

**THE NATIONAL WAR COLLEGE  
WASHINGTON, DC 20319-5078**



**SYLLABUS**

**NWC 6009 Nuclear Weapons and National Security  
in the 21<sup>st</sup> Century**

**Fall 2020**

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## Course Schedule

### **NWC 6009 Nuclear Weapons and National Security in the 21<sup>st</sup> Century**

Fall 2020, Academic Year 2020-2021

Topic	Date / Time	Title
1	Tues / 15 Sep 1230-1430	Understanding Nuclear Weapons: Nukes 101
2	Tues / 22 Sep 1230-1430	Deterrence – The Basics
3	Tues / 29 Sep 1230-1430	Evolution of Nuclear Strategy
4	Tues / 6 Oct 1230-1430	Deterrence Today (meet in SCIF)
5	Tues / 13 Oct 1230-1430	Who Has Nuclear Weapons and What For? 1 & 2
6	Tues / 20 Oct 1230-1430	Proliferation 3 & 4
7	Tues / 27 Oct 1230-1430	Nonproliferation 5 & 6
8	Tues / 3 Nov 1230-1430	Arms Control and U.S.-Russian Nuclear Force Reductions (with Mr. Rich Davison)
9	Tues / 10 Nov 1230-1430	Prospects for Additional Nuclear Arms Reductions and Global Zero 7 & 8
10	Tues / 1 Nov 1230-1430	Strategic Defenses and Stability 9
11	Tues / 1 Dec 1230-1530	Nuclear C2 at Pentagon’s <b>National Military Command Center</b>
12	Tues / 8 Dec 1230-1430	Implications for U.S. Nuclear Policy and Force Structure

## Course Overview

Nuclear weapons have the power to change forever the world as we know it—or even to end it. Therefore, anyone wishing to become a national security strategist needs more than just a passing familiarity with nuclear weapons and the many issues surrounding them. While some hoped that nuclear weapons would become irrelevant in the post-Cold War world, the return of great power competition with attendant nuclear saber rattling by Russia and China has highlighted the continuing importance of nuclear weapons, today and well into the future. Moreover, Iran and North Korea have been top international security concerns in large measure because of their nuclear programs. Responsible government officials are not at liberty to ignore the implications of nuclear coercion and nuclear weapons proliferation.

This course will address a range of issues related to nuclear weapons and national security in the 21st century. The first block will cover basic information about nuclear weapons, the evolution of nuclear strategy, and the concept of nuclear deterrence and how it is changing. The second block will address the forces and policies of states with nuclear weapons, efforts by others to get them, different approaches to slowing proliferation, the role that arms control treaties do or do not play in cutting nuclear forces, and prospects for further reductions in and elimination of nuclear weapons. The final block will consider the relationship between nuclear deterrence and missile defense, nuclear command and control (via a visit to the Pentagon's National Military Command Center), and issues related to US nuclear policy and force structure.

Each student will be expected to make a 10-minute, in-class presentation on the nuclear program of one of the nine countries possessing nuclear weapons. Each student will also be required to write a 4-5 page Op-Ed piece (1,500 words maximum) on a topic of his or her choosing related to nuclear weapons. Required reading averages 60 pages per week.

Although the course reading materials are unclassified, seminar discussions will be allowed to go to classified levels, depending on the venue, and the Pentagon visit will expose students to TOP SECRET information. Therefore, a TOP SECRET clearance is required.

## Approach

The course consists of twelve 2:00-hour sessions. The topics will be addressed through a combination of seminar discussions, student presentations, occasional guest speakers, and video clips. Required readings include passages taken from the following books issued to students:

- a. Keith B. Payne, *The Great American Gamble: Deterrence Theory and Practice from the Cold War to the Twenty-First Century*, (United States: National Institute Press, 2008).
- b. Brad Roberts, *The Case for U.S. Nuclear Weapons in the 21<sup>st</sup> Century*, (Stanford, California: Stanford University Press, 2016).
- c. Matthew Kroenig, *The Logic of American Nuclear Strategy: Why Strategic Superiority Matters* (United States: Oxford University Press, 2018).
- d. Mark Fitzpatrick, *Asia's Latent Nuclear Powers* (New York: Routledge, 2016).

The remainder of readings will be posted on the NWC Blackboard.

### **Course Learning Outcomes**

By the end of the course, the students should be able to:

- a. Comprehend the basics of nuclear weapons and fissile material;
- b. Comprehend the concepts of deterrence and extended deterrence, and be able to describe how they affected the evolution of U.S. nuclear strategy;
- c. Assess the nuclear forces and policies of other nuclear-armed states, and understand the motivations for the pursuit and retention of these arsenals;
- d. Evaluate current concerns regarding proliferation of nuclear weapons, the potential reasons behind this proliferation, and possible future implications;
- e. Describe and evaluate the key instruments and initiatives used to constrain proliferation and reduce nuclear arms, and assess their relationship to other factors such as missile defense;
- f. Understand key issues that will surround efforts for further reduction, and eventual elimination, of nuclear weapons;
- g. Comprehend U.S. nuclear command and control.
- h. Assess the current status of U.S. nuclear forces and policy, and apply course concepts to determine the role of nuclear weapons in U.S. national security; and

### **Suggested Web Sites**

Arms Control Association: <http://www.armscontrol.org/>

Brookings Institution, Arms Control Initiative: <http://www.brookings.edu/topics/arms-control.aspx>

Carnegie Endowment for International Peace, Nuclear Policy Program: <http://carnegieendowment.org/npp/>

The Center for Arms Control and Non-Proliferation: <http://armscontrolcenter.org/>

Center for Strategic and International Studies, Project on Nuclear Issues (PONI): <http://csis.org/program/project-nuclear-issues>

Department of Defense, 2018 Nuclear Posture Review: <https://media.defense.gov/2018/Feb/02/2001872886/-1/-1/1/2018-NUCLEAR-POSTURE-REVIEW-FINAL-REPORT.PDF> and 2019 Missile Defense Review: [https://www.defense.gov/Portals/1/Interactive/2018/11-2019-Missile-Defense-Review/The%202019%20MDR\\_Executive%20Summary.pdf](https://www.defense.gov/Portals/1/Interactive/2018/11-2019-Missile-Defense-Review/The%202019%20MDR_Executive%20Summary.pdf)

Department of State, Under Secretary for Arms Control and International Security: <http://www.state.gov/t/>

Federation of American Scientists, Congressional Research Service Reports on Nuclear Weapons and Related Topics: <http://www.fas.org/sgp/crs/nuke/>

Federation of American Scientists, Nuclear Information Project: <http://www.fas.org/programs/ssp/nukes/index.html>

Heritage Foundation, Defense: <https://www.heritage.org/defense>

Institute for Science and International Security: <http://www.isis-online.org/>

Middlebury Institute of International Studies at Monterey – James Martin Center for Nonproliferation Studies: <http://cns.miis.edu/> or [https://www.nonproliferation.org/category/types/type\\_nuclear/](https://www.nonproliferation.org/category/types/type_nuclear/)

National Defense University, Center for the Study of Weapons of Mass Destruction: <https://inss.ndu.edu/About/Center-for-the-Study-of-WMD/>

Natural Resources Defense Council, Nuclear Energy, Waste and Weapons: <http://www.nrdc.org/nuclear/default.asp>

Nuclear Threat Initiative (NTI): <https://www.nti.org/>

NTI Nuclear Terrorism: <https://www.nti.org/about/nuclear-terrorism/>

Nuclear Proliferation International History Project: <https://www.wilsoncenter.org/nuclear-history-documents>

Stimson Center, Nuclear Security: <https://www.stimson.org/programs/nuclear-security>

“The Nuclear Vault” at George Washington University’s National Security Archives: <http://www.gwu.edu/~nsarchiv/nukevault/index.htm>

## Requirements

With the exception of the first class and the visit to the Pentagon, classes will be conducted as Socratic seminars. Thus, student preparation and participation is required. Each student will also be responsible for a 10-minute, in-class presentation on the nuclear forces and policies of one of the nine countries with nuclear arsenals; one or more students will be assigned to each country. A presentation evaluation rubric appears at the end of this syllabus. The most heavily weighted portion of the evaluation will be the first block: “Content: Depth of Research and Accuracy of Material.” Students should note the strict time criteria. Practice is strongly recommended—especially when two students are making a joint presentation. Students will also be responsible for an Op-Ed of 1200-1500 words on topics of their choosing, once approved by the FSL. The Op-Eds are due by close-of-business, the day of Topic-11, December 1, 2020. As noted in the Assessment Policy below, each graded item will count for one-third of the course grade.

## Blackboard

The elective will use the NDU Blackboard to post all necessary materials and communications.

## Readings

The students will be expected to read approximately 60 pages per topic.

## Op-Ed Paper Format and Guidelines

- Prepare papers double-spaced with 12-point font, preferably Times New Roman or Georgia.
- Prepare the paper to the directed word count target or page length; list word count on the last page. Footnotes or endnotes are not included in the word count. In-text quotes and epigraphs are included in the word counts.
- Use one-inch margins, all around.
- The Op-Ed for this course requires footnotes or endnotes, but not a bibliography. Footnotes or endnotes, should follow the format in the Chicago Manual of Style, as detailed in Kate Turabian, *A Manual for Writers of Research Papers, Theses, and Dissertations*, 8<sup>th</sup> edition, Chapters 15-17.
- Prepare a cover sheet that shows the paper title, student’s name, course (i.e., NWC 6009: Nuclear Weapons and National Security in the 21<sup>st</sup> Century), FSL (i.e., Dr. Mark Bucknam), student’s Faculty Advisor, and date. Students will not put their names on subsequent pages (e.g., in the footer or header).
- Include page numbers at the bottom, middle of the page.

**Administrivia:** Consult the NWC Student Catalogue for policies and standards on grading, absence policy, and original work.

## Topic 1

### Understanding Nuclear Weapons

Meitner or Frisch calculated that energy [from the fission of a single atom of U235] to be about 200 MeV: 200 million electron volts...Two hundred million electron volts is not a large amount of energy, but it is an extremely large amount of energy from one atom. The most energetic chemical reactions released about 5 eV per atom. In each mere gram of uranium there are about  $2.5 \times 10^{21}$  atoms, an absurdly large number, 25 followed by twenty zeros: 2,500,000,000,000,000,000,000.

— Richard Rhodes, The Making of the Atomic Bomb

The chain reaction would have to proceed faster than the vaporizing and swelling of the heating metal ball. Peierls calculated the time between neutron generations, between  $1 \times 2 \times 4 \times 8 \times 16 \times 32 \times 64 \dots$ , to be about four millionths of a second...Some eighty generations of neutrons—as many as could be expected to multiply before the swelling explosion separated the atoms of U235 enough to stop the chain reaction—still millionths of a second in total, gave temperatures as hot as the interior of the sun, pressures greater than the center of the earth where iron flows as liquid.

— Richard Rhodes, The Making of the Atomic Bomb

Each gram of deuterium converted to helium should release energy equivalent to about 150 tons of TNT, 100 million times as much as a gram of ordinary chemical explosive and eight times as much as a gram of U235; theoretically, twelve kilograms of liquid deuterium ignited by one atomic bomb would explode with a force equivalent to one million tons of TNT—one megaton; a cubic meter of liquid deuterium would yield ten megatons.

— Richard Rhodes, Dark Sun: The Making of the Hydrogen Bomb

#### Overview

It is not easy to truly comprehend the enormous power of nuclear weapons, although it is simple to appreciate the fact that they are enormously powerful. Often lumped together with chemical and biological weapons under the category of weapons of mass destruction (WMD), nuclear weapons are really in a class of their own. Some writers have attempted to further expand the category of WMD, using terms like weapons of mass effect, in an attempt to place cyber-attacks on a par with nuclear weapons. The plain fact is that a 15 kiloton explosion—a relatively small yield, equivalent to the power of the bombs dropped on Japan in 1945—can devastate a city, instantly. There are no vaccines, antidotes, reconstituting of networks, databases or grids, no antiretroviral medicines to mitigate the effects. There would be no time to analyze the problem and attempt to cope with it as it unfolded. Once a nuclear weapon is detonated, the energy released in less than a thousandth of a second creates effects that are irreversible, and very costly and difficult—if not impossible—to defend against.

Before delving into the military and political ramifications and the myriad issues that surround nuclear weapons, such as deterrence, missile defense, arms control, and proliferation, it would be useful to gain a basic understanding of these unique weapons and their relationship to the nuclear fuel cycle used to produce fuel for nuclear power plants. How do nuclear weapons work? How and why are they different from other weapons? What are the different types of nuclear weapons, and why should a strategist or policy-maker care? This lesson will examine those questions and establish a foundation for understanding nuclear weapons and the various issues that attend them.

**Topic Objective:** Understand the basics of nuclear weapons, fissile material, and the nuclear fuel cycle.

**Issues for Consideration:**

1. What are fission and fusion, and what are the physical requirements needed to harness these natural phenomena for weapons?
2. What are uranium (U235, U238), plutonium (Pu239, Pu240), hydrogen, deuterium, tritium, lithium, electrons, protons, neutrons, alpha particles, beta particles, and electromagnetic radiation (thermal radiation, light, x-rays, gamma rays)?
3. How are fission and fusion achieved in a nuclear weapon (e.g., gun design, implosion, boosting, radiation pressure, “spark plug,” neutron triggering)? Students should appreciate the difference between test devices and deliverable weapons.
4. What are the various effects produced by nuclear weapons (blast, radiation, EMP, neutrons, fallout)?
5. What distinguishes nuclear weapons from conventional bombs, missiles and explosives?
6. Why might a strategist care whether another country’s arsenal is uranium-based or plutonium-based? Does it really matter whether a country has a thermonuclear weapon rather than just a simple fission weapon?
7. Why do ballistic missiles seem to go hand-in-hand with nuclear weapons?
8. What are the major components of the U.S. nuclear weapons enterprise and of the U.S. nuclear weapons force structure?

**Required Readings** (Total Readings: 62 pages)

- a. [Nuclear Matters: A Practical Guide](#) (Washington: Department of Defense, 2016), Sections 3.2, 3.3 and 3.4 “Nuclear Weapons Force Structure,” etc., pp. 25-37; Chapter 4: “U.S. Nuclear

Weapons Infrastructure,” pp. 47-56; and Appendix C: “Basic Nuclear Physics and Weapons Effects,” pp.169-198. (53 pages)

b. David Ochmanek and Lowell H. Schwartz, [The Challenge of Nuclear-Armed Regional Adversaries](#) (Arlington, Virginia: RAND, 2008), Chapter 2: “The Uniquely Destructive Capabilities of Nuclear Weapons,” pp.5-13. (9 pages)

### **Supplemental Reading**

a. Richard Rhodes, [The Making of the Atomic Bomb](#) (New York: Simon & Schuster, 1986).

b. Richard Rhodes, [Dark Sun: The Making of the Hydrogen Bomb](#) (New York: Simon & Schuster, 1995), pp. 504-512 and 541-543. (12 pages)

c. Richard L. Garwin and Georges Charpak, [Megawatts + Megatons: The Future of Nuclear Power and Nuclear Weapons](#) (USA: University of Chicago Press, 2002), “Chapter 3: Nuclear Weapons,” pp.58-78. (21 pages)

d. [Nuclear Matters: A Practical Guide](#) (Washington: Department of Defense, 2016)

## Topic 2

### Deterrence – The Basics

Meanwhile the Athenians, aware that the preparations of the enemy [Sparta] were due to his conviction of [the Athenians'] weakness, wished to show him that he was mistaken...and [the Athenians] manned a hundred ships...and putting out to the Isthmus, displayed their power... it made the Spartans think that the Lesbians had not spoken the truth [about the weakness of Athens, and so];...[the Spartans] went back home.

— Thucydides, The Peloponnesian War [Book III, 3.16]

#### Overview

Deterrence did not begin with nuclear weapons. As the epigraph above citing Thucydides indicates, ancient Athens was able by a show of force to deter the Spartans' imminent invasion of Attica. However, the awesome destructive effects of nuclear weapons—particularly thermonuclear weapons—led academics and policy-makers to focus significant intellectual effort toward improving their understanding of deterrence. Because nuclear weapons are so destructive, the consequences of their use and the threat of nuclear retaliation could quickly eclipse any possible political objective for using them. Thus, the 1950s and 1960s were a time of intense and prolific theorizing and writing on deterrence.

This course cannot comprehensively cover the literature on deterrence theory and practice. Fortunately, it need not do that. It must, however, address key concepts and definitions, such as costs and benefits, deterrence by threat of punishment, deterrence by denial, the rational actor model, and credibility.

**Topic Objective:** Comprehend the concepts of deterrence and extended deterrence.

#### Issues for Consideration:

1. How is deterrence the same or different from coercion, and what are some of the different types of deterrence?
2. How does one deter? What are the presumed mechanisms by which deterrence works? What ingredients contribute to deterrence? Where does deterrence occur?
3. What is a “rational actor”? How do costs and benefits factor into deterrence calculations? How and why might an adversary deviate from the rational actor model? Given that decision-making can be irrational or non-rational, how can deterrence be maintained?
4. What is extended deterrence, and how does it work? What does the term linkage refer to in extended deterrence, and how is it related to escalation control and credibility?

**Required Readings** (Total Readings: 67 pages)

- a. Keith B. Payne, The Great American Gamble: Deterrence Theory and Practice from the Cold War to the Twenty-First Century (United States: National Institute Press, 2008), Chapters 1 and 2, pp. 1-59. (59 pages)
- b. Steven Pifer, et. al., U.S. and Extended Deterrence: Considerations and Challenges, Brookings Arms Control Series Paper 3, May 2010 (Washington: The Brookings Institution, 2010), pp. 1-8 (stop at beginning of discussion of the Geo. W. Bush admin.). (8 pages)

**Supplemental Reading**

- a. Bradley A. Thayer, “Thinking about Nuclear Deterrence Theory: Why Evolutionary Psychology Undermines Its Rational Actor Assumptions”, *Comparative Strategy*, 26:4, (October 24, 2007) pp. 311-323 (13 pages), <https://doi.org/10.1080/01495930701598573>

## Topic 3

### The Evolution of Nuclear Strategy

Conventional strategy was a strategy of action; it prepared for war and then implemented those preparations. Nuclear strategy was a strategy of dissuasion; it prevented war. ...Nuclear strategy abandoned the focus on victory. It was, in the opinion of one French commentator, 'astrategic'.

— Hew Strachan, "The Lost Meaning of Strategy," Survival

The question has been whether any useful purpose could be served by employment of devices which invited discussion using words such as 'holocaust', 'doomsday' and 'armageddon', and whether any employment could be sufficiently deliberate and controlled to ensure that political objectives were met. Which means that at issue has been whether a 'nuclear strategy' is a contradiction in terms.

— Sir Lawrence Freedman, The Evolution of Nuclear Strategy, 2d Ed.

#### Overview

While it is hard to imagine a U.S. national security strategy that does not take into account nuclear weapons—America's and others'—it is worth considering whether the United States has a coherent strategy for its nuclear weapons. Is the term "nuclear strategy" an oxymoron? Or, could it be that leveraging nuclear weapons might in some sense represent the epitome of strategy, such that all other strategizing operates in the long shadow these weapons cast? A moment's reflection should lead one to wonder about the boundaries between nuclear policy, nuclear strategy, and nuclear planning. These are some of the issues to be discussed in this class.

The development of nuclear strategy led to the invention of some new terms—first use, first strike, second strike, counterforce, countervalue. The nuclear strategists who pioneered this new thinking tended to be academics, government advisors, and think tank employees, rather than military operators. Thankfully, their ideas emerged in the absence of operational experience—beyond the one-sided employment of two relatively small yet devastating bombs at the end of the Second World War. This unorthodox background to nuclear strategy could undermine one's confidence in it, and it at least suggests several promising avenues of discussion for achieving a deeper understanding of nuclear strategy.

Throughout the Cold War, the U.S. application of nuclear strategy involved a constant tension between credibly threatening to use nuclear weapons to achieve deterrence and the realization that actually using nuclear weapons could quickly escape political control and lead to national suicide. Many of the assumptions underlying Cold War nuclear strategy derive from this tension and it is worth considering whether those assumptions still apply in the post-Cold War world.

**Topic Objective:** Analyze the concepts of deterrence and extended deterrence, and be able to describe how they affected the evolution of U.S. nuclear strategy.

## Issues for Consideration:

1. Can there be a U.S. nuclear strategy? If not, why not? If so, how would you describe that strategy?
2. Did U.S. nuclear strategy evolve during the Cold War? If not, what was the fundamental continuity linking massive retaliation, flexible response, and mutual assured destruction? If so, what fundamental aspects of the strategy changed?
3. How would you distinguish between nuclear policy and nuclear strategy?
4. How does the concept of deterrence relate to nuclear strategy?
5. Could nuclear strategy change, and yet nuclear plans and targeting remain the same? Conversely, could nuclear strategy remain the same, despite significant changes in nuclear plans?
6. How did America's extended deterrence guarantees to its allies affect U.S. nuclear strategy? What logical tensions or paradoxes did extended deterrence create for U.S. strategists?

## Required Readings (Total Readings: 72 pages)

- a. Karl P. Mueller, "[Strategic Airpower and Nuclear Strategy: New Theory for a Not-Quite-So-New Apocalypse](#)," in *The Paths of Heaven: The Evolution of Airpower Theory*, ed. Phillip S. Meilinger (Maxwell AFB, Alabama: Air University Press, 1997), pp. 279-307. (29 pages)
- b. LTG William Odom (USA, retired), "The Origins and Design of Presidential Decision-59: A Memoir," Chapter 6 in [Getting MAD: Nuclear Mutual Assured Destruction, Its Origins and Practice](#) (Carlisle, Pennsylvania: Strategic Studies Institute, 2004), pp. 175-196. (20 pages)
- c. General George Lee Butler, USAF (Ret.) with Franklin C. Miller, "Chapter 23: Masters of the Nuclear Weapons Enterprise," in [Uncommon Cause: A Life at Odds with Convention Volume II: The Transformative Years](#), General George Lee Butler, USAF (Ret.) (USA: Outskirts Press, 2016), pp. 1-23. (23 pages)

## Supplemental Reading

- a. Fred Kaplan, [The Bomb: Presidents, Generals, and the Secret History of Nuclear War](#) (New York: Simon & Schuster, 2020). See especially Chapter 8: "Pulling Back the Curtain," pp. 175-197. (23 pages)
- b. Lawrence Freedman, "The First Two Generations of Nuclear Strategists," in [Makers of Modern Strategy: from Machiavelli to the Nuclear Age](#), ed. Peter Paret, (Princeton, New Jersey: Princeton University Press, 1986), pp. 735-778. (43 pages)
- c. Steven Pifer, et. al., [U.S. and Extended Deterrence: Considerations and Challenges](#), Brookings Arms Control Series Paper 3, May 2010 (Washington: The Brookings Institution, 2010), pp. 1-29. (29 pages)

## Topic 4

### Nuclear Deterrence Today

[D]esperate men are apt to do desperate things.

— Ochmanek and Schwartz, The Challenge of Nuclear-Armed Regional Adversaries

Damage limitation measures may contribute usefully to the credibility of U.S. punitive deterrence threats and also to denial deterrence effect.

— Keith Payne, The Great American Gamble

#### Overview

The last two sessions introduced multiple concepts related to nuclear weapons, but important questions remain on how nuclear weapons are incorporated into strategy. In the past, U.S. nuclear strategy focused overwhelmingly on one adversary—the Soviet Union. As U.S.-Russian relations relaxed, and Russian military spending went into freefall, the American nuclear arsenal came down significantly. More recently, all states possessing nuclear weapons except for the United States and perhaps the United Kingdom have begun to modernize their arsenals, and some have expanded the size and capabilities of their nuclear arsenals.

Even as European and American arsenals shrank, the threat of new nuclear powers grew. North Korea first detonated a nuclear device in the autumn of 2006. And after a flurry of ballistic missile tests, including two ICBM tests in July 2017, North Korea detonated a sixth nuclear device on September 3, 2017—by far its most powerful explosion. North Korea claimed to have detonated a hydrogen bomb and Kim Jung Un appeared in photographs of a weapon that looked like a two-stage thermonuclear warhead small enough to fit in the nosecone of a ballistic missile.

Meanwhile, Iran was enriching uranium off-and-on throughout the first decade and a half of the 21<sup>st</sup> Century. The revolutionary Islamic state is believed to have had a robust nuclear weapons program, and in February 2015 Iran launched a satellite using an indigenously produced rocket based on its most powerful ballistic missile, the Shahab-3. Although the Joint Comprehensive Plan of Action (JCPOA) that Iran signed with the P5+1 (China, France, Germany, Russia, the United Kingdom, and the United States) in July of 2015 put a brake on Iran's uranium enrichment, Iran has retained much of the infrastructure it would need for a nuclear weapons program, leaving many observers concerned that Iran will eventually acquire nuclear weapons. Since the Trump administration withdrew from the Iran nuclear deal in May 2018, Iran has threatened to resume uranium enrichment that would exceed the deal's limits.

In September of 2007, Israel bombed a site in eastern Syria that allegedly contained a nearly completed nuclear reactor building that was a carbon copy of the facility at Yongbyon in North Korea. Each of the nuclear aspirants mentioned above has pursued foreign policies hostile to U.S. interests and could be the object of future U.S. deterrence efforts.

Moreover, established nuclear powers Russia and China have not disappeared from the deterrence picture. Russia, with a demographic profile obviating any chance for a large conventional force buildup, has placed greater reliance on its nuclear arsenal to defend its vital interests. Russia's military operations in northern Georgia and Ukraine, and its expressed interest in retaining a sphere of influence in its near abroad, has some of its neighbors, including Poland and the NATO members in the Baltic region, concerned about the potential for future Russian coercion or military adventurism. Thus, Russia and the United States appear to be locked into a long-term relationship of mutual deterrence.

Although tensions over the Taiwan Strait eased significantly following the Taiwanese presidential election of 2008, China's growing power and continued military modernization and expansion, which includes its nuclear arsenal, has the United States and its Pacific allies wary about how China will behave should Beijing's interests someday collide with theirs. China's military assertiveness in recent years and U.S. insistence on preserving its influence and defending its interests in the Indo-Pacific region ensure the continued relevance of nuclear deterrence in that part of the world.

Thus, even as the primary motivation and original object of U.S. nuclear deterrence has evolved, new rationales and targets for deterrence have emerged. This lesson will focus on today's security environment and the role nuclear weapons might play in deterring potential adversaries. The next lesson begins Block II of the syllabus, which starts by examining which states possess nuclear weapons and why states have or might seek them.

### **Topic Objectives:**

1. Analyze the concepts of deterrence and extended deterrence, and be able to describe how deterrence today might be different from deterrence in the Cold War.
2. Compare and contrast deterrence concepts based on prospect theory as compared to the rational actor model.

### **Issues for Consideration:**

1. How is deterrence today different from deterrence as practiced during the Cold War? How is it the same? Which are more important, the similarities or the differences?
2. Given the preponderance of U.S. military power and America's sizable nuclear arsenal, why should the United States worry about relatively small and weak states such as North Korea, Iran, or Syria obtaining nuclear weapons? Could the United States not simply rely on deterrence to prevent such states from using nuclear weapons even if they obtained them?
3. Would Iran behave according to the rational actor model if it had nuclear weapons? Why, or why not?
4. If a relatively new nuclear power such as North Korea could be considered a rational actor, would that eliminate concern during a time of crisis about the potential for that power to use its nuclear weapons? Why, or why not?

5. How might relative stakes involved in a crisis scenario affect deterrence?
6. Does the nature of U.S. nuclear capabilities affect deterrence? If so, how? If not, why not?
7. What is prospect theory, and does it have relevance for deterrence?
8. How might strategic defenses or the ability to limit damage to oneself affect deterrence today and in the near future?
9. What is nuclear superiority? Does the United States have it? Does it matter? Is the concept valid? If so, under what conditions? If not, why not?

**Required Readings** (Total Readings: 61 pages)

- a. General Kevin Chilton, USAF and Greg Weaver, “Waging Deterrence in the Twenty-First Century”<https://www.law.upenn.edu/live/files/1363-waging-deterrence-in-the-21st-century-chilton>,” Strategic Studies Quarterly (Spring 2009), pp. 31-35. (5 pages)
- b. Jeffrey D. Berejikian, “[A Cognitive Theory of Deterrence](#),” Journal of Peace Research, Vol 39, No 2, (2002), pp. 165-183, (18 pages).
- c. Matthew Kroenig, The Logic of American Nuclear Strategy: Why Strategic Superiority Matters (United States: Oxford University Press, 2018), Introduction and Chapter 1, pp 1-38 (38 pages).

**Supplemental Reading**

- a. David Ochmanek and Lowell H. Schwartz, [The Challenge of Nuclear-Armed Regional Adversaries](#) (Arlington, Virginia: RAND, 2008), Chapters 3 and 4, pp.15-45. (31 pages)
- b. Elaine Bunn, [Can Deterrence Be Tailored?](#) Strategic Forum, No. 225. Washington: National Defense University Press, January 2007. (8 page)
- c. Amy Woolf, [U.S. Strategic Nuclear Forces: Background, Developments, and Issues](#), Congressional Research Service Report No. RL33640, September 3, 2019. (43 pages)
- d. [Deterrence Operations: Joint Operating Concept](#), Version 2.0, Department of Defense, 2006.

## Topic 5

### Who Has Nuclear Weapons, and What For?

Russia is one of the most powerful nuclear nations. This is a reality, not just words.

— Vladimir Putin, August 2014

The widespread deployment of advanced digital technologies that have no equals in the world, including hypersonic strike systems and underwater drones, will give the fleet unique advantages and increased combat capabilities.

— Vladimir Putin, 26 July 2020

Nuclear deterrence has played a fundamental role in maintaining peace and international security, particularly in Europe. I am firmly convinced that our deterrence strategy maintains all of its stabilizing virtues, a particularly valuable asset in the world which we see before us, one of competition between powers, disinhibited behaviors and the erosion of norms. The fundamental purpose of France’s nuclear strategy, ..., is to prevent war.

— French President Emmanuel Macron, Speech at the Ecole de Guerre, Paris, 7 February 2020

To ensure the government maintains an effective deterrent throughout the commission of the Dreadnought Class ballistic missile submarine we are replacing our existing nuclear warhead to respond to future threats and the security environment.

— Mr. Ben Wallace, Defence Secretary, United Kingdom, 26 February 2020

#### Overview

The United States was the first country to develop nuclear weapons, and is the only country that has used them in a war. The U.S. nuclear monopoly did not last long, however. The Soviet Union tested its first nuclear weapon in 1949, followed by the United Kingdom in 1952, France in 1960, and the People’s Republic of China in 1964. These five countries are given “official” status under the Treaty on the Non-Proliferation of Nuclear Weapons—more commonly known as the Non-Proliferation Treaty or NPT. The treaty enshrined this “official” status for the states that had exploded nuclear weapons before January 1, 1967.

During the Cold War, the United States and the Soviet Union built up massive arsenals of over 30,000 and 40,000 nuclear weapons, respectively. These numbers have been reduced tremendously and are still coming down, as will be discussed in Topic 8. The United Kingdom (UK) and France have also made cuts in their nuclear stockpiles, with the UK declaring it has fewer than 160 operationally available weapons, and France fewer than 300. China, on the other

hand, which is assessed to have on the order of 400 nuclear weapons, appears to be in the process of building up its nuclear forces, not reducing them.

Countries that developed and tested nuclear weapons after the NPT's cut-off date of January 1, 1967—including Israel, India, and Pakistan—are not accorded status as nuclear-weapon states. These three countries, believed to have smaller nuclear arsenals, have chosen to remain outside of the NPT regime, since they would have to give up their weapons in order to join the treaty. North Korea, which arguably withdrew from the treaty before testing a nuclear weapon for the first time in 2006, has subsequently unarguably withdrawn from the treaty and has conducted six nuclear explosive tests, most recently claiming to have tested a hydrogen bomb on September 3, 2017.

The purpose of this session is to provide an overview of the nine states with “established” nuclear arsenals. One or two students will be assigned to learn about the nuclear policy and forces of one of the nine, and make a presentation of not more than 10 minutes in class. For each country, the presentation should cover:

- its existing nuclear forces
- ongoing or planned modernization of those forces
- its rationale (both stated and unstated) for continued possession of nuclear weapons
- its declaratory policy, if any, regarding nuclear weapons employment

**Topic Objective:** Assess the nuclear forces and policies of other nuclear-armed states, and understand the motivations for the pursuit and retention of these arsenals.

### **Issues for Consideration:**

1. What are the principal reasons behind the retention of significant nuclear arsenals by nine countries in the 21<sup>st</sup> century? Are they related to specific external threats, international prestige, domestic politics, a hedge against an uncertain future, or some combination of these factors?

2. What interrelationships, if any, are there regarding the nuclear forces of these countries? To what extent does country A's desire for nuclear weapons depend on a perceived threat from country B, and vice versa? And does this have follow-on effects with countries C and D? What does this say about future developments, and what would have to change to remove these perceived threats?

3. If the United States decided to eliminate its nuclear forces unilaterally, how would this change the equation for the other eight countries, if at all?

4. How similar, or different, are the declaratory policies of the countries regarding the purpose or employment of their nuclear weapons? What is the purpose of these declaratory policies, and how important are they? How much can or should they be trusted by others as indicating how a country would actually act in a crisis?

**Required Readings** (Total Readings: 13 pages + individual research on countries of interest)

- a. Hans M. Kristensen and Matt Korda, "[Status of World Nuclear Forces](#)," Federation of American Scientists, Updated May 2019. (4 pages)
- b. David A. Smith, "[Theories of Nuclear Proliferation: Why Do States Seek Nuclear Weapons?](#)" *Inquiries Journal*, Vol. 8, No. 08 (2016). (6 pages)
- c. Zachary Keck, "[Why Countries Build Nuclear Weapons in the 21st Century](#)," *The Diplomat*, July 03, 2013. (3 pages)
- d. [**Individual research** for seminar discussion and country reports] Federation of American Scientists, "[FAS Nuclear Notebook](#)," [as of March 2020] Here you will find country reports for China, France, India, North Korea, Pakistan, Russia, and the United States.
- e. [**Individual research**] See relevant Websites listed on pages 4 and 5 of this syllabus.

**Supplemental Readings**

- a. Scott D. Sagan, "[Why Do States Build Nuclear Weapons: Three Models in Search of a Bomb](#)," *International Security* Vol. 21, No. 3 (Winter 1996/97), pp. 54-86. (33 pages)
- b. Muthiah Alagappa, [The Long Shadow: Nuclear Weapons and Security In 21<sup>st</sup> Century Asia](#), (Stanford California: Stanford University Press, 2008), Chapter 1: Introduction: Investigating Nuclear Weapons in a New Era, pp. 1-34 (33 pages)

## Topic 6

### Nuclear Proliferation

I ask you to stop and think for a moment what it would mean to have nuclear weapons in so many hands, in the hands of countries large and small, stable and unstable, responsible and irresponsible...If only one thermonuclear bomb were to be dropped on any American, Russian, or any other city, whether it was launched by accident or design, by a madman or by an enemy, by a large nation or by a small, from any corner of the world, that one bomb could release more destructive power on the inhabitants of that one helpless city than all the bombs dropped in the Second World War.

— President John F. Kennedy, 26 July 1963

And there is no greater threat to the American people than weapons of mass destruction, particularly the danger posed by the pursuit of nuclear weapons by violent extremists and their proliferation to additional states.

— U.S. National Security Strategy, May 2010

No threat poses as grave a danger to our security and well-being as the potential use of nuclear weapons and materials by irresponsible states or terrorists. ...Our commitment to the denuclearization of the Korean Peninsula is rooted in the profound risks posed by North Korean weapons development and proliferation. ...We have made clear Iran must meet its international obligations and demonstrate its nuclear program is entirely peaceful.

— U.S. National Security Strategy, February 2015

The danger from hostile state and non-state actors who are trying to acquire nuclear, chemical, radiological, and biological weapons is increasing. ... Terrorist groups continue to pursue WMD-related materials. We would face grave danger if terrorists obtained inadequately secured nuclear, radiological, or biological material.

— U.S. National Security Strategy, December 2017

#### Overview

Because of their awesome power and the catastrophic consequences of their use on urban populations, not to mention their huge implications for international security, the spread of nuclear weapons has been a key concern for U.S. national leaders for over half a century. While this concern originally focused on state actors alone—in President Kennedy’s lifetime only four countries had nuclear weapons, with China’s first test coming the year after his death—today there is increasing fear that terrorists might be able to procure a nuclear weapon through theft, fabrication (if they can get the requisite enriched uranium), or even deliberate transfer from a state.

There is still debate in the academic community about the effects of nuclear weapons on international stability. Kenneth Waltz, a political scientist of the realist school, has argued that the slow spread of nuclear weapons to other states can have a stabilizing effect. Two horribly

destructive world wars were fought in the first half of the 20<sup>th</sup> century, and many credit U.S. and Soviet nuclear arsenals with having kept the Cold War from turning hot. Similarly, some believe that nuclear deterrence may have helped prevent a fourth India-Pakistan war. Others argue, however, that the spread of nuclear weapons inexorably increases the probability that nuclear weapons will eventually be used. New nuclear-armed states might not have controls adequate to prevent accidents, theft, or unauthorized use, and more nuclear-armed states means increased chances for miscalculations that could cause deterrence to break down. This latter school of thought predominates. Moreover, almost all observers agree that possession of nuclear weapons by terrorists or other non-state actors would be very destabilizing. Accordingly, over the years great emphasis has been laid on different approaches to preventing or slowing proliferation—a topic we will examine next week.

For the last two decades, North Korea and Iran have been states of great proliferation concern. The United States and other countries continue efforts to stop North Korea and Iran from acquiring nuclear weapons capability, with some limited success. North Korea has tested nuclear weapons six times—in 2006, 2009, 2013, twice in 2016, and 2017—and is assessed to have an arsenal of at least 20 nuclear weapons and enough fissile material for at least 30 more. North Korea is also believed to have helped Syria construct covertly a nuclear reactor that was destroyed by an Israeli airstrike on September 6, 2007. In June 2010, then-CIA Director Leon Panetta stated that Iran had enough fissile material for two nuclear weapons, but that it would take a year to enrich it to weapons grade, and an additional year to develop a delivery system for a nuclear weapon. By 2015, just prior to the signing of the Joint Comprehensive Plan of Action (JCPOA) limiting Iran's uranium enrichment and other nuclear activities, the Obama administration assessed the breakout time for Iran to produce a nuclear bomb to be three months. If these countries become established nuclear powers, it is feared it might spark a “cascade” of proliferation among their neighbors. Indeed, a number of Middle Eastern countries have shown increased interest in nuclear technology, possibly as a way of hedging their bets against Iran's development of nuclear weapons. In September and October 2019, Turkey's Prime Minister Recep Tayyip Erdoğan repeatedly stated that he could not accept being barred from having nuclear weapons when other countries in the region had them. While his comments were undoubtedly aimed at Israel, many observers believe that Iran's obtaining nuclear weapons would push Turkey to get the bomb.

Two days before chairing the Nuclear Security Summit in Washington in April 2010, President Obama stated that “the single biggest threat to U.S. security... would be the possibility of a terrorist organization obtaining a nuclear weapon.” As the epigraphs at the start of this topic showed, the same sentiment was expressed in February 2015 in his administration's final *National Security Strategy* and appeared in President Trump's December 2017 *National Security Strategy*. Al Qaeda was engaged in an effort to acquire nuclear weapons decades ago, and may be still. While most analysts doubt that a state would choose to provide a nuclear weapon to a terrorist group, there have been some disturbing instances of insider threats to the security of nuclear weapons or special nuclear material—in Pakistan, for instance.

**Topic Objective:** Evaluate current concerns regarding proliferation of nuclear weapons, the potential reasons behind this proliferation, and possible future implications.

## Issues for Consideration:

1. What motivated North Korea and Iran to pursue nuclear weapons? Given these motivations, what inducements, if any, might lead North Korea to abandon its efforts? What should U.S. policy be toward North Korea? Was the Joint Comprehensive Plan of Action (JCPOA) with Iran effective at blocking proliferation of nuclear weapons to Iran?

2. If international efforts to convince North Korea to abandon its efforts fail, or if Iran abandons the JCPOA, what are the possible regional consequences? What are the consequences for other parts of the world? Do you believe there will be a “cascade” of nuclear proliferation? Could the United States attempt to prevent this through “extended deterrence?” How would such a strategy fare against the criteria of feasibility, suitability, sustainability, etc.?

3. Even if North Korea or Iran acquire credible nuclear arsenals, would this be a big deal? Would this change North Korean or Iranian actions? If so, how? Would it change or constrain likely U.S. responses to those actions? Wouldn't U.S. nuclear weapons be able to deter any threatened use of nuclear weapons by North Korea or Iran? If not, why not?

4. How serious is the threat of terrorist acquisition of a nuclear weapon? Do you agree with *National Security Strategy* statements in the epigraphs to this lesson, or is the threat being overblown? What are the implications for U.S. national security strategy, particularly with regard to ways and means?

5. What are the possible terrorist paths to acquisition of a nuclear weapon? To the means of delivering such weapons? How can these paths be blocked?

6. If a terrorist organization acquired a nuclear weapon, what would its leaders do with it? Would they attempt to use it for bargaining or blackmail? Would they actually detonate it? Can terrorists be deterred from detonating a nuclear weapon, and if so, how?

## Required Readings (Total Readings: 59 pages)

- a. Kenneth Waltz, “[The Spread of Nuclear Weapons: More May Be Better](#),” *Adlephi Papers*, No. 171 (London: International Institute for Strategic Studies, 1981). (33 pages)
- b. Michael Rühle, “The Bomb for Beginners,” [Spiegel Online International](#), 3 March 2010; or [IP Global](#) (Published by the German Council on Foreign Relations (DGAP)), 25 February 2010, pp. 37-40. (4 pages)
- c. Evan Braden Montgomery, “[Understanding the Threat of Nuclear Terrorism](#),” CSBA Backgrounder, April 2010. (8 pages)
- d. Michael Levi, “[Stopping Nuclear Terrorism](#)” *Foreign Affairs* (January/February 2008), pp. 131-140. (10 pages)
- e. Shaun Gregory, “[Terrorist Tactics in Pakistan Threaten Nuclear Weapons Safety](#),” *CTC Sentinel*, June 1, 2011, pp. 4-7. (4 pages)

## Topic 7\*

### Nuclear Nonproliferation\*

There are indications because of new inventions, that 10, 15, or 20 nations will have a nuclear capacity, including Red China, by the end of the Presidential office in 1964. This is extremely serious. . . I think the fate not only of our own civilization, but I think the fate of the world and the future of the human race, is involved in preventing a nuclear war.

— Senator John F. Kennedy, 13 October 1960

We are approaching a point at which the erosion of the non-proliferation regime could become irreversible and result in a cascade of proliferation.

— Report of the UN High-level Panel on Threats, 2004

Rules must be binding. Violations must be punished. Words must mean something. The world must stand together to prevent the spread of these weapons.

— President Barak Obama, Prague Speech, 5 April 2009

#### Overview

The dark view of the future expressed by JFK as a presidential candidate clearly did not come to pass. Fifty years later, there are only nine states with established nuclear arsenals, and one of those nine (North Korea) possesses a nascent capability. There have been nonproliferation successes along the way. South Africa announced in 1993 that it had dismantled six nuclear weapons (and a partially assembled seventh), and the newly independent republics of Belarus, Kazakhstan, and Ukraine returned to the Russian Federation the nuclear weapons present in those countries when the Soviet Union dissolved. Argentina, Brazil, South Korea, Taiwan, and Libya abandoned programs to develop nuclear weapons. And, for the moment, the 2015 Joint Comprehensive Plan of Action has delayed Iran's nuclear weapons program—perhaps.

Why did more states not acquire nuclear weapons? Extended deterrence (as discussed in topics 3 and 4) may have played a part. Other factors militating against nuclear weapons programs include their high cost and the nature of the specific security situations faced by countries considering nuclear programs. But efforts to curb nuclear proliferation—culminating in the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) signed in 1968 and entered into force in 1970—are believed by many to have played a significant role.

Now with almost universal membership—Israel, India, Pakistan, and North Korea are not members—the NPT embodies a general recognition that the spread of nuclear weapons would be

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\* Note: Switch to late schedule 1530-1720.

harmful to international security. It enshrines a grand bargain between nuclear-weapon State Parties—the United States, the USSR (now Russia), the United Kingdom, France, and China (the last two only acceded to the Treaty in 1992)—and all other states (the non-nuclear-weapon State Parties). The latter agreed to forego the acquisition of nuclear weapons, and all, especially the former, agreed under ARTICLE VI of the treaty to “*pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a treaty on general and complete disarmament under strict and effective international control.*” Nothing in the treaty abridged the right of any party to the use of nuclear energy for peaceful purposes. Safeguards to ensure that nuclear material was not diverted to nuclear weapons programs by non-nuclear-weapon states would be verified by the International Atomic Energy Agency (IAEA).

A number of other arms control initiatives similarly aim at preventing the proliferation of nuclear weapons. Multilateral agreements on “nuclear-weapon-free zones” are in effect for Latin America and the Caribbean, the South Pacific, Southeast Asia, Africa, and Central Asia. The Comprehensive Test Ban Treaty (CTBT), opened for signature in 1996, would prohibit all nuclear weapon test explosions by parties to the treaty, going beyond the Limited Test Ban Treaty of 1963 that banned tests in the atmosphere, outer space, or under water. The CTBT will not enter into force until all 44 countries possessing nuclear reactor technology in 1996 have signed and ratified the agreement. As of September 2019, India, Pakistan, and North Korea had not yet signed, and others that had signed it, hadn’t ratified it, including China, Egypt, Iran, Israel, and the United States. The Conference on Disarmament (CD) has on its to-do list the negotiation of a Fissile Material Cut-Off Treaty that would prohibit any additional production of enriched uranium and plutonium for weapons purposes, but this has long been stalled because the CD operates on the principle of consensus.

In addition to legally binding treaties, there are many less formal initiatives with non-proliferation of nuclear weapons and materials as their goal. The Nuclear Suppliers Group (NSG) is a consortium of countries with common guidelines for the export of nuclear materials and technology. Controversy surrounded an NSG decision, pressed by the United States in September 2008, to allow nuclear exports to India, even though India possesses nuclear weapons and is not a party to the NPT. The Cooperative Threat Reduction (CTR) or Nunn-Lugar program was a U.S. program initially intended to help states of the former Soviet Union to securely transport, store, and destroy nuclear weapons and other weapons of mass destruction. The Proliferation Security Initiative (PSI), launched by President George W. Bush, established coordination among a group of about 95 states to stop shipments of weapons of mass destruction and the missiles that can deliver them. And in March 2016, President Obama hosted the fourth bi-annual Nuclear Security Summit aimed at taking measures to secure nuclear material and to prevent nuclear smuggling and terrorism. These and other non-proliferation initiatives serve to complement the NPT and strengthen the regime of controls intended to stop proliferation.

The ability of countries to hide nuclear weapons programs from inspectors is a significant problem. The extent of the Iraqi nuclear weapons program was only discovered *after* the first Gulf War, having escaped earlier IAEA inspections; similarly, Iran’s covert program for uranium enrichment came to light only through disclosure by an Iranian group dedicated to toppling the regime. While many countries have agreed to the IAEA’s proposal for an “Additional Protocol”

that would allow for more intrusive inspections, the challenge of enforcing compliance remains. Diplomatic engagement and UN Security Council resolutions have so far failed to persuade or coerce North Korea and Iran from continuing to pursue nuclear weapons capabilities. If both treaty-based and informal non-proliferation efforts do not succeed, countries may face a choice between two very unpalatable options—accepting the existence of new nuclear-armed states, or taking action to deny or disrupt their programs (as Israel did in striking the Iraqi Osirak reactor in 1981 and a Syrian reactor in 2007, and as someone apparently did in the 2009 Stuxnet cyber-attacks against Iran’s centrifuges for enriching uranium).

**Topic Objective:** Describe and evaluate the key instruments and initiatives used to constrain proliferation and reduce nuclear arms.

### **Issues for Consideration:**

1. Given the unabridged right to use nuclear energy for peaceful purposes as codified in the NPT, how can the spread of nuclear technology and development of “latent” capability to build nuclear weapons be prevented? Why would countries be willing, or unwilling, to depend on other states for their vital energy needs, e.g., the supply of reactor fuel?

2. Countries can legally withdraw from the NPT three months after giving official notification (and justification) of their intent to do so. Could this be prevented? If so, how? Should it be? Would the U.S. Government enter into a legally binding arms control regime, or the Senate give its consent to ratification, without a clause allowing for withdrawal? But if withdrawal is so easy, what good is the treaty?

3. In NPT Review Conferences and other arms control fora, a number of countries make the argument that the NPT enshrines an inequitable “double standard,” dividing the world into nuclear “haves” and “have-nots.” Such countries often argue that continuing proliferation is due in large part to the failure of the nuclear-weapon-states (and the United States in particular) to fulfill their NPT commitments for nuclear disarmament. Do you agree or disagree? Why?

4. How important is the CTBT in stopping nuclear weapons proliferation? Might a country develop and produce a nuclear weapon even in the absence of testing? If so, what good does the CTBT do? What are the stumbling blocks that might prevent the CTBT from coming into force? Why have the P5 been observing a moratorium on nuclear testing for so long, even in the absence of entry into force of the CTBT?

5. What are the chances for negotiation of a Fissile Material Cut-Off Treaty? What are the main stumbling blocks?

6. Should the NPT be revised to reflect India, Pakistan, and Israel as nuclear weapon state parties? Why or why not? How likely is it that any of these countries will agree to abandon its nuclear arsenal, absent a fundamental shift in the security conditions it faces? How about for North Korea? At what point should U.S. and international efforts switch from trying to impede a

country's nuclear weapons program to trying to ensure it is under secure control that can prevent any theft, or accidental or unauthorized use?

7. What is the relationship between Nuclear Weapons Free Zone Treaties and the Non-proliferation Treaty? What are the obstacles for U.S. ratification of the outstanding signed treaties?

8. What place, if any, do non-treaty-based initiatives such as the NSG, CTR, PSI, and the Nuclear Security Summit have in non-proliferation? Are these "coalitions of the willing" inequitable or discriminatory, imposing the will of the few on the many? What is their relationship to legally binding treaty regimes—do they complement them, or undermine them?

9. Why did the United States push the NSG to allow nuclear-related exports and cooperation with India, even though India is not a member of the NPT and has a nuclear arsenal? Doesn't this fundamentally undercut the NPT regime, and defeat the whole purpose of the NSG? Why has the same not been done for Pakistan? Should it be?

10. What are the chances for negotiation of a Fissile Material Cut-off Treaty? What are the main stumbling blocks?

11. What is the Missile Technology Control Regime? How are its members and objectives linked to nuclear weapons? What are some of the limitations and challenges to constructs like the MTCR?

12. When, if ever, might it make sense to take military action to try to prevent another country from gaining a nuclear weapons capability?

**Required Readings:** (Total Readings: 68 pages (ROK) or 82 pages (Japan))

- a. SKIM: [Timeline of the Nuclear Nonproliferation Treaty](#), Arms Control Association, February 4, 2018. (8 pages)
- b. [Treaty on the Non-Proliferation of Nuclear Weapons](#), IAEA INFCIRC/140, April 22, 1972. (5 pages) **Pay particular attention to Article VI on page 4.** (5 pages)
- c. Daryl Kimball, "[Comprehensive Test Ban Treaty at a Glance](#)," Fact Sheet, Arms Control Association, Updated February 2019. (5 pages)
- d. Daryl Kimball and Kingston Reif, "[Fissile Material Cut-off Treaty \(FMCT\) at a Glance](#)," Fact Sheet, Arms Control Association, Updated June 2018. (3 pages)
- e. Mark Fitzpatrick, *Asia's Latent Nuclear Powers* (New York: Routledge, 2016), read the chapter on the Republic of Korea (Chapter 1, pp. 17-64 (47 pages)), or on Japan (Chapter 2, pp. 65-126 (61 pages)) as assigned by FSL.

## Supplemental Readings

- a. Amy Woolf, Mary Beth Nikitin, and Paul Kerr, "[Arms Control and Nonproliferation: A Catalog of Treaties and Agreements](#)," Congressional Research Service Report No. RL33865, March 26, 2020, pp. 25-36. (12 pages)
- b. Kaegan McGrath, [Entry into Force of the CTBT: All Roads Lead to Washington A Report from the Fifth Article XIV Conference](#), Nuclear Threat Initiative (April 1, 2018). (13 pages)
- c. [EU Statement to the Preparatory Committee for the 2020 Review Conference of the Parties to the Treaty on the Nonproliferation of Nuclear Weapons](#), EU Delegation to the UN in Geneva (April 23, 2018). (6 pages)
- d. David Sanger and William Broad, "[Saudis Want a U.S. Nuclear Deal. Can They be Trusted Not to Build a Bomb?](#)" New York Times, (New York, November 22, 2018), (4 pages)
- e. Gawdat Bahgat, "[A WMD-Free Zone in the Middle East?](#)", Middle East Policy Council, (Washington DC, 2018), (4 pages).
- f. [Treaty on the Prohibition of Nuclear Weapons](#), United Nations Office for Disarmament Affairs (July 2017). <https://www.un.org/disarmament/wmd/nuclear/tpnw/> (10 pages)
- g. Peter Van Ham, "[The MTCR at 30: Ideas to Strengthen the Missile Technology Control Norm](#)", Clingendael, (November 2017), (12 pages)
- h. Mark Hibbs, "[A More Geopolitized Nuclear Suppliers Group](#)", Carnegie Endowment for International Peace, (Washington D.C. December 14, 2017), (11 pages)
- i. [Nuclear Weapons Free Zones: Proposals and Prospects](#), Central Intelligence Agency, Sanitized Copy Approved for Release 2012/02/16, (Jan 1984), pp. 4-20 (16 pages)
- j. Muhammed Jawad Hashmi, Muhammad Mushtaq, Masood Ur Rehman Khattak, "[Non-Proliferation Regime: A Pakistani Perspective on Fissile Material Cut-Off Treaty \(FMCT\)](#)", Pakistan Journal of Social Sciences, Vol 35, No. 2 (December 2014), pp 543-555. (12 pages)
- h. Article VI and eighth to twelfth preambular paragraphs, [Final Document, 2000 Review Conference of the Parties to the Treaty on the NonProliferation of Nuclear Weapons](#), "13 Practical Steps" (2000), pp 19-21. (3 pages)

## Topic 8

### Arms Control and U.S.-Russian Nuclear Force Reductions

Arms control has to have a future, or none of us does. But it doesn't necessarily have to come in big packages of 600-page treaties.

— Attributed to Stanley Hoffmann

#### Overview

At its peak in 1967, the U.S. nuclear arsenal contained over 31,000 warheads. Today, that number is below 4,800, of which fewer than 1,550 are operationally deployed on long-range ballistic missiles or at heavy bomber bases. Though the Russians have not made their nuclear stockpile data public, their arsenal has also been substantially cut from its reported peak of over 40,000 warheads in the Cold War. In April 2010, Presidents Obama and Medvedev signed the “New Strategic Arms Reduction Treaty” (New START) that brought the number of accountable warheads on deployed strategic systems down below 1,550 for each side. The New START Treaty does not cover non-strategic nuclear weapons, which according to the U.S. Congressional Research Service stand at “between 1,000 and 6,000 warheads” for Russia and approximately 500 for the United States.

At times during the Cold War, nuclear arms control negotiations were a fundamental element in the overall US-Soviet strategic relationship. They took on great importance not only because of their objective—hopefully making the nuclear balance more predictable, and less likely to result in a crisis or war—but also because they constituted one of the few venues for serious, extended, face-to-face negotiations in very tense times. While some believe formal nuclear arms control negotiations and agreements with the Russian Federation remain important, others think they are outdated given the current political climate between the two countries. Certainly they no longer hold the same exalted status as before.

The first Strategic Arms Limitation Treaty (SALT I) was signed by the United States and the Soviet Union (USSR) in 1972, together with the Anti-Ballistic Missile (ABM) Treaty (covered in topic 10). Only a few pages long, it limited the number of ICBM and SLBM launchers on both sides, placing no limits on heavy bombers or on the number of warheads per missile. The United States attempted to constrain increases in Soviet ICBM size by limiting increases in silo launcher dimensions; there was a great outcry from some in the United States when the Soviets nevertheless deployed significantly larger missiles with much greater “throw-weight.” Signed in 1979, SALT II represented a more serious attempt to cap the growth in strategic offensive forces, limiting bombers and the maximum number of warheads per missile, and attempting to plug other SALT I loopholes. Senate consent to ratification was not assured; when the Soviets invaded Afghanistan at the end of 1979, President Carter withdrew the treaty from Senate consideration, and it never entered into force.

Also in 1979, NATO took a “dual track” decision: it would deploy Pershing II ballistic missiles and Ground-Launched Cruise Missiles (GLCMs) in Europe to counter the mobile SS-20 missiles the USSR was fielding, but would at the same time seek limits on these systems, or their complete elimination, through negotiations. The Soviets sought to stop GLCM and Pershing II deployment by a number of means, including walking out of the negotiations in late 1983. But their efforts failed. The U.S. missiles were deployed and U.S.-Soviet negotiations resumed in 1985; ultimately, Presidents Reagan and Gorbachev signed the Intermediate-range Nuclear Forces (INF) Treaty in 1987. The INF Treaty required the superpowers to eliminate all land-based ballistic and cruise missiles with ranges between 500 and 5,500 kilometers, and included significant on-site verification measures. In 2014, the U.S. State Department reported that “the Russian Federation is in violation of its obligations under...the INF Treaty.” In 2019, with Russia continuing to deny its violation of the INF Treaty, the United States formally withdrew from it.

In 1991, the United States and the USSR signed the Strategic Arms Reduction Treaty (START I), the first agreement requiring reductions in the number of warheads on strategic systems. With its annexes, protocols, agreed statements, etc., the treaty is over 700 pages long. Entering into force in 1994 (after all nuclear weapons had been removed from Belarus, Ukraine, and Kazakhstan), START I expired in December 2009. START II, signed in 1993, would have required even deeper reductions and the elimination of all multiple-warhead ICBMs, but it never entered into force because the Russian Duma demanded certain conditions for ratification and those conditions were not met.

Taking advantage of the dissolution of the Warsaw Pact and the end of the Cold War, President George H. W. Bush made unilateral decisions in September 1991 and January 1992 to withdraw and dismantle the vast majority (thousands) of U.S. tactical nuclear weapons from Europe, leaving only nuclear bombs carried by dual-capable fighter aircraft; to cancel or curtail many programs to modernize U.S. nuclear forces; and to accelerate retirements. Presidents Gorbachev and Yeltsin, respectively, made similar decisions curtailing Soviet/Russian nuclear forces in response. These “Presidential Nuclear Initiatives” represented a radical new approach to nuclear arms reductions because they involved unilateral steps without negotiation, legal documents, or verification measures. This same philosophy underlay President George W. Bush’s unilateral decision in 2001 to reduce in the following decade the number of deployed U.S. strategic nuclear weapons to between 1,700 - 2,200. At the request of President Putin, the United States agreed to codify this in a legally binding bilateral agreement. Signed in 2002, the Strategic Offensive Reductions Treaty (SORT, or Treaty of Moscow) is only two pages long, places no constraints on the sides’ forces other than the overall warhead limit of 2,200, and includes no definitions or verification measures; it was in force until early 2011, when it was superseded by a new agreement.

The “New START” treaty, signed by Presidents Obama and Medvedev in April 2010, represented a return to a more formal approach to nuclear arms reductions, patterned on START I. With its protocol and annexes covering data exchanges, notifications, and verification measures, the treaty is over 350 pages long. It entered into force on February 5, 2011 with the exchange of Instruments of Ratification by the United States and Russia. At the end of a 7-year reduction period, each country was limited to a total of 800 deployed and non-deployed ICBMs,

SLBMs, and heavy bombers, of which no more than 700 may be deployed, with no more than 1,550 warheads on them (each bomber counts as carrying a single warhead).

As the February 2018 date for fulfilling the terms on the New START Treaty approached, the United States drew down its count of deployed strategic warheads to below 1,550 as required by the treaty. Meanwhile, Russia built up its arsenal to 1,765, considerably above the treaty's limit, before reducing its forces and reporting it had met the treaty's limits by the deadline. In 2019, arms control supporters have urged an immediate extension of the New START Treaty through 2026. Arms control skeptics demand the treaty be expanded to include Russia's non-strategic nuclear weapons and/or that China be brought into the agreement. New START is set to expire in 2021 if it is not extended.

**Topic Objective:** Describe and evaluate the key instruments and initiatives used to constrain proliferation and reduce nuclear arms, and assess the future of U.S. arms control with Russia.

### **Issues for Consideration:**

1. How important to U.S. national security have nuclear arms control agreements been with the Soviet Union and then Russia? Have they had a significant effect on nuclear threats faced by the United States, or is their benefit—if any—primarily political in nature? What role do they play? Which of the agreements do you think were most valuable, and why?

2. There was furor among political conservatives in the United States over perceived Soviet violations of both SALT I and SALT II (though the latter was never ratified, both sides agreed not to undercut its provisions). What impact did this have on the negotiation of subsequent arms control agreements? In bilateral arms control agreements, if one side believes the other is violating one or more of its provisions, what recourse does it have?

3. What are the relative benefits and drawbacks of negotiated, legally-binding, arms control treaties? How do they compare with the benefits and drawbacks of unilateral measures such as the Presidential Nuclear Initiatives? When is one approach more appropriate than another?

4. In her 2003 article, Avis Bohlen argued that the era of strategic arms control was over, starting her conclusion with "As strategic arms control passes into history..." Why did the Obama Administration return to the model of traditional nuclear arms control, negotiating a "New START" treaty of more than 350 pages?

5. What are the primary benefits to the United States of the New START treaty? What objectives did the Administration have in negotiating it? Did it meet those objectives?

6. Should the New START treaty be extended for 5 years beyond its original end-date in 2021, as allowed under the treaty? Why, or why not?

7. Should the United States have withdrawn from the INF Treaty? Why, or why not?

**Required Readings** (Total Readings: 69 pages (of which 25 are to be SKIMMED only))

- a. Avis Bohlen, "[The Rise and Fall of Arms Control](#)," *Survival* 45, no. 3 (Autumn 2003), pp. 7-34 (28 pages)
- b. Fred Charles Iklé, "[After Detection—What?](#)" *Foreign Affairs* (January 1961), pp. 1-13. (14 pages)
- c. Department of State Fact Sheet, [Russia's Violation of the Intermediate-Range Nuclear Forces Treaty](#), Office of the Spokesman Department of State, (December 4, 2018) (2 pages)
- d. SKIM: Amy Woolf, "[The New START Treaty: Central Limits and Key Provisions](#)," Congressional Research Service Report No. R41219, June 10, 2020, pp. 1-25. (25 pages)

**Supplemental Readings:**

- a. Amy F. Woolf, "[Russian Compliance with the Intermediate Range Nuclear Forces \(INF\) Treaty: Background and Issues for Congress](#)," Congressional Research Service Report No. R43832, (August 2, 2019), pp 17-44 (27 pages)
- b. Harvard Kennedy School, Belfer Center for Science and International Affairs, "[The Iran Nuclear Deal: A Definitive Guide](#)," Cambridge, MA: Harvard College, August 2015.
- c. Marc A. Thiessen, "[The Arms Control Dinosaurs Are Back](#)," *Wall Street Journal* 19 May 2009, p. A17 (2 pages)
- d. Amy Woolf, Mary Beth Nikitin, and Paul Kerr, "[Arms Control and Nonproliferation: A Catalog of Treaties and Agreements](#)," Congressional Research Service Report No. RL33865, March 26, 2020, pp. 5-24. (19 pages)
- e. "Reductions in U.S. and Former Soviet Union Nuclear Weapons" Fact Sheet, April 30, 1992, U.S. Arms Control and Disarmament Agency. (4 pages)
- f. Eli Corin, "[Presidential Nuclear Initiative: An Alternative Paradigm for Arms Control](#)," NTI Issue Brief, March 2004. (8 pages)

## Topic 9

### Prospects for Additional Nuclear Arms Reductions and Global Zero

As I have indicated in previous statements to the Congress, my central arms control objective has been to reduce substantially, and ultimately to eliminate, nuclear weapons and rid the world of the nuclear threat.

— President Ronald Reagan, 25 March 1988

Nuclear weapons are not empty symbols; they play an important deterrent role, and cannot be eliminated.

— Dr. Harold Brown and Dr. John Deutch, The Wall Street Journal, 19 November 2007

So today, I state clearly and with conviction America's commitment to seek the peace and security of a world without nuclear weapons. (Applause.) I'm not naive. This goal will not be reached quickly—perhaps not in my lifetime. It will take patience and persistence. But now we, too, must ignore the voices who tell us that the world cannot change. We have to insist, "Yes, we can."

— President Barack Obama, Prague Speech, 5 April 2009

### Overview

The goal of eliminating nuclear weapons has long been held by many well-intentioned people, and the concept is, arguably, enshrined in the Nuclear Non-Proliferation Treaty of 1968. While conservatives are generally more skeptical of this goal, and liberals more supportive, sentiment does not break cleanly across party lines. Despite presiding over a massive modernization of U.S. nuclear forces in the 1980s, President Reagan was nevertheless a “nuclear abolitionist” who repeatedly espoused the goal of ridding the world of nuclear weapons; the two skeptics cited above were, respectively, the Secretary of Defense in the Carter Administration, and the Deputy Secretary of Defense (and later Director of Central Intelligence) in the first Clinton Administration.

The abolition of nuclear weapons—or “global zero”—has taken on new life since the publication in January 2007 of an op-ed piece by former Secretaries Shultz, Perry, and Kissinger and former Senator Nunn. Many non-governmental organizations have produced books or reports addressing it, and new organizations have sprung up to advance the cause. In a speech in Prague in April 2009, President Obama espoused this goal, while recognizing it might not be achieved in his lifetime—very probably an accurate prediction.

What steps remain before this vision of nuclear zero can be realized, and what stumbling blocks lie in the way? Even with New START Treaty reductions, thousands of warheads remain in U.S. and Russian nuclear stockpiles. Russia's government does not appear at all interested in reducing its stockpile of non-strategic nuclear weapons. Indeed, Russia has been increasing its

reliance on these weapons to compensate for shortfalls in its conventional force capabilities. Meanwhile, the other three nuclear weapons states under the NPT—China, France, and the United Kingdom—have made clear that they are not interested in entering multilateral negotiations until the numbers of U.S. and Russian nuclear weapons have come much closer to those in the other three states’ much smaller arsenals. None of the established nuclear weapon states are likely to go to zero as long as countries outside the NPT retain nuclear weapons—so how can Israel, India, Pakistan, and North Korea (and possibly someday Iran) be convinced to give them up?

Any credible approach to the elimination of nuclear weapons must also seriously address two age-old questions in arms control—how to verify compliance, and how to enforce it. As noted in topic 7, inspection regimes are fallible: the extent of Iraq’s nuclear weapons program was not discovered, despite IAEA inspections, until after the first Gulf War. Even if all states give up their nuclear weapons in good faith, there will still be the problem of “latent” nuclear weapons capability. An ample supply of nuclear material (often associated with nuclear energy programs) and the knowledge and technology required to build nuclear weapons will still exist. And as demonstrated by the current controversies over the North Korean and Iranian nuclear programs, the answer to the question of compliance is just as elusive today as it was in 1961 when Fred Ikle published his seminal article in *Foreign Affairs*, “After Detection—What?” Clear and compelling answers to these concerns will be key to any arms control regime aimed at abolishing nuclear weapons.

**Topic Objective:** Comprehend and evaluate key issues that would surround efforts for further reduction and eventual elimination of nuclear weapons.

**Issues for Consideration:**

1. If additional U.S.-Russian nuclear arms reduction beyond the New START Treaty is required before other countries will agree to reduce or eliminate their nuclear arsenals, what is the best way to go about it? Given the disparity in the size of U.S. and Russian holdings of non-strategic nuclear weapons, what, if anything, would convince Russia to come down to, or below, current U.S. levels of these weapons?
2. How far down would U.S. and Russian stockpiles have to come before China, France, and the United Kingdom would be willing to join in negotiations on reduction or elimination of their nuclear weapons? Would the three insist that all countries reach zero at the same time, or might they agree to go to zero before the United States and Russia do? Would any of these countries consider a unilateral decision to abandon nuclear weapons even if other countries (including those outside the NPT) still retained them? If so, under what conditions, and what might be the considerations behind such a decision? Is there any chance that, as U.S. and Russian arsenals reduce to 1,000 weapons or below, China might decide to increase its holdings in order to gain recognition as a peer nuclear power?

3. What conditions would have to pertain, or what inducements would have to be offered, to get Israel, India, Pakistan, and North Korea (and possibly Iran in the future) to give up nuclear weapons?

4. As the number of nuclear weapons falls to very low levels, the perceived significance of a relatively small number of weapons might increase greatly. How can stability be maintained during the reduction process? Once all nuclear weapons are eliminated, what is the best way to address the issue of “latent” capability, to prevent a destabilizing, WWI-like race to mobilize this capability in a crisis?

5. What would be required for a verification regime to provide high confidence in determining the number of weapons a country possessed, and how feasible is achievement of such a regime? Would the United States accept such a regime?

6. What kind of international cooperative regime would be needed for effective enforcement of compliance? If in a crisis a country revealed that it had some number of nuclear weapons, would other states not involved in the crisis risk becoming a target of those weapons by taking part in collective action against that country?

7. Will a succession of nuclear arms control treaties be the catalyst that brings about the elimination of all nuclear weapons? Or will arms control reflect and codify that which is made possible by other changes in the international security environment?

8. Is the goal of “global zero” helpful or harmful? Isn’t it important to have a clear vision of where you want to go, even if it is hard to see the exact path that will lead you there? Naysayers scoffed at President Kennedy’s vision of landing a man on the moon; is the same dynamic at work here?

### **Required Readings** (Total Readings: 54 pages)

a. George P. Shultz, William J. Perry, Henry A. Kissinger and Sam Nunn, “[A World Free of Nuclear Weapons](#),” The Wall Street Journal, 4 January 2007, p. A15. (4 pages)

b. Harold Brown and John Deutch, “[The Nuclear Disarmament Fantasy](#),” The Wall Street Journal, 19 November 2007, p. A19 (3 pages)

c. Thomas C. Schelling, “[A World without Nuclear Weapons?](#)” Daedalus (Fall 2009), pp. 124-129 (6 pages)

d. George Perkovich and James M. Acton, “Chapter 2: Verifying...[Assessing completeness: worrying about what is not declared](#),” Abolishing Nuclear Weapons: A Debate (Washington: Carnegie Endowment, 2009) pp. 60-69. (10 pages)

e. George Perkovich and James M. Acton, “[Chapter 4: Enforcement](#),” Abolishing Nuclear Weapons: A Debate (Washington: Carnegie Endowment, 2009) pp. 99-114. (16 pages)

f. Josef Joffe and James W. Davis, “[Less Than Zero: Bursting the New Disarmament Bubble](#),” Foreign Affairs, 90, No. 1 (Jan/Feb 2011), pp. 7-13. (6 pages)

g. “[Nuclear Weapons: The Unkicked Addiction](#),” The Economist, 7 March 2015. (9 pages)

### **Supplemental Reading**

a. George P. Shultz, William J. Perry, Henry A. Kissinger and Sam Nunn, “[Toward a Nuclear-Free World](#),” The Wall Street Journal, 15 January 2008, p. A15. (6 pages)

b. Ivo Daalder and Jan Lodal, “[The Logic of Zero: Toward a World Without Nuclear Weapons](#),” Foreign Affairs Vol. 87, Iss. 6 (Nov/Dec 2008), pp. 80-95. (16 pages)

c. Bruno Tertrais, “[The Illogic of Zero](#),” The Washington Quarterly, 33, no. 2 (April 2010), pp. 125-138. (14 pages)

d. Skim: Barry M. Blechman, “[Chapter 1: Why We Need to Eliminate Nuclear Weapons—and How to Do It](#),” Elements of a Nuclear Disarmament Treaty (Washington: Stimson Center, 2009) pp. 1-26 (26 pages – not counted in Total Readings page count)

## Topic 10

### Strategic Defenses and Stability

They agree on the essential contribution of the ABM Treaty to reductions in offensive forces, and reaffirm their commitment to that Treaty as a cornerstone of strategic stability.

— Joint Statement by Presidents Clinton and Putin on Strategic Stability, 4 June 2000

We need a new framework that allows us to build missile defenses to counter the different threats of today's world. To do so, we must move beyond the constraints of the 30-year-old ABM Treaty. This Treaty does not recognize the present or point us to the future; it enshrines the past... We should leave behind the constraints of an ABM Treaty that perpetuates a relationship based on distrust and mutual vulnerability.

— President George W. Bush, Speech at National Defense University, 1 May 2001

After the U.S. withdrew from the Anti-Ballistic Missile (ABM) Treaty we have been working hard to develop new promising weaponry systems and this enabled us to make a big step forward creating new strategic arms . . . U.S. global missile systems are mainly against ballistic missiles and these are the core of our nuclear deterrence. This is why Russia has been developing extremely effective systems to defeat missile defense.

— President Vladimir Putin, State of the Nation Speech, 1 March 2018

#### Overview

In 1972, the United States and the Soviet Union (USSR) signed the Anti-Ballistic Missile (ABM) Treaty, which banned nationwide defenses against strategic ballistic missiles. It permitted only two deployment areas of 100 interceptors each to defend the national capital and an ICBM base. A 1974 protocol reduced the allowable fielding options to a single deployment area for each country, with the United States choosing to defend a Minuteman base in North Dakota and the USSR electing to defend Moscow. The United States abandoned its ABM system in 1975; the Moscow system (whose interceptors carry nuclear warheads) still exists, and was upgraded in the 1980s. The treaty did not ban or limit deployment of defenses against short- and intermediate-range ballistic missiles, though there were serious arguments between the sides over the “demarcation” line separating those defenses from ones banned by the treaty. Over time the ABM Treaty came to be viewed as the very embodiment of the benefits of mutual vulnerability—the “cornerstone of strategic stability,” as espoused by Thomas Schelling. More broadly, missile defense systems have become nearly as consequential in nuclear deterrence as the nuclear weapon systems themselves. The debate on the importance and threat of missile defense systems has become almost theological.

President Reagan’s 1983 proposal for a Strategic Defense Initiative did not result in deployments, but spurred technology development. Following the collapse of the Soviet Union

in 1991 North Korean and Iranian missile programs continued to progress shifting missile defense sentiment in favor of countering “rogue states”. This received great impetus in August 1998 when—one month after a bipartisan Congressional commission produced an alarming report on the future ballistic missile threat to the United States—North Korea tested a missile with an unexpected third stage (which failed in flight). Addressing rogue states and regional threats to the homeland required modifying the ABM Treaty to permit limited defense of national territory, however Russia steadfastly refused Clinton Administration proposals to amend the ABM Treaty. Governor Bush made missile defense an issue in his presidential campaign, and following the attacks of 9/11 the United States gave formal notification in December 2001 of its intent to withdraw from the ABM Treaty. Because of the international political climate after the September 11 attack, Russia reacted in a very low-key manner, stating that Russian national security was not threatened. President Bush directed deployment of ground-based interceptors – 44 are now deployed between two locations, Fort Greely Alaska and Vandenberg Air Force Base in California.

Unlike U.S. national deployments, plans by the Bush Administration to deploy 10 interceptors in Poland and a radar in the Czech Republic to counter Iranian missile threats elicited strongly negative Russian reactions, despite U.S. proposals to Russia for cooperation on missile defense. In part to address Russian concerns, in September 2009 these plans were canceled in favor of a “Phased Adaptive Approach” that would focus first on defenses against shorter-range Iranian missiles, working up to deployment of a system in Europe beginning in 2020 to protect against potential threats while remaining insufficient in number or capability to undercut Russian nuclear deterrence. Missile defense sites have come on line in Poland and Romania with significant negative reaction from Russian leaders.

**Topic Objective:** Describe and evaluate the capabilities of missile defense systems and their deployment locations against the philosophies of strategic stability as it relates to the arms control regime and attributes of nuclear deterrence.

**Issues for Consideration:**

1. What is strategic stability? What role did it play during the Cold War? Does it remain a relevant or useful tool for U.S. nuclear strategy today?
2. What impact did the ABM Treaty have on the U.S.-Soviet “arms race” during the Cold War? How did it affect strategic stability? According to the theory of mutual vulnerability, it should have helped to remove fears of a first strike and reduced incentives to build up offensive arsenals; did it succeed?
3. To what extent did the United States and the USSR buy into the theory that strategic stability was assured by acceptance of mutual vulnerability to attack? Does the argument that strategic missile defenses are destabilizing apply to civil defense, bomber defenses, or defenses against short- and intermediate-range missiles? Why or why not?

4. Given that Russia can deploy 1,550 warheads on its strategic systems under New START, and thousands of non-strategic nuclear warheads unlimited by any agreement, why did Russia react so strongly against the Bush Administration proposal to put 10 interceptors in Poland?

5. Under what circumstances, if any, can missile defenses play a stabilizing role? Are there any examples of this in the past? How effective do missile defenses have to be before they can provide positive benefits?

6. How are missile defenses likely to play in the U.S.-China relationship? How much, if at all, should China care about U.S. ground-based interceptors in Alaska and California? About U.S. defenses against ballistic missiles of shorter ranges? About U.S. missile defense cooperation with its allies in the Pacific (such as THAAD batteries in South Korea)?

**Required Readings** (Total Readings: 63 pages)

a. Keith B. Payne, [The Great American Gamble: Deterrence Theory and Practice from the Cold War to the Twenty-First Century](#), (United States: National Institute Press, 2008), pp. 379-398. (20 pages)

b. Thomas Karako and Ian Williams, "[Missile Defense 2020: Next Steps for Defending the Homeland](#)," Chapter 6, Future Options, Report of CSIS Missile Defense Project, April 2017. (18 pages)

c. "[The European Phased Adaptive Approach at a Glance](#)," Fact Sheets & Briefs, Arms Control Association, Updated January 2019. (5 pages)

d. U.S. Department of Defense, [2019 Missile Defense Review](#), (Washington, DC: DOD, 2019), Secretary's Preface and Executive Summary, pp. I-XX. (20 pages)

**Supplemental Readings:**

a. Lynn F. Rusten, "[U.S. Withdrawal from the Antiballistic Missile Treaty](#)," Case Study Series No. 2, Center for the Study of Weapons of Mass Destruction (Washington: National Defense University Press, January 2010). (13 pages)

b. James Acton, "[Reclaiming Strategic Stability](#)," Chapter 4 in Strategic Stability: Contending Interpretations, U.S. Army War College Press, February 2013, pp. 117-139, (22 pages)

c. "[Key Findings: China-U.S. Dialogue on Strategic Nuclear Dynamics](#)" Pacific Forum CSIS, March 2017, (3 pages)

d. Matthew Rojansky, "[Russia and Strategic Stability](#)," Chapter 8 in Strategic Stability: Contending Interpretations, U.S. Army War College Press, February 2013, pp. 295-327, (34 pages)

## Topic 11

# Nuclear Command and Control

It is perhaps not surprising, therefore, that in modern wars the big blunders have usually been strategic rather than tactical.

— Bernard Brodie, *Strategy in the Missile Age*

The question of what happens if deterrence fails is vital for the intellectual cohesion and credibility of nuclear strategy.

— Sir Lawrence Freedman, *The Evolution of Nuclear Strategy*

### Overview

This lesson offers an opportunity for seminar members to visit the nuclear operations section of the Pentagon's National Military Command Center (NMCC).

The faculty seminar leader will coordinate with the appropriate officials of the Joint Staff, J-3. They will endeavor to set up a meeting with a general/flag officer responsible for nuclear operations, a tour of the NMCC, and a briefing or demonstration of the role of the NMCC in nuclear command and control.

This visit is intended to provide the students a holistic view of the systems and processes used to communicate with senior leaders during a potential threat and develop and execute appropriate responses to that potential threat.

**Topic Objective:** Comprehend the command and control of nuclear forces at the highest levels of the U.S. government.

### Issues for Consideration:

1. Does America's nuclear command and control ensure presidential control over the employment of nuclear weapons, assurance of mission accomplishment, and prevention of unauthorized or accidental use of a nuclear weapon?

2. Do the officials in the Pentagon possess sufficient situational awareness to advise the President of the United States in the event of a nuclear crisis?

3. Is the current system of presidential authority over the use of nuclear weapons correct? If so, why? If not, why not, and what changes should be made?

4. After viewing US systems and processes, what key attributes of an adversary's nuclear command and control would be important or relevant? Not all decision-making and decision support regarding nuclear weapons has to be in the model of the U.S., what key attributes or requirements might you postulate would be achievable or desired by an adversary?

**Required Readings:** (68 pages)

- a. C. Robert Kehler, "[Nuclear Weapons & Nuclear Use](#)," *Daedalus* Vol. 145, Issue 4, (Fall 2016) pp. 50-61. (12 pages)
- b. Jeffrey G. Lewis and Bruno Tertsais, "[The Finger on the Button: The Authority to Use Nuclear Weapons in Nuclear-Armed States](#)," James Martin Center for Nonproliferation Studies, February 2019, pp 1-34 (34 pages)
- c. Lt Gen David Deptula (Ret.), William LaPlante, and Robert Haddick, "[Modernizing U.S. Nuclear Command, Control, and Communications](#)," Mitchell Institute for Aerospace Studies, February 2019, pp 6-28, (22 pages)

**Additional Relevant Material:**

- a. [Full Committee Hearing Authority to Order the Use of Nuclear Weapons](#), United States Senate Committee on Foreign Relations, November 14, 2017. Video at hyperlink. Watch Senator Risch, Senator Merkley, Senator Shaheen, Senator Corker. Other Senator Questions listed below to skim topics that might interest you.
  - Start 30:25
  - Gen C. Robert Kehler (Former STRATCOM Commander) Introductory Remarks – 40:05
  - Professor Peter Feaver (Duke University Sanford of School of Public Policy) Introductory Remarks - 46:00
  - Honorable Brian McKeon (Former Under Secretary of Defense for Policy) Introductory Remarks 52:00
  - Senator Ben Cardin Questions – 57:50 (focus on legality, proportionality, challenges/refusal of Presidential decision)
  - Senator Ron Johnson Questions - 1:05:40 (imminent attack scenarios)
  - Senator Tom Udall Questions - 1:13:10 (require declaration of war prior to nuclear use, imminent attack scenarios, second leader confirmation of Presidential decision)
  - Senator Todd Young Questions - 1:19:00 (legal standard of decision making, recourse of refusing Presidential decision)
  - Senator Chris Murphy Questions - 1:25:45 (legality of order tied to declaration of war or imminent attack, imminent attack scenarios)
  - Senator Marco Rubio Questions - 1:31:40 (allies and adversaries are watching this hearing, calculated ambiguity in nuclear deterrence)
  - Senator Edward Markey Questions - 1:37:20 (remarks/opinions on sole authority, does President require separate authorization to launch nuclear attack)
  - Senator Tim Kaine Questions - 1:43:50 (refusal of Presidential order based on internal procedures/processes, legality/illegality of order, North Korea status of war types of legal orders)

- **\*Senator Jim Risch** Questions - 1:52:38 (commenting to Kim Jung Un to not doubt US resolve)
- **\*Senator Jeff Merkley** Questions - 1:57:00 (how does the President get the military involved, decision support factors to President, survivable forces, false alarm/warnings of attacks, declaratory statement application and discussion – no first use)
- **\*Senator Jeanne Shaheen** Questions - 2:03:35 (classification of consequence and escalation of nuclear attack, comments on irrational decision, policy to limit authority but not weaken deterrence)
- **\*Senator Bob Corker** Questions - 2:12:30 (recap, modernization, final remarks)
- Senator Edward Markey Questions - 2:18:45 (preemptive nuclear war)
  
- End 2:23:30

## Topic 12

# Implications for U.S. Nuclear Policy and Force Structure

### Overview

As with all weapons systems, nuclear weapons have a finite timeline. As those weapons exceed design life, replacements will naturally be modernized in some measure to accommodate technological advances since the weapon was fielded and account for any potential future security challenge or new capability that might be required. Barring a worldwide commitment to arms control and/or global zero, adversaries will continue to explore technologies that provide a military advantage. Incorporating new technology with nuclear weapons will force continued analysis and evaluation of effective strategies and decision-making processes to uphold the tenants of deterrence.

Addressing more than just a numbers game of nuclear warheads and delivery vehicles, future practitioners, diplomats, and strategists will have to consider and evaluate how disruptive technologies might potentially alter the nature of nuclear deterrence.

Most U.S. warheads were produced in the 1970s and 1980s, and there remains a strong debate regarding the future safety, security, and reliability of the U.S. nuclear stockpile and its associated delivery systems. While the New START Treaty did not require deep cuts in U.S. force structure, it has capped systems at levels that make arguments for eliminating a leg of the triad seem possible or even fiscally prudent. In addition to the actual warheads and delivery systems, the concomitant command, control, and communications systems as well as early warning and missile defense systems have become synonymous with the nuclear enterprise. Advocates for and against nuclear weapons both recognize the importance of the entire fabric of capabilities and technology required to maintain a credible nuclear deterrent force. All components of the nuclear weapons enterprise require modernization and recapitalization in the coming years as obsolescence and expiration of design life increase.

It is clear adversaries will continue to pursue technological breakthroughs and new designs to close perceived or actual gaps in their deterrent forces. New adversary capabilities may very well create asymmetries that will drive analyses and questions regarding stability among nuclear states. Political leaders and policy makers will be faced with a myriad of choices both in the procurement as well as the posture of nuclear forces. While a world without nuclear weapons may indeed be an aspirational goal, nuclear weapons are likely to remain the most important tool for protecting a nation's vital interests and sovereignty.

### Topic Objectives:

1. Evaluate potential disruptive technologies as applied to the nuclear enterprise and how they might shape new or exotic weapon systems as well as the complementary nuclear policy decisions.

2. Analyze and evaluate the U.S. nuclear posture.

**Issues for Consideration:**

1. What is your view of the U.S. declaratory policy regarding nuclear weapons? Should nuclear weapons be used in response to a non-nuclear strategic attack against the United States? Why or why not?
2. What is the 2018 NPR's rationale for low-yield warheads on Trident missiles and a new sea-launched cruise missile? Do you agree with that rationale?
3. What are the relative advantages and disadvantages of the different legs of the triad, and how relevant will these be to future needs? Should the United States move to a dyad or a monad, and if so, which leg(s) of the triad should be eliminated?
4. What is the most important need in addressing nuclear adversaries' perception of the U.S. nuclear enterprise? What messaging is necessary to increase stability or security with respect to other nuclear powers?
5. What path should the United States take to control the type and number of nuclear states that must be deterred by the U.S. nuclear arsenal? If the current non-proliferation regime is not achieving results in managing potential nuclear adversaries what new objectives should be pursued?
6. The enormity of the decision to potentially employ a nuclear weapon demands the highest level of analysis. How should decision support procedures and processes link the nation's nuclear strategy, policy, and posture to that decision? What, if any, analytic tools can or should be used to help political leaders evaluate potential changes or uses of the weapons in the nuclear enterprise?

**Required Readings** (Total Readings: 50 pages)

- a. U.S. Department of Defense, [2018 Nuclear Posture Review](#), (Washington DC: DOD, 2018), Executive Summary, pp. V-XVII. (12 pages)
- b. Brad Roberts, [The Case for Nuclear Weapons in the 21st Century](#), (United States: Stanford University Press, 2016), Chapter 9: Conclusion, and Epilogue, pp.235-273. (38 pages)

## National War College

### PRESENTATION EVALUATION for \_\_\_\_\_

STUDENT: \_\_\_\_\_ Topic: \_\_\_\_\_ DATE: \_\_\_\_\_

	A	A-	B+	B	B-	C	F
<p><b><u>CONTENT</u></b></p> <p><b>Depth of Research/ Accuracy of Material</b></p>	<p>--Tremendous, thorough research displaying material beyond that readily accessible or commonly known</p> <p>--Exceptional attention to detail and accuracy revealed</p>	<p>--Solid research covering mainstream sources aside from those presented in class texts</p> <p>-- Accurate material presented throughout</p>	<p>--Research based largely on material contained in course texts</p> <p>--Material contains some gaps in accuracy and detail</p>	<p>--Research is haphazard and makes use of minimal sources; more opinion than empirical evidence offered</p> <p>--Material presented contains substantial gaps in accuracy and detail; very superficial</p>	<p><input type="checkbox"/></p>	<p><input type="checkbox"/></p>	<p><input type="checkbox"/></p>
<p><b>COMMENTS:</b></p>							
<p><b><u>CONTENT</u></b></p> <p><b>Relevance</b></p>	<p>--Outstanding effort showing relevance of topic to present/future national security issues</p>	<p>--Sound display of how the topic is relevant to present/future national security issues</p>	<p>--Some degree of relevance for present/future national security issues exhibited</p>	<p>--No effort made to show why the topic is relevant for present/future national security issues</p>	<p><input type="checkbox"/></p>	<p><input type="checkbox"/></p>	<p><input type="checkbox"/></p>
<p><b>COMMENTS:</b></p>							

<p><b><u>PRESENTATION</u></b></p> <p><b>Organization</b></p>	<p>--Presentation is remarkably clear and inherently logical in structure; seminar audience can follow with ease from introduction to conclusion</p> <p>--Transitions smoothly link ideas within and between main points</p> <p>--No digressions distract viewers</p> <p><input type="checkbox"/> <input type="checkbox"/></p>	<p>--Presentation has a sound organizational structure throughout</p> <p>--Adequate transitions guide the audience within and between different parts of the presentation</p> <p>--Digressions and irrelevancies, if present, are rare and do not significantly distract from the flow</p> <p><input type="checkbox"/> <input type="checkbox"/></p>	<p>--Some degree of organization present</p> <p>--Presentation is sometimes difficult to follow because of confusing arrangement of supporting ideas and/or ineffective transitions</p> <p>--Digressions or irrelevancies sometimes distract audience from the flow of the presentation</p> <p><input type="checkbox"/></p>	<p>--Logical flow of ideas is interrupted, broken, or non-existent</p> <p>--Presenter's thoughts are difficult to follow throughout; transitions are not used, abrupt, confusing, or unclear</p> <p>--Digressions and irrelevancies consistently distract the audience from the flow of the presentation</p> <p><input type="checkbox"/> <input type="checkbox"/></p>
<p><b>COMMENTS:</b></p>				
<p><b><u>PRESENTATION</u></b></p> <p><b>Time Limit</b></p>	<p>-- Perfectly timed (<math>\pm</math> 10 seconds)</p> <p><input type="checkbox"/> <input type="checkbox"/></p>	<p>--Within 1 min over/under</p> <p><input type="checkbox"/> <input type="checkbox"/></p>	<p>--Within 2 min over/under</p> <p><input type="checkbox"/></p>	<p>--Exceeds 3 min over/under</p> <p><input type="checkbox"/> <input type="checkbox"/></p>
<p><b>COMMENTS:</b></p>				
<p><b><u>PRESENTATION</u></b></p> <p><b>Demeanor</b></p>	<p>--Exceptionally confident and comfortable with the subject matter; very polished and well-rehearsed</p> <p>--Consistently strong eye contact with audience; class fully attentive at all times</p> <p><input type="checkbox"/> <input type="checkbox"/></p>	<p>--Generally confident and comfortable with the subject matter; practice evident in solid presentation</p> <p>--Eye contact usually maintained with audience; class generally attentive</p> <p><input type="checkbox"/> <input type="checkbox"/></p>	<p>--Occasionally comfortable with presentation, but polish lacking; minimal practice evident</p> <p>--Limited eye contact with audience; overly focused on notes; class attention often wanders</p> <p><input type="checkbox"/></p>	<p>--Not comfortable; no polish, and no practice evident</p> <p>--Eye contact not maintained with audience; head down into notes or focused toward slides; class rarely focused on speaker</p> <p><input type="checkbox"/> <input type="checkbox"/></p>
<p><b>COMMENTS:</b></p>				

<b>Visual Aids (if applicable)</b>	--Exceedingly high quality and excellent attention to detail --Work well—the first time --Not so elaborate as to distract from topic <input type="checkbox"/> <input type="checkbox"/>	--Solid quality visuals that convey desired impact --Only minor glitches that do not significantly detract <input type="checkbox"/> <input type="checkbox"/>	--Some visuals work well; others do not --Quality is inconsistent <input type="checkbox"/>	--Visuals detract from the pitch more than assist it --Extremely poor quality; no evidence of QCing products <input type="checkbox"/> <input type="checkbox"/>
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**COMMENTS:**

**OVERALL EVALUATION**

<b>CONTENT</b>	A <input type="checkbox"/>	A- <input type="checkbox"/>	B+ <input type="checkbox"/>	B <input type="checkbox"/>	B- <input type="checkbox"/>	C <input type="checkbox"/>	F <input type="checkbox"/>
<b>PRESENTATION</b>	A <input type="checkbox"/>	A- <input type="checkbox"/>	B+ <input type="checkbox"/>	B <input type="checkbox"/>	B- <input type="checkbox"/>	C <input type="checkbox"/>	F <input type="checkbox"/>

**COMMENTS:**

**National War College**  
**WRITING ASSIGNMENT EVALUATION RUBRIC:** First LastName – Paper Topic

	<b>Exceptional</b>	<b>Superior</b>	<b>High Quality</b>	<b>Acceptable</b>	<b>Below Expected Quality</b>	<b>Unsatisfactory</b>
<b>Mastery of Course Content</b>	--Displays a precise and clear knowledge of course themes and content and ability to interpret/critique course content. --Demonstrates an outstanding ability to apply course concepts and analytical tools to new situations. --Demonstrates detailed and explicit understanding of course materials. <input type="checkbox"/>	--Displays a strong knowledge of course themes and objectives. --Displays an ability to consistently apply course tools and concepts to new situations. --Shows a strong understanding of course materials. <input type="checkbox"/>	--Demonstrates knowledge of most elements of course themes and content. --Displays an ability to consistently apply course tools and concepts to assigned cases. --Shows a sound understanding of course materials. <input type="checkbox"/>	--Demonstrates knowledge of some elements of course themes and content. --Shows a general ability to apply concepts and tools of analysis developed in the course to assigned cases. --Shows some understanding of course materials. <input type="checkbox"/>	--Makes only limited reference to major course themes/content or sometime includes incorrect references. --Shows limited ability to apply tools of analysis developed in the course to assigned cases --Shows limited understanding of course materials. <input type="checkbox"/>	--Makes no explicit reference to major course themes/content, or the references are incorrect. --Does not use tools of analysis developed in course or uses them in invalid ways. --Does not reference course materials or makes clear their understanding is invalid. <input type="checkbox"/>
<b>COMMENTS:</b>						
<b>Thesis/ Focus</b>	--Thesis is not only exceptionally clear, concise and supportable, but also establishes an original point of view that is directly related to the assignment. --The central idea uniformly drives the entire paper and provides the highest degree of clarity and coherence for it. <input type="checkbox"/>	--Thesis is clear, concise, and supportable. --Thesis establishes a clear, insightful point of view that is directly linked to the assignment. --The central idea and clarity of purpose are consistently clear throughout the entire paper. <input type="checkbox"/>	--Thesis is clear, concise, and supportable. --Thesis establishes a point of view that is linked to the assignment. --The central idea and clarity of purpose are maintained throughout the paper. <input type="checkbox"/>	--Thesis is clear and generally supportable. --Thesis is linked to the assignment. --Paper occasionally strays from the central idea or purpose as stated in the thesis. <input type="checkbox"/>	--Thesis is present, but may be unclear, too broad or difficult to argue or only indirectly linked to the assignment. Paper routinely strays from the central idea or purpose as stated in the thesis. <input type="checkbox"/>	--Thesis is non-existent, incompletely expressed, or irrelevant to the paper. --No central idea or purpose guides the paper. <input type="checkbox"/>
<b>COMMENTS:</b>						

<b>Support of Thesis/ Evidence</b>	--Masterful support for thesis provided throughout; evidence and arguments are clear, insightful and compelling. --Support reflects exceptional analysis and interpretation of evidence, and, if appropriate/required, exhaustive research. --Potential counterarguments are comprehensively addressed. --Conclusion powerfully reinforces the thesis. <input type="checkbox"/>	--Thesis is strongly supported by arguments and evidence that are consistently accurate, thorough and relevant. --Support reflects sophisticated analysis of evidence, and, if appropriate/required, comprehensive research. --Potential counterarguments are acknowledged. --Conclusion logically and effectively reinforces the thesis. <input type="checkbox"/>	--Thesis is well-supported by arguments and evidence which are accurate, thorough, and relevant. --Support consistently reflects sound analysis of evidence, and, if required, solid research. --Potential counterarguments are partially acknowledged. --Conclusion logically reinforces the thesis. <input type="checkbox"/>	--Thesis is sufficiently supported by arguments and evidence which are usually accurate and relevant. --Support generally reflects sound analysis of evidence, and, if appropriate/required, adequate research. --Conclusion adequately reinforces the thesis. <input type="checkbox"/>	--Thesis is generally supported by evidence, though not sufficient for all points. --Paper reflects some careful thought and analysis, but it's inconsistent, and the quality and quantity of research—if appropriate/required—is sometimes superficial --Conclusion is present, but does not tie to thesis well. <input type="checkbox"/>	--Thesis is never adequately supported; evidence is weak, inaccurate and/or irrelevant. --Minimal analysis reflected in the paper, and research, if appropriate/required, is inadequate --No real conclusion or, if present, it fails to relate to the thesis. <input type="checkbox"/>
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**COMMENTS:**

<b>Organization</b>	--Paper is inherently logical in structure; reader can easily follow the argument from introduction to conclusion. --Skillful transitions effortlessly link ideas within and between paragraphs. --All paragraphs tightly constructed around topic sentences. --Paper is free of digressions and irrelevancies. <input type="checkbox"/>	--Paper is well-organized. --Sound use of transitions to guide the reader within and between paragraphs. --Consistently strong paragraph construction referencing topic sentences. --Digressions or irrelevancies, if present, are rare and do not distract from argument flow. <input type="checkbox"/>	--Paper is satisfactorily organized. --Adequate transitions guide the reader within and between paragraphs. --Paragraph structure is solid throughout. --Digressions or irrelevancies are minimal and generally do not distract from the argument flow. <input type="checkbox"/>	--Paper is generally organized. --Adequate transitions usually guide the reader within and between paragraphs. --For the most part, paragraph structure is solid. --Digressions and irrelevancies occasionally distract from the argument flow. <input type="checkbox"/>	--Some degree of organization present. --Paper is sometimes difficult to follow because of confusing arrangement of supporting ideas and/or ineffective transitions. --Paragraph structure occasionally weak-- multiple ideas covered in lengthy passages or frequent one or two-sentence paragraphs --Digressions or irrelevancies frequently distract reader from the flow of the argument. <input type="checkbox"/>	--Logical flow of ideas is interrupted, broken, or non-existent. --Writer's thoughts are difficult to follow throughout; transitions are not used, abrupt, confusing, or unclear. --Paragraph structure is haphazard. --Digressions and irrelevancies consistently distract the reader from the flow of the argument. <input type="checkbox"/>
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**COMMENTS:**

<b>Grammar/ Spelling/ Punctuation Mechanics/ Word Choice</b>	--Displays exceptional command of standard written English. --Includes superbly-crafted sentences and adroit word choice; analogies and figures of speech are precisely used with maximum impact. --Presentable to high-level officials/officers without revisions. <input type="checkbox"/>	--Displays excellent command of standard written English. -Well-crafted sentences throughout. Errors in syntax, grammar, mechanics, or word choice, if present, are rare and do not distract from overall high quality. --Presentable to high-level officials/officers with few revisions or edits. <input type="checkbox"/>	--Demonstrates strong command of standard written English. --No persistent errors in syntax, grammar, mechanics, word choice. --Presentable to high-level officials/officers after minor revisions and edits. <input type="checkbox"/>	--Demonstrates sound command of standard written English. --Contains few errors in syntax, grammar, mechanics, or word choice. --Presentable to high-level officials/officers after moderate revisions and edits. <input type="checkbox"/>	--Contains errors in spelling, punctuation, capitalization, sentence structure, and/or word choice that sometime interfere with communication. --Presentable to high-level officials/officers only after significant revisions and edits. <input type="checkbox"/>	--Contains extensive errors in spelling, punctuation, word choice, capitalization and/or sentence structure that hinder communication. --Not presentable to any audience as written. <input type="checkbox"/>
<b>COMMENTS:</b>						
<b>Documen- tation (if applicable)</b>	--Sources are fully cited. --All citations are in correct format in accordance with Chicago Style (Turabian). <input type="checkbox"/>	--Sources are fully cited. --Citations are in correct format; errors are rare. <input type="checkbox"/>	--Sources are fully cited. --Citations are generally in correct format; errors are infrequent and correctable. <input type="checkbox"/>	--Most sources are fully cited. --Occasional errors in format are evident. <input type="checkbox"/>	--Many sources are either not cited or are incorrectly cited. <input type="checkbox"/>	--Most sources are either not cited or are incorrectly cited. <input type="checkbox"/>
<b>COMMENTS:</b>  <p style="text-align: center;"><b>NOT APPLICABLE</b></p>						
<b>CONTENT</b>	<b>A</b> <input type="checkbox"/>	<b>A-</b> <input type="checkbox"/>	<b>B+</b> <input type="checkbox"/>	<b>B</b> <input type="checkbox"/>	<b>B-</b> <input type="checkbox"/>	<b>C</b> <input type="checkbox"/>
<b>COMPOSTION</b>	<b>A</b> <input type="checkbox"/>	<b>A-</b> <input type="checkbox"/>	<b>B+</b> <input type="checkbox"/>	<b>B</b> <input type="checkbox"/>	<b>B-</b> <input type="checkbox"/>	<b>C</b> <input type="checkbox"/>
<b>OVERALL EVALUATION</b>	<b>A</b> <input type="checkbox"/>	<b>A-</b> <input type="checkbox"/>	<b>B+</b> <input type="checkbox"/>	<b>B</b> <input type="checkbox"/>	<b>B-</b> <input type="checkbox"/>	<b>C</b> <input type="checkbox"/>
<b>OVERALL COMMENTS:</b>						