

A Nuclear World Transformed: The Rise of Multilateral Disorder

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The end of the Cold War produced great hope that the risks and dangers associated with nuclear weapons could be minimized or tamed in a cooperative international environment heavily regulated by arms control. If arsenals could be reduced, nuclear weapons marginalized, destabilizing factors constrained or eliminated, and proliferation prevented in a world increasingly governed by negotiated arms control, the nuclear perils of the Cold War would be left behind. Nearly three decades later, these hopes have been dashed. Instead, relations among the major nuclear powers have grown more contentious, the spread of nuclear weapons to new states has resulted in worrying regional nuclear orders, and technological advances are raising new threats and possibly introducing new instabilities, while arms control is in a state of near total collapse. A new nuclear order, combining traditional concerns with distinctive new dangers, is here. The perils of this new and still evolving nuclear reality must be understood if they are to be safely managed.

The end of the Cold War inspired hopes that the persistent threat of nuclear war could be left behind with the twentieth century. Instead, in the post-Cold War era, the contours of the global nuclear order have been reshaped, producing a new nuclear environment filled with distinctive risks and additional perils. Nuclear weapons have regained a central place in the difficult and competitive relations among the major powers, but in a framework that is less bilateral and more triangular. The spread of nuclear weapons to additional states has multiplied the sources of nuclear risk and introduced new pathways to the use of nuclear weapons. Unprecedented fears of nuclear terrorism have haunted policy-makers and consequently had a major influence on policy. In addition, the advance of technology is creating new threats and challenges, such as cyberattacks and cyber espionage, while also potentially undermining the survivability of traditional nuclear forces and hence eroding the deterrent stability that has long been thought essential for containing nuclear dangers. All this has unfolded while arms control has been nearly eliminated from the picture, moving toward an unconstrained environment in which the new nuclear dynamics can play out, with arms race pressures and potential instabilities already in view. What has emerged

and is still emerging is a more complex, more difficult, and less regulated nuclear environment whose distinguishing hazards must be safely navigated if we are to avoid the many nightmarish nuclear use scenarios. Understanding how much has changed, and the implications of those changes, leads directly to the conclusion that nuclear risks are dramatically increasing.

During the Cold War, the rivalry between the Soviet Union and the United States dominated the global nuclear order. These two states were preoccupied with one another and amassed vast arsenals of nuclear weapons in efforts to gain advantage and to deter the ambitions and capabilities of the other. Most of the formative theoretical and policy-oriented thinking about nuclear weapons emerged in this bilateral context: conceptions of stability and instability, the logic of arms control, the nature of crisis management, deliberations about deterrence and the adequacy of nuclear force postures, and arguments about how the powerful mutual interest in avoiding nuclear war could best be pursued. This world was not, of course, purely bilateral. On the Western side, the United Kingdom and France acquired small nuclear arsenals, but these states were formal allies of the United States and their nuclear assets were seen as minor supplements to NATO's nuclear capability. On the Communist side of the great East-West competition, China developed nuclear weapons, but its force was very small and limited, China itself was still a weak developing country, China's relationship with the Soviet Union was less stable than that of the NATO allies, and the Chinese threat was massively overshadowed by a Soviet arsenal that peaked at nearly forty thousand nuclear weapons. It was the confrontation between the two great nuclear titans that structured the global nuclear order during the Cold War and dominated the politics, policies, and thinking associated with nuclear weapons. We must now come to grips with the fact that this nuclear order no longer exists, and it is unclear whether the solutions and verities of the bilateral era will be adequate in today's more complex nuclear environment.

During the forty-five years of the Cold War, Moscow and Washington gradually constructed a nuclear relationship that was regarded as reasonably stable (though worries about destabilizing developments persisted), was heavily regulated by negotiated agreement (though doubts about arms control were ever-present), and was jointly managed via an ongoing arms control process (though critics questioned the desirability and effectiveness of this approach). There were risks and dangers, but the bilateral structure had a certain clarity and simplicity: two nuclear behemoths competing diplomatically while seeking to deter one another without sparking a nuclear war. This was a world, in security theorist Thomas Schelling's phrase, that we thought we understood.¹

The end of the Cold War initially produced new worries and dangers, particularly because the disintegration of the Soviet Union left the vast Soviet nuclear arsenal scattered across the newly independent states that emerged from the Soviet

collapse, raising the possibility of new nuclear-armed states and causing concern that nuclear weapons, materials, or personnel might leak into nuclear black markets and provide options for rogue states or nonstate actors. In the transition from the old world to the new, these risks represented an urgent challenge, and it would take several years and considerable effort to consolidate Soviet nuclear assets into Russia, which was accepted by key actors such as the United States as the sole nuclear successor state to the former Soviet Union.

Meanwhile, however, relations between Moscow and Washington (who between them still possessed – and possess – the overwhelming majority of the world’s nuclear weapons) quickly assumed a much more benign form as they together formally proclaimed “an era of friendship and partnership.”² This allowed, as one contemporaneous analysis put it, “serious consideration of international orders predicated on high levels of security cooperation.”³ The replacement of intense rivalry with congenial relations and cooperation seemed to open up huge vistas for negotiated restraint and joint management of the nuclear order. Reflecting the optimism of the time, another analysis suggested: “The revolutions of 1989 have opened unprecedented opportunities for more sweeping agreements. Arms control can now begin dismantling the East-West military confrontation – not merely moderating its risks – and thereby help shape the security structure of the post–Cold War world.”⁴ Indeed, soon after the collapse of the Soviet Union, ambitious new arms control objectives emerged on the bilateral agenda. At the Bush-Yeltsin summit in Washington, D.C., in June 1992, for example, the two presidents announced that they had agreed to make dramatic cuts in strategic nuclear forces, to eliminate destabilizing multiple-warhead (MIRV, or multiple independently targetable reentry vehicle) missiles, and to undertake an array of other cooperative measures: provisions codified in the START II agreement of January 1993. President Bush himself underscored the unprecedented character of this “extraordinary agreement,” noting at his joint press conference with President Yeltsin that “this fundamental agreement which in earlier years could not have been completed even in a decade has been completed in only five months. Our ability to reach this agreement so quickly is a tribute to the new relationship between the United States and Russia.”⁵ There seemed to be every reason to be hopeful that the new era would be marked by cooperation and restraint in nuclear affairs.

At the outset of the post–Cold War era, then, a well-elaborated and dominating bilateral nuclear framework inhabited an unprecedentedly harmonious international political context, Russian and American nuclear forces were shrinking dramatically, the balance was regarded as stable, nuclear arms control had real momentum, and it seemed as if nuclear dangers were being substantially tamed. Because the nuclear weapons left behind by the Soviet Union in newly independent states were being relocated to Russia, it also seemed likely that the bilateral structure of the nuclear order would remain intact. Further, there had not been

an open addition to the roster of nuclear armed states since the 1960s, when China acquired nuclear weapons: Israel's program remained opaque and unacknowledged while South Africa's long-hidden nuclear weapons program had been terminated in 1989. While proliferation worries remained (North Korea was already looming as a problem), there were no immediate nonproliferation crises on the international agenda, and it seemed that the central nuclear challenge would be managing the U.S.-Russian nuclear relationship in the context of what President George H. W. Bush called the new world order. These circumstances gave rise to extravagant visions of the nuclear order that might now be possible. A Harvard project on cooperative denuclearization, for example, suggested in 1993 that if this propitious moment were fully exploited, it might be possible to achieve "the elimination of nuclear weapons from the central role they have played in international life for fifty years" and to "establish new international norms that push nuclear weapons to the fringe of international life."⁶

But no such world has come to pass. Instead, over a period of nearly three decades, the benign bilateral nuclear order and the high hopes that accompanied it have disappeared.⁷ The optimistic expectations of the early post-Cold War period have been blighted, obviously, by the striking deterioration of U.S.-Russian relations that has revived the rivalry and hostility of the previous era. However, this factor alone does not adequately account for the realities of the current moment in nuclear affairs. Indeed, if the decay of the relationship between Washington and Moscow involved simply the restoration of something like the dominating Cold War nuclear balance, we would be on familiar ground, back on Schelling's well-understood terrain of maintaining bilateral nuclear stability within the confines of a conflictual and sometimes toxic political relationship. What has emerged is something different, something unfamiliar: a nuclear environment whose essential dynamics cannot be captured by a single overweening bilateral relationship at the core of the system. This outcome is the result of at least four major changes in the attributes of the nuclear order, changes that have arrived unevenly and fitfully over a several decade period. Together, however, they have combined to transform the nuclear environment in ways that are likely to make it more difficult to contain the risks and dangers associated with nuclear weapons.

The erosion of the bilateral nuclear order. In contrast to the bipolar Cold War international order, great-power relations are no longer overwhelmingly bilateral. China's stunning rise over the past quarter-century has changed the dynamics among the most powerful states at the heart of the international system. In the United States, China is now widely seen as the greatest challenge to American power and interests for the foreseeable future. Strikingly, the Pentagon believes that Beijing is harnessing its growing power to enormous ambitions: "As China continues its economic and military ascendance, asserting power through

an all-of-nation long-term strategy, it will continue to pursue a military modernization program that seeks Indo-Pacific regional hegemony in the near-term and displacement of the United States to achieve global preeminence in the future.”⁸ Beijing’s postulated goal of displacing the United States obviously represents a fundamental threat to America’s role in the world and is certain to elicit vigorous counteraction by Washington.

Simultaneously, Russia has reemerged as a rival. With its contentious policies, aggressive behavior, and thousands of nuclear weapons it will continue to figure centrally in Washington’s perceptions. But no longer does the United States focus in a singular way on Moscow. Increasingly, Russia and China are paired as the largest threats to U.S. security and to American influence in the international order. This can be seen plainly in the 2017 U.S. National Security Strategy, which states that “China and Russia challenge American power, influence, and interests, attempting to erode American security and prosperity.”⁹ This theme is echoed and underscored in the Trump administration’s 2018 Nuclear Posture Review (NPR), which highlights “the return of great power competition” as one of the animating forces shaping U.S. nuclear policy and identifies Beijing and Moscow as major sources of American insecurity. According to the NPR, “Global threat conditions have worsened markedly. . . . International relations are volatile. Russia and China are contesting the international norms and order we have worked with our allies, partners, and members of the international community to build and sustain.”¹⁰

China’s growing status as a serious challenger to the United States will inevitably make the nuclear relationship at the core of the global nuclear order more triangular. Bilateral dynamics will of course remain important, but they will be influenced and sometimes shaped by three-sided considerations. This will not be a symmetrical triangle, because China’s doctrine of minimum deterrence and its restraint in the acquisition of nuclear assets has produced a nuclear force posture considerably smaller and more limited in capability than the arsenals of the United States and Russia. Moscow’s thousands of nuclear weapons will for the foreseeable future constitute the largest nuclear threat. But China’s steady nuclear modernization program is creating a more capable force that is viewed as worrisome by Washington, requiring a “tailored” deterrent response. “Our tailored strategy for China,” the 2018 Nuclear Posture Review states, “is designed to prevent Beijing from mistakenly concluding that it could secure an advantage through the limited use of its theater nuclear capabilities or that any use of nuclear weapons, however limited, is acceptable.”¹¹

This three-sided nuclear relationship will produce more complex interactions among and more complicated calculations for the three protagonists. China’s growing impingement on the Russian-American orbit brings into the mix of great-power relations an actor with differing views on the preferred characteristics of the international order and sometimes divergent perspectives on key issues like

nuclear proliferation or on significant players such as North Korea, Iran, and Pakistan.¹² Effective management of this three-sided relationship will be difficult, as can already be seen in the frictions that have arisen in U.S. relations with both China and Russia and in the potential alignment of Beijing and Moscow against Washington.¹³

The nuclear policy reverberations among the three contending powers are already apparent. In the American discussion about the fate of the bilateral U.S.-Russia Intermediate-Range Nuclear Forces (INF) Treaty, for example, Washington's protracted concerns about Russian noncompliance put the issue on the agenda, but the case for terminating the agreement increasingly included the argument that the INF handicapped the United States in its effort to cope with the build-up of Chinese forces in the Western Pacific. China was not a party to the INF agreement and, being unconstrained, made a heavy investment in shore-based missiles that were seen as a serious threat to U.S. allies and U.S. naval forces in the region. The INF agreement prohibited the United States and Russia from deploying land-based missiles with a range between 500 and 5,500 kilometers, which precluded U.S. ground-based deployments in Asia to offset the Chinese missile capability. In terms of the Sino-American competition in the Pacific, the INF came to be widely regarded as a strategic liability.¹⁴ Indeed, when the U.S. withdrawal from the INF took formal effect on August 2, 2019, it was immediately apparent that the China factor had weighed heavily in the American decision. The termination of the treaty coincided with the news that the United States was planning a new missile "intended to counter China," and the U.S. secretary of defense expressed the goal of deploying ground-based missiles in Asia as soon as possible.¹⁵ Moscow was moved by a similar calculation, because Chinese medium-range missiles could hit targets in Russia but Russia was prevented by the INF agreement from deploying a symmetrical capability.¹⁶ Hence, Moscow followed Washington in announcing that it would withdraw from the INF. Mutual American and Russian accusations of noncompliance were the proximate cause of these withdrawals, but undergirding these decisions were strategic calculations that reflected the three-sided nature of the environment.

A similar trilateral dynamic can be seen in the context of ballistic missile defense (BMD). Here we find a round-robin of reciprocal concern, driven by Washington's sustained investment in missile defense over a period of decades. Because the United States withdrew from the Anti-Ballistic Missile (ABM) Treaty in 2002, there are no legal constraints on missile defense deployments, and the United States appears to possess an expansive appetite for such capabilities. Though current deployments and capabilities are quite limited, particularly against offensive forces as large as those possessed by Russia and China, Moscow and Beijing display palpable apprehension that their deterrent postures may eventually be undermined by advances in U.S. missile defense.

The United States has sought to allay such fears by insisting that its missile defense program is aimed at other states with small capabilities, such as North Korea and Iran, and lacks the capability to pose a serious threat to Russian or Chinese nuclear forces. However, explicit displays of interest in the United States in developing national missile defense for the homeland, continued substantial investment in missile defense technology, and occasional unadorned comments by U.S. officials and analysts about more ambitious missile defense goals undermine U.S. attempts to reassure Russia and China about its missile defense plans. In fact, the Trump administration's Missile Defense Review, released in January 2019, makes it clear that one of the goals of the U.S. BMD effort is to deal with challenges from Russia and China.¹⁷ In unveiling the Missile Defense Review, President Trump himself emphasized the expansive and open-ended nature of the U.S. BMD program: "Our goal is simple. To ensure that we can detect and destroy any missile launched against the United States anywhere, anytime, anyplace."¹⁸ China is also likely to have taken note when the national security advisor of the United States said, "China is building its nuclear capacity now. It's one of the reasons why we're looking at strengthening our national missile defense system here in the United States."¹⁹ For Russia, missile defense has been described as "a burning issue."²⁰ Russian President Vladimir Putin has been repeatedly outspoken about the danger posed by U.S. BMD. In his annual major speech to the Russian Federal Assembly in 2018, he remarked, "The U.S. is permitting constant, uncontrolled growth of the number of anti-ballistic missiles, improving their quality, and creating new missile launching areas. If we do not do something, eventually this will result in the complete devaluation of Russia's nuclear potential." Putin pledged that "we will make the necessary efforts to neutralize the threats posed by the deployment of the U.S. global missile defence system" and outlined an extensive set of nuclear modernization efforts that were justified as reactions to the U.S. BMD program.²¹

Triangular considerations are also making themselves felt in the realm of arms control. Increasingly, the view in Washington is that China will need to be drawn into negotiations and agreements that were once bilateral. China's growing power, the steady modernization of its nuclear forces, concerns about the possible future expansion of its nuclear arsenal, and its status with Russia as a primary challenger to the United States combine to suggest that in the future it will be increasingly difficult both to leave China out and to impose additional constraints on U.S. and Russian nuclear capabilities if China remains unconstrained. It is not a new thought to suggest that future strategic arms agreements should include China, but this calculation is becoming increasingly evident in policy discussions. President Trump, for example, has instructed his team to prepare for possible nuclear negotiations that would include both China and Russia. Including China in future arms control seems understandable, reasonable, and desirable, but at least in the short-to-medium term, it will represent a significant complication that is

more likely to impede progress than to lead to three-sided constraints.²² Nuclear arms control with China is unprecedented, its force posture is not comparable to those of Russia and the United States, and Beijing shows no interest in participating in negotiations under these circumstances. As Richard Burt, chief negotiator of the Strategic Arms Reduction Treaty, and Jon Wolfsthal, nuclear weapons expert and *Dædalus* author, have written, “Trying to expand nuclear deals to include China now may seem like a good idea, but in practice, it will have little or no chance of being achieved.”²³ And in the longer term, as well, it may prove difficult to find mutually acceptable solutions in three-way negotiations, keeping in mind that even the bilateral strategic arms negotiations were often arduous and painstaking affairs that required years to reach agreement.

In short, the familiar bilateral nuclear order that dominated nuclear affairs for the first six or seven decades of the nuclear age is fading away. In its place stands a triangular relationship whose complexities will only gradually be discovered, whose dynamics are only beginning to be learned.

The emergence of regional nuclear subsystems. In the hopeful days at the beginning of the post-Cold War era, concerns about nuclear relationships in regional settings simply did not exist because outside of the East-West context, nuclear weapons were not a part of the equation. In 1991, Israel was the only state thought to possess nuclear weapons outside of the five nuclear-armed states acknowledged by the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), and Israel’s nuclear capability was opaque, unacknowledged, and had not provoked successful nuclear acquisition by other states in the Middle East.²⁴

That began to change in May 1998 when India and, soon thereafter, Pakistan tested nuclear weapons, becoming the first states in several decades to openly transgress the nonproliferation norm and seek a deployed nuclear capability. In the intervening years, both New Delhi and Islamabad have invested steadily in their nuclear programs, have produced nuclear weapons numbering in the hundreds, and have acquired increasingly diverse and capable delivery systems. A regional nuclear order now exists in South Asia – a dramatic change from the world of 1991.

Nuclear-armed South Asia is a source of major concern for several reasons. First, relations between India and Pakistan remain fraught and serious incidents between them occur with some regularity. A string of crises – the 1999 Kargil War, the 2001 terrorist attack on the Indian Parliament in New Delhi, the 2008 bombings in Mumbai, among other incidents and clashes – has highlighted the dangers of acute friction between two nuclear-armed states. In March 2019, an Indian aircraft violated Pakistani airspace, was shot down, and the pilot was captured, creating a potentially incendiary crisis and providing yet another illustration of the fact that South Asia is a dangerous setting for nuclear weapons. Second, it is not clear how stable the nuclear balance in South Asia can be. Far from being separated by

hemispheres, as were the Soviet Union and the United States, India and Pakistan are immediate neighbors with a shared border and a history of war. Distances and flying times are short, warning time will be minimal, nuclear assets and command and control may be vulnerable (possibly producing preemptive or use-them-or-lose-them pressures), and in Pakistan's case, it has adopted a NATO-like doctrine of first use intended to neutralize India's conventional advantages. The Indian and Pakistani governments have shown their ability to manage incidents while avoiding escalation, but it is far from reassuring that this possibly precarious nuclear balance is tested by crisis after crisis. It is this dynamic that leads many to believe that nuclear weapons are more likely to be used in South Asia than anywhere else. Third, India's security policy and nuclear posture are influenced not only by Pakistan but also by China, with whom it has a history of uneven relations, unresolved border issues, concern about Beijing's close relations with Pakistan, and past wars within living memory. Here then we find another triangle, one that intersects with the great-power triangle and raises the prospect of cascading ripple effects. Chinese responses to developments in U.S. nuclear policy can affect India's calculations, which in turn will have implications for Pakistan.

After India and Pakistan came North Korea. As the Cold War receded and as former Soviet weapons were secured in Russia, looming proliferation concerns centered on North Korea's nuclear behavior. However, this crisis was staved off for nearly a decade by the 1994 Agreed Framework, which significantly constrained Pyongyang's nuclear program and put its nuclear assets under IAEA supervision. But this arrangement collapsed in 2002, North Korea withdrew from the NPT in 2003, and by 2006, it had conducted its first test of a nuclear weapon. In the subsequent decade and a half, North Korea has conducted a series of nuclear weapon and missile tests and acquired an estimated few dozen nuclear weapons, has deployed missiles capable of hitting regional targets such as Japan and South Korea, and has tested missiles of intercontinental range that, if deployed, would give Pyongyang the ability to threaten targets in the United States with nuclear attack. Thus, one of the world's most isolated and erratic regimes, led by an extremely authoritarian government that places extraordinary power in the hands of a single eccentric individual, is a nuclear-armed state. This has been one of the most disturbing developments of the past twenty years and has greatly complicated the security dynamics in Northeast Asia.

North Korea is a state, moreover, with a long history of deeply hostile relations with the United States and its regional allies. Indeed, because a formal peace treaty was never reached between North Korea and the coalition of states that fought against it, these states remain technically in a state of war. Pyongyang has given much evidence over a protracted period of time that it feels acutely threatened by the United States and its South Korean ally – who together dwarf North Korea in economic might and military power – so it is likely that it regards its nuclear

weapons as a necessary guarantor of its security, if not survival. Pyongyang's fear of attack appears to be genuine – not surprisingly, since the United States has in fact threatened North Korea in a variety of ways – and is a volatile factor that could prove destabilizing and even escalatory in a crisis.

The North Korean situation impinges on the interests of China and Russia as well as the United States, meaning that in Northeast Asia we find a quadrilateral set of nuclear-armed states involved in attempting to manage the region's security affairs, but with different relationships among the quadrilateral actors, different capabilities to influence the regional situation, and different interests and preferred outcomes. To complicate matters further, two key actors in the region, Japan and South Korea, are American allies and benefit from U.S. nuclear guarantees. Northeast Asia is a heavily nuclearized region: every actor in the region is a part of the regional nuclear order, whether directly or indirectly.

This disturbing picture illustrates several unfortunate consequences of the rise of regional nuclear orders. First, as was the case in South Asia, the situation in Northeast Asia raises nuclear risks in an environment in which bellicose rhetoric has been commonplace and serious incidents – including minor uses of force – have recurred. The unexpected détente in 2018 between President Trump and North Korean leader Kim Jong-un has calmed the situation for the time being, but it is not clear how long that will last or where it is heading. Their failed Hanoi summit suggests that continued progress may not be forthcoming. But the more common mode in North Korean relations with the United States and South Korea has been friction and confrontation. Indeed, the antecedent to the Trump–Kim Jong-un honeymoon was the war scare of 2017. On the American side, this was marked by the movement of naval forces, provocative flights along North Korea's coast, evacuation of some U.S. citizens from South Korea, and harsh threats from President Trump. With a crescendo of inflammatory rhetoric in the late summer of 2017, Trump delivered his most flamboyant and memorable line: “North Korea best not make any more threats to the United States. They will be met with fire and fury like the world has never seen.” This was, as the *New York Times* account commented, “chilling language that evoked the horror of a nuclear exchange.”²⁵ On the North Korean side, 2017 was a year of multiple missile tests, a nuclear weapon test, and brash rhetoric from Kim Jong-un, including personal insults of President Trump. This was a contest in reciprocal threat and provocative actions that produced genuine fears of war. “Nuclear war seems terrifyingly imaginable,” wrote *New York Times* columnist Nicholas Kristof in the midst of this crisis.²⁶

Second, North Korea displays few of the qualities and capabilities that make for effective crisis management.²⁷ Its military command system is unlikely to promote accurate and truthful reporting while its early-warning systems lack sophistication and redundancy. Mistakes, misperceptions, and errors are unlikely to be reported or corrected because of the fear of punishment in a harsh domestic political

environment. Senior decision-makers are quite likely to be operating on the basis of inadequate or inaccurate information, whether responding to an actual crisis or a false alarm. In addition, Pyongyang combines substantial vulnerability to attack with deep (and possibly warranted) fears of attack, a mix that could prove sharply escalatory in a crisis, especially in view of North Korea's preemptive nuclear doctrine. If Pyongyang believes, rightly or wrongly, that it is under attack or about to be attacked, it could well feel pressured to use nuclear weapons preemptively early in a crisis. The existence of such incentives in a region prone to tension and confrontational incidents is extremely dangerous. There is little reason to be confident that the North Korean system would be inclined or able to behave in a careful, cautious, restrained, or disciplined way under the pressure of a nuclear crisis. The traditional remedy to such nuclear risks is to promote strategic stability, which would imply accepting, if not facilitating, the emergence of a mutual deterrence relationship between Pyongyang and the United States. Because of North Korea's limited nuclear capabilities and Washington's massive advantage in military power, it is not clear whether it is possible for Pyongyang to develop a credible deterrent posture. But the problem is exacerbated by American policies aimed at preserving coercive and preemptive options against North Korea: U.S. policy prolongs and reinforces the instabilities that raise frightening nuclear risks on the Korean peninsula. For the foreseeable future, a crisis, an incident, or even a false alarm in this region represents a distressingly plausible path to the use of nuclear weapons.

Third, the North Korean case displays as well the interconnectedness of regional nuclear orders with the wider global environment. To provide protection from the North Korean missile threat in Northeast Asia, for example, the United States is deploying its Theater High Altitude Area Defense (THAAD) system in South Korea. To American eyes, this is a limited and purely regional deployment, aimed at North Korea, which should have no significant implications for China. Perhaps not surprisingly, Beijing does not see it that way and has reacted very negatively, criticizing the move and pressuring South Korea to change its policy. China appears to believe that the radar associated with the THAAD deployment in South Korea will augment existing American capabilities in ways that increase the U.S. ability to precisely track and target Chinese missiles, thereby degrading its deterrent force.²⁸ As Li Bin, one of China's leading strategic experts and a contributor to this volume, has explained, "China has to worry that the THAAD radar in the ROK would undermine China's nuclear deterrence by collecting important data on Chinese nuclear warheads that the United States could not acquire from other sources."²⁹ Thus, Washington's effort to address the challenge posed by North Korea's nuclear arsenal is having a direct impact on its relationship with China. If China responds vigorously to this perceived threat to its deterrent force, this will almost surely have implications for other nuclear actors (particularly India) in the triangles that involve China.

With the emergence of regional nuclear balances, there are new nuclear players, new risks, new sources of potential nuclear use, multiplying worries about nuclear stability, and new sets of intersecting policy concerns and calculations. Moreover, these regional dynamics are playing out in the context of an international system that is more complex and a core nuclear order among the major powers that is more triangular than bilateral. As political scientist and coeditor of this volume Robert Legvold has written of this challenge,

Over the forty years of the Cold War, leaders, defense planners, and pundits slowly came to understand the dynamics of a two-sided nuclear competition in a two-sided global setting – even if that setting began to lose its cohesion in its later years. But how were the dynamics of a many-sided nuclear world, with pairings and triangles multiplying, in a fractured international political setting to be understood?³⁰

This question poses a new challenge and represents an enormous change from the world of 1991.

Nuclear terrorism climbs the agenda of worries. It is simply impossible to understand American security policy in the post-Cold War era without recognizing the centrality of nuclear terrorism in Washington's threat perceptions. To be sure, nuclear terrorism was a concern even during the Cold War, but it was not prominent in the policy discourse and it was not a major influence on nuclear policy.³¹ Since the end of the Cold War, however, it has leapt up the agenda of nuclear worries: indeed, for a number of years, nuclear terrorism was widely regarded as the gravest danger to American security.³² This elevation occurred in two phases. In the first, starting in the early 1990s, the driving consideration was fear that the massive but shattered and impoverished Soviet nuclear complex might leak weapons-relevant materials and expertise and thereby provide a potentially large supply of nuclear assets for an international black market. This could fuel the proliferation of weapons to states but could also provide an opportunity for extremist terrorist groups to gain access to nuclear weapons or the materials and expertise to make them. In the chaotic aftermath of the collapse of the former Soviet Union, with political and social instability widespread, budgets plummeting, and zero demand for the services of the nuclear weapons complex, there was no confidence that the Soviet Union's nuclear assets would be properly secured. This was understood as a crisis and became an abiding priority during the 1990s. The United States launched the Cooperative Threat Reduction program (also known as the Nunn-Lugar program, after the two senators who sponsored the original legislation) in 1991, aimed at working with Russia to ensure that all nuclear weapons and materials were safely and securely stored. Years of effort and billions of dollars were invested in this effort, with considerable success in improving the security at Russian nuclear facilities. This experience also produced

an urgent long-term concern about the security of all nuclear materials on a global basis, a problem that remained a high priority at least until the advent of the Trump administration. President Obama, in fact, made the security of weapons-usable nuclear materials one of his signature issues and presided over four Nuclear Security Summits intended to promote higher standards of nuclear security for all holdings of nuclear materials.

The second phase in the elevation of the nuclear terrorism threat commenced with the shock of September 11, 2001. The terrorist attacks on the United States made it inescapably clear that terrorists were capable of mounting sophisticated operations on the U.S. mainland, were willing and able to kill large numbers of people, and harbored beliefs deeply hostile to the United States. Immediately and for some years to come, the so-called war on terrorism became a central element – arguably the central element – of America’s external policy. The specter of a nuclear 9/11 haunted this effort. As President George W. Bush warned on a number of occasions, it would be a nightmare if the world’s most dangerous weapons fell into the most dangerous hands. A bipartisan group of prominent political figures proclaimed nuclear terrorism to be the number one threat to American security.

Thus, for nearly two decades, Washington has viewed terrorists as another potential source of serious and worrisome nuclear risk, to be combatted where necessary, to be deterred if possible, and to be regarded always as a central concern of U.S. policy. Efforts to address this threat have, in various forms, had a huge impact on U.S. policy, including such major preoccupations as the Cooperative Threat Reduction Program with Russia, the 2003 invasion of Iraq, and the Nuclear Security Summits, all of which were justified at least in part by the imperative to reduce the threat of nuclear terrorism. This is a striking change in the nuclear agenda and a destabilizing influence on the international order compared to the familiar bilateral world that existed in 1991.

*E*volving technology raises new concerns. A fourth development changing the nuclear environment – and another that has progressed unevenly, and sometimes with unsettling rapidity – has been the evolution of technology. The accumulation of improvements and innovations is having a large effect on the character and stability of nuclear relationships. Three overlapping broad trends are notable.

First, advanced conventional weapons are increasingly capable of performing strategic missions, either through direct attack on an adversary’s nuclear assets or by attacking dual-use facilities (such as warning systems or command and control) whose destruction would degrade the other side’s ability to conduct nuclear operations.³³ Such attacks blur the line between conventional and nuclear conflict and create scenarios in which conventional operations can produce pressures to

escalate to nuclear use. This problem is compounded by the fact that some delivery platforms, including aircraft and missiles of various types, are being deployed in a dual-capability mode, meaning that an opponent will not be sure whether an incoming attack is conventional or nuclear.

Second, advances in surveillance, precision, and lethality are making it more difficult to retain confidence in the survivability of nuclear forces that are the foundation of stable nuclear relationships.³⁴ Land-based forces can be targeted, mobile forces can be surveilled and struck, sea-based forces may be increasingly vulnerable, and command and control of nuclear forces may be susceptible to disruption by conventional-, nuclear-, or cyberattack. The assured destruction that is, in the canons of nuclear strategy, the source of mutual stability may be increasingly difficult to assure. This is especially worrisome in the context of regional nuclear balances, with more limited forces and difficult security environments. But in the future, even the bigger nuclear powers may feel a need to take refuge in larger numbers and more diversified force postures.

Third, we have witnessed in the several decades since the end of the Cold War the emergence of new domains of technological competition, whether through the arrival of new systems such as cyber, advanced drones, and hypersonic delivery systems or through the extension of advanced military technologies into new environments such as space. In 1991, for example, no one worried about cyber threats to nuclear forces, but today, it is a growing concern.³⁵ Cyber interference in the command and control systems for nuclear weapons have the potential to very effectively disrupt an opponent's capabilities. Moreover, new technologies can widen the array of actors who are able to pose serious disruptive threats and have the potential to level the playing field between larger and smaller players. States like North Korea or Iran cannot possibly hope to match the nuclear force postures of the larger nuclear-weapon states, but they are capable of developing effective cyber capabilities, using drones, or putting military assets in space. For example, North Korea's nuclear weapons are of course worrisome, but there is a parallel concern about its cyber capabilities, which, unlike nuclear weapons, North Korea has appeared to employ regularly.³⁶ Technological advances are producing a wider array of threats from a wider array of actors.

Taken together, these trends are producing a military environment that is more complex and less stable. Technological advancement has been normal in the nuclear context, but the pace and extent of technological innovation in recent years is raising unprecedented issues and introducing new sources of threat, worry, and instability. The extensive nuclear modernization programs being undertaken by almost all of the nuclear armed states mean that the situation is very dynamic, with new technologies continually being absorbed into the postures, doctrines, and operations of states, creating a nuclear order that is markedly different from that which existed at the end of the Cold War.

*I*mplications. What is different about the current nuclear order? First, the great-power rivalry at the heart of the order has become less bilateral, more triangular. Second, fraught regional nuclear orders did not exist before about 2000, but now have become a major factor and a major concern. Third, the threat of nuclear terrorism looms much larger for the United States than was true during the Cold War. And finally, this extensive geopolitical change is unfolding in a fluid and fast-moving technological environment that may make it more difficult to create and preserve stable nuclear relationships. What are the implications of these changes?

- *Multiple audiences.* From Washington's perspective, it has become increasingly evident that its nuclear deterrent policies must be aimed at multiple audiences. Where the overwhelming preoccupation was once with Moscow (and China included as a lesser player), now the focus is on devising specific strategies for different targets, ranging from nonstate actors to great powers. This concept of "tailored deterrence" has become a prominent theme in U.S. nuclear policy, from George W. Bush to Donald Trump. As one analysis of the concept explains, tailored deterrence seeks

to address the distinctive challenges posed by advanced military competitors, regional powers armed with weapons of mass destruction (WMD), and non-state terrorist networks. . . . Given the wider variety of actors that could inflict mass casualties upon the United States, its allies, or its interests, it makes sense to explore whether and how deterrence could be adapted, adjusted, and made to fit 21st-century challenges.³⁷

- *More complex patterns of interaction.* The new nuclear order can be viewed as comprising a core nuclear triangle (China, Russia, and the United States) plus two multilateral regional nuclear subsystems. Two other regional arenas – Europe and the Middle East – can also be regarded as regional nuclear subsystems: Europe because of the American nuclear guarantees to its NATO allies and because the United Kingdom and France possess nuclear weapons; the Middle East because Israel has long been presumed to have a nuclear weapons capability and because concerns about Iran's appetite for nuclear weapons have been an overwhelmingly important factor in regional and international politics. The multiplicity of players in the nuclear order that now exists make possible reverberating chains of interaction, as nuclear relationships among some ripple through the perceptions and behavior of others. Thus, for example, China aided Pakistan, discomfiting India, while Pakistan in turn provided assistance to Iran's nuclear program, producing strong reactions in Washington, Jerusalem, and Riyadh. Nuclear relationships are not only bilateral or multilateral, but can cascade through multiple

actors in the system. In short, these multiple nuclear subsystems, each with its own characteristics and dynamics, intersect and interact. There are multiple points within these structures that can initiate moves that produce cascading reactions. China appears to occupy a particularly pivotal role because it is a major player in nearly all the multilateral components of the global nuclear order. Whether it persists with its relatively restrained nuclear policy – relying on a small deterrent force accompanied by a no-first-use doctrine – will be one of the crucial influences shaping the order in the years ahead. If China comes to adopt a more ambitious nuclear policy that expands its nuclear forces and makes it more competitive with Russia and the United States, Washington and New Delhi will surely react in some significant way, Russia will respond to whatever changes Washington makes to its policy, Pakistan will adjust to whatever New Delhi has done, and China's changed policy will have rippled through much of the system. But this is only one possible chain of interactions in a world of multiple multilateral nuclear subsystems. The arms race implications are obvious, especially as constraints on nuclear capabilities are waning. In the event that the only remaining limits – those in the New START agreement – are allowed to lapse, then, as journalist Fred Kaplan has written, “The Russians could build more weapons, the United States (and perhaps other nuclear powers) would probably respond, and off we go, once more, into the wild blue yonder.”³⁸

- *Multiple sources of instability.* The specter that haunted the Cold War was the large-scale nuclear war between the United States and the Soviet Union, and smaller or inadvertent variations of that catastrophic scenario. Today, there are multiple flash points. Relations between the big three powers are unsettled and Russian-American relations have become distressingly toxic. Given the evolving technological context, it is unclear how stable the great-power nuclear relationships will be, but there is no question that the combination of intense rivalry and worryingly vulnerable forces is a dangerous mix. However, the regional nuclear balances are even more likely to cause the use of nuclear weapons, given the troubled security environments in those regions and the factors that make conflict an imaginable outcome. There is even more doubt in regional contexts that the nuclear-armed states will be able to develop confidence-inspiring deterrent postures: the conditions that facilitated stability in the superpower setting are not easily replicable in regional settings and the regional nuclear powers must contend with the same technological challenges to stability as the bigger powers. Finally, there is the diffuse threat of nuclear terrorism, which provides yet another potential nuclear flash point, a risk of unknown proportions that, at least in Washington, is taken very seriously. In short, politics and technology have combined to produce an unfortunate number of sources of instability. As arms control

and nonproliferation scholar Steven Pifer has written, “Strategic stability appears increasingly a multilateral and multi-domain construct. This is a much more complex model than during the Cold War.”³⁹

- *More difficult environment for arms control.* Technology is evolving in ways that can make past agreements obsolete and new agreements difficult or impossible to achieve. Cyber threats, for example, may represent an urgent problem, but it is hard to see how they can be constrained by arms control. If technology is making arms control more difficult, politics seems to be making it less likely. The frayed relations between Moscow and Washington have led to a substantial erosion of the Cold War arms control architecture and there appears to be little will to move forward with new initiatives. China is now a major player but appears to be still unready to join trilateral or multilateral strategic arms control negotiations. The regional nuclear balances are almost completely untouched by any negotiated constraints. Prominent multilateral arms control efforts, such as the Comprehensive Nuclear-Test-Ban Treaty and the Fissile Material Cutoff negotiations, have been stymied for years, with no indications of progress anywhere in sight. Ideally, it would be possible to constrain and manage the new nuclear order using the kinds of arms control processes and mechanisms that helped to regulate the nuclear rivalry in the Cold War. In time and with concerted effort, perhaps it will prove possible to recreate a negotiated regulatory infrastructure that will moderate the risks and dangers of this new age. For the moment, however, conditions are not propitious and the current picture is bleak: bilateral arms control is collapsing but seems in any case insufficient; trilateral arms control seems necessary but so far remains impossible; multilateral arms control is comatose; and regional arms control is desirable but is as yet nonexistent.

Thus, the great challenge for nuclear policy today: finding a safe path through a nuclear environment that will for the foreseeable future be considerably more complex, filled with sources of risk, and considerably less regulated than what we have known. The perils are likely to be at least as great as those confronted in earlier eras of the nuclear age. That we have survived three quarters of a century without nuclear catastrophe is no guarantee that we will successfully manage the nuclear danger in the coming phase. Rather, what we urgently need is a deep understanding of the risks that now exist and that may yet emerge, and hard thinking about the steps that can be taken to minimize those risks. This volume hopes to serve that cause.

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