Meeting the Challenges of the New Nuclear Age:
Emerging Risks and Declining Norms in the Age of Technological Innovation and Changing Nuclear Doctrines

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With an Introduction by
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Technology, Doctrine, and the Risk of Nuclear War

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Arms and military organizations can hardly be considered the exclusively determining factors in international conflict, but neither can they be considered neutral.

—Thomas C. Schelling (1966)

A war between two nuclear-armed states has become all too imaginable. Following Russia’s annexation of Crimea in 2014 and its interference in the 2016 U.S. presidential election, Russia’s relations with the United States are now probably worse than U.S.-Soviet relations during at least some phases of the Cold War. Stresses between China and the United States, including from the former’s land reclamation efforts in the South China Sea, are not as serious and have not built up as quickly, but a sustained détente is unlikely anytime soon. In the six years since Kim Jong-un assumed the leadership of North Korea, Pyongyang’s provocative behavior has sunk U.S.–North Korean relations to a level not seen in decades. Indeed, the two states are now engaged in a serious, if slow moving, crisis over North Korea’s nuclear and missile programs. Meanwhile, even if the Indian-Pakistani relationship is not especially bad at the moment—if judged by its own low standards—it could deteriorate rapidly and at any time.

The possibility of nuclear use would hang over a deep crisis or conflict in any of these dyads. Fortunately, the day-to-day likelihood of nuclear use is probably still lower than it was during the Cold War. Certainly, the risk of nuclear use—the product of consequence and probability—almost certainly remains much smaller. Nonetheless, this risk is increasing, and not only as a result of politics. I will argue in this paper that changes in military doctrine and technology—especially in the context of growing multipolarity—also drive this risk, including in ways that are frequently overlooked.

To be sure, politics, almost certainly, would be the primary factor in pushing two nuclear-armed states to the brink of a war—or over it. Doctrine and technology might exacerbate tensions and make a war more likely, but they would be unlikely to spark one by themselves. Once a conflict was underway,

however, doctrine and technology could be pivotal in driving escalation. Understanding their implications is also important for practical policy-making. After all, however difficult it is to persuade states to change their military doctrine or to focus on less-escalatory technologies, it is much easier than attempting to shape international politics as a whole.

I advance two arguments here about the implications of changes in technology and doctrine for the likelihood of nuclear use. First, these changes are making the nuclear order more difficult to manage. Programs to build up nuclear arsenals, develop new nuclear capabilities, or modernize existing weapon systems can increase tensions between nuclear-armed states. Such tensions can be further magnified by multipolarity, as the steps that one state takes to counter a rival can spark concern in a third country. These dynamics do not increase the chance of nuclear use directly; rather they do so indirectly by increasing both the chance of a conflict and the difficulty of implementing risk-mitigation measures.

Second, in the event that a crisis or conflict occurs, developments in military doctrine for both nuclear and conventional warfighting are increasing the likelihood of escalation, whether deliberate or inadvertent, to nuclear use. Technological changes are having a similar effect. Some drivers of this growing danger—such as the development of potentially vulnerable nuclear forces in China, Russia, and Pakistan—are well known from the Cold War. Others are less familiar but include the development, by the United States in particular, of nonnuclear technologies that can threaten—or are perceived as being able to threaten—an opponent’s nuclear forces and their enabling capabilities.

MANAGING THE NUCLEAR ORDER

Over the course of the Cold War, eight states developed nuclear weapons, yet strategic relations—like international politics more generally—remained decidedly bipolar in character. China represented the most significant third pole, although political conditions allowed it to brandish its nuclear weapons only rarely. France and the United Kingdom were military allies of the United States. Although both states explicitly retained the option of using nuclear weapons independently of the United States (and Paris even went so far as to withdraw from NATO’s unified military command structure), neither came remotely close to needing to do so. Meanwhile, the arsenals of India, Israel, and South Africa remained highly recessed. India tested what it termed a peaceful nuclear explosive in 1974, but moved very slowly thereafter to develop nuclear weapons, and neither deployed nor advertised them. Israel and South Africa also developed nuclear weapons but did not acknowledge their existence (and, indeed, by 1991 South Africa had dismantled its arsenal).

Today, nuclear multipolarity is asserting itself more, albeit rather gradually. This change results primarily not from the very small net increase in the number of nuclear-armed states (South Africa has left the nuclear club, while Pakistan
and North Korea have joined), but from increasingly competitive dynamics within the web of interlocking deterrence dyads.

The most important of these dynamics are occurring among five nuclear-armed states, which are arranged into triangles: one involves the United States, Russia, and China, and a second involves China, India, and Pakistan. Within each triangle, each state seeks to deter both of the others, except for Pakistan and China, which enjoy cooperative relations. Israel is not part of a deterrence dyad with another nuclear-armed state because, today at least, its nuclear weapons serve exclusively as a hedge against a loss of conventional superiority or further proliferation in the Middle East. France, the United Kingdom, and North Korea do have deterrence relations with other nuclear-armed states. However, their nuclear forces are unlikely to have much influence on the evolution of the world’s other arsenals over the next few decades (even while the risks of nuclear escalation in a crisis involving North Korea are serious).

Various generic effects, within and between these dyads, are currently embrittling the nuclear order, rendering it more difficult to manage and more prone to crises. Each of these five states has embarked on ambitious strategic procurement programs to develop new nuclear weapons, modernize existing ones, and/or expand their arsenals. Within each deterrence dyad, these programs tend to enhance tensions. Perception is critically important here. Many of these strategic procurement programs, in fact, may be defensively oriented. In particular, those focused on enhancing the survivability of nuclear forces might well mitigate escalation pressures in a crisis or conflict and, on balance, reduce nuclear risks. Yet such efforts often result in increased tensions, because rivals have a definite tendency to interpret them in the worst possible light.

To complicate matters further, because of the multipolar structure of deterrence relations, the dyads are not entirely isolated from one another, creating the possibility of multiplayer competitions. One particular risk is that strategic procurement programs aimed at countering one adversary can inadvertently spark concern—and potentially a counterreaction—in another. This form of the security dilemma involving three states has been termed a “trilemma.” These dynamics can be further stoked by cooperation that assists (or is perceived as assisting) a state to enhance its military capabilities. Moreover, multipolarity can increase the challenge of arms control since a state can worry that a bilateral arrangement would disadvantage it relative to an unconstrained third party.

Before showing how these dynamics play out in practice, two underlying assumptions should be made explicit (even if limitations of space preclude making a detailed argument for either). Both assumptions are controversial—


although, in fairness, no statements about what makes for safe and stable relations between nuclear-armed states would engender any less dispute.

First, arms buildups, modernization programs, and development programs, especially where they occur competitively, tend to exacerbate international tensions. While there is certainly some truth to the claim that international tensions catalyze arms racing, there is also empirical evidence that arms races exacerbate those tensions. Indeed, throughout the nuclear age, policy-makers—in Washington, Moscow, Beijing, New Delhi, Islamabad, and elsewhere—have regularly cited an adversary’s strategic procurement programs as cause for concern. Even if some of those accusations were convenient excuses, the nuclear age would likely have been less fraught if states had shown greater restraint in development and acquisition (and more fraught if they had shown even less). To be sure, strategic procurement is sometimes necessary and can enhance security, but even where it does, it can aggravate interstate tensions nonetheless.

Second, arms control—originally defined, broadly and helpfully, as “all the forms of military cooperation between potential enemies”—can play a significant role in mitigating both the tensions induced by strategic procurement programs and the likelihood of escalation in a crisis. In this regard, the main value of arms control is not in reducing numbers of nuclear weapons per se, but in limits and transparency that together create predictability and help to reduce arms race pressures. Even more importantly perhaps, arms control can enhance a state’s confidence in the survivability of its nuclear forces and hence mitigate escalatory pressures in a crisis or conflict.

The Two Triangles

The Asian triangle—involving Pakistan, India, and China—is characterized by both nuclear competition and nuclear cooperation. The most obvious rivalry is between India and Pakistan, which are frequently described as being locked in an arms race. Yet this description is potentially misleading; while Pakistan may be racing India, New Delhi is taking part in an altogether different competition with Beijing.

Nuclear technology irritates the Pakistani-Indian bilateral relationship. Worried about India’s conventional strength, Pakistan is rapidly augmenting its capacity to produce fissile material and appears to be building up its nuclear arsenal faster than any other state, creating friction with New Delhi. Yet, so far at least, India has not responded in kind. In fact, it has recently shut down one of


5. This definition of arms control is from Thomas C. Schelling and Morton H. Halperin, Strategy and Arms Control (New York: Twentieth Century Fund, 1961), 2, which also provides an exceptionally cogent argument in its favor. For a counterargument see Colin S. Gray, House of Cards: Why Arms Control Must Fail (Ithaca, N.Y.: Cornell University Press, 1992).
its two aging plutonium-production reactors (although this closure was a political sop to the United States and not an act of strategic restraint). But, India does have the potential to build up its arsenal quickly, even without building new fissile material production facilities—an unintended side effect, in part at least, of nuclear cooperation with the United States. India’s weapon program could, for example, co-opt a fairly large quantity of reactor-grade plutonium that was conspicuously excluded from international safeguards when New Delhi separated its civilian and military nuclear programs pursuant to a 2005 agreement with the United States (this agreement was designed to facilitate international nuclear commerce with India). The 2005 agreement also could enable an Indian buildup by allowing limited domestic uranium resources to be used for weapon production as opposed to power generation. As such, the U.S.-India deal has exacerbated tensions with Pakistan and almost certainly become another driver of Islamabad’s expanding nuclear arsenal.

The missile “race” between India and Pakistan is also more complex than it first appears. While both states have very active missile development programs, they have different emphases. Pakistan’s primary focus is on short-range systems to offset India’s conventional strength. India, however, is primarily pursuing long-range systems to target China. Nonetheless, these missiles still contribute to the rivalry with Pakistan and are thus the manifestation of a trilemma.

Historically, India has probably been a minor consideration for China in crafting its nuclear strategy. Indeed, even in private, Chinese officials have generally denied that Indian nuclear weapons are a consideration for them. Now, however, Beijing appears to be paying more attention. In 2012, for example, a serving Chinese officer, Major General Yao Yunzhu of the People’s Liberation Army Academy of Military Sciences, took the unusual, perhaps unprecedented step of acknowledging that “China and India have been securely locked in a relation of mutual deterrence.” Retired Admiral Yang Yi has stated that the “indisputable fact” of India’s expanding and modernizing its nuclear arsenal demands measures to “enhance strategic mutual trust”—with the implication that New Delhi’s efforts are viewed as a potential threat in Beijing. Now China appears to be responding in kind. The U.S. Department of Defense, for exam-

6. Indeed, India has plans to replace the reactor. On the decision to close it, see Dinshaw Mistry, The U.S.-India Nuclear Agreement: Diplomacy and Domestic Politics (Cambridge: Cambridge University Press, 2014), 69–70.

7. Conceptually it provides an example of how cooperation, as well as competition, can stimulate arms accumulations within a multipolar system. China’s provision to Pakistan, in 1982, of both highly enriched uranium and a nuclear weapon design is another more direct example. See also Zia Mian and M. V. Ramana, “Asian War Machines,” Critical Asian Studies 46 (2) (2014): 345–360.


ple, assesses that India’s nuclear arsenal is a “driver,” albeit not a primary one, of China’s own nuclear modernization programs.\(^{10}\)

China sits at the intersection of the two triangles. Within the U.S.-Russian-Chinese triangle each state seeks to deter the other two, even if the Sino-Russian deterrence relationship is largely “recessed” (and likely to remain so for some time given growing cooperation between Beijing and Moscow on a range of issues).\(^{11}\) The United States is, beyond doubt, the main driver of nuclear planning in both Russia and China. A significant point of friction is both states’ concerns about the survivability of their nuclear forces, particularly in light of developments in U.S. non-nuclear weaponry, including long-range, high-precision conventional weapons and ballistic missile defenses. Both attribute their strategic modernization programs to this concern. In some significant part, these dynamics represent another trilemma, since U.S. ballistic missile defense programs to protect the homeland are oriented at North Korea and a possible future nuclear-armed Iran, not Russia or China.\(^{12}\)

China is augmenting its nuclear force qualitatively (most significantly by enhancing mobility) and probably also quantitatively—although any growth in numbers is slow.\(^{13}\) These efforts spark concern in the United States and among some of its allies that Beijing’s intentions are not purely defensive. For its part, China has repeatedly stated it “will never enter into a nuclear arms race with any other country.”\(^{14}\) Chinese analysts generally explain this statement as a pledge not to seek numerical parity with the United States and Russia. However, given the opacity surrounding China’s nuclear forces—which Chinese officials and experts argue is necessary to ensure their survivability—Beijing’s declaratory policy does not appear to have had much impact on reducing Washington’s (or probably Moscow’s) threat perceptions.

Between Russia and the United States, the New Strategic Arms Reduction Treaty (New START) ensures a high degree of mutual transparency and helps to mitigate mutual concerns about each other’s strategic modernization programs. Tactical nuclear weapons are, however, not covered by New START. The United States periodically publishes figures on its total nuclear weapon hold-


ings, which imply continuing reductions of its tactical forces. By contrast, both the size and future trajectory of Russia’s tactical forces are highly uncertain. This opacity sparks significant concern among the United States and its European allies. Moreover, the United States has accused Russia of violating the Intermediate-Range Nuclear Forces (INF) Treaty by deploying a prohibited ground-launched cruise missile—adding further stress to the bilateral relationship.\textsuperscript{15}

\textit{A Multipolar Nuclear Future}

As much as this picture of multipolar nuclear interactions already gives cause for concern, its most worrying feature is the potential for much more competitive and corrosive dynamics to emerge quickly. To begin, the future of the U.S.-Russian arms control process is far from assured. There are currently no negotiations toward a successor agreement—a result partly of the decline in bilateral relations but also of numerous Russian preconditions (such as the removal of all tactical nuclear weapons from Europe before the commencement of any negotiations over this type of weapon). It is at least possible that, faced with the expiry of New START in 2021, Moscow will become more pliable. But, even if it does, it may not find a willing and able negotiating partner in Washington—not least because even Democratic senators would be unlikely to support ratification of a new arms control agreement while the United States assesses that Russia is in noncompliance with the INF Treaty.\textsuperscript{16} The United States and Russia could buy more time by availing themselves of the option to extend New START once by up to five years. However, it is currently far from clear whether they will do so, and whether they could make productive use of a delay to avert the collapse of the arms control regime.

Multipolarity compounds these challenges. The United States has indicated an interest in further bilateral arms control—or, at least, it did under the administration of President Obama, and the Trump administration has not completely eschewed the possibility. By contrast, Russia’s official position is that the next round must include all nuclear-armed states.\textsuperscript{17} While this extreme position might be moderated in any future negotiations, the general trend is clear: as Russia and the United States build down, and as China builds up, both Moscow and Washington are likely to seek some form of involvement from Beijing in arms control (which, initially at least, may simply be greater transparency as opposed to binding limits).


\textsuperscript{16} In fact, this compliance dispute could even lead to the demise of New START before its expiry.

\textsuperscript{17} For a recent example see “Moscow Slams Washington over Development of ‘Prompt Global Strike’ System,” Sputnik, February 6, 2016, http://sputniknews.com/military/20160206/1034340105/prompt-global-strike.html.
U.S. and Russian calculations are, in part, strategic. But within the United States, domestic politics also has an impact. After New START was signed in April 2010, China’s lack of involvement in the treaty became, for the first time, a real issue in an American domestic debate over the ratification of an arms control agreement. And, unless U.S.-Chinese relations take an unexpected turn for the better, the salience of China in any such debates in the future is likely to be greater still. Given China’s stated concerns about the survivability of its own nuclear forces, however, and its possible concerns about the future trajectory of India’s nuclear forces (not to mention potential bureaucratic barriers), the prospects for its involvement in any form of arms control are currently very poor. As a result, even if the United States and Russia were somehow to overcome the bilateral barriers to future arms control, its continuation would be far from assured. Such a breakdown, however it occurred, would reduce predictability in the U.S.-Russian strategic relationship and perhaps even pave the way for a new arms race.

There are other potential triggers of arms races. India, for example, may decide to accelerate its production of nuclear weapons. Such a decision could be motivated by strategy or domestic pressure (or both), and could be aimed at Pakistan or China (or both). But, whatever the cause, if India started to build up more quickly, China might do so too. If New Delhi’s buildup was actually a response to Islamabad, but Beijing wrongly believed it was the target, then these dynamics would constitute a trilemma. Similarly, if China started to increase its arsenal rapidly, the United States or Russia might respond in kind. If Beijing’s actions had actually been a response to New Delhi, this situation would represent another trilemma.

Finally, even without further proliferation, new deterrence dyads could emerge, most obviously between Israel and Pakistan. Today, there is little evidence of a deterrence relationship between these two states, not least because both appear to lack delivery systems capable of reaching the other—a result, perhaps, of mutual restraint. Pakistan is, however, openly developing a medium-range ballistic missile, the Shaheen III, which it claims will have a range of 2,750 kilometers—enough to reach Israel from western Pakistan. Israel, meanwhile, is reported to be developing the intermediate-range Jericho III with a range of 4,000 kilometers. If deployed, or perhaps even if not, these missiles could facilitate the emergence of a new deterrence dyad.

An Israel-Pakistan deterrence dyad might be the consequence of another trilemma—two in fact, since it is entirely possible that neither state is seeking to target the other with nuclear weapons. Israel may be focused solely on targeting all of Iran, and Pakistan’s only goal may be to reach all of India, but the capabilities they are developing to meet these requirements risk implicating one another. Nonetheless, regardless of each state’s true intentions, deterrence

18. At their closest points, Israel and Pakistan are about 2,400 kilometers apart. However, key targets in eastern Pakistan are about 3,500 kilometers from Israel. In theory, aircraft could manage this distance with mid-air refueling. Israeli F-15I aircraft may also have just enough range to reach Pakistan on a one-way mission.
relations would have obvious potential to be particularly fraught. Indeed, this dyad would be the first to involve one country that did not recognize the other’s right to exist. Pakistan’s then defense minister, Khawaja Muhammad Asif, provided a brief and worrying glimpse into what this deterrence relationship might look like in December 2016. He responded to a fake news story, which claimed that Israel had made a nuclear threat against Pakistan, by posting a now-deleted tweet that read, “Israeli def min threatens nuclear retaliation. . . . Israel forgets Pakistan is a Nuclear state too.” In theory, a mutual reassurance process between Israel and Pakistan, focused perhaps on building confidence in precise missile ranges and deployment locations, could be technically possible. Politically, however, it would be extremely difficult to orchestrate, particularly for Pakistan.

The advent of Israeli-Pakistani deterrence relations would be unique among the consequences of nuclear multipolarity discussed here in that it would bear directly on crisis dynamics—at least insofar as it could create a new deterrence dyad in which a crisis could occur. Moreover, its emergence could further fuel multipolar arms race dynamics. For example, if Israel were to start augmenting its long-range forces significantly, Pakistan might respond in kind, and, in so doing, stir new concerns in India.

CRISIS AND ESCALATION

Rising tensions increase the chance of a deep crisis or even a conventional conflict between two nuclear-armed states. In such a conflict, there would necessarily be some risk that one of these states, in a last-ditch effort to stave off a catastrophic conventional defeat, would resort to the use of its nuclear weapons. Today, this risk of deliberate escalation is growing as a result, in particular, of apparent doctrinal developments in Russia, Pakistan, and North Korea.

Simultaneously, developments in both doctrine and technology are creating a growing danger of inadvertent escalation—escalation that is an unintended consequence of authorized military threats and operations. While there are numerous potential causes of inadvertent escalation, two are particularly important and the focus of the following discussion.

First, crisis instability could occur if, in a deep crisis or conventional conflict, a state became worried that its nuclear forces were at risk of being destroyed preemptively. As an empirical matter, states make generally pessimistic assumptions in assessing the survivability of their own nuclear arsenals (and optimistic

19. While the United States recognized the Republic of China (Taiwan), and not the People’s Republic of China, until 1979, it did not question the latter’s right to exist.


ones in assessing their adversaries’ arsenals). In a conflict, this pessimism could become intense. In this case, the state could attempt to enhance survivability by modifying its posture—by predelegating launch authority, for example—or it could attempt to ward off an attack by issuing nuclear threats—either of which could trigger further escalation. In extremis, it might even employ nuclear weapons first, most likely in limited ways.

A second pathway to inadvertent escalation would be the transmission of unintended escalatory signals. Giving political leaders the option of signaling their willingness to use nuclear weapons is, on balance, desirable, since it could facilitate a form of crisis communication. However, escalatory signals sent without the knowledge of—or perhaps even contrary to the wishes of—political leaders could be very dangerous, since it would lessen those leaders’ ability to manage a crisis effectively.

**Doctrine and Escalation**

Three out of the four deterrence dyads in which a large-scale military conflict is foreseeable in the near future—India-Pakistan, the United States–Russia, and the United States–North Korea—are characterized by serious and lasting asymmetries in conventional power. In each dyad, the weaker state is believed to have potential incentives to initiate conventional violence and to contemplate the use of nuclear weapons to offset its weakness—a potentially combustible combination not seen during the Cold War. The stronger power in each dyad, meanwhile, has been developing a military doctrine that seeks to bring its conventional advantage to bear most effectively, but in ways that exacerbate escalation risks. In the fourth dyad, between the United States and China, the conventional balance is more fluid—though the United States still enjoys an advantage even in the West Pacific, let alone further afield. Escalation risks result, nonetheless, from U.S. efforts to maintain its advantage and from Chinese efforts to narrow the gap.

The development of anti-access/area denial (A2/AD) capabilities—by China in particular, but also by Russia and Iran—appears to be driving significant changes in U.S. doctrine for fighting a conventional war. These capabilities seek to prohibit or slow U.S. forces from entering a conflict zone or from maneuvering within it. China’s anti-ship ballistic missile, the DF-21D, may be the most headline-grabbing A2/AD weapon, but it is just one part of a larger suite of capabilities. To try and ensure its freedom of maneuver, the

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U.S. military has been exploring a concept originally called Air-Sea Battle that has now been subsumed within the somewhat less ear-catching Joint Concept for Access and Maneuver in the Global Commons. According to the Pentagon, the three goals of this concept are to “disrupt adversary command, control, communications, computers, intelligence, surveillance, and reconnaissance . . . destroy adversary A2/AD platforms and weapons systems, and defeat adversary employed weapons and formations.”

With the caveat that Air-Sea Battle and its successor are both classified and under development—making any discussion necessarily speculative—these goals appear to present certain risks of crisis instability. The most serious of these risks would arise if, as some U.S. analysts suspect, the command-and-control systems for China’s conventional and nuclear missiles overlap. In this case, U.S. strikes designed to deny Beijing control of its conventional ballistic missiles could be mistaken for a first strike on China’s nuclear forces. However, even if China has two entirely separate command-and-control systems, it is still possible the United States might misidentify the assets associated with the conventional one and accidentally attack its nuclear counterpart.

Other aspects of Air-Sea Battle are also potentially escalatory. Strikes against China’s air defense system or its strategic early-warning system could generate fears that its nuclear forces had suddenly become vulnerable to follow-on attacks. Alternatively, the United States might attack a nuclear-armed DF-21A after misidentifying it as a superficially similar nonnuclear DF-21D. Escalation would be especially likely if Beijing assessed this strike to be the start of a broader campaign against its nuclear forces—which is possible given that some Chinese strategists argue the United States might try to pick off China’s nuclear forces one by one, dismissing each strike as an “accident.”

Although much less noticed, China’s strategy for offsetting the United States’ conventional strength also could prove dangerous. Chinese strategists have, for example, advocated attacking command-and-control assets, including

28. Although focused on a U.S.-Soviet confrontation in the Cold War, the basic principles of escalation set out in Barry R. Posen, Inadvertent Escalation: Conventional War and Nuclear Risks (Ithaca, N.Y.: Cornell University Press, 1991), remain relevant.
early-warning satellites that have both conventional and nuclear functions. Since such satellites provide cuing information to regional ballistic missile defenses, Beijing might attack them to try and ensure the effectiveness of its conventional missiles, especially if it were losing a war. The United States, however, might interpret such attacks as the prelude to nuclear use; after all, early-warning satellites also serve to detect an incoming nuclear strike, and China might want to suppress them if it were about to use nuclear weapons, not least to try and ensure that such weapons could penetrate homeland missile defenses. To try and persuade Beijing to back down, Washington might issue its own nuclear threats, escalating the crisis toward the nuclear threshold.

In Europe, a Russian move against the Baltic states represents the most likely starting point for a major conflict involving Russia and the United States, which no longer seems entirely unthinkable in light of Moscow’s annexation of Crimea. Although NATO enjoys a wide margin of conventional superiority in Europe as a whole, it is significantly weaker than Russia around the Baltic (although efforts are now underway to at least start to address this problem). This imbalance creates the risk that Russia could take NATO territory relatively quickly and painlessly and present the alliance with a fait accompli. Russia might hope that the need for NATO to wage a costly and bloody war to reclaim the territory would deter it from trying. Russia might also try to bolster deterrence by threatening the use of nuclear weapons if NATO did launch a counterattack. This strategy—sometimes termed “escalate to de-escalate” in the Western discourse—creates significant risks of deliberate escalation. Moreover, even if Russia did not act on its nuclear threats following a counterattack, there would still be risks of inadvertent escalation—not least as a result of NATO efforts to suppress Moscow’s A2/AD capabilities and its nonnuclear forces, some of which are colocated with some of Russia’s nuclear forces. These risks would, however, be probably somewhat smaller than in a war against China, because Russia’s nuclear arsenal is significantly more survivable.

In Northeast Asia, while a North Korean invasion of South Korea looks highly unlikely, Pyongyang does have a long history of launching “provocations” against its neighbor. To date, Seoul has shown great restraint in responding. In


31. While inconsistent with Russia’s official declaratory policy, this strategy is consistent with what senior U.S. civilian officials and military officers have stated they believe Russia’s nuclear doctrine to be. See, for example, *Statement of Robert Work, Deputy Secretary of Defense, and Admiral James Winnefeld, Vice Chairman of the Joint Chiefs of Staff, Before the House Committee on Armed Services, 114th Cong., 4* (June 25, 2015), http://docs.house.gov/meetings/AS/AS00/20150625/103669/HHRG-114-AS00-Wstate-WinnefeldJrUSNJ-20150625.pdf.

a future crisis, however, it might hit back more forcefully, perhaps motivated by
domestic pressure. For example, following the shelling of South Korea’s Yeon-
pyeong Island in 2010 and public criticism of the government’s weak response,
then President Lee Myung-bak vowed that “war can be prevented and peace
assured only when such provocations are met with a strong response.” Retali-
ation by Seoul, however, would create the possibility of an escalating conflict
involving the United States, which is committed to defend South Korea. Faced
with a potentially catastrophic defeat, North Korea might resort to the employ-
ment of nuclear weapons to try and coerce the United States and South Korea
into backing down. Indeed, although Pyongyang has committed not to use
nuclear weapons first, it has also stated that this promise only applies if “hostile
forces for aggression do not encroach upon its sovereignty.”

Inadvertent escalation could also be a serious problem in a U.S.–North
Korean conflict. Once again, U.S. attempts to suppress North Korea’s nonnu-
clear missiles would risk generating crisis instability. Separately, as U.S. polit-
ical scientists Keir Lieber and Daryl Press argue, “the new American way of
war” involves attempts “to blind, confuse, and overwhelm the enemy. Even
if the United States decided to leave the adversary’s leaders in power . . .
how would Washington credibly convey the assurance that it was not seeking regime
change once its adversary was blinded by attacks on its radar and communica-
tion systems and command bunkers?” This escalation pathway would probably
become more likely to the extent that North Korea expects the United
States to pursue regime change. For this reason, South Korea’s overt planning
to “decapitate” North Korea’s leadership could make it more difficult to assure
Pyongyang once the shooting had started. To complicate matters further,
the United States probably would—and probably should—be unwilling to
foreswear regime change in all circumstances; there would, in particular, be
obvious benefits to threatening it in the event that North Korea used nuclear
weapons. But there would also be at least one significant disadvantage: a con-
ditional promise not to seek regime change might well be less credible than a
blanket promise.

33. Quoted in Ethan Kim, “North Korean Soldiers Boast of Yeonpyeong Island Attack,” Los
-korea-clash-20101227.

34. “Statement by the Government of Democratic People’s Republic of Korea,” Korean Central
News Agency (KCNA), Pyongyang, January 6, 2016.

35. Keir A. Lieber and Daryl G. Press, “The Nukes We Need: Preserving the American Deter-
has repeatedly observed in official statements the fates of Saddam Hussein and Muammar Gadd-
afi, both of whom gave up nuclear weapon programs and subsequently lost conventional wars
to the United States.

36. Choe Sang-Hun, “South Korea Plans ‘Decapitation Unit’ to Try to Scare North’s Leaders,”
asia/north-south-korea-decapitation-.html.
Finally, it is also possible to trace a clear causal pathway between sub-conventional violence and nuclear use in South Asia. The Pakistani government—or at least elements of it—has a long history of sponsoring terrorism against India. Following the December 2001 terrorist attacks on the Indian parliament and the ensuing crisis, the Indian army began to develop a doctrine, popularly known as Cold Start, to respond to further attacks. It calls for rapid mobilization, followed by a shallow incursion into Pakistan in an effort to punish Islamabad and force it to clamp down on terrorism. Pakistan has explicitly threatened to use nuclear weapons in response—a relatively credible threat given that such use could be on Pakistani soil after Indian troops had crossed the border. Paradoxically perhaps, an Indo-Pakistani crisis could be most dangerous if it was sparked by a terrorist atrocity emanating from Pakistan that was not, in fact, authorized by Islamabad. In this case, as U.S. analyst George Perkovich notes, India might wrongly blame Pakistan, and each side, believing itself to be the victim of aggression, could be particularly reluctant to back down.

*Nuclear Weapons and Escalation*

Programs to develop new strategic capabilities or modernize existing ones tend to spark a debate about whether they are “stabilizing” or “destabilizing.” It’s only a slight exaggeration to say that for “nuclear hawks” the distinction depends only on whether their own country is conducting the program (in which case it’s stabilizing) or another country is (when it’s not). As judged by “nuclear doves,” meanwhile, all such programs are destabilizing. Instead, the implications of nuclear weapon systems need to be considered on a case-by-case basis.

The most worrying developments are occurring in North Korea, which is developing land-based mobile missiles and sea-launched ballistic missiles, with the presumed goal of enhancing the survivability of its nuclear forces. Such efforts may enhance crisis stability; but any reduction in inadvertent escalation risks could be more than offset by an increased likelihood of deliberate escalation. Specifically, Pyongyang is developing intercontinental ballistic missiles (ICBMs), with the explicit goal of holding at risk targets in the United States,

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38. The Indian Army has denied the existence of an official doctrine by the specific name of “Cold Start,” but it has endorsed the concept’s essential elements and practiced them in exercises. For a recent discussion of Cold Start and its escalation risks see George Perkovich and Toby Dalton, “Proactive Strategy,” in Not War, Not Peace? Motivating Pakistan to Prevent Cross-Border Terrorism (Oxford: Oxford University Press, 2016), chap. 2.

which guarantees the security of both Japan and South Korea. If North Korea reaches the point (if it hasn’t already) where it believes it has attained mutual vulnerability with the United States, then, following the logic of the so-called stability-instability paradox, it may be more inclined to act aggressively against U.S. allies at the conventional and sub-conventional levels.  

Two developments in nuclear weaponry elsewhere appear particularly dangerous from the perspective of exacerbating inadvertent escalation risks. Programs to develop tactical nuclear weapons—particularly “battlefield” systems, such as short-range missiles, weapons delivered by short-range aircraft, and nuclear artillery—probably create the most acute risks. Pakistan is openly developing and deploying nuclear-armed, land-based ballistic and cruise missiles, which are reported to have ranges as low as sixty kilometers. Russia is probably also modernizing its force of battlefield weapons as part of an apparently extensive but highly opaque effort to update its large arsenal of tactical nuclear weapons. There has even been some informed speculation that North Korea may also be developing nuclear artillery.

The short ranges of such weapons necessitate their deployment near the battlefield, where they are potentially highly vulnerable to nonnuclear strikes or even to being overrun by a rapid advance. Although destruction of these weapons would not compromise a state’s ability to threaten an adversary’s homeland with nuclear strikes, it would undermine the state’s strategy for war termination on acceptable terms, raising the prospect of a catastrophic conventional defeat. As a result, “use ’em or lose ’em” dynamics could still trigger nuclear escalation. Moreover, to compensate for the inherent vulnerability of battlefield nuclear weapons and also, perhaps, to ensure operational flexibility, states might predelegate launch authority to field commanders, further exacerbating escalation risks.

The second development is Russian and Chinese efforts to field silo-based ICBMs armed with multiple independently targetable reentry vehicles (MIRVs). Russia has openly advertised its development of a new “heavy” missile, that is, a silo-based, liquid-fueled ICBM capable of delivering a large number of warheads. (Exactly how many warheads this weapon will carry is not known, but it is intended to replace the SS-18 Satan, which can be loaded with ten.) Meanwhile, according to the U.S. Department of Defense, China is currently in the


42. The arsenal also includes air defense weapons and long-range cruise missiles, which cannot be described properly as battlefield weapons.

process of fielding its first MIRVed missile by converting some old single-warhead, silo-based DF-5 ICBMs into a multiple-warhead variant.44

These programs may be financially attractive to Russia and China since putting multiple warheads on one missile is cheaper than building one missile for every warhead. But they are likely to come with the cost of an increase in the already acute fears that these states have for the survivability of their nuclear forces. Because it is generally assumed that two nuclear warheads would be used to destroy one silo, placing multiple warheads on the missile inside turns it into a much more attractive target. Doing so is also likely to compound Moscow’s and Beijing’s concerns about the vulnerability of their nuclear forces to conventional weapons, since silos are potentially vulnerable to advanced nonnuclear penetrators.45

At the other end of the spectrum, various modernization programs—including U.S. efforts to develop a new nuclear-powered ballistic missile submarine (SSBN), and Russian and Chinese efforts to field new land-based, mobile ICBMs—should promote stability by enhancing survivability. Some of the potential benefits may, however, be seriously compromised by states’ deployment practices. Mobile weapons are survivable only after being dispersed, and the act of dispersing them, which might be purely defensive, could send unintended escalatory signals. This risk can be mitigated by keeping some weapons permanently dispersed, as a number of nuclear-armed states do with their SSBNs. However, Russia and China do not appear to have adopted this practice with their mobile ICBMs.

An apparent shift in China’s nuclear strategy may further exacerbate this risk. Historically, Beijing appears to have planned to “ride out” a nuclear attack before retaliating. However, an important officially sanctioned textbook, the 2013 edition of the Science of Military Strategy, states that China has now developed the capability to launch its nuclear weapons on receiving warning of an incoming attack.46 While publicly available evidence suggests that this claim may be an exaggeration since China’s early-warning capabilities may not yet be adequate to enable a launch-on-warning posture, Beijing has embarked on an effort to modernize these capabilities and potentially facilitate a change in

posture in the not-too-distant future.\textsuperscript{47} At the same time, China still appears to keep its warheads and missiles stored separately, as it has always done, and there is little evidence that it is rethinking this arrangement. As a result, Beijing may be moving toward a posture in which its nuclear forces are kept off alert on a day-to-day basis, but placed on alert during a crisis. If so, the act of alerting would necessitate sending highly escalatory signals regardless of whether Chinese leaders actually wanted to. Moreover, China’s missile forces could be particularly vulnerable while warheads were being mated to missiles, exacerbating the risk of crisis instability. In fact, if China is to move away from its traditional policy of riding out an attack, it would probably be better for it to “go all the way” and keep at least some portion of its forces permanently on alert. Compared to a policy of alerting in a crisis, such a posture would slightly increase the risk of an accidental launch but significantly lower the risks of inadvertent escalation.

From a crisis stability perspective, it is not only the survivability of a state’s own nuclear forces that matters; the extent to which it can threaten an opponent’s forces is also important. From this perspective, U.S. efforts to modernize the B-61 gravity bomb, which appear to involve improving the weapon’s accuracy and hence its ability to destroy “hard” targets, could exacerbate escalation risks with Russia and China.\textsuperscript{48} In this case, such an outcome was not inevitable—the B-61 could have been modernized without increasing its military capabilities—but in other cases irresolvable trade-offs between different escalation risks can arise. For example, bombers are the most effective type of nuclear weapon delivery system for signaling, and so they are a useful tool for crisis management. The United States is currently developing a new nuclear-capable bomber, the B-21. If nuclear signals sent using this aircraft are to be credible, it must be able to penetrate the advanced air defenses that Russia and China are currently developing. However, given that these defenses probably have a role in protecting Moscow’s and Beijing’s nuclear forces, the capability to penetrate them is unavoidably escalatory.\textsuperscript{49}

\textit{Nonnuclear Weapons and Escalation}

The escalation risks resulting from developments in nuclear weaponry are at least familiar. Historical experience provides some kind of an empirical basis for understanding these risks, since perceived first-strike threats really did generate crisis instability during the Cold War—such as the dispersal of forces in crises

\textsuperscript{47} According to media reports, this program involves the development of early-warning satellites. For example, “China Plans to Launch Test Satellite for Missile Defense,” Kyodo News, August 24, 2015.


\textsuperscript{49} Indeed, given that the B-21 is set to be dual capable, it could be seen as enhancing the U.S. capability for both nuclear and conventional counterforce.
out of fear they were vulnerable—even if such instability did not culminate in nuclear use.50 Moreover, this experience may lead military planners to have some awareness of the risks. By contrast, the escalation risks resulting from developments in non-nuclear weapons are much less familiar. Looking forward, however, the emerging interactions between nuclear and nonnuclear weapons—sometimes termed “entanglement”—may prove to be a defining risk of the current nuclear age.

One manifestation of entanglement is dual-use delivery systems (that is, systems that can carry both nuclear and conventional warheads), as well as nuclear delivery systems that are superficially similar to nonnuclear ones. Such entanglement creates concern that a state might mischaracterize an incoming nonnuclear weapon as nuclear armed and launch a nuclear response. Such “warhead ambiguity” is a major argument against the United States’ development of a new nuclear-armed cruise missile.51 Supporters of the missile counter this concern by noting, entirely correctly, that “the United States has used dual-capable cruise missiles around Russia’s periphery multiple times . . . all without starting a nuclear war.”52 Yet, on none of these occasions was the United States at war with Russia itself, so they provide little evidence about how Moscow (or Beijing or Washington) might react—or not react—if it were the target. Indeed, part of the reason why this debate is both static and rancorous is the almost complete absence of evidence for either side, making it extremely difficult to assess the severity of the risk.

Moreover, the focus on warhead ambiguity may be overshadowing a potentially much more serious risk arising prior to the employment of dual-use delivery systems. In 2015, for example, China advertised its deployment of a new intermediate-range ballistic missile, the DF-26. According to apparently authoritative sources, the same missile body can be loaded with either a nuclear or conventional warhead (in contrast to other Chinese missiles, which have slightly different nuclear-armed and conventionally armed variants).53 This capability—termed “change the warhead, not the missile”—increases inadvertent escalation risks for two different reasons. First, if the United States misidentified conventional missiles as nuclear armed, it might wrongly conclude that China was considering nuclear use and potentially take aggressive measures to

50. James M. Acton, “Reclaiming Strategic Stability,” in Strategic Stability: Contending Interpre-
51. William J. Perry and Andy Weber, “Mr. President, Kill the New Cruise Missile,” Washing-
ton Post, October 15, 2015, https://www.washingtonpost.com/opinions/mr-president-kill-the-
new-cruise-missile/2015/10/15/e3e2807c-6ecd-11e5-9bfe-e59f5e244f92_story.html.
52. Matthew Costlow, “The New Nuclear Cruise Missile and the Stability Argument,” Real-
the_new_nuclear_cruise_missile_and_the_stability_argument_109003.html.
had-to-develop-the-dongfeng-26-ballistic-missile-bilingual-text-analysis-links/.
try and convince China to back down. Second, the United States might find itself attempting to destroy nuclear-armed missiles preemptively if it incorrectly assessed that they were loaded with conventional warheads. In this case, there would be a high risk of China’s wrongly interpreting U.S. operations as either an extremely aggressive nuclear signal, or worse still, as the opening salvos of a broader move against its nuclear forces.

By contrast, it seems unlikely that the “classic” warhead ambiguity problem could trigger inadvertent escalation after a DF-26 missile had been launched. The U.S. arsenal is highly survivable, so once DF-26 missiles were actually in flight, Washington would have little to reason to use nuclear weapons until the incoming missiles had detonated, allowing the nature of their payloads to be definitively determined (though, of course, Washington might well take other steps, such as attempting to intercept the missiles while still in flight).

A second manifestation of entanglement is nonnuclear threats—whether actual or perceived—to nuclear weapons and their enabling capabilities. During the Cold War, such risks were subject to serious consideration by Western analysts only during the decade or so before the collapse of the Soviet Union, with a focus on threats to Soviet SSBNs and its command-and-control system.

At the time, Soviet analysts were already starting to worry about whether advanced nonnuclear munitions might soon pose a direct threat to all components of their nuclear forces. Twenty-five years later, this possibility is a major concern of Russian nuclear strategists and, perhaps even more so, of their counterparts in China, which has a smaller and less survivable arsenal. These concerns have been most vocally expressed in the context of opposition to U.S. ballistic missile defense deployments. However, they extend to U.S. high-precision conventional weapons, including cruise missiles and even guided gravity bombs, and to improvements in the United States’ ability to identify and track mobile targets. In fact, most worrying of all to Moscow and Beijing is the combination of precise conventional weapons and ballistic missile defenses on the grounds that, even if U.S. missile defenses could not defeat a large-scale attack, they might be able to “mop up” the smaller number of warheads that might survive a conventional first strike. Some Russian and Chinese strategists even argue that threatening to retaliate with surviving nuclear weapons after a purely conventional U.S. first strike lacks credibility.

These concerns can appear fanciful to U.S. officials and analysts, and sometimes are dismissed as either paranoid or insincere. Indeed, for the foresee-


able future, it is inconceivable that U.S. nonnuclear weapons would be able to undermine Russia’s or even China’s nuclear deterrents. Moreover, it is sometimes useful for Russian and Chinese officials to play up their concerns, such as when arguing for greater military spending at home or scoring diplomatic points abroad. Yet, the evidence suggests that, by and large, Russian and Chinese concerns are real—which matters because, ultimately, the risk of crisis instability depends primarily on perceptions of force survivability.

The U.S. Department of Defense has frequently credited Chinese concerns. For example, in its 2015 annual report on *Military and Security Developments Involving the People’s Republic of China*, the Pentagon assesses that Chinese strategic modernization efforts are “intended to ensure the viability of China’s strategic deterrent in the face of continued advances in U.S. and, to a lesser extent, Russian strategic [intelligence, surveillance, and reconnaissance], precision strike, and missile defense capabilities.” A similar statement appeared in the five previous iterations of this report.

The U.S. Department of Defense does not produce an equivalent report on Russia, so its assessment of Russian concerns is not publicly known. However, the huge cost of Russia’s strategic modernization program shows that it is putting its money where its mouth is. Most aspects of this program—including the fielding of new SSBNs and road-mobile ICBMs—are clearly oriented toward enhancing survivability (if Russia’s only goal were to maintain numerical parity with the United States, it could do so much more cheaply by building only silo-based ICBMs). Air defenses constitute a second major focus of Russia’s military modernization; it is procuring the advanced S-400 system in large numbers and is developing the even more sophisticated S-500 system. Given that both systems will be deployed to protect Russia’s nuclear forces, these investments underscore the seriousness of its concerns about its vulnerability to precise conventional weapons.

In fact, Russian and Chinese actions point to other concerns they have yet to voice publicly. The nuclear forces of both countries are preparing defenses against cyberattacks. One interpretation of these efforts is that Moscow and Beijing are seeking to prevent the unauthorized use of their nuclear weapons. While this may be partially true, their primary fear is probably that Washington might employ cyber weapons to try to *deny* them control of their nuclear forces (presumably as one element of a nonnuclear first strike). The possibility of

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cyberattacks against nuclear weapons, or more likely their command-and-control system, might add to the risk of crisis instability. It might also create a virtual form of warhead ambiguity. One characteristic of cyber weapons is that fully determining the purpose of malware, especially complex malware, is both difficult and time consuming. As a result, a state that discovered a virus in its nuclear command-and-control system might be unable to determine the attacker’s intentions and mistake, say, an intelligence-gathering operation for an offensive one, sparking a potentially escalatory reaction.

Looking forward, the degree of entanglement between nuclear and nonnuclear forces appears set to increase as a result of further technological developments. The United States is conducting research and development into various technologies for precise, long-range conventional weapons that could travel at hypersonic speeds (at least five times the speed of sound). The Conventional Prompt Global Strike program, which is focused on the development of rocket-launched gliders, is the most well-known example of such a program, but it is not the only one.\(^{58}\) Both Moscow and Beijing (which, incidentally, also are exploring these technologies) worry that such weapons might be able to destroy their nuclear forces directly.\(^{59}\) Technological developments could also threaten the survivability of nuclear forces by holding command-and-control capabilities at risk. Ground-based components, such as antennae and satellite uplinks, are relatively “soft” targets and may already be vulnerable to high-precision conventional weapons. Meanwhile, reliable anti-satellite weapons, especially if able to reach targets in geostationary orbit, could threaten command-and-control satellites. Such entanglement bodes ill for stability.

**LOOKING FORWARD**

The drivers behind the growing likelihood of nuclear use are a mix of the old and the new. Crisis instability remains a major potential cause of inadvertent escalation, and the underlying dynamics, driven by concerns about force survivability, are the same as during the Cold War. The types of nuclear weapons that most exacerbate these risks—heavy ICBMs and short-range tactical systems—also remain the same. What has changed is the perceived emergence of serious nonnuclear threats—both kinetic and non-kinetic—to nuclear forces. Such threats are one manifestation of the growing entanglement of nonnuclear weapons with nuclear forces and their enabling capabilities. Entanglement is also creating other escalation pathways, without much of a Cold War antecedent, such as the possibility of nonnuclear operations transmitting unintended but highly escalatory signals. Simultaneously, deliberate escalation is becoming more

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58. For an overview see Acton, *Silver Bullet*?

likely, largely as a result of the relatively new risk of conventionally weak powers that rely heavily on nuclear weapons and have potential incentives to start wars. These risks are likely to become more acute over time. Multipolarity could facilitate the emergence of both damaging new arms races and fraught new deterrence dyads, even if further proliferation is held at bay. Developments in nonnuclear technology are likely to create even more entanglement. And all forms of risk reduction, but especially cooperative approaches, are becoming more difficult.

The challenge with cooperative risk reduction is, in part, technical. Governments have failed to subject most types of tactical nuclear weapons to arms control (though there are, at least, some promising ideas about potential approaches). These challenges pale in comparison, however, to the difficulty of developing risk-mitigation measures for some types of nonnuclear weapons that are becoming increasingly entangled with nuclear forces. Cyber weapons present particularly daunting challenges, but there is also no obvious way forward on anti-satellite weapons or even conventional cruise missiles. That said, the extent of the challenge depends on the specific technology. It could be very straightforward, for example, to make rocket-launched hypersonic gliders accountable under any future strategic arms control treaty.

Yet the greatest difficulties are, as always, political. Growing nuclear multipolarity undermines the feasibility of bilateral arms control, yet there is little appetite to tackle the complexities of multilateral negotiations. Generally poor relations between key states complicate matters further (although, as the Cold War demonstrates, states can take advantages of even temporary thaws to negotiate and implement useful arms control arrangements). Moreover, some states may even oppose the goal of reducing the risk of inadvertent escalation. Russia and China, for example, may be reluctant to entangle their nuclear and nonnuclear forces, because doing so could reduce the risk to the United States of attacking Moscow’s or Beijing’s nonnuclear forces. Thus, regardless of why these states entangled their nuclear and nonnuclear forces in the first place (a question that is open to considerable debate), they may now view entanglement as advantageous to deterrence.

The challenge of international politics is heightened by the generally corrosive effects of domestic politics. While it is simply incorrect to look back at the Cold War as a time when American politics stopped at the border, widespread fear about the possibility of a nuclear war did, from the mid-1960s onward, help to surmount some of the political barriers to arms control. Today, nuclear weapons lie near the edge of public consciousness almost everywhere, and, in the United States, arms control is often subject to the furies of a political system that is much more polarized than at any time during the Cold War. Moreover,

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60. The only exception was weapons eliminated under the INF Treaty. For suggestions on next steps in tactical nuclear arms control see CSIS Next Generation Working Group, Beyond New START: Enhancing U.S. National Security through Arms Control with Russia (Washington, D.C.: Center for Strategic and International Studies, September 2011), 16–18, http://csis.org/files/publication/110824_Acton_BeyondNewSTART_WEB.pdf.
American domestic politics is not the only problem. In South Korea, for example, popular pressure to respond forcefully to future provocations by North Korea could spark an escalating conflict. Meanwhile, it remains to be seen for how long Indian public opinion will tolerate New Delhi’s lack of a response to Pakistan’s rapid nuclear buildup.

Under these circumstances, the most promising—or, perhaps, the least unpromising—avenue to risk reduction lies with organizational reform within governments and militaries. In making a similar proposal more than two decades ago, U.S. political scientist Barry Posen acknowledged this conclusion may seem “odd,” but organizational reform provides one promising and practical pathway to raising the salience of nuclear risks in decision-making processes.\(^\text{61}\)

The importance of perceptual factors in driving interstate tensions, arms races, and escalation—especially inadvertent escalation—is difficult to overstate. Even a strategic procurement program motivated exclusively by defensive goals, such as enhancing force survivability, can stir tensions, and sometimes induce a counterreaction, because an adversary may judge it imprudent to assume that its purpose is entirely benign. In a crisis or conflict, the belligerent parties’ perceptions of the survivability of their own nuclear forces, as opposed to any more objective measure, would be the key determinant of crisis stability. The likelihood of escalation would also depend heavily on the extent to which leaders were capable of accurately assessing the intentions behind the adversary’s operations, and were simultaneously capable of understanding how their own operations might be interpreted—or misinterpreted—by the adversary.

Militaries are organized frequently in ways that tend to lead to such factors being discounted. The responsibilities for conventional and nuclear war planning are often divided, for example, which impedes consideration of the pathways by which conventional conflicts might inadvertently escalate to nuclear use. In the United States, conventional war planning is the province of the regional combatant commands, such as U.S. Pacific Command, while nuclear war planning is generally the responsibility of U.S. Strategic Command. More fundamentally, militaries, which are tasked with winning battles, are often poorly equipped to determine how an adversary might assess a new weapon system or interpret the purpose behind a military operation. Rather, it is civilians, including intelligence analysts, who are best placed to make such calls.

Organizational reform could help ameliorate these problems. In particular, nuclear-armed states could set up dedicated teams of civilian specialists, within defense departments or militaries, responsible for mitigating nuclear risks. These teams could assess war planning for its potential escalation consequences, and examine strategic procurement programs (whether nuclear or nonnuclear) from the same perspective, as well as for their effects on interstate tensions and arms racing. They could also be charged with developing arms control and confidence-building proposals to mitigate any identified risks. The results from their analysis would be made available to the senior decision-makers responsible for

overseeing procurement and war planning, who would be tasked with weighing them alongside other, more traditional military considerations. These risk-reduction teams could also be included in the group of advisers responsible for providing advice to national leaders in a crisis or conflict.

This idea is, of course, unlikely to gain traction in all of the nuclear-armed states, especially those in which strategic procurement and war planning is subject to a minimum of civilian oversight. But other nuclear-armed states would lose nothing by setting up such teams, and the United States, in particular, should take the lead. Ideally the Pentagon would set up a new assistant secretary, reporting to the under secretary of defense for policy, to lead risk-reduction efforts (although, in practice, creating a new deputy assistant secretary position would probably be a more realistic goal).

By itself, organizational reform is almost certainly an inadequate response to the scale of the challenge, but it would be a useful first step. At a practical level, while governments and militaries may be difficult to reform, they are at least more susceptible to change than international politics. Moreover, by institutionalizing greater awareness of escalation risks, organizational reform might help pave the way for a more proportionate response.