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The Further Spread of Nuclear Weapons: Why We Should Care

Augusta Binns-Berkey



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by Augusta Binns-Berkey

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Cover images, from top left clockwise: 1) Still from a North Korean propaganda video showing a nuclear explosion in Washington D.C.; 2) Iranian President Hassan Rouhani, left, speaks as he is accompanied by the head of Iran's Atomic Energy Organization Ali Akbar Salehi on a visit to the Bushehr nuclear power plant.; 3) North Korea unveils new missile capabilities in a 2015 parade to mark the 70th anniversary of the founding of its ruling Workers' Party; and 4) Pakistan and Indian troops taking part in the Wagah Border Ceremony at the Indo-Pakistan border.

Nonproliferation Policy Education Center

The Nonproliferation Policy Education Center (NPEC), a 501(c)3 nonprofit organization, is a nonpartisan, educational organization founded in 1994 to promote a better understanding of strategic weapons proliferation issues. NPEC educates policymakers, journalists, and university professors about proliferation threats and possible new policies and measures to meet them.

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The Further Spread of Nuclear Weapons: Why We Should Care

Augusta Binns-Berkey

More than a quarter century after the end of the Cold War, the threat of nuclear war has receded into the past in the minds of many Americans. Gone are the days of Soviet missiles in Cuba, gone is the fear of Warsaw Pact troops pouring through the Fulda Gap, and even longer gone are duck-and-cover drills and fallout shelters. After 15 years of counterinsurgency and nation-building in the Middle East and Afghanistan, nuclear weapons seem to some a relic of the past. To others, they have returned to the forefront only because of the budget debate over modernization of the U.S. nuclear weapons complex.

Yet nuclear weapons remain front and center in the minds of many others around the world. Russian officials regularly make reference to Russia's nuclear arsenal in public statements aimed at its neighbors. Kim Jong-un's regime produces videos showing mushroom clouds over Washington, D.C. Pakistan continues to produce new warheads at a greater pace than any other nuclear state, while Indian commentators fret publicly about the Pakistani nuclear threat. While proliferation has taken a back seat in public U.S. debates since the close of the agreement signed by the Obama administration with Iran, it is possible, if not likely, that there are government officials in other countries who aspire to join the nuclear club.

Likewise, the threat of dozens of Russian ICBMs raining down on the continental United States may have receded, but it is plausible that one or more nuclear weapons will be detonated in a regional conflict some time in the next few decades. Anticipation of this event, in confluence with existing conditions in the world today, could make proliferation much more likely among countries with a particular set of security conditions.

Those who argue against counterproliferation efforts often fall into one of three categories: Either they doubt that further nuclear proliferation is likely, they are sanguine about the consequences if more countries do obtain nuclear weapons, or they see more urgent problems demanding scarce government time and funds. This essay aims to address all three sets of doubts by surveying the existing incentives for countries to seek nuclear weapons, and demonstrating the changing, and possibly easing, paths to designing and producing nuclear weapons.

Finally, this essay explores the possible consequences of the detonation of nuclear weapons in a conflict in the next few decades, using several scenarios as a starting point. It concludes, perhaps unsurprisingly, that a more proliferated world, both in terms of the number of countries fielding nuclear weapons and in terms of the size and quality of each country's arsenal, would be dangerous for the United States in many ways. New and small nuclear powers would gain bargaining power, forcing the United States to contend with many disproportionately empowered leaders in the mold of Kim Jong-un. U.S. alliances might be shaken, depending on the willingness of the United States to continue to provide extended deterrence guarantees against a growing number of nuclear threats.

There would almost certainly be upward pressure on defense spending to match or defend against new capabilities in other countries, and to train and equip U.S. troops for operations in nuclear environments. There might be a reconsideration of the U.S. role in the world, either to intervene to prevent more prolif-

eration, or to withdraw from global operations in order to protect troops from nuclear effects. Finally, there might be a return to the constant fear of the early Cold War, especially for those in cities, that would dwarf the current fear of small-scale terrorist attacks, changing American quality of life for the worse. In short, we should care about nuclear proliferation because it is likely, and it would pose the most difficult national security problem the United States has seen since the early Cold War.

Modern Archetypes

Governments may seek nuclear weapons for a variety of reasons, including traditional ideas of deterrence, improving warfighting capabilities, increasing bargaining power in the international arena, or seeking support and intervention from third parties. Beyond simply acquiring the technology for a single nuclear weapon, however, an aspiring nuclear state must make decisions about what kind of nuclear arsenal it will seek. Its military must design or procure delivery systems. It has to choose doctrine for use, both declaratory and secret, and it must design command and control mechanisms to ensure that the weapons are used only when and how the leadership decides. While mirror image outcomes are certainly not guaranteed, planners are likely to look partly to the examples set by the current nuclear powers in doctrine and force structure. They may also draw lessons about the usefulness of nuclear weapons, in war planning, international negotiations, conflict below the level of war, and even domestic politics. The section that follows surveys some of the existing nuclear weapons states, focusing on characteristics that possible proliferant countries might take as examples.

Russia

While the United States and NATO have played down the role of nuclear weapons since the end of the Cold War, officials across the Russian government have continued to promote nuclear weapons as the core of Russian national security.¹ The Russian military faces a perceived gap in conventional capability when compared to NATO and the United States, and Russian war planning includes the theater-range nuclear force structure to overcome that gap. Russia maintains a wider variety of delivery systems for theater use than any other country. At least some of these may be deployed with pre-delegated launch authority for local commanders.²

Russian doctrine holds that nuclear weapons are usable in limited wars. In 2007, Russian Defense Minister Sergei Ivanov announced, “As regards the use of nuclear weapons in case of aggression, of course [we will use them]. What else were they built for?”³ While Russian leaders no longer seem to worry as much about global nuclear war, Russian planning for regional war over the Baltics or Eastern Europe appears to include options for limited nuclear use. Far from a “no first use” policy, the much-ballyhooed “escalate to de-escalate” strategy explicitly describes nuclear use in response to a failing conventional defense, and an

1. For example, a paper from a 2007 official conference in Moscow stated, “The security of the Russian state is 90 percent dependent on nuclear deterrence.” Quoted in Roger N. McDermott, “Russia’s Conventional Armed Forces: Reform and Nuclear Posture to 2020,” in *Russian Nuclear Weapons: Past, Present, and Future*, Stephen J. Blank, ed., Carlisle, PA: Strategic Studies Institute, 2011, p. 62.

2. Stephen P. Lambert and David A. Miller, “Russia’s Crumbling Tactical Nuclear Weapons Complex: An Opportunity for Arms Control,” *USAF Institute for National Security Studies*, Occasional Paper 12, April 1997, p. 9.

3. Andrei Shoumikhin, “Nuclear Weapons in Russian Strategy and Doctrine,” in *Russian Nuclear Weapons: Past, Present, and Future*, ed. Stephen J. Blank, Carlisle, PA: Strategic Studies Institute, 2011, p. 117.

addendum to the 2010 Military Doctrine enumerated two threats short of a nuclear attack that could lead to nuclear use.⁴ U.S. and NATO planners, while avoiding a “no first use” policy, have long eschewed rhetoric about using nuclear weapons, often treating tactical weapons as political tools rather than military ones.⁵

Short of war, Russian foreign policy during the Putin administrations has included a healthy dose of nuclear coercion. For example, in 2007, the commander of the Strategic Rocket Force said regarding U.S. missile defense plans in Poland and the Czech Republic, “If we see that these facilities pose a threat to Russia, these targets will be included in the lists of our planners—strategic, nuclear, or others.”⁶ In 2008, then President Dmitry Medvedev threatened to move short-range Iskander missiles to the Kaliningrad oblast if the United States deployed a third ballistic missile defense site in Europe.⁷ More recently, when Denmark announced in 2015 that it would contribute radar capability from its ships to the NATO missile defense system, the Russian ambassador to Denmark told a Danish newspaper, “If that happens, Danish warships will be targets for Russian nuclear weapons.”⁸

Pakistan

The producer of the first “Islamic bomb” holds the distinction of one of the fastest-growing nuclear arsenals in the world, according to non-governmental observers.⁹ At different times, the Pakistani government has used its nuclear weapons to draw in third party international mediators, to counter the threat of Indian conventional military superiority, and to give itself cover to harass India with irregular warfare. The Pakistani general in charge of the nuclear force described to an Italian reporter in 2002 the four red lines that, if crossed, would precipitate Pakistani nuclear strikes, again explicitly a “first use” policy in which nuclear weapons are not only intended to deter other nuclear weapons.¹⁰

Observers believe that Pakistani short-range missiles are deployed with pre-delegated authority, which would be necessary in conflict due to unreliable communication. This is compounded by the extremely short warning times, in the vicinity of five minutes, for a missile coming from India, which would drastically shrink windows for decision-making and increase the likelihood of miscalculation.¹¹ Pakistan did not

4. One appeared to be a NATO and U.S. threat to core economic, political, and military centers; the other pointed some analysts to a possible war with China in the Russian Far East. Jacob W. Kipp, “Asian Drivers of Russia’s Nuclear Force Posture,” in *The Next Arms Race*, ed. Henry D. Sokolski, Carlisle, PA: Strategic Studies Institute, 2012, p. 47.

5. Steve Pifer, “Time to push back on nuclear saber-rattling,” *Brookings Institution*, May 10, 2016, available from <http://www.brookings.edu/research/opinions/2016/05/10-nuclear-saber-rattling-push-back-pifer>.

6. Shoumikhin, 118.

7. Shoumikhin, 128.

8. “Russia threatens to aim nuclear missiles at Denmark ships if it joins NATO shield,” *Reuters*, March 22, 2015, available from <http://www.reuters.com/article/us-denmark-russia-idUSKBN0MI0ML20150322>.

9. Hans M. Kristensen and Robert S. Norris, “Pakistani nuclear forces, 2016,” *Bulletin of the Atomic Scientists* 72, no. 6, p. 369.

10. The four red lines were: threats to “space threshold,” territorial integrity; “military threshold,” the possible destruction of the Pakistani military; “economic strangling,” for example a blockade of the Pakistani coast or the Indus River; and “domestic destabilization,” interfering with ethnic minorities within Pakistan. Note that the Pakistani government chose not to re-state these red lines, but did not repudiate them. Timothy D. Hoyt, “Pakistan’s Nuclear Posture: Thinking About the Unthinkable?” in *Strategy in the Second Nuclear Age*, ed. Toshi Yoshihara, Washington, DC: Georgetown University Press, 2012, pp. 185-6.

11. Hoyt, 190

have a nuclear command and control structure when it tested its first nuclear weapons in 1998, and has a poor history of civilian control over the military, raising doubts about the resiliency of the national command authority in peacetime and in crisis.¹² In previous wars, India has sought decisive victories, difficult to imagine in nuclear conflict outside of a fully-disarming first strike. In contrast, Pakistan has generally sought to deny India its objectives in war, accepting that as sufficient for victory in the short term.¹³ Speculation about Pakistan's planning for battlefield nuclear war, even on its own territory, suggests that it might attempt to create the conditions for such a limited nuclear victory.

India

Though India is rarely seen by U.S. analysts as the main source of nuclear provocation in South Asia, its role in the region's competitions cannot be discounted. The Indian nuclear force structure reflects similar values to those in the United States: Nuclear forces are useful for high-level deterrence, and developing battlefield nuclear capabilities is not just unnecessary but also dangerous. The Indian Chief of the Army Staff in 2009, V.K. Singh, stated publicly, "Let us be quite clear that nuclear weapons are not for war fighting. They have got a strategic capability and that is where it should end."¹⁴ This kind of declaratory doctrine allows Pakistan to operate at lower ends of the spectrum, including both irregular warfare and threatening with tactical nuclear weapons.

India also provides a good example of how multiple competitions can become intertwined, and security forces meant to address requirements on one front can drive a competition on another. Many Western analysts believe that India's development of strategic nuclear capabilities are primarily aimed at balancing China, whose conventional forces would pose a much larger threat to India than Pakistan's.¹⁵ India plans and develops its force structure as a deterrent against China, but Pakistan feels more and more threatened with each new capability fielded by the Indian military. Though the *Arihant* class SSBN may not be intended for India's war plans for Pakistan, Pakistani planners still feel pressured to counter it.

China

There is lingering broad uncertainty about the Chinese nuclear program and its accompanying doctrine. For many years, China maintained the capability for what some have described as "assured retaliation," the ability to survive an attempted first strike and inflict enough damage on adversary cities in return that an adversary would be deterred. This posture does not require the development of real operational requirements or a large arsenal.¹⁶ Recently, however, Chinese military writing has begun to emphasize

12. Hoyt, 187.

13. Montgomery and Edelman, p. 6.

14. Evan Braden Montgomery and Eric S. Edelman, "Rethinking Stability in South Asia: India, Pakistan, and the Competition for Escalation Dominance," *Journal of Strategic Studies*, 2014, p. 19.

15. Gurmeet Kanwal, "India's Nuclear Force Structure 2025," *Carnegie Endowment for International Peace*, June 30, 2016, available from <http://carnegieendowment.org/2016/06/30/india-s-nuclear-force-structure-2025-pub-63988>.

16. M. Taylor Fravel and Evan S. Medeiros, "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Force Structure and Strategy," *International Security* 35, no. 2, Fall 2010, p. 51.

counterforce targeting of enemy military assets as well as countervalue, which would be a shift.¹⁷ Media reports in March of 2016 also indicated that the newly-created People's Liberation Army Rocket Force was considering adoption of a launch on warning posture in order to protect against a possible disarming first strike, presumably from the United States.¹⁸

China has long maintained a declaratory “no first use” policy, but that also seems to have been up for debate in the last few years. It is not entirely clear that the adversary’s “first use” in order to provoke a nuclear response would have to be nuclear; it could be a devastating precision conventional strike, or a conventional strike that caused effects on the scale of a weapon of mass destruction, such as the breaching of the Three Gorges Dam.¹⁹ Finally, declaratory policy need not always reflect actual policy. The Soviet Union maintained a “no first use” policy publicly, but their operational planning demonstrated a different internal framework.²⁰

More recently, China appears to be building up its nuclear force structure both in size and in variety and quality of delivery systems. The U.S. Department of Defense’s annual report on China’s military power anticipated that the new road-mobile intercontinental ballistic missile (ICBM), the DF-41, will carry multiple independently-targetable vehicles (MIRVs).²¹ China may have had the capability to MIRV the DF-41’s predecessor, the DF-5, for decades, but just announced that it would do so in 2015.²²

Finally, though there is considerable debate about the technical feasibility of a nuclear electromagnetic pulse (EMP) weapon, speculation about Chinese EMP weapon development has abounded for more than a decade. The Pentagon’s 2005 China Military Power report, as well as the final report of the so-called EMP Commission, both stated that China might be developing EMP weapons as an auxiliary or independent means of attack.²³ A since-declassified report by the National Ground Intelligence Center in 2005 assessed that Chinese scientists had conducted medical research into the effects of electromagnetic pulses on animals, and speculated that the purpose was to determine whether detonation over Taiwan or U.S. carrier groups would cause enough casualties to prompt escalation.²⁴ Taiwanese government officials have also said that they believe China would use EMP weapons in support of an invasion of Taiwan.²⁵

17. Fravel and Medeiros, pp. 76-77

18. Gregory Kulacki, “China’s Military Wants to Put its Nukes on Hair Trigger,” *DefenseOne*, March 31, 2016, available from http://www.defenseone.com/ideas/2016/03/china-military-nuclear-obamaICBM/127139/?oref=d_brief_nl.

19. Fravel and Medeiros, p. 80.

20. Fravel and Medeiros, p. 79.

21. “Annual Report to Congress: Military and Security Developments Involving the People’s Republic of China 2016,” *U.S. Department of Defense*, Office of the Secretary of Defense, April 2016, p. 25, available from <http://www.defense.gov/Portals/1/Documents/pubs/2016%20China%20Military%20Power%20Report.pdf>.

22. Jeffrey Lewis, “China’s Belated Embrace of MIRVs,” in *The Lure and Pitfalls of MIRVs: From the First to the Second Nuclear Age*, ed. Michael Krepon, Travis Wheeler, and Shane Mason, Stimson Center, May 2016, p. 95, available from http://www.stimson.org/sites/default/files/file-attachments/Lure_and_Pitfalls_of_MIRVs.pdf.

23. Mark Schneider, “The Nuclear Doctrine and Forces of the People’s Republic of China,” *U.S. Nuclear Strategy Forum*, November 2007, p. 21, available from <http://www.nipp.org/wp-content/uploads/2014/12/Chinanuclear-final-pub.pdf>.

24. National Ground Intelligence Center, “China: Medical Research on Bio-Effects of Electromagnetic Pulse and High-Power Microwave Radiation,” August 17, 2005, declassified September 13, 2010, available from <http://nsarchive.gwu.edu/NSAEBB/NSAEBB351/Doc011.PDF>.

25. Schneider, p. 4.

If EMP weapons work as some believe, they could be used to disable electronics across a broad area, potentially stopping a large military force without causing extensive casualties. Most alarmingly, the China Military Power report added that some PLA theorists “might consider using [EMP weapons] in an unconventional attack, believing that the United States and other nations would not consider it as a use of force and a crossing of the nuclear threshold.”²⁶ Even if EMP weapons do not work as well as some believe, if Chinese planners believed they did and believed that their use did not cross the nuclear threshold, the risks of miscalculation would be higher.

North Korea

As the world’s youngest and most opaque nuclear state, the Democratic People’s Republic of Korea (DPRK) can be the hardest to assess. While the Kim Jong-un regime may be building a nuclear arsenal to be able to threaten and deter South Korea, the North Korean nuclear program has had two uses so far. First, the DPRK has been able to hold the international community at bay using first the threat of a nuclear program, followed by the first test in 2006. Illicit trade in nuclear technology has allowed the North Korean government to establish a beneficial relationship with Pakistan, and helped ensure that China remains a protector while deterring intervention from the United States or other outside powers.²⁷

Second, Kim Jong-un has used the regime’s nuclear program as a tool for consolidation of power and internal control over the population. Some of the testing conducted in early 2016 seemed premature, including failed rocket launches and yields that did not appear to match the pronouncements of a thermonuclear reaction. Those tests may have provided DPRK scientists with valuable technical information, but some analysts have suggested that the tests were intended to provide Kim with major successes ahead of the Seventh Party Congress in May, proving his ability to provide strong leadership.²⁸ He told that Congress that the nuclear program brings his country “dignity and national power,” and appears to believe the program gives his regime legitimacy.²⁹

The force structure is difficult to judge, but North Korea is assumed to be working towards mating miniaturized nuclear warheads to an intercontinental ballistic missile, which at least one analyst expects within the next 10 years.³⁰ As late as 2009, the International Crisis Group assessed that the country’s nuclear weapons were not under control of the Army like conventional missiles, but were governed by some unknown organization reporting directly to Kim.³¹ While it is unlikely that the country will be able to grow its arsenal very quickly, one high-end estimate of 125 warheads by 2020 would almost guarantee at least

26. Schneider, p. 21.

27. Siegfried S. Hecker, “What to Make of North Korea’s Latest Nuclear Test?” *38 North*, U.S.-Korea Institute at SAIS, September 12, 2016, available from <http://38north.org/2016/09/shecker091216/>.

28. Bruce Bennett, “North Korea Rocket Launch: Why Did Kim Fire a Missile Now?” *The RAND Blog*, February 8, 2016, available from <http://www.rand.org/blog/2016/02/north-korea-rocket-launch-why-did-kim-fire-amissile.html>.

29. Choe Sang-hun, “North Korean Leader Tells Congress His Nuclear Program Brings ‘Dignity,’” *New York Times*, May 16, 2016.

30. Hecker.

31. Shane Smith, “North Korea’s Evolving Nuclear Strategy,” *U.S.-Korea Institute at SAIS*, August 2015, p. 14, available from http://38north.org/wp-content/uploads/2015/09/NKNF_Evolving-Nuclear-Strategy_Smith.pdf.

a few would get through South Korean missile defenses as part of a barrage, especially if combined with conventional missiles as part of a “haystacking” strategy.³²

Israel

The U.S. intelligence community judged as early as 1974 that Israel had already produced nuclear weapons, yet more than 40 years later, the presumptive ninth member of the nuclear club is the only one that still has not acknowledged its membership.³³ The most recent estimates from the non-governmental arms control community assert that Israel has about 80 nuclear warheads, along with enough fissile material for up to 200 additional warheads, with a traditional triad of seabased, air-delivered, and ground-launched missiles for delivery.³⁴

Israel never signed or ratified the Non-Proliferation Treaty, but the policy of “strategic ambiguity” still allows it to avoid openly flouting international law. More importantly, it has been able to quietly maintain its nuclear force without losing the support of the United States, whose prominent nonproliferation efforts against other countries would complicate an open acknowledgement of Israeli nuclear weapons. Israel’s nuclear force may have served as a mechanism to pressure the United States into intervening during the 1973 war.³⁵ It is also possible that the continual threat of Israeli use of nuclear weapons in case of true crisis has contributed to the willingness of U.S. policymakers to provide Israel with advanced conventional weaponry during peacetime.

Because of the policy of opacity, there has been no public debate in Israel about nuclear doctrine and strategy, so any analysis is based on guesswork. From the proliferation perspective, however, what matters is the example that Israel might set for other international observers, so such informed guesswork is still valuable. Israel’s early nuclear program might have begun as a reaction to both the Holocaust and the threat of neighboring Arab states; no other country speaks as often and as sincerely about facing an “existential threat.” That mindset was reinforced by a conventional near-loss in the 1973 war, and by a nuclear program in Iran, a country whose leaders have explicitly referred to the wholesale destruction of Israel.³⁶ Though technologically advanced and defended by a well-trained and -equipped military, Israel is also geographically tiny, with its population concentrated in small and vulnerable areas. Its planners

32. Scott A. Snyder, “Addressing North Korea’s Nuclear Problem,” Policy Innovation Memorandum No. 54, *Council on Foreign Relations*, November 2015, available from <http://www.cfr.org/north-korea/addressing-north-koreas-nuclear-problem/p37258> and Garth McLennan, “Needle in a Haystack: How North Korea Could Fight a Nuclear War,” *38 North*, U.S.-Korea Institute at SAIS, June 13, 2016, available from <http://38north.org/2016/06/gmclennan061316/>.

33. Special National Intelligence Estimate 4-1-74, “Prospects for Further Proliferation of Nuclear Weapons,” August 23, 1974, Top Secret, Partially declassified, *National Security Archive*, available from <http://nsarchive.gwu.edu/NSAEBB/NSAEBB240/snie.pdf>.

34. Hans M. Kristensen and Robert S. Norris, “Israeli nuclear weapons, 2014,” *Bulletin of the Atomic Scientists Nuclear Notebook*, October 28, 2014.

35. For extensive discussion of this possibility, see Elbridge Colby, et al, “The Israeli ‘Nuclear Alert’ of 1973: Deterrence and Signaling in Crisis,” *CNA*, April 2013, available from <http://www.dtic.mil/dtic/tr/fulltext/u2/a579830.pdf>. The CNA analysts conclude that is possible but not definitely documented that Israeli leaders put nuclear weapons on alert on October 8-9, 1973, both to prepare for use in case of the collapse of Israeli conventional forces and to coerce the United States into intervening. As in other cases described in this paper, what actually happened is less important than what lessons other countries might draw from observing events.

36. Nazila Fathi, “Wipe Israel ‘Off the Map,’ Iranian says,” *The New York Times*, October 27, 2005.

should therefore prefer deterrence over war-fighting on its territory even more than most militaries, and that seems to be reflected in the longer-range delivery systems mentioned above.

Finally, Israel has a history of favoring preemption in a non-nuclear context that must be taken into account when speculating on nuclear doctrine. Most famously, the 1967 Arab-Israeli War began with an extensive preemptive strike against the Egyptian Air Force, setting the stage for a swift victory in that war. The commitment for preemption was publicly reiterated in 1981 by Prime Minister Menachem Begin after the Israeli strike on the Iraqi reactor at Osirak, and again in less dramatic instances within the last few years.³⁷ Again, because of Israel's geographic constraints, it is likely that Israeli leaders would consider a preemptive strike, nuclear if necessary, if it seemed that deterrence were about to fail.

Scenarios

This section is intended not to predict the future, but to explore some plausible ways in which nuclear weapons use in conflict could influence the decision-making of third party observers in the short term. The final section of the paper will address possible changes to the security environment more broadly and in the longer term, from the point of view of the United States.

Escalation on the South Asian Subcontinent

Often cited as the most likely path to nuclear use in the near future, the next war between India and Pakistan could easily begin with another terrorist attack on the Indian homeland. India would most likely accuse Pakistan of supporting the terrorists, whether correctly or not. At the same time, a previously scheduled large-scale Indian military exercise would arouse Pakistani fears of a surprise invasion, prompting Pakistan to begin mobilizing its ground forces. A small cross-border exchange of fire could then escalate and finally draw Indian invasion of Pakistan through the eastern border.

With its ground forces quickly crumbling, Pakistan's territorial integrity and military would both be in danger, meeting the internal criteria for nuclear use.³⁸ With Pakistani short-range ballistic missiles (SRBMs) in danger of being overrun anyway, a small number of Pakistani Hatf-9 missiles carrying low-yield nuclear warheads could be launched at Indian ground forces. Though they might not destroy more than a small fraction of Indian tanks, Indian troops would be in disarray, communication would be disrupted, and contaminated and destroyed terrain would be much harder to navigate.

Indian leadership would then have to decide whether to retaliate with nuclear weapons. If they did, Indian declaratory doctrine would dictate strikes on Pakistani cities. Pakistan, having kept some longer-range missiles in reserve, would then most likely strike Indian cities. The war might stop at this point, with both countries too devastated and preoccupied with taking care of their own citizens to continue. Even if the capitals had been spared, the leadership might be under threat, especially in Pakistan. International aid would be slow as the rest of the world tried to figure out how to conduct humanitarian operations in a nuclear environment, and casualties in these densely populated cities might be in the millions.

37. Leonard S. Spector and Avner Cohen, "Israel's Airstrike on Syria's Reactor: Implications for the Nonproliferation Regime," *Arms Control Today* 38, no. 6, July/August 2008, p. 15-21 and "No one immune from Israeli preemptive strikes, says PM," *Times of Israel*, February 1, 2015.

38. Hoyt, 185-186.

Alternatively, Indian leadership might anticipate the above scenario and decide that striking Pakistani cities was not worth it. Accepting the comparatively smaller number of casualties but unwilling to risk more, Indian troops would withdraw back across the border, and a ceasefire might be declared at this point. Pakistan would have sustained some nuclear damage on its own territory, but would have also demonstrated its willingness to use nuclear weapons and stand up to an Indian invasion. India would have accomplished little, sustained many casualties, and might be convinced of the need for a proportional battlefield nuclear option for the next war. An observer outside the region might come to the same conclusion for itself, especially in the face of a conventionally superior and hostile neighbor.

War in the Baltics

10 or 15 years from now, the United States and NATO may have doubled down on commitments to allied Eastern Europe, with forces forward-deployed in Poland and rotating through the Baltic states. Ethnic Russians in Lithuania could issue louder than usual complaints about mistreatment by the government, and local protests could turn into armed rebellion supported by “little green men” with no overt ties to the Russian government. NATO forces nearby could intervene to enforce a ceasefire, raising the perennial Russian fear of NATO invasion. Following Russian mobilization, the United States might begin to bring more ground forces in from Poland and move naval assets to the Baltic and Norwegian Seas in support.

An accident could tip the situation into a shooting war; perhaps a ground unit belonging to another NATO partner might navigate off course, stumble upon Russian forces, who might decide on their own to capture the soldiers before receiving orders from higher headquarters. The lack of the direct lines between Moscow and Washington that existed by the end of the Cold War would increase the chances of miscommunication and misperception. After a few weeks of maneuvering and escalating casualties, Russian forces might begin losing ground as NATO forces are brought to bear. Russia might then use any one of its tactical nuclear systems. For example, a few nuclear anti-ship missiles might be aimed at U.S. ships in the Baltics providing fire or radar support, or Iskander short-range ballistics missiles that Russia might base in Kaliningrad could be used against U.S. ground reinforcements coming in from Poland. At the same time, nuclear-tipped interceptors deployed with advanced Russian missile defense, possibly in Kaliningrad, might destroy incoming U.S. missiles, detonating at an altitude sufficient to avoid extensive fallout.³⁹

U.S. and NATO leadership might decide that a nuclear response was unnecessary given the advanced conventional capabilities in the U.S. toolkit, and might retaliate with precision conventional weapons. In the meantime, however, the incoming reinforcements would be in disarray or the fire support from the Baltics would be halted at least temporarily. Russia would have bought some time to bring supplies and reinforcements of its own from, and would be able to stay in the war long enough to be able to negotiate from a position of relative strength at war’s end.

If the war did not escalate to intercontinental nuclear strikes between Russia and the United States (plausible in a conflict over the Baltics, despite NATO commitments) Russia would have demonstrated tactical use of nuclear weapons during a war without escalation to so-called “strategic exchange.” Russian missile defenses would have also succeeded beyond the common estimates of the ability of hit-to-kill interceptors, causing temporary radar blackout but little else in the short term. This solution to the tricky problem of effective missile defense might be appealing to countries facing a missile threat, particularly those with smaller, concentrated populations.

39. Hans M. Kristensen and Robert S. Norris, “Russian nuclear forces, 2016,” *Bulletin of the Atomic Scientists* 72, no. 3, p. 126.

Preemption on the Korean Peninsula

An end to the decades-old armistice on the Korean Peninsula could come through escalation following any number of small incidents: Clashes between fishing boats, one too many North Korean insults to the South Korean leadership, or a North Korean defector so prominent as to be unacceptable. Following extended North Korean fire over the DMZ, the South Korean government might finally decide to cross the border and address the source of the strikes.

With the North Korean economy even weaker than it is now, and fearing the loss of power precipitated by economic and societal collapse, Kim might act in desperation to stop the South Korean advance. Sending a large barrage of conventional missiles aimed at South Korean cities, he might threaten to include ten nuclear warheads in the mix. In one scenario, this would be a bluff. The barrage would still overwhelm U.S. THAAD batteries and any future South Korean missile defenses, and at least some missiles would land. There would be limited destruction, but North Korea would have demonstrated the validity of the tactic. Even without the detonation of a nuclear weapon, the proof of concept would likely force South Korea and other countries facing small nuclear weapons states to drastically increase spending on missile defense technology. It would also increase the deterrence potential of countries with small numbers of nuclear weapons, which might provide an incentive for a country to begin a nuclear program without the capacity to build a large arsenal.

Alternatively, some nuclear warheads could be included, and perhaps two densely populated South Korean cities might be devastated, though not completely destroyed; immediate casualties might be in the hundreds of thousands, including expatriates from the United States and many other countries. South Korea might be able to continue its advance or not, but in either circumstance the United States would almost certainly intervene in retaliation against North Korea. The Kim regime might collapse, and chaos would ensue, drawing in China to shore up the border or help rebuild the state. The South Korean economy would almost certainly be crippled, likely causing ripple effects throughout Asia and the rest of the world.

Unlike in the two earlier scenarios, North Korea would not have achieved its strategic objectives in any way, and no other country would want to follow its example. Yet the precedent would be set for nuclear use in a desperate situation, with the regime backed into a corner and facing likely devastation no matter what. A country like the United States, dealing with a desperate nuclear-armed adversary, might think twice in the future before assuming the adversary would not use its weapons in an apparently irrational manner.

Watchful Nations

Clearly not every country aspires to join the nuclear club, or has the combination of will and resources required to get there. Similarly, not all aspiring nuclear powers take the same path or arrive at the same outcome, and so not all countries would draw the same lessons from observing the same events. With an eye to scenarios like the first two above, in which the country detonating the nuclear weapon achieved some military advantage, this section seeks to identify characteristics of other countries that would make them susceptible to these lessons. Those might be countries seeking nuclear weapons, or they might be current nuclear states considering changes in posture.

First are countries facing adversaries that have perceived conventional military advantages. Pakistani planners seem to believe that they can overcome Indian conventional superiority with nuclear weapons, similar to U.S. planning against the Soviet Union in the early Cold War. This conventional advantage

could come in quantity only (numbers of divisions, for example) or in quality as well. Since the demonstrations of U.S. precision strike capability in the 1990s, Russian planners have sought to overcome the qualitative U.S. advantage in long-range precision strike with nuclear weapons. On the other hand, Israel still maintains technological superiority over the Arab countries surrounding it, but faces numerical inferiority. Forever hampered by its geography, Japan also faces inevitable numerical inferiority compared to China, as well as something approaching technological parity. Superiority can also exist locally, along a single front or in a single region: Apart from overall populations, there are many more Chinese citizens living along the border of the Russian Far East than local Russians, which has played into Russian fears about a Chinese territorial incursion.⁴⁰ In any of these cases, the weaker power might decide it needs a shortcut to match its stronger neighbor.

Second, some countries face specific operational problems that may seem to be solvable through certain nuclear postures. Like Pakistan or Israel, they might have limited battlespace, creating strong incentives to be able to stop an invasion quickly or deter it in the first place. Countries that have short warning times from adversaries, like Pakistan, will be pushed toward postures and doctrines requiring little time for decision-making, such as pre-delegated authority and launch-on-warning. Countries with long mobilization timelines might also see limited use of nuclear weapons as a way of stalling, particularly against an adversary without a good response option, nuclear or conventional.

Third, countries that are dissatisfied with the international system as it stands or with their own status within that system will have less to lose by violating it. Already a pariah state, North Korea faced comparatively fewer consequences after violating the Non-Proliferation Treaty than might a country that benefits significantly from a relationship with the United States, the primary enforcer of the non-proliferation regime. Countries that have a history of ignoring or disputing international law might therefore be more willing to break the norm of nuclear non-use as well. Major powers might fall into this category as well as pariahs: after the Permanent Court of Arbitration's decision in the maritime dispute with the Philippines, Chinese state media dismissed the ruling as "naturally null and void," pointing to a willingness to disregard international law when it does not suit Chinese purposes.⁴¹

Finally, states—or regimes—facing what they believe are existential threats may also be tempted. The Kim regimes in North Korea have demonstrated the value of a nuclear program to strengthen a government and defend against outside threats. Much has been made about the lessons to be learned from Muammar Gadhafi and Saddam Hussein, who both gave up nuclear programs and ended up on the losing end of regime change. From a broader state perspective, Israeli leaders use rhetoric describing existential threats to the entire Israeli state, and are indeed a small country with a concentrated population and many enemies. The less often cited comparison is Japan, a similarly small, densely populated country in range of a powerful adversary that holds a very old grudge. Rather than having less to lose, these countries have everything to lose. This might also change their calculations.

These general descriptions may beg a further question: Which countries might be tempted by one of the above incentives? Though technical feasibility will be discussed at length in the following section, it is worth laying out the most commonly mentioned possible proliferants, without purporting to make predictions about who will and will not go nuclear in the near future. At the top of the list is obviously Iran, given the debate over the Iranian nuclear program over the last decade. Many analysts believe that if Iran

40. Kipp, 47.

41. Tom Phillips, et al, "Beijing rejects tribunal's ruling in South China Sea case," *The Guardian*, July 12, 2016, available from <https://www.theguardian.com/world/2016/jul/12/philippines-wins-south-china-sea-case-againstchina>.

obtained nuclear weapons, there would be some sort of proliferation cascade, perhaps beginning with Saudi Arabia and Turkey, both of whom have a combination of skill and funding to build or buy weapons. The smaller Gulf countries, like Qatar, Bahrain, and the United Arab Emirates, might not have indigenous technical knowledge, but might be able to buy nuclear technology. (They might also play into regional arms races as requestors of extended deterrence guarantees from one power or another.) Egypt and Algeria, though less wealthy than some of their Middle Eastern neighbors, might face some of the regime pressures mentioned above, and have both been willing to ignore international pressure before.

In Asia, Japan and South Korea are most often mentioned as countries that might want nuclear weapons in response to China and North Korea, respectively (and indeed, political minorities in both countries have argued for nuclear programs). Both countries would likely have the technical skill and funding to start a program, though keeping it secret would be a different challenge. Another Asian country facing a much more powerful conventional adversary is Vietnam, which might be tempted to pursue its own nuclear program if the United States backed away from security commitments in the South China Sea. The Philippines might have been included in the same sentence before the recent foreign policy about-face conducted by President Rodrigo Duterte, which provides a good example of how quickly an ally or partner can jump ship.

Anti-nuclear sentiment is more firmly rooted in Western and Central Europe, but Eastern European countries, especially those feeling threatened by Russian revanchism, might seek weapons. Though both Poland and Ukraine seem less likely to be able to successfully produce a weapon, just a program in either country would be immediately provocative to Russia. The same logic applies to Taiwan, which seems unlikely to be able to complete a program, but would almost certainly cause conflict with China just by restarting one. It may be tempting to dismiss the ability of such small or poor countries to obtain nuclear weapons. It is worth keeping in mind that North Korea was able to carry out its first nuclear test despite years of economic isolation and intense international scrutiny, and Pakistan was able to produce viable nuclear weapons with the devotion of enough resources to the task.

How Hard Could it Be?

Assuming there are countries that do not currently have nuclear weapons but will seek them at some point in the future, the next question is how difficult it would be to get them and to keep the program secret if they choose. There is a common assumption that new proliferators will take the same path as the United States and the Soviet Union did in the 1940s and 50s, starting with big, unwieldy warheads on unwieldy, inaccurate long-range delivery systems. Both constraints and incentives have changed, however, and what was true in the early Cold War may not be true for other countries now.

The increased availability of physics and engineering knowledge is the first eased constraint. A basic level of knowledge is freely accessible on the Internet. While details of nuclear designs are not necessarily available, even the basics constitute a leg up.

Livermore Radiation Lab famously conducted the Nth Country Experiment in 1964, asking two new physics post-docs to design a nuclear weapon without access to nuclear secrets or other lab researchers. Using only material publicly available from libraries, they produced an implosion design that they believed would work (and were told so by senior Livermore researchers).⁴² While the design may have been

42. Oliver Burkeman, "How two students built an A-bomb," *The Guardian*, June 24, 2003, available from <https://www.theguardian.com/world/2003/jun/24/usa.science>.

rudimentary, experienced nuclear physicists might be able to accomplish much more. Research can also now be conducted without access to physical materials, and advanced computing technology allows for quicker and more accurate evaluation of designs.

Beyond the development of indigenous designs, it is reasonable to assume that international trade in nuclear technology will occur again. A.Q. Khan demonstrated the enormous personal wealth and prestige that can be gained by playing nuclear godfather, and copycat attempts can be expected. State-to-state exchanges or sales can also be a venue for the spread of nuclear technology, with payment in money or security benefits. There are allegations of state-to-state sales of nuclear technology from China to Pakistan; the Soviet Union to China; and Pakistan (through Khan) to Libya, North Korea, and Iran; in addition to missile technology from North Korea to Pakistan and the proliferation of Scud variants. Technology transfer can also happen on a much smaller scale, while still producing wide-ranging consequences. French scientists involved in their country's nuclear program have written that a few words from a British physicist at a cocktail party in 1967 was enough to point the French in the right direction in designing their first thermonuclear weapon.⁴³

Beyond sales, espionage or theft of intellectual property allegedly contributed to the proliferation attempts of the Soviet Union, China, Israel, France, South Africa, Libya, Argentina, Brazil, South Korea, and Taiwan. Especially in the era of cyber espionage, there is no reason to believe that the only transfers of nuclear technology in the future will be consensual ones. Furthermore, the rise of global supply networks using means like the Dark Web, in addition to traditional black and gray markets, has made the job of tracking proliferation attempts more difficult.⁴⁴

Unintentional transfer can also occur through the proliferation of nuclear energy technology, which can also provide cover for “break-out” or “sneak-out” attempts. Like several foreign proliferators, the two post-docs at Livermore in the Nth Country Experiment used Atoms for Peace materials in their research. More recently, nuclear energy has been identified as a possible contributor to proliferation efforts in many cases, and might do so in the future as well. Some observers point out that France has supported the building of a Japanese plutonium reprocessing facility that could give Japan the capability to quickly produce enough plutonium to suit any nuclear program they might choose to begin. While the Japanese claim that reprocessed plutonium has no use for weapons programs, some physicists disagree.⁴⁵ The U.S. government has also acknowledged that reactor-grade plutonium can be used to make nuclear weapons with yields over one kiloton.⁴⁶ Given the spread of technology and engineering knowledge, the long pole in the tent may be the availability of fissile material, and international monitoring might not be able to detect the diversion of material in a “timely” fashion.

We also often make an assumption that states will not want to share their nuclear technology, in order to keep others out of the club or maintain balances of power. Yet states or individuals may traffic in nuclear

43. Pierre Billaud and Venance Journé, “The Real Story Behind the Making of the French Hydrogen Bomb,” *The Nonproliferation Review*, 2008 15, no. 2, pp. 353-372, 362

44. T.X. Hammes, “Cheap Technology Will Challenge U.S. Tactical Dominance,” *Joint Force Quarterly* 81, March 29, 2016.

45. Victor Gilinsky and Henry Sokolski, “How France is Fueling Japan and China’s Nuclear ‘Race,’” *The National Interest*, November 6, 2015, available from <http://nationalinterest.org/feature/how-france-fueling-japanchina%E2%80%99s-nuclear-race-14271>.

46. Brian G. Chou, Richard H. Speier, and Gregory S. Jones, “The Proposed Fissile Material Production Cut Off: Next Steps,” *RAND*, prepared for the Office of the Secretary of Defense, Santa Monica, CA: 1995, available from <http://www.dtic.mil/get-tr-doc/pdf?AD=ADA304720>.

technology for a variety of reasons that do not appear to be in their best interest. For example, one analyst made a viable case that A.Q. Khan's so-called "fourth customer" was actually India, despite Pakistan's deep-seated enmity with its neighbor.⁴⁷ Whether true or not, it is plausible that an individual in Khan's position could create a principal-agent problem, in which he was acting in his own monetary self-interest while acting against the state. States can also be driven by economic desperation; some analysts anticipate North Korean attempts to sell excess nuclear fuel or devices in the future to bolster its economic situation.⁴⁸

Furthermore, the goals may have changed. The benchmark for the early and middle Cold War was the most megatons on the longest-range missile, but as the scenarios above describe, high yields and long ranges are no longer the goals for every nuclear power in all circumstances. While miniaturizing is likely to remain important, yield requirements may be lower if the weapon is meant for battlefield use, or conversely if it is only meant as a demonstration of power or resolve. The proliferation of precision guidance technology is likely to exacerbate this shift, as high yields are no longer necessary to compensate for inaccuracy in order to destroy some targets. The majority of the most plausible scenarios now also involve regional wars, so while the ICBM may remain a prestige symbol or a way to draw in the United States, it may not be a requirement for operational capability.

There have also been advances in non-nuclear technology and engineering that have eased the path to producing nuclear weapons. While additively manufacturing nuclear material may be challenging, 3-D printing has the potential to enable the nuclear fuel cycle at the very least. The process makes it easier to produce parts to exacting standards to a high degree of reliability, while leaving a much smaller manufacturing footprint. It also requires less skill, compared to the expert machinists required to produce centrifuge parts, for example, and designs for parts that are currently being created within the defense industry in the United States and China.⁴⁹ Because the equipment is dual use, it is harder to track than the specialized machining tools used to make parts specific to nuclear weapons. The machines are also small and can be dispersed, making them harder to detect.⁵⁰

Additive manufacturing is unlikely to allow a country to go nuclear that would not otherwise have been capable, but it may speed up timelines and permit greater secrecy. There was a gap of ten years between when Iran was able to smuggle in centrifuge designs and models and when it broke ground on its first centrifuge facility.⁵¹ With 3-D printing, it might be able to cut that to a fraction, while also dispersing its facilities to protect against detection and offensive action.

Advances in technology and manufacturing can also enable the supporting systems for nuclear weapons more cheaply and powerfully. Intelligence, surveillance, and reconnaissance are more accurate and cost effective using commercial space companies and high-altitude, long endurance unmanned aerial vehicles (UAVs). Advances in nanomaterials may create new opportunities for conventional explosives. An American company recently announced that it had created a 3-D printer, costing less than \$9000, that could print

47. Jeffrey Lewis, "India Was Khan's Fourth Customer," *Arms Control Wonk* blog, December 21, 2011, available from <http://www.armscontrolwonk.com/archive/204905/india-was-khans-fourth-customer/>.

48. See Snyder. Also Graham Allison, "North Korea's Lesson: Nukes for Sales," *The New York Times*, February 12, 2013.

49. For a long discussion, see Matthew Kroenig and Tristan Volpe, "3-D Printing the Bomb? The Nuclear Nonproliferation Challenge," *The Washington Quarterly*, Fall 2015 38, no. 3, pp.7-19.

50. Kroenig and Volpe, p. 11.

51. Kroenig and Volpe, p. 10.

an entire operational UAV, including avionics and engine.⁵² Combined with rapidly advancing swarm and artificial intelligence technologies, all these technologies have the potential to further complicate paths to nuclear weapons.

Every state that might consider developing nuclear weapons sits somewhere on a timeline to successful deployment, whether it be months or years or a decade. Alone or with help, states may now be able to leapfrog steps and skip ahead on the timeline, straight to an operationally useful capability, rather than spending years building bombs too heavy to put on missiles or carry in aircraft. Skipping inefficient early designs could make better use of limited nuclear materials. In the spirit of “eating grass,” a willingness to devote more and more resources could shorten the timeline; the United States was certainly able to do that during World War II, with only two years between the breaking of ground at Los Alamos to the successful test of the Trinity device. Combined with faster and more secretive manufacturing and the proliferation of missile and precision-strike technology, the path to building a useful nuclear weapon today may be much shorter than in the past.

What Are the Consequences for the United States?

If it is easier than in the past to design and produce nuclear weapons, and there are growing or changing incentives for states to obtain and use nuclear weapons, the logical outcome is a growing likelihood of nuclear proliferation and use in the coming decades. This section will consider the consequences of such a scenario for U.S. military and national security consequences, leaving aside the broader ecological, cultural, and societal consequences for the moment.

The consequences of proliferation of nuclear weapons, even before detonation, would be profound. Statistically, the more nuclear weapons deployed at more bases, the more likely leakage to terrorist groups or criminal networks becomes. Smaller countries that would otherwise hold less geopolitical sway would be able to deter international intervention, in the style of Kim Jong-un. Countries wishing to conduct limited wars or campaigns below the level of open conflict would be able to do so, with the spread of the so-called stability-instability paradox.

It is worth noting that these concerns do not apply only to countries typically seen as adversaries to the United States. While we might grudgingly accept another nuclear-armed treaty ally or partner, there is always the possibility of regime change or instability in the future that would bring an abrupt change in sentiment; the overthrow of the Shah in Iran and the accompanying Iranian Revolution is a good reminder of how dramatic those shifts can be. Even without regime change, proliferation is likely to breed more proliferation, so a new nuclear ally might trigger a new nuclear-armed adversary. Practically, with intelligence collection requirements presumably more often directed at adversaries, we might be more likely to miss the signs of imminent proliferation in friendly governments, and therefore be less prepared to intervene while they can still be stopped.

Statistically, it seems likely that more countries with nuclear weapons would also raise the chances of detonation in conflict. Despite the seventy years that have passed since Nagasaki without another instance of nuclear use, there are a number of additional factors that make current and emerging nuclear competitions less stable than during the Cold War. The direct communication and dialogue that emerged between the United States and the Soviet Union does not exist between most nuclear-armed states today, making diffusion of crises more difficult. Emerging technologies and increasing investments in space and cyber

52. Hammes.

warfare capabilities make predicting adversary reactions more difficult. Expanding alliance structures, on both sides of many competitions, might also increase the likelihood of entanglement or miscalculation, as might the growth of powerful nonstate actors receiving support from states.

Circumstances following nuclear use in war could be described along two continua, not necessarily mutually exclusive. The detonation could have enormously devastating physical consequences, most likely because of ground bursts at higher yields, in proximity to large populations, or it could cause less collateral damage than expected; and the detonation could be effective militarily, or not. The combination of these two factors would produce different outcomes for the United States, in terms of the risk of further proliferation and the perceived dangers faced by the U.S. military and population.

If the nuclear strike were on or near a city, the most prominent lesson might be that cities are not safe. We might see a mass exodus from cities considered vulnerable, or, given the strong preferences for the urban status quo, we might see a return to the craze for civil defense, including bomb shelters, duck-and-cover drills, and other remnants of the early Cold War. We would almost certainly see a reinvestment in secure facilities for leadership, perhaps reopening long-abandoned mountain bunkers and rebuilding resilient communications infrastructure. There might also be pressure to build active defenses like those Russia maintains around Moscow and St. Petersburg.

If the detonation did not help the state in question achieve its military or political aims, like in the North Korea or first South Asian scenario described above, there would be less incentive for states to acquire nuclear weapons based on that example. The tradition of nuclear non-use would be broken, which might be enough to tip the scales in some cases, but broadly the proliferation consequences would be lower.

The circumstance most likely to cause further proliferation would be a strike that caused less collateral damage than expected (whether due to luck or inadequate understanding of technology) but was strategically effective. If more states acquire nuclear weapons, and, importantly, are more inclined to use them like very effective conventional weapons, the U.S. military would find itself operating in a new and more dangerous environment. Changes would be required in the way the military is trained and equipped, as well as new doctrine and operational concepts to deal with the blurring of the firebreak between powerful conventional weapons and low-yield nuclear weapons.

Though the experiences of the Pentomic Army in the 1950s have long been dismissed as folly, plans for dispersal, protection, and maneuver would likely be revisited. Extensive research and development would be required to devise sufficient protections for individuals on the ground or at sea, as well as to develop vehicles and ships that could protect those inside them. A serious effort might have to be made to harden systems of all kinds against the effects of specialized EMP weapons in addition to those incidental to nuclear use. Ground forces in particular would have to be retrained to operate in a nuclear environment, and would almost certainly be constrained.

Operationally, we would have to contend with what amounted to an anti-access/area denial umbrella extended by any nuclear-armed country, on the ground and perhaps at sea. We might also confront nuclear weapons combined with any number of emerging technologies and tactics, including artificial intelligence, autonomy, and swarming tactics. Doctrines for all of these technologies are still very unclear, which complicates the task of predicting and preparing for them. While the pairing of nuclear warheads with autonomous weapons may be anathema to most Americans, some adversaries may see it differently. Similarly, as the lines between domains blur, there is still no consensus in the United States around deterrence in space or cyberspace; there is even less understanding of how other militaries might try to deter nuclear use with space or cyber forces, or vice versa.

Finally, the United States might be pressured to reconsider its own force structure and role in the world. Following a war like the Baltic scenario above, there might be pressure to develop our own nuclear weapons for battlefield use in order to have proportional response options. With advances in technology creating wider bands of uncertainty and the possibility of new capabilities, there might be pressure to resume nuclear testing, especially if other countries had done so already.

As proliferation was happening, there might be a push to intervene militarily to prevent success, similar to the debate in the United States and Israel over the Iranian nuclear program. After a successful proliferation, there might be pressure to get more involved as a third party mediator to prevent conflicts that might otherwise have stayed below the threshold for U.S. intervention. Alternatively, there might be a rising tide in the United States to withdraw and remain isolated in order to avoid the danger.

No matter the exact path, the consequences of further nuclear use and ensuing proliferation would almost certainly include extraordinary spending on both defensive and offensive capability. All this would take place in the CNN and social media eras, in which the photographs of the aftermath of a nuclear detonation would not be black and white, grainy, and delayed, but would be prompt and high-definition. We might experience extreme economic and societal upheaval, but at the very least, we would be forced to set aside the current calm induced by confidence in the strength of the “nuclear taboo” and return to the anxiety of the early Cold War.

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