



CSBA

Center for Strategic and Budgetary Assessments

UNDERSTANDING STRATEGIC INTERACTION IN THE SECOND NUCLEAR AGE

THOMAS G. MAHNKEN
GILLIAN EVANS TOSHI YOSHIHARA
ERIC S. EDELMAN JACK BIANCHI

UNDERSTANDING STRATEGIC INTERACTION IN THE SECOND NUCLEAR AGE

THOMAS G. MAHNKEN

GILLIAN EVANS

TOSHI YOSHIHARA

ERIC EDELMAN

JACK BIANCHI

CSBA

Center for Strategic and Budgetary Assessments

2019

ABOUT THE CENTER FOR STRATEGIC AND BUDGETARY ASSESSMENTS (CSBA)

The Center for Strategic and Budgetary Assessments is an independent, nonpartisan policy research institute established to promote innovative thinking and debate about national security strategy and investment options. CSBA's analysis focuses on key questions related to existing and emerging threats to U.S. national security, and its goal is to enable policymakers to make informed decisions on matters of strategy, security policy, and resource allocation.

ABOUT THE AUTHORS

Thomas G. Mahnken is President and Chief Executive Officer of the Center for Strategic and Budgetary Assessments. He is a Senior Research Professor at the Philip Merrill Center for Strategic Studies at The Johns Hopkins University's Paul H. Nitze School of Advanced International Studies (SAIS) and has served for over 20 years as an officer in the U.S. Navy Reserve, to include tours in Iraq and Kosovo. He currently serves as a member of the Congressionally-mandated National Defense Strategy Commission and as a member of the Board of Visitors of Marine Corps University. His previous government career includes service as Deputy Assistant Secretary of Defense for Policy Planning from 2006–2009, where he helped craft the 2006 Quadrennial Defense Review and 2008 National Defense Strategy. He served on the staff of the 2014 National Defense Panel, 2010 Quadrennial Defense Review Independent Panel, and the Commission on the Intelligence Capabilities of the United States Regarding Weapons of Mass Destruction. He served in the Defense Department's Office of Net Assessment and as a member of the Gulf War Air Power Survey. In 2009 he was awarded the Secretary of Defense Medal for Outstanding Public Service and in 2016 the Department of the Navy Superior Civilian Service Medal.

Gillian Evans is a Senior Analyst at the Center for Strategic and Budgetary Assessments. At CSBA her work focuses on U.S. national security strategy, nuclear strategy and modernization, and trends in future warfare. Prior to joining CSBA, Gillian worked as a Consultant Analyst in PA Consulting Group's Federal Defense Strategy practice, supporting projects for the Office of Naval Research and the Office of the Secretary of Defense. Her prior experience also includes work for the Afghanistan Policy team at the Office of the Secretary of Defense, and from 2014 to 2015 she served as a fellow at the Lahore University of Management Sciences in Lahore, Pakistan. She has an M.A. in Strategic Studies from Johns Hopkins SAIS and an undergraduate degree from Georgetown University's Walsh School of Foreign Service.

Toshi Yoshihara is a Senior Fellow at CSBA. Before joining CSBA, Toshi Yoshihara held the John A. van Beuren Chair of Asia-Pacific Studies at the U.S. Naval War College where he taught strategy for over a decade. He was also an affiliate member of the China Maritime Studies Institute at the war college. Dr. Yoshihara has served as a visiting professor at the Fletcher School of Law and Diplomacy, Tufts University, the School of Global Policy and Strategy, University of California, San Diego and the U.S. Air War College. He is the recipient of the Navy Meritorious Civilian Service Award in recognition of his scholarship on maritime and strategic affairs at the Naval War College. His latest book, with James R. Holmes, is the second edition of *Red Star over the Pacific: China's Rise and the Challenge to U.S. Maritime Strategy* (Naval Institute Press, 2019).

Eric Edelman is Ambassador Eric S. Edelman is Counselor at the Center for Strategic and Budgetary Assessments. He retired as a career minister from the U.S. Foreign Service on May 1, 2009. He has served in senior positions at the Departments of State and Defense as well as the White House, where he led organizations providing analysis, strategy, policy development, security services, trade advocacy, public outreach, citizen services, and congressional relations. As under-secretary of defense for policy (August 2005-January 2009), he was DoD's senior policy official, overseeing strategy development with global responsibility for bilateral defense relations, war plans, special operations forces, homeland defense, missile defense, nuclear weapons and arms control policies, counterproliferation, counternarcotics, counterterrorism, arms sales, and defense trade controls. He served as U.S. ambassador to Finland in the Clinton administration and Turkey in the Bush administration and was Vice President Cheney's principal deputy assistant for national

security affairs. He was chief of staff to Deputy Secretary of State Strobe Talbott, special assistant to Undersecretary of State for Political Affairs Robert Kimmitt, and special assistant to Secretary of State George Shultz. His other assignments included the State Department Operations Center, Prague, Moscow, and Tel Aviv, where he was a member of the U.S. Middle East delegation to the West Bank/Gaza autonomy talks. Ambassador Edelman has been awarded the Department of Defense Medal for Distinguished Public Service, the Chairman of the Joint Chiefs of Staff Joint Distinguished Civilian Service Award, the Presidential Distinguished Service Award, and several Department of State Superior Honor Awards. In 2010, he was named a knight of the French National Order of the Legion of Honor. Ambassador Edelman serves as the Chair of the National Defense Strategy Commission and on the bipartisan board of directors of the United States Institute of Peace.

Jack Bianchi is a Senior Analyst at CSBA who focuses on national security strategy and defense issues in the Asia-Pacific region. Mr. Bianchi was previously a Research Analyst at Defense Group Inc. where he performed bilingual (Chinese and English) open source research and analysis for U.S. government clients on Chinese cybersecurity issues and China's defense-related science and technology development. Mr. Bianchi has working proficiency in Mandarin Chinese and has studied the language at academic programs in both Beijing and Taipei. He co-authored "Warfare Drivers: Mission Needs and the Impact on Ship Design," a chapter in Chinese Naval Shipbuilding: An Ambitious and Uncertain Course. Mr. Bianchi's prior experience also includes work at the Department of Justice and in the Office of Investment Security at the Department of the Treasury.

ACKNOWLEDGMENTS

The authors would like to thank Hal Brands, Frank Miller, Evan Montgomery, and Travis Sharp for their insightful comments on previous drafts of this monograph, and Kamilla Gunzinger for her editing and publication support. The analysis and findings presented here are solely the responsibility of the authors. CSBA receives funding from a broad and diverse group of contributors, including private foundations, government agencies, and corporations. A complete list of these organizations can be found on our website at www.csbaonline.org/about/contributors.

Cover: A U.S. Air Force KC-135 Stratotanker from the 100th Air Refueling Wing refuels a U.S. Air Force B-2 Spirit from the 509th Bomb Wing during a mission that targeted Islamic State training camps in Libya, January 18, 2017. U.S. Air Force Photo by Staff Sgt. Kate Thornton.

Contents

CHAPTER 1: INTRODUCTION	1
The Net Assessment Approach	2
Report Structure	4
CHAPTER 2: STRATEGIC INTERACTION	5
External Sources of Competition	5
Internal Sources of Competition	8
Thinking About U.S.-Russia-China Strategic Interaction	9
CHAPTER 3: U.S. STRATEGIC CULTURE & INTERACTION	11
Early Cold War and the Development of a Deterrence Theory	12
Late-Cold War, Détente, and the Revitalization of Competitive Strategies	18
Post-Cold War and Current Policy	23
Continuity and Change in U.S. Nuclear Policy	32
Conclusion	38
CHAPTER 4: RUSSIA: STRATEGIC CULTURE AND INTERACTION	39
Early Cold War and the Threat of Surprise Attack	40
Late Cold War and the Pursuit of Nuclear Superiority	42
Post-Cold War and Current Policy	45
Continuity and Change in Soviet and Russian Nuclear Policy	54
Conclusion	57
CHAPTER 5: CHINA: CONTINUITY AND CHANGE IN NUCLEAR POLICY AND STRATEGY	59
Chinese Nuclear Policy from a Historical Perspective	60
Continuities in Chinese Nuclear Policy	64
Potential Sources of Change in Chinese Nuclear Policy	71
Conclusion	83
CHAPTER 6: IMPLICATIONS	85
LIST OF ACRONYMS	89

CHAPTER 1

Introduction

The nuclear balance is changing. Whereas the total inventory of nuclear warheads has been decreasing for decades, the number of nuclear powers is increasing. Whereas the nuclear balance throughout the Cold War was centered on the United States and the Soviet Union, today nuclear competition is on the brink of becoming multipolar. And although strategic interaction between the United States and the Soviet Union during the Cold War fell far short of the “action-reaction” model developed by international relations theorists, current and future patterns of interaction among nuclear powers are likely to be more complex.¹ Whereas the nuclear arsenals of the United States and Russia have been constrained by bilateral nuclear arms control agreements, those of other nuclear powers have not. Moreover, the composition of nuclear forces is changing as new technologies, such as hypersonic delivery vehicles, enter service. Some states, such as the United States and Great Britain, appear to see decreasing utility in nuclear weapons, whereas others, notably Russia, Pakistan, and North Korea, appear to see nuclear weapons as having increasing utility.

Given the shifting nuclear landscape, the time is ripe for a net assessment of the nuclear balance.² This report is the second in a series of studies that collectively offer an unclassified net assessment of the nuclear balance in the “Second Nuclear Age,” a period that is arguably more complex and potentially more volatile than the bipolar U.S.-Soviet struggle that

1 On U.S.-Soviet interaction during the Cold War, see Ernest R. May, John D. Steinbruner, and Thomas W. Wolfe, *History of the Strategic Arms Competition, 1945–1972*, Parts I and II (Washington, DC: Historical Office, Office of the Secretary of Defense, March 1981). On arms races in general, see Thomas G. Mahnken, Joseph A. Maiolo, and David Stevenson, eds., *Arms Races in International Politics from the Nineteenth to the Twenty-First Century* (Oxford: Oxford University Press, 2016).

2 For a previous such official effort, see Secretary of Defense and Director of Central Intelligence, *US and Soviet Strategic Forces: Joint Net Assessment*, NI 83-10002X (Washington, DC: Central Intelligence Agency, November 14, 1983).

characterized the Cold War.³ The first report discusses trends and asymmetries in the nuclear balance in the post-Cold War era. This report focuses on the ways in which nuclear states interact with one another. It examines how the United States, Russia, and China, in particular, have historically perceived global nuclear competition, how they have conceptualized the purpose of their own nuclear forces, and how these perceptions have influenced their approaches to the development and execution of nuclear strategy. In each country, nuclear decision-making has and will likely continue to be influenced by competitors' strategies and military forces, both nuclear and conventional. However, differences in strategic culture have shaped each country's distinct approach to nuclear strategy, complicating a simple action-reaction model of strategic interaction. This report outlines the historical roots of U.S., Russian, and Chinese nuclear policies and identifies continuities in each country's nuclear strategy and policy. It also identifies sources of change, especially changes that may prove particularly consequential in a more multipolar and competitive international environment.

The Net Assessment Approach

As used in this report, the term “net assessment” is defined as “The comparative analysis of military, technological, political, economic, and other factors governing the relative military capability of nations. Its purpose is to identify problems and opportunities that deserve the attention of senior defense officials.”⁴

As initially defined by the father of net assessment in the U.S. government, Andrew W. Marshall, net assessment is meant to be

A careful comparison of U.S. weapon systems, forces, and policies in relation to those of other countries. It is comprehensive, including description of the forces, operational doctrines and practices, training regime, logistics, known or conjectured effectiveness in various environments, design practices and their effect on equipment costs and performance, and procurement practices and their influence on cost and lead times. The use of net assessment is intended to be diagnostic.⁵

Two elements of this definition are worth noting. The first is the fact that net assessment is meant to be comprehensive and emphasizes a multidisciplinary approach to analysis. The second is that it is diagnostic, not prescriptive. It seeks to create an understanding of the character of a military balance rather than prescribing a particular course of action or policy recommendation. Specifically, it seeks to highlight emerging problems or opportunities in a

3 Evan Braden Montgomery, *Extended Deterrence in the Second Nuclear Age: Geopolitics, Proliferation, and the Future of U.S. Security Commitments* (Washington, DC: Center for Strategic and Budgetary Assessments, 2016), p. 4. See also Colin S. Gray, *The Second Nuclear Age* (Boulder, CO: Lynne Rienner, 1999); Andrew F. Krepinevich, *Meeting the Challenge of a Proliferated World* (Washington, DC: Center for Strategic and Budgetary Assessments, 2010); and Paul Bracken, *The Second Nuclear Age: Strategy, Danger, and the New Power Politics* (New York: Times Books, 2012).

4 Office of the Secretary of Defense (OSD), “Director of Net Assessment,” DOD Directive 5111.11, December 23, 2009, p. 1.

5 A. W. Marshall, “The Nature and Scope of Net Assessments,” National Security Council Memorandum, August 16, 1972, p. 1.

given area of military competition that a senior leader such as the Secretary of Defense would still have time to make decisions. This emphasis on emerging challenges and opportunities is a unique feature of the approach.

The net assessment approach includes a number of characteristic features. This series of reports seeks to address all of them collectively, though specific reports within the series lend themselves to emphasize different elements. The first—and most important to this specific report—is its emphasis upon competitive interaction of national security organizations.⁶ The net assessment approach assumes that the relationship between states and other actors is characterized neither by conflict nor cooperation, but rather competition between actors seeking to achieve different objectives. Moreover, it assumes that competitors are not “strategically autistic,” but rather interact with one another, albeit imperfectly. Similarly, the net assessment approach assumes that competitors may perceive the world differently and act accordingly. In the military realm, this means that even though different countries may possess similar military hardware, they may choose to employ those systems in very different ways.

A second characteristic of the net assessment approach is the emphasis it places on bureaucratic, organizational, and cultural factors that often lead to sub-optimal behavior. These considerations are all the more important in an era of joint warfare. How potential opponents and the United States integrate different forms of combat power can heavily influence the overall effectiveness of their forces.

A third feature of net assessment is its acknowledgment of the fact that competitors possess limited resources and operate on the basis of imperfect information. Net assessment, like managerial economics and decision analysis, must deal with uncertainty. It also is comfortable using qualitative as well as quantitative data unlike, for example, much of systems analysis or cost-benefit analysis.⁷

A fourth characteristic of net assessment, which flows from the previous three, is an emphasis on asymmetry. One output of net assessment analyses is an understanding of asymmetries in doctrine, concepts of operations, and effectiveness of military systems and forces. Where are the key differences? What might be their impact on a conflict? Which ones could be useful for U.S. decisionmakers? Which ones must they take into account and either counter or end-run? These asymmetries often create opportunities for one side or the other when actual strategies are developed.

Finally, net assessments evaluate how the competition is likely to evolve over time, often two to three decades. The net assessment approach attempts to reflect the time dimension of

6 Stephen Peter Rosen, “Net Assessment as an Analytical Concept,” in A. W. Marshall, J. J. Martin, and Henry S. Rowan, eds., *On Not Confusing Ourselves* (Boulder, CO: Westview Press, 1991), pp. 283–301.

7 On this comparison, see Eliot A. Cohen, *Net Assessment: An American Approach*, JCSS memo #29 (Tel Aviv: JCSS, 1990).

national military strengths and weaknesses relative to those of a potential foe. As a result, the net assessment approach puts a heavy emphasis on analyzing long-term trends, including, but not limited to, those in the military sphere.

Report Structure

This report is the second in a series of studies that collectively offer an unclassified net assessment of the nuclear balance. It follows an initial report that discusses nuclear trends and asymmetries in the post-Cold War era and provides a framework for measuring nuclear balances in the Second Nuclear Age. A future report will assess key military balances, including system capabilities and emerging technologies.

This report focuses on strategic interactions between states. It examines how strategic interaction has shaped national perceptions of nuclear balances and informed each state's approach to the development of nuclear policy. Chapter 2 provides a framework for thinking about strategic interaction. Chapters 3–5 are devoted to the United States, Russia, and China, respectively. They trace the evolution of each country's approach to nuclear strategy, and they identify important sources of change and continuity. Chapter 6 concludes the report with a discussion of the implications of these patterns of interaction for how we think about the nuclear balance in the 21st century.

CHAPTER 2

Strategic Interaction

Sound net assessment requires an understanding of the interaction among the actors. What do they notice and respond to? What, conversely, do they ignore? How closely coupled, if at all, are their actions to those of other states? This chapter describes the range of factors, external and internal, that influence interaction among states. In so doing, it should cause us unease with the neat formulations of an “arms race” or “action-reaction” dynamics. While there is a loose coupling between decisions made by competitors, a range of internal dynamics also drives state behavior and ensures that one state’s decision-making rarely mirrors its competitors’.

External Sources of Competition

Arms race theory has historically played an oversized role in understanding strategic competition.⁸ The most common, and simplistic, formulation of arms race theory is the action-reaction model. As Barry Buzan and Eric Herring have put it, the action-reaction model stipulates “that states strengthen their armaments because of the threats the states perceive from other states. The theory implicit in the model explains the arms dynamic as driven primarily by factors external to the state.”⁹ This view holds that the search for security, together with uncertainty and worst-case estimates of enemy intentions and capabilities, will yield efforts to amass ever-greater stockpiles of weaponry. That means exaggerated fears and inflated estimates of the threat will lead to the spiraling growth of armaments and arms spending. This is supported by

8 For earlier versions of this argument, see Thomas G. Mahnken, “Arms Races and Long-Term Competition,” in Thomas G. Mahnken and Dan Blumenthal, eds., *Strategy in Asia: The Past, Present, and Future of Regional Security* (Palo Alto, CA: Stanford University Press, 2014); and Thomas G. Mahnken, “Introduction to Part III,” and “Armaments Developments Since the Cold War,” in Mahnken, Maiolo, and Stevenson, *Arms Races in International Politics*.

9 Barry Buzan and Eric Herring, *The Arms Dynamic in World Politics* (London: Lynne Rienner, 1998), p. 83.

the fact that plans to field new weapons are often made before the systems they are intended to counter appear on the scene.¹⁰

During the Cold War, such a view held that U.S. developments and deployments in the nuclear realm triggered, in a direct and straightforward way, Soviet responses, and vice versa. Applied to the current environment, the action-reaction view holds that China and Russia's nuclear programs are a direct response to U.S. nuclear moves, and vice versa.¹¹ Conversely, many arguments in favor of nuclear disarmament claim that if the United States eliminates its nuclear arsenal, then others will follow.

Action-reaction theory assumes that the decisions made by competitors on arms are connected—that is, that actors pay close attention to one another and the magnitude and timing of their responses are directly related to actions by opponents. In practice, it assumes that states will perceive a competitor's developments in a timely manner and will devise and implement responses accordingly. But in reality, the theory often oversimplifies state behavior and overstates the degree to which one sole competitor drives a state's security strategy. While Russia and China clearly respond to changes in the external environment and are engaged in active competition with the United States, characterizing either state's behavior as examples of action-reaction dynamics understates the role that strategic culture, domestic politics, and bureaucratic factors play in state decision-making.¹²

The action-reaction dynamic is appealing because of its simplicity. As Secretary of Defense Robert McNamara once remarked, “Whatever their intentions or our intentions, actions—or even realistically potential actions—on either side relating to the buildup of nuclear forces necessarily trigger reactions on the other side. It is precisely this action-reaction phenomenon that fuels the arms race.”¹³ To the extent that such assessments are inaccurate, it assumes that states will overestimate a competitor's capabilities rather than underestimate them. In particular, arms race theory holds that the combination of uncertainty over an adversary's future capabilities combined with worst-case planning will produce overestimation and overreaction.¹⁴

10 George W. Rathjens, *The Future of the Strategic Arms Race: Options for the 1970s* (Washington, DC: Carnegie Endowment for International Peace, 1969); Samuel P. Huntington, “Arms Races: Prerequisites and Results,” *Public Policy* 8, 1958; Paul Kennedy, “Arms-Races and the Causes of War, 1850–1945,” in *Strategy and Diplomacy, 1870–1945* (London: George Allen and Unwin, 1983); George Downs, “Arms Races and War,” in Philip E. Tetlock et al., eds., *Behavior, Society, and Nuclear War*, vol. 2 (New York: Oxford University Press, 1991), pp. 82–84; and Charles L. Glaser, “The Causes and Consequences of Arms Races,” in Nelson W. Polsby, ed., *Annual Review of Political Science*, vol. 3 (Palo Alto, CA: Annual Reviews, 2000), pp. 251–276.

11 Paul Warnke, “Apes on a Treadmill,” *Foreign Policy*, Spring 1975; and Tom O'Connor, “China Wants New Nuclear Weapons to Keep Up with U.S. and Russia Military Power,” *Newsweek*, January 30, 2018, available at <http://www.newsweek.com/china-wants-new-nuclear-weapons-keep-us-russia-military-power-795401>.

12 Thomas G. Mahnken, “Armaments Developments Since the Cold War,” in Mahnken, Maiolo, and Stevenson, *Arms Races in International Politics*, p. 282.

13 Robert S. McNamara, “The Dynamics of Nuclear Strategy,” *Department of State Bulletin*, LVII, October 9, 1967.

14 See Rathjens, *The Future of the Strategic Arms Race*.

Despite its theoretical appeal, the action-reaction dynamic alone cannot explain past patterns of arms acquisition, let alone serve as a useful means of interpreting present and future interaction. Although arms race theory developed during the Cold War, it is questionable whether it actually explained Soviet-American interactions. For example, a study by Andrew W. Marshall of Soviet defense expenditures in the 1960s revealed a much looser interaction between Washington and Moscow than predicted by action-reaction theory. Understanding that the competition placed greater weight on the organizational context and constraints in the Soviet Union, Marshall urged that we learn:

how the perceptions of what the other side is doing come about in various places within these complicated bureaucracies, and how these perceptions influence the behavior of the various organizations and the decision makers involved in the complex decision processes that drive . . . several defense programs.¹⁵

Also telling is the work that Ernest May, John Steinbruner, and Thomas Wolfe conducted at the behest of the Secretary of Defense during the second half of the 1970s, which included access to some of the most highly sensitive intelligence sources on the Soviet Union. Tasked with writing a contemporary history of the U.S.-Soviet arms competition, the authors discovered “budgets, forces, deployments, and policies of the United States . . . were products less of direct interaction with the Soviet Union than of the tension in the United States between dread of Communism on the one hand and the dread of deficit spending on the other.”¹⁶ That is, even at the height of the Cold War, they found that American nuclear programs were only partially driven by Soviet plans and actions, and vice versa. This is not to say that arms race dynamics do not exist, or that states do not react and respond to a competitor’s activities. Throughout the Cold War, both Soviet and U.S. policymakers remained attuned to one another’s actions and to their perceptions of the relative balance of power and military forces between the two countries. But conclusions that assume the totality of state decision-making stems in response to a competitor’s own activities are insufficient explanations of state behavior.

What we have subsequently learned about strategic interaction during the Cold War, to include interviews with Soviet military leaders and greater access to Russian archival sources, corroborates this view. Indeed, Soviet leaders paid attention to a mixture of external and internal developments. Their focus was selective, and their grasp of international affairs was mediated through strategic culture, ideology, and bureaucratic politics. What is more, their responses were conditioned by organizational culture, bureaucratic politics, and standard operating procedures. The dynamics prevalent during the Cold War thus diverged significantly

15 Andrew W. Marshall, *Long-Term Competition with the Soviets: A Framework for Strategic Analysis* (Santa Monica, CA: RAND Corporation, 1972), p. 7.

16 May, Steinbruner, and Wolfe, *History of the Strategic Arms Competition*, Part I, p. 241.

from the expectations of the action-reaction theory.¹⁷ Given that those dynamics existed during intense bipolar competition, there is even more reason to doubt the utility of such an approach in today’s multipolar environment.

Internal Sources of Competition

The historical record shows that arms competitions are influenced not only by interaction with competitors, but also by domestic factors such as political objectives, bureaucratic politics, military culture, and bureaucratic processes. First, national political objectives play a major role in arms decisions. These may or may not be directly related to competitors. Second, bureaucratic politics influence arms procurement. Based on memoirs and interviews with military and industrial leaders in the Soviet Union, bureaucratic politics in the form of competition between weapons design bureaus played a major role in determining the shape of investments in Soviet arms.¹⁸ This is also likely to be the case with regard to China.

Third, military culture influences decisions on acquisition. Robert Perry indicated in the context of U.S.–Soviet competition that “whether Soviet or American, R&D institutions as readily aspire to organizational immortality as do trade guilds or cavalry regiments; instinctively, they resist change.”¹⁹ This is particularly the case in the United States, where the cultures of each military Service influence what type of weapons they acquire.²⁰ Moreover, Russia, like the Soviet Union, until recently had separate branches for both long-range missiles (Strategic Missile Forces) and homeland air defense (Aerospace Defense Forces). The former favored intercontinental ballistic missiles (ICBMs) over submarine-launched ballistic missiles (SLBMs) and bombers, whereas the latter heavily invested in air defense interceptors and long-range surface-to-air missiles. The organizational culture of the People’s Liberation Army (PLA) also influences acquisition. Specifically, the Rocket Force serves as a home and advocate for Chinese ballistic missiles.

Fourth, bureaucratic processes influence decisions on arms. For example, major dissimilarities in U.S. and Soviet research, development, and acquisition systems produced significantly different forces.²¹ An observable contrast existed between the Soviet practice of evolutionary

17 See, for example, Pavel Podvig, “The Window of Vulnerability That Wasn’t: Soviet Military Buildup in the 1970s—A Research Note,” *International Security* 33, no. 1, Summer 2008; John A. Battilega, “Soviet Views of Nuclear Warfare: The Post-Cold War Interviews,” in Henry D. Sokolski, ed., *Getting MAD: Nuclear Mutual Assured Destruction, Its Origins and Practice* (Carlisle, PA: U.S. Army War College, 2004), pp. 151–174; and John Hines, Ellis M. Mishulovich, and John F. Shulle, *Soviet Intentions 1965–1985*, vol. I, *An Analytical Comparison of U.S. Soviet Assessments During the Cold War* (McLean, VA: BDM Federal, Inc., 1995).

18 David Holloway, “The Soviet Style of Military R&D,” in Franklin A. Long and Judith Reppy, eds., *The Genesis of New Weapons: Decision Making for Military R&D* (New York: Pergamon Press, 1980), p. 145.

19 Robert Perry, “American Styles of Military R&D,” in Long and Reppy, *The Genesis of New Weapons*, p. 107.

20 See Thomas G. Mahnken, *Technology and the American Way of War Since 1945* (New York: Columbia University Press, 2008).

21 Franklin A. Long and Judith Reppy, “Decision-Making in Military R&D: An Introductory Overview,” in Long and Reppy, *The Genesis of New Weapons*, pp. 13–14.

development and the American preference for large-scale innovation.²² Additionally, as Barry Buzan and Eric Herring have indicated, “As the leading edge creates ever-higher standards of military capability, followers either have to upgrade the quality of their weapons or else decline in capability relative to those who do.”²³ Moreover, Lord Solly Zuckerman observed, “The momentum of the arms race is undoubtedly fueled by the technicians in governmental laboratories and in the industries which produce the armaments.”²⁴ Similarly, Marek Thee noted “the close interaction in stimulating the arms race between the feats of military technology, the interests and preferences of the military, the doings of the military industry, and of the state political bureaucracy.”²⁵ Although the assertions may be inflated, assessments of foreign research and development, together with perceptions of the threat environment, influence weapons decisions.

Thinking About U.S.-Russia-China Strategic Interaction

If strategic interaction during the height of the Cold War fell short of an action-reaction arms race, there is even less reason to believe that such a model will prevail in a world marked by multipolar nuclear interaction.²⁶ As the following three chapters describe, the interaction between the United States, Russia, and China, let alone other nuclear powers, is more complex than that between the United States and the Soviet Union—or even the United States, Britain, and France and the Soviet Union—during the Cold War. To the contrary, they describe very different approaches to nuclear weapons brought on by a variety of internal and external circumstances. The diffusion of global power that characterizes the Second Nuclear Age will further confound states’ efforts to send clear signals of intent and to evaluate the intentions of others. This implies greater opportunities for misinterpretation of state behavior and consequently a more volatile interactive environment.

Moreover, the development of effective air and missile defenses further complicates the offense-defense balance, and their widespread proliferation will force states to consider new offense-defense dynamics in an increasingly crowded signaling environment. Although technological advances and countermoves are an enduring feature of military competition, it is difficult to predict the way that certain newer technologies—to include cyber capabilities, artificial intelligence (AI), and space systems—might interact with nuclear systems, and different countries will likely take different approaches to their integration within their nuclear

22 Holloway, “The Soviet Style of Military R&D,” p. 139.

23 Buzan and Herring, *The Arms Dynamic in World Politics*, p. 30.

24 Solly Zuckerman, *Nuclear Illusion and Reality* (London: Collins, 1982), p. 103.

25 Marek Thee, “Military Technology: A Driving Force Behind the Arms Race and an Impediment to Arms Control and Disarmament,” in Hans Günter Brauch, ed., *Military Technology, Armaments Dynamics and Disarmament* (New York: St. Martin’s Press, 1989), p. 42.

26 On Sino-American strategic competition, see Tai Ming Cheung and Thomas G. Mahnken, eds., *The Gathering Pacific Storm: Emerging U.S.-China Strategic Competition in Defense Technological and Industrial Development* (Amherst, NY: Cambria Press, 2018).

arsenals. This collection of dynamics implies that strategic interaction is likely to grow more complicated and less predictable in the coming decades.

CHAPTER 3

U.S. Strategic Culture & Interaction

The United States led the world in developing a distinct body of scholarship on the purpose and use of nuclear weapons. After 1945, U.S. theorists and policymakers sought to develop strategies that would reduce the likelihood that nuclear weapons would ever be used again. The imperative of deterring nuclear war grounded U.S. Cold War strategy, even as the U.S. nuclear advantage diminished over time. Francis Gavin notes, “Much of the Cold War debate surrounding nuclear deterrence was less over what it was and whether it worked, but rather how many nuclear weapons, what kinds, and within what strategies nuclear weapons should be deployed to best realize the greatest stabilizing benefits at the lowest cost and danger.”²⁷

The United States engaged in nuclear competition with the Soviet Union throughout the Cold War, and the tension between the pursuit of superior nuclear forces and a stable nuclear balance burdened successive U.S. presidents. The fall of the Soviet Union ushered in a period of diminished nuclear concern that demonstrated surprising continuities in U.S. strategic thought surrounding nuclear issues, even in the absence of bipolar competition.

This chapter will trace the development of U.S. nuclear doctrine, highlighting the internal and external factors that shaped it as well as the Cold War-era themes that are observable in contemporary U.S. strategy. It will identify continuities in U.S. strategic thought across the Cold War and contemporary eras that may help policymakers recognize predictable patterns. Finally, it will highlight important changes in U.S. nuclear policy in the Second Nuclear Age that depart from U.S. Cold War experiences.

²⁷ Francis J. Gavin, “Beyond Deterrence: U.S. Nuclear Statecraft since 1945,” in Linton Brooks, Francis J. Gavin, and Alexei Arbatov, eds., *Meeting the Challenges of the New Nuclear Age: U.S. and Russian Nuclear Concepts, Past and Present* (Cambridge, MA: American Academy of Arts and Sciences, 2018), p. 6.

Early Cold War and the Development of a Deterrence Theory

The bombing of Hiroshima and Nagasaki ushered in a period of serious thinking about the effect of nuclear weapons on global warfare and competition. U.S. leadership would need to consider new doctrines and concepts for their employment and integration into U.S. military forces. Despite an early period during which the United States considered nuclear weapons merely as super destructive bombs, the rapid development of nuclear fusion bombs quickly grew the weapons' destructive power by several orders of magnitude and convinced leadership of their *sui generis* strategic impact.

As the first country to develop a nuclear arsenal, the United States led the establishment of nuclear strategy as a distinct intellectual discipline that was not merely a subdivision of conventional warfighting. Civilians, not military leadership, were the driving force behind the development of U.S. nuclear strategy, which has influenced the U.S. political class and how national security decision-makers have thought about nuclear use. The civilian orientation of nuclear strategy reflects the overwhelming U.S. focus on nuclear exchange in the context of international politics and strategy, as opposed to specific warfighting capabilities. Theorists like Thomas Schelling and Bernard Brodie led efforts to conceptualize the ways by which nuclear strategy would alter the traditional conduct of war and strategic competition.²⁸ In a 1945 paper, Brodie described the strategic shift that the nuclear age would usher in, writing, "Thus far the chief purpose of our military establishment has been to win wars. From now on its chief purpose must be to avert them."²⁹ Their overwhelmingly destructive nature led policymakers and scholars to question whether the weapons could even confer warfighting value. George Kennan in 1961 said:

The atom has simply served to make unavoidably clear what has been true all along since the day of the introduction of the machine gun and the internal combustion engine into the techniques of warfare . . . that modern warfare in the grand manner, pursued by all available means and aimed at the total destruction of the enemy's capability to resist, is . . . of such general destructiveness that it ceases to be useful as an instrument for the achievement of any coherent political purpose.³⁰

Even when U.S. nuclear scholars and policymakers have disagreed about the appropriate relative levels of emphasis on nuclear warfighting capabilities, low-yield weapons, or arms control

28 See Thomas C. Schelling, *Arms and Influence* (New Haven, CT: Yale University Press, 1966); Albert J. Wohlstetter and Roberta Wohlstetter, "Nuclear Deterrence: On the Genesis of Nuclear Strategy," in Robert Zarate and Henry Sokolski, eds., *Nuclear Heuristics: Selected Writings of Albert and Roberta Wohlstetter* (Carlisle, PA: Army Strategic Studies Institute, 1968); and Bernard Brodie, *Strategy in the Missile Age* (Princeton, NJ: RAND Corporation, 1959).

29 Bernard Brodie, "The Atomic Bomb and American Security," Yale Institute of International Studies, Occasional Paper no. 18, Fall 1945.

30 Quoted in Chris Hables Gray, *Postmodern War: The New Politics of Conflict* (London: Routledge, 1997), p. 138.

activities, they have all generally agreed that promoting stable deterrence is the first and foremost priority of U.S. nuclear strategy.³¹

Intellectual thinking around nuclear weapons was driven by the bipolar Cold War competition with the Soviet Union, and the legacy of that competition continues to shape the lens through which U.S. policymakers conceive of nuclear strategy. Rapid conventional demobilization in Europe after World War II left the United States and its European allies at a significant conventional disadvantage against Warsaw Pact forces. Political leadership viewed the American nuclear advantage as a key offset to Soviet conventional forces. From the beginning, there was a sense of the impermanence of the U.S. nuclear monopoly, (although most suspected it would last longer than it did), and therefore longer-term planning needed to account for the fact that U.S. nuclear capabilities would exist alongside those of the Soviet Union and potentially other countries. The successful test of a Soviet weapon in 1949, which came as a shock to many, underscored the urgency of that task.

In particular, the threat of a surprise attack dominated early strategists' concerns.³² Given the role that strategic surprise played in World War II, including both the Pearl Harbor attack and the German invasion of the Soviet Union, it was only natural that a surprise attack dominated U.S. policymakers' concerns. If U.S. nuclear weapons were vulnerable to a surprise attack, then an important solution would be developing capabilities to retaliate in kind.³³ The Truman administration's seminal NSC-68 national strategy document sought to develop a response to the evolving nature of the Soviet threat, which was now nuclear as well as conventional. The Soviets' growing nuclear capability threatened the U.S. nuclear advantage, the asymmetry U.S. policymakers had viewed as key to countering Soviet conventional superiority. To meet this challenge, NSC-68 advocated for a large buildup of U.S. conventional and nuclear weapons, and it treated the development of a large Soviet nuclear arsenal as an inevitability.³⁴ However, NSC-68 echoed earlier statements by Kennan and ruled out the possibility of a preventive war to neutralize the Soviet nuclear threat.³⁵ The justification was both for reasons of practicality—atomic weapons may be insufficient to compel or prevent attacks on allies—and morality. In the event of a nuclear exchange, U.S. forces “must be proportioned to the extent

31 See Thomas G. Mahnken, “U.S. Strategic and Organizational Subcultures,” in Jeannie L. Johnson, Kerry M. Kartchner, and Jeffrey A. Larsen, eds., *Strategic Culture and Weapons of Mass Destruction: Culturally Based Insights into Comparative National Security Policymaking* (New York: Palgrave Macmillan, 2008).

32 Lawrence Freedman, *The Evolution of Nuclear Strategy* (London: Palgrave Macmillan, 2003), p. 60.

33 Michael Gershon, “The Origins of Strategic Stability: The United States and the Threat of Surprise Attack,” in Elbridge Colby and Michael Gerson, eds., *Strategic Stability: Contenting Interpretations* (Carlisle, PA: U.S. Army War College Press, 2013), p. 5.

34 David S. McDonough, “Nuclear Superiority: The ‘New Triad’ and the Evolution of Nuclear Strategy,” *The Adelphi Papers* 46, 2007, p. 16.

35 NWC lecture, December 21, 1949, Kennan Papers, Box 17; and John Lewis Gaddis, *Strategies of Containment*, revised edition (New York: Oxford University Press, 2005), p. 47.

of the mischief” and not needlessly initiate “a war of annihilation.”³⁶ Despite Soviet conviction that the United States sought to launch a disarming first strike, executing a preventive war was never a formal tenet of U.S. nuclear strategy.³⁷ The relative size of U.S. and allied conventional forces precluded U.S. policy from adopting a no-first-use (NFU) pledge, given the necessity of leveraging the U.S. nuclear arsenal in the event of a conventional conflict with the Soviet Union; however, a nuclear exchange would only be an avenue of last resort.³⁸

The Eisenhower administration grew concerned about the fiscal implications of implementing NSC-68 during the Korean War, during which U.S. defense spending tripled. Accordingly, the administration embraced the concept of massive retaliation as a cost-effective strategy to compensate for the relative inferiority of U.S. and allied conventional forces. Massive retaliation was also a policy of first use; the United States would not only use its nuclear weapons in an in-kind attack but would also use them to escalate and win in a conventional confrontation, especially one in Europe.³⁹ Massive retaliation served as the backbone of Eisenhower’s New Look strategy to counter the Soviet Union by leveraging asymmetric U.S. advantages throughout the 1950s while restraining the defense budget.

To ensure the viability of an asymmetric strategy reliant on a superior nuclear arsenal, the United States continued to expand its nuclear stockpile and delivery capabilities throughout this period, amassing both strategic, hydrogen bombs and tactical warheads for battlefield use. As Brodie noted in 1954, nuclear weapons were no longer “exceedingly scarce or costly.”⁴⁰ The United States had moved from a period of “nuclear scarcity” during its atomic monopoly to an era of “nuclear plenty,” which made a massive retaliation threat plausible, even if doubts about its practicality and credibility grew throughout the 1950s. The U.S. nuclear stockpile numbered 1,000 weapons in 1953 but reached 18,000 weapons by the end of Eisenhower’s tenure.⁴¹

Massive retaliation’s flaws became quickly apparent. Firstly, the threat was not necessarily credible, especially where clear, vital U.S. interests weren’t apparently at stake. The idea that

36 “United States Objectives and Programs for National Security,” NSC-68, April 14, 1950, p. 12, available at https://www.trumanlibrary.org/whistlestop/study_collections/coldwar/documents/pdf/10-1.pdf.

37 There was, however, debate about the value of a preventive war strategy during the early Cold War, especially after the Soviets had broken the U.S. nuclear monopoly. Marc Trachtenberg has argued that massive retaliation implied a strategy of first use that might be characterized as “massive preemption.” See Marc Trachtenberg, “Preventive War and U.S. Foreign Policy,” *Security Studies* 16, no. 1, January–March 2007; and Marc Trachtenberg, *A Constructed Peace: The Making of the European Settlement 1945–1963* (Princeton, NJ: Princeton University Press, 1999).

38 Freedman, *The Evolution of Nuclear Strategy*, p. 67.

39 Louis Menand, “Fat Man: Herman Kahn and the Nuclear Age,” *The New Yorker*, June 27, 2005, available at <https://www.newyorker.com/magazine/2005/06/27/fat-man>.

40 Bernard Brodie, “Nuclear Weapons: Strategic or Tactical?” *Foreign Affairs* 32, no. 2, January 1954, p. 222.

41 From 1958 to 1960 alone the warhead stockpile grew from 6,000 to 18,000 warheads. McDonough, “Nuclear Superiority,” p. 18. During these early years U.S. strategy relied heavily on the U.S. Air Force and its bombers as the backbone of the deterrent force. The import that the nuclear role conferred the Air Force prompted increased competition from the other Services, which sought their own nuclear capabilities to preserve their sustained relevance in the nuclear age.

the United States would escalate a conflict and use nuclear weapons to prevent a communist takeover in West Berlin seemed questionable. If the threat of massive retaliation was not perceived as credible, then it would not be an effective deterrent. As important, the policy hinged on U.S. nuclear superiority. As the Soviet Union expanded its nuclear arsenal and developed the capabilities to deliver a serious nuclear attack against the U.S. homeland, the threat to massively retaliate against a Soviet conventional attack became less appealing, and strategists began to doubt the wisdom of retaining a massive retaliation policy over the longer term.⁴²

While the Eisenhower administration expressed intent to use theater nuclear forces to advance U.S. security interests outside Europe, its reaction to several foreign policy crises reflected a reluctance to use nuclear weapons that belied Secretary of State John Foster Dulles' public rhetoric. The decision against using nuclear weapons to end the siege of Dien Bien Phu demonstrates that nuclear weapons were not seen as a viable alternative to conventional forces. A strategy of nuclear coercion helped resolve the Quemoy and Matsu crisis in 1955, but this does not necessarily suggest that Eisenhower would have used theater nuclear weapons to resolve a crisis. The administration ultimately never opted to use nuclear weapons, which helped establish a tradition of nuclear non-use that is discussed at greater length later in this chapter.⁴³

The strong assumption that Moscow would behave rationally—that is, that the thinking in Moscow surrounding nuclear weapons usage would mirror that in the United States—was a dominant strain of thinking that informed both strategists' prioritization of deterrence over warfighting in the literature about nuclear strategy. Thomas Schelling articulated the trusted value of “mirror-imaging” to understand Soviet strategic behavior, noting that “you can sit in your armchair and try to predict how people will behave by asking how you would behave if you had your wits about you. You get, free of charge, a lot of vicarious, empirical behavior.”⁴⁴ The intuitive beliefs surrounding the forces that would be necessary to successfully deter Soviet nuclear usage influenced the perceptions of many policymakers—including those of President Kennedy and Secretary of Defense Robert McNamara—regarding Soviet actions in the early Cold War. Alternatively, strategists like Herman Kahn and Alfred Wohlstetter advanced a counterargument that underscored the vastly divergent Soviet approaches to nuclear warfighting and bluff. Their efforts helped counter policymakers' tendency toward mirror-imaging of Soviet strategy and intent as the Cold War progressed.

The Kennedy administration's flexible response strategy was designed to expand the breadth of nuclear and conventional options available to decision-makers to reinforce the credibility

42 Freedman, *The Evolution of Nuclear Strategy*, pp. 7–79.

43 See T. V. Paul, “Taboo or Tradition? The Non-Use of Nuclear Weapons in World Politics,” *International Studies*, no. 36, 2010.

44 Quoted in Kathleen Archibald, ed., *Strategic Interaction and Conflict: Original Papers and Discussion* (Berkeley, CA: Institute of International Studies, University of California, Berkeley, 1966), p. 150; and Keith Payne, *The Fallacies of Cold War Deterrence and a New Direction* (Louisville, KY: University of Kentucky Press, 2015), p. 19.

of U.S. deterrence commitments and avoid unbridled escalation and “overkill.” The expansion of the Soviet arsenal no longer implied the United States would retain an unambiguous advantage in nuclear contests. Secretary of Defense Robert McNamara saw the need to revise the U.S. nuclear war plan, the Single Integrated Operational Plan (SIOP) to provide more “limited” options and to ensure the “president’s hand not be forced by a lack of alternatives.”⁴⁵ The original SIOP, first established in 1960, entailed the launch of thousands of weapons against over one thousand targets identified across the Soviet Union, its satellites, and mainland China. New war plans were explored that might emphasize restraint to ensure that nuclear war, should it occur, would be more limited—not only with respect to the size of the warheads but also the focus of the targets.⁴⁶ McNamara argued for prioritizing counterforce over countervalue targeting, arguing that as in conventional war, the “principal military objectives . . . should be the destruction of the enemy’s military forces, not his civilian population.”⁴⁷ Counterforce targeting and the encouragement of a shared U.S.-Soviet policy of “city avoidance” was intended to protect civilians and limit the scope of destruction in a nuclear exchange; however, increased effort to perfect counterforce targeting only increased the perception among Soviet and even some U.S. actors that the United States was seeking to achieve a disarming first strike.⁴⁸ Damage limitation and city avoidance would require bilateral restraint, and the Soviet Union’s disinterest in the concepts and suspicion of U.S. intentions rendered them infeasible doctrines.⁴⁹

The Cuban missile crisis emphasized the overwhelming danger of the status quo and convinced McNamara that the prospects for a controlled, limited, and rational nuclear war were impossible.⁵⁰ Moreover, by late 1962 McNamara had concluded that U.S. development of a first strike capability was an infeasible and undesirable policy objective. Soviet SLBMs improved the survivability of Soviet forces, and the level of damage the Soviet Union might be able to inflict in a retaliatory strike was too great a level for the U.S. government to find acceptable.⁵¹ The quantities of U.S. weapons had grown to such a level that greater increases to quantity were beginning to produce diminishing returns. U.S. security could be maintained

45 Freedman, *The Evolution of Nuclear Strategy*, p. 220.

46 McDonough, “Nuclear Superiority,” p. 20.

47 Quoted in McDonough, “Nuclear Superiority,” p. 20; Freedman, *The Evolution of Nuclear Strategy*, p. 325; and John Lewis Gaddis, *The Cold War: A New History* (New York: Penguin Books, 2005), p. 79.

48 See Lawrence Freedman’s discussion of the Air Force’s response to city avoidance in *The Evolution of Nuclear Strategy*, pp. 229–231.

49 David Rosenberg, “The Origins of Overkill: Nuclear Weapons and American Strategy, 1945–1960,” *International Security* 7, no. 4, Spring 1983; and Avner Cohen and Steven Lee, *Nuclear Weapons and the Future of Humanity: The Fundamental Questions* (Totowa, NJ: Rowman & Littlefield, 1986), p. 55.

50 Gaddis, *The Cold War*, p. 81.

51 Secretary of Defense McNamara “Recommended FY 1964–FY 1968 Strategic Retaliatory Forces,” draft memorandum to President Kennedy, November 21, 1962, available at <https://history.state.gov/historicaldocuments/frus1961-63v08/d112>. For greater discussion of the Kennedy administration’s decisions surrounding force structure and its missile build up, see Desmond Ball, *Politics and Force Levels: The Strategic Missile Program of the Kennedy Administration* (Berkeley, CA: University of California Press), 1980.

through the preservation of a force large enough to execute an “assured destruction” mission. The period following the crisis led to the rise of the Mutually Assured Destruction (MAD) concept within nuclear discourse.⁵² The logic behind MAD mirrored that of massive retaliation in all but the latter’s presumption of U.S. nuclear superiority. The purpose of U.S. nuclear forces remained first and foremost to deter an attack by an adversary, and the presumed second-strike retaliatory capability by either side would be the mechanism for enforcing deterrence. Ensuring the survivability of each country’s retaliatory capability would require limiting both sides’ passive defensive measures, including anti-ballistic missile (ABM) systems.⁵³ In practice, however, U.S. policymakers never formally adopted MAD or treated it as a guiding strategic concept. MAD did not invalidate or supplant U.S. counterforce targeting, and the SIOP largely focused on counterforce targets. Under flexible response, the United States retained a range of limited nuclear options, and assured destruction was only the final and most expansive option.

Moreover, whatever interest there was in preserving mutual vulnerability and pursuing more stable nuclear balances did prevent U.S. policymakers from pursuing strategic superiority. Kennedy famously declared in 1963 that the United States would maintain nuclear forces “second to none.”⁵⁴ Despite the public perception that the Soviet Union was developing ICBMs more quickly and in greater numbers than the United States, the Kennedy administration understood that the so-called “missile gap” favored the United States, in fact.⁵⁵ The United States possessed a far greater arsenal of strategic missiles compared to the Soviet Union—approximately nine times the size—and still initiated a massive expansion of U.S. strategic forces and delivery capabilities.⁵⁶ But there was a sense that the era of unambiguous nuclear superiority that the United States had enjoyed during the 1940s and 1950s had drawn to a close, and the pursuit of a first strike capability was too quixotic to be a useful U.S. policy goal. This tension between the often-competing values of strategic stability and strategic superiority

52 In 1964 McNamara defined an assured destruction capability as one that could destroy “25 percent of [the Soviet] population and more than two-thirds of its industrial capacity.” For further discussion of McNamara’s conceptual definition and assumptions about the forces required to execute an assured destruction strike, see Secretary of Defense McNamara, “Recommended FY 1966–1970 Programs for Strategic Offensive Forces, Continental Air and Missile Defense Forces, and Civil Defense,” memorandum to President Johnson, December 3, 1964, available at <https://nsarchive2.gwu.edu/nukevault/ebb311/doc02.pdf>.

53 The infeasibility of emerging ABM technologies to fully defend against a strategic attack by the Soviet Union encouraged first downsizing the scale of missile defense activity and ultimately the decision to pursue ABM treaty negotiations over the development of a comprehensive strategic ABM system. See James Cameron, *The Double Game: The Demise of America’s First Missile Defense Systems and the Rise of Strategic Arms Limitation* (London: Oxford University Press, 2018).

54 President John F. Kennedy, Remarks at a Rally in Fort Worth in Front of the Texas Hotel, November 22, 1963, available at <http://www.umsl.edu/~thomaskp/jfkftx.htm>.

55 Desmond Ball, *Politics and Force Levels: The Strategic Missile Program of the Kennedy Administration* (Berkeley, CA: University of California Press, 1980), pp. 179–263.

56 Samuel Stern, *The Cuban Missile Crisis in American Memory* (Palo Alto, CA: Stanford University Press, 2012).

is a reoccurring theme in U.S. strategic thought and one that echoes in efforts to deter the contemporary Russian government from aggression.⁵⁷

The U.S. nuclear triad was also fielded in the 1960s, but it was only in retrospect that it became understood as a suite of complementary capabilities to improve the flexibility and survivability of the U.S. nuclear arsenal.⁵⁸ Despite the active role of civilian nuclear strategists in the development of deterrence theory, they had much less impact on the development of U.S. nuclear force structure. The dominance of nuclear weapons within U.S. national strategy established an imperative for the Services to prove their relevance in the nuclear age, and it is no surprise that each ultimately developed its own nuclear rationale. The United States relied overwhelmingly on its bomber forces during the initial stages of the Cold War, which required proximity to the Soviet Union and required the United States to base nuclear forces in the region. The development of intercontinental ballistic missiles in the late 1950s allowed the both the United States and Soviet Union to threaten one another from greater distances, though over time their vulnerability to attack rendered them of increasingly questionable retaliatory value.⁵⁹ Finally, the Navy deployed its first SLBM-equipped SSBN in 1959, and the enduring challenge of anti-submarine warfare ensured their survivability relative to the highly visible bomber and land-based forces. Over time, a coherent rationale that defended each of the Service's claim to the nuclear enterprise evolved and today explicitly justifies the current three-pronged nuclear force structure, the value of which each post-Cold War president has continued to affirm.

Late-Cold War, Détente, and the Revitalization of Competitive Strategies

By the 1970s, a balanced nuclear triad had convinced U.S. policymakers that the United States could assure the destruction of the Soviet Union, even if the Soviet Union were to conduct a debilitating preemptive strike. A simultaneous Soviet buildup had ensured the reverse was also true. The abundance of U.S. strategic warheads combined with the relative security of SLBMs produced diminishing returns to greater quantities of weapons, shifting the nuclear competition to focus on qualitative improvements, like multiple independently targetable reentry vehicle (MIRV) warheads and improved accuracy. A massive Soviet missile buildup indicated that Moscow would soon achieve numerical parity with the United States, forcing a revision of U.S. strategy that had previously assumed the unambiguous quantitative and qualitative superiority of the U.S. arsenal. Moreover, the contentious Vietnam War imposed constraints on the funding and attention that the Department of Defense could direct toward U.S. nuclear forces. The Nixon administration articulated a new goal of nuclear “sufficiency,”

57 Matthew Kroenig, *The Logic of American Nuclear Strategy: Why Strategic Superiority Matters* (New York: Oxford University Press, 2018), p. 2; and Robert Jervis, *The Illogic of American Nuclear Strategy* (Ithaca, NY: Cornell University Press, 1984).

58 Alex Wellerstein, “A Brief History of the Nuclear Triad,” *Restricted Data: The Nuclear Secrecy Blog*, July 15, 2016, available at <http://blog.nuclearsecrecy.com/2016/07/15/brief-history-nuclear-triad/>.

59 See Colin S. Gray, *The Future of Land-Based Missile Forces* (London: International Institute for Strategic Studies, 1977).

or a level of capability necessary to deter the Soviet Union, nullify its strategic advantages, and ensure the survivability of U.S. deterrent forces.⁶⁰ As opposed to a minimum deterrence threshold, sufficiency implied that assessments of the U.S. arsenal would remain somewhat relative to Soviet capabilities. John Lewis Gaddis notes that:

“Sufficiency,” it is important to note, never meant unilateral restraint: Kissinger was convinced that Moscow would regard that as a weakness, and would only seek to exploit it. It did, though, mean a recognition that quests for “superiority” were likely to be both costly and self-defeating, and that a combination of pressures and inducements aimed at convincing the Russians that “sufficiency” was in their own best interests would, simultaneously, best serve those of the United States.”⁶¹

As a result, the Nixon administration pursued a series of bilateral arms control efforts that sought to restrain further Soviet buildup without preventing the United States from upgrading its own capabilities. The first Strategic Arms Limitations Treaty (SALT I) established quantitative limits to further production of SLBMs and ICBM launchers and locked in rough quantitative parity with the Soviet Union. The United States, meanwhile, continued to pursue qualitative advantages to its nuclear forces, including the development of the Trident submarine and the B-1 bomber and plans for a mobile land-based ICBM and sub-sonic cruise missile.⁶²

Activities to improve U.S. nuclear forces during the détente period again revealed the tension in U.S. strategy between the objectives of stability and superiority. Continued Soviet activities that demonstrated dissatisfaction with mere parity, including the deployment of MIRVed heavy ICBMs and the Backfire bomber, inflamed this tension.⁶³ Increasingly accurate missile guidance stirred debate about the vulnerability of U.S. fixed-location, silo-based ICBMs to a first strike.⁶⁴ Potential technological developments that were capable of shifting the strategic balance—including anti-submarine warfare technologies, conventional long-range cruise missiles, and space-based weapons and sensors—challenged the idea that sufficiency could be maintained without continuing investment to improve the U.S. arsenal and its delivery systems.⁶⁵ The SALT II negotiation process’s failure to limit the Soviet Union’s heavy

60 Laurence Linn and Helmut Sonnenfeldt, “June 18 NSC Meeting on US Strategic Posture and SALT,” memorandum to Henry Kissinger, June 17, 1969, available at <http://nsarchive.gwu.edu/NSAEBB/NSAEBB173/SIOP-8.pdf>.

61 Gaddis, *Strategies of Containment* (2005), p. 278; and Kissinger, *The White House Years* (New York: Simon & Schuster, 2011), p. 575.

62 Kroenig, *The Logic of American Nuclear Strategy*, p. 157.

63 Gaddis, *Strategies of Containment* (2005), p. 324. Part of the imperative to maintain superiority stemmed from the anxiety of U.S. allies that depended on the promised superiority of U.S. nuclear forces to guarantee their own security from Russian and Chinese threats. Further discussion about U.S. extended deterrence commitments and their implications for U.S. strategic thought are included later in this chapter.

64 See Gray, *The Future of Land-Based Missile Forces*; and Paul H. Nitze, “Deterring Our Deterrent,” *Foreign Policy*, Winter 1976–1977.

65 Andrew W. Marshall, “The Future of the Strategic Balance,” memorandum for the Secretary of Defense, August 26, 1976.

ICBMs led to increasing political dissatisfaction with the compromises inherent to bilateral arms control agreements and ultimately prevented its ratification by the U.S. Senate.

While the Reagan administration followed a period of deepening pessimism about U.S. global influence and the sense that the United States faced inexorable decline, it developed a strategy that presupposed the fundamental weakness of the Soviet Union, advocating not for the normalization of the status quo through prolonged détente, but for greater cost imposition that might exploit Soviet weaknesses.⁶⁶ In the area of nuclear strategy, this meant the rejection of mutually assured destruction as a “suicide pact” to instead exploit U.S. technological advantages to undermine Soviet leaders’ sense of security in Europe.⁶⁷ The Reagan administration expanded upon policy changes first undertaken by the Carter administration as part of its 1978 Nuclear Policy Targeting Review (NPTR). The NPTR concluded that in order to deter the Soviet Union, the United States needed to hold at risk the things Moscow valued most—which meant targeting senior leadership and command and control as opposed to population and industrial centers.⁶⁸

The Reagan administration also presided over a military buildup that affected Soviet leadership’s perception of the country’s vulnerability. U.S. development of the B-1 bomber, for instance, provoked the Soviet Union to reprioritize the development of defensive over offensive systems and prompted the Soviet military to spend exorbitantly on improved air defense capabilities including the MiG-25 interceptor, new surface-to-air missiles, and radar.⁶⁹ The Strategic Defense Initiative, an effort to develop an anti-ballistic missile capability, threatened to negate the mutual vulnerability ensured by the ABM treaty and render the United States invulnerable to Soviet offensive capabilities. The new strategic direction under Reagan was alarming enough to Soviet leaders that some misinterpreted a NATO nuclear exercise in 1983 as a sign of a now-anticipated U.S. first strike.⁷⁰

The deployment of highly accurate Pershing II intermediate-range ballistic missiles (IRBMs) and ground-launched cruise missiles (GLCMs) to Europe was particularly corrosive to Soviet leaders’ perception of state security. The so-called Second Offset strategy of the 1980s aimed to exploit the U.S. advantage in advanced technology and produced advances in precision strike systems, stealth bombers, battlefield intelligence and information processing,

66 See Hal Brands, *Making the Unipolar Moment: U.S. Foreign Policy and the Rise of the Post-Cold War Order* (Ithaca, NY: Cornell University Press, 2016), pp. 68–119.

67 James Gerstenzang, “Weinberger Sees End of ‘Mutual Suicide Pact,’” *Los Angeles Times*, October 10, 1985, available at http://articles.latimes.com/1985-10-10/news/mn-15630_1_defense-strategy.

68 Secretary of Defense Harold Brown, “Nuclear Targeting Policy Review,” Memorandum to President Jimmy Carter, November 28, 1978, available at <https://www.archives.gov/files/declassification/isicap/pdf/2011-064-doc39.pdf>.

69 Gordon S. Barrass, “U.S. Competitive Strategy during the Cold War,” in Thomas G. Mahnken, ed., *Competitive Strategies for the 21st Century: Theory, History and Practice* (Stanford, CA: Stanford University Press, 2012), p. 78.

70 See Dmitry Dima Adamsky, “The 1983 Nuclear Crisis—Lessons for Deterrence Theory and Practice,” *Journal of Strategic Studies* 36, no. 1, 2013; Marc Ambinder, *The Brink: President Reagan and the Nuclear War Scare of 1983* (New York: Simon & Schuster, 2018); and Benjamin B. Fischer, “Scolding Intelligence: The PFIAB Report of the Soviet War Scare,” *International Journal of Intelligence and CounterIntelligence* 31, no. 1, 2018.

automated target detection, and night vision technology—all of which benefited the United States in the “battle for perceived capabilities” and furthered U.S. efforts to convince the Soviet Union that it could not win a war against the United States.⁷¹ The deployment of improved U.S. capabilities to Europe led to the 1987 Intermediate-Range Nuclear Forces Treaty (INF). The INF treaty eliminated all nuclear and conventional intermediate- and shorter-range ground-based missiles from Europe and forced the removal of Russia’s SS-20 mobile missile, which had distressed U.S.-allied European leaders since its deployment in 1976.⁷² By the end of the administration, a combination of economic weakness, popular revolt in Soviet satellite states, and liberal reforms had transformed the character of the Soviet Union, which would formally dissolve early in the succeeding Bush administration.

Continuities in U.S. Cold War nuclear strategy: Extended deterrence and nonproliferation

Perhaps the greatest departure of U.S. nuclear strategy from those of other nuclear-armed states is the commitment to extended deterrence, whereas other nuclear states maintain arsenals primarily to deter adversary attacks against their homelands. The historic refusal of U.S. presidents to commit to no-first-use stemmed from the imperative to use nuclear forces as a counterbalance to the Soviet Union’s conventional military superiority that might lead to an attack on Western Europe. The need to reinforce the credibility of U.S. extended deterrence guarantees profoundly shapes U.S. declaratory posture and force structure. If successful deterrence policy is understood as a function of perceived will and capability, extended deterrence is particularly sensitive to the will side of the equation. The perception of U.S. willingness to use potentially devastating capabilities in response to a non-homeland threat determines the credibility of the U.S. commitment.⁷³

NATO’s Article V security guarantee established the U.S. commitment to European security in 1949 to check the conventional advantages held by the Warsaw Pact states: This included the use of U.S. nuclear weapons. NATO’s Nuclear Planning Group (NPG) allowed U.S. allies input into the policies surrounding nuclear use and “dual key” nuclear sharing agreements. These allow NATO members both to host nuclear weapons and to deliver those weapons if the Supreme Allied Commander Europe (SACEUR) determines it to be necessary and the U.S. president and U.K. prime minister authorize their use. NATO’s nuclear sharing arrangement has played a key role in U.S. nonproliferation strategy by convincing member states of

71 Barrass, “U.S. Competitive Strategy during the Cold War,” p. 79.

72 The Reagan administration also coincided with increasing global anti-nuclear protests, especially in Europe in response to the deployment of Pershing II and GLCM systems. See Angela Santese, “Ronald Reagan, the Nuclear Weapons Freeze Campaign and the Nuclear Scare of the 1980s,” *International History Review* 39, no. 3, August 2016; and Josef Joffe, “Peace and Populism: Why the European Anti-Nuclear Movement Failed,” *International Security* 11, no. 4, Spring 1987.

73 See Phillip A. Karber and Jerald A. Combs, “The United States, NATO, and the Soviet Threat to Western Europe: Military Estimates and Policy Options, 1945–1963,” *Diplomatic History* 22, no. 3, Summer, 1998; Albert Wohlstetter, “Nuclear Sharing: NATO and the N+1 Country,” *Foreign Affairs* 39, no. 3, April 1961; and David N. Schwartz, *NATO’s Nuclear Dilemmas* (Washington, DC: The Brookings Institution, 1983), pp. 136–92.

their influence over U.S. nuclear escalation policies and of the U.S. commitment to fighting on behalf of European security.⁷⁴ Forward basing of U.S. soldiers and forces, signaling (as with Truman’s dispatch of U.S. nuclear-configured bombers to Britain at the outset of the Korean war), and declaratory policy were all part of the multi-decade effort to reinforce the credibility of U.S. security guarantees and to reinforce deterrence on the European continent. The forward stationing of U.S. nuclear forces at bases in Belgium, Germany, Italy, the Netherlands, and Turkey have been an important pillar of this broader extended deterrence guarantee and nonproliferation strategy.

In Asia, U.S. defense commitments generally took the form of bilateral agreements, and only in South Korea did the United States develop integrated command structures. U.S. nuclear weapons were deployed to the Philippines, South Korea, and Taiwan from the 1950s onward. However, The U.S. military retained sole control of those forces, and U.S. leadership opted against developing joint nuclear planning or sharing organizations akin to U.S. security architecture in Europe.⁷⁵

As a result, alliance politics have been more embedded in U.S. nuclear decision-making than in that of any other nuclear state, both during the Cold War and in the current era. Both declaratory policy and the composition and posture of U.S. forces can reinforce or erode the perceived credibility of the U.S. nuclear guarantee, as evidenced by increasing European anxiety during the détente period as leaders wondered if nuclear sufficiency would adequately preserve European security amid an ever-expanding Soviet arsenal. Consequently, the provision of extended deterrence requires that the United States maintain a certain level of transparency about the size, scope, and intended use of the U.S. nuclear arsenal that is not required of either China or Russia.⁷⁶ The U.S. government cannot keep its nuclear doctrine and the contents of its arsenal secret and simultaneously reassure allies that it is both willing and able to act as their security guarantor. Consequently, throughout the Cold War U.S. policy reflected far less “calculated ambiguity” than that of the Soviet Union. The tension over U.S. willingness to defend its allies’ territorial integrity but not necessarily their overseas interests has, at times, soured U.S. allies on the extended deterrence arrangement. After the United States signaled its selective commitment to French security interests during the 1956 Suez Crisis, the French government opted instead to pursue an independent nuclear capability that would better preserve both the country’s defense and its interests.

The U.S. strategic interest in nonproliferation both informed and reinforced its positive security assurances. The use of extended deterrence guarantees to deter countries from pursuing

74 Montgomery, *Extended Deterrence in the Second Nuclear Age*, p. 9.

75 Matthew Fuhrmann and Todd Sechser, “Nuclear Strategy, Nonproliferation, and the Causes of Foreign Nuclear Deployments,” *Journal of Conflict Resolution* 58, no. 3, April 2014.

76 Timothy W. Crawford, “The Endurance of Extended Deterrence: Continuity, Change, and Complexity in Theory and Policy,” in T. V. Paul, Patrick M. Morgan, and James J. Wirtz, eds., *Complex Deterrence: Strategy in the Global Age* (Chicago: University of Chicago Press, 2009), available at https://www.academia.edu/32151100/The_Endurance_of_Extended_Deterrence_Continuity_Change_and_Complexity_in_Theory_and_Practice.

indigenous nuclear capabilities has remained a cornerstone of U.S. nuclear strategy.⁷⁷ U.S. strategists and policymakers posited that a greater number of nuclear states complicates the tailoring of deterrence policies and produces greater crisis instability and opportunity for strategic miscalculation.⁷⁸ The imperative to prevent proliferation was great enough that the United States pursued Soviet cooperation to establish both the 1963 Partial Test Ban Treaty and the 1968 Nuclear Nonproliferation Treaty, which constrained the acquisition of nuclear forces by U.S. and Soviet allies alike.⁷⁹ In addition to improved global security and crisis stability, nonproliferation also encouraged the convergence of U.S. and allied security concerns and dissuaded U.S. allies from pursuing actions contrary to U.S. interest. Kennedy, for instance, warned that nuclear-armed U.S. allies “would be in a position to be entirely independent and we might be on the outside looking in.”⁸⁰ Security assurances, including NATO, have been a core part of this nonproliferation strategy.

Post-Cold War and Current Policy

The collapse of the Soviet Union produced questions among strategists about the continued utility and purpose of U.S. nuclear forces. In a post-Soviet era marked by the absence of great power competitors, challenges posed by regional actors and nuclear proliferation shifted U.S. attention away from Russia’s nuclear arsenal. Deterrence, while still important, moved to the margins of U.S. national strategy.⁸¹ The shift to U.S. global leadership required that the U.S. attention pivot to a greater range of security challenges, both nuclear and non-nuclear, and it increased the diversity of U.S. security challenges, if not always the difficulty. Conventional weapons were sufficient to deter most potential U.S. adversaries, and, as a result, nuclear deterrence seemed somewhat superfluous.

Ultimately, the end of the Cold War did not seriously alter the thrust of U.S. strategic thinking about the purpose of its nuclear arsenal and the enduring value of nuclear weapons. Each president has continued to assert the value of a strong nuclear deterrent and flexible triad

77 See F. C. Ikle et al., “The Diffusion of Nuclear Weapons to Additional Countries: The ‘Nth Country’ Problem,” RAND Research memorandum, February 15, 1960, available at https://www.rand.org/content/dam/rand/pubs/research_memoranda/2018/RM2484.pdf/; Robert McNamara “The Diffusion of Nuclear Weapons With and Without a Test Ban Agreement,” memorandum to President John F. Kennedy, February 12, 1963, <https://fas.org/man/eprint/dod1963.pdf>; and Francis J. Gavin, “Strategies of Inhibition: U.S. Grand Strategy, the Nuclear Revolution, and Nonproliferation,” *International Security* 40, no. 1, Summer 2015.

78 See Wohlstetter, “Nuclear Sharing: NATO and the N+1 Country”; “Report by the Committee on Nuclear Proliferation, January 21, 1965,” in *Foreign Relations of the United States, 1964–1968*, vol. 11, *Arms Control and Disarmament* (Washington, DC: GPO, 1997), pp. 173–182; and National Intelligence Estimate 100-6-57, “Nuclear Weapons Production in Fourth Countries—Likelihood and Consequences,” June 18, 1957, in William Burr, ed., *National Intelligence Estimates of the Nuclear Proliferation Problem: The First Ten Years, 1957–1967*, National Security Archive Electronic Brief Book (NSA EBB) 155, doc. 2, available at <http://nsarchive.gwu.edu/NSAEBB/NSAEBB155/prolif-2.pdf>.

79 Gavin, “Strategies of Inhibition,” p. 17.

80 Gavin, “Strategies of Inhibition,” p. 23; and Marc Trachtenberg, *A Constructed Peace: The Making of the European Settlement, 1945–1963* (Princeton, NJ: Princeton University Press, 1999), p. 321.

81 Lawrence Freedman, *Deterrence* (Cambridge: Polity Press, 2004), p. 1

to U.S. national security. The nuclear capabilities that deterred Soviet aggression have been perceived as equally valuable in deterring the lesser adversaries and rogue states that posed many U.S. national security challenges in the post-Cold War era. Moreover, the reemergence of great power competition in recent years has refocused attention on the nuclear arsenal and prompted renewed discussion about the combination of capabilities, posture, and policy necessary to deter great powers in an increasingly multipolar world.

The George H. W. Bush administration and the dawn of the post-Soviet era

At the time of the collapse of the Soviet Union, the United States possessed approximately 21,000 nuclear weapons and an arsenal with a massive variety of delivery options and yields across all three Services. The U.S. triad was approaching completion of a long modernization effort, and weapons were deployed both to Europe and to East Asia. The near-singular focus on the Soviet threat to U.S. forces and allies across the globe underpinned U.S. strategy and force posture, and, suddenly, such a large strategic arsenal seemed anachronistic.

Under the leadership of President George H. W. Bush, the United States moved to adjust its force posture away from that of the Cold War, chiefly by reducing the size of strategic forces and the number of nuclear forces deployed overseas and at sea. Some of these changes included the removal of strategic bombers from alert status and the destruction of short-range ground-based missile systems deployed abroad. Several plans to upgrade existing forces were canceled in recognition that the United States no longer needed increasingly advanced and expanded nuclear capabilities.⁸² Soviet President Mikhail Gorbachev reciprocated by announcing a massive reduction in the size of the Soviet arsenal that included both tactical and strategic systems across all domains, and his Russian successor Boris Yeltsin reaffirmed and expanded those commitments.⁸³ The first Bush administration swiftly established that, while nuclear weapons would continue to play a critical role in the preservation of U.S. and allied security, they would no longer be the centerpiece of U.S. strategy. This idea emerged as one of the most central and enduring trends of U.S. post-Cold War nuclear strategy.

The first Bush administration also prioritized efforts to reduce Russia's massive Cold War-era stockpile, both overseeing the ratification and implementation of the first START treaty to limit the deployment of strategic forces, as well as negotiating and signing the START II treaty, which would have banned MIRV warheads had Russia ever effectively implemented it. The U.S. nuclear weapons inventory fell by almost 40 percent over the course of the first Bush administration, and Russia's by 15 percent.⁸⁴ U.S. nuclear strategy became not only about preventing the use of nuclear weapons by U.S. adversaries but also about ensuring the security

82 Brad Roberts, *The Case for U.S. Nuclear Weapons in the 21st Century* (Stanford, CA: Stanford University Press, 2016), p. 14.

83 Daryl Kimball and Kingston Reif, "The Presidential Nuclear Initiatives (PNIs) on Tactical Nuclear Weapons at a Glance," *Arms Control Association*, July 2017, available at <https://www.armscontrol.org/factsheets/pniglance/>.

84 Robert Norris and Hans M. Kristensen, "Global Nuclear Weapons Inventories: 1945–2010," *Bulletin of Atomic Scientists*, July/August 2016, p. 82, available at <https://journals.sagepub.com/doi/pdf/10.2968/066004008>.

of Russia's massive arsenal during a time of potential political turbulence. In 1991 the bipartisan Nunn-Lugar Act established the Cooperative Threat Reduction (CTR) program to secure and dismantle WMD left outside Russian borders in Kazakhstan, Belarus, and elsewhere after the dissolution of the Soviet Union. This presaged the new long-term shifted focus on the prevention of nuclear proliferation to regional and even non-state actors.

The Clinton administration and the 1994 NPR

The Clinton administration built on its predecessor's efforts both to reduce nuclear stockpiles and to deprioritize nuclear weapons within U.S. defense policy. The administration's Strategy of Engagement and Enlargement reflected an optimism about opportunities for U.S. global leadership in a post-Soviet world; however, it also identified WMD proliferation as a major challenge that threatened to stymie those efforts.⁸⁵ Secretary of Defense Les Aspin initiated both a large-scale Bottom-Up Review (BUR) of U.S. conventional defense posture and the development of the first major post-Cold War nuclear strategy document, the 1994 U.S. Nuclear Posture Review.

The 1994 review was the first publicly released end-to-end review of nuclear policy that had taken place in 15 years, and it was perhaps the first formal DoD effort to incorporate reviews of policy, doctrine, force structure, command and control, operations, supporting infrastructure, safety, security, and arms control in one document.⁸⁶ The Nuclear Posture Review (NPR) stated that "nuclear weapons [were] playing a smaller role in U.S. security than at any other time in the nuclear age," echoing H. W. Bush's efforts to scale back the strategic focus on nuclear balances as the bellwether of American security. At the same time, both the NPR and administration officials defended and reaffirmed the enduring value of a nuclear deterrent. In his annual report to Congress in 1995, Secretary of Defense William Perry noted that "recent international upheavals have not changed the calculation that nuclear weapons remain an essential part of American military power. Concepts of deterrence . . . continue to be central to the U.S. nuclear posture."⁸⁷ The 1994 NPR did not adopt a no-first-use pledge and reserved the right to use nuclear weapons first in response to a chemical or biological weapons (CBW) attack against the United States or its allies.⁸⁸

The tagline for the Clinton strategy was "lead but hedge:" The United States would assume a leadership role in the effort to reduce strategic weapons and prevent further proliferation, but it would remain realistic about the potential for future deterioration of global security that

85 William Clinton, *A National Security Strategy of Engagement and Enlargement* (Washington, DC: White House, 1996).

86 Celeste Drewien and Doug Lawson, "The Nuclear Posture Review," PowerPoint brief, Sandia National Laboratories, Updated April 9, 2010, slide 3, available at <https://www.osti.gov/servlets/purl/1325698>.

87 U.S. Department of Defense, *Annual Report to the President and Congress* (Washington, DC: DoD, February 1995), p. 84.

88 Janne Nolan and Brian Radzinsky, "Continuity from Ambiguity: The Real Role of Nuclear Posture Reviews in U.S. Nuclear Strategy," *War on the Rocks*, February 19, 2018, available at <https://warontherocks.com/2018/02/continuity-ambiguity-real-role-nuclear-posture-reviews-u-s-nuclear-strategy/>.

would necessitate the preservation of a flexible and capable nuclear arsenal. Russia's post-Soviet political situation remained a wild card. If a future government in Moscow emerged that was hostile to Washington, the U.S. government would regret an overcorrection that left U.S. deterrence insufficient against a still-massive Russian stockpile. As a result, policymakers sought to hedge by retaining the capability to reconstitute dismantled forces in the event that arms control processes collapsed, and Russia moved to reconstitute its own nuclear forces.⁸⁹

The Clinton administration expressed broad support for bilateral and multilateral arms control efforts, both to lower nuclear stockpiles and enhance nuclear security and nonproliferation efforts. The NPR outlined a goal to begin to negotiate a START III agreement, even though Russia had not yet taken steps to bring START II into force. Clinton also signed the Comprehensive Test Ban Treaty, to which the U.S. government has adhered despite the Senate's decision against its ratification. However, even though deployments of both strategic and low-yield weapons fell significantly during the 1990s, levels of stockpiled warheads did not drop in equal proportion. Warhead inventories remained mostly stable.⁹⁰

In 1997 Clinton revised the U.S. presidential nuclear guidance, which had not been rewritten since Reagan in 1981. The presidential decision directive (PDD), which instructs the Secretary of Defense and Joint Chiefs of Staff on nuclear targeting, removed language about "prevailing" in a nuclear conflict, focusing instead only on the deterrence of nuclear war. The directive also expressed a need for "tailored deterrence" options to meet a more diverse range of threats outside Europe, including "rogue state" WMD threats. This implied potential targeting options of WMD sites in China, Libya, and Iraq, in addition to the Russian civil and military targeting plans that would still remain relevant.⁹¹ North Korea's pursuit of long-range ballistic missile technology that could hold the U.S. homeland at risk underscored the importance of a deterrent tailored to new regional challenges, setting the stage for future

The George W. Bush administration and the 2002 NPR

The 2002 NPR was released in the wake of 9/11, which had derailed the administration's initial national security and nuclear strategies and forced the reexamination of U.S. priorities and objectives. The non-state actor attack gave credence to the understanding that the major challenges facing the United States came not from traditional global powers or competitors, but from regional actors and rogue states that might attack the United States asymmetrically.

Despite the massive shift in U.S. national security priorities that followed the 9/11 attacks, the 2002 NPR did not reveal any radical shift in U.S. strategic thinking about the role of nuclear

89 Roberts, *The Case for U.S. Nuclear Weapons in the 21st Century*, p. 17.

90 "Transparency in the U.S. Nuclear Weapons Stockpile," U.S. Department of State, April 27, 2015, available at <https://2009-2017.state.gov/documents/organization/241377.pdf>.

91 Paul Richter, "Clinton Orders Revised Nuclear Weapons Policy," *Los Angeles Times*, September 7, 1997, available at <http://articles.latimes.com/1997/dec/07/news/mn-61759>; and Roberts, *The Case for U.S. Nuclear Weapons in the 21st Century*, p. 18.

weapons in national security.⁹² Following the trend established by H. W. Bush, the 2002 NPR advocated that nuclear weapons play a lesser role in U.S. defense relative to other capabilities. However, it strongly reaffirmed the value of a nuclear deterrent, particularly one that was flexible enough to address a range of threats posed by different countries. The most important departure was its explicit assertion that Russia should not be the singular determinant of U.S. nuclear deterrence strategy. The imperative that U.S. nuclear forces deter a wider diversity of threats, especially WMD challenges from rogue states, was a view that had been steadily gaining traction over the past two administrations and was operationalized after the 2002 NPR.

Like its predecessors, the Bush White House sought a reduction in the number of operationally deployed warheads and shifted many of those warheads into reserve stockpiles. The administration's security strategy emphasized uncertainty as a driver of U.S. national security strategy; maintaining warheads in reserve reflected an effort to preserve U.S. advantages as a hedge against future uncertainty. While its goal of strategic arms reduction mirrored that of the Clinton administration before it, the second Bush administration remained skeptical that arms control agreements were the most effective way to produce those results. Instead, it responded to Russia's refusal to implement START II's restrictions on MIRVs with a declaration of intent to reduce deployed strategic weapons unilaterally. The NPR set a target of 1,700 to 2,200 weapons—a number deemed sufficient to preserve U.S. deterrence regardless of Russian reciprocity.⁹³ Russian leadership's decision to mirror U.S. force reductions produced the Strategic Offensive Reductions Treaty (SORT) that included that same 1,700 to 2,200 weapons target.

At the same time, the 2002 NPR emphasized the enduring U.S. commitment to maintaining an arsenal "second to none" as reassurance to U.S. allies that Russia would not overtake the United States to achieve strategic superiority. It was also intended to preclude a U.S. arsenal small enough to incite an opportunistic Chinese "sprint to parity." To those ends, it proposed upgrades or modifications to existing nuclear forces for the first time in 10 years.⁹⁴

92 The 2002 NPR was released prior to the national security strategy and was heavily influenced by a 2001 National Institute for Public Policy study directed by Keith Payne that outlined the rationale and requirements for U.S. nuclear forces. The 2002 NPR was not released in unclassified form. At the unclassified level, government officials provided congressional testimonies and briefings. Keith Payne also provided an unclassified summary as part of a journal article clarifying the key findings and priorities outlined in the 2002 NPR. See *Rationale and Requirements for U.S. Nuclear Forces and Arms Control*, vol. 1, *Executive Report* (Fairfax, VA: National Institute of Public Policy, 2001); Keith Payne, "The Nuclear Posture Review: Setting the Record Straight," *Washington Quarterly* 28, no. 3, July 2005; and Roberts, *The Case for Nuclear Weapons in the 21st Century*, p. 18.

93 Roberts, *The Case for Nuclear Weapons in the 21st Century*, p. 23.

94 Congress ultimately did not support proposed modernization efforts, including the Robust Nuclear Earth Penetrator and the Reliable Replacement Warhead programs. Roberts, *The Case for Nuclear Weapons in the 21st Century*, p. 23; and "Energy Department Formally Ends Effort to Develop New Type of Earth-Penetrating Nuclear Warhead," *Nuclear Threat Initiative*, March 24, 2006, available at <https://www.nti.org/gsn/article/energy-department-formally-ends-effort-to-develop-new-type-of-earth-penetrating-nuclear-warhead/>.

The 2002 NPR's chief innovation was its advocacy for a "New Triad," a strategic framework that updated the traditional triad concept that organizes forces by domain.⁹⁵ The New Triad was organized into three legs: first, offensive strike forces that included nuclear, non-nuclear, and non-kinetic capabilities; second, a "damage-limiting" leg to support deterrence by denial, including layered ballistic missile defenses; and third, revitalized and responsive infrastructure that would facilitate adaptation to unknown future threats and operating environments. The administration's decision to leave the ABM treaty in 2002 facilitated the development of strategic defenses outlined in the New Triad's second leg, and interceptor missiles were deployed to Fort Greeley in Alaska and Vandenburg Air Force Base in California. The New Triad concept was never fully operationalized, though, and did not establish itself as a core principle in U.S. nuclear strategy.⁹⁶

Finally, DoD abandoned the term "SIOP" in favor of a more flexible plan that would give the president retaliatory options for the use of both nuclear and non-nuclear weapons outside Russia and China. It still included integrated operational plans for the employment of nuclear weapons, but it also included five countries deemed "immediate, potential, or unexpected contingencies . . . setting requirements for nuclear strike capabilities:" Iran, Iraq, Libya, North Korea, and Syria.⁹⁷ The incorporation of regional counter-proliferation strike options within the strategic war plan, including conventional alternatives, was a new phenomenon that reflected the 2002 NPR's emphasis on preemption as a tool for counterproliferation and the preservation of U.S. security.

The Obama administration and the 2010 NPR

The 2010 NPR was developed under a period of increasing U.S. debate about the long-term goal of post-Cold War arms reduction. The consensus on the enduring necessity of a highly capable and flexible deterrent was weakening, influenced by growing institutional and civil society support for disarmament initiatives. The advocacy of the global zero campaign, which seeks the total elimination of nuclear weapons worldwide, had gained greater traction both in Washington and other Western capitals, as evidenced by groups like Global Zero, the Australian- and Japanese-backed International Commission on Nuclear Non-Proliferation and Disarmament, and the International Campaign to Abolish Nuclear Weapons.⁹⁸ Moreover, a bipartisan group of veteran policymakers comprising Henry Kissinger, William Perry, George Shultz, and Sam Nunn had joined forces to forcefully advocate for a stronger U.S. commitment to the eventual elimination of nuclear weapons, advocating for near-term

95 McDonough, "Nuclear Superiority," p. 8.

96 Nolan and Radzinsky, "Continuity from Ambiguity."

97 Hans M. Kristensen, "White House Guidance Led to New Nuclear Strike Plans Against Proliferators, Document Shows," Federation of American Scientists, blog, November 5, 2007, available at https://fas.org/blogs/security/2007/11/white_house_guidance_led_to_ne/.

98 Roberts, *The Case for Nuclear Weapons in the 21st Century*, p. 27.

reductions in forces below SORT levels either in partnership with Russia or unilaterally.⁹⁹ As evidence of growing popular support for global disarmament, both 2008 presidential candidates endorsed the long-term goal of a world without nuclear weapons.¹⁰⁰

Early in his presidency, Obama established that U.S. nuclear strategy under his administration would seek to set the long-term conditions for the reduction and ultimately the abolition of nuclear weapons. In an April 2009 speech in Prague, he stated:

As the only nuclear power to have used a nuclear weapon, the United States has a moral responsibility to act. We cannot succeed in this endeavor alone, but we can lead it . . . So today, I state clearly and with conviction America's commitment to seek the peace and security of a world without nuclear weapons.¹⁰¹

In the same speech, he suggested that total nuclear disarmament was unlikely to be achieved in his lifetime, setting expectations for a long-term and slow-moving effort, not a swift unilateral drawdown.

Despite a seeming groundswell of popular support for bold disarmament, the 2010 Nuclear Posture Review did not fundamentally alter U.S. nuclear strategy, and it reiterated the long-standing strategic imperative of maintaining a secure and effective nuclear deterrent. The report prioritized the prevention of nuclear terrorism and proliferation over the development of new systems, including the missile defense systems that were an integral piece of the 2002 NPR's New Triad. But the 2010 NPR did affirm that "as long as nuclear weapons exist, the United States will sustain safe, secure, and effective nuclear forces. These nuclear forces will continue to play an essential role in deterring potential adversaries and reassuring allies and partners around the world."¹⁰²

Of the report's five major goals, none broke from traditional U.S. strategic thinking. They included preventing nuclear proliferation and terrorism, reducing the role of nuclear weapons in U.S. strategy, reducing the number of nuclear weapons while preserving strategic stability, strengthening extended deterrence and the assurance of allies, and maintaining a safe and secure deterrent as long as nuclear weapons remain. Aside from the reference to the eventual elimination of nuclear weapons, none of the key goals articulated in the 2010 NPR diverged from broader post-Cold War trends in nuclear strategy. The report opted against more radical revisions of U.S. strategy and posture that might have, for example, moved U.S. nuclear forces out of Europe or eliminated a leg of the triad. The limited changes outlined in the document

99 George P. Shultz, William J. Perry, Henry A. Kissinger, and Sam Nunn, "Toward a Nuclear-Free World," *Wall Street Journal*, January 15, 2008, available at <https://www.wsj.com/articles/SB120036422673589947>.

100 Roberts, *The Case for Nuclear Weapons in the 21st Century*, p. 37.

101 Barack Obama, "Remarks by President Barack Obama As Delivered," Prague, April 25, 2009, available at <https://obamawhitehouse.archives.gov/the-press-office/remarks-president-barack-obama-prague-delivered>.

102 OSD, *Nuclear Posture Review Report* (Washington, DC: DoD, April 2010), p. iv.

suggest the resilience of the post-Soviet bipartisan consensus among the U.S. strategy community.

The 2010 NPR updated declaratory policy and narrowed the conditions under which nuclear weapons might be employed. The U.S. government still reserved the right to use nuclear weapons in response to a conventional or CBW attack, but it stressed that the U.S. government “would only consider the use of nuclear weapons in extreme circumstances to defend the interests of the United States or its allies and partners.”¹⁰³ The report also asserted a near-term goal to improve conventional capabilities “with the objective of making deterrence of nuclear attack on the United States or our allies and partners the sole purpose of U.S. nuclear weapons.”¹⁰⁴

In this context of the administration’s ambitions, the 2010 New Strategic Arms Reduction Treaty (New START) might be understood not merely as an effort to retard arms race dynamics, but as a first step in the long process of nuclear disarmament.¹⁰⁵ But in practice, New START did not differ substantially from other post-Cold War arms reduction efforts in its essential function to reduce the number of strategic weapons deployed both by the United States and Russia. While the Obama administration achieved its goal of further bilateral arms reduction, the rapid deterioration of the U.S.-Russia relationship during the administration’s second term arrested further bilateral arms limitation efforts. Congress had stipulated that support for New START was contingent on presidential support for future nuclear force modernization efforts, circumscribing the degree of arms reduction that the administration could reasonably achieve.

By Obama’s second term, Chinese and Russian efforts to modernize and expand their nuclear capabilities had stymied efforts to reduce U.S. nuclear systems and warheads and had, if anything, begun to reverse direction. Both countries also rejected the U.S. president’s calls to reduce the role that nuclear weapons played in their respective national strategies. By 2016, Janne Nolan notes that the administration had “endorsed the most ambitious program of nuclear modernization in three decades,” requesting Congress for an estimated \$1 trillion over 30 years to recapitalize all legs of the nuclear triad.¹⁰⁶ Efforts to dismantle U.S. nuclear warheads had slowed. The 702 warheads eliminated under the Obama administration represents the smallest stockpile reduction of any post-Cold War presidency.¹⁰⁷

103 Ibid., p. ix.

104 Ibid.

105 Gershon, “The Origins of Strategic Stability,” in Colby and Gerson, *Strategic Stability*, p. 1.

106 Nolan and Radzinsky, “Continuity from Ambiguity.”

107 William J. Broad, “Reduction of Nuclear Arsenal Has Slowed Under Obama, Report Finds,” *New York Times*, May 26, 2016, available at <https://www.nytimes.com/2016/05/27/science/nuclear-weapons-obama-united-states.html>.

The Trump administration and the 2018 NPR

The Trump administration's Nuclear Posture Review, released in early 2018, takes a mainstream position on the role and use of nuclear weapons as part of the U.S. national strategy, and its continuities outweigh its changes to U.S. strategic direction and policy.¹⁰⁸ It also reflects a return to a traditional bipartisan consensus on the value of the U.S. nuclear arsenal by removing the global zero-influenced objectives surrounding the eventual elimination of both U.S. and global nuclear weapons. Like all post-Cold War presidencies, the 2018 NPR emphasizes the enduring value of a flexible and capable nuclear triad, and it states an intention to retain a mix of bombers, submarines, and land-based missiles to preserve the resiliency and flexibility of the U.S. nuclear force. The 2018 document affirms prior declaratory policy reserving the right of the United States to use nuclear weapons to deter both nuclear and "non-nuclear strategic attacks." The 2018 NPR implicitly suggests that an extreme cyberattack, in addition to other non-nuclear WMD threats, could warrant a nuclear response.¹⁰⁹

The first nuclear planning guidance issued since the marked downturn in U.S.-Russian relations, the 2018 NPR does not explicitly name either Russia or China as a U.S. adversary; however, it frames U.S. deterrence challenges in the context of renewed great power competition and the specific challenges posed by Russian and Chinese national strategies. In an effort to address Russia's potential strategy to use non-strategic nuclear weapons to "escalate and win" a heretofore conventional conflict, the 2018 NPR advocates the development of a new low-yield SLBM option to improve the escalatory range of U.S. response options and the restoration of nuclear sea-launched cruise missiles (SLCMs). The intent of the former is to enhance the credibility of U.S. deterrent by providing lower-yield options for U.S. escalation, the deployment of which Russian leadership would perceive as more credible than strategic weapons due to their comparatively minimized destructive impact. The restoration of nuclear SLCMs, which were removed in 2010 by the Obama administration, would enhance extended deterrence in Asia by returning a routine U.S. nuclear presence to the region as a signal of the U.S. government's commitment to its Asian security guarantees. SLCMs also avoid the difficult public debates and objections that overseas land-basing of U.S. nuclear warheads often incite within the host country's population.¹¹⁰ The 2018 NPR argues that SLCMs could also incentivize Russian cooperation on non-strategic nuclear weapons reduction initiatives and establish a specific negative consequence for Russia's persistent violations of the INF treaty.

Recognizing that the return of great power competition will likely increase the value of nuclear weapons to U.S. deterrence strategy, the 2018 NPR affirms the importance of modernizing the U.S. nuclear arsenal and continues the modernization program initiated under the Obama administration, including the rebuilding of warhead production infrastructure.

108 John R. Harvey, Franklin C. Miller, Keith B. Payne, and Bradley H. Roberts, "Continuity and Change in U.S. Nuclear Policy," *Real Clear Defense*, February 7, 2018, available at https://www.realcleardefense.com/articles/2018/02/07/continuity_and_change_in_us_nuclear_policy_113025.html.

109 OSD, *Nuclear Posture Review Report* (Washington, DC: DoD, February 2018), p. vii.

110 Harvey, Miller, Payne, and Roberts, "Continuity and Change in U.S. Nuclear Policy."

Continuity and Change in U.S. Nuclear Policy

Contemporary U.S. nuclear strategy and doctrine reflects the origins of U.S. deterrence policy formed at the outset of the nuclear era, and the continuities that link U.S. Cold War and contemporary strategic thought far surpass their divergences. The period of U.S. global primacy that followed the collapse of the Soviet Union demonstrated that even in the absence of major adversaries, U.S. strategic consensus affirms the value of a strong and flexible nuclear deterrent. The nature of the threats facing the United States in the Second Nuclear Age has reduced the centrality of nuclear deterrence within U.S. national security strategy; however, the ways in which the United States seeks to use its nuclear arsenal have changed very little.

As the United States enters a period of renewed great power competition, it is likely that nuclear issues will return to the foreground of U.S. strategy. However, the emergence of multiple great power competitors—and perhaps adversaries—in addition to new rogue state proliferation challenges greatly increases the diversity of nuclear issues facing U.S. leadership.

Continuity: Nuclear use to deter non-nuclear actions

From the beginning, it was not just the nuclear balance, but also the conventional balance, that influenced U.S. nuclear doctrine and the size and shape of U.S. nuclear forces. U.S. policymakers have continually asserted the right to use U.S. nuclear weapons to deter non-nuclear actions, and as a result, the leadership has refrained from committing the United States to a policy of no-first-use. The necessity of preventing a Russian conventional attack on Western Europe during the early years of the Cold War required a doctrine that permitted a nuclear response. Even as the once sizable U.S. nuclear advantage waned, the numerical superiority of Soviet conventional forces in Europe precluded revision to U.S. declaratory policy.

In the years since the Soviet Union's collapse, U.S. presidents have repeatedly affirmed the right to use nuclear weapons in response to non-nuclear threats, though the latitude to do so has shifted slightly. Particularly in the case of rogue states that pose a WMD threat, U.S. policymakers have viewed nuclear weapons as an advantageous tool to deter potential aggression. Obama slightly narrowed the conditions under which the United States would consider a nuclear response to a conventional or CBW attack and perhaps came the closest of any president to the adoption of an NFU pledge, having considered its advantages both at the outset and the close of his administration. Ultimately the policy did not change, and the subsequent 2018 NPR under President Trump has reiterated the role of nuclear weapons in non-nuclear deterrence.¹¹¹

Importantly, the 2018 NPR suggests a slight expansion of the non-nuclear circumstances under which the United States might deploy nuclear weapons. The document identifies cyber

111 David Sanger and William Broad, "Obama Unlikely to Vow No First Use of Nuclear Weapons," *New York Times*, September 5, 2016, available at <https://www.nytimes.com/2016/09/06/science/obama-unlikely-to-vow-no-first-use-of-nuclear-weapons.html>.

activity as a non-nuclear strategic threat against which U.S. policymakers must hedge, in addition to chemical, biological, and large-scale conventional aggression.¹¹² An argument for a nuclear response to a cyberattack against the United States would be extremely controversial among U.S. policymakers and nuclear strategists, not to mention the American populace. But as cyber threats evolve, future U.S. policy may be forced to contemplate the scale or type of cyber threat that would warrant consideration of a nuclear response.¹¹³

Continuity: Mostly bipartisan consensus on the value of the triad

The importance of maintaining a nuclear triad that includes air-, ground-, and sea-based nuclear delivery platforms has been an unchanging tenet of nuclear strategy since the mid-20th century. Its initial emergence was not rooted in any coherent strategic vision concerning the optimum U.S. nuclear posture. However, intervening decades have revealed the utility and wisdom of a triad that leverages systems operating in the air, sea, and ground domains to provide capabilities that not only deter a foreign attack but also can survive a first strike and signal U.S. allies and adversaries during periods of crisis.

Policymakers considered alternatives to the triad in the wake of the Cold War, when some considered the possibility that a sophisticated suite of nuclear capabilities would be unnecessary should the United States enter a period of long-term uncontested primacy. The Obama administration also considered moving to a dyad during the president's second term but ultimately decided against it. The vulnerability of silo-based ICBMs have often generated discussion about the continued value of the U.S. ground-based deterrent, and it is possible that future Democrats could revive Obama-era discussions about the utility of ground-based forces.¹¹⁴ However, the Trump administration's intent to fund the Minuteman III replacement program, in addition to the modernization of the sea-based and air-breathing nuclear systems, indicates that the United States will likely retain a balanced triad of nuclear forces for the medium- to long-term future.

Continuity: U.S. tradition of nuclear non-use

The United States remains the only country to have used nuclear weapons: No country has again crossed that nuclear threshold since 1945. The Eisenhower administration advocated reliance on nuclear weapons as a defense against seemingly smaller scale conventional threats; however, when faced with crises, Eisenhower opted against their employment. The reluctance to use the U.S. arsenal helped foster a tradition of nuclear non-use that reflects a decades-long

112 OSD, *Nuclear Posture Review Report* (2018), p. 37.

113 James B. Steinberg, "Expanding the Options and Lowering the Threshold for Nuclear Weapons," *Texas National Security Review*, February 13, 2018, available at <https://tnsr.org/roundtable/policy-roundtable-trump-administrations-nuclear-posture-review/#essay7>.

114 See Colin S. Gray, *The Future of Land-Based Missile Forces* (London: International Institute for Strategic Studies, 1977); and Todd Harrison, *Options for the Ground-Based Leg of the Nuclear Triad* (Washington, DC: Center for Strategic and International Studies, 2017).

consensus among political leadership that the employment of nuclear weapons would not advance national interests.¹¹⁵ U.S. strategists and policymakers alike have doubted the ability to control nuclear usage or escalation once this norm is broken. Schelling describes the fear of early Cold War strategists and statesmen that “nuclear weapons, once introduced into combat, could not, or probably would not, be contained, confined, or limited.”¹¹⁶

In many ways, this tradition of non-use appears to have strengthened since the end of the Cold War. After 30 years of undisturbed global primacy, a period in which major national security threats emerged mostly from rogue regional powers and non-state actors, the U.S. government and policymaking community have fewer people with experience thinking seriously about the conditions under which U.S. leadership might be forced or inclined to use its arsenal. Successive NPRs have all reiterated the desirability of minimizing nuclear weapons’ role within U.S. deterrence posture. Despite President Trump’s occasionally bellicose statements toward North Korea, the employment of U.S. nuclear weapons has not been a serious consideration in the post-Cold War era.

At the same time, U.S. competitors’ nuclear modernization efforts indicate that the de-emphasis on nuclear weapons has been a uniquely American trend, not a global one. That is, the American de-emphasis on nuclear weapons appears to be largely decoupled from foreign developments. Russian doctrine and rhetoric invoking the use of non-strategic nuclear weapons have already prompted plans for new U.S. nuclear capabilities that will be more believably usable in response to Russian nuclear aggression. It is possible that, if Russian saber rattling grows more frequent or more credible, U.S. policymakers will be forced to reevaluate the durability of norms against nuclear use and will need to actively reinforce those norms to sustain them in the Second Nuclear Age.

Continuity: The centrality of nonproliferation to U.S. strategy

The effort to prevent other states, both allies and adversaries alike, from acquiring nuclear systems is one of the enduring cornerstones of U.S. nuclear policy since the inception of nuclear weapons. In 1963 Kennedy predicted that “15 or 20 or 25 nations” would have nuclear weapons; thanks to the efforts of the United States and the success of the 1968 Nuclear Nonproliferation Treaty, only nine states have managed to acquire and retain that capability

115 Alternatively, Nina Tannenwald argues that international norms against nuclear use are stronger than a “tradition” of non-use. She proposes the term “nuclear taboo,” which implies an absence of debate and the norm’s strengthening over time. As T.V. Paul discusses, though, the notion of a “taboo” belies U.S. policymakers’ willingness to expand the circumstances under which the U.S. will consider nuclear use in recent NPRs, and it overlooks the U.S. public’s self-reported openness to nuclear use during crises, including the Gulf War. See T. V. Paul, “Taboo or Tradition? The Non-Use of Nuclear Weapons in World Politics,” *International Studies* 36, 2010; and Nina Tannenwald, *The Nuclear Taboo: The United States and the Non-Use of Nuclear Weapons since 1945* (Cambridge, UK: Cambridge University Press, 2008).

116 Thomas C. Schelling, “An Astonishing 60 Years: The Legacy of Hiroshima,” *American Economic Review* 96, no. 4, September 2006, p. 932.

in 2019.¹¹⁷ U.S. nonproliferation policy has included coercive strategies, including the consideration of preventive strikes against China in the 1960s and the threat of sanctions against Taiwan and South Korea.¹¹⁸ More recent efforts have included sanctions against India, Pakistan, North Korea, and Iran, with lesser degrees of effect. Positive assurances have been central to U.S. nonproliferation strategy, both during and since the Cold War. NATO's Article V and bilateral security agreements with Japan, South Korea, and Taiwan all reflect the use of U.S. extended deterrence guarantees to prevent the spread of nuclear weapons to new states. The 2018 NPR's advocacy for the restoration of submarine-launched cruise missiles in Asia reflects the enduring commitment to East Asian security guarantees.¹¹⁹ Recent proliferation challenges posed by Iran and North Korea demonstrate the difficulty of influencing a rogue state bent on acquiring nuclear capabilities; however, repeated U.S. efforts to delay, pause, and roll back both countries' nuclear weapons programs over the last two decades demonstrates the strong intent of U.S. policymakers to uphold nonproliferation as a core tenet of nuclear strategy.

Continuity: The pursuit of flexible options to improve credibility

Throughout the Cold War successive U.S. presidents responded to their SIOP briefing with horror at its huge number of deployed weapons, massive expected destruction, and a dearth of more limited alternatives.¹²⁰ Despite their reactions, no president succeeded in limiting the U.S. nuclear war plan. The Kennedy administration responded to the Eisenhower policy of massive retaliation with plans both to shore up conventional alternatives to nuclear use and to promote intra-war deterrence and "urban withhold" strategies that might limit the damage of a nuclear exchange. Ultimately, while the administration developed a range of more limited options for nuclear employment, later presidents still balked at the overwhelming damage that SIOP options would produce, and successive presidents have faced similar frustration when trying to envisage options for limited nuclear war. The Carter administration's PD-59 sought to give the president greater flexibility in the nuclear war plan, and the second Bush administration faced similar frustrations, seeking to expand conventional options and focus on retaliatory options outside Russia and China. Post-Cold War administrations also explored more flexible nuclear warhead options, including the Robust Nuclear Earth Penetrator and the Reliable Replacement Warhead, but ultimately canceled the programs after deeming

117 President John F. Kennedy, "News Conference 52, March 21, 1963," Washington, DC, March 21, 1963, available at <https://www.jfklibrary.org/archives/other-resources/john-f-kennedy-press-conferences/news-conference-52>.

118 Gavin, *Strategies of Inhibition*, p. 29.

119 Bruno Tertrais, *Security Guarantees and Nuclear Non-Proliferation*, note no. 14/2011 (Paris: Fondation pour la Recherche Stratégique, 2011), available at <https://www.frstrategie.org/web/documents/publications/notes/2011/201114.pdf>.

120 See William Burr, "The Nixon Administration, 'The Horror Strategy,' and the Search for Limited Nuclear Options, 1969–1972," *Journal of Cold War Studies* 7, no. 3, July 2005; and Scott Sagan, "SIOP-62: The Nuclear War Plan Briefing to President Kennedy," *International Security* 12, no. 1, 1987.

them unnecessary. The 2018 NPR's advocacy of a low-yield weapon to provide less escalatory nuclear capabilities reflects U.S. policymakers' continued search for flexibility.

Continuity: Tension between superiority and stability

The early superiority of the U.S. nuclear arsenal waned throughout the 1960s until the Soviet Union ultimately achieved strategic parity in the mid-1970s. The advent of parity forced policymakers to evaluate the respective strategic value of nuclear superiority versus sufficiency, the latter of which might be more conducive to stability, but which would leave U.S. forces vulnerable to unforeseen strategic shifts and would become more difficult to define in a world with additional nuclear powers. U.S. nuclear strategy has long revealed a tension between these two goals. Kennedy advocated a nuclear arsenal "second to none," and the promise of U.S. superiority over the Soviet Union reinforced the credibility of U.S. extended deterrence commitments in Europe and Asia. But concerns about overkill and the diminishing returns to greater numbers of weapons begged the question of whether arms race dynamics might overextend the U.S. defense budget and injure the country's longer-term ability to compete. During the 1970s and 1980s, U.S. policymakers argued that a nuclear war could never be won and must never be fought. But even as they did that, they were pursuing war-fighting capabilities meant to limit a Soviet second strike, exemplifying this tension between the values of stability and superiority. Similar concerns exist today, and both European and Asian allies remain sensitive to U.S. signals about the future of its nuclear forces, especially given Russia and China's aggressive nuclear modernization efforts. The 2018 NPR reaffirms the intended modernization of U.S. nuclear forces, which could aggravate a cycle of arms racing if multiple countries intend to pursue the superiority of their nuclear forces.

Post-Cold War change: Shift to a global deterrence outlook

During the Cold War U.S. strategic thinking revolved around the Soviet Union, and the impetus for nearly all U.S. strategic relationships and nuclear decision-making could be traced back to the bipolar competition. The end of the Cold War and the ascendancy of U.S. global primacy shifted the focus of U.S. deterrence strategy from one powerful state to a collection of many smaller and often non-nuclear actors. The development of U.S. nuclear doctrine and posture is thus the result of increasingly complex patterns of interaction. Regional powers have played an increasingly prominent role, and U.S. presidents found it necessary to expand contingency planning beyond the Soviet Union and China to include rogue states that often have or are pursuing WMD capabilities.¹²¹ The necessity of deterring regional actors forced changes in U.S. nuclear policy, including the withdrawal of the United States from the ABM treaty in 2001 in order to expand U.S. defenses against the North Korean ballistic missile threat. Russian leadership's protest of the U.S. withdrawal foreshadows the future challenge

121 For discussion of the increasing role of regional, nuclear-equipped states in nuclear conflict, see Vipin Narang, *Nuclear Strategy in the Modern Era: Regional Powers and International Conflict* (Princeton, NJ: Princeton University Press, 2014).

of deterring multiple nuclear states with a range of strategies, doctrines, and capabilities. In another example, the bilateral U.S.-Russian INF Treaty constrained U.S. actions to deter China, which operates free of the legal strictures that governed the deployment of U.S. ground-based missiles. Actions intended to deter one country will invariably alter a second or third country's own security calculus, and bilateral arms limitations will be of decreasing utility in a multipolar nuclear system. Multipolar deterrence, interaction, competition, and crisis dynamics will be major challenges for the United States in an increasingly multipolar era, and those challenges will only intensify if nuclear weapons proliferate to new regional powers.

Post-Cold War change: Decreasing the role of nuclear weapons within U.S. defense policy

Nuclear weapons remained the core of U.S. national strategy throughout the Cold War, and each administration undertook measures to expand and modernize U.S. capabilities in an effort to remain competitive against the Soviet Union. Since the Cold War, this has changed. Each successive administration, with the exception of the Trump administration, has explicitly sought to decrease the role that nuclear weapons play in the preservation of U.S. security and in U.S. deterrence posture, notwithstanding foreign nuclear trends. This had budget, infrastructure, and strategy implications, all of which produced the intentional marginalization of nuclear strategy over the past 30 years.

However, the pendulum has begun to swing back toward interaction between the size and shape of the U.S. nuclear arsenal, on the one hand, and those of competitors' arsenals, on the other. The 2018 NPR is the first post-Cold War strategy document to move U.S. policy in the opposite direction. It notes that Russia and China have failed to deprioritize their own nuclear programs in tandem with the United States and seek to expand and modernize their respective nuclear arsenals. The return of great power competition may renew global focus on nuclear balances and the role of nuclear weapons in competitive strategies, which would represent a major shift in post-Cold War U.S. nuclear strategy. But it will also expose the U.S. government to a double standard held by international and domestic critics who pressure the United States to respond to Russian and Chinese nuclear activities with restraint to avoid fomenting an "arms race."¹²² Future U.S. policymakers will need to manage the pressure to continue decreasing nuclear weapons' role in U.S. strategy, despite U.S. competitors' refusal to do the same.

¹²² See "Vladimir Putin Warns of New Arms Race with America," *AFP*, October 25, 2018, available at <https://www.straitstimes.com/world/europe/vladimir-putin-warns-of-a-new-arms-race-with-america>; Mikhail Gorbachev, "Mikhail Gorbachev: A New Nuclear Arms Race Has Begun," *New York Times*, October 25, 2018, available at <https://www.nytimes.com/2018/10/25/opinion/mikhail-gorbachev-inf-treaty-trump-nuclear-arms.html>; and W. J. Hennigan, "President Trump's Plans to Boost Missile Defense Could Spark an Arms Race," *Time*, January 17, 2019.

Post-Cold War change: The atrophying of nuclear expertise

During the Cold War, the U.S. arsenal was supported by a thriving ecosystem across government, the military Services, academia, and private industry to ensure the competitiveness of U.S. research, development, and production capacity for technologically cutting-edge nuclear forces. Today, as U.S. nuclear forces age and the Cold War recedes further into history, institutional knowledge of the active systems within the nuclear arsenal is diminishing. The Clinton administration dismantled many of the formal institutions surrounding the development and implementation of nuclear policy, anticipating its decreased relevance in the post-Soviet era.¹²³ The long-term de-emphasis of nuclear strategy and deterrence within the national defense strategy has left fewer DoD, military, and national security senior leaders with professional experience and fluency in nuclear issues. A 2008 Defense Science Board study highlighted that the United States has increasingly lost its own nuclear deterrence skill set among senior officials.¹²⁴ The reemergence of great power competition that will feature a dramatically more consequential China than during the Cold War will entail new challenges, including that of tailored deterrence in a multipolar world. The revitalization of serious thinking about nuclear issues among U.S. scholars, policymakers, and military leaders could help develop strategies for managing increasingly multipolar nuclear competition. However, the current U.S. nuclear enterprise lacks the prestige, budgetary prioritization, and bureaucratic institutions that contributed to the development of successful nuclear strategy during the Cold War.

Conclusion

Despite radical changes in the global security architecture and in U.S. defense priorities over the past 75 years, strategic thinking surrounding the purpose of U.S. nuclear forces has remained remarkably constant. Deterring nuclear and large-scale conventional aggression against the United States and our allies has remained the guiding principle of U.S. nuclear strategy, and the policymakers' extreme reluctance to use nuclear weapons has produced a normative global tradition of non-use. The development of an allied security architecture in Europe and of bilateral security agreements in Asia helped preserve U.S. advantages over the Soviet Union and prevent the spread of nuclear weapons beyond a handful of states. Changes in the strategic environment, including the fall of the Soviet Union, the rise of regional powers, and the increasingly multipolar international system, have forced revisions to U.S. nuclear force structure, posture, and strategy. U.S. strategic thinking will likely evolve as leaders face the challenge of deterring both nuclear and non-nuclear threats in an increasingly multipolar world, and the resurgence of great power competition may shift nuclear deterrence to the foreground of national strategy once again.

123 Roberts, *The Case for U.S. Nuclear weapons in the 21st Century*, p. 40.

124 *Report of the Defense Science Board Nuclear Task Force on Nuclear Deterrence Skills* (Washington, DC: DoD, 2008), p. 8.

CHAPTER 4

Russia: Strategic Culture and Interaction

Since its first nuclear test in 1949, Soviet and then Russian leadership has endeavored to develop strategic forces that can preserve Russia's national security and safeguard against foreign aggression. The deep sense of insecurity that is endemic to both Soviet and Russian strategic culture is a product of history and has influenced efforts to develop and shape a nuclear force that not merely rivals but actually surpasses that of the United States.

Despite an initial focus on preemption that reflected the relative weakness of the early Soviet arsenal, Russian leaders quickly pivoted as Soviet capabilities matured to develop less escalatory retaliatory approaches, indicating an effort to avoid a nuclear exchange between the superpowers. Soviet insecurity, however, drove the military's steady acquisition of increasingly sophisticated weapons and delivery systems throughout the Cold War even after the Soviet Union had achieved nuclear parity with the United States. Contemporary strategy seeks to return Russia to its former great power status, and Putin considers an expansive and sophisticated array of nuclear capabilities as a prerequisite.

Like Soviet leaders before him, Putin is guiding Russia's pursuit of "strategic superiority," which Russian strategic culture regards as the ultimate guarantor of state security. Russian nuclear doctrine, however, is less clear. The conditions under which the Soviet Union and now Russia might employ nuclear weapons are the subject of intense debate. In particular, the dissolution of the Soviet Union spurred new ideas about the role that low-yield nuclear weapons might play in conventional conflicts, particularly with respect to regional war and escalation control.

This chapter will trace the development of Soviet nuclear doctrine and point out the echoes of Soviet behavior and thinking in contemporary Russian strategy. It will identify continuities in Russian behavior across the Cold War and contemporary eras that may help policymakers

recognize predictable patterns. Finally, it will highlight important changes that distinguish contemporary Russian strategic thinking from its Soviet antecedents.

Early Cold War and the Threat of Surprise Attack

The Soviet Union tested its first atomic device in 1949, followed by its first hydrogen bomb in 1953. This was achieved in spite of the fact that Stalin’s unforgiving punishment of political dissent, especially against Stalinist military principles, disincentivized innovation in Soviet military strategy.¹²⁵ During the early years of the Cold War when U.S. nuclear superiority was unquestionable, the Soviets developed a defensively oriented posture that focused on protecting Warsaw Pact states from invasion. Historian William C. Green suggests that Soviet leadership’s apprehension about the limits of nuclear technology and the infancy of the Soviet program deterred public discussion of nuclear weapons’ strategic significance, lest it “draw Western attention to this area of fundamental Soviet weakness.”¹²⁶ Early Soviet discussions of the significance of nuclear weapons tended instead to focus on their tactical or battlefield utility.¹²⁷

After Stalin’s death in 1953, Soviet military thinking began to refocus on integrating nuclear weapons into Soviet national strategy and military planning and organization. Under Khrushchev’s leadership, the Soviet Union underwent a “Revolution in Military Affairs,” reorganizing its military to elevate the role of nuclear weapons in national strategy; deploy its new ICBM systems; and incorporate advances in guidance, reentry, and C2 systems into the armed forces.¹²⁸ The Strategic Rocket Forces were established in 1959 as a new branch of the Soviet military, and corresponding cuts to conventional tactical aviation and artillery reflected Soviet perceptions of their diminished importance in the early nuclear era.

Early Soviet nuclear strategy, like that of the United States, was preoccupied with the threat of a surprise attack. Germany’s unforeseen invasion in 1941, which only compounded a longer history of foreign invasion against Russia, loomed large in Soviet memory, and it shaded Soviet perceptions of its own insecurity throughout the Cold War. Moreover, the United States’ unambiguous nuclear superiority convinced the Soviet leadership that the USSR would be incapable of carrying out a retaliatory strike if attacked first. Soviet leaders were convinced that U.S. ICBMs were designed as first strike weapons and that the United States designed its nuclear arsenal to facilitate a first strike against the Soviet Union. The perceived

125 William C. Green, “The Early Formulation of Soviet Strategic Nuclear Doctrine,” *Comparative Strategy* 4, no. 4, 1984, p. 370. Green cites examples of the tendency to overstate the “Stalinist stagnation” phenomenon, including Raymond Garthoff, *Soviet Strategy in the Nuclear Age* (New York: Praeger Publishers, 1958); Herbert Dinerstein, *War in the Soviet Union* (New York: Praeger Publishers, 1959); Raymond Garthoff, “The Death of Stalin and the Birth of Mutual Deterrence,” *Survey* 25, no. 2, Spring 1980; and David Holloway, *The Soviet Union and the Arms Race* (New Haven, CT: Yale University Press, 1983).

126 Green, “The Early Formulation of Soviet Strategic Nuclear Doctrine,” p. 381.

127 Battilega, “Soviet Views of Nuclear Warfare,” in Sokolski, *Getting MAD*, p. 153.

128 Green, “The Early Formulation of Soviet Strategic Nuclear Doctrine,” p. 370.

vulnerability of Soviet ICBM silos rendered them unlikely to survive a first strike, and the slow process of preparing liquid-fuel Soviet missiles for launch precluded the possibility of a launch-on-warning attack. As a result, Soviet leaders believed that, should a nuclear exchange between the two countries occur, preemption held the key to Soviet survival. Marshal Andrei Grechko, who served as Commander-in-Chief of both the Ground Forces and Warsaw Pact Forces before serving as Minister of Defense from 1967 to 1976, described an imperative to “avoid repeating the mistakes of 1941 by waiting to be struck on the head.”¹²⁹ The deep sense of insecurity that pervaded Soviet strategic culture, combined with a comparatively small and vulnerable nuclear force, drove Soviet reliance on preemptive strategy through the 1960s.¹³⁰

During the 1950s the Soviet military leadership also focused on improving the Soviet Union’s capacity to fight and win a nuclear war in the event of a U.S. first strike, no matter how much damage the Soviet Union sustained.¹³¹ Whereas U.S. nuclear policy was advancing the concept of MAD, the Soviet Union did not yet accept the argument that the Pyrrhic nature of nuclear war would preclude victory on either side. In interviews conducted after the Cold War’s end, Soviet officials described an ideological imperative to believe in the possibility of nuclear victory that lasted until approximately the mid-1970s.¹³² Whereas U.S. scholars developed elaborate deterrence schemes that included intra-war deterrence and counterforce versus countervalue targeting, Soviet thinking about nuclear war did not fully accept or incorporate deterrence theory as U.S. policymakers might recognize it during the Cold War.¹³³ To be sure, the Soviet political leadership sought to dissuade the United States from attempting a nuclear strike on Russian soil, but, as John Battilega writes, “The Soviet concept of deterrence was based on the premise that an aggressor would receive crushing punishment in case of an actual or imminent nuclear attack.”¹³⁴ To the extent that the Soviet leadership reached an internal consensus that nuclear war between the great powers was unwinnable, that consensus occurred later than in the United States, where the idea of a “stable balance of terror” gained popularity in the 1960s. In contrast to U.S. thinking, during the 1950s and 1960s, Arbatov notes that “the fundamental assumption of Soviet military doctrine was that, if a global war was unleashed by the ‘imperialist West,’ the Soviet Union would defeat the enemy and achieve

129 Hines, Mishulovich, and Shulle, *Soviet Intentions 1965–1985*, vol. I, p. 29.

130 *Ibid.*, p. 33.

131 Alexey Arbatov, “Understanding the US-Russia Nuclear Schism,” *Survival* 59, no. 2, 2017, p. 39.

132 Hines, Mishulovich, and Shulle, *Soviet Intentions 1965–1985*, vol. I, p. 26.

133 Dmitry Dima Adamsky, “If War Comes Tomorrow: Russian Thinking about ‘Regional Nuclear Deterrence,’” *Journal of Slavic Military Studies* 27, January 2014, p. 164.

134 Battilega, “Soviet Views of Nuclear Warfare,” in Sokolski, *Getting MAD*, p. 159.

victory, despite the enormous ensuing damage.”¹³⁵ The Soviet Union’s well-developed network of hardened shelters reflects the leadership’s preparations for the failure of a preemptive strategy and its efforts to prepare for the dreaded necessity of riding out a nuclear attack.¹³⁶

Late Cold War and the Pursuit of Nuclear Superiority

During the 1970s, Soviet strategy began to evolve as U.S. and Soviet nuclear systems became more numerous, diverse, and sophisticated. Rapidly deployable solid-fuel missiles, MIRV warheads, launch-on-warning technology, improved guidance systems, and survivable SLBMs improved the retaliatory capabilities of both countries. The Soviet Union, in particular, embarked on a massive quantitative buildup that began in the 1960s and continued through the 1970s, and both countries’ expansive arsenals produced diminishing returns to acquiring greater quantities of nuclear forces.

The initiation of arms control discussions during the 1970s likely influenced Soviet conceptions of nuclear strategy and deterrence, and the process of arms control negotiation appeared to improve crisis stability during the latter part of the Cold War. The Soviet political leadership increasingly began to use the language of deterrence to describe Soviet objectives and intent during the 1970s and early 1980s, even declaring an NFU pledge that, although purely symbolic, invoked the concept and language of deterrence instead of nuclear warfighting.¹³⁷ Alexey Arbatov argues that the extensive and iterated bilateral arms control negotiations throughout the 1970s encouraged the convergence of Soviet and American approaches to deterrence.¹³⁸

Arms control negotiations, however, did not significantly dissuade the Kremlin’s efforts to expand and upgrade its nuclear arsenal, nor did they encourage a lasting sense of security among Soviet leaders. Throughout the period of détente and arms control in the 1970s, the Soviet Union invested in heavy ICBMs and continued to MIRV its strategic weapons, multiplying the power of its arsenal and negating much of SALT I’s impact on the overall strategic balance. Deployment of SS-17, SS-18, and SS-19 ICBMs indicated the Soviet Union did not consider its forces “sufficient,” and the U.S. intelligence community underestimated the degree to which the Soviet Union was willing to direct national resources toward its national security

135 Some of the focus on warfighting and damage limitation might be attributed to the military’s role in establishing Soviet nuclear doctrine and plans, which stands in contrast to the civilian-led debate in the United States. The Soviet Union had one major operational plan (*Plan Udara*, or strike plan), and it sought to impose maximum damage on the United States and its forces as part of a first or retaliatory strike; it did not have a range of limited or counterforce targeting options to tailor to different crisis scenarios. Over time that plan was updated to encompass a larger range of target options, but those changes were facilitated by the Soviet Union’s growing numbers of increasingly sophisticated weapons, not an evolution in Soviet deterrence strategy. Arbatov, “Understanding the US-Russia Nuclear Schism,” pp. 39, 40.

136 Hines, Mishulovich, and Shulle, *Soviet Intentions 1965–1985*, vol. I, p. 24.

137 Soviet plans nevertheless called for large-scale early use of theatre nuclear weapons, rendering the NFU pledge valueless.

138 Arbatov, “Understanding the US-Russia Nuclear Schism,” p. 40.

and defense programs.¹³⁹ Historical assessments of the Soviet program also indicate that, from a purely quantitative standpoint, the Soviet Union did not respond to arms control with restrictions on weapons development.¹⁴⁰

The Soviet leadership did not supply a straightforward explanation for its military buildup throughout the 1970s during which the Soviet Union first achieved and then surpassed nuclear parity with the United States. In the absence of clear declaratory policy, the characteristics of that buildup reflect a strategy that emphasized retaliation over preemption. Contrary to the perceptions of U.S. analysts and policymakers at the time, post-Cold War interviews with Soviet military officers suggest that the Soviet leadership did not seek to acquire a first strike capability for its strategic forces in the 1970s.¹⁴¹ Throughout the late 1960s and early 1970s, Soviet military leadership debated whether to upgrade its existing vulnerable silo-based ICBMs to a more survivable force that might support a second strike capability.¹⁴² The Soviet leadership's ultimate decision, to deploy several variants of MIRVed ICBMs in hardened silos, reflects a preference to develop a secure second strike or retaliatory capability that would soften the incentive to strike first in a crisis and preempt a U.S. nuclear attack. The specific capabilities central to Soviet ICBM modernization in the 1970s, including hardening system components against radiation effects, would have conferred limited advantages in the context of a surprise first strike attack; their benefits are optimized for a retaliatory capability. Improvements to early-warning and resilient C2 systems designed to function during or after an attack also indicate that resilience and second strike capabilities were among the Soviet Union's top strategic priorities.¹⁴³ As a result, Brendan Green and Austin Long note that "in general, Soviet military writings in the early 1970s transitioned towards envisioning a much higher threshold for nuclear escalation due to the Soviet deterrent."¹⁴⁴

Persistent Soviet efforts to develop the resilience of its nuclear forces even after parity had been achieved suggest that the détente period failed to convince Soviet leaders that the United States had ruled out a first strike against Soviet forces. Late-Cold War efforts by the United States to improve counterforce and leadership targeting, combined with improvements to

139 Martin E. Goldstein, *Arms Control and Military Preparedness: Truman to Bush* (New York: Peter Lang, Inc., 1993), p. 175; and Albert J. Wohlstetter and Roberta Wohlstetter, "Racing Forward? Or Ambling Back?" in Zarate and Sokolski, *Nuclear Heuristics*, pp. 414–463.

140 Hans Kristensen and Robert Norris, "The Status of World Nuclear Forces," Federation of American Scientists, updated November 2018, available at <https://fas.org/issues/nuclear-weapons/status-world-nuclear-forces/>.

141 Hines, Mishulovich, and Shulle, *Soviet Intentions 1965–1985*, vol. I; and Pavel Podvig, "The Window of Vulnerability That Wasn't: Soviet Military Buildup in the 1970s," *International Security* 33, no. 1, Summer 2008, p. 122.

142 Podvig, "The Window of Vulnerability That Wasn't," p. 125.

143 *Ibid.*, p. 133. Podvig also argues that ICBM expansion in the 1970s reflects not only high-level Soviet strategic doctrine, but also the various internal bureaucratic dynamics at work. Decisions to develop the SS-17, SS-18, and SS-19 MIRVed ICBMs were influenced by the power of design bureaus and by financial considerations related to the costs of silo conversion, and he argues that ICBM modernization programs were "driven primarily by internal inertia, not by an effort to go beyond acknowledged rough equivalence with the United States."

144 Brendan Green and Austin Long, "The MAD Who Wasn't There: Soviet Reactions to the Late Cold War Nuclear Balance," *Security Studies* 6, no. 4, 2017, p. 616.

U.S. intermediate-range systems and reentry guidance, exacerbated Soviet concern over an American first strike capability and convinced Soviet leaders that Russia's retaliatory capability was under threat, despite its 30,000-warhead stockpile and now-significant numerical advantage.¹⁴⁵ Operation RYaN, an early 1980s initiative to gather intelligence about perceived U.S. contingency plans for a first strike against the Soviet Union, demonstrates political leaders' enduring suspicion of U.S. intentions. That expectation of a U.S. first strike contributed to the 1983 Able Archer crisis, in which members of the Soviet political leadership misinterpreted a NATO nuclear exercise as evidence of an impending nuclear attack on Moscow.¹⁴⁶ As in the early Cold War, Soviet leaders remained convinced the United States was preparing to execute a decapitating first strike, reflecting the deep-seated sense of insecurity that pervades Russian perceptions of nuclear balances and security.

The retaliatory capabilities that Moscow pursued in the late Cold War suggest the Soviet conception of deterrence differed from that of the United States and shaped a force posture different from that of the United States. The Soviet military leadership largely rejected the value of preserving mutual vulnerability, instead perceiving a potent retaliatory capability as the most effective deterrent.¹⁴⁷ The Soviet leadership also rejected the idea that restraint would produce less aggressive U.S. behavior and national strategy.¹⁴⁸ Consequently, the Soviet leadership prioritized launch-on-warning and launch-under-attack concepts, despite their vulnerability to false alarms, and explored the integration of automated systems into nuclear command and control networks.¹⁴⁹ The Perimeter system, which was flight tested between 1979 and 1986, was a ballistic missile that could be launched on warning and transmit launch orders to ICBM forces, even if communication and command chains had been destroyed.¹⁵⁰ One step further, the Dead Hand system was a fully automatic system that, if tripped by a combination of early warning signals, blast, or thermal and radiation effect data, would be launched by a computer—removing human decision-making from the process entirely.¹⁵¹ Both the Perimeter and Dead Hand systems were kept secret. Given that both systems could only convey full deterrent value if they were completely public, their secrecy indicates a sharp and confounding departure in Soviet conceptions of deterrence from those of the United States,

145 Green and Long, "The MAD Who Wasn't There: Soviet Reactions to the Late Cold War Nuclear Balance," p. 608.

146 See Adamsky, "The 1983 Nuclear"; Marc Ambinder, *The Brink: President Reagan and the Nuclear War Scare of 1983* (New York: Simon & Schuster, 2018); and Fischer, "Scolding Intelligence."

147 Battilega, "Soviet Views of Nuclear Warfare," in Sokolski, *Getting MAD*, p. 160.

148 Arbatov, "Understanding the US-Russia Nuclear Schism," p. 56. Given U.S. nuclear strategy under the Reagan administration, this assumption was likely correct.

149 *Ibid.*, p. 45.

150 David Hoffman, *Dead Hand* (New York: Doubleday, 2009), pp. 149–154.

151 *Ibid.*

and it suggests the continued prioritization of a Soviet warfighting capability, even after the political leadership had begun to doubt the possibility of winning a nuclear war.¹⁵²

By the 1970s, the Soviet leadership had begun to conclude that the massive destruction incurred by a possible nuclear exchange rendered nuclear war unwinnable. Interviews with former Soviet officials after the Cold War indicate that the Soviet leadership was profoundly sobered by the devastation that a U.S.-Soviet nuclear exchange would wreak on American and Russian citizenry, and they reveal that while Soviet plans may have focused on how to eventually win a nuclear war, leadership was far from sanguine about the outcome of nuclear exchange.¹⁵³ Even if the Soviet leadership remained skeptical of MAD and the preservation of mutual vulnerability, the prospect of nuclear war still terrified Soviet political leadership. There is no doubt that the Soviet political leadership, which had experienced the devastation of World War II and had no desire to relive mass devastation on Russian soil, genuinely sought to avoid and prevent nuclear war.¹⁵⁴

Post-Cold War and Current Policy

After the Cold War and the dissolution of the Soviet Union, Russian leadership did not radically alter Soviet strategy with respect to strategic nuclear deterrence and the purpose of its high-yield strategic nuclear forces. The collapse of the bipolar competition that drove the Cold War increases in nuclear stockpiles facilitated sharp reductions to both the U.S. and Russian arsenals: This lowered Russia's strategic and low-yield weapons inventories to a fraction of their apex in the mid-1980s. Despite the bilateral reductions in strategic warheads, however, the role of nuclear weapons within Soviet national strategy did not diminish after the Cold War. The reduction in the size of Russia's nuclear weapons stockpile since the end of the Cold War belies the significant upgrades the military has undertaken in the past decade to modernize its Cold War-era nuclear forces. Russia's nuclear modernization efforts, numerous non-strategic nuclear forces, and occasional threats to employ nuclear weapons against

152 The military's role in strategy development may have contributed to this dynamic. Its influence and control over nuclear planning and deployment encouraged an orientation toward war plan implementation rather than war prevention, and this may have contributed to the Soviet Union's greater willingness to consider automation in its nuclear systems. After 1972, Soviet political leadership did not participate in any military exercises that involved nuclear weapons, leaving the General Staff to develop scenarios for nuclear war. See "Record of Interview: Gen.-Col. (Ret.) Andrian A. Danilevich," in John Hines, Ellis M. Mishulovich, and John F. Shulle, *Soviet Intentions 1965-1985*, vol. II, *Soviet Post-Cold War Testimonial Evidence* (McLean, VA: BDM Federal, Inc., 1995), p. 64; and Arbatov, "Understanding the US-Russia Nuclear Schism," pp. 40, 45.

153 Hines, Mishulovich, and Shulle, *Soviet Intentions 1965-1985*, vol. I, pp. 24-25. In one incident in 1972, Soviet General Secretary Brezhnev participated in a military exercise that simulated a U.S. first strike on Soviet soil that killed over 80 million Soviet citizens and wiped out 85 percent of Soviet industrial capacity, as well as a sizable portion of its armed forces. The exercise required Brezhnev to physically press a button to authorize a retaliatory strike; Brezhnev was reportedly so disturbed that he displayed a physical reaction to the exercise and required repeated assurances that the button was, in fact, a prop that would not launch real world strikes against the United States.

154 *Ibid.*, p. 23.

other countries all raise questions about the intended purpose of Russia's nuclear forces, as discussed below.

Russian declaratory policy and the nuclear threshold

In 1993, the revised Russian military doctrine document asserted that the Russian government would not renew Brezhnev's 1982 NFU pledge, a formal change in Russia's declaratory policy. Although U.S. policymakers did not believe the prior Soviet NFU policy to be genuine, the explicit change in declaratory policy suggests that the Russian government sought to leverage one of its few assets—the Russian nuclear arsenal—to compensate for the decline of the conventional military advantages the Soviet Union had enjoyed during the Cold War, in addition to its poor economic conditions, declining demographics, and loss of geopolitical power. The 1993 military doctrine stated that Russia would not use nuclear weapons against non-nuclear states that were members of the NPT, with the exception of those allied with a nuclear state.¹⁵⁵ The changed language indicated that Russian nuclear forces would be used not only to deter nuclear attacks but also to deter large-scale conventional wars.¹⁵⁶

The withdrawal of the NFU doctrine in 1993 was followed by a 1998 Russian Security Council document that indicated nuclear weapons might be used to deter not only large-scale conventional conflicts but also regional conventional conflicts. The absence of an NFU pledge did not necessarily distinguish Russian declaratory policy from that of the United States or denote any eagerness to employ nuclear weapons as a solution to conventional conflicts; however, Russia's hollow post-Cold War conventional forces meant that it would be at a disadvantage in a conflict with the United States and NATO. This raised concerns in the U.S. and international community about potential triggers for Russian nuclear use, especially in a regional context like the Russian campaign in Chechnya.¹⁵⁷

One of the main sources of doctrinal change in the post-Cold War era has been Russian regional nuclear deterrence efforts, which the country's large arsenal of non-strategic nuclear weapons is intended to support. Russia's 2000 military doctrine reiterated that Russian nuclear weapons are intended to support both large-scale great power conflict and regional war, leading many analysts to conclude a dual-purpose theory for the use of Russian nuclear weapons. Russia's arsenal may be used, first, to deter nuclear aggression with its strategic forces by threatening massive launch-on-warning and retaliatory strikes and, second, to deter or terminate a large-scale regional conventional war through the employment of low-yield nuclear weapons.

155 Ankit Panda, "No First Use" and Nuclear Weapons (Washington, DC: Council on Foreign Relations, July 17, 2018), available at <https://www.cfr.org/background/no-first-use-and-nuclear-weapons>.

156 Adamsky, "If War Comes Tomorrow," p. 166; and Dmitry Dima Adamsky, "Cross Domain Coercion: The Current Russian Art of Strategy," *Proliferation Papers*, no. 54, November 2015, p. 14.

157 Olga Oliker and Tanya Charlick-Paley, *Assessing Russia's Decline: Trends and Implications for the United States and the U.S. Air Force* (Santa Monica, CA: RAND Corporation, 2002), p. 75.

In 2010, contrary to expectations, Russia's updated military doctrine raised the nuclear threshold, limiting the use of nuclear weapons in conventional conflicts to situations when "the very existence of the state is under threat."¹⁵⁸ This put Russian doctrine closer to where it had been in 1993, prior to the inclusion of regional conflicts in nuclear policy. This did not, however, reflect a more optimistic Russian security outlook. To the contrary, the document asserted that "despite the decline in the likelihood of a large-scale war involving the use of conventional means of attack and nuclear weapons . . . in a number of areas military dangers to the Russian Federation are intensifying."¹⁵⁹ The updated 2010 military doctrine coincided with the military's major conventional modernization effort that began in 2008 and is discussed in greater detail later in this section.

The current Russian military doctrine was issued in 2014, less than one year after the crisis in Ukraine began. The document's language addressing nuclear doctrine and strategy mirrors that of the 2010 military doctrine and states:

The Russian Federation shall reserve the right to use nuclear weapons in response to the use of nuclear and other types of weapons of mass destruction against it and/or its allies, as well as in the event of aggression against the Russian Federation with the use of conventional weapons when the very existence of the state is in jeopardy.¹⁶⁰

As in 2010, the document maintains that Russia will retaliate against any first strike WMD attack and that it reserves the right to use nuclear weapons in any conventional conflict that poses an existential threat to Russia. Although the 2014 military doctrine did not suggest a change in the employment of Russian nuclear weapons, it displays a pessimistic tonal shift relative to 2010 and includes more specific descriptions of Western threats to Russian security, including conventional global strike systems, missile defenses, and space-based precision weapons.¹⁶¹

Although Russian military doctrine over the past 20 years has regularly invoked Russia's right to use nuclear weapons in response to a nuclear or WMD attack on its allies, Russia has not actually extended any security guarantees to other states. The invocation of allies' security is most likely an effort to deter Western interference in Eastern Europe and to help justify future opportunism, not unlike Moscow's justification for intervention in Ukraine in 2014. Russia has not developed the web of extended deterrence commitments that the United States has. Without the imperative of reassuring allies, Russia can afford to maintain less transparency

158 "The Military Doctrine of the Russian Federation," Office of the President of the Russian Federation, February 5, 2010, available at http://carnegieendowment.org/files/2010russia_military_doctrine.pdf.

159 "The Military Doctrine of the Russian Federation," 2010.

160 "The Military Doctrine of the Russian Federation," Office of the President of the Russian Federation, December 25, 2014, available at <https://rusemb.org.uk/press/2029>.

161 Olga Oliker, "Russia's New Military Doctrine: Same as the Old Doctrine, Mostly," *Washington Post*, January 15, 2015, available at https://www.washingtonpost.com/news/monkey-cage/wp/2015/01/15/russias-new-military-doctrine-same-as-the-old-doctrine-mostly/?utm_term=.dae24dfd51c.

in its nuclear doctrine and red lines, as could the Soviet Union before it, and benefit from the ambiguity surrounding its nuclear threshold. Russia's calculated ambiguity is most apparent in its approach to its non-strategic nuclear weapons (NSNW), discussed later in this chapter.¹⁶²

Leadership statements that threaten or describe nuclear usage beyond the policy outlined in formal military doctrine complicate the credibility of Russia's declaratory policy. Putin has said that he "hopes nuclear warheads will not be needed" to defeat ISIS, for instance, and officials have threatened nuclear usage against ballistic missile defense facilities and in regional situations that pose neither an existential nor a WMD threat to Russia.¹⁶³ Putin's stated willingness to put Russia's nuclear forces on alert during the 2014 Ukraine crisis also contravened Russia's policy for nuclear use as outlined in both its 2010 and 2014 military strategies. Although the threat to use nuclear weapons against ISIS seems an obvious bluff, it is difficult from the outside to discern where the Russian leadership's actual red lines may fall amongst all the saber rattling and how far away those red lines lie from official public doctrine. During the Cold War, U.S. policymakers roundly rejected the sincerity of Brezhnev's NFU pledge, and it seems likely now that Russia's official declaratory policy fails to reflect Putin's actual strategic calculus.

Russian military modernization under Putin

Although the particulars of Russia's public nuclear threshold have varied over the last 20 years, the significance of nuclear forces to Russian security has proven an enduring continuity. Despite broad international consensus that the Cold War's end lessened the utility of nuclear weapons, a nuclear arsenal has conferred contemporary Russia an outsized geopolitical prestige relative to what its economic condition might otherwise warrant. It has also helped to deter both regional and global competitors from interfering in Eastern European affairs in Russia's backyard. Ongoing Russian efforts to expand those systems indicate that Russia intends to continue leveraging its nuclear systems for political and potentially coercive gain.¹⁶⁴

Under the leadership of Vladimir Putin, the Russian military has undertaken an extensive and robust plan of modernization that has profoundly improved its conventional capabilities. Accordingly, its contemporary focus on nuclear systems departs from Russia's immediate post-Cold War policy, which emphasized nuclear weapons as a tool to *compensate* for diminished conventional capacity. Between 2001 and 2007 Russia doubled its defense expenditures,

162 The absence of clear Soviet or Russian nuclear doctrine until the 1990s can be attributed partly to the structure of the Soviet government and the nature of its international partnerships. Unlike the United States, Soviet leadership did not need to justify spending on nuclear programs to any kind of domestic legislative body, nor did it need its force posture to telegraph its nuclear capability or intent to allies dependent on Russian security guarantees. See Arbatov, "Understanding the US-Russia Nuclear Schism," p. 39.

163 Hans M. Kristensen and Robert S. Norris, "Russian Nuclear Forces, 2018," *Bulletin of the Atomic Scientists* 74, no. 3, 2018, p. 187.

164 Elbridge Colby, *Russia's Evolving Nuclear Doctrine and its Implications*, note no. 01/2016 (Paris: Fondation pour la Recherche Stratégique, January 12, 2016), p. 2, available at <https://www.frstrategie.org/web/documents/publications/notes/2016/201601.pdf>.

expanding military capacity and increasing training across the force. The glaring military deficiencies that were exposed during the 2008 Georgia War catalyzed further reforms, and by 2015 Putin announced plans to increase Russian defense spending from \$57 billion to \$91 billion (in constant 2014 dollars).¹⁶⁵ These broad investments and reforms have transformed the Russian military into a far more professional, agile, and capable force that is equipped with advanced integrated air defense systems, unmanned aerial systems, advanced electronic warfare systems, enhanced massed fires, and heavy infantry vehicles that establish conventional superiority over immediate neighbors, including NATO states on Russia's border. As evidence of the improvement, it took Russia only a few days to deploy roughly 40,000 troops to the Ukrainian border in 2014, an effort that lasted weeks in 1999 when Russia moved a similar number of forces into Chechnya.¹⁶⁶

Echoing the Soviet buildup of the 1970s that persisted in spite of détente and newly signed arms control treaties, Russia has upgraded and invested in new nuclear capabilities over the last decade, even when U.S. policy proclaimed a goal of global disarmament under the Obama administration. The number of Russian warheads on deployed strategic systems actually increased after the signing of the 2010 New START agreement.¹⁶⁷ Over the last 10 years, the Russian Strategic Rocket Forces have deployed a new silo- and road-based ICBM and continued development of three other ICBM systems, to include the SS-X-30 heavy ICBM. Russia is currently replacing its Soviet-era ballistic missile submarines with upgraded Borei-class SSBNs, which are armed with 16 SS-N-32 SLBMs that can carry up to six warheads each.¹⁶⁸ Russian investments in potential dual-use systems like the Kh-101 ALCM, Iskander SRBM, and SS-N-30A SLCM further obfuscate the scale and scope of Russia's strategic assets.¹⁶⁹ In a March 2018 announcement, Putin described the ongoing development of an extremely long-range nuclear-powered and nuclear-armed autonomous underwater vehicle as well as a novel intercontinental nuclear-powered and nuclear-armed cruise missile that could hold the U.S. homeland at risk.¹⁷⁰ The former, known as the Status-6 torpedo, echoes the Dead Hand and Perimeter systems in its impracticality as a deterrent system. Its invisibility means that it will hold no signaling value and can function only as punishment or retribution. The Russian military is also pursuing the application of hypersonic technology for nuclear use, and the deployment of Russian hypersonic weapons, either cruise or ballistic missiles, is likely

165 Eric S. Edelman and Whitney Morgan McNamara, *U.S. Strategy for Maintaining a Europe Whole and Free* (Washington, DC: Center for Strategic and Budgetary Assessments, 2017), p. 18.

166 *Ibid.*, p. 19.

167 Hans M. Kristensen, "New START Data Shows Russian Warhead Increase Before Expected Decrease," Federation of American Scientists, blog, October 3, 2016, available at <https://fas.org/blogs/security/2016/10/new-start-data-2016/>.

168 Hans M. Kristensen and Matt Korda, "Russian Nuclear Forces, 2019," *Bulletin of the Atomic Scientists* 75, no. 2, 2019, available at <https://www.tandfonline.com/doi/full/10.1080/00963402.2019.1580891>.

169 Pavel Podvig, "Blurring the Line Between Nuclear and Nonnuclear Weapons: Increasing the Risk of Accidental Nuclear War?" *Bulletin of the Atomic Scientist* 72, no. 3, May 2016, p. 145.

170 Vladimir Putin, "Presidential Address to the Federal Assembly," Moscow, March 1, 2018, available at <http://en.kremlin.ru/events/president/news/56957>.

within the next decade.¹⁷¹ Moreover, long-sought defensive capabilities conferred by the S-400 and prospectively the S-500 have markedly improved missile defenses and troubled U.S. allies.

Russia's investments in cyber and space capabilities may have nuclear implications as well, especially if Russia's ambitious space agenda includes the capacity to conduct conflict in space. Russia's cross-domain approach to coercion has inspired the use of cyber tools to achieve strategic effects (for instance, Russian interference in foreign elections). Although Russia's AI capabilities still lag behind those of the United States and China, Soviet interest in incorporating elements of automation into Cold War-era nuclear systems suggests that nuclear applications are likely to be explored if and when Russian capabilities mature.¹⁷²

China's military modernization and rising geopolitical influence have also prompted revisions to Russian military strategy and activities. Russia has deployed and stored a significant number of strategic and tactical nuclear weapons in its Eastern Military District for potential use by the Russian Pacific Fleet, Air Force, Strategic Rocket Forces, and Army operating in those regions.¹⁷³ In 2010 Russia held its Vostok exercise in Siberia and the far eastern reaches of Russian territory. It was the first Russian military exercise to address the eastern strategic direction, and it sought to assess Russia's capacity to mobilize and deploy its upgraded conventional forces against an eastern adversary.¹⁷⁴ The only branch of the Russian military excluded from direct combat operations in 2010 was the Strategic Rocket Forces, the role of which was merely to defend bases from terrorist attacks.¹⁷⁵ The 2014 Vostok exercise, however, rehearsed the use of nuclear missile systems in a manner that implied that the exercise's hypothetical adversary was modeled on China.¹⁷⁶ Of Russia's emerging security concerns, Jacob Kipp writes that Russian political leadership must "evaluate whether its reformed conventional forces might achieve a viable deterrence in case of attack from a modernized Chinese military. In the absence of such a capability, Russia will be forced to gamble even more on theater nuclear forces and be even less willing to consider reductions in its non-strategic nuclear forces."¹⁷⁷ The most recent 2018 Vostok exercise included the participation of Chinese

171 Anton Troianovski and Paul Sonne, "Russia Is Poised to Add a New Hypersonic Nuclear-Capable Glider to Its Arsenal," *Washington Post*, December 26, 2018, available at https://www.washingtonpost.com/world/europe/russia-is-poised-to-add-a-new-hypersonic-nuclear-warhead-to-its-arsenal/2018/12/26/e9b89374-0934-11e9-8942-0ef442e59094_story.html?utm_term=.4b5e27e139dd.

172 Alina Polyakova, *Weapons of the Weak: Russia and AI-driven Asymmetric Warfare* (Washington, DC: Brookings Institution, 2018).

173 Jacob Kipp, "Asian Drivers of Russia's Nuclear Force Posture," Nonproliferation Policy Education Center, August 26, 2010, p. 3, available at http://www.npolicy.org/article_file/Asia_Drivers_of_Russian_Nuclear_Force_Structure.pdf.

174 *Ibid.*, p. 15.

175 Jacob Kipp, "Vostok 2010 and the Very Curious Hypothetical Opponent," *Eurasia Daily Monitor* 7, no. 133, July 2010, available at <https://jamestown.org/program/vostok-2010-and-the-very-curious-hypothetical-opponent/>.

176 Roger McDermott, "Vostok 2014 and Russia's Hypothetical Enemies (Part One)," *Eurasia Daily Monitor* 11, no. 167, September 2014, available at <https://jamestown.org/program/vostok-2014-and-russias-hypothetical-enemies-part-one/>.

177 Kipp, "Asian Drivers of Russia's Nuclear Force Posture," p. 17.

forces, indicating increasing strategic alignment between the two states. However, the posture of China's increasingly capable military forces complicates a NATO-centric Russian security strategy and increases the potential costs of neglecting its eastern flanks.

Taken as a whole, this pattern of investment suggests not just the broad revitalization of Russia's nuclear program but also an increasing role for nuclear weapons in support of Russian security. The range of Russian capabilities suggests a force that is carefully calibrated to deter, deescalate, and potentially win both smaller regional and large-scale conflicts. They contribute to growing uncertainty about the nature of Russia's long-term nuclear strategy, the intended purpose of Russia's new systems, and under what circumstances Putin might employ them. The procurement of highly sophisticated and novel systems like the nuclear-armed unmanned underwater vehicle (UUV) also implies a Russian strategy that is seeking unambiguous nuclear superiority, as opposed to strategic sufficiency.

Non-strategic nuclear forces and escalation

The Soviet Union and now Russia have long held a large collection of non-strategic nuclear weapons, and the size and scale of Russia's NSNW arsenal eclipses that of the United States by most academic estimations. Russia maintains an approximate 1,850 operationally assigned non-strategic warheads ready for use, compared with fewer than 500 in the U.S. arsenal.¹⁷⁸ The purpose of these weapons is widely debated. Compared to Russian strategic nuclear forces, there is little transparency surrounding the NSNW program, including their deployments, targets, operational doctrine, and red lines. U.S. arms control efforts since the end of the Cold War have sought to increase the transparency surrounding Russia's NSNW arsenal and encourage its reductions, but those efforts have produced no success.¹⁷⁹ Many analysts have argued that the intended purpose of Russia's NSNW arsenal remains unclear and that Russian capabilities are not clearly linked to a well-articulated strategy, either public or classified.¹⁸⁰

In the wake of the Cold War, Russia's reliance on nuclear weapons to maintain some semblance of great power status made sense. Given Russia's conventional inferiority—especially in light of the precision weapons and advanced warfighting capabilities the United States had demonstrated during the Gulf War and subsequent military operations—Russia's decision

178 Katarzyna Zysk, "Nonstrategic Nuclear Weapons in Russia's Evolving Military Doctrine," *Bulletin of Atomic Scientists* 73, no. 5, 2017, p. 323. "Operationally assigned" NSNW are defined as those that have been assigned to available delivery systems and could therefore be available for use within the constraints of a general nuclear war. See Igor Sutyagin, *Atomic Accounting: A New Estimate of Russia's Non-Strategic Nuclear Forces* (London: Royal United Services Institute for Defense and Security Studies, November, 2012), p. 1.

179 Micah Zenko, *Towards Deeper Reductions in US and Russian Nuclear Weapons* (Washington DC: Council on Foreign Relations, November 2010), pp. 10, 21; and OSD, *Nuclear Posture Review Report* (2010), pp. x, xi, 27–28.

180 Dmitry Dima Adamsky, "Nuclear Incoherence: Deterrence Theory and Non-Strategic Nuclear Weapons in Russia," *Journal of Strategic Studies* 37, no. 1, 2014; and Zysk, "Nonstrategic Nuclear Weapons in Russia's Evolving Military Doctrine."

to maintain a large arsenal of non-strategic weapons was a logical and shrewd asymmetric strategy.

Russia's conventional forces have grown significantly larger and more sophisticated under Putin's leadership.¹⁸¹ If the elevation of nuclear weapons within Russia's national security strategy at the end of the Cold War was to compensate for the deficiencies of its conventional forces, then one might expect Russian policy to again de-emphasize the role that nuclear weapons might play to deter or win a conventional conflict. Yet the revitalization of the Russian military has not produced a corresponding reduction in Russia's non-strategic nuclear forces, raising questions about their intended use.

In the late 1990s, many Russian scholars advocated for an increased reliance on Russia's nuclear arsenal, either as a cost-effective alternative to expensive conventional upgrades to deter conflict, or as a way to quickly escalate a conflict and convince an adversary that the high stakes of conflict are not worth further engagement.¹⁸² The latter argument grew into Russia's oft-cited "escalate to de-escalate" strategy, sometimes alternatively called "escalate to win" or "escalate to survive."¹⁸³ Because Russian officials doubted the country's ability to win a protracted conflict against a conventionally superior power like the United States or China, the employment of low-yield nuclear weapons early in the conflict could deter adversaries from expanding or prolonging the conflict, or from deploying its own nuclear weapons lest a large-scale and mutually destructive nuclear exchange ensue.

The concept was not included in official Russian military doctrines; however, the Russian Ministry of Defense did include it in its 2003 white paper *Important Tasks of the Development of the Armed Forces*, where it described the concept as "forcing the adversary to cease hostilities by threatening or actually delivering strikes of various sizes with use of conventional and/or nuclear weapons." It described the strategy as useful against a conventionally superior enemy only if combined with well-equipped and combat-ready general

181 Russian conventional forces remain numerically inferior to both NATO forces to the west and Chinese forces to the south and east.

182 Olikier and Charlick-Paley, *Assessing Russia's Decline*, p. 75.

183 Sydney J. Freedberg Jr, "When the Football Comes Out, Who Watches the President?" *Breaking Defense*, November 9, 2017, available at <https://breakingdefense.com/2017/11/stratcom-wargames-its-own-death-who-watches-the-president/>; Jay Ross, "Time to Terminate Escalate to De-Escalate—It's Escalation Control," *War on the Rocks*, April 24, 2018, available at <https://warontherocks.com/2018/04/time-to-terminate-escalate-to-de-escalateits-escalation-control/>; and Matthew Kroenig, *The Logic of American Nuclear Strategy: Why Strategic Superiority Matters* (New York: Oxford University Press, 2018).

forces.¹⁸⁴ A number of Russian government and military officials, including Russia's Security Council Secretary Nikolai Patrushev, have since referenced the strategy.¹⁸⁵

Analysts have suggested that to communicate Russian resolve, a de-escalatory nuclear strategy in action might include initial non-lethal nuclear strikes against uninhabited areas or vacant secondary military targets. Should non-lethal targets fail to weaken the resolve of the adversary, Russia might then employ tactical nuclear weapons against military infrastructure critical to adversary operations, with the intent to impose damage without the overwhelming human casualties that might inadvertently strengthen an adversary's resolve or its imperative to respond in-kind. Successful execution would render Russian low-yield strikes the final military engagement in the conflict (at least with the conventionally superior adversary that Russia sought to deter); further escalation would indicate the strategy's failure.¹⁸⁶

This strategy appears to have been tested in the June 1999 Zapad-99 military exercise. The Zapad exercise is a joint military exercise that Russia has undertaken every 4 years and is considered the capstone of Russia's annual rotating military exercise series.¹⁸⁷ The Zapad-99 exercise simulated a Russian nuclear strike to end a conventional conflict after the adversary overwhelmed its own forces. Because the nuclear strike within the Zapad-99 game was not used to preserve the Russian state or its ally (denoting an existential threat) but instead to convince an adversary to cease hostilities, it appeared to reflect a strategy for the employment of nuclear weapons that is beyond Russia's current declaratory policy.

Many analysts disagree that Russia has adopted an escalation control strategy for low-yield weapons.¹⁸⁸ Skeptics point out that the Zapad-99 exercise was an isolated example, and more recent Russian exercises have failed to test similar concepts. They also cite Russia's official declaratory policy over the past two decades, noting that the older official strategy in 2000 was the document that outlined greater latitude for nuclear usage. More recent documents from 2010 and 2014 are more restrictive. By these estimations, Russian debate over the utility of

184 Ministry of Defence of the Russian Federation, "Актуальные задачи развития вооруженных сил Российской Федерации [Important Tasks of the Development of the Armed Forces of the Russian Federation]," *Krasnaya Zvezda*, October 11, 2003; Zysk, "Nonstrategic Nuclear Weapons in Russia's Evolving Military Doctrine," p. 323; and Katarzyna Zysk, "Managing Military Change in Russia," in Jo Inge Bekkevold, Ian Bowers, and Michael Raska, eds., *Security, Strategy and Military Change in the 21st Century: Cross-Regional Perspectives* (London and New York: Routledge, 2015), p. 161.

185 Vladimir Mamontov, "Меняется Россия, меняется и ее военная доктрина [Russia is Changing, and Its Military Doctrine is Changing]," *Izvestiya*, October 14, 2009, available at <https://iz.ru/news/354178>.

186 Zysk, "Nonstrategic Nuclear Weapons in Russia's Evolving Military Doctrine," p. 323.

187 Dmitry Gorenburg, "Everything You Need to Know: Russia's Massive Zapad Military Exercise," *The National Interest*, August 7, 2017, available at <https://nationalinterest.org/feature/everything-you-need-know-russias-massive-zapad-military-21814>.

188 See Olga Oliker, *Russia's Nuclear Doctrine: What We Know, What We Don't, and What That Means* (Washington, DC: Center for Strategic and International Studies, May 2016); Kristin Ven Bruusgaard, "The Myth of Russia's Lowered Nuclear Threshold," *War on the Rocks*, September 22, 2017, available at <https://warontherocks.com/2017/09/the-myth-of-russias-lowered-nuclear-threshold/>; and Bruno Tertrais, "Russia's Nuclear Policy: Worrying for the Wrong Reasons," *Survival* 60, no. 2, 2018.

nuclear de-escalation may have peaked during the late 1990s, and the absence of military exercises and formal doctrine since may be proof that Russian leadership has rejected the concept.

Whether or not Putin intends to employ a nuclear de-escalatory strategy to win a conventional conflict will likely remain unclear in the medium term; however, its utility has undoubtedly been discussed within Russian leadership, and as long as Russia maintains an arsenal of low-yield weapons, it will remain a strategy available to the Russian government. Putin regularly demonstrates leadership behavior that is less risk-averse than his Soviet predecessors, many of whom experienced firsthand World War II's devastation and were frightened by the consequences of great power military confrontation. It is worth considering how Putin's greater tolerance for risk might affect his perception of the value of NSNWs.

Continuity and Change in Soviet and Russian Nuclear Policy

Contemporary Russian nuclear strategy and doctrine reflects its Soviet roots, and the continuities between the two periods outweigh differences. The recent revitalization of Russia's conventional military underscores that Moscow's focus on nuclear systems to preserve Russian interests is a deliberate choice and not just a strategy of necessity designed to compensate for post-Cold War weaknesses. Many of the officials who steer Russia's contemporary nuclear weapons program have a background in Soviet nuclear systems that influences their approach to nuclear strategy.¹⁸⁹ As the Russian military under Putin's leadership continues to pursue new and expanded capabilities and U.S. policymakers attempt to deduce their purpose, it will be useful to understand which contemporary Russian behaviors and challenges mirror those already faced by an earlier generation of U.S. policymakers.

Continuity: An emphasis on superiority over sufficiency

Both Soviet and Russian leaderships have been keenly attuned to the nuclear balance between the great powers, and neither regime subscribed to the notion that mutual vulnerability can underwrite nuclear stability. According to Soviet and Russian strategic thinking, stability is achieved only if one country holds clear superiority over the other, and, even then, nuclear balances may be easily upset by advances in technology and increased warhead quantities.¹⁹⁰ This outlook explains Soviet efforts to secure strategic superiority over the United States between 1965 and 1985 and the military's enduring push to improve and expand Soviet capabilities even after it achieved parity with the United States in the mid-1970s. Similarly, it explains why Putin is now upgrading Russia's forces and pursuing novel and aggressive new nuclear capabilities, even as U.S. leadership left its own nuclear forces largely to atrophy over the last 20 years and is only now beginning to pursue relatively predictable nuclear modernization activities. Both Soviet and Russian nuclear policy has sought to redress strategic

189 Andrei Shoumkhin, "Nuclear Weapons in Russian Strategy and Doctrine," in Stephen Blank, ed., *Russian Nuclear Weapons: Past, Present, and Future* (Carlisle, PA: Strategic Studies Institute, U.S. Army War College, 2011), p. 101.

190 Battilega, "Soviet Views of Nuclear Warfare," in Sokolski, *Getting MAD*, p. 163.

weaknesses and improve on existing offensive and defensive capabilities, even during periods of comparatively warm U.S.-Russian relations during détente in the 1970s and the “Russian reset” of the late 2000s.

Given Russia’s great power ambitions and dogged pursuit of expanded nuclear capabilities, U.S. policymakers can infer that superiority is Putin’s strategic objective. The Soviet Union did not accept a minimum deterrent concept as a safeguard against foreign aggression, and it is unlikely that Russia will do so in the foreseeable future. While this particular strategic outlook implies that efforts to curb future Russian nuclear investments will be a challenge, it offers some semblance of predictability to counter the uncertainty that Russia’s saber rattling and ambiguous doctrine often produce.

Continuity: The failure of bilateral arms control to alter Russian behavior

The Russian leadership’s aforementioned belief that only superiority delivers reliable security is perhaps the simplest explanation for the failure of arms control to restrain Soviet and Russian behavior. While there is significant evidence that arms control negotiations contributed to improved crisis stability during the 1970s, there is little to suggest that it successfully curbed Soviet leadership’s efforts to expand its strategic capabilities. Historical assessments of the Soviet program indicate that, from a purely quantitative standpoint, the Soviet Union did not respond to arms control with restrictions on weapons development; instead, they coincided with a substantial quantitative buildup.¹⁹¹ Soviet leadership’s suspicions (most of which were later vindicated by U.S. activities) that arms limitation would fail to constrain U.S. behavior and investments informed its decision to upgrade its forces with MIRVs and pursue heavy ICBMs capable of targeting U.S. land-based forces.¹⁹² There is also evidence that the Soviet Union cheated on arms limitation agreements during this period.¹⁹³ The suggestion that neither side would push to develop their nuclear advantages ran counter to Soviet beliefs about nuclear competition and strategic stability. As a result, Soviet leadership did not alter its strategy or behavior.

Fifty years later, Russian treatment of both the INF Treaty and the 2010 New START agreement mirrors Soviet behavior during SALT negotiations. Russia’s possession of a ground-launched cruise missile that violates the INF treaty reveals Putin’s skepticism that adherence to arms control agreements can support Russian strategic interests more so than

191 Kristensen and Norris, “The Status of World Nuclear Forces.”

192 Henry Kissinger argued to Secretary of Defense Melvin Laird that SALT I provided an opportunity to limit the Soviet quantitative buildup while still allowing the United States to make qualitative improvements to its own forces, and SALT I coincided with the decisions to greenlight both the Trident SSBN and the B-1 bomber. John Lewis Gaddis, *Strategies of Containment* (New York: Oxford University Press, 1982.) p. 323; and Goldstein, *Arms Control and Military Preparedness*, p. 163.

193 Manfred Hamm, “Soviet SALT Cheating: The New Evidence,” Heritage Foundation, August 5, 1983, available at http://thf_media.s3.amazonaws.com/1983/pdf/em31.pdf; and Mark Schneider, “Does Russia Have 2-to-1 Advantage in Deployed Strategic Nuclear Weapons?” *Real Clear Defense*, January 12, 2019, available at https://www.realcleardefense.com/articles/2019/01/12/does_russia_have_2-to-1_advantage_in_deployed_strategic_nuclear_weapons_114100.html.

enhanced nuclear capabilities.¹⁹⁴ Russia's effort to upgrade its nuclear capabilities across the air, sea, and ground domains, even in the midst of U.S. efforts to "reset" U.S.-Russian political relations, demonstrates the leadership's conviction that strategic superiority is a better guarantor of Russian security than bilateral arms limitation and reduced tension.

Continuity: The ambiguity of Russia's red lines and declaratory policy

Throughout the Cold War, the United States government struggled to discern Soviet intentions and doctrine for the employment of its nuclear forces. The Soviet Union's clear reluctance to initiate a nuclear exchange did not denote a refusal to do so, and U.S. policymakers' broad rejection of the sincerity of Russia's NFU pledge demonstrates a gap between Russia's public-facing declaratory policy and its actual calculations for nuclear use. Scholars debated the justification for persistent missile buildups, the existence of doctrines for battlefield nuclear use, and the primacy of deterrence versus warfighting in Soviet nuclear thinking. In other words, much of Soviet nuclear strategy appeared ambiguous to foreign analysts and policymakers at the time it was happening. Post-Cold War interviews of Soviet military officials revealed that U.S. analysts frequently overestimated Soviet aggression and understated its sense of insecurity, demonstrating how difficult it is to effectively evaluate an adversary's perceptions and intent in real time; it is much easier to do so in retrospect.¹⁹⁵

This trend is evident today as analysts attempt to locate Russia's current red lines for nuclear use. Doctrines and declaratory policy for the employment of low-yield weapons are particularly difficult to infer. Even when Russian military journals reveal the existence of certain strategic debates, it is hard for outside observers to discern which arguments have real traction among military and political leaders. Part of this challenge stems from the incongruity between Russia's relatively conservative formal declaratory policy and Russian leadership's more aggressive statements and occasional threats of nuclear use. Russian political leaders' current rhetoric around nuclear use is the most belligerent since the Khrushchev era. The ambiguity is certainly intentional and can play to Russia's advantage, especially when it convinces the United States and its allies to respond by giving Russia an extra-wide berth on the European continent.

Change: The elevation of NSNWs within Russia's nuclear strategy

Soviet leaders rejected U.S. theories of limited nuclear war during the Cold War and largely did not study the concept.¹⁹⁶ Soviet military leadership conceptualized both low-yield weapons and regional warfare as operational activities, and they did not devise concepts in which

194 See Mark Schneider, "Russian Violations of its Arms Control Obligations," *Comparative Strategy* 31, no. 4, 2012; and Schneider, "Does Russia Have 2-to-1 Advantage in Deployed Strategic Nuclear Weapons?"

195 Hines, Mishulovich, and Shull, *Soviet Intentions 1965-1985*, vol. I.

196 Adamsky, "If War Comes Tomorrow," p. 182.

tactical weapons would be used to achieve strategic effects.¹⁹⁷ In the 1990s, though, necessity forced a revision to Russian strategic thinking surrounding the employment of low-yield weapons that was briefly but formally codified in Russian military doctrine during the late 1990s and early 2000s. Coupled with Russia's preservation of an expansive and diverse NSNW arsenal, it is probable that NSNWs play an outsized role in Russia's near- and medium-term strategy to regain regional dominance and recover its great power status.

Conclusion

Nuclear forces remain integral to Russia's national strategy, and both Soviet and Russian leaderships have been committed to the preservation of a massive, highly capable nuclear arsenal no matter the state of Russia's conventional capabilities. Contemporary Russian strategy reflects its Soviet origins, most notably in its combined sense of insecurity and its inclination toward assertiveness that often manifests as aggression. While Russia's doctrines for the use of non-strategic weapons remain unclear, military leadership's commitment to the preservation and expansion of its nuclear capabilities reflects an enduring continuity that will color Russia's approach to its national and regional strategy in at least the medium term.

197 Ibid., p. 183; and Stephen Blank, "Russia and Nuclear Weapons" in Blank, *Russian Nuclear Weapons*, p. 296.

CHAPTER 5

China: Continuity and Change in Nuclear Policy and Strategy

Since China conducted its first nuclear test in 1964, Beijing has adopted a defensive nuclear policy and strategy, relying on a small arsenal that furnishes Chinese leaders an assured retaliatory capability. At least rhetorically, China has demonstrated remarkable consistency about its relatively modest nuclear posture over the past five decades. Even as Beijing has adhered to longstanding principles of restraint, it has in recent years steadily modernized its nuclear arsenal, increased the size of the force, and engaged in debates about loosening the apparent limits on its nuclear policy and strategy. The balance between continuity and change in Chinese nuclear affairs has thus been a topic of great interest to policymakers and academics alike.

This chapter argues that the pressures to break from the past have multiplied in quantity and intensity. External stimuli—including rapid technological developments driven in part by the United States and Russia, as well as the emergence of increasingly capable regional rivals such as India—have compelled Chinese strategists to reconsider their nation’s nuclear strategy and force structure. At the same time, domestic constituents, ranging from the military services responsible for the nuclear mission to the military-industrial complex, have clamored for more muscular doctrine, strategy, and capabilities. As China’s nuclear forces continue to expand and improve, Beijing will be better positioned to implement ambitious strategies that challenge the strategic balance in Asia and the credibility of U.S. extended deterrence. To what extent and how quickly change will take place remains to be seen. This chapter suggests that straight extrapolations of past constraint may become an increasingly unreliable measure of China’s future trajectory in nuclear matters, finding that external and internal sources of competition will influence Beijing’s calculus; this conforms to the concept of strategic interaction as laid out in Chapter 2. It thus behooves observers to keep an open mind about the direction of Chinese nuclear strategy as Beijing’s power and ambitions grow and China adapts to new and emerging nuclear threats.

To advance the argument, this chapter draws from a combination of Western and Chinese-language literature to discern the sources of continuity and change in China's nuclear policy and strategy. It first traces the origins of Chinese nuclear doctrine and examines key aspects of China's approach to nuclear affairs that, thus far, have been resistant to radical change. It then assesses the recent debates among Chinese strategists that identify a range of international security developments that could force or justify departures from past practices. While the internal debate pays close attention to external threats, the debate itself is an illustration of the growing voice and possible influence of domestic actors with a stake in China's nuclear modernization. Finally, the chapter draws preliminary conclusions about what the Chinese literature reveals about the concept of strategic interaction.

Chinese Nuclear Policy from a Historical Perspective

The persistence of China's nuclear policy, strategy, and operations since the 1960s is the product of external threat perceptions and internal institutional factors. Beijing's official narrative portrays a seemingly straightforward interaction whereby its national military strategy is shaped by its external security environment and that this broader strategy then informs China's nuclear policy, nuclear strategy, and nuclear operations concepts.¹⁹⁸ But internal factors such as the active defense doctrine, the defensive mindset of China's early nuclear strategists, the technological limitations of China's nuclear forces, and the nature of the PLA as a Party army have undoubtedly molded China's nuclear thinking.

The Chinese Communist Party's (CCP) interactions with its various opponents, most of which were existential in nature, deeply influenced the Party's thinking about nuclear weapons. The lessons drawn from the rivalries against the Nationalists during the Chinese Civil War, the Japanese during World War II, the United States and the Soviet Union during the Cold War, and the United States in the post-Cold War era were applied to China's nuclear strategy.¹⁹⁹ During the superpower rivalry and its aftermath, China confronted threats from much stronger powers, and it therefore adopted the strategy of the weak that the Chinese call "active defense" (积极防御 [Jíjī fángyù]). This evolving concept of active defense dating back to the 1930s involves the use of offensive operations and tactics in pursuit of strategically defensive goals, such as the survival of the CCP. Maoist China, for example, employed or threatened to employ active defense against materially and technologically superior opponents such as Imperial Japan, the United States, and the Soviet Union. Communist forces counted on China's strategic depth, huge reserves of manpower, and strategy of protraction to attrite the enemy's will and resources and to overextend the adversary.

198 "China's National Defense in 2006," Information Office of the State Council of the People's Republic of China, 2006, available at <https://fas.org/nuke/guide/china/doctrine/wp2006.html>. See also John W. Lewis and Xue Litai, "Making China's Nuclear War Plan," *Bulletin of the Atomic Scientists* 68, no. 5, 2012, p. 46.

199 Academy of Military Science, *Science of Military Strategy* (Beijing: Military Science Press, 2013), p. 70.

While active defense remains a pillar of Chinese military doctrine, the leadership's military guidance has changed several times in response to different security threats and environments. Following the Korean War, the PRC was locked in an adversarial relationship with the United States, and, starting in the late 1950s, it had increasingly strained ties with the Soviet Union that eventually resulted in the collapse of the Sino-Soviet alliance. On multiple occasions, China was implicitly threatened with nuclear attack, including by the United States during the Korean War and the Taiwan Strait Crises and by the Soviet Union in the late 1960s and 1970s.²⁰⁰ Faced with potential large-scale nuclear conflict, Mao Zedong denounced the superpowers' "nuclear blackmail" (核讹诈 [Hé'ézhà]) and "nuclear threats." He instructed China's military forces to prepare for "early war, major war, nuclear war."²⁰¹

In 1955, Mao decided to develop nuclear weapons, first with Soviet help and then as an independent effort when the Soviets withdrew support in the late 1950s.²⁰² China sought nuclear weapons primarily for strategic deterrence, both to deter attack and to prevent coercion. Mao famously labeled nuclear weapons as "paper tigers," contending that they could not defeat the Chinese masses in a people's war. Mao and other senior Chinese leaders nevertheless believed they had no other way to adequately respond to an adversary's use, or threat of use, of nuclear weapons. Secondly, Chinese leaders also hoped that nuclear weapons would confer great power status to China.²⁰³ China successfully tested its first atomic weapon in October 1964 and its first hydrogen weapon in June 1967. China's strategic inferiority vis-à-vis the superpowers forged and reinforced a defensive and minimalist mindset among the PRC's early political leaders and nuclear strategists. In their view, nuclear weapons were a way to defend against blackmail, deter nuclear conflict, and, if necessary, respond in a qualitatively adequate way if attacked with nuclear weapons. Such attitudes, which largely confined the utility of nuclear weapons to retaliatory missions, would persist as an internal source of continuity in Chinese nuclear strategy.²⁰⁴

Starting in the early 1970s, China's security environment gradually improved, and the leadership shifted its military guidance from preparing for large-scale nuclear war with a superpower to preparing for local conventional conflicts. In that decade, tensions with the United States eased during Sino-U.S. rapprochement, and, in the 1980s, relations with the Soviet Union gradually improved. Beginning in the late 1970s and proceeding into the 1980s, paramount leader Deng Xiaoping repudiated Mao's confrontational policies and embarked on a new path

200 John W. Lewis and Xue Litai, *China Builds the Bomb* (Stanford, CA: Stanford University Press, 1988), pp. 11–41.

201 Lewis and Xue, "Making China's Nuclear War Plan," p. 50; and Michael S. Chase, "China's Transition to a More Credible Nuclear Deterrence: Implications and Challenges for the United States," *Asia Policy*, no. 16, July 2013, pp. 55–56.

202 Lewis and Xue, *China Builds the Bomb*, pp. 39–46, 60–72.

203 Lewis and Xue, *China Builds the Bomb*, pp. 35–38. See also M. Taylor Fravel and Evan S. Medeiros, "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure," *International Security* 35, no. 2, Fall 2010, pp. 58–61; and Academy of Military Science, *Science of Military Strategy* (2013), p. 172.

204 See Jeffrey Lewis, *The Minimum Means of Reprisal: China's Search for Security in the Nuclear Age* (Cambridge, MA: American Academy of Arts and Sciences, 2007).

of peace and development. Under Deng, China would rely on a relatively peaceful security environment to recover from the ravages of the Cultural Revolution and to focus on national reconstruction and economic development. By 1985, Deng concluded that great power wars involving nuclear weapons were highly unlikely and reoriented China toward local conventional conflicts along the Chinese periphery resembling the Sino-Vietnamese border conflict in 1979.²⁰⁵ Deng's view that China enjoyed a favorable security environment would persist through the fall of the Soviet Union and into the post-Cold War unipolar era. Indeed, successive Chinese statesmen since Deng, including Xi Jinping, have described China's prevailing circumstances as an "important period of strategic opportunity."

Enduring features of China's nuclear policy

Despite changes in China's security environment and its military guidance over time, China's military strategy remains wedded to active defense, and this enduring concept has internally influenced, clarified, and constrained the thinking of Chinese strategists who sought to fit China's nuclear strategy, policy, and operations within existing doctrine. Despite changing assessments about the international environment, including the expectation that China would emerge as a co-equal among the great powers in a multipolar world, Chinese strategists, and therefore China's nuclear declaratory policy, still cling to active defense as their overriding doctrinal concept.²⁰⁶ Official policy statements, speeches, publications such as defense white papers, and other authoritative publications issued by PLA-affiliated organizations such as the *Science of Military Strategy* have consistently reaffirmed key features of China's nuclear policy, namely:

- Self-Defense: China's nuclear forces are for self-defense against the nuclear powers.
- Restricted Use: No first use, and no use or threat of use against nuclear-free states and zones.
- Arms Control: Opposition to arms races and support for the prohibition of nuclear weapons.²⁰⁷

China's official announcement of its first nuclear weapons test on October 16, 1964, included aspects of all three elements. China declared that it was forced to exercise its right to self-defense by developing nuclear weapons to defend against the "U.S. imperialist policy of nuclear blackmail and nuclear threats." Consistent with its claim to self-defense, China

205 Academy of Military Science, *Science of Military Strategy* (2013), pp. 17, 59.

206 Ibid., pp. 41–50.

207 Of the many Chinese sources, examples include "Statement of the Government of the People's Republic of China," October 16, 1964; "China's National Defense in 2006," 2006; and Academy of Military Science, *Science of Military Strategy* (2013), pp. 176–178. For Western analysis identifying similar features in China's nuclear strategy, see Lewis and Xue, "Making China's Nuclear War Plan," pp. 46–47; Eric Heginbotham et al., *China's Evolving Nuclear Deterrent: Major Drivers and Issues for the United States* (Santa Monica, CA: RAND Corporation, 2017), pp. 15–22; and Chase, "China's Transition to a More Credible Nuclear Deterrence," pp. 53–83.

declared a defensive NFU policy, stating that it “will never at any time and under any circumstances be the first to use nuclear weapons.”²⁰⁸ The announcement also proposed an international agreement among the nuclear powers which would include a commitment not to use or threaten to use nuclear weapons against non-nuclear states or nuclear-free zones, a commitment which later became part of China’s stated nuclear policy.²⁰⁹ China has repeatedly stated its commitment to its NFU policy over recent decades, yet as documented below, there has been growing internal debate in recent years about adjustments to the policy. Authoritative sources are arguing for changes, such as a launch-on-warning posture and a policy allowing a nuclear response to a conventional attack on nuclear assets, a debate which by itself is undermining the belief in other countries that China will adhere to such a policy in future crises or conflicts.²¹⁰

Finally, China’s nuclear policy includes stated opposition to arms races and support for the prohibition of nuclear weapons, with these stated objectives primarily intended to restrict the growth of the major nuclear powers.²¹¹ China has opposed arms races, and its 2006 defense white paper proclaimed that it “has never entered into and will never enter into a nuclear arms race with any other country.”²¹² China’s 1964 statement also included a commitment to the “complete prohibition and thorough destruction of nuclear weapons through international consultations.” China has continued to restate this policy, but it warily approaches nuclear arms control efforts, always placing emphasis on countries with the largest nuclear arsenals—the United States and Russia—to first make additional reductions. Chinese strategists caution that arms control efforts are a tool of the nuclear powers to limit the capabilities of their adversaries, and they even advocate the development and employment of tactics to ease pressure on China to participate in arms control efforts.²¹³

208 “Statement of the Government of the People’s Republic of China,” October 16, 1964.

209 For example, see Huang Hua, General Debate, 33rd Session of the United Nations General Assembly, New York, September 28, 1978, as cited in Wang Jia, “China’s Views on the Disarmament Road Map,” in Li Bin and Tong Zhao, eds., *Understanding China’s Nuclear Thinking* (Washington, DC: Carnegie Endowment for International Peace, 2016), pp. 103–126.

210 Fravel and Medeiros, “China’s Search for Assured Retaliation,” p. 80. See also Fiona S. Cunningham and M. Taylor Fravel, “Assuring Assured Retaliation: China’s Nuclear Posture and U.S.-China Strategic Stability,” *International Security* 40, no. 2, 2015, pp. 24, 49.

211 While China’s arms control policy has included support for nonproliferation in recent decades, considerable evidence of China’s support for Pakistan’s nuclear program undermines that aspect of its stated policy. See Thomas C. Reed and Danny B. Stillman, *The Nuclear Express: A Political History of the Bomb and Its Proliferation* (Minneapolis, MN: Zenith Press, 2009).

212 For example, see Hua, General Debate, 33rd Session of the United Nations General Assembly, 1978; Fravel and Medeiros, “China’s Search for Assured Retaliation,” p. 56; and “China’s National Defense in 2006,” Information Office of the State Council of the People’s Republic of China.

213 Academy of Military Science, *Science of Military Strategy* (2013), pp. 176–177.

Continuities in Chinese Nuclear Policy

China's nuclear policy has informed China's nuclear strategy, which is rooted in deterrence. Western and Chinese authors have used numerous different terms to label China's nuclear strategy, with most of the terminology more or less indicating the same basic strategic approach.²¹⁴ This paper uses the term "assured retaliation," which, as explained by Taylor Fravel, Evan Medeiros, and Fiona Cunningham, means that China seeks to provide a credible threat that an adversary will suffer some unacceptable level of retaliation if China is attacked with nuclear weapons.²¹⁵ China's nuclear strategy, while slowly formed over decades, has had several consistent elements dating as far back as the 1960s, including:

- Strategic Deterrence: Credibly deterring adversary use or threat of use of nuclear weapons.²¹⁶
- Lean and Effective Force Structure: Fielding a small, secure, and reliable capability.
- Centralized Command: Ensuring the senior leadership's full control of nuclear forces.

While these elements provide rough guidance on strategy and force structure, they are inherently ambiguous and allow for continued reinterpretation as circumstances change. Moreover, while the broad outline of China's nuclear strategy appears clear, nuclear strategy has been underdeveloped in China due to constraints such as senior political leadership views, limited institutional capacity, a restrictive work environment, and a shortage of expertise.²¹⁷ Chinese development of strategy and doctrine on nuclear weapons did not start until the late 1970s and

214 For terms Chinese analysts have used to describe China's nuclear strategy, see Chase, "China's Transition to a More Credible Nuclear Deterrence," pp. 63–67.

215 Fravel and Medeiros, "China's Search for Assured Retaliation," pp. 48–87; and Cunningham and Fravel, "Assuring Assured Retaliation," pp. 7–50. As detailed further below, China's strategy is not one of minimum deterrence because it includes both countervalue and counterforce targets. Additionally, the 2001 edition of the Academy of Military Science's *Science of Military Strategy* notes three types of nuclear deterrence: "maximum nuclear deterrence," "time minimum nuclear deterrence," and "nuclear deterrence of moderate intensity." China's strategy most closely matches the final concept, which describes a "sufficient and effective" nuclear force similar to descriptions of China's own "lean and effective" nuclear force structure. See Alastair Iain Johnston, "China's New 'Old Thinking': The Concept of Limited Deterrence," *International Security* 20, no. 3, Winter 1995–1996, pp. 5, 8; Fravel and Medeiros, "China's Search for Assured Retaliation," pp. 76–77; and Academy of Military Science, *Science of Military Strategy* (Beijing: Military Science Press, 2005), p. 175.

216 In the Chinese context, strategic deterrence encompasses not only nuclear capabilities, but also conventional, space, and cyber capabilities. Michael Chase and Arthur Chan, *China's Evolving Approach to "Integrated Strategic Deterrence"* (Santa Monica, CA: RAND Corporation, 2016).

217 Fravel & Medeiros, "China's Search for Assured Retaliation," pp. 57–73.

progressed slowly through the 1980s and 1990s; historically, there have been few external or internal authoritative publications that discuss nuclear strategy in detail.²¹⁸

Continuity: The primacy of strategic deterrence

Through China's assured retaliation strategy, China has sought to deter adversaries from using or threatening the use of nuclear weapons against China, both in peacetime and during conventional conflict.²¹⁹ While China's nuclear strategy was never fully and explicitly stated publicly by Mao or Deng, the assured retaliation strategy is consistent with the views expressed by Chinese leaders since Mao Zedong and espoused by China's military strategists today.²²⁰ Under this strategy, nuclear weapons are "a type of deterrent weapon," and the "deterrent application is the basic mode of application of nuclear forces."²²¹ Adversaries are credibly threatened with some unacceptable degree of retaliatory damage, a damage level that has never been officially defined but is assumed to be low given China's small force structure.²²² Consistent with its active defense strategy and NFU policy, China's nuclear strategy has therefore been defensive, focused on striking only after the enemy has struck (后发制人 [Hòufāzhìrén]).²²³

Notably, battlefield applications have not been publicly discussed as part of China's nuclear strategy. Limited information is available on leadership views of warfighting, but China's

-
- 218 Publications that do discuss Chinese nuclear strategy in detail include Lonnie D. Henley, "War Control: Chinese Concepts of Escalation Management," in Andrew Scobell and Larry M. Wortzel, eds., *Shaping China's Security Environment: The Role of the People's Liberation Army* (Carlisle, PA: Strategic Studies Institute, U.S. Army War College, 2006), pp. 81–103. Also see Lonnie D. Henley, "Evolving Chinese Concepts of War Control and Escalation Management," in Michael D. Swaine, Andrew N.D. Yang, and Evan S. Medeiros, with Oriana Skylar Mastro, eds., *Assessing the Threat: The Chinese Military and Taiwan's Security* (Washington, DC: Carnegie Endowment, 2007), pp. 85–110.
- 219 For decades, China denounced the term deterrence (威慑 [Wēishè]) in describing its nuclear strategy. This reluctance is due partly to the meaning of the term "deterrence" in Chinese, which contains both the concept of "deterrence" and "compellence." The coercive nature of the latter concept was seen by China as an aggressive technique of hegemonic nuclear powers. In effect though, the foundation of China's assured retaliation strategy was nuclear deterrence. See Fravel and Medeiros, "China's Search for Assured Retaliation," p. 71. See also Lewis and Xue, "Making China's Nuclear War Plan," pp. 48–49.
- 220 Fravel and Medeiros, "China's Search for Assured Retaliation," pp. 58–69.
- 221 Academy of Military Science, *Science of Military Strategy* (2013), p. 171.
- 222 Fravel and Medeiros, "China's Search for Assured Retaliation," pp. 65–66.
- 223 Academy of Military Science, *Science of Military Strategy* (Beijing: Military Science Press, 1987), as cited in Fravel and Medeiros, "China's Search for Assured Retaliation," p. 69. See also Academy of Military Science, *Science of Military Strategy* (2013), p. 172.

political and military leaders historically believed that nuclear weapons could not by themselves win wars, and they viewed nuclear weapons as having limited battlefield utility.²²⁴

Continuity: A lean and effective force structure

To meet its strategic deterrence goals, China's leaders have expressed the belief that they need to develop and maintain only a small nuclear force structure. China's leaders never explicitly stated why they were committed to a small force structure, but their statements and force structure decisions indicate their confidence that a small force structure was sufficient to realize their strategy.²²⁵ More recently, starting with the 2006 defense white paper, official and authoritative documents state that China's force structure should be "lean and effective," a term which encapsulates previous leadership and military statements on the need for few but capable nuclear weapons.²²⁶ This new term is generally regarded by Chinese analysts to mean a small arsenal that is large and advanced enough to accomplish China's deterrence goals.²²⁷ Yet "lean and effective" is inherently ambiguous, having never been explicitly defined, and leaves ample room for future reinterpretation. There is no absolute numerical requirement for nuclear forces; the requirement is relative, responsive to both adversary capabilities and the broader security environment.²²⁸

Since the 1970s, China has held a long-term goal of modernizing its nuclear forces to increase their credibility, reliability, and survivability. For several decades, China maintained a limited, vulnerable force structure that potentially did not even meet its goal of providing a credible retaliatory attack capability.²²⁹ China's early political leaders supported continuous modernization, but they never openly clarified the operational requirements of the force, aside from indicating that both the quantity and quality of the force should increase over time. PLA leaders and publications since the 1980s specifically emphasized survivability and reliability

224 Limited publicly available information on Chinese tactical nuclear weapons has led to a debate about their existence in Western publications. If China possessed tactical nuclear weapons, it could call into question the civilian leadership's commitment to a strategy of strategic deterrence. Declassified U.S. government documents indicate that China did develop one type of tactical nuclear weapon, an enhanced radiation weapon (ERW), in the late 1970s and 1980s, though there is no indication that this capability was ever deployed. The decision to develop this capability but to defer deployment may have been driven by several variables, including the political leadership's desire to develop a "technology reserve" that matched that of the existing superpowers, both for status-related techno-nationalist reasons and to avoid being at a relative strategic disadvantage in potential future security environments. Jonathan Ray, *Red China's "Capitalist Bomb": Inside the Chinese Neutron Bomb Program*, China Strategic Perspectives 8 (Washington, DC: National Defense University, January 2015), pp. 32–33; and Fravel and Medeiros, "China's Search for Assured Retaliation," pp. 61–62. See also Kristensen and Norris, "Chinese Nuclear Forces, 2018," p. 290.

225 Ibid., pp. 65–66.

226 "China's National Defense in 2006," Information Office of the State Council of the People's Republic of China; Fravel and Medeiros, "China's Search for Assured Retaliation," pp. 63–64, 69–70; and Academy of Military Science, *Science of Military Strategy* (1987).

227 Li Bin, "Differences Between Chinese and U.S. Nuclear Thinking and Their Origins," in Bin and Zhao, *Understanding China's Nuclear Thinking*, p. 65.

228 Chase, "China's Transition to a More Credible Nuclear Deterrence," pp. 55–67.

229 Ibid., p. 52.

as modernization goals.²³⁰ In the last decade, China has made several technological improvements that dramatically improve the credibility of its retaliatory strike capability, including road-mobile solid-fueled missiles such as the DF-26, DF-31, DF-31A, DF-31AG, and DF-41; multiple independently targetable re-entry vehicles; and a sea-based strategic deterrent with the Type-094 Jin-class SSBN and the JL-2 SLBM. China has also made investments in the survivability of command posts and in redundant communications networks that can survive under wartime conditions.²³¹

While China has previously focused on quality over quantity in force structure modernization, recent publications suggest China will pursue both qualitative and quantitative improvements to the systems themselves and the supporting personnel and infrastructure. As the 2013 *Science of Military Strategy* indicates, China's nuclear modernization goals will likely focus on increasing the number of ICBMs; strengthening its sea-based nuclear deterrent by increasing the number of nuclear ballistic missile submarines; improving survivability and penetrability, to include developing rapid maneuver and launch, hypersonic glide, and MIRV capabilities; and, finally, enhancing operational effectiveness after a first strike, to include operations planning, unit training, and other infrastructure upgrades.²³² Additionally, China's Air Force may be developing a nuclear-capable strategic bomber and an air-launched nuclear ballistic missile.²³³

While China's nuclear policy and strategy have remained defensive, recent additions to China's force structure and its stated modernization goals signify that China's ability to deliver accurate theater-level nuclear strikes against targets defended by modern air defense systems is increasing. These capabilities may drive changes in China's nuclear policy and strategy by permitting Chinese leaders to feasibly consider a new range of offensive and escalatory nuclear operations. Indeed, as detailed below, some Chinese strategists are already hinting at such changes, including the adoption of warfighting strategies.

Continuity: Centralized command and control (C2)

China's leadership has always stressed that nuclear forces remain under highly centralized control. The 2013 *Science of Military Strategy* states that, for nuclear forces, "decision power must be concentrated at the supreme decision-making level," and that nuclear deterrence and counterattack operations, to include the "scale, timing, and targets," are all decided by the Central Military Commission (CMC).²³⁴ The CMC has direct, redundant communication links with the PLA Rocket Force (PLARF), the military service that serves as China's main strategic deterrence force and which controls the PLA's conventional and nuclear land-based

230 Fravel and Medeiros, "China's Search for Assured Retaliation," pp. 64–65, 69.

231 Lewis and Xue, "Making China's Nuclear War Plan," p. 55.

232 Academy of Military Science, *Science of Military Strategy* (2013), pp. 214, 233–234.

233 Ankit Panda, "Revealed: China's Nuclear-Capable Air-Launched Ballistic Missile," *The Diplomat*, April 10, 2018.

234 Academy of Military Science, *Science of Military Strategy* (2013), pp. 175, 235.

missile forces.²³⁵ Historically, China's leaders have prioritized the preservation of centralized command under crisis scenarios, as they did in the 1969 Zhenbao Island incident with the Soviet Union and during the subsequent escalation involving a massive mobilization of Soviet forces along the Chinese border and Soviet plans for a preemptive strike against China's nuclear facilities. At that time, China's leadership decided to ensure central control by not dispersing its nuclear gravity bomb stockpiles, even though this greatly increased their vulnerability to a first strike.²³⁶

The leadership's focus on centralized C2 underscores another paramount internal imperative: namely the absolute primacy of the CCP over the PLA. The PLA is an armed wing of the Party. The prime directive of the PLA is to keep the Party in power and to remain unwaveringly loyal to the CCP. In such a Party-army system, the CCP's leadership demands overriding control over the instruments of violence in nearly all conceivable circumstances, especially those as dire as nuclear war. The Party is thus deeply and instinctively averse to delegating tactical commanders the means to initiate nuclear conflict, even if this hinders the credibility of China's nuclear deterrent.²³⁷

Yet, looking forward, the apparent obsession with centralized control of forces will increasingly run up against China's growing technological prowess and more assertive bureaucratic actors in the nuclear strategy debate. On the technological front, the PLA Navy (PLAN) has recently begun operating the Type 094 Jin-class SSBN, armed with JL-2 SLBMs.²³⁸ The development of a credible sea-based deterrent may require some tradeoffs against the political leadership's demands for centralized C2.²³⁹ Given that these submarines must be undetected in crisis or wartime and avoid communications, lest they reveal their positions to enemy forces, new C2 arrangements, including those that loosen tethers to the Party, may be inevitable.

Bureaucratically, PLA services with nuclear capabilities are growing in number and institutional importance. For years, the credibility of China's undersea deterrent remained in doubt. However, it appears that the Type 094 submarines have undertaken deterrent patrols since 2015, suggesting that China finally possesses a credible nuclear dyad.²⁴⁰ Now that the PLAN has joined the PLARF in upholding China's nuclear deterrent, inter-service dynamics will

235 Lewis and Xue, "Making China's Nuclear War Plan," p. 57.

236 Jeffrey Lewis, *The Minimum Means of Retaliation* (Cambridge, MA: The MIT Press, 2007), pp. 195–196.

237 This stands in contrast to the Russian case, in which it seems the Chief of the General Staff plays a greater role in nuclear C2 as a validating military authority. Jeffrey Lewis and Bruno Tertrais, *The Finger on the Button: The Authority to Use Nuclear Weapons in Nuclear-Armed States* (Monterey, CA: James Martin Center for Nonproliferation Studies, 2019), p. 10.

238 China had previously commissioned one Type 092 Xia-class SSBN in the 1980s, but that submarine did not even undertake one deterrent patrol.

239 Heginbotham et al., *China's Evolving Nuclear Deterrent*, pp. 107–110.

240 Benjamin David Baker, "China Deploys First Nuclear Deterrence Patrol," *The Diplomat*, December 19, 2015.

become a more important factor in the formulation of strategy.²⁴¹ These two services will likely be joined by yet another service, the PLA Air Force (PLAAF), which has ambitions to become a strategic air force. The development of a long-range nuclear-capable stealth bomber, the H-20, may help bring such a goal closer to fruition.²⁴² The PLARF itself was elevated from a branch to a service in the massive military reforms of 2015. Prior to the 2015 reforms, the PLARF was known as the PLA Second Artillery Force (PLASAF).²⁴³ It was in many ways already treated as a service despite being lower than the services in rank, yet this bureaucratic promotion formally acknowledged the PLARF's increasing role and influence in PLA strategy and operations.²⁴⁴ Overall, the institutional clout of PLARF, PLAN, and PLAAF has been growing in recent years at the expense of the PLA Army, the traditionally dominant service. New institutional relationships are thus emerging that may lead to greater inter-service rivalry over the nuclear mission and more complicated C2 arrangements in future joint operations.²⁴⁵

Continuity: Prioritizing a counterattack nuclear operation

According to the Chinese, China's nuclear forces have prepared for only one type of operation, a nuclear counterattack, which is consistent with its NFU policy and assured retaliation strategy. Authoritative Chinese sources on nuclear operations first started to appear in the 1980s, with publications such as the 1987 *Science of Military Strategy* stating that China must "strike after the enemy has struck."²⁴⁶ Successive publications such as defense white papers and other *Science of Military Strategy* editions only discuss conducting counterattacks in self-defense.²⁴⁷

For counterattack operations, Chinese strategists have emphasized the guiding principles of surviving the first strike so that the remaining forces can retaliate against key enemy targets. Chinese writers have discussed survivability under the term "close protection" (严密防护)

241 Heginbotham et al., *China's Evolving Nuclear Deterrent*, pp. 102–110.

242 Michael S. Chase and Cristina L. Garafola, "China's Search for a Strategic Air Force," *Journal of Strategic Studies* 39, no. 1, 2016, pp. 24–25.

243 Prior to the 2015 reforms, the Second Artillery Force was also known as the Second Artillery Corps.

244 Michael S. Chase, Daniel Yoon, and Mark Stokes, "The People's Liberation Army Second Artillery Force (PLASAF) as an Organization," in Kevin Pollpeter and Kevin Allen, eds., *The PLA as Organization v2.0* (Vienna, VA: Defense Group Inc., 2015), pp. 398–399.

245 The relationship between the PLARF and the PLA Strategic Support Force (PLASSF) is also worth watching closely. The PLASSF, a new PLA branch that was created in the major 2015 PLA organizational reforms, has responsibility in the mission areas of network, electromagnetic, and space operations, though much is still unknown about its roles and responsibilities and its relations with the other PLA services. As noted above, in the Chinese context, strategic deterrence encompasses not only nuclear capabilities, but also conventional, space, and cyber capabilities, which means that the PLASSF will also be responsible for conducting some strategic deterrence operations. Additionally, through its C4ISR platforms and systems, the PLASSF could potentially play a supporting role in the PLARF's use of nuclear weapons. See Kevin Pollpeter, Michael S. Chase, and Eric Heginbotham, *The Creation of the PLA Strategic Support Force and Its Implications for Chinese Military Space Operations* (Santa Monica, CA: RAND Corporation, 2017), p. 32.

246 Fravel and Medeiros, "China's Search for Assured Retaliation," pp. 68–69.

247 See, for example, China's Defense White Papers from 2000, 2006, and 2015 and the 2013 *Science of Military Strategy*.

[Yánmì fánghù]), which refers to all measures that can be taken to ensure force survivability, including “combat engineering, defensive systems, unit deployments, position configurations, [and] concealment and camouflage,” both before and during conflict.²⁴⁸ Following a first strike, China’s nuclear forces would respond with “key point counterstrikes” (重点反击 [Zhòngdiǎn fǎnjí]) against an adversary’s strategic targets, to include population centers and military targets. Unlike in Western discourse, Chinese writings do not clearly distinguish between countervalue and counterforce targets.²⁴⁹ While China’s nuclear delivery systems historically have lacked the accuracy to conduct a warfighting strategy that targets mobile battlefield groupings, Chinese writings indicate that leaders would likely consider strikes against strategic fixed military targets, such as bases.²⁵⁰

But China’s ability to deliver precision nuclear strikes that penetrate modern air defense systems is increasing, making strikes against military targets more feasible. Moreover, stemming from the inter-service rivalry, each service may attempt to gain greater leverage in the nuclear debate by accelerating the technological trends noted above, bolstering their own capabilities through the development of more precise missiles and increasingly diverse and survivable nuclear platforms and delivery vehicles. As a result, China’s future political leaders will likely be presented with a range of new countervalue and counterforce options distributed along various rungs of the escalation ladder. These technological and bureaucratic developments may thus break down the internal constraints that maintained China’s limited nuclear policy, strategy, and operational concepts.²⁵¹

To review, both the external dynamics of China’s security environment and internal factors—including the active defense concept, the defensive mindset of China’s early leaders, the nature of the PLA as a Party army, and the limited technological capabilities of the PLA’s nuclear delivery vehicles—all influenced the development of China’s nuclear policy, strategy, and operations. These factors mutually supported each other and contributed to the stability of

248 People’s Liberation Army Second Artillery Force, *Science of Second Artillery Campaigns* (Beijing: People’s Liberation Army Press, 2004), pp. 303–304. See also Academy of Military Science, *Science of Military Strategy* (2013), p. 175; and Academy of Military Science, *Science of Military Strategy* (1987).

249 The 2013 *Science of Military Strategy* does clarify between the two targets, noting the more sophisticated technological requirements of counterforce strikes, but remains ambiguous as to how China would select between the two types of targets for a nuclear counterstrike. Academy of Military Science, *Science of Military Strategy* (2013), pp. 175–176.

250 See, for example, Academy of Military Science, *Science of Military Strategy* (2013), pp. 175–176; Heginbotham et al., *China’s Evolving Nuclear Deterrent*, p. 32; Lewis and Xue, “Making China’s Nuclear War Plan,” pp. 58–60; and Fravel and Medeiros, “China’s Search for Assured Retaliation,” p. 70.

251 In addition to the potential bottom-up influences noted here, the role of civilian leaders on nuclear strategy and policy is a crucial facet of civil-military relations on Chinese nuclear affairs. However, publicly available information about this top-down interaction remains woefully limited in the West. Nevertheless, it is plausible to speculate that civilian control may be decreasing because of several trends, including the central leadership’s apparent looser grip on nuclear weapons issues compared with the early decades of China’s nuclear program, the lack of military experience of China’s current and future generations of political leaders, and the growing “bureaucratization” of policymaking in China. On the other hand, Xi’s rapid consolidation of political power and exertion of control over the PLA through major military reforms may indicate that the civilian leadership is still firmly in control over nuclear policy and the development of China’s nuclear forces. For additional details, see Heginbotham et al., *China’s Evolving Nuclear Deterrent*, pp. 98–102.

China's nuclear thinking since the 1960s. Yet, several of these factors are changing, portending possible changes in China's nuclear forces. Externally, as China's economy has grown, its security interests have consequently expanded, and its devotion to defensive strategic concepts may be weakening. Internally, defensive doctrinal concepts may adjust to new, more offensive strategic demands. The defensive thinking embedded in China's original conception of nuclear warfare may be diminishing as a new generation of civilian leaders and military commanders take the lead of an increasingly technologically advanced force. The Party's centralized C2 may loosen as the PLAN puts larger numbers of SSBNs to sea. Technological improvements, in both new nuclear platforms and the increased precision and survivability of new delivery vehicles, will permit Chinese leaders to conduct a wider range of counterforce strikes, in addition to countervalue ones. Finally, new organizational dynamics are emerging. Inter-service rivalries may encourage the services to develop more offensive nuclear capabilities and concepts to stake out a greater role in China's nuclear affairs. Recognizing these important changes, the following section more deeply explores the factors that may lead China to pursue a less restrained nuclear policy and strategy.

Potential Sources of Change in Chinese Nuclear Policy

Most Chinese analysts insist that China will remain faithful to its longstanding nuclear doctrine. They assert that China's commitment to the NFU policy and to self-restraint concerning the size and scale of its nuclear arsenal is unshakeable. Many attribute the stability of this modest nuclear ambition to China's unique circumstances, historical experiences, worldview, and strategic traditions. They frequently cite the legacy of Mao Zedong's military thought, superpower "nuclear blackmail" during the Cold War, China's strategic depth, confidence in the decisive role of China's conventional military power, and other formative factors as the sources of this continuity.²⁵²

Yet external stimuli, including technological trends and geopolitical shifts, are leading Chinese strategists to rethink the bounds of Chinese nuclear strategy and force structure. China's authoritative 2013 *Science of Military Strategy* claims that "the nuclear security circumstances facing China in overall terms are trending toward complexity."²⁵³ Chinese analysts highlight U.S. global conventional precision strike systems, U.S. missile defenses, and India's nuclear weapons modernization as drivers of China's own nuclear modernization. In response, these analysts have proposed measures ranging from quantitative and qualitative

252 For vigorous defenses of continuity in Chinese nuclear strategy, see 王仲春 [Wang Zhongchun], 核武器 核国家 核战略 [Nuclear Weapons, Nuclear Powers, and Nuclear Strategies] (Beijing: Shishi Press, 2007), pp. 213–220; 荣于洪源 [Rong Yu and Hong Yuan], "从反核威慑战略到最低核威慑战略: 中国核战略演进之路 [From Counter Nuclear Deterrence Strategy to Minimum Deterrence Strategy: The Evolution of Chinese Nuclear Strategy]," 当代亚太 [Journal of Contemporary Asia-Pacific Affairs], no. 3, 2009, pp. 120–132; 夏立平 [Xia Liping], "论中国核战略的演进与构成 [On the Evolution and Formation of Chinese Nuclear Strategy]," 当代亚太 [Journal of Contemporary Asia-Pacific Affairs], no. 4, 2010, pp. 113–127; and 李显荣 [Li Xianrong], 论核战略 [On Nuclear Strategy] (Beijing: Renmin Press, 2014), pp. 323–372.

253 Academy of Military Science, *Science of Military Strategy* (2013), p. 171.

improvements of China's nuclear force to modifications of China's nuclear strategy, including loosening the NFU policy and adopting a warfighting strategy.

A departure from China's longstanding nuclear policy and strategy may also reflect its own growing ambitions and capabilities. As assertive Chinese behavior in recent years strongly suggests, a more powerful and confident China could seek to reshape the external surroundings more to its liking and, in the process, erode the U.S. position in the Western Pacific. For example, China has already sought to undermine U.S. commitments to Asian allies South Korea, Japan, Taiwan, and the Philippines. In other words, greater power could incline Beijing to expand or redefine its regional objectives that in turn informs a correspondingly bold strategy. To what extent Chinese nuclear strategy will play a more prominent role in achieving Beijing's larger regional goals remains to be seen. Nevertheless, given the active internal debate over China's nuclear policy, as noted above, close scrutiny of the discourse that indicates a shift toward a more coercive nuclear strategy is warranted.²⁵⁴

Potential change: The vulnerability of China's nuclear forces to conventional prompt global strike

A major external driver that has shaped Chinese discourse is the pace and scale of technological change and innovation by the leading military power, the United States. Chinese analysts have closely monitored and expressed concerns over the U.S. development of prompt global strike for at least a decade.²⁵⁵ Prompt global strike systems would enable the U.S. military to rapidly destroy mobile, hardened, or deeply-buried targets, including enemy ballistic missiles, ground-based radars and sensors, anti-satellite missiles, mobile missile launchers, ships at pier-side, and parked aircraft.²⁵⁶ Their long ranges would reduce heavy reliance on overseas forward bases and would thereby avoid the associated political constraints on the U.S. freedom to act. They also promise to replace or complement manned bombers, which labor under slower speeds, heavier logistical burdens including mid-air refueling, and the risk of casualties.²⁵⁷ To the Chinese, the most worrisome danger is that such precision strike weaponry would furnish the United States a conventional instrument to conduct a disarming first strike against Chinese nuclear forces.

254 Johnston, "China's New 'Old Thinking,'" pp. 5–42; Fravel and Medeiros, "China's Search for Assured Retaliation," p. 80; Cunningham and Fravel, "Assuring Assured Destruction," pp. 24–26; and Nan Li, "China's Evolving Nuclear Strategy: Will China Drop 'No First Use'?" *China Brief* 18, no. 1, January 12, 2018.

255 周黎妮 朱启超 邓斌 匡兴华 [Zhou Lini, Zhu Qichao, Deng Bin, and Kuang Xinghua], "美国快速全球打击计划的最新进展 [The Latest Developments of U.S. Prompt Global Strike Program]," 国防科技 [*National Defense Science and Technology*], no. 2, 2012, p. 80. The authors are researchers at the National University of Defense Technology.

256 党爱国 李晓军 徐宝 [Dang Aiguo, Li Xiaojun, and Xu Bao], "外军快速全球打击能力发展动态 [The Development and Trends of Foreign Prompt Global Strike Capabilities]," 飞航导弹 [*Aerodynamic Missile*], no. 7, 2012, p. 51.

257 童雄辉 [Tong Xionghui], "美国未来全球快速精确打击体系预测分析 [Forecast and Analysis of Future U.S. Prompt Global Strike System]," 导弹与航天运载技术 [*Missile and Space Vehicle*], no. 5, 2008, p. 61.

Authoritative Chinese sources have explicitly highlighted the challenge of long-range conventional strike systems to China's security and to its nuclear forces. National Defense University's 2015 *Science of Military Strategy* states that a key technological trend among the great powers is the "integration of conventional and nuclear strike capabilities" and notes the resulting danger to China's nuclear forces:

As the demands increase for striking hardened and deeply-buried targets, time-sensitive targets, mobile targets, and hidden targets, the strategic nuclear missiles currently in service are increasingly less able to fulfill operational needs. Equipping conventional strategic missiles with prompt global precision-strike capabilities will become an important constituent of the strategic missile forces of major military powers.²⁵⁸

The report cites the U.S. modification of ICBMs for conventional purposes and Russian arming of its nuclear missiles with conventional munitions as evidence that the traditional dividing line between conventional and nuclear weaponry has already begun to blur. Similarly, the 2013 edition of the *Science of Military Strategy* identifies the U.S. prompt global strike program by name and depicts the consequences of its deployment for China:

Once the program becomes an actual combat capability to be used conventionally to strike our nuclear missile forces, it would place us in a reactive position, greatly influence our nuclear counterstrike capabilities, and weaken the effectiveness of our nuclear deterrence.²⁵⁹

The Chinese have paid close attention to hypersonic weapons, which they forecast would constitute a key element of U.S. prompt global strike. Beyond range and speed, they see hypersonic vehicles as a potent tool for defeating China's air and missile defenses. As a team of experts from the PLA Equipment Academy notes:

Compared to ballistic missiles, a boost-glide vehicle's flight altitude is near space. It flies higher than the maximum interception-range of traditional air defense systems. It also flies lower than the range of mid-course interceptors of ballistic missile defense systems. Moreover, its speed, maneuverability, and less predictable flight path substantially enhances its penetration ability and survivability.²⁶⁰

The prospect of a conventional disarming first strike has stimulated discussions about a range of possible shifts in China's nuclear posture. Analysts have called on the Chinese leadership to engage in mutual reassurances with the United States, expand the nuclear arsenal, enhance the survivability of its retaliatory forces, embark on its own prompt global strike development, loosen the constraints of the NFU policy, and even adopt a warfighting nuclear strategy. All of these choices would clearly have implications for the size, composition, and readiness of

258 National Defense University, *Science of Military Strategy* (Beijing: Military Science Press, 2015), p. 362.

259 National Defense University, *Science of Military Strategy* (2013), p. 171.

260 梁熠 于洪敏 蔡业泉 邢继娟 胡磊 [Liang Yi, Yu Hongmin, Cai Yequan, Xing Jijuan, and Hu Lei], "美军快速全球打击装备发展分析 [Analysis of U.S. Prompt Global Strike Developments]," 装备学院学报 [*Journal of Equipment Academy*] 25, no. 5, October 2014, p. 61.

current nuclear forces. Sun Xiangli, for example, explicitly links the future size of the Chinese nuclear arsenal to external technical trends to include future advances in the prompt global strike program. Sun explains:

The limited scale of China’s nuclear capabilities does not mean that the number of nuclear weapons will remain fixed. In reality, quantity is linked to the nuclear arsenal’s survivability and penetration capabilities. As other countries’ *precision strike capabilities increase swiftly* [emphasis added] and their strategic missile defense systems develop, the minimum level and technical targets necessary for nuclear deterrence must be raised correspondingly. . . . The scale of China’s nuclear power will change according to the external threat environment, but China will not expand its nuclear arsenal on a large scale.²⁶¹

To Sun, quantity is a relative concept. In theory, a lean and effective force entails a sizable buildup that corresponds proportionately to changes in the external environment. The meaning of “lean” is a subjective judgment that belongs squarely in the eyes of Chinese decision-makers.

For Xia Liping, China has four choices as the United States brings prompt global strike to fruition. First, China and the United States could formally pledge not to conduct first strikes against each other’s nuclear facilities. Second, China could increase the size of its undersea deterrent force and land-based mobile launchers to enhance the survivability of its nuclear arsenal.²⁶² Third, China could continue developing its own prompt global strike capabilities to ensure mutual vulnerability. Notably, in his view, a Chinese arsenal of conventionally armed long-range strike systems that could hold at risk U.S. nuclear forces would ensure mutual vulnerability and thus restore strategic stability. Fourth, China could modify its NFU policy, allowing it to conduct nuclear retaliation should conventional weaponry be used against its nuclear forces.²⁶³

Yuwen Jingbo and Tang Liwen of the Academy of Equipment Command and Technology contend that the U.S. development of prompt global strike demands a comprehensive response from China. The authors call for advancing aerospace technologies, including investments in space weapons, medium- to long-range missiles designed to enhance “multi-directional deterrent power,” the defense and survivability of space systems, and long-range transport and deployment capabilities. Most intriguingly, they argue:

The appearance of the prompt global strike program has posed a challenge to our nuclear strategy. The United States can use conventional weapons to conduct attacks against our nuclear facilities. As such, under the premise that the principles of our nuclear strategy will

261 孙向丽 [Sun Xiangli], “中国核战略研究 [Research on Chinese Nuclear Strategy],” in 张托生 [Zhang Tuosheng, ed.], *核战略比较研究 [Comparative Study on Nuclear Strategies]* (Beijing: Social Science Academic Press, 2014), p. 17.

262 Xia also cites Russian development of rail-based ICBMs as one potential method for shoring up the survivability of Chinese nuclear forces against a first strike.

263 夏立平 [Xia Liping], “高边疆理论视阈下美国全球快速常规打击计划 [America’s Conventional Prompt Global Strike in the Context of the High Frontiers Theory],” *国际观察 [International Review]*, no. 5, 2014, p. 12.

remain unchanged, we should change the function of nuclear weapons from strategic deterrence toward the direction of simultaneously upholding deterrence and warfighting [慑战并举 Shè zhàn bìngjǔ].²⁶⁴

The authors do not explain why China would be compelled to depart radically from longstanding nuclear policy. Nor do they elaborate on the concept of warfighting and its implications for Chinese nuclear strategy. Yet shifting to a warfighting posture may become more feasible for China as it continues its nuclear modernization program, which includes accurate theater delivery systems, such as the DF-26, that can penetrate modern air defense systems.

Potential change: Countering theater missile defense systems and the threat to China's assured retaliation

In addition to the apparent anxieties about American offensive weaponry, Chinese analysts have voiced alarm about U.S. advances in defensive capabilities in the nuclear competition. China has expressed concerns about missile defense and its destabilizing effects on nuclear deterrence since at least the late 1980s. Chinese angst and debate rose in response to, particularly, the U.S. decision to withdraw from the ABM Treaty in 2001 and the introduction of Terminal High Altitude Area Defense (THAAD) to South Korea. Objections to the missile defense system reached fever pitch when the U.S. military deployed THAAD on Korean soil in mid-2017. In-depth essays and articles multiplied over the following weeks and months as the missile batteries became fully operational. In this opposition literature, despite repeated assurances from the United States and South Korea, Chinese observers remain convinced that THAAD would negatively impact China's nuclear deterrent, and they have revealed intriguing details about Beijing's possible responses.

Chinese analysts have directed much of their ire at the X-band AN/TPY-2 long-range high-altitude radar system and its potential ability to peer deep into China's interior from the Korean Peninsula. Most Chinese commentators peg the radar's range at the upper limits of open-source estimates.²⁶⁵ Based on these worst-case assumptions, observers find that the radar would pose peacetime and wartime threats to China.

According to three researchers, the X-band radar would purportedly be able to monitor Chinese missile tests and other aerospace activities taking place in North

264 宇文静波 唐立文 [Yuwen Jingbo and Tang Liwen], “美国快速全球打击计划探讨与启示 [An Exploration of the U.S. Prompt Global Strike Program and Its Implications],” 装备指挥技术学院学报 [Journal of the Academy of Equipment Command and Technology] 22, no. 3, June 2011, p. 60.

265 Two engineers from the PLA's 91550 unit in Dalian, which manages the only submerged-launched weapons test site of the Chinese navy, sampled and assessed various open source estimates of the radar's range. Based on their research, the low-end figures ranged from 600 km to 870 km while the high-end figures ranged from 1,732 km to 2,000 km. See 吴训涛 张强 [Wu Xuntao and Zhang Qiang], “美国萨德系统AN/TPY-2雷达威力探析 [An Analysis of the U.S. THAAD System's AN/TPY-2 Radar Capabilities],” 飞航导弹 [Aerodynamic Missile], no. 5, 2017, pp. 8–9. Another researcher estimates that the higher-end ranges of the radar run from 1,026 km to 1,540 km. 祁昊天 [Qi Haotian], “萨德入韩与美国亚太反导布局的战术与战略考量 [A Tactical and Strategic Consideration of THAAD's Introduction to South Korea and the U.S. Asia-Pacific Missile Defense Arrangement],” 现代国际关系 [Contemporary International Relations], no. 7, 2016, p. 18.

China—encompassing Beijing and Tianjin municipalities, Hebei and Shanxi Provinces, and Inner Mongolia—and the northeast provinces.²⁶⁶ One analyst contends that the radars in South Korea would be well positioned to detect and track tests of submarine-launched ballistic missiles fired toward impact sites in western China from the Bohai and Yellow Seas.²⁶⁷ At the same time, the sensors on the peninsula would substantially improve early detection and advance warning of sea-based nuclear strikes originating from China’s eastern littorals against the United States. Further, their forward positions would enable them to track the critical stage of a missile’s flight when it releases its warheads and decoys, undermining the penetration capabilities of Chinese nuclear forces and, more importantly, the credibility of China’s second-strike deterrent.

Another researcher claims the THAAD radar would detect the ascent of DF-31A ICBMs during their boost phases if the missiles were fired from launch sites in Shanxi Province, a rugged region ideal for hiding missile units and home to intercontinental ballistic missile brigades.²⁶⁸ If the AN/TPY-2 radar had a range of 1,500 kilometers, then most of Shanxi Province would fall well within the detection zone of THAAD units currently deployed in Seongju, South Korea.

Two engineers from the Navy Equipment Research Academy conducted simulations of THAAD’s ability to detect and track missile launches by sea-based deterrent forces off China’s coast.²⁶⁹ Their experiments show that the Korea-based radar could track a missile fired from the East China Sea during its boost phase and post-boost phase, the latter being the stage when the warheads and decoys are released. Compared to THAAD sensors deployed in Japan’s Kyotango and Aomori, the radar on the peninsula detected the launch 50 and 80 seconds earlier respectively. To them, those crucial additional seconds would substantially improve the probability that the United States intercepts the incoming missile. They also determined that the AN/TPY-2 radar would not substantially improve warning against sea-launched missiles fired from the South China Sea since the detection window would open only after the warheads and decoys had already been released. They further found that THAAD batteries in South Korea could track the boost and post-boost phases of an SLBM test launched from the East China Sea toward the Chinese interior. They warn that such a

266 孙超 周军 李大光 [Sun Chao, Zhou Jun, and Li Daguang], “萨德反导系统入韩威胁东北亚地缘安全 [THAAD Missile Defense System’s Introduction to South Korea Threatens Northeast Asia’s Geopolitical Security],” 飞航导弹 [*Aerodynamic Missile*], no. 5, 2017, pp. 6–7.

267 刘冲 [Liu Cong], “美国酝酿在韩部署萨德系统问题辨析 [Analyzing the Problem of U.S. Deployment of the THAAD System in South Korea],” 现代国际关系 [*Contemporary International Relations*], no. 5, 2015, p. 17.

268 廖生智 [Liao Shengzhi], “萨德入韩与中国东北亚地缘安全困境的加剧及应对 [THAAD’s Introduction to South Korea and the Aggravation and Responses to China’s Geopolitical Security Dilemma in Northeast Asia],” 东疆学刊 [*Dongjiang Journal*] 34, no. 3, July 2017, p. 104.

269 王世涛 邢晓莉 [Wang Shitao and Xing Xiaoli], “韩国部署萨德系统对中国沿海弹道导弹影响浅析 [An Analysis of the THAAD System Deployment in South Korea and Its Influence on China’s Ballistic Missiles in the Littorals],” 飞航导弹 [*Aerodynamic Missile*], no. 9, 2016, pp. 44–45.

capability would allow the United States to gather and accumulate substantial data and intelligence about China's undersea deterrent.

In response to the operational and strategic advantages that THAAD purportedly confers to the United States, Chinese commentators have called for responses similar to those designed to counter U.S. prompt global strike systems. One Chinese scholar urges the PLA to field "a certain numerical scale" of the DF-41 ICBM armed with multiple warheads, modernize China's nuclear triad, and build up the size and striking power of its undersea nuclear forces.²⁷⁰ Others have pressed for the development of hypersonic delivery vehicles to defeat U.S. missile defense systems.²⁷¹ Still others have hinted at a broader reconsideration of China's NFU policy, in addition to increasing the size and penetration capabilities of the existing ICBM force.²⁷²

Potential change: Views on India's nuclear deterrent and the changing Sino-Indian nuclear balance

China confronts an increasingly complex geometry of deterrence in the Second Nuclear Age, an era characterized by proliferation among rising regional powers. India's emergence as a nuclear power has been particularly problematic for Beijing. Zhang Jiegeng, an authority on nuclear dynamics on the Indian subcontinent, aptly captures China's predicament:

For China, the sudden appearance next door of an openly hostile nuclear power undoubtedly poses a challenge to China's security environment. Moreover, as India formulates and implements its nuclear strategy with China as an important deterrence target, the challenge to China's security will grow. Not only that, because India has further developed its nuclear strategy, the nuclearization of South Asia has become irreversible. As a result, China's geopolitical environment will steadily deteriorate.²⁷³

For Zhang, India poses multiple dilemmas. First, New Delhi's entry into the nuclear club opened up a new front for China, forming an omnidirectional threat environment. To complicate matters further, India and Pakistan have engaged in brinkmanship in past crises, introducing elements of strategic instability. Questions about adequate safety, security, and command and control of Indian and Pakistani forces linger.

Second, New Delhi sees China as the primary threat and has designed its deterrent posture accordingly. As Zhang notes:

270 Shengzhi, "THAAD's Introduction to South Korea," p. 105.

271 郑兆岚 [Zheng Zhaokai], "美萨德入韩的影响与对策 [The Impact of and Response to U.S. THAAD Deployment to South Korea]," 国防 [National Defense], no. 12, 2016, p. 54; and 曹庭 [Cao Ting], "萨德入韩引发的地缘政治危机及中国的对策 [The Geopolitical Crisis Arising from THAAD's Deployment to South Korea and China's Response]," 国防科技 [National Defense Science and Technology] 38, no. 4, August 2017, p. 66. Zheng Zhokai is an engineer attached to a missile testing base under the command of the Strategic Support Force.

272 陈向阳 [Chen Xiangyang], "萨德入韩对东北亚地区的战略影响 [The Strategic Impact of THAAD's Deployment to South Korea on Northeast Asia]," 现代国际关系 [Contemporary International Relations], no. 4, 2017, p. 2.

273 张节根 [Zhang Jiegeng], 印度的核战略 [India's Nuclear Strategy] (Beijing: Shishi Press, 2015), pp. 211–212.

Despite major improvements in Sino-Indian relations in recent years, India still views China as a strategic adversary. This is evident in India's military strategy and it is even more so in its nuclear strategy. Indian strategists began to develop India's nuclear strategy in the 1980s and their most important hypothetical enemy has been China.²⁷⁴

One study observes that the capabilities of India's long-range strategic missiles, particularly the Agni IRBM and ICBM series, far exceed the requirements of a contingency involving Pakistan and are clearly directed at China.²⁷⁵ Zhang further cites Indian hardliners who have openly called for a retaliatory capacity to destroy China's major political, economic, and industrial centers, including Beijing, Shanghai, and Hong Kong, and its sea-based nuclear deterrent. He thus concludes, "Whether China is willing or not, it will frequently be drawn into South Asia's nuclear arms race. This is because India sees China as a main target of its nuclear deterrence, which has in turn determined its development and deployment of nuclear capabilities."²⁷⁶

Third, a future conflict between India and Pakistan would carry tremendous strategic risks, many of which would not likely be confined to the subcontinent. Conventional combat that escalated—either deliberately or inadvertently—into a nuclear exchange would almost certainly draw in the great powers and would create a massive humanitarian disaster on China's doorstep. Beijing thus must take into account the potential spillover effects of the intense regional rivalry to its south. Finally, India's nuclear capabilities are now integral to the calculus of extra-regional great powers. From China's perspective, New Delhi is seeking to leverage its nuclear status to draw in the United States to counterbalance China, while Washington similarly exploits India's nuclear deterrent to tie down Beijing. The U.S.-India Civil Nuclear Agreement is seen as the most concrete manifestation of this mutual interest in containing China.

To what extent India's deterrent posture will influence Chinese nuclear force modernization remains uncertain, not least because of sharp asymmetries in threat perceptions between the two antagonists. Indian strategists tend to overinflate the Chinese danger while their counterparts in China are inclined to hold a sanguine, if not condescending, attitude toward its southern neighbor. Nevertheless, given India's strategic depth, large numbers of population and industrial centers, increasingly competitive economic and technological base, and growing nuclear arsenal that the Chinese acknowledge is directed at them, Beijing will almost certainly adapt its nuclear posture in accord with developments in South Asia.

274 张节根 [Zhang Jiegen], "印度核战略对中国安全环境及南亚政策的影响 [The Influence of Indian Nuclear Strategy on China's Security Environment and South Asia Policy]," 同济大学学报 [*Tongji University Journal*] 22, no. 2, April 2011, p. 65.

275 刘红良 [Liu Hongliang], "印巴核武器及核战略 [Nuclear Weapons and Nuclear Strategies of India and Pakistan]," 印度洋经济体研究 [*Indian Ocean Economic and Political Review*], no. 5, 2014, p. 42.

276 张节根 [Zhang Jiegen], "印巴核战略稳定及其对中国的影响 [India-Pakistan Nuclear Stability and Its Influence on China]," 印度洋经济体研究 [*Indian Ocean Economic and Political Review*], no. 4, 2014, p. 33.

Potential change: Chinese research on U.S. extended deterrence

While China has long chafed at the U.S. nuclear umbrella in Asia since the earliest days of the Cold War, Chinese writings do not directly address Beijing's official views or policies concerning U.S. extended deterrence. Rather, they have explored Cold War history, the evolution of U.S.-NATO relations, U.S. regional strategy, and game theory, reflecting a keen and growing interest in the study of extended deterrence (延伸威慑 [Yánshēn wēishè]). Indeed, they offer important hints about how Beijing may understand the features, strengths, and weaknesses of U.S. extended deterrence. The following employs this literature as a proxy for evaluating Chinese perspectives and offers some preliminary findings about how evolving Chinese views might influence nuclear strategy.

First, Chinese analysts have looked to the past for lessons. For example, an in-depth history of U.S. nuclear strategy in the early 1970s—that supports a larger government-sponsored research effort on U.S. deployment of nuclear weapons in the Far East during the Cold War—examines the influence of the Schlesinger Doctrine. The author attributes the shift toward a limited nuclear option in part to deepening American concerns that extended deterrence to European allies under existing policies lacked credibility.²⁷⁷

Chinese commentators have also explored the transatlantic debates following the Soviet introduction of SS-20 intermediate-range ballistic missiles in the late 1970s. They pay attention to the danger of decoupling that had animated Western fears at the time.²⁷⁸ Decoupling was premised on the idea that an exclusive nuclear threat against Europe might disincline the United States—whose territory would be spared from the Soviet theater missiles—to intervene and retaliate on behalf of its allies across the Atlantic.

They have assessed the U.S. nuclear umbrella over Europe since the end of the Cold War. One article, written prior to Russia's invasion of Crimea and Ukraine, details the divisive debates among NATO members about the utility of tactical nuclear weapons deployed in Europe.²⁷⁹ Another piece published after Ukraine's dismemberment highlights how Russian aggression reawakened Europe to the realities of great power politics, reviving the importance of deterrence and nuclear weapons in the alliance's security debates.²⁸⁰

Still others have sought to measure the credibility of U.S. extended deterrence. One study methodically compares the degree to which American security commitments and the

277 刘磊 [Liu Lei], “施莱幸格主义与尼克松政府核战略的调整 [The Schlesinger Doctrine and Adjustments to Nixon Administration's Nuclear Strategy],” 史林 [Historical Review], no. 4, 2013, p. 143.

278 刘芝平 [Liu Zhiping], “冷战时期联邦德国促使北约双重决议萌芽的原因 [The Reasons Behind West Germany's Push for NATO's Dual-Track Decision During the Cold War],” 南华大学学报 [Journal of University of South China] 11, no. 4, August 2010, p. 57.

279 夏立平 孙崇文 [Xia Liping and Sun Chongwen], “论冷战后时期的北约核战略 [On NATO's Nuclear Strategy in the Post-Cold War Period],” 欧亚研究 [Chinese Journal of European Studies], no. 6, 2012, p. 84.

280 员欣依 孙向丽 [Yuan Xinyi and Sun Xiangli], “北约核政策与核态势的回顾及展望 [Retrospect and Prospect of NATO's Nuclear Policy and Nuclear Posture],” 国际安全研究 [Journal of International Security Studies], no. 5, 2017, pp. 145–151.

extension of its nuclear deterrent differ across Europe, Asia, and the Middle East. The authors find U.S. credibility is strongest in Europe, weakest in the Middle East, and somewhere in between in Asia. Significantly, the key factors that explain this variation in credibility are the forward presence of non-strategic nuclear weapons and formal institutional mechanisms that involve U.S. allies in decisions over the employment of nuclear weapons.²⁸¹

Lastly, a scholar at the then-Second Artillery Command Academy applies game theory to examine three-way interactions between a defender, a challenger, and a third-party intervener as a patron power that extends its security guarantees to the challenger. It is apparent that the author is testing how China might respond to provocations by a U.S. ally or partner, such as Taiwan or Japan, and whether the United States would intervene on its behalf. While nuclear weapons are not explicitly addressed in the game, the article offers an example of the PLA's interest in formally studying extended deterrence.²⁸²

These Chinese writings implicitly illustrate the growing gap between U.S. commitments and resources in the context of extended deterrence. The literature frequently recounts the sharp reductions in U.S. forward-deployed nuclear forces during the post-Cold War period, including deep cuts in Europe; the unilateral withdrawal of tactical nuclear weapons, including those in South Korea, in 1991; and the decision to retire nuclear-armed Tomahawk land-attack cruise missiles in 2010. Chinese analysts also highlight the contentious debates about the declining utility of nuclear weapons that have sown division within the United States and among its allies since the 1990s drawdown. Yet, as the Chinese point out, regional aggression and proliferation in Europe, Asia, and the Middle East over the past decade have made deterrence and reassurance ever more urgent and problematic.²⁸³ How the United States will bring equilibrium between its commitments and resources and to what extent nuclear weapons, both strategic and tactical, will help restore that balance are questions of apparent interest to Chinese observers.

There is some preliminary evidence that Beijing's interpretation of the past may hold some clues and insights about the future course of Chinese nuclear strategy. For example, one Chinese analyst applauds China's deployment of theater-range missiles by explicitly drawing parallels to the Soviet SS-20 intermediate-range ballistic missile. He notes:

281 孙逊 韩略 [Sun Xun and Han Lue], “冷战后美国延伸威慑战略模式探析—基于地缘政治的视角 [An Analysis of Models of U.S. Extended Deterrence Strategy in the Post-Cold War—Premised on a Geopolitical Perspective],” 当代亚太 [Journal of Contemporary Asia-Pacific Studies], no. 5, 2017, pp. 13–14.

282 向钢华 王永县 [Xiang Ganghua and Wang Yongxian], “一种三方不完全信息延伸威慑动态博弈模型 [A Game Model of Three-Way Extended Deterrence Dynamics Under Incomplete Information],” 系统工程 [Systems Engineering] 24, no. 4, April 2006, pp. 40–43. For another study on extended deterrence based on game theory, see 曹金绪 [Cao Jinxu], “实力与决心的较量—三方不对称军事威慑博弈分析 [The Contest of Capability and Will: A Game Analysis of Asymmetric Three-Way Military Deterrence],” 国际政治科学 [Quarterly Journal of International Politics] 34, no.2, 2013, pp. 1–34.

283 For an excellent summary of Russia's challenge to U.S. extended deterrence in Europe, see 蒋翊民 [Jiang Yimin], “美俄中导条约履约争议与欧洲地区安全: 影响与管控 [The Debate Over the U.S.-Russia INF Treaty and European Regional Security: Influence and Control],” 国际关系研究 [Journal of International Relations], no.6, 2015, pp. 102–103.

Based on the capabilities of the Soviet SS-20 missile, it is designed to be deployed along the territorial periphery to cope with threats from neighboring countries and regions and to strike the strategic rear of adjacent states or nearby straits and military strategic points. . . . According to our needs for deterrence, the costs of building deterrent power, and the requirements for striking capabilities, intermediate-range missiles are undoubtedly our main force for deterring our periphery.²⁸⁴

The PLA Rocket Force's fielding of theater-strike systems, including the dual-capable DF-26 IRBMs and the DF-21 MRBMs, appears to support this view. Notably, these missiles would put China's nuclear forces within range of all U.S. forward bases, allied bases, and cities along the first island chain. Considering this buildup, how might China seek to exploit the dilemmas of extended deterrence? How might China adopt postures intended to decouple U.S. security commitments to its allies in Asia? While the Chinese writings to date are silent on these questions, the literature on Beijing's views of extended deterrence may be an area worthy of closer attention in the coming years. It is possible that China is seeking to undermine extended deterrence in Asia and perhaps use decoupling as the tool with which to break the chains of the U.S. alliance structure in Asia.

In sum, Chinese strategists see an array of external challenges that demand a more vigorous response. What stands out from this review of Chinese writings is the seemingly singular focus on the dominant military power in the international system, the United States. While India has clearly emerged as a more credible factor in Beijing's calculus, the South Asian power remains a secondary consideration. American advances in hypersonic weaponry, the deployment of theater missile defenses in Asia, and U.S. extended deterrence have stimulated extensive debate and discussion in Chinese doctrinal and technical writings. If the literature sampled here is a proxy for Beijing's worldview, then it suggests that China sees the United States as the standard by which it evaluates evolving external threats, measures the pace of technological change in the competition, and compares its own relative position in the nuclear rivalry.

Reflections on Chinese literature as an internal source of competition

It is important to note that the literature surveyed above is not official policy. Some sources, such as the *Science of the Military Strategy*, stand above the rest for their relative authoritativeness. Even so, they do not necessarily reflect policy, consensus, or thinking of the Party, the government, and the PLA. At least several degrees of separation exist between actual policy and these works. This gap—between what can be discerned from open sources and what is being decided behind the curtain of secrecy that surrounds Chinese nuclear policy—poses a methodological challenge that has long bedeviled outside observers.

284 [张相国] Zhang Xiangguo, “为什么中程导弹再次引起关注 [Why Intermediate-Range Missiles Have Attracted Attention Again],” 兵器知识 [Ordnance Knowledge], no. 1, 2016, p.33.

Nevertheless, a literature review of the kind conducted above is not an exercise in futility. Chinese state and society, including the PLA, the military-industrial complex, academia, and the scientific community, are increasingly dynamic, open, and eager to communicate their views, ambitions, and preferences. These domestic constituents, many represented in the writings above, have clamored to ensure that their voices are heard in policy circles. While their ideas and proposals may not carry the weight of policy, they offer hints about the direction of policy debates, the options available to policymakers, and the sources of Chinese anxieties and optimism. The consistency and urgency with which various stakeholders have responded to prompt global strike, for example, suggests that the Chinese take the threat of conventional weaponry to their nuclear forces quite seriously.

Unsurprisingly, the literature sampled above depicts China's nuclear modernization as a one-way reaction to unwelcome U.S.-led initiatives. But such a politically expedient narrative distorts the cause and effect of Beijing's behavior while disguising the wider range of choices available to Chinese decision-makers. Contrary to this self-serving storyline, China is neither an inanimate object nor exclusively responsive to external stimuli. Rather, China possesses an agency of its own. China's nuclear strategy and force structure are also a function of internal factors, including the civilian leadership's increasing dependence on the PLA for nuclear expertise; the growing influence of the PLA Rocket Force, Navy, and Air Force; inter-service rivalry concerning missions and resources; and synergies between and the integration of China's conventional and nuclear missile technologies.²⁸⁵

As China continues to modernize its forces, Chinese leaders will enjoy more options hitherto unavailable to them, and they may be more inclined to exercise those new options. For example, China's growing theater-level nuclear forces may tempt Beijing to test the vulnerabilities of U.S. extended deterrence in Asia. Many of the proposed Chinese countermeasures including the buildup of a more diverse and sophisticated nuclear force, the development of hypersonic weapons, and a reconsideration of the NFU policy have been well underway or actively debated for years. Indeed, it is not self-evident that China's efforts in those areas followed in lockstep with U.S. programs. The tight coupling of U.S. action and Chinese reaction that the writings above portray may be exaggerated, if not misleading. While worries about American intentions and capabilities expressed in the literature are undoubtedly real, other domestic motivations less visible to outside observers may be at work. Consistent with the concept of strategic interaction outlined in Chapter 2, a corollary is that internally-driven, offensively-oriented calculations, beyond keeping up with the United States, may be influencing Chinese nuclear strategy. It is incumbent upon observers to consider how Chinese leaders may exploit its nuclear capabilities to proactively shape—instead of passively react to—its external environment in ways that accommodate China's growing power and ambition.

285 Heginbotham et al., *China's Evolving Nuclear Deterrent*, pp. 97–120.

Conclusion

The degree to which China's nuclear policy and strategy will stay the course or depart established practices rests on a complex mix of internal and external sources of competition. Strategic tenets that have been deeply institutionalized can be highly resistant to change and can even impede innovation. The longstanding Maoist doctrine of active defense, which verges on sacrosanct within the PLA, have demonstrably bounded the limits of debate. Theorists and strategists in China thus found themselves tiptoeing around the active defense concept or advancing arguments for change under the guise of active defense. The primacy of the CCP exerts an enormous influence on how command and control of nuclear forces is arranged and on how the force posture and structure maximize political control of nuclear weapons. The Party's absolute command of the military may incline Chinese leaders to develop and adopt technical solutions and workarounds that carefully balance operational expediency against the Party's overriding imperative to maintain its monopoly on political power.

At the same time, trends in the security environment, including technological breakthroughs by leading military powers, can impel change and encourage decision-makers to test the limits of their self-imposed constraints. How Beijing appraises its opponents will determine the sense of urgency animating nuclear modernization. As the geometry of deterrence becomes more complex and diverse with new players such as India on the scene, the incentive structure for innovation will also become multi-faceted and more pressing. New fronts, geographical areas of responsibilities, missions, and capabilities will emerge. There is also strong evidence that advocates for nuclear modernization have seized on such external developments to justify their own agendas, highlighting the interplay between external stimuli and the internal actors that could spur change. The decades-old forces that have imposed strict adherence to restraint are no longer as overwhelming or monolithic as they were in the past. The limits that have long characterized Chinese nuclear policy and strategy are likely to give way to a more responsive posture and capability that better reflect China's domestic and international circumstances.

CHAPTER 6

Implications

This report demonstrates vividly that the shape of strategic interaction is not straightforward. National security bureaucracies possess imperfect information about other states' capabilities and future plans. In addition, a host of internal political, bureaucratic, and cultural factors influence doctrine and force development. As a result, strategic interaction has historically fallen short of an action-reaction arms race and has at times bordered on strategic autism.

The strategic environment today is, if anything, even more complex than in the past. The analysis of Cold War-era strategic interaction demonstrates that the pursuit of strategic stability proved enormously challenging when global competition involved only two major powers. Tripolar competition could complicate this dynamic significantly and produce a crowded, complex signaling environment. Moreover, while the total inventory of nuclear weapons in the world is falling, the number of nuclear powers is increasing. As a result, multipolar nuclear competition will involve not only the great powers that are the focus of this report but also smaller nuclear powers. As Chapter 5 notes, for example, nuclear powers like India can exert an influence on nuclear interaction among the nuclear great powers.

Although the United States and Russia are, for the moment, constrained by bilateral nuclear arms control agreements, other nuclear powers face far fewer restrictions. Coupled with emerging technological advances, these dynamics suggest that strategic interaction will likely grow more complicated in the coming decades, not less. The chapters herein produce several implications for strategic interaction in the Second Nuclear Age, the most important of which are included below.

Achieving a multilateral arms control regime will be an enormous challenge.

The New START agreement will expire either in 2021 or in 2026, depending on whether the United States and Russia choose to renew the agreement. The collapse of the INF Treaty means that New START's dissolution will mark the end of bilateral U.S.-Russian arms control, which has been a dominant feature of U.S.-Russian strategic interaction since the late 1960s.

The INF Treaty underscored the drawbacks of U.S. bilateral arms control commitments in a multipolar great power competition environment. Evaluations of Russian and Chinese approaches do not produce cause for optimism about the prospect for a multipolar arms regime in the near future. It is unlikely that China, Russia, or the United States will eagerly pursue future bilateral agreements that fail to constrain the activities of the third. As a result, future arms control processes are likely to pose greater challenges as they require the participation of more actors.

Russia has been reluctant to pursue arms control processes that address non-strategic nuclear weapons, which are the systems that have featured most prominently in changes to Russia's nuclear doctrine in recent decades and that would be most important to address, from a U.S. perspective. Moreover, as this report details in Chapter 4, arms control treaties have a poor record in changing long-term Russian strategic behavior. Russian willingness to defy the terms of the INF Treaty should introduce skepticism about future Russian commitments to arms control processes, which will again increase the complexity of future multilateral efforts.

It is still unknown how China's increased attention on Indian threats will impact Chinese nuclear strategy and strategic interaction in Asia more broadly; however, simplified interaction is not the likely outcome. Both Russia and China are unlikely to pursue future arms control that does not also constrain the United Kingdom and France, which again expands the circle of actors that future arms control will likely need to address. This wide variety of actors, threats, and bilateral relationships renders future arms control enormously complex and likely difficult to achieve. Absent agreed norms or arms control agreements, policymakers will need to consider how the United States might best posture itself to strengthen deterrence and strategic stability in a comparatively unconstrained strategic environment.

Coming decades may strain the tradition of non-nuclear use.

While U.S. policy has continually de-emphasized the role that nuclear weapons play in national security in the post-Cold War years, U.S. competitors' nuclear modernization efforts indicate that the de-emphasis on nuclear weapons has been a uniquely American trend, not a global one. In other words, the American de-emphasis on nuclear weapons appears to be largely decoupled from foreign developments. Russian doctrine and rhetoric invoking the use of non-strategic nuclear weapons have already prompted plans for new U.S. nuclear capabilities that will be more credible—that is, believably usable—in response to Russian nuclear aggression. Internal Russian debates over the utility of nuclear escalation in conventional conflict raise questions about the circumstances under which Moscow might contemplate the use of nuclear weapons. Moreover, Russia is not the only country to have recently threatened

nuclear use; both U.S. and North Korean leadership have issued warnings of potential nuclear use to one another within the last 2 years.²⁸⁶

The United States faces an increasingly challenging environment for reinforcing extended deterrence and nonproliferation.

The end of the INF treaty may also strain U.S. extended deterrence commitments. European concerns about Russian IRBMs capable of holding Europe at risk produced the impetus for the INF treaty in the mid-1980s. A chief concern was that theater weapons undercut the U.S. extended deterrence commitment and threatened to decouple NATO and American security. In other words, a nuclear threat impacting only Europe could prove insufficient motivation for the United States to intervene and retaliate on behalf of European allies. It was the U.S. deployment of Pershing II IRBMs and GLCMs that created the conditions for the INF treaty and the removal of ground-based intermediate-range weapons from the continent. The reemergence of these weapons in the wake of the treaty's dissolution could reintroduce former doubts about European security. Moreover, as China continues to expand its arsenal of conventional and nuclear-capable theater-range missiles, Beijing may soon be able to introduce similar doubts about U.S. security commitments in Asia. Chapter 5 outlines the CCP's growing scholarly interest in extended deterrence, which suggests that China might seek to undermine U.S. security assurances in Asia more directly in coming years.

The guarantee of extended deterrence to U.S. allies is the linchpin of U.S. nonproliferation strategy, and threats to the credibility of U.S. security assurances carry implications for the global nonproliferation regime. For decades, U.S. policymakers have emphasized the role of the NPT in preventing a "nuclear cascade" that might be triggered by nuclear proliferation to a regional actor. Those efforts to prevent regional proliferation were largely successful throughout the Cold War, but successful North Korean and Iranian efforts to advance their respective nuclear programs indicate that proliferation concerns are not diminishing and that regional actors still perceive great value in indigenous nuclear weapons programs. North Korea's development of nuclear weapons and credible delivery systems has strained the NPT; a nuclear Iran might push it to the breaking point and threaten the global nonproliferation regime.

Technological advancements will add layers of complexity.

New technological advances make understanding nuclear interaction even more complex. The existence of precision strike systems and air and missile defenses, let alone emerging capabilities such as hypersonic and directed energy weapons, are likely to have second- and

²⁸⁶ Zachary Cohen and Barbara Starr, "North Korea Promises Nuclear Strike on US If Regime Is Threatened," *CNN.com*, July 25, 2017, available at <https://www.cnn.com/2017/07/25/politics/north-korea-threatens-nuclear-strike-us/index.html>; and Peter Baker and Choe Sang-Hun, "Trump Threatens 'Fire and Fury' Against North Korea If It Endangers U.S.," *New York Times*, August 8, 2017, available at <https://www.nytimes.com/2017/08/08/world/asia/north-korea-un-sanctions-nuclear-missile-united-nations.html>.

third-order effects on the importance and role of nuclear weapons in the strategies of all the participants in this multiplayer interaction. Technological competition and countermoves have always been an enduring feature of nuclear competition, and improvements in range, guidance, and survivability of nuclear forces during the Cold War affected strategic interaction between the United States and the Soviet Union. Marked improvements in contemporary missile defenses are again aggravating offense-defense issues in nuclear strategy, but now missile defense dynamics also include China. That concerns over U.S. THAAD deployments have provoked discussion in China about the wisdom of its NFU pledge indicates that future advances in missile defense could significantly affect states' nuclear strategy and strategic interaction in coming decades.

The impact of technological advances like AI are even more difficult to predict, and different countries will likely develop their own approaches to the integration of AI into nuclear systems. The Soviet Union's receptiveness to greater automation in nuclear systems during the Cold War (specifically the Dead Hand system) suggests that Russian applications for AI could diverge from those that the United States might consider.

We should be wary of applying labels such as an "arms race" to these complex set of interactions because these labels imply a linear, predictable trajectory to state interaction that is possible to anticipate clearly. The above findings indicate this is not the case. Rather, this study highlights the need to understand in depth the sources and nature of strategic interaction if we are to manage an increasingly complex environment and to continue to effectively deter nuclear use against the United States and our allies.

LIST OF ACRONYMS

ABM	anti-ballistic missile
AI	artificial intelligence
CCP	Communist Party of China
CMC	Central Military Commission
DoD	Department of Defense
GLCM	ground-launched cruise missile
ICBM	intercontinental ballistic missile
INF	Intermediate-range Nuclear Forces
IRBM	intermediate-range ballistic missile
MAD	mutually assured destruction
MIRV	multiple independently targetable reentry vehicle
NATO	North Atlantic Treaty Organization
NFU	No First Use
NPR	Nuclear Posture Review
NSNW	non-strategic nuclear weapons
NTPR	Nuclear Targeting Policy Review
PLA	People's Liberation Army
PLAAF	People's Liberation Army Air Force
PLAN	People's Liberation Army Navy
PLARF	People's Liberation Army Rocket Forces
SALT	Strategic Arms Limitation Talks/Treaty
SIOP	Single Integrated Operational Plan
SLBM	submarine-launched ballistic missile
SLCM	submarine-launched cruise missile
SORT	Strategic Offensive Reductions Treaty
SRBM	short-range ballistic missile
SSBN	nuclear-powered ballistic missile submarine
START	Strategic Arms Reductions Treaty
THAAD	Terminal High Altitude Area Defense
WMD	weapons of mass destruction

An aerial night photograph of a city grid, likely Washington D.C., with a pen nib pointing to a specific location on the grid.

CSBA

Center for Strategic and Budgetary Assessments

1667 K Street, NW, Suite 900

Washington, DC 20006

Tel. 202.331.7990 • Fax 202.331.8019

www.csbaonline.org