# On Nuclear War: Deterrence, Escalation, and Control

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## Introduction

During the Cold War, and especially in the 1980s, there were some serious efforts in the academic and policy communities to study how a nuclear war could end.[1] The large nuclear arsenals of the Americans and Soviets, the drift of US and Soviet military thinking, and the policy related anxieties of other skeptics, all precluded closure on this question before the Cold War ended. In a policy debate on the role of nuclear weapons polarized between the "deterrence only" and "actual use" schools of thought, the question of how to conduct a nuclear war controlled by policy and coherent strategy received short shrift.

The subject of nuclear war termination should be reopened now because the threat of nuclear danger has changed from one of quantity to one of quality – who has nuclear weapons, and for what purpose are they intended? The political and technological environments relevant to starting and stopping a nuclear war are markedly different from the Cold War context. It would be a major tragedy if in the aftermath of the first nuclear weapons fired in war since Nagasaki, neither the United States nor other great powers had thought through how to abort a nuclear conflict in its early stages. For unlike the hypothetical Armageddon between the Americans and Soviets that never occurred in the last century, smaller than global but nevertheless highly destructive nuclear wars could take place in this century. Some of these conflicts have the potential to spread into a wider war – for example, between India and Pakistan – that could engulf other nuclear powers in the Asia-Pacific region. Pakistan could find

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itself supported by China, and India could find itself supported by Russia and/or the United States, initially by means of extended deterrence but later by actual conventional or nuclear strikes. In addition, although the likelihood of any deliberate nuclear attack by the US or NATO against Russia, or vice versa, is obviously small to nonexistent, the possibility of inadvertent nuclear war or escalation into nuclear first use in Europe is not to be excluded – including in Russia's declaratory military doctrine and in NATO contingency planning.[2]

This study will attempt neither to construct particular scenarios of war termination nor to examine important topics such as bargaining strategies or monitoring and verification of nuclear cease fires. The focus here is broader, namely, the political-military contexts for the management of nuclear crises and post-crisis force operations, including escalation control and war termination. Specifically, correcting the potential inability of states to terminate a nuclear war requires that military planners and policymakers first accept the concept of nuclear war termination as feasible and desirable. There are considerable obstacles standing in the way of that acceptance, not the least being the intellectual resistance by many, based on the assumption that deterrence is undermined by a willingness to plan seriously for its possible failure.

## Deterrence: How Reliable?

The first use of a nuclear weapon by one state against another since 1945 will create a tectonic shift in the expectations of policymakers and military planners worldwide. The nuclear taboo that supposedly restrained the hands of crisis bound policymakers during the Cold War and for the remainder of the twentieth century will have been shattered. Left in its place will be uncertainty, and the plausible expectation that first use may be followed by retaliation and further escalation. Of course a nuclear power could choose to attack or coerce a non-nuclear state, primarily with conventional weapons but amplified by the shadow of its nuclear power. Such an attempt at coercion could incur condemnation from the international community and responses from allies of the victim, including those with nuclear weapons. North Korea's intermittent and unpredictable disputes with South Korea, including the sinking of a South Korean naval vessel in March 2010, illustrate political and conventional

military coercion supported by the tacit deterrence of North Korea's limited nuclear capability.

It is generally assumed that the possibility of a nuclear war is related in some unquantifiable but nonetheless discernible way to the number of states with nuclear weapons and to the amicability or hostility of the inter-state relations. Unfortunately for peace in the twenty-first century, the roster of states with nuclear arsenals is increasing. North Korea's official acknowledgment of its nuclear weapons capability has been followed by off-and-on international efforts through the six-party talks (the United States, Russia, China, Japan, South Korea, and North Korea) to negotiate a freeze, followed by a reversal of the DPRK's military nuclear program. These efforts have proved extremely frustrating for those negotiating with North Korea, and uncertainty about North Korea's intentions increased with the death of Supreme Leader Kim Jong-Il in January 2012 and his succession by his son, Kim Jong-Un, who sports a political and personal blank slate.

Along with North Korea's entry into the nuclear club, Iran is suspected of having a strong intent to weaponize its nuclear fuel cycle. The US and leading European Union states, including Britain, France, and Germany, have exerted diplomatic and economic pressure against Iran since 2004, attempting to persuade Tehran to stop short of a de facto or acknowledged nuclear weapons threshold capability. In addition, negotiations between Iran and the P5 (the permanent members of the UN Security Council: the United States, Russia, Britain, France, and China) and Germany seek to create an ongoing diplomatic engagement, supported by pressure on Iran from the International Atomic Energy Agency (IAEA) and the European Union to demonstrate additional transparency about its nuclear aspirations and infrastructure. Part of the problem for the P5+1 was to determine exactly with "whom" or what domestic factions they were negotiating: it appeared that alternative hard and soft views within Iran's political and military elites, including its Revolutionary Guards Corps and religious leadership, created a shifting kaleidoscope of Iranian intentions and negotiating positions.

Figure 1 summarizes expert estimates of the probabilities of various paths for Iran to nuclear explosive materials.

**Figure 1. Probability Levels of Iranian Paths to Nuclear Explosive Materials**

| Method | Probability 2013 | Probability 2014-15 |
|---|---|---|
| Rapid jump at declared centrifuge sites to highly enriched uranium (HEU) using safeguarded LEU | | |
| Natanz | low | low |
| Fordow | low-medium | low-medium |
| Rapid jump at undeclared, covert centrifuge site using the safeguarded LEU stockpile | low-medium | medium |
| HEU production under safeguards at declared centrifuge plants | low | medium |
| Parallel covert centrifuge program | low | medium |
| Secret production of HEU at declared safeguarded sites | low | low |
| Arak reactor and secret, undeclared reprocessing plant (reactor operational in 2014) | – | low |
| Laser enrichment to produce HEU | low | low |
| Illicit acquisition of fissile material overseas for use in nuclear weapons | low | low |
| Legal withdrawal from NPT followed by weapons production | low | low-medium |

**Sources**: David Albright, Paul Brannan, Andrea Stricker, Christina Walrond, and Houston Wood, "Preventing Iran from Getting Nuclear Weapons: Constraining its Future Nuclear Options," Institute for Science and International Security, March 5, 2012, http://www.isis-online.org/uploads/isis-reports/documents/USIP_Template_5March2012-1.pdf, cited in Anthony H. Cordesman and Alexander Wilner, *Iran and the Gulf Military Balance – II: The Missile and Nuclear Dimensions*, Working Draft, Major Revision 5 (Washington, D.C.: Center for Strategic and International Studies, July 16, 2012), p. 40, www.csis.org/burke/reports. See also David E. Sanger and William J. Broad, "Iran Said to Nearly Finish Nuclear Enrichment Plant," *New York Times*, October 25, 2012, http://www.nytimes.com/2012/10/26/world/middleeast/iran-said-to-complete-nuclear enrichment-plant/html.

As of November 2012, neither diplomatic coercion nor various economic and political inducements led Iran or North Korea to nuclear abstinence.[3]

The existing state powers and international organizations had to decide what other steps short of war were available. One alternative was to put the matter of Iranian or North Korean nuclearization before the UN Security Council. Regarding this option, China was likely to block any serious sanctions against North Korea. Better prospects existed for multilateral (US and European) or international (Security Council) coercion of Iran. A series of UN resolutions since 2006 have increased pressure on Iran to comply with international arms control inspectors, to restrict its trade in nuclear and military related materials and equipment, to suspend enrichment and reprocessing activities, and to limit the activities of the Iranian Revolutionary Guards Corps (IRGC) and others suspected of engaging in prohibited activities. The European Union in January 2012 agreed on an oil embargo against Iran effective from July of that year and a freeze on the assets of Iran's Central Bank. In March 2012, Iranian banks in breach of UN sanctions were disconnected from SWIFT, a global coordinating hub for international financial transactions. A number of states have imposed bilateral sanctions against Iran, especially the US, with its almost total economic embargo and arms ban, including sanctions on Iranian financial institutions and companies doing business with Iran.[4]

Despite these and other sanctions, Iran's march toward the cusp of nuclear weapons capability appears inevitable, barring an unprecedented breakthrough in diplomacy or military action. A study by the Institute for Science and International Security has noted:

> If Iran is unwilling to make concessions to negotiate a long-term solution, the strategy must remain the alternative path of complicating and constraining Iran's pursuit of nuclear weapons capabilities or the weapons themselves. Achieving interim negotiated measures, such as caps on enrichment levels and centrifuge deployments, would remain important. But the main effort would entail a strengthened effort to delay, thwart, and deter Iran's pursuit of nuclear capabilities.[5]

The problem of containing proliferation among rogue or state actors was actually twofold. The first part was what to do with additional states having become nuclear capable. The second aspect was the valid concern that rogue nuclear powers might pass nuclear technology or know-how to non-state actors, including terrorists. It was known, for example, that even before 9/11 al-Qaeda had attempted to acquire nuclear weapons grade

material. The US and other countries with comparatively large national territories were ironically more vulnerable to some kinds of attacks by weapons of mass destruction (WMD), including chemical, biological, radiological, or nuclear weapons, in the sense that larger states have a greater variety of target sets to defend, including widely dispersed civilian infrastructure.

Some optimists about the probable consequence of further nuclear weapons proliferation among states might argue that deterrence would work in the future, as it presumably did during the Cold War. The optimism is based on the hindsight that we survived the Cold War without accidentally or deliberately setting off a US-Soviet nuclear exchange leading to a global catastrophe. Persons living through the Cold War and its various crises, especially the Cuban missile crisis, had a somewhat less deterministic view about the success of deterrence. Moreover, even if Cold War deterrence was as assured as optimists supposed, deterring terrorists and other non-state actors from nuclear adventurism is another task altogether.

Deterrence of non-state actors lies outside the scope of this essay, assuming that "deterrence" as a robust concept applies at all to prevention of terrorist attacks.[6] The objective of deterring rogue or other states is sufficiently challenging for Western planners and policymakers. Some government officials and others concerned about the behavior of rogue actors have concluded that they are in all likelihood beyond the grasp of rational deterrence strategies. At the very least, rogue actors might not be amenable to military persuasion by the US or any Western model of rational deterrence.

The US model of deterrence rationality emphasizes the cost-benefit calculations of various courses of action. Decision makers choose the alternative with the lowest anticipated cost and the largest potential benefit relative to other available alternatives. Deterrence theory is thus one aspect of public choice theory, and as such, it works only within a limited frame of reference or "bounded rationality." Within this framework, adversaries are assumed to have accurate information about one another's goals, alternatives, and positive or negative weights assigned to various options.

The vulnerabilities of this model of analysis, applied to the real world of nuclear crisis management, are serious and potentially deadly.[7] It is not so much that deterrence theory is more deficient in the abstract, compared to other possible approaches to conflict management. The challenge lies in

applying the abstract logic to a myriad of concrete situations. The specific circumstances of a crisis are important in understanding how it tumbled into a war. Once deterrence has presumably failed and war has broken out, the course of battle influences the remaining options for policymakers and commanders who wish to stop the war sooner rather than later.

It is a mistake to suppose that an outbreak of war is necessarily the result of deterrence failure. An adversary may be bent on attack come what may. Thus the motives and mindsets of possible enemies are as important as are their capabilities for determining whether and when they might attack. History is full of wars begun under assumptions about enemy intentions and capabilities that the test of battle later proved fallacious. Attackers have not infrequently begun wars against states with greater military capabilities. Often the attackers in question doubted the resolve of the defenders. In other instances, states misperceived one another's intentions relative to war because they failed to comprehend essential aspects of the other side's strategic culture, military planning priorities, or "art of war." Wars undertaken by leaders who err on one or more of these factors are sometimes referred to as "accidental" or "inadvertent" (usually by political scientists who favor these concepts, less often by historians who are more skeptical).

Deterrence during the Cold War, at least in US academic discourse and public policy analysis, was in constant danger of overstretch. For some analysts and policymakers it became a talisman that replaced hard data or serious thought. Deterrence was also sometimes substituted for policy instead of for military strategy (separate problems, but related). The domino theory that the US used to justify its military escalation in Vietnam is one example of deterrence (and its twin, credibility) stretched across the conceptual and geographical fault lines that separated war in Europe from war in Asia.

It would be premature to declare that aspiring nuclear powers, including rogue states, are "beyond deterrence" in the sense of existential deterrence. Nonetheless, deterrence will certainly operate differently in the twenty-first century compared to the Cold War. One reason for this is related to nuclear proliferation. Nuclear weapons were the hallmarks of great powers that during the Cold War were mostly content with the geopolitical status quo. Future nuclear aspiring or nuclear capable states, on the other hand, may be revisionists with regard to their international policy objectives.

In fact, the very term "rogue" or "state of concern" implies as much: the rogue is only roguish from the standpoint of those who favor the existing system and its parameters. Those who wish to overturn the system might regard rogues as heroes. In the eighteenth century, American and French revolutionaries were rogues against the established order: now their successor states are part of it.

Another question raised about deterrence is whether it can apply to heads of state, military leaders, or terrorists whose motives are apocalyptic or otherwise non-rational. This of course invites the question: what is a rational motive?[8] Suffice it to say that one state's rationality may be another's irrationality, but the distinction is not a clinical one. Individuals who are clinically suspect may nevertheless make clear decisions on behalf of their states in troubled times: indeed, many have done so. Rationality has to do with the logic of means and ends connections: is the state acting in a way that maximizes its likelihood of success in the event, or minimizes its probability of failure.

In a crisis between two nuclear powers, the difficulty rises because the decision logics or "rationalities" of the two sides are interdependent. Each has a sequence of moves that may be more or less logical, in reaction to the move of the other. This interdependency of moves and motives is what makes nuclear or other crises so hard to manage.[9] Imagine a two dimensional chess game with the players blindfolded, and with each side permitted a finite number of mistakes (say, two wrong moves) before the players and the board are blown to smithereens. The example is not fatuous: US President John F. Kennedy and Soviet Premier Nikita Khrushchev played something like this during the Cuban missile crisis.

## Principles of Escalation Control

As related to the problem of ending a nuclear war, theories of escalation control contain several key propositions. All are controversial, but none is self evidently impossible. First, even nuclear war, however destructive, would involve political goals, at least at the outset. Second, states and leaders can be expected to recognize certain rules of the game about fighting and ending wars, despite cultural and national differences. Third, although time pressures and the military planning process impose constraints upon escalation control for war termination, success is not precluded in practice.[10] Paul Bracken has argued with reference to defensible Cold War

views of this matter: "The assumption of robustness with respect to time pressures and planning rigidities is supported by the certainty that in a nuclear crisis each nation's top leader would be at the helm, overriding bureaucratic obstacles of delay and omission."[11]

The idea of ending a nuclear war already in progress implies that deterrence can be applied to the problem of limiting a war as well as preventing it. A nuclear war is a failure of deterrence that has already happened. Worse, however, would be for the various parties to the conflict to continue firing until their arsenals were exhausted or all major cities destroyed. Getting combatants to the bargaining table after the shock of nuclear combat would not be easy. Unless the war was started by mistake, say an accidental launch or a rogue commander, important issues of state would be in dispute. In addition, the anger of survivors at the consequences of nuclear attacks on their society would be difficult for governments to manage. Survivors' demands for retaliation and revenge might overwhelm policymakers' efforts to arrange ceasefires or surrenders.

The termination of a nuclear war, as in any war, has both military-tactical and politico-strategic aspects.[12] The tactical situation on the battlefield is obviously important. After the early nuclear attacks have taken place, each side may have surviving forces. The surviving forces are bargaining assets that can be used in negotiating a ceasefire or peace agreement. Even a few surviving forces on either side can threaten to inflict a great deal of societal destruction on the other, and its leaders might prefer to negotiate instead of to continue fighting. However, in the chaos attendant to nuclear war, even a "small" regional war by Cold War standards, leaders and their military advisors might not have reliable information about the status of the enemy's forces and command and control systems.

Command and control systems present an anomaly to planners who might want to leave the door open for intra-war deterrence and nuclear war termination. On the one hand, in traditional military thinking based on experience in conventional war fighting, attacking command and control and communications systems makes perfect sense. It is an efficient way to destroy the opponent's military cohesion and coordination. Attacks on the enemy's brain and central nervous system, as were carried out during Operation Desert Storm, are important force multipliers that can be used to win a war in good time and save both friendly and enemy casualties.

But in a nuclear war, the destruction of enemy political or military command and control systems would almost certainly exacerbate the problem of ending the war, and at two levels. At the tactical level, the destruction of military control systems would cut the nuclear retaliatory forces and their commanders into separate pieces. Each piece would be programmed to continue firing and fighting unless otherwise directed to stand down. However, the stand down orders might never reach the relevant field commanders having custody of nuclear weapons, nor those authorized to fire them (who might be the same people, but not necessarily). Thus, "outliers" in the nuclear military chain of command might not hear, or want to hear, ceasefire orders.[13]

Destruction of the main political center of the opponent might paralyze its civilian leadership and make it impossible for the President or Prime Minister, or other surviving cabinet officials, to gain secure and reliable control over the armed forces.[14] Consider, for example, an Iranian attack on Israel, or a Pakistani strike against India, that "succeeded" in decapitating the heart of the enemy's political leadership. Effective control over the armed forces of the attacked states would almost certainly pass directly to the military and other security organs. The surviving political leadership in Tel Aviv and in India would at least temporarily be the prisoners of fast moving events and asserted military imperatives. It would take considerable time, and at least the appearance of an interim ceasefire, before anything like "normal" relationships between politicians and the armed forces were reestablished.

Assessment of the viability of command and control systems under the stress of nuclear or other WMD attacks is made difficult by the scarcity of reliable information in the public record. It might be supposed, for example, that each state or government has official, written arrangements for delegation of political office and for devolution of military command during crisis and war – across the spectrum of conventional and if necessary nuclear conflict. But this assumption could be mistaken for nuclear aspiring or new nuclear states. Even if written protocols exist, they may not be adhered to or correspond to reality once the shooting starts. In addition, the delegation of political authority and the devolution of military command and control may differ in important ways. Another uncertainty with respect to nuclear crisis or wartime command and control systems is how they might be affected by strategic or operational cyber war. For example, cyber

attacks preceding or accompanying kinetic attacks might make it more difficult to control military operations and to assess enemy intentions accurately, thereby confounding negotiation for war termination.[15]

The American Presidential Succession Act and various other legislative enactments, as well as Constitutional requirements, clarify both non-emergency and emergency procedures for answering the question "Who is in charge?" if the President is killed or disabled. The military chain of command, although it begins with the presidential center, is not identical to the political one. The wartime chain of military command proceeds from the President, to the Secretary of Defense, and then to the regional or functional combat commanders (through the Joint Chiefs of Staff). This system ensures that even if the political decision center is paralyzed by a surprise attack, the military commands authorized to retaliate can do so in a timely manner. These command and control arrangements were worked out over many years of Cold War trial and error. They were, and are, intended to provide a solution for the oxymoronic requirement that forces "never" be fired without appropriate authorization but "always" respond promptly when authorized missions are required.[16]

In the early years of the nuclear age, US policymakers and military leaders struggled to define a rule for the control of nuclear weapons in peacetime and for the management of nuclear forces during crisis and war. The Truman administration initially assigned custody over atomic weapons to a civilian agency. The weapons could only be released to the military by presidential order. As this became impracticable in the missile age, systems were required for dispersing weapons to the military while maintaining them in secure storage and proof against accidental or unauthorized use. In addition, land based, sea based, and air launched weapons required platform-specific protocols: aircraft could surge to "fail safe" points and wait for confirming orders before proceeding to attack. Missiles, on the other hand, are not subject to recall: their launch was an irrevocable decision for war.

## Escalation Control: New Challenges

The details of US and Soviet Cold War force operations, including command and control, are not important here. Enough has been presented to stress that only over considerable time, and as a result of much trial and error on the part of operators and analysts, were these systems established

as reliable against usurpers or accidents and as responsive to authorized commands. The lessons learned by the Americans and post-Cold War Russians in this regard have not necessarily been passed along to future generations of nuclear capable states. The extent to which some existing nuclear powers, to say nothing of future ones, accept the idea of deterrence based on second strike capability, as opposed to preemption, is unclear. Nor are the relationships among the highest levels of political and military command, with regard to the alert of forces in crisis or the employment of forces in war, altogether clear for states such as Pakistan and North Korea. How custody of nuclear weapons along with the authority to fire them has been delegated to field commanders in India, Pakistan, Israel, or North Korea is a closely guarded secret.

Once nuclear weapons were fired in South or Northeast Asia or in the Middle East, would political leaders be able to maintain continued control over force employment, targeting, and termination decisions? States with small inventories of weapons, especially if they were first strike vulnerable, might follow the logic of "use them or lose them" and rapidly expend their existing arsenals. On the other hand, even smaller states might want to maintain some forces in reserve in order to avoid nuclear blackmail in the post-attack phase of a war. A small residue of survivable forces, perhaps tactical missiles or nuclear capable aircraft of limited range, could be the difference between an imposed surrender and a negotiated peace. Thus surviving but unexpended residual nuclear forces have two faces: they can be coupled to the credible threat of further escalation, or they can be attached to proposals for de-escalation and conflict termination. A war between nuclear armed states that continues until both or all combatants have totally exhausted their nuclear arsenals is a political failure, regardless of its military accomplishments. Such a war turns Clausewitz on his head and makes nuclear battle and mass destruction into pseudo-political ends in themselves.

In order for negotiations between India and Pakistan, or Israel and a nuclear Iran, to take place after the nuclear threshold has been crossed, leaders in firm control of their nuclear forces are a prerequisite. Leaders would have to survive the early attacks, communicate with their nuclear forces, and impose targeting restraints or even nuclear ceasefires. These steps to expedite negotiation might not be possible. Rogue commanders, once enabled to fire nuclear weapons, and having observed unprecedented

destruction on their own country, might resist ceasefires and become bent on revenge or holocaust. The delegation of nuclear release authority having been made from senior politicians and military commanders to force operators, retrenchment and "putting the genie back in the bottle" would call for wartime commanders to put professional obligations and the military chain of command ahead of personal agendas and motives. Some might, and some might not.

Nor is this problem one that has been entirely obviated among "mature" nuclear powers. Russia in the 1990s was in dire economic straits. As its economy lagged, its conventional military forces became cash starved and operationally deprived of oxygen. Consequently, Russia became primarily dependent upon its nuclear weapons, especially its long range weapons, for deterrence of major nuclear or conventional attacks on its state territory. Russia's position in the 1990s was like NATO's during the Cold War: presumed inferiority in conventional forces, and therefore an acknowledged reliance on nuclear weapons to project strength. In addition, after the fall of the Soviet Union, Russia's missile warning and control systems deteriorated, including its satellite and ground based radar networks. Russia's nuclear weapons complex and its nuclear scientific establishment were also casualties of its free falling economy. The US established programs of military assistance to Russia in the 1990s in order to improve Russia's handling of nuclear materials and weapons, including accurate accounting and safe storage and dismantlement.

This marks an ironic turn of events, compared to the Cold War: the US government is now a large "investor" in Russian nuclear safety and security. The concern in Washington is no longer the prospect of a deliberate Soviet nuclear attack, but of Russian loss of political or military control that leaves nuclear weapons and launchers in the hands of regional warlords. This subject is almost taboo in official diplomatic circles, but interestingly, the topic of Russian breakup or deconstruction into a plurality of regional entities is the subject of much speculation among Russians. Russian media and polling organizations frequently sample public opinion on this issue, and about a third of Russians generally regard the possibility of a breakup of post-Soviet Russia as more than trivial. The question in such an event is whether the split would be a case of gradual and consensual political devolution, or whether it would likely be associated with a civil war.

The current administration of President Vladimir Putin has made clear its intent to resist any regionalization or other dismemberment of Russia. Putin's firm opposition to Chechen terrorism and insurgency and Putin's absolute "nyet" to the demand for political autonomy or independence for that troubled region have been consistent and emphatic: there will be no departure from Russia by means of armed resistance. US policy is that Russia should indeed hold together, for a major breakup of Russia would destabilize the entire central Eurasian subcontinent with ripple effects to the west, east, and south. An immediate concern about a dissolving Russian polity would be the consequences for the command and control over its nuclear weapons and launch platforms.

The US and its allies have been in this situation once before. In the immediate aftermath of the Soviet breakup, the post-Soviet states of Ukraine, Belarus, and Kazakhstan were suddenly numbered among the world's nuclear powers. The fates of their respective nuclear arsenals were up for grabs, and various heads of state in these countries sought to play the nuclear card for economic assistance or for the temporary prestige it might bring them. US policy was to establish Russia as the logical and legal successor state to the Soviet Union for the purpose of controlling nuclear weapons and forces. Otherwise, dispersal of nuclear weapons among post-Soviet states could lead to chaos, including the unauthorized distribution of nuclear weapons and weapons grade materials among terrorists. After considerable political wheeling and dealing in the early 1990s that involved the US, Russia, and the new trio of nuclear powers, agreement was reached for the forces of Ukraine, Belarus, and Kazakhstan to be "returned" to Russia (standing in for the former Soviet Union) or dismantled.

Russia's nuclear weapons deployed for use on intercontinental missiles or long range bombers are, according to Russian officials, under secure storage and control in peacetime.[17] In the nearest approximation to a nuclear crisis during the 1990s, the launch of a Norwegian scientific rocket in January 1995 was temporarily confused by Russian warning systems with a possible US missile launch from a ballistic missile submarine. Russian nuclear forces were alerted. Russian President Boris Yeltsin, together with his Defense Minister and chief of the general staff, used – for the first time in the post-Cold War era – their nuclear "footballs" or briefcases that accompany the head of state and his principal military advisors. Russian tracking of the missile trajectory eventually established that its path was

headed out toward sea and away from Russian territory.[18] It turned out that the Black Brant missile launch that temporarily alarmed the Russians was the result of a diplomatic snafu. The Norwegian government had notified the Russian Foreign Ministry months in advance of the planned rocket launch and its purpose: gathering scientific data on aurora borealis. But the communication got lost in the Russian bureaucracy and never made it to the desks of the responsible officials in the Russian armed forces and Defense Ministry.

The preceding survey of concerns about mature nuclear powers is not intended to single out Russia, but to caution against casual acceptance of the assumption that "rogue" or new nuclear states would be more likely to start a war, and less willing to end a war short of Armageddon, than longstanding nuclear powers would be. Of course, the major powers' larger and more diverse arsenals give them options for controlling conflict and for intra-war deterrence, compared to smaller powers. And even at lower levels of force size, the qualities of forces and their operational parameters are partial determinants of their ability to maintain political and military control during a nuclear war.

That said, the decisions for prolonging or ending a war vary widely, based on the motives and personalities of leaders, as well as the moods of publics that were subject to attack. An additional variable for any state engaged in a nuclear war will be the policymaking process in that state: how power and influence are distributed among office holders and politically influential persons. We have some idea how the process of national security decision making works in the United States, Britain, France, China, and Russia, as these polities have been studied extensively by insiders and outsiders.

What power shifts, however, would take place after war began in India, Pakistan, North Korea, or Iran? North Korea is virtually opaque to foreign intelligence. Pakistan is a government under siege from jihadists whose influence extends into its military and intelligence organs. The regime in Tehran is torn between traditionalist ayatollahs with visceral hatred for the US and Israel and modernizers who would prefer to focus on economic development and gradual social change. India is the world's largest democracy and a remarkably stable one, but under the stress of a nuclear attack, the relationship between its military and its government might undergo drastic change, compared to its peacetime condition. Recall

that one Indian Prime Minister during the Cold War was assassinated by several of her own official bodyguards.

For that matter, what could we expect from an American President in the aftermath of a nuclear attack on US soil by a rogue or other, state? US history does not inspire confidence that cool heads would prevail and that the government would seek to manage a conflict toward "victory" at the lowest possible level of destruction or to negotiate an agreed peace. US reaction to 9/11 was instructive: not only terrorists everywhere, but regimes that aided terrorists, were placed into the crosshairs of American response. Al-Qaeda deserves all the opprobrium it received, but the point here is a different one. Americans and their political leaders are not, by temperament and training, accustomed to dealing out military punishment in measured doses. The likely reaction to a nuclear attack even by terrorists on US soil would be a public demand for a Carthaginian peace.

## Conclusion

Nuclear war termination was controversial during the Cold War, and for different reasons it will continue to be so. Contemplation of the "awfulness" of nuclear war is certainly not to be expected of most politicians or publics, apart from the post 9/11 now-ubiquitous fears of nuclear terrorism. But apart from terrorism, states still have the responsibility for world order, and peacemaking does not stop after war has begun. Political leaders and military planners in nuclear armed and other leading states need to think through, before the fact of deterrence failure, what the "downstream" steps would be.[19] Military machines should not be permitted to run on nuclear autopilot.

The preceding illustrations do not constitute a prediction, but a template for considering some aspects of the problem of nuclear conflict termination. American and Russian forces were used for illustrations because we know something about how each state operated its nuclear forces during peacetime and in crises – and because they have committed themselves to structural and operational arms control through the year 2018. Finally, the diversity of US and Russian launch platforms, even at lower levels of force size, holds implications for smaller nuclear powers and for nuclear-aspiring, but currently non-nuclear states.

The management or prevention of nuclear proliferation is made harder by the uncertainty about relationships between politicians and

their militaries in countries that are only token democracies or less. How would arrangements for delegation of authority and nuclear enablement for deterrence or war fighting be handled in a nuclear armed Iran or Egypt or, for that matter, in currently nuclear capable North Korea and Pakistan? Opacity in these matters is not reassuring, and dictatorships have a way of appearing solid on the outside but brittle on the inside, once a diplomatic crisis has begun to slide into a war. In addition, future deterrence and war termination strategies will have to take into account the possible conjunction of weapons of mass destruction, including nuclear ones, with strategies for cyber conflict. It is a reasonable expectation that future interstate conflicts will include some measure of cyberwar; so too, will nuclear crisis management, escalation control, and conflict termination.[20]

## Notes

1 See for example: Stephen J. Cimbala, ed., *Strategic War Termination* (New York: Praeger Publishers, 1986); Paul K. Davis, "A New Analytic Technique for the Study of Deterrence, Escalation Control and War Termination," in Stephen J. Cimbala, ed., *Artificial Intelligence and National Security* (Lexington, Mass.: Lexington Books, 1986), pp. 35-60; and George H. Quester, "War Termination and Nuclear Targeting Strategy," ch. 14, in Desmond Ball and Jeffrey Richelson, eds., *Strategic Nuclear Targeting* (Ithaca, NY: Cornell University Press, 1986), pp. 285-305. For a perspective on this issue at the end of the Cold War, see the essays in Stephen J. Cimbala and Sidney R. Waldman, eds., *Controlling and Ending Conflict: Issues before and after the Cold War* (Westport, Ct.: Greenwood Press, 1992).

2 "The Military Doctrine of the Russian Federation," www.Kremlin.ru, February 5, 2010, in *Johnson's Russia Lis*t 2010 - #35, February 19, 2010, davidjohnson@starpower.net. See also Nikolai Sokov, "The New, 2010 Russian Military Doctrine: The Nuclear Angle," Center for Nonproliferation Studies, Monterey Institute of International Studies, February 5, 2010, http://cns.miis.edu/stories/100205_russian_nuclear_doctrine.htm; and Jacob W. Kipp, "Russia's Nuclear Posture and the Threat that Dare Not Speak its Name," ch. 10, in Stephen J. Blank, ed., *Russian Nuclear Weapons: Past, Present, and Future* (Carlisle, Pa.: Strategic Studies Institute, U.S. Army War College, 2011), pp. 459-503.

3 The cases of North Korea and Iran may require different treatment from the perspectives of deterrence and nonproliferation because North Korea is a declared nuclear weapons state and Iran is still an allegedly aspirational one. See Amitai Etzioni, *Security First: For a Muscular, Moral Foreign Policy* (New Haven, Yale University Press, 2007), pp. 241-42.

4 For a history of Iran's nuclear program, including a documented list of Iran's violations of its Safeguards Agreement with the International Atomic Energy Agency, see Iran Watch, "Iran's Nuclear Program, " updated March 2012, http://www.iranwatch.org/wmd/wmd-nuclear essay-footnotes.htm, downloaded August 13, 2012. See also "Sanctions against Iran," *Wikipedia*, http://en.wikipedia.org/wiki/Sanctions_against_Iran.

5 David Albright, Paul Brannan, Andrea Stricker, Christina Walrond and Houston Wood, "Preventing Iran from Getting Nuclear Weapons: Constraining its Future Nuclear Options," Institute for Science and International Security, March 5, 2012, p. 45, http://www.isis-online.org/uploads/isis-reports/documents/USIP_Template_5March2012-1.pdf. Albright et al, also outline elements of a five stage framework agreement between the P-5+1 and Iran, pp. 42-44.

6 For informative discussions of nuclear terrorism, see: Brian Michael Jenkins, *Will Terrorists Go Nuclear*? (New York: Prometheus Books, 2008); Etzioni, *Security First*:, esp. pp. 218-43; and Graham Allison, *Nuclear Terrorism: The Ultimate Preventable Catastrophe* (New York: Times Books − Henry Holt, 2004). For additional perspectives on nuclear terrorism, see Morten Bremer Maerli, Annette Schaper, and Frank Barnaby, "The Characteristics of Nuclear Terrorist Weapons," pp. 209-22; Matthew Bunn and Anthony Wier, "The Seven Myths of Nuclear Terrorism," pp. 223-35, and John Mueller, "The Atomic Terrorist?" pp. 236-54, all in James J. F. Forest and Russell D. Howard, eds., *Weapons of Mass Destruction and Terrorism*, 2nd ed. (New York: McGraw-Hill, 2012).

7 For pertinent critiques of deterrence theory as applied to post-Cold War issues, see Colin S. Gray, *The Second Nuclear Age* (Boulder, Colo.: Lynne Rienner Publishers, 1999), esp. pp. 88-93; and Keith B. Payne, *Deterrence in the Second Nuclear Age* (Lexington, Ky: University Press of Kentucky, 1996. See also Patrick M. Morgan, *Deterrence Now* (Cambridge: Cambridge University Press, 2003), pp. 238-84.

8 On the issue of rationality and deterrence, see Morgan, *Deterrence Now*, pp. 42-79.

9 The work of Thomas Schelling on this topic as applied to nuclear deterrence is seminal, as in *Arms and Influence* (New Haven: Yale University Press, 1967). See also Lawrence Freedman, *The Evolution of Nuclear Strategy*, 3rd ed. (New York: Palgrave-Macmillan, 2003), esp. pp. 171-84.

10 Paul Bracken, "War Termination," ch. 6, in Ashton B. Carter, John D. Steinbruner, and Charles A. Zraket, eds, *Managing Nuclear Operations* (Washington, D.C.: Brookings Institution, 1987), pp. 197-214.

11 Ibid., p. 201.

12 Bracken, "Delegation of Nuclear Command Authority," ch. 10, in *Managing Nuclear Operations*, pp. 352-72, esp. pp. 355ff., offers similar if slightly different distinctions between "provincial" and "political" control. Provincial

control includes strategic and tactical control of the armed forces; political control deals with grand strategy, which is essentially policy.

13 Various aspects of this issue are discussed in Bracken, *The Command and Control of Nuclear Forces* (New Haven, Ct.: Yale University Press, 1983).

14 Perspectives on this and related problems appear in Albert Wohlstetter and Richard Brody, "Continuing Control as a Requirement for Deterring," ch. 5, in Carter, Steinbruner, and Zraket, eds, *Managing Nuclear Operations*, pp. 142-96. See also Bracken, "Delegation of Nuclear Command Authority," p. 359. As Bracken observes, delegation of nuclear command authority by political leaders to others will not happen except in the most dire circumstances – which are exactly those in which a nuclear war will most likely take place (Ibid., p. 356).

15 Robert A. Miller, Daniel T. Kuehl, and Irving Lachow, "Cyber War: Issues in Attack and Defense," *Joint Force Quarterly* 61, no. 2 (2011): 18-23, esp. p. 21 on escalation control of "I2Os" (information and infrastructure operations). See also U.S. Department of Defense, *Department of Defense Strategy for Operating in Cyberspace* (Washington, D.C.: U.S. Department of Defense, July 2011), http://www.defense.gov/news/d20110714cyber.pdf, downloaded August 14, 2012, and The White House, *International Strategy for Cyberspace: Prosperity, Security and Openness in a Networked World* (Washington, D.C.: The White House, May 2011), http://www.whitehouse.gov/sites/default/files/rss_viewer/international_strategy_for_cyberspace.pdf. For pertinent commentary on these documents and related issues, see Rosemary M. Carter, Brent Frick, and Roy C. Undersander, "Offensive Cyber for the Joint Force Commander," *Joint Force Quarterly* 66, no. 3 (2012): 22-27.

16 This perspective is developed in Peter Douglas Feaver, *Guarding the Guardians: Civilian Control of Nuclear Weapons in the United States* (Ithaca, NY: Cornell University Press, 1992), pp. 12-28. See also, in the same volume, his comments on civilian control after the decision to use nuclear weapons, pp. 55-66.

17 Weapons grade or other nuclear materials, including vast stores of uranium and plutonium, are another matter. US and other nonproliferation experts remain concerned about leakage from Russia's nuclear weapons complex or other sources of nuclear or radiological materials. This is a separate, albeit important, subject. See Andrew and Leslie Cockburn, *One Point Safe* (New York: Doubleday, 1997), for pertinent cases and arguments based on Russian post-Cold War experience in the 1990s.

18 Ibid., pp. 240-44.

19 An excellent case is made for this point in George H. Quester, *Nuclear First Strike: Consequences of a Broken Taboo* (Baltimore, Md.: Johns Hopkins University Press, 2006), esp. pp. 24-52 and 90-126.

20 For an appreciation of cyber war in strategic context, see Colin S. Gray, "Making Strategic Sense of Cyberpower: Why the Sky is Not Falling," paper, Wokingham, Berkshire, UK, September, 2012, esp. pp. 7-9.