

REPORT

U.S. Future Options for Nuclear Deterrence and Arms Control

Report on the Pilot Workshop and Introduction to the Project

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Executive Summary

Context

The size of China's nuclear arsenal is increasing, though its pace and objectives remain poorly understood, raising fundamental questions about U.S. deterrence and an arms-control system designed for a different era. Experts disagree sharply on the response — some call for renewed nuclear dominance, others for restraint and eventual disarmament — and no consensus has formed. That's not because the questions are unanswerable. It's because much of the disagreement rests on assumptions experts hold but rarely state out loud.

Deterrence and arms control are usually treated as separate issues. They aren't. An arms control agreement is only as sound as the deterrence logic behind it — so progress on one requires clarity on the other. Simultaneously, the stakes are rising: friction in Asia and Europe, the rollout of Golden Dome, and the expiration of New START all raise the cost of the US policy community's continued ambiguity about its own position. Ambiguity comes at a cost. Adversaries may read it as an opening; allies, as unreliability.

This report draws on a pilot project run October–November 2025 by the Center on Conflict, Development and Peacebuilding (Geneva Graduate Institute) with support from the Institute on Global Conflict and Cooperation (IGCC), the Rockefeller Brothers Fund and the Ploughshares. Its centerpiece was a one-day workshop held November 17, 2025 in Washington, DC. Roughly twenty experts convened under the Chatham House Rule around three commissioned papers — on crisis scenarios, build-up options, and arms control — to work through these assumptions directly rather than past one another. A second phase, run jointly with MIT's Center for Nuclear Security Policy, follows in 2026–2027. See Section 1.5 for the full workshop structure and Section 1.2 for the wider landscape of expert opinion this project sits within. The findings below are organized around four main messages, which the editors hope will help inform the ongoing debates.

Four Messages:

1. Disagreement within the policy community is more about assumptions than facts

In February 2026, the U.S. marked the expiration of New START by reserving the right to expand its own arsenal. But the question of what happens next in U.S. nuclear policy requires answers to questions the U.S. hasn't settled yet. Experts split into camps: some favor renewed nuclear supremacy, others a calculated build-up meant to force China and Russia into talks, others a doctrine shift, and others outright restraint (see Section 1.1). These camps have mostly argued past each other rather than being tested against one another directly. This project's core is to convene people from across these camps into direct dialogue instead of another round of position papers, on the premise that disagreement gets more tractable once the assumptions behind it — on timing, adversary reaction, risk tolerance, and what counts as success — are actually named rather than left implicit.

2. There are Four build-up paths for the US, each with a distinct risk profile

Combining different time horizons and approaches, the pilot project produced four options for U.S. nuclear expansion, each carrying a different risk profile across political, program, strategic, and competition dimensions. Rapid Rise/Lightening Lock (quick and comprehensive/selective) are judged the most alarming options to both China and Russia, and the most likely to prompt adversaries to suddenly reveal reserve capabilities they've possibly kept hidden. Measured Edge (slow and selective) is judged the least alarming. Steady Rise (slow and comprehensive) is judged likely to push more Russian-Chinese coordination against the US. Two further findings cut across all four: missile defense is missing from this typology despite directly affecting how much offense is needed, and while fully separate postures for China and Russia are likely impractical, tailoring how deterrence is signaled to each adversary separately remains possible.

3. Arms control with China needs a different model than the one used with Russia

Decades of U.S.-Russia arms control rested on rough parity and mutual restraint. That premise doesn't transfer cleanly to China, which is at an earlier and different stage of nuclear development — nor does it easily solve the U.S. problem of deterring Russia and China at once. Near-term, achievable steps include risk-reduction measures with China (hotlines, launch notifications, incidents-at-sea agreements) and possibly a conditional "escalation clause" in a New START successor with Russia, letting both sides expand if China's arsenal crosses an agreed threshold. Longer-term, the 1922 Washington Naval Treaty offers a possible template: it capped naval forces at different levels for different countries, which could inform a trilateral cap allowing asymmetric limits for the U.S., Russia, and China. Notably, the process of engagement has value on its own — even without a signed agreement.

4. What is the US protecting, and how?

Underneath every option in this report sit two open questions the United States has not answered for itself. First: is nuclear posture protecting the homeland alone, or the wider alliance system that depends on U.S. guarantees abroad? Second: are Russia and China a fixed, coordinated bloc to plan around, or a pair of interconnected bilateral relationships, each to be managed with diplomacy and careful signaling? Neither question has one right answer, and the report doesn't supply one — different honest answers lead to different postures, and more than one can be defensible. What it offers instead is a way to analyze the assumptions behind any given position, and therefore to assess where one position begins to diverge from another. That's often more useful than one more argument for the "right" answer: it turns disagreement into something that can be located, understood, and discussed, rather than just repeated.

Chapter 1:

Reflections on the Pilot Workshop and Introduction to the Project

Abdulla Ibrahim

1.1 The Challenge

China's rapid and still-opaque nuclear buildup has reopened fundamental questions about U.S. deterrence requirements and about an arms control architecture built for a different era. The expert community has engaged these questions actively, producing responses ranging from calls for renewed nuclear supremacy to arguments for restraint and eventual disarmament (see Section 1.2). No strategic consensus has emerged. This is not because the underlying questions are unresolvable, rather because much of the disagreement is never argued out directly: it rests on assumptions that experts hold but rarely state, so debate proceeds at cross purposes rather than toward resolution. That points to the need for a structured dialogue that surfaces those assumptions and produces a comparative set of options with explicit risks and strategic utility. In this sense, what's needed is less another study arguing for "the right answer" than an analytical framework that lets participants in these debates work through deterrence and arms control logics for themselves — systematically and defensibly — whatever their conclusions.

Arms control and deterrence are two faces of one problem: an arms control framework is only as sound as the deterrence logic beneath it, and progress on one is unlikely without clarity on the other. Under Secretary of State Thomas G. DiNanno illustrated both faces in his February 6, 2026, address to the Conference on Disarmament in Geneva, which formally announced the end of New START. First, consistent with the U.S. National Defense Strategy, he said the United States retains the option to adapt its nuclear posture "to address the emerging security environment, if directed by the President" — including by expanding current forces, diversifying capabilities, developing new theater-range nuclear forces, and adapting extended deterrence as necessary.

He then set out a parallel goal: to "prevent an unmitigated nuclear arms race, limit the build-up of nuclear arms, restore responsible behavior when it comes to nuclear testing, and, as appropriate, address issues concerning non-NPT nuclear weapons possessing states." Both commitments are meant to be taken seriously. But the United States has not resolved even its own internal deterrence requirements across near- and longer-term horizons, leaving both halves of the statement without a practical foundation. Closing that gap — not choosing between the two commitments but giving policymakers a structured way to reason through both — is the task ahead.

This lack of clarity carries practical consequences. Amid active friction in both the Asian and European theaters, the rollout of the Golden Dome missile defense initiative, and that vacuum resulting from the expiry of the New START, the United States has struggled to articulate a coherent nuclear policy, let alone communicate one credibly to allies and adversaries. This resulting ambiguity may itself be destabilizing: adversaries may read it as opportunity, and allies

as unreliability, at precisely the moment when clarity would most stabilize expectations on all sides.

More broadly, this is a problem of superpower competition, and the nuclear dimension cannot be managed apart from its economic, technological, and other dimensions.¹ China's economic and technological rise is not itself new; the United States and its allies have been adjusting to it for a generation. What is new is the nuclear dimension of that rise, and it does not supersede the others — it compounds them. Non-military instruments — *e.g.*, alliance cohesion, conventional capability, economic statecraft — remain central to managing the competition as a whole, and so to containing the risks that are distinctly nuclear. A posture decision made as though the nuclear problem stood apart from these instruments is unlikely to deliver the stability it intends.

With these rivalry dynamics in mind, this project focuses on the nuclear deterrence dimension and is designed, in part, to close specific gaps — between President Trump's rhetorical emphasis on "denuclearization" and his simultaneous focus on "peace through strength"; the traditional prioritization of deterrence among Republican-aligned nuclear experts; the coalescence of many bipartisan U.S. strategic policy experts around the need to augment Western nuclear capabilities in some way, though without clarity on how; and the continuing desire for arms limitations within the arms control community. These positions have so far largely argued past one another rather than being reconciled through direct engagement.

The project poses the question: how do the tools of augmented capabilities and negotiated limitations work in concert to address the challenges the US face? As an initial attempt to answer it, the project convenes sub-groups of U.S. epistemic and policy communities, on the premise that these disagreements are more likely to be clarified through such engagement than through further parallel position-taking.

This report presents the results of a pilot project conducted between October and November 2025 by the Center on Conflict, Development and Peacebuilding (CCDP) at the Geneva Graduate Institute with support from the Institute on Global Conflict and Cooperation (IGCC) at the University of California, and funding from the Rockefeller Brothers Fund (RBF) and the Ploughshares. Its centerpiece was a one-day workshop held on November 17, 2025, in Washington, DC, bringing together roughly twenty experts and former officials under the Chatham House Rule.

Two background papers were discussed at that meeting — one by Pranay Vaddi and Robert Peters, the other by Austin Long, Michael Albertson, Thomas G. Mahnken, and Evan B. Montgomery — and a third, by Christopher Ford, was commissioned afterward to round out the analysis. Participant comments and reflections have since been incorporated into each paper. This overview summarizes the project's concept, situates it within the decision framework developed in Section 1.4, and previews the three papers summarized in Section 1.3; together they make up the complete report. The project's next phase will be carried out jointly with MIT's Center for Nuclear Security Policy in 2026–2027. The aim throughout is to share these deliberations with the wider expert and policy community, invite engagement, and encourage similar exercises elsewhere, organized around the same or other relevant questions.

¹ For example, alliance networks vs. territorial expansion, or broad geopolitical issues related to rules-based-order questions.

1.2 Context of the Discussion: Schools of Thought, Assumptions, and Contribution

Four Schools of Thought

It is worth situating this project within the wider landscape of expert opinion. A survey of the field identifies four broad schools of thought on how the United States should respond to China's nuclear buildup, each resting on different assumptions about cost, industrial capacity, adversary reactions, and the role of allies.

One school argues that the United States should maintain outright nuclear supremacy over Russia and China combined, on the theory that demonstrable superiority most reliably deters adversaries and reassures allies; its principal obstacles are the absence of durable domestic political consensus, the risk of provoking the very arms race it seeks to forestall, and the sheer cost and programmatic difficulty of building and maintaining an arsenal of that size even if the United States could preserve such advantages in the face of new Russian and Chinese construction.

A second school favors a more limited, deliberate build-up explicitly designed to bring China and Russia to the negotiating table — an “arms race to achieve arms control” logic drawn from the INF Treaty precedent — though critics note that adversaries might just as easily respond by accelerating their own programs rather than negotiating, especially if they perceive that the United States lacks the infrastructure capacity to compete effectively in an arms race.

A third school is more skeptical that any numerical approach can resolve a three-way dynamic, and instead proposes a doctrinal shift: moving U.S. targeting away from adversary nuclear forces and command-and-control (*i.e.*, counterforce targeting) and more toward conventional military and industrial targets or perhaps even population centers (*i.e.*, countervalue targeting), thereby obviating the need for a large nuclear force and freeing resources for conventional capabilities — at the cost of needing to convince both allies and adversaries that extended deterrence remains credible under the revised doctrine.

A fourth school simply advocates disarmament, on the grounds that both nuclear war and arms races are unwinnable and that diplomacy and advanced conventional forces can and should substitute for expanded arsenals; its obstacles lie chiefly in ensuring verification, the problem of obtaining reciprocity in light of the apparent complete disinterest of other nuclear possessors in taking such a step, the problem of how to deter conventional aggression in areas (*e.g.*, Eastern Europe and the Western Pacific) where a U.S. strategic adversary may enjoy a local preponderance of forces, and the mismatch between the urgency of the China and Russia challenges and the long timelines disarmament requires.

All these schools of thought rest on similar or divergent assumptions about costs, risks, and desired outcomes, which are worth making explicit and subjecting to open scrutiny and debate, though hitherto they seldom have been. This project aims to draw out such logics explicitly, but deliberately focuses primarily on the first two schools, without thereby disregarding the latter two.

Assumptions and Biases, and Their Consequences

Any effort to think systematically about future nuclear force posture rests on assumptions that are rarely made explicit — and that, left unexamined, are vulnerable to a familiar set of

analytical pitfalls. Such unexamined divergence does more than generate disagreement: it can produce specific, avoidable policy failures.

On the assumptions side, four questions recur throughout the chapters that follow, and getting them wrong carries a distinct cost. Timing — that is, when might China achieve rough parity and whether efforts to negotiate strategic stability could be made notwithstanding that build-up or would only be available, if at all, after Beijing’s achievement of parity — determines whether investments are made prematurely, being sunk into a threat that has not yet materialized, or come too late, forcing the United States to play catch-up under worse terms. Reactions — how China, Russia, and U.S. allies and partners would respond to different U.S. build-up choices — determines whether a given posture stabilizes or instead triggers the escalation it was meant to forestall. Risk — the strategic, financial, and operational hazards of each path — determines whether costs are absorbed deliberately or discovered after the fact. And mitigation — which policies can reduce those risks without forfeiting their benefits — determines whether risk is managed or merely tolerated by default.

On the pitfalls side, five recurring biases carry equally concrete consequences. Linear projection assumes current trends in adversary capability trendlines or intent will continue unchanged and can lead planners to either under-build against a threat that accelerates or over-build against one that plateaus. The search for the “silver-bullet” of a crisp, one-size-fits-all answer risks concentrating resources in a single program while the underlying multidimensional problem persists untouched. Stability bias treats the already-eroding strategic equilibrium as a natural baseline, leaving planners unprepared for the range of futures that may be in play. Mirror imaging projects U.S. assumptions about rationality and risk tolerance onto adversaries who may not share them, producing misread signals and miscalculated responses. And overconfidence — in intelligence, in the predictability and/or manageability of escalation, or in the durability of alliance commitments or treaty instruments — may lead planners to discount genuine uncertainty until it resolves the hard way. Surfacing these assumptions and biases will not resolve the underlying debates, but it is a necessary precondition for having them productively rather than at cross purposes.

The Project’s Contribution

The project’s contribution lies less in providing any single conclusion than in the intellectual discipline and conceptual clarity provided by the process itself, as it is organized around five aims. First, it clarifies the four assumptions described above — timing, adversary and allied behavior, risk, and mitigation — so that disagreements could be traced to their actual source rather than argued past one another. Second, it generates a typology of plausible build-up options, moving the discussion beyond a binary choice between “more” and “less” and toward a structured comparison of distinct paths. Third, it works through how allies and adversaries would likely respond to each type in that typology, since posture choices that look attractive in isolation can look very different once reactions are considered. Fourth, it identifies a risk profile for each type, together with options for managing those risks, rather than treating risk as an afterthought to capability planning. Fifth, it produces the beginnings of a decision framework for policymakers and the expert community that brings greater clarity to the underlying challenges and greater transparency about the assumptions on which any given choice depends, elaborated in Section 1.4 below.

1.3 Summary of the Pilot Discussions and Papers

Scenarios: Facts and Assumptions in a Two-Theater Confrontation

The November workshop's first session addressed scenarios, co-authored by Pranay Vaddi and Robert Peters (Chapter 2). Its purpose was to establish a common, explicit set of facts and assumptions about a simultaneous Asia-Europe confrontation, against which later posture and arms control choices can be assessed on shared terms. It developed two scenarios across two-time horizons: the medium term (2025–2035) and the longer term (2035–2045). Both assumed that China and the United States would treat Taiwan as a vital interest each is prepared to fight for, and that Russia would continue to seek expanded influence in Europe even at the risk of confrontation with NATO. Allied material contributions and political cohesion are treated as variables, not constants: allies are expected to contribute, but how much and how cohesively remains uncertain.

In Scenario 1, China imposes a maritime blockade on Taiwan as a prelude to eventual reunification while Russia conducts grey-zone operations to destabilize Europe, concentrated in and around the Baltic Sea. The principal U.S. deterrence gap is the lack of a full spectrum of nuclear capabilities to signal resolve and manage escalation across two simultaneous peer contingencies, and it operates at three levels. At the theater level the problem is scarcity: options outside Europe are limited to a few SLCM-Ns, and the submarines and dual-capable aircraft that carry theater weapons would be committed to conventional operations in a crisis. The United States still holds a theater asymmetry, since China has not yet fielded theater nuclear options, but the shortfall matters most in Asia, where China's conventional advantage is greatest and allies are more likely to act if U.S. theater forces are credible. At the strategic level the problem is insufficiency: absent investment, U.S. forces cannot confidently hold at risk the full range of adversary targets, and doubts about sufficiency invite conventional escalation, though U.S. strategic forces themselves remain secure. At the level of combined peer pressure the problem is simultaneity: China and Russia present distinct challenges that could arise at once, compounding mainly because assets committed against one cannot readily be repositioned against the other — a problem of capacity.

In Scenario 2, China attempts an outright invasion of Taiwan against the backdrop of a stronger Russia maintaining sustained pressure on Europe, particularly the Baltics. The deterrence gap is qualitatively different at each level, not simply larger. At the theater level it shifts from scarcity to lost asymmetry: U.S. options remain thin and the platform trade-off is sharper under an invasion than a blockade, but China now fields mature theater nuclear options of its own, so the United States must deter a Chinese theater capability with a force that was thin even when unopposed. At the strategic level it shifts from insufficiency to vulnerability: China is at rough parity and, depending on its choices on alert status, prompt systems, ISR and enablers, may hold counterforce capability against U.S. forces, so U.S. strategic assets are themselves at risk. At the level of combined peer pressure it shifts from simultaneity towards potential alignment: Chinese-Russian cooperation on technology, energy and exercises stops short of formal coordination, but could raise the likelihood of opportunistic action by one adversary while the other has Washington's attention — a problem of linkage as well as capacity, which force

structure alone may not resolve. The result is a structural deterrence gap rather than a quantitative shortfall.

Across both scenarios, the questions put to workshop participants centered on: the credibility of nuclear signaling as an escalation-management tool given the conventional balance in each theater; the material and political contributions allies would need to make, and the assurance measures the United States would need to provide in return; and the extended-deterrence requirements for European allies during a period of intense U.S. military engagement in Asia.

Discussion of the scenarios produced the following policy takeaways, organized around three themes: the framing of the scenarios themselves; nuclear utility and the conventional-nuclear balance; and alliance credibility, assurance, and signaling.

Scenario framing

- *The scenarios' assumption of symmetric U.S.-China stakes obscures the core U.S. interest at stake.* What is at risk is U.S. primacy in the western Pacific and the durability of the broader alliance structure, not Taiwan's fate as such. The stakes are not symmetric to begin with: a Taiwan loss plausibly carries existential weight for CCP regime legitimacy, while for the United States the cost would fall on a given administration's political standing and the credibility of the alliance system rather than the US government's survival. The scenarios should not assume that the United States would match Chinese resolve intensity-for-intensity, or that the two sides' commitments to the Taiwan scenario are similar in nature.
- *The invasion-centric framing understates two distinct problems: sub-invasion coercion and the intermediate case of a stalled invasion.* Treating invasion as a binary of success or failure omits the scenario most likely to raise nuclear-use questions — a PLA beachhead bogged down in protracted resistance while China struggles to sustain logistics across the Strait.
- *The "worst of the worst" framing in the scenarios leaves the actual severity of Russian and North Korean action undefined.* The scenarios posit that China gains Russian/North Korean assistance while U.S. allies do not help — a genuine worst case — but never specify where Russian or DPRK behavior lands between escalated grey-zone activity and outright war (e.g., a Baltic invasion or WMD use against South Korea/Japan). This ambiguity matters directly for force-posture requirements, and it flags the risk that planners might reasonably discount a scenario this demanding if it is unclear how likely it is.
- *The tension between "core" (homeland) and "extended" (theater) deterrence is a load-bearing concept the scenarios rely on without stating.* Strategic-level mutual vulnerability undermines the credibility of extended deterrence (the Cold War "trade New York for Hamburg" problem), which pushes toward prioritizing theater-level capability. Whether that same credibility — a more "usable" theater force — also raises the odds of actual nuclear use in a regional conflict is an open question this project will address in subsequent workshops.

Nuclear utility and the conventional-nuclear balance

- *Nuclear use requires a credible "theory of victory," which the scenarios do not supply.* A U.S. nuclear strike inviting Chinese retaliation would not obviously improve the U.S. position, and tactical nuclear weapons might add little beyond existing conventional capability.
- *Where conventional capacity falls short, the remedy might be to strengthen it or narrow U.S. commitments, not automatically lower the nuclear threshold.* Submarines, magazine depth, long-range strike, and strategic enablers are all priority fixes. The reverse risk also holds: unremedied conventional shortfalls could push toward nuclear use to offset conventional inferiority.
- *Perceived nuclear parity combined with local conventional superiority invites the very crisis it assumes away.* An adversary who perceives strategic nuclear parity — while enjoying local conventional superiority — might attack a U.S. ally on the bet that Washington would not intervene for fear of mutual assured destruction. If that bet is wrong, the result is precisely the U.S. nuclear response the adversary had gambled against. The dynamic is self-reinforcing: the adversary's confidence that Washington will not respond can only be tested by acting on it, so the belief itself invites the crisis that proves it false. The only way to find out who is right is to run the experiment with an actual invasion and an actual nuclear decision.
- *A stalled invasion, not a clean one, is the outcome most likely to tempt Chinese nuclear first-use* — which calls for escalation-management capability, not deterrence capability alone. If Beijing judges that limited strikes could break Taiwanese resistance or defeat intervening U.S. forces, an intermediate outcome is where the nuclear question becomes live. This shapes what the United States needs to be able to do once deterrence has failed, not only what it needs to prevent the attempt.

Alliance credibility, assurance, and signaling

- *The core U.S. interest is the alliance system, and allied contributions should be calibrated accordingly.* Because the stakes are asymmetric between Washington and Beijing, and because allied responses vary with how directly their own interests are engaged, the asymmetry should shape how allied contributions and expectations are set rather than being assumed away.
- *Assurance requires both declaratory clarity and material capability; neither alone is sufficient.* Ambiguous statements and unclear commitments undermine credibility as much as capability gaps do, which raises the harder question of how much capability is enough for a given ally. Insufficient assurance carries proliferation risk: allies uncertain of U.S. backing may reconsider their own nuclear options.
- *Allied burden-sharing must increase to correct longstanding imbalances.* Greater allied conventional investment would relieve pressure on U.S. requirements. This is especially

urgent in the Pacific theater, where allied contributions have received comparatively little attention.

- *Coordinated Russian-Chinese aggression poses materially different assurance and signaling challenges than parallel, independent action by the two.* Burden-sharing and assurance planning should account for this distinction rather than treat the two adversaries as a single, undifferentiated threat. In the near term, Asia and Europe should be treated as loosely coupled: Russian hybrid activity is not existential, and Europe should be expected to manage it largely on its own.

Build-Up Options

Chapter 3, co-authored by Austin Long, Michael Albertson, Thomas Mahnken, and Evan Montgomery, turns from facts and assumptions to options, developing a typology of possible U.S. nuclear build-up paths by crossing two temporal horizons — near-term (three to five years) and long-term (five to fifteen years) — with two strategic approaches — comprehensive and selective. The resulting 2×2 matrix is deliberately meant to structure discussion rather than constrain it: it clarifies the trade-offs any build-up decision entails, helps communicate those trade-offs to domestic and allied audiences, and makes the underlying assumptions and risk profiles explicit rather than implicit. Because the four types are not mutually exclusive, the framework also allows for hybrid strategies — for instance, a measured, incremental approach to some capabilities combined with a faster, narrower push on others.

Table 1.1: Build-up types

Build-Up Types	Comprehensive	Selective
Short Term (3–5 years)	Rapid Rise	Lightning Lock
Long Term (5–15 years)	Steady Rise	Measured Edge

The four resulting options are *Rapid Rise*, a fast, wide-scale expansion across most systems within three to five years; *Lightning Lock*, a similarly fast but narrowly targeted build-up concentrated on a small set of high-priority systems; *Steady Rise*, a broad, comprehensive expansion phased over five to fifteen years; and *Measured Edge*, a long-term but selective investment in a limited suite of high-value capabilities. Each entails a distinct balance of cost, industrial feasibility, and risk. The two short-term options depend most heavily on political consensus at home and among allies and are most exposed to program risk from an industrial base already operating near capacity; the two long-term options spread cost and political risk over time but carry greater exposure to strategic risk if the pace of build-up fails to keep ahead of the pace of adversary modernization.

Chapter 3 also develops a shared vocabulary for evaluating these choices across four recurring risk categories: *political risk*, the degree of domestic and allied consensus needed to sustain a given path; *program risk*, the possibility that acquisition programs are delayed or fail to meet expectations; *strategic risk*, the danger that declared strategy and actual capability drift apart; and

competition risk, the possibility that U.S. investments provoke offsetting adversary responses that nullify their intended benefit. Read together, the typology and the risk framework are intended to give decision-makers a common language for weighing options that are too often debated past one another.

The workshop addressed this material across two sessions: the second introduced the build-up options, and the fourth turned to their associated risks.

What Can Be Done Quickly, at What Cost, and at What Risk

- *Inaction and misread signals are risks, not neutral defaults.* Participants stressed that choosing not to act is still a choice with consequences: a mismatch between core and extended deterrence, introduced above, or a signal that is misread by an adversary, generates risk regardless of which build-up path — or non-path — is chosen. These risks exist independent of the four-option typology and should not be treated as absent simply because no new program has been launched.
- *The four build-up options carry different risk profiles, and the most conservative path favors existing, affordable platforms over new development.* Rapid Rise and Lightning Lock, as short-term options, carry the greatest political risk, since both require rapid, significant, and sustained domestic and allied consensus on short notice. Steady Rise trades that political exposure for greater programmatic risk, given its longer timeline and broader scope. The least risky path overall, in this view, favors capitalizing on already-fielded, affordable platforms rather than developing new large ICBMs, paired with unilateral measures to reduce external — industrial or alliance — dependencies.
- *Not all forms of risk are equally predictable, and that asymmetry should temper confidence in any near-term plan.* Participants judged political and program risk comparatively tractable: domestic experts community understanding on the need to act already exists, and many program delays can in principle be resolved with sufficient resourcing. The need to build and maintain consensus on such resourcing, of course — especially if it is very large — is yet another challenge and important variable to consider. Strategic and competition risk were judged inherently messier and harder to predict — described by one participant as a “Pandora’s box” that cannot easily be closed once opened by adversary reactions. Given that irreducible uncertainty, several participants argued that a sustained, roughly decade-long stabilization dialogue with China and Russia is a more realistic goal than trying to resolve these risks upfront through force posture alone.
- *The opportunity cost of avoiding one type of risk may be taking another.* While Rapid Rise and Lightning Lock options might entail considerable escalation risks, they would in principle also permit potentially dangerous deterrence gaps to be addressed more quickly than slower-paced responses. Drawing out such tensions and implicit choices and making their logics explicit - so that policymakers can evaluate and make decisions with their eyes fully open - is a key purpose of this project.

- *A cheaper, simpler class of warhead designs - optimized for "producibility" rather than performance - could stretch a constrained budget further and potentially speed up acquisition as well.* Separately, the participants questioned whether current Stockpile Stewardship policy deserves scrutiny: whether to keep maintaining existing warheads indefinitely without explosive testing or shift toward periodically remanufacturing them instead.

Build-Up Options and Escalation Management

- *Damage limitation becomes far harder to achieve once two peer nuclear powers exist, not just one.* Experts distinguished between Three tiers of nuclear “need” — deterrence (through threat of assured destruction), escalation management, and damage limitation — each requiring a larger force than the last, roughly N , $N+X$, and $N+X+Z$. Damage limitation scales with the number of adversary targets, so it degrades badly under two-peer conditions, especially if China and Russia act opportunistically or in coordination. Re-MIRVing is flagged as one partial response, though it is perhaps not a long-term answer in the absence of a robust nuclear production infrastructure.
- *Missile defense is a missing variable in the build-up typology, despite directly affecting how much offense is needed.* Confidence in U.S. theater and homeland missile defense would change how much nuclear capability is required at each level, since more effective defense improves survivability and so may reduce nuclear requirements. But this cuts both ways: assessing missile defense also means gauging how quickly adversary forces could expand to overwhelm new defenses, and how much adversary defenses, in turn, might degrade the U.S. ability to hold their targets at risk. This is an important gap in the evaluation framework, to be addressed in future workshops.
- *Some participants judged peer-specific tailoring — distinct force postures for China versus Russia — unlikely to be achievable as a practical matter.* Budget and program constraints will likely force a single posture that must be adequate or “good enough” against both adversaries rather than two postures, each tailored to a specific threat. Real tailoring is more likely to happen through doctrine and declaratory policy than through distinct weapons systems.
- *A deliberate hedge — spare industrial capacity and/or deployable warhead reserves beyond what any chosen build-up path requires — should be maintained regardless of which option is picked.* This capacity acts as insurance against underestimating future threats, and visible spare capacity may itself give adversaries more incentive to pursue arms control.

Trade-offs and Bargaining Space

- *High-end or exotic systems can serve as bargaining chips, but only under narrow conditions rarely met in practice.* Participants pointed to liquid-fueled (and hence potentially high payload) ICBMs and other exotic or space-based systems as the leading candidates for this role but cautioned that a bargaining chip only functions as one if the adversary dislikes it enough to pay a genuine price for its removal and that price is one that nets the United States more benefit than having the exotic capability in the first place. Convincing an adversary that an offer to trade away such a system is sincere, moreover — rather than a permanent build-up dressed up as a concession — can itself be a difficult signaling problem, further complicated by the fact that adversary risk tolerance is not fixed but shifts as the environment changes.
- *Any build-up decision needs to answer, explicitly, what the United States is trying to achieve relative to China — and this remains unresolved.* Participants noted that sustaining extended deterrence without triggering a counterproductive reaction requires first knowing what the goal is. Options span a spectrum: building leverage that motivates China toward dialogue; maintaining enough capacity to improve escalation-management alternatives and help deter a PLA conventional attack on a Pacific friend or ally; or sustaining outright dominance or parity for its own sake. Each implies different force choices and different signaling. They also distinguished forward-deployed systems, which carry their own signaling and risk-reduction profile, from changes to core U.S. strategic forces, cautioning against treating the two as interchangeable in this calculus.
- *Nuclear posture cannot be judged in isolation from the broader defense strategy.* Conventional forces, space assets, and emerging technologies all generate risks, not nuclear force levels alone, so trade-offs assessed within the nuclear domain only will understate the true risk picture — as well, potentially, as the assets and capabilities that could potentially be employed in mitigating risks.

Allied Contribution to Risk Management

- *Whether allies will credit U.S. assurances — and how to prevent them from being coerced in the meantime — is a central, unresolved question.* Participants questioned whether allies would believe U.S. assurances given China's ongoing actions and stressed that addressing allied assurance needs is inseparable from preventing those allies from being coerced while U.S. posture catches up. This also implies that the United States might need to adopt "riskier" behavioral choices, in the short term, to help handle this "reassurance and deterrence gap" in the temporary absence of an adequate force posture. They linked this to the need for a foundation of high-level engagement that begins by openly acknowledging that nuclear risks do exist, rather than treating assurance as a matter of capability alone.
- *Risk reduction should be understood broadly, covering crisis dynamics and domains well beyond warhead counts.* Participants pointed to the danger of "shoot first, shoot fast" pressures on allies, and stressed the value of early-stage risk management, before a crisis

has the chance to escalate. They cautioned that small numerical changes in force levels can carry disproportionate strategic effect, and that risk reduction should extend to space and cyber measures aimed at lengthening decision and response time, alongside recognition that adversaries and the United States may hold different levels of risk tolerance. Individual leaders may also have differing risk tolerances, and planners should be aware that force posture choices will "feel" somewhat different to whomever is in charge later no matter what logics underlie the force posture choices made today. It is far from clear how to build this possibility into planning, but it is a variable that must at least be considered.

- *Allies are not passive recipients of U.S. posture choices; their own force decisions matter directly to non-proliferation and risk management.* Participants called for closer coordination with allies on how they weigh the consequences of the strategic forces they themselves develop, such as in distinguishing between pushing allies toward more survivable systems versus more vulnerable ones, or perhaps toward ones focused more upon last-ditch “strategic” utility versus ones more “usable” in escalation management. Alliance management and soft power were treated as risk-mitigation tools, and participants noted that the costs and risks of any U.S. build-up fall partly on allies rather than resting solely with Washington.

Adversary Reactions to the Build-Up Options

- *Rapid Rise (quick and comprehensive) is judged likely to be the most alarming option to both China and Russia; and the one most likely to prompt adversaries to unveil reserve capabilities without warning.* China already views the United States as dominance-seeking. Participants traced this perception at least to 2018 and to U.S. low-yield nuclear developments. A public U.S. debate over rapidly expanding capabilities would therefore be read in Beijing as confirmation of that intent, not as a discrete new threat. Russia is expected to respond in kind and quickly, restoring parity through its own conversion efforts and regional deployments, and could amplify negative reactions among U.S. allies in the process. Because this option moves fastest, it is also the scenario most likely to draw on the undeployed “reserve” technology (e.g., exotic systems rooted in Cold War-era research) that both adversaries are believed to hold – or perhaps, simply on warhead and delivery system production capacity in excess of that possessed by the United States – fielded quickly enough to offset the build-up before it takes effect.
- *Lightning Lock (quick and selective) creates uncertainty that depends on the choice: a quantitative focus is comparatively predictable for adversaries to track, while a qualitative one keeps them guessing.* Either way, its effects may reach beyond China and Russia themselves. Concentrating on a small set of high-priority upgrades rather than broad numerical growth makes it harder for adversaries to timely respond, particularly where it touches second-strike survivability — keeping them guessing in ways that could push behavior toward either greater caution or greater risk-taking. Participants noted that this uncertainty is not confined to Beijing and Moscow: allied nuclear planning in the UK and France, and the risk that China or Russia might assist North Korean nuclear or

missile development in response, are separate, additional channels through which a qualitative shift could reverberate.

- *Steady Rise (slow and comprehensive) ranks as the second most alarming option to U.S. adversaries, largely because of what a sustained build-up would likely be felt to signal about long-term U.S. intent.* A sustained, multi-year build-up would be read in Beijing as revealing the kind of strategic order Washington wants, rather than a one-off reaction to a specific crisis, and risks pushing China and Russia toward closer cooperation, including a convergence of views on missile defense specifically. Because this option unfolds over years, participants stressed that the scenarios' European premises need sharper definition to assess it properly — *e.g.*, where the line between “grey zone” activity and kinetic conflict actually sits, and whether Russia might increase pressure on NATO precisely while the U.S. is engaged in Asia, potentially creating first-strike pressure of its own.
- *Measured Edge (slow and selective) is judged least threatening to U.S. adversaries.* Its incremental character leaves room for sustained, high-level dialogue that could help adversaries understand the rationale behind the build-up and calibrate their reactions accordingly, rather than responding reflexively as they might to a faster option. But dominance and parity would be read very differently in Beijing and Moscow and imply different build-up logics entirely — and participants cautioned generally against assuming any adversary's reaction is a fully predictable function of U.S. choices, since Chinese and Russian planning may follow its own trajectory and U.S. inaction sends signals of its own.

A Framework for Arms Control

The fourth session turned from the build-up options themselves to the risk-reduction and arms control measures that might manage risk in the interim — an interim that, absent a working framework with either adversary, could last years. Participants stressed that the form arms control eventually takes matters as much as its timing, since measures adopted now shape what remains negotiable later.

Two points from this discussion go beyond the risk-management themes already covered above. First, several participants argued that the risk-reduction measures discussed earlier all depend on a prior, more basic step: openly acknowledging, at a high political level, that nuclear risks exist at all. An honest domestic and allied debate on the role of nuclear weapons was described as the precondition for everything else, particularly since risk tolerance is not fixed but shifts as the environment changes. So also does threat perception shift with the personal and political cast of characters. Second, participants cautioned that risk-aversion itself can be turned against the United States — an adversary that recognizes Washington's reluctance to escalate may exploit that hesitancy rather than reciprocate it, a dynamic any arms control or risk-reduction strategy needs to anticipate rather than assume away.

Chapter 4, contributed by Christopher Ford, takes up this same question of form and timing at greater length, asking what the decades-long U.S.-Russia arms control legacy can offer as a starting point for a genuinely trilateral strategic environment. That legacy was built on a premise — rough parity between two powers with sufficient shared interest to sustain mutual restraint —

that does not transfer cleanly to a China operating from a different stage of nuclear development, different doctrinal assumptions, and a historical reluctance to engage in nuclear arms limitation talks at all. Extending the bilateral model to a third power is therefore a matter of genuine conceptual adaptation, not simple extension.

Even so, several elements of the bilateral legacy appear transferable. Early-generation risk-reduction measures — communication hotlines, launch notification protocols, incidents-at-sea agreements, and data-exchange arrangements, along with analogues extending to newer conflict domains such as space and cyber — offer a calibrated model for initiating U.S.-China engagement at a level of ambition China's current political posture might actually accept, since such measures do not necessarily require Beijing to accept caps on an arsenal it may still wish to grow. For a U.S.-Russia successor to New START, one option worth examining is a conditional or "escalation clause," under which the two parties would cap their own arsenals but reserve the right to expand proportionally if a third power's capabilities approach some agreed ceiling — a mechanism designed to preserve bilateral stability while creating a lawful, calibrated response to Chinese growth rather than an unconstrained race.

At the trilateral level, the chapter distinguishes formal capability limits from more modest, near-term alternatives. The Washington Naval Treaty of 1922 offers a historical template for asymmetric treaty design — one that assigned different powers different tonnage ratios reflecting genuine differences in strategic position, embedded within a broader diplomatic settlement — and suggests that a comparable arrangement, with China accepting a cap below current U.S. and Russian levels in exchange for regional posture commitments from Washington and Moscow, is conceivable in principle even if politically demanding in practice. A more immediately achievable step would be a modular transparency and confidence-building framework that states could join incrementally and expand over time, building the habits of engagement that any deeper agreement would eventually require. In both cases, the chapter's central caution is that the process of arms control engagement carries value independent of whether it produces a signed agreement — and that this process value should not be dismissed simply because a comprehensive trilateral treaty remains, for now, out of reach.

1.4 A Decision Framework Linking Deterrence and Arms Control

This section turns the report's central argument—that deterrence and arms control are two faces of the same problem, rather than separable tracks (Section 1.1)—into a practical decision tool. Distilled from the workshop discussions summarized in Section 1.3, a 2×2 matrix translates that argument into four distinct strategic options.

The matrix asks what U.S. nuclear posture is fundamentally for: homeland or extended deterrence, and whether adversary coordination is contingent or inevitable. The second asks, given that posture, what level of resources is available and what risk environment surrounds competition with Russia and China. Its four cells correspond to Chapter 3's four build-up options—Steady Rise, Rapid Rise, Measured Edge, and Lightning Lock—restated as a function of resources and risk. Read together, the two matrices show that a single strategic logic runs through the report's discussions of deterrence (Section 1.1), force posture (Chapter 3), and arms control (Chapter 4).

The matrix systematizes thinking about what U.S. nuclear posture is intended to accomplish: whether nuclear weapons exist to protect the alliance system or primarily the homeland, and whether China and Russia are treated as a fixed, coordinated bloc or as a relationship the United States can still shape. Because both axes represent durable strategic assumptions rather than near-term conditions, the matrix is less about predicting what will happen next year than about forcing clarity over what the United States is trying to achieve—precisely the kind of unstated assumption that Section 1.2 identifies as a source of expert disagreement.

It also reinforces the point made in Section 1.1: nuclear posture cannot be separated from the broader instruments of strategic rivalry. The “Coordination Contingent” column is not a passive bet that China and Russia will simply remain apart. It reflects the possibility that diplomatic engagement, economic interdependence, and careful management of escalation risk can be used actively to limit coordination or discourage opportunistic aggression. Discounting those non-military tools, by contrast, makes movement toward the “Coordination Inevitable” column more likely.

Table 1.2: The strategic layer

	Core Deterrence Only	Extended Deterrence
Coordination Contingent	Improved Core + Ambitious Diplomatic Track	Improved Core + Cautious Extended + Ambitious Diplomatic Track
Coordination Inevitable	Augmented Core + Limited Diplomatic Track	Augmented Core + Hard Extended Deterrence + Limited Diplomatic Track

1.5 Structure of the Report

This overview constitutes the first of four parts making up the complete report. It is followed by the three papers summarized in the above section, each developed independently by its own authors: Chapter 2 presents the two crisis scenarios (Vaddi and Peters); Chapter 3 develops the build-up typology and associated risk framework (Austin Long, Michael Albertson, Thomas Mahnken, and Even Montgomery); and Chapter 4 examines the arms control implications of a three-player nuclear environment (Christopher Ford). Read together with the decision framework in the final section, these three papers provide the detailed evidentiary basis for the arguments advanced above.

Chapter 2:

Two Scenarios for Multi-theater Aggression and the Implications for the United States

Pranay Vaddi and Robert Peters

This chapter outlines two illustrative simultaneous Asia/Europe crisis scenarios to help assess U.S. nuclear posture requirements in the medium (2025–2035) and long term (2035–2045). The two scenarios aim to shed light on the following elements: conventional and nuclear balances; the possible contribution and risks of nuclear signaling and use in altering the course and outcomes of battles; the contribution of U.S. allies — European and Asian — to the overall balances and dynamics; and the reaction of adversaries (China and Russia) and their partners (North Korea, Belarus) to U.S. force posture improvements in the coming two decades.

Both scenarios assume that China and the United States will continue to regard Taiwan as a critical national security interest and will be willing to employ maximum measures in its defense. Russia will continue to seek to expand its influence in Europe at the possible risk of a confrontation with NATO. The scenarios further assume potential intervention by Chinese and Russian partners against the United States and its allies. U.S. allies are expected to contribute to the common effort; however, their levels of material contribution and political cohesion remain unpredictable and are treated as variables rather than constants. These parameters are designed to illuminate the stress placed on U.S. capabilities in a crisis and the critical role of U.S. nuclear forces in achieving strategic objectives — and, in turn, to highlight the range of strategies required to manage escalation dynamics.

The hypothesized development of events is deliberately extreme in order to put U.S. vital interests clearly at stake. The two scenarios assume opacity regarding Chinese actions and objectives, and ambiguity regarding Russia's parallel actions and objectives — a situation that requires sustained attention to the Russia-Europe theater while maintaining primary focus on an emergent military crisis with China in Asia. North Korea, while not depicted as an overt additional stressor on U.S. military posture, remains a potential complicating factor for U.S. and allied deterrence given its growing nuclear arsenal and capacity for opportunistic provocations against South Korea and Japan.

The first scenario depicts a Chinese maritime blockade of Taiwan as a prelude to eventual reunification, set in the 2025–2035 period, while Russia conducts grey zone operations to destabilize Europe with intensified hostile activities in and around the Baltic Sea. The second scenario, set in 2035–2045, involves a Chinese attempt at outright invasion, against the backdrop of a stronger Russia maintaining sustained pressure on Europe, particularly in the Baltics. Each scenario and its accompanying order of battle is described below.

2.1 Scenario 1 (2025-2035)

Theatre dynamics:

- China begins a maritime blockade of Taiwan, preventing trade and access to military assistance via maritime transport. Over the course of the blockade, the PLA uses a false flag provocation (a purported ramming of a Chinese coast guard vessel by Taiwan irregular military vessel) to generate air, naval, and missile forces as a prelude to an outright military invasion.
- Russia is in a frozen war with Ukraine (which remains outside of NATO) and continues regular deterrence signaling efforts and military exercises on a normal schedule, including in the Far East. Russia intensifies grey zone provocations against NATO (including cyber-espionage against NATO command-and-control and critical civilian infrastructure, regular GPS disruption of NATO aircraft conducting patrols, sabotage of undersea transatlantic data network infrastructure, non-kinetic interference with satellite imagery and communications, and an expansion of exercises and basing infrastructure in the Arctic) to test the boundaries of kinetic conflict. Moscow also levies new dirty bomb allegations against Ukraine, as pretext for heightened readiness of Russian strategic forces personnel, to ensure the specter of nuclear use is still present in the conflict and keep U.S. attention on nuclear risk in Europe. There is no bilateral arms control agreement in effect limiting U.S. or Russian nuclear forces.
- Russia begins an unannounced “snap exercise” in Kaliningrad and Western Military District. There are additional “readiness tests” of strategic nuclear forces that yield greater than normal mobile ICBMs out of garrison and SSBNs at sea. There are fragmentary intelligence reports of small numbers of theater nuclear warheads being removed from central storage.
- European allies continue to support Ukraine with significant financial and military assistance but have also begun slowly procuring advanced military capabilities to take on a greater share of the conventional deterrence burden against Russia. Yet still not enough to be independent of US strategic enablers.
- North Korea continues steady-state missile tests and provocations along the border, but no clear mobilization for military action.
- In the Middle East, Iran remains a non-nuclear power while Israel maintains an uneasy peace with its neighbors requiring US attention. See table 2.1 below for more details.

Potential U.S. view on Scenario 1 (2025–2035)

The principal deterrence gap the United States would face in this scenario is the absence of a full spectrum of nuclear capabilities sufficient both to credibly signal resolve and to manage escalation across two simultaneous peer contingencies, either or both of which could result in large-scale major-power conflict. That gap operates at three distinct levels.

At the theater level, the problem is one of scarcity. U.S. options outside Europe are limited to a small number of SLCM-Ns; within Europe, dual-capable aircraft and B61 gravity bombs add options, but submarines and DCA alike are likely to be heavily committed to conventional operations in a crisis, creating a direct trade-off between conventional and nuclear employment of the same platforms. What the United States retains, however, is asymmetry: China has not yet fielded theater nuclear options of its own, so even scarce U.S. capabilities can anchor escalation management below the strategic threshold. The shortfall is most consequential in Asia, where the conventional imbalance favoring China is most acute, and where allies are more likely to act if U.S. theater forces are credible. The current posture does not fully provide these.

At the strategic level, the problem is one of insufficiency. Absent additional investment, U.S. forces will be challenged to hold at risk the full range of adversary military (particularly counter-nuclear), economic, and political targets necessary for confident escalation management above the theater level. China is closing the gap in deployable strategic weapons but has not yet reached parity, and U.S. strategic forces themselves remain secure. The danger is indirect: doubts about whether U.S. strategic capabilities are sufficient would encourage adversaries to escalate conventionally at the theater level.

At the level of combined peer pressure, the problem in this period is primarily one of simultaneity. China and Russia present distinct nuclear challenges that could arise at the same time, but there is little evidence that either would act in expectation of support from the other. China will narrow the gap in deployable strategic weapons and may begin fielding limited theater options; its conventional advantage in the Taiwan theater means that deterring a full invasion could require the United States to rely on the implicit or explicit threat of limited nuclear use, backed by a larger and more diverse strategic arsenal. Russia already fields a wide variety of theater options and a robust, if not yet fully modernized, strategic force; it is primarily a regional conventional power in this scenario, but one that appears to use nuclear signaling deliberately to divide U.S. attention and constrain allied responses in Europe. To the extent the two challenges compound, they do so mainly because strategic assets committed to deterring one adversary cannot readily be repositioned against the other. This is, in the first instance, a problem of capacity.

The combined effect is that the United States faces simultaneous demands on its theater and strategic nuclear posture that its current force structure is not optimally configured to meet — a finding that directly motivates the capability options and risk trade-offs examined in Chapter 3.

2.2 Scenario 2: (2035-2045)

Theatre dynamics:

- Repeat of scenario one actions risking Taiwan capture, but with China confidence in its conventional and nuclear capabilities. China's advantage in conventional forces and confidence that an invasion will be successful is decreasing, which motivates a more escalatory approach to reunification. Realizing that the tide of a protracted conventional war may shift against the PLA if the United States and allies are able to marshal forces, China is more willing to accept the risk of escalatory actions early in the conflict, as it also possesses a small number of reliable, limited theater-range nuclear options. As a result of long-term Russian technical assistance, China has confidence in its early warning and NC3 capabilities.

It now possesses the necessary sensor, prompt ICBM launch, and NC3 capabilities to fully implement its “early warning counterstrike” doctrine.

- Repeat scenario one with more Russian capacity to either retake more territories in Ukraine or start a war over the Baltics with stronger yet nervous European countries. Russia is no longer at war with Ukraine, with an uneasy truce existing with hostilities against Europe over Ukraine continuing but allowing for some redeployment of Russian ground forces to traditional bases in the Western Military District. Mutual deployment of long-range systems across the Russia-Europe borders have heightened tensions, and continued hostilities in the Baltic Sea are making Europeans nervous. By then Russia has reconstituted some of its conventional forces after significant losses in Ukraine, remaining short on manpower but fielding modern air, missile, and land capabilities capable of threatening a resumption of hostilities in Ukraine or direct conflict with NATO. Russia’s nuclear modernization is complete, with additional long-range exotic nuclear systems deployed in small numbers, a range of nuclear-capable intermediate-range missiles deployed on the border with Europe and in Kaliningrad, and advanced strategic defenses around Moscow. Russia has also deployed or is capable of quickly deploying several nuclear-armed anti-satellite weapons. Finally, Russia regularly exercises its nuclear and general-purpose forces, including in the Far East, and conducts maritime and bomber patrols jointly with PLA forces.
- Also as in scenario 1, Russia begins an unannounced “snap exercise” in Kaliningrad and Western Military District. There are additional “readiness tests” of strategic nuclear forces that yield greater than normal mobile ICBMs out of garrison and SSBNs at sea. There are fragmentary intelligence reports of small numbers of theater nuclear warheads being removed from central storage.
- European countries have completed the buildup of their conventional forces, including considerable strategic capabilities, yet they do still rely on the US for nuclear deterrence. The friction between the front countries and Western European countries are weakening the responses to Russia’s moves, amidst uncertainty on the US position on European security.
- North Korea now possesses 180 nuclear warheads, and 20 reliable mobile ICBMs, as well as a rudimentary ballistic missile submarine. As a result of Russian technical assistance, North Korea conducts more regular missile tests and has increased fissile material production. Iran remains a non-nuclear, medium power within the region. See table 2.2 below for more details.

Potential U.S. view on the second scenario (2035-2045):

The deterrence gap the United States would face in this scenario is not simply a more severe version of Scenario 1; it is qualitatively different at each level. At the theater level, the problem shifts from scarcity to lost asymmetry; at the strategic level, from insufficiency to vulnerability; and at the level of combined peer pressure, from parallel challenges to possible active collaboration.

At the theater level, the problem shifts from scarcity to lost asymmetry. U.S. options remain limited, and the platform trade-off is if anything more acute given the demands of a full invasion compared to a blockade. But China now possesses mature theater nuclear options of its own, alongside a more survivable strategic deterrent that also enables limited strategic employment. The United States can no longer rely on a theater-level asymmetry to manage escalation below the strategic threshold; it must deter and manage a Chinese theater nuclear capability with a force that was thin even when unopposed.

At the strategic level, the problem shifts from insufficiency to vulnerability. The target-coverage challenge of Scenario 1 persists, but China is now at rough parity and, depending on the choices it has made over the intervening decade — alert status, number of prompt systems, ISR, strategic enablers — may have developed significant counterforce capability against U.S. strategic forces. The United States must therefore manage escalation not only with a force that cannot fully cover adversary targets, but with one whose own assets can be held at risk in return. Russia's modernization is by this point largely complete, but it is China's counterforce potential that changes the character of the strategic problem.

At the level of combined peer pressure, the problem shifts from simultaneity towards potential alignment. China and Russia continue to cooperate on security issues, including technology exchanges, fossil fuel sales, and increasingly joint exercises. Whether this amounts to shared strategic intent is uncertain, and formal coordination of military action remains unlikely. But even loose alignment could change the calculus: if each adversary expects the United States to be distracted by the other, and can count on at least tacit support from its partner, a crisis with one may raise the likelihood of opportunistic action by the other. China is the primary actor in this scenario, with Russia serving as a junior strategic partner. The United States would then face a problem of linkage as well as capacity — one that additional force structure alone may not resolve.

The combined effect is a structural deterrence gap — not merely a quantitative shortfall — that directly motivates the capability options and risk trade-offs examined in Chapter 3.

2.3 Key questions

Nuclear signaling and use

- In Scenario 1, given the conventional imbalance favoring China and the limited U.S. theater nuclear options available in Asia, how credible is nuclear signaling as an escalation management tool — and under what conditions, if any, does the burden of nuclear first use fall on the United States? What capability or policy changes would alter that calculus?
- In Scenario 2, where China possesses theater nuclear options of its own and potentially meaningful counterforce capability, does the United States retain escalation management options at every rung of the ladder — or has the loss of theater-level nuclear asymmetry fundamentally changed the conditions under which nuclear signaling and limited use remain viable?

Contribution of the Allies:

- Given that U.S. allies are assumed to participate in both scenarios, what levels of material contribution and political cohesion are required to meaningfully offset the theater-level gaps identified in each scenario — and what assurance measures does the United States need to provide to sustain that participation, particularly in Asia?
- What extended deterrence requirements exist for European allies during a period of active U.S. military engagement in Asia, when Russian grey zone activity continues but falls short of military escalation, and U.S. theater nuclear assets are primarily committed to the Pacific?

Table 2.1: Projected Order of Battle (2025-35)

China	Russia	United States	U.S. Allies
1,500 operationally “deployable” strategic and non-strategic nuclear warheads - Experimental low-yield warheads in small numbers 462-550 ICBM launchers and missiles[1] 1,000 short- to intermediate-range dual-capable missiles.[2] - Six Jin-class SSBNs equipped with 6 JL-3 SLBMs each. 40 total H-6N and H-20 bombers. - Limited ASAT capabilities. - Nascent ABM capabilities. N-Korea: 150 nuclear weapons on a variety of launchers, including two dozen ICBMs and hundreds of nuclear-capable short to medium range missiles. - Antiquated conventional air (MiG-17s, Mig-21s, etc.) and maritime capabilities, along with large numbers of obsolete Soviet-era armor and artillery capabilities.	2200 operationally deployed strategic nuclear weapons, primarily on road-mobile launchers and bombers. 2000 non-strategic warheads on a variety of platforms, to include dual-capable short to intermediate range missiles, both ballistic and non-ballistic. - A large but largely antiquated fleet of Cold War era bombers. ~100 “5th gen” fighters. - Limited ASAT capability. - Nascent ABM capability.	3,780 total warhead stockpiles. 2,000 deployed strategic nuclear warheads – approximately 500 warheads uploaded to U.S. ICBMs and SLBMs above New START force posture. 450 deployed ICBMs in silos. - Approximately 220 SLBM launchers (mix between Ohio and Columbia class). 50 B-21 and 74 B-52H nuclear-capable bombers, approximately 500 LRSOs (and retained AGM-86 ALCMs). 20 SLCM-Ns deployed on Virginia class submarines in theater. 2-3 Multi-Domain Task Force (MDTF): each with at least one battery of four HIMARS launchers with eight total Precision Strike Missiles (PRsM), one 4x4 launcher for Tomahawk or SM-6; one long-range hypersonic weapons system (LRHW) with four launchers.	Asian allies: Japan - Type 12 precision strike missile deployments, Tomahawk integration into JMSDF Aegis ships, HGVP deployed on Japanese territory, including southern islands, and 20 SSK attack submarines capable of anti-ship and land-attack missile strikes. Taiwan - Modern short-range air defenses (SHORAD), coastal anti-ship cruise missiles, land-attack missiles, and UAS. Australia - Tomahawk integration for Hobart-class destroyers, two Virginia-class SSNs, probable role in logistics support, transshipment, and basing for U.S. aircraft. Europe: - Robust battery of modern defenses, to include US, Israeli, and European-made short-range and theater range missile defense systems. - Hundreds of F-35s spread across numerous countries in the theater 2000 European and US made deep precision strike capabilities, such as Scalp, Tomahawk, Stormshadow, etc. - Tens of thousands of disposable strikes and ISR drones.

Table 2.2 Projected Order of battle in 2035-45, in addition to the first scenario

China	Russia	United States	U.S. Allies
• 200 low-yield warheads for theater dual-capable missiles. • 20 additional H-20 bombers. • Co-orbital and terrestrial anti-satellite weapons, kinetic and non-kinetic. • Strategic air and missile defenses around critical military infrastructure, including PLAN bases, Hainan Island, and Beijing. N. Korea: • 200 nuclear weapons on three dozen ICBMs and a thousand dual-capable short to intermediate range missiles.	• 2,200 operationally deployed strategic nuclear weapons, primarily on road-mobile launchers and bombers. • 2,000 non-strategic warheads on a variety of platforms, to include dual-capable short to intermediate range missiles, both ballistic and non-ballistic. • A large but mostly antiquated fleet of Cold War era bombers. • ~125 “5th gen” fighters. • Capable ASAT capability. • Capable ABM capability.	• 100 total SLCM-Ns, 50 deployed in theater on 20-30 Virginia class SSNs. • Program of record delivering on Sentinel and Columbia. • 50 additional B-21s, 500 additional Long-Range Standoff (LRSO) replacing AGM-85. • Dozens of nuclear-capable JASSM-ER available for deployment from Guam. • 1,000+ one-way UAS in theater, deployed across allied and partner territory. • U.S. forward deployed F-35A and Collaborative Combat Aircraft (CCA).	Asian allies: • Taiwan: Introduces long-range SAMs and strike capabilities which extend A2/AD bubble deep into the Chinese mainland. Japan: • Suite of precision “counterstrike” capabilities including modernized Type 12 for air, sea, and land deployment, regular deployment of Japan Maritime Self-Defense Force (JMSDF) in Taiwan Strait with US and Taiwan navies. Australia: • AUKUS progresses with the Australian Navy receiving first SSN-AUKUS delivery, four total Virginia-class submarines, and Tomahawk integration. Europe: • Roughly 100 “6th gen” fighters • 20 B-21 bombers • 4,000 DPS capabilities • More robust missile defenses.

Chapter 3:

Nuclear Capability Options and their Associated Risks

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This paper identifies the range of options available to the United States for managing the two crisis scenarios outlined in Chapter 2, along with their associated costs and risks. The analysis develops four buildup typologies derived from crossing two temporal horizons (near-term versus long-term) with two strategic approaches (comprehensive versus selective). This 2×2 matrix yields the following categories:

- 1- **Rapid Rise**: a short-term, comprehensive buildup. The United States would launch a fast, wide-scale expansion of all relevant weapons systems within three to five years to close the deterrence gap identified in the first scenario in response to a crisis between 2030-2035.
- 2- **Lightning Lock**: a short-term, selective buildup. Rather than expanding every system, the United States would concentrate on a narrow set of critical platforms, still within the three-to-five-year window, to address the same near-term deterrence shortfall.
- 3- **Steady Rise**: a long-term, comprehensive buildup. Beginning now, the United States would pursue a gradual, broad-based expansion that reaches full capability over a five-to-fifteen-year horizon, thereby filling the gaps anticipated in the second scenario and be ready by approximately 2035-2045.
- 4- **Measured Edge**: a long-term, selective buildup. The United States would start today but focus only on a limited suite of high-value systems, allowing sufficient time to develop the capability needed for the later crisis window (2035-2045).

These four models are deliberately overlapping; they are intended to structure the discussion rather than constrain imagination. Each typology carries its own calculus of costs, industrial-production limits, risk exposure, and overall contribution to credible nuclear deterrence at the chosen horizon.

Table 3.1: Build-up types

Build-Up Types	Comprehensive	Selective
Short Term (3–5 years)	Rapid Rise	Lightning Lock
Long Term (5–15 years)	Steady Rise	Measured Edge

3.1 Varieties of Risk

This section identifies four types of risk that any nuclear modernization program must confront and applies them to the scenarios developed in this workshop. To avoid fixating solely on risk, it also explores the opportunities each category presents and outlines ways to mitigate them.

1. **Political Risks** refers to the level of consensus on nuclear modernization in the United States and among allies. Without broad agreement on the strategic value of increased nuclear capacity, approval and long-term funding are uncertain. Extended programs are especially vulnerable to shifting political commitments, and stationing U.S. nuclear weapons on allied territory adds another layer of domestic political complexity. However, building a new consensus about the role of nuclear weapons could strengthen national strategy, and forward-deploying systems may reassure allies and shore up extended deterrence.

Decision-makers can either confront political conflict head-on through open debate to build consensus or pursue less-visible steps—such as exercises or infrastructure upgrades on U.S. soil—to minimize controversy. The most promising way to mitigate political risk, both at home and abroad, is a transparent discussion about the role of nuclear weapons and the need for an updated posture.

2. **Program Risk** is the possibility of delays and unmet expectations of the defense acquisition programs. Fielding new capabilities takes time and money, and untested projects or those revived after long gaps cost even more. To mitigate program risk, appoint a senior leader with clear authority and keep requirements limited to what's essential.
3. **Strategic Risk** emerges when actions or inaction widen the gap between national strategy and the capabilities needed to support it. Misalignment between political decisions, program management, and declaratory policy could undermine longstanding U.S. objectives, such as providing a nuclear backstop for conventional forces and honoring extended deterrence commitments.
4. **Competition Risk** occurs when U.S. actions may provoke countermeasures from adversaries, nullifying the benefits of new systems and potentially inviting additional strategic risks. Yet, if designed carefully, competitive strategies can still play to U.S. strengths. Mitigation depends on an honest assessment of both America's long-term strengths and weaknesses and those of its competitors. Without this understanding—and without addressing political, program, and strategic risks—the U.S. might mistakenly believe it is competing on favorable terms when the reality is quite different.

Table 3.2: Build-up options, systems, and risks

	Category	Time Horizon	Focus/Objectives	Systems	Risks
1	Rapid Rise	Short term/ Comprehensive	<i>Strategic/Quantitative</i>	Strategic: reconverting SLBM launchers and heavy bombers, uploading warheads onto ICBMs and SLBMs. Theater: expanding the Dual Capable Assets DCA/B61 in Europe and beyond to demonstrate outreach, adding storage sites or by increasing the number of DCA-capable nations equipped with F-35 aircraft.	Entail considerable political risk. They depend upon political agreement in the U.S. government as well as among allies. If that agreement is not forthcoming, it's difficult to see how this scenario could unfold. Both scenarios also entail program risk. They also bear at least the possibility of competition risk, if US investments trigger self-defeating responses by competitors.
			<i>Regional/Qualitative</i>	Theater: developing, testing, producing, and possibly deploying a new theater-nuclear deterrent. Candidate systems could include warheads for air-launched standoff missiles, ground-launched ballistic or cruise missiles, and sea-launched cruise missiles.	
			<i>Balanced</i>	Strategic/theater: combine reconversions and uploads with a modest expansion of the DCA force and a demonstration of a new regional deterrent capability.	
2	Lightning Lock	Short term/ Selective	<i>Strategic/quantitative</i>	Strategic: reconverting and uploading ICBM, SLBM launchers, and heavy bombers.	Entail considerable political risk. They depend upon political agreement in the U.S. government as well as among allies. If that agreement is not forthcoming, it's difficult to see how this scenario could unfold. Both scenarios also entail program risk. They also bear at least the possibility of competition risk, if US investments trigger self-defeating responses by competitors.
			<i>Strategic/Qualitative</i>	Strategic: announcing a new warhead design or modifying an existing reentry vehicle). Developing capabilities aimed at hardened and deeply buried targets, or enhancing ISR assets to locate, fix, and target adversary mobile forces.	
			Regional/Quantitative	Theater: expand the number of DCA-participating states, add storage sites, or deploy additional weapons in Europe, and extend the DCA mission to Asia.	
			<i>Strategic/Qualitative</i>	Strategic: development, testing, production, and potential deployment of a new theater-nuclear deterrent capability, like the regional-qualitative strand of the Rapid-Rise concept.	
3	Steady Rise	Long term/ Comprehensive	Increase survivability and warhead capacity.	Strategic: alternative ICBM variants, such as a heavy ICBM (akin to the former Peacekeeper) or a mobile ICBM. Expanding the U.S. submarine industrial base to accelerate construction of additional Columbia-class boats.	Entails less political risk than the first two scenarios. Or, more properly, that risk is spread out over a much longer time, which would likely mitigate it. It entails greater program risk, to the extent that the scenario envisions fielding a suite of new capabilities. Here too, that risk would be mitigated by being spread out over time. This scenario would also, however, entail significant strategic risk, to the extent that the relatively slow pace of U.S. nuclear modernization relative to that of competitors could call into question U.S. strategy.
4	Measured Edge	Long term/ Selective	Regional focus aims to demonstrate a sustained U.S. commitment to allies	Theater: new warheads with tailored effects (e.g., enhanced radiation/neutron bombs or EMP devices). Theater: new intermediate-range prompt-nuclear or dual-capable delivery systems (such as a nuclear cruise-propulsion system or a long-range hypersonic weapon). Theater: delivery platforms capable of engaging mobile targets, for instance anti-ship missiles with nuclear payloads.	Shares the risk profile of “Steady Rise”, with additional strategic risk stemming from the limited scope of the scenario.
			Strategic Focus	Strategic: expanding the acquisition of strategic delivery systems—additional B-21 bombers, LRSO missiles, Columbia/D5LE2 submarines, or Sentinel Sea-based platforms. The choice among these would reflect differing priority attributes: more Sentinels would emphasize promptness and complicate adversary attack planning; more Columbias would prioritize survivability and targeting flexibility; more B-21s would enhance conventional-nuclear integration, visibility, and forward-basing flexibility; more LRSOs would broaden non-prompt target coverage while still delivering quickly. Strategic: retaining newer legacy systems longer, such as the latest Ohio-class submarines or the B-2 bomber. Strategic: developing more advanced warhead and re-entry vehicle designs, including maneuvering capabilities, hardened-target defeat technologies, or both.	

3.2 Evaluation Framework

When weighing the four options, there should be consideration of four principal dimensions: Cost, Industrial Capacity, Risk, and Deterrence Contribution. These quantitative factors could be filtered through five strategic questions that shape the qualitative weighting of each typology:

1. Counter-force/Damage limitation strategy: Will the United States retain its traditional counter-force posture in a world where two peer nuclear powers are emerging?
2. Theater nuclear capability: Is a dedicated theater nuclear force required to support counter-force or damage-limitation missions?
3. Extended deterrence and assurance: Does the United States continue to place high value on extended deterrence commitments to NATO and Asian allies?
4. Peer-Specific Tailoring: Should the nuclear force be customized for different peers or geographic theaters?
5. Adjustments to existing programs: Are changes needed to the strategic forces, theater forces, both, or neither? If changes are required, should they be qualitative (new capabilities, novel concepts), quantitative (additional warheads or delivery vehicles), or a combination of both?

The answers to these questions are key to the cost-risk-benefit calculations. For example, a “yes” to extended deterrence heightens the attractiveness of a comprehensive approach (Rapid Rise or Steady Rise), whereas a “no” to a theater nuclear capability could push the analysis toward selective models (Lightning Lock or Measured Edge).

Because the United States’ industrial base is already operating near capacity, a short-term comprehensive buildup (Rapid Rise) would demand substantial upfront funding and could strain production lines, while a short-term selective buildup (Lightning Lock) would be cheaper but would leave many systems unchanged. Conversely, the long-term options afford more flexibility: a gradual comprehensive expansion (Steady Rise) spreads cost and production over a decade, and a measured selective path (Measured Edge) allows the United States to invest in a limited set of high-impact systems while preserving capacity for future adjustments.

3.3 Rapid Rise (Short-Term, Comprehensive)

The “Rapid Rise” scenario assumes that the United States perceives an urgent need to act in the short term—within the next three to five years—to counter the challenges posed by China’s force buildup, the erosion of conventional balances in Europe and Asia, and the looming expiration of the New START Treaty in February 2026.² “Quick” is defined as a program that can be executed in that 3-5-year window, while “wide-scale” means the effort must be large enough in both quality and quantity to be strategically and operationally meaningful, covering both central strategic and regional requirements. The ultimate scope and scale will be bounded by industrial capacity, technical feasibility, and fiscal realities, but the U.S. could choose to emphasize strategic/quantitative, regional/qualitative, or a balanced mix of the two.

² This chapter was written in 2025, before the treaty expired.

- a) *Strategic/quantitative*. The focus would be on strengthening the strategic hedge against China's ICBM silos and other counter-force requirements that emerge once New START expires. This would entail a heavier emphasis on reconverting SLBM launchers and heavy bombers, uploading warheads onto ICBMs and SLBMs, and expanding the DCA/B61 force in Europe—either by adding storage sites or by increasing the number of DCA-capable nations equipped with F-35 aircraft. A worldwide DCA deployment capability would also be demonstrated to show that the same force could be used in Asia.
- b) *Regional/qualitative*. While some changes to the strategic triad would still be required, the primary goal here would be to close the gap in theater nuclear capabilities in Asia (and, to a lesser extent, in Europe). The effort would center on developing, testing, producing, and possibly deploying a new theater-nuclear deterrent that overcomes the current DCA force's shortcomings in survivability, penetration of adversary defenses, target coverage, and forward presence. Candidate systems could include warheads for air-launched long range standoff missiles LRSO, ground-launched ballistic or cruise missiles, and sea-launched cruise missiles.
- c) *Balanced strategic/regional (qualitative + quantitative)*. This approach would blend elements of the two preceding options, pursuing a more limited mix of strategic and regional force changes. It could combine reconversions and uploads with a modest expansion of the Dual Capable Aircrafts (ADCs) and a demonstration of a new regional deterrent capability.

3.4 Lightning Lock (Short-Term, Selective)

The “Lightning Lock” scenario also assumes a short-term (3-5-year) response, but it targets a narrowly defined problem rather than a broad set of challenges. “Narrowly focused” means the United States would make a strategic choice to concentrate either on quality or quantity, and either on strategic or regional domains. As with the other short-term options, the ultimate scope will be constrained by industrial, technical, and fiscal realities.

- a) *Strategic/quantitative*: The effort would concentrate on reconverting and uploading ICBM, SLBM launchers, and heavy bombers.
- b) *Strategic/qualitative*: Because the existing program of record faces significant hurdles, only modest upgrades would be feasible. Possibilities include announcing a new warhead design or modifying an existing reentry vehicle (for example, adding maneuverability), developing capabilities aimed at hardened and deeply buried targets, or enhancing ISR assets to locate, fix, and target adversary mobile forces.
- c) *Regional/quantitative*: This path would expand the number of DCA-participating states, add storage sites, or deploy additional weapons in Europe, and extend the DCA mission to Asia.

- d) *Regional/qualitative*: The focus would be on the development, testing, production, and potential deployment of a new theater-nuclear deterrent capability, like the regional-qualitative strand of the Rapid-Rise concept.

Both the Rapid Rise and Lightning Lock build up options would entail considerable political risk related to the extended deterrence component. They depend upon political agreement in the U.S. government as well as among allies. If that agreement is not forthcoming, it's difficult to see how these options could unfold. Both scenarios also entail program risk as the U.S. defense industrial base, to include the nuclear industrial base, might be unable to deliver the needed capabilities on time (within 2-5 years). Where time is of the essence, it will be particularly important to lean heavily upon capabilities that are already deployed or are well along the path to deployment (such as the B-21 *Raider*). Another option would be to field a nuclear variant of existing systems.

In addition to the political, and programmatic risks, they also bear at least the possibility of competition risk, if US investments trigger self-defeating responses by competitors.

3.5 Steady Rise (Long-Term, Comprehensive)

“Steady Rise” serves as the longer-term counterpart Lightning Lock and a broader version of Measured Edge. It represents the most expansive execution of the Strategic Posture Commission’s call for additional or different capabilities, limited only by budgetary constraints and industrial capacity. Over a 5-15-year horizon, the United States could implement many or all elements of the Rapid-Rise variants, while also pursuing more ambitious options in the later years of the period. Possible expansions include:

- Introducing alternative ICBM variants, such as a heavy ICBM (akin to the former Peacekeeper) or a mobile ICBM, to increase survivability and warhead capacity.
- Expanding the U.S. submarine industrial base to accelerate construction of additional Columbia-class boats, a move that would require substantial early-stage investment.

These longer-term investments would complement the shorter-term rapid-rise actions, ensuring that the United States builds a resilient, adaptable nuclear force capable of meeting both strategic and regional deterrence requirements well into the next decade and beyond.

This option, however, entails less political risk than the first two scenarios as the risk is spread out over a much longer time, which would likely mitigate it. Yet this could translate to higher program risk, especially if this option includes fielding a suite of new capabilities. The longer time horizon also could help mitigate the risk of delivery delays. The possibly slow pace of the US nuclear modernization and future build up might produce significant strategic risk, if the capabilities/strategy gap is wide relative to the competitor’s capabilities and intentions.

3.6 Measured Edge (Long-Term, Selective)

“Measured Edge” is the longer-term counterpart to Lightning Lock, defined here as a 5-15-year horizon (three FYDP/FNSP cycles in DoD/DOE terminology). The concept envisions modest, incremental growth of U.S. nuclear forces over an extended period, with targeted increases in both quantity and quality. The emphasis can be placed on either regional or strategic capabilities, depending on the desired deterrence posture.

- a) *Regional focus.* The objective would be to demonstrate a sustained U.S. commitment to allies by fielding nuclear capabilities that are continuously or frequently forward-deployed in theater. Deterrence would stem from showing adversaries that the United States possesses a diverse set of regional nuclear options. In addition to the near-term capabilities described in Lightning Lock, Measured Edge could incorporate:
 - New warheads with tailored effects (e.g., enhanced radiation/neutron bombs or electromagnetic pulse EMP devices).
 - New intermediate-range prompt-nuclear or dual-capable delivery systems (such as a nuclear cruise-propulsion system or a long-range hypersonic weapon).
 - Delivery platforms capable of engaging mobile targets, for instance anti-ship missiles with nuclear payloads.
- b) *Strategic focus.* This variant would also draw on the near-term Lightning-Lock capabilities but would aim to convince adversaries that the United States’ strategic arsenal retains sufficient flexibility and capacity to achieve U.S. objectives against multiple peer competitors, even if the regional posture remains static. Potential additions include:
 - Expanding the acquisition of strategic delivery systems—additional B-21 bombers, LRSO missiles, Columbia/D5LE2 submarines, or Sentinel Sea-based platforms. The choice among these would reflect differing priority attributes: more Sentinels would emphasize promptness and complicate adversary attack planning; more Columbias would prioritize survivability and targeting flexibility; more B-21s would enhance conventional-nuclear integration, visibility, and forward-basing flexibility; more LRSOs would broaden non-prompt target coverage while still delivering quickly.
 - Retaining newer legacy systems longer, such as the latest Ohio-class submarines or the B-2 bomber.
 - Developing more advanced warhead and re-entry vehicle designs, including maneuvering capabilities, hardened-target defeat technologies, or both.

This option shares the risk profile of “Steady Rise,” with additional strategic risk stemming from the limited scope of the options adopted.

What, then, would be the attributes of a risk-reduction rearmament profile? It would likely be mostly unilateral, unfold over a measured pace, rely on existing systems where possible, and avoid areas where the U.S. advantage might erode quickly.

Chapter 4:

Bilateral and Trilateral Arms Control Typologies and Dynamics: The Conceptual Terrain

Christopher A. Ford

4.1 Introduction

China's accelerating nuclear modernization is fundamentally reshaping the strategic environment in which arms control operates. For decades, nuclear arms control was conceived and practiced as a bilateral enterprise between Washington and Moscow—one that produced a substantial body of agreements, from the 1963 Limited Test Ban Treaty to New START, helping to manage superpower competition, reduce arsenals, and establish the communication channels essential for escalation management. Today, however, the United States confronts what analysts have described as a "two-peer" nuclear deterrence problem: simultaneous strategic rivalry with Russia and a rapidly expanding China.

Beijing is reportedly constructing hundreds of new intercontinental ballistic missile silos, expanding its nuclear warhead production capacity, and is projected to achieve strategic parity with current New START-level deployments by approximately 2035. Russia, meanwhile, has expanded its theater-range nuclear arsenal and violated multiple arms control commitments, contributing to the collapse of the INF Treaty and the Open Skies Treaty. With New START's expiration in February 2026, no strategic arms control agreement between Washington and Moscow currently remains in force.

The historical record of US-Soviet and US-Russian arms control could provide an essential reference point for any new framework, but it may not be sufficient as a template for what lies ahead. The bilateral model was premised on rough strategic parity between two powers with sufficient common interest to sustain mutual restraint. Incorporating a third major nuclear power—one at a different stage of strategic development, operating from different doctrinal assumptions, and historically resistant to arms control engagement—demands conceptual adaptation rather than simple extension of existing models.

This background paper argues, however, that even where a formal trilateral arms control agreement remains challenging, the process of arms control engagement retains independent value. Sustained dialogue, transparency measures, and incremental confidence-building can reduce the risk of miscalculation and establish the relational and institutional infrastructure upon which more ambitious agreements might eventually be built. Understanding the conceptual terrain—the purposes, typologies, verification challenges, and historical precedents of arms control—is a prerequisite for effective policy in this new strategic environment. This paper offers a reference guide to that terrain, without prescribing specific recommendations for which measures should be pursued in any given diplomatic context.

4.2 Purposes of Arms Control: Process and Outcomes

Arms control serves as an instrument of national security policy rather than an end in itself. This distinction is analytically and practically significant. Treating arms control as an intrinsic objective rather than a means toward security goals risks producing agreements that undermine the very interests they purport to serve, or that create political inhibitions against abandoning arrangements that have ceased to function as intended. The task of arms control diplomacy is therefore always subordinate to the broader imperatives of national security.

When appropriately conceived, arms control can serve several distinct but related functions. It can mutually limit capabilities—through arsenal caps, weapon-type prohibitions, or qualitative constraints—so as to prevent destabilizing shifts in the strategic balance. It can facilitate transparency and information exchange, thereby reducing the risk of dangerous misunderstanding, accident, or miscalculation. It can institutionalize crisis communication channels between adversaries, providing mechanisms through which decision-makers can manage escalation and prevent localized incidents from escalating to broader conflict. It can establish verification procedures to ensure that violations are detected in time for an effective response. And what some scholars have termed "political arms control" can address the underlying tensions and competitive incentives that drive arms racing, thereby reducing the incentive to acquire additional armaments rather than merely regulating their acquisition.

A key analytical distinction concerns the difference between the process of arms control engagement and formal outcomes in the form of binding agreements. These two dimensions are related but separable and conflating them can distort policy. The process of arms control negotiation carries independent value: it can reduce tensions, establish communication norms, socialize parties to transparency practices, and generate the relational trust necessary for more ambitious agreements at a later stage. Conversely, a formally concluded but poorly designed, unverifiable, or bad-faith agreement can produce worse security outcomes than no agreement at all.

The historical trajectory of US-Soviet arms control confirms the insight articulated by Winston Churchill in 1934: "[When you have peace you will have disarmament.](#)" Peace creates disarmament, not the reverse. Major reductions in nuclear forces became possible only after the underlying geopolitical environment had shifted sufficiently to reduce the perceived costs of restraint. Arms control diplomacy that runs ahead of geopolitical conditions tends to produce fragile agreements or to invite strategic opportunism. For contemporary policy, this suggests that equal or greater attention should be devoted to addressing the sources of strategic tension as to devising the formal architecture of treaty obligations.

4.3 Arms Control Typologies

Arms control arrangements can be categorized along several dimensions relevant to the design of new frameworks for nuclear risk management.

Structural Dimensions

Agreements may be bilateral, involving two parties—as with the sequence of US-Soviet strategic arms treaties—or multilateral, engaging a broader range of states, as with the Chemical Weapons Convention and the Nuclear Non-Proliferation Treaty (NPT). Intermediate "plurilateral" arrangements among a small group of states have also proved workable, as illustrated by the Washington Naval Treaty of 1922.

Agreements may impose symmetric constraints, applying identical limits to each party, or asymmetric constraints, acknowledging differences in strategic circumstance, geography, or capability. US-Russian strategic treaties have generally been symmetric in their basic numerical limits. The Washington Naval Treaty, by contrast, established different capital ship tonnage ratios for the five participating naval powers, reflecting genuine asymmetries in strategic position and ambition.

Agreements may be formally legally binding under international law—ratified treaties governed by the Vienna Convention on the Law of Treaties—or merely politically or politically binding, as with the Presidential Nuclear Initiatives of 1991-92 or the 2015 Iran nuclear agreement. Politically binding arrangements carry lower procedural burdens and may be more accessible entry points for states reluctant to accept formal legal commitments, though they offer weaker structural guarantees of compliance.

Functional Categories

From a functional perspective, arms control agreements fall into five overlapping categories.

- 1- *Capability-limitation agreements* impose caps or reductions on arsenals or prohibit specific weapon types; examples include SALT I, the INF Treaty, START, and the CWC.
- 2- *Behavioral-limitation agreements* regulate destabilizing actions rather than weapons as such—the 1972 Incidents at Sea agreement and the Limited Test Ban Treaty are illustrative examples.
- 3- *Communication agreements* institutionalize transparency, data exchange, and crisis management channels; the 1963 US-Soviet hotline accord, the Open Skies Treaty, and the Nuclear Risk Reduction Center (NRRC) network represent this category.
- 4- *Exclusion agreements* demarcate zones or domains from which certain forces or weapons are prohibited, as with the Outer Space Treaty and regional nuclear-weapon-free zones.

- 5- *Political arms control measures* address the underlying competitive tensions that fuel arms races, as exemplified by the Nine-Power Treaty of 1922.

These categories are not mutually exclusive. Effective frameworks typically combine elements from several, and policymakers designing new arrangements should consider which combination of functional purposes best addresses the specific risks of the contemporary strategic environment.

4.4 Verification

Verifiability is a necessary consideration in arms control design, though it should be treated as a relative rather than absolute standard. Perfect verification is neither achievable in practice nor generally required; what matters is whether agreed monitoring mechanisms provide effective and timely warning of violations serious enough to affect the underlying security balance.

Two concepts have historically guided verification thinking. "Effective verification" denotes the capacity to detect not only militarily significant violations in time to permit a meaningful response, but also lesser violations warranting a political response. "Timely warning"—a concept traceable to the Acheson-Lilienthal Report of 1946—emphasizes that detection must occur early enough to leave adequate time for an effective counteraction. The adequacy of any verification regime therefore depends not only on its technical detection capabilities, but also on the time required to mount a meaningful response once a violation is discovered.

Not all violations are of equivalent consequence. Minor technical infractions that do not affect the core security balance differ fundamentally from "material breaches" within the meaning of Article 60 of the Vienna Convention—violations serious enough to relieve the aggrieved party of its own compliance obligations. Effective verification must prioritize detection of violations that would confer a meaningful strategic advantage, while maintaining sufficient breadth to deter normalization of incremental non-compliance.

The relationship between competitive rivalry and verification requirements is systematic. When competitive incentives are strong and the potential gain from clandestine violation is high, robust verification provisions are correspondingly more important. When parties expect each other to comply for independent strategic or financial reasons—as was the case with the Moscow Treaty of 2002, which lacked independent verification provisions—formal monitoring mechanisms are less critical. In the contemporary environment, characterized by active strategic competition among three nuclear powers and a documented history of Russian arms control violations, verification challenges must be treated as a central design priority in any new framework.

4.5 Options for Nuclear Arms Control Among Three Powers

The emergence of a tripolar nuclear environment creates challenges that cannot be addressed by simply extending the bilateral US-Russian arms control model. No comprehensive trilateral framework exists, and China has consistently declined to engage in nuclear arms limitation negotiations, arguing that its arsenal remains substantially smaller than those of the United States or Russia. A realistic strategy must draw on historical precedent while adapting to a qualitatively different strategic environment. The following considers both bilateral approaches—including

how the US-Russia legacy might be extended to include China—and trilateral frameworks combining formal and informal elements.

Bilateral Approaches

The US-Soviet and US-Russian arms control sequence offers both a model and a set of critical lessons. Beginning with risk reduction measures in the early 1960s and progressing through successive agreements addressing behavioral constraints, capability limitations, and ultimately deep reductions, Washington and Moscow developed over four decades an architecture of increasing sophistication and ambition. That sequence was not linear—progress depended on underlying geopolitical conditions, and the collapse of the INF Treaty following Russian violations illustrates the fragility of agreements whose political foundations erode.

Several features of this bilateral legacy are potentially transferable to a US-China or Russia-China context. The early emphasis on risk reduction and communication—the 1963 hotline accord, the 1972 Incidents at Sea agreement, and the NRRC network—offers a calibrated model for initiating engagement with China at a level of ambition consonant with current political realities. Such measures do not require China to accept caps on its arsenal at its current relatively modest levels; they ask only for commitments to reduce the risk of inadvertent escalation, serving Chinese interests alongside those of its interlocutors. A bilateral US-China confidence-building track could establish communication protocols, launch notification arrangements, and crisis management channels analogous to those developed between Washington and Moscow in the 1960s and 1970s.

Any effort to negotiate a successor to New START between the United States and Russia must also address the China variable directly. One mechanism worth considering is a conditional or "escalation clause" provision, under which the two parties would agree to cap arsenals at a specified level, subject to the condition that either party would have the right to increase its forces proportionally should a third power's capabilities approach parity with the agreed ceiling. Such a provision would allow a US-Russia bilateral framework to remain viable without creating incentives for unconstrained Chinese build-up, while preserving the flexibility necessary if China eventually elects to engage. Crucially, such a mechanism would preserve strategic parity between Washington and Moscow while giving both a legal basis to respond to Chinese expansion without precipitating an unconstrained three-way arms race.

Trilateral Approaches: Formal and Informal Elements

A fully negotiated trilateral nuclear arms control agreement presents formidable political and technical challenges, but the choices are not binary between a comprehensive treaty and no engagement at all. History demonstrates that multilateral strategic stability has been achieved through combinations of formal and informal arrangements tailored to the specific concerns and political constraints of each party.

The Washington Naval Treaty of 1922 offers the most instructive historical precedent. Negotiated among five naval powers—the United States, the United Kingdom, Japan, France, and Italy—it established asymmetric tonnage limits for capital ships and aircraft carriers, reflecting genuine differences in strategic circumstance and geographic position. The United States and Britain accepted naval co-equality at a level that capped further expansion; Japan

accepted a lower ratio but gained effective regional naval supremacy through associated non-fortification commitments by the other powers; France and Italy received lower limits reflective of their Mediterranean rather than global naval ambitions. Critically, the 1922 naval arrangements were embedded within a broader diplomatic framework—including the Four-Power consultative treaty on East Asian security and the Nine-Power Treaty on China's territorial integrity—that addressed the underlying political tensions driving naval competition. The result was a multilateral structure that managed the accommodation of rising powers within a framework of constrained competition for approximately a decade.

A modern nuclear analog to the Washington system would combine asymmetric capability constraints with differentiated regional arrangements. China's arsenal could be capped at a level higher than its current deployments but lower than those of the United States and Russia, with the asymmetry justified by China's more limited geographic reach and the earlier stage of its strategic modernization. In exchange, the United States and Russia might accept constraints on theater-range systems or make regional posture commitments in areas of particular Chinese strategic concern—analogue to the non-fortification provisions that made the 1922 naval ratios acceptable to Tokyo. Such an arrangement would require acknowledging China as a full participant in a great-power arms control framework—a significant political step for Beijing, but one that would also formally recognize its status as a peer nuclear power.

A more immediately achievable trilateral approach would operate at the level of transparency and confidence-building rather than capability limitation. A modular Transparency and Confidence-Building Measures (TCBM) framework—structured to allow states to accede to some or all its provisions, with the option to expand participation and commitments over time—would maximize diplomatic flexibility while beginning to build the engagement habits and institutional relationships that deeper agreements require. New signatories could initially accept only those provisions consonant with their domestic political constraints, with the expectation of progressive engagement. This architecture has clear precedents: the NPT welcomed new adherents on a rolling basis after its opening for signature in 1970; the Hague Code of Conduct on Ballistic Missile Proliferation has admitted participants incrementally; and the NRRC network has expanded over time. A modular TCBM framework could incorporate communication protocols, missile launch notifications, force structure data exchanges, and crisis management channels. With careful drafting, it could accommodate not only the three principal nuclear powers but also states outside the NPT framework—including those that openly possess weapons but have not joined the treaty, such as India and Pakistan, and potentially even states currently regarded as nuclear pariahs.

The balance between formal and informal elements is itself a significant design choice. Informal arrangements carry lower procedural and political burdens and may be more readily adapted to changing circumstances, but they provide weaker assurance of compliance and may be more easily abandoned under pressure. Formal agreements provide stronger legal foundations but require sustained domestic political support and may impose inflexibility as strategic circumstances evolve. A pragmatic strategy would pursue informal TCBMs as a near-term priority—establishing engagement channels and building trust—while developing the conditions for formal agreements as the political environment permits. In this respect, the process of arms control engagement matters as much as its formal outcomes: even agreements that are not immediately achievable can be approached through sustained diplomacy that reduces tensions,

builds institutional familiarity, and keeps open the channels through which eventual agreements might be reached.

One further caution is warranted. Arms control diplomacy itself, no less than arms control agreements, is an instrument of statecraft rather than an intrinsic good. States may enter negotiations not only to reach stabilizing agreements, but also to shape perceptions, delay adversary action, preserve allied cohesion, expose an opponent's unwillingness to negotiate, or otherwise maneuver for strategic advantage. This does not negate the value of arms control engagement; indeed, dialogue and negotiation can still reduce risks and clarify intentions even when formal agreement is unlikely. But it does mean that policymakers should evaluate the diplomatic process with the same prudence they apply to treaty text: asking what security interests it serves, what incentives it creates, and whether it advances stability or merely creates the appearance of progress.

4.6 Conclusion

The emergence of a tripolar nuclear environment—in which China's growing arsenal joins those of the United States and Russia as a central determinant of strategic stability—presents challenges that the bilateral arms control architecture of the Cold War era was not designed to address. The historical record of superpower arms control offers indispensable precedent and lessons, but the contemporary situation is qualitatively distinct in ways that demand conceptual adaptation rather than template extension.

Several foundational insights should guide policy. First, arms control is an instrument of national security rather than an end in itself; any arrangement pursued must serve rather than undermine strategic interests, and leaders must be willing to reject or abandon arrangements that fail this test. Second, the process of arms control engagement carries value independent of formal outcomes: sustained dialogue, transparency measures, and incremental confidence-building reduce the risk of miscalculation and establish the institutional and relational foundations upon which more ambitious agreements may eventually be constructed. Third, a realistic strategy for managing tripolar nuclear competition will likely combine bilateral arrangements—drawing on the US-Russia legacy while developing new US-China and Russia-China confidence-building tracks—with multilateral elements, formal and informal, calibrated to the specific strategic concerns and political constraints of each party.

The Washington Naval Treaty precedent suggests that even a complex multipolar strategic environment can be made more manageable through creative and asymmetric treaty design—one that accommodates differences in capability and position while establishing agreed constraints on unconstrained competition. Whether a comparable architecture can be constructed for contemporary nuclear rivalry remains to be demonstrated. What the conceptual analysis offered in this paper aims to establish is that the repertoire available to policymakers is richer than is sometimes assumed, and that a clear understanding of arms control purposes, typologies, verification requirements, and historical precedents is an essential foundation for navigating the challenges ahead.



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