



UNITED STATES AIR FORCE
CENTER FOR STRATEGIC
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Feature Report

“INFECTIOUS DISEASE MODELING: Opportunities to Improve Coordination and Ensure Reproducibility”. Published by U.S. Government Accountability Office; May 2020

<https://www.gao.gov/assets/710/706927.pdf>

What GAO Found

Within the Department of Health and Human Services (HHS), the Centers for Disease Control and Prevention (CDC) and the Office of the Assistant Secretary for Preparedness and Response (ASPR) used models to inform decision-making during and after outbreaks of Ebola, Zika, and pandemic influenza. These agencies’ modeling efforts informed public health planning, outbreak response, and, to a limited extent, resource allocation. Four CDC centers perform modeling.

HHS agencies reported using multiple mechanisms to coordinate modeling efforts across agencies, but they do not routinely monitor, evaluate, or report on the extent and success of coordination. Consequently, they risk missing opportunities to identify and address modeling challenges—such as communicating clearly, and obtaining adequate data and resources—before and during an outbreak. As a result, agencies may be limiting their ability to identify improvements in those and other areas. Further, there is potential for overlap and duplication of cross-agency modeling efforts, which could lead to inefficiencies.

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- [Inhofe, Reed Back New Military Fund to Confront China](#) (Defense News)
They said their version will back investments in land-based, long-range strike capabilities, but also “theater missile defense, expeditionary airfield and port infrastructure, [and] fuel and munitions storage,” to enable new modernized platforms, rather than buying more of the platforms themselves.
- [Army Invites Air Force ABMS To Big Network Test: Project Convergence](#) (Breaking Defense)
The exercise will test sharing of targeting data amongst the Army’s newest weapons, including aerial scouts, long-range missile launchers and armored vehicles.

US ARMS CONTROL

- [IAEA Nuclear Oversight Grew in 2019](#) (Arms Control Today)
The agency circulated its annual report of its safeguards activity in April, disclosing that its personnel conducted 2,179 inspections in 183 states in 2019.
- [Experiment Improves Predictions of Uranium Dispersion](#) (Lawrence Livermore National Laboratory)
The research team synthesized uranium oxide nanoparticles using a plasma flow reactor under controlled conditions of temperature, pressure and oxygen concentration.
- [Engaging China on Bioweapons and Beyond](#) (Middlebury Institute)
Moral and ethical arguments aside, biological weapons are prohibited by the Biological Weapons Convention (BWC), a multilateral disarmament treaty of 183 states parties that bans biological weapons development and related activities.
- [New Russian Policy Allows Use of Atomic Weapons against Non-nuclear Strike](#) (AP via Defense News)
By including a non-nuclear attack as a possible trigger for Russian nuclear retaliation, the document appears to send a warning signal to the U.S.

COMMENTARY

- [You Can Teach a Marine Deterrence: Understanding Coercion Requires Changing PME](#) (War on the Rocks)
“As professionals who have talked about coercion theory and topics like deterrence to elected officials and senior appointees through the Cyberspace Solarium Commission, and have worked on global campaign and contingency plans, we can attest to a widespread lack of understanding of deterrence and compellence.”
- [Keeping an Eye on the Nuclear Ball](#) (Yale Global Online)
“Failing renewed global arms control, the international order could become characterized by an absence of formal legal limitations on nuclear force modernization.”
- [The Postponed 2020 NPT Review Conference: A Modest Proposal](#) (Bulletin of the Atomic Scientists)
“Let’s take up in turn each potential pitfall that I foresee: nuclear disarmament, the IAEA Additional Protocol, gift baskets, and so-called outcome documents.”
- [Has the United States Abandoned Arms Control?](#) (War on the Rocks)
“The answer to both questions depends in large part on how we define “arms control,” a term whose meaning has divided scholars for decades. Broadly speaking, there are three schools of thought.”
- [Minding the Missile Defense Gap](#) (National Interest)
“History shows us that reliable national defense is built on layers of complementary and redundant systems.”

NUCLEAR WEAPONS AND DETERRENCE

Institute of World Politics (Washington, D.C.)

Peter Huessy Speaks about “The Role of Nuclear Weapons in Chinese Strategy”

June 3, 2020

On Wednesday, May 13, The Institute of World Politics hosted a webinar on the role of nuclear weapons in Chinese strategy. The Institute welcomed Mr. Peter Huessy to speak on the subject.

Mr. Huessy is an expert on nuclear deterrence, missile defense, and strategic threats to the U.S. and its allies, having lectured on these topics around the world. He is currently the President of his own defense consultancy, GeoStrategic Analysis, which was founded in 1981. He is also the Director of Strategic Deterrent Studies at the Mitchell Institute on Aerospace Studies. Previously, he was a defense consultant at the National Defense University Foundation, a National Security Fellow at the AFPC, and a Senior Defense Consultant at the Air Force Association.

Mr. Huessy opened the webinar by telling an anecdote. His mentor, a once-Secretary of Defense, told him that analysts focus too often on nuclear “beans,” countable nuclear tangibles like warheads and missiles. Instead, his mentor said, analysts should look at how nations develop their nuclear capabilities and how they are likely to employ their nuclear capabilities into their wider strategies.

In the 21st century, nuclear strategy is deeply different from what it was during the Cold War. Whereas the Cold War traditional nuclear strategy was one of deterrence, Russian President Vladimir Putin has developed a strategy of “escalate to win.” This strategy involves threatening the use of nuclear weapons in a coercive manner to intimidate the opponent into backing down early in a confrontation. An example of this strategy is how Russia has threatened the U.S. with nuclear attacks should it try to deploy nuclear missiles in Europe.

Mr. Huessy then outlined the conventional wisdom on China’s nuclear capabilities, what he called the “can’t, won’t, wouldn’t, and aren’t” of Chinese nuclear weapons. These mean that:

1. China can’t develop more nuclear weapons because they lack the uranium and plutonium to build more.
2. China won’t develop more advanced nuclear warheads. Beijing claims it is content with its arsenal of single warheads and will not pursue maneuverable or multiple warheads.
3. China wouldn’t ever use its nuclear weapons first.
4. China isn’t interested in further nuclear development. This is because they have the minimal deterrent capability which would allow China to launch nuclear strikes on American cities in retaliation to any nuclear attack but would not have the capability to target U.S. military bases.
5. China claims its nuclear deterrent is employed to prevent what it views as American hostile actions in the Asia-Pacific.

Mr. Huessy responded to each of these points:

1. China said they couldn’t develop more nuclear weapons when they had 20 warheads. Now they may have as many as 300. Why should we believe them this time?
2. China is allegedly developing more advanced nuclear weapons through its “peaceful” space programs.

3. Huessy quoted the head of STRATCOM, Admiral Charles Richard, who said there were loopholes so big in China's "no first use policy" that "you could drive a truck through them."
4. The Director of National Intelligence actually suggests that China is indeed expanding its nuclear force.
5. Finally, Mr. Huessy claimed that China was the hostile party in the Asia-Pacific and not the U.S., suggesting Beijing is being disingenuous about the motivations for its nuclear deterrent.

China has claimed, in the past, that it has no intention of proliferating nuclear weapons. However, according to Mr. Huessy, China then went on to help Chinese partners, like Pakistan, attain nuclear weapons. This means that the U.S. should be cautious about Chinese pronouncements on nuclear weapons.

Mr. Huessy then outlined what he calls the Chinese "nuclear breadcrumbs," which allow us to get an idea of what China is up to in terms of its nuclear capabilities. Even though China claims it keeps its nuclear warheads and conventional weapons separate, suggesting a "no first use policy," Mr. Huessy believes that China's actions – for example, sending out Chinese nuclear submarines on patrol and the "Underground Great Wall," a tunnel system built below China for the covert transportation of nuclear weapons – hints at a strategy beyond "no first use." Mr. Huessy has also seen evidence to suggest that China targets U.S. military installations with its nuclear warheads, which implies a Chinese strategy beyond minimal deterrent.

Mr. Huessy also asserts that China, despite denials, is indeed building a nuclear triad (intercontinental ballistic missiles, submarine-launched ballistic missiles, and strategic bombers), which is another stark shift away from minimal deterrence.

China seems to be moving towards a Putin-like strategy of "escalate to win" by threatening to use its nuclear capabilities on a regional level. An example of this is the mention of nuclear force against Taiwan in Chinese strategy. China, Mr. Huessy argues, is not only trying to remove U.S. dominance in the Asia-Pacific but is trying to cut off American regional allies like Japan and South Korea, a strategy China calls "deterrence," which should not be confused with Western conceptions of nuclear deterrence.

Increased anti-U.S. rhetoric, such as claims that the U.S. is unfit to lead the world, especially in the wake of the coronavirus pandemic, and China's acceleration of its hegemonic strategy, which would originally have seen China declaring itself the leader of the world in 2048, will cause worries for the U.S. In these changing circumstances, Mr. Huessy says it is only natural to see a more aggressive Chinese nuclear posture, such as the "escalate to win" strategy. This should be causing alarm bells to ring in Washington, D.C.

Questions from the audience followed, ranging on topics such as whether the New START treaty should be pursued even without China, the potential for a Chinese electromagnetic pulse attack on the U.S., and whether Russia and China are cooperating over their nuclear capabilities.

<https://www.iwp.edu/past-events/2020/06/03/peter-huessy-speaks-about-the-role-of-nuclear-weapons-in-chinese-strategy/>

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Arms Control Today (Washington, D.C.)

Book Review | The Bomb: Presidents, Generals, and the Secret History of Nuclear War

Reviewed by Nina Tannenwald

June 2020

The Bomb: Presidents, Generals, and the Secret History of Nuclear War

By Fred Kaplan (Simon and Schuster, 2020), 384 pages

Reining in Nuclear War Planners: A Checkered History of U.S. Civilian Leaders

In the late 1980s, Fred Kaplan's book *The Wizards of Armageddon* was required reading if you hoped to pass your exams in security studies. That book, as its title aptly suggested, focused on the theorists of nuclear deterrence and other "defense intellectuals" whose novel ideas about deterrence helped shape U.S. nuclear strategy during the Cold War. Now a cult classic for nuclear nerds, it was a path-breaking intellectual history of the people and ideas behind the concept of nuclear deterrence.

Kaplan's newest book, 36 years later, synthesizes a lifetime of research and reporting to provide an overview of U.S. nuclear deterrence policy, from 1945 to the present, with the perspectives of presidents, their advisers, and the generals in charge of the nuclear arsenal. Kaplan, the long-time national security columnist at *Slate*, traces their efforts to wrestle with the political, military, and moral paradoxes of threatening all-out nuclear catastrophe as a way to protect the country. Kaplan brings to the task his expert command of the issues, a historian's appreciation for the archives, and a journalist's gift for lively, accessible writing and vivid storytelling. He appears to have interviewed every important person, looked at every archive, and viewed every TV interview. The outlines of this story are generally known, especially with regard to the Cold War years, but Kaplan's account provides important new detail while carrying the story up to the present. The result is an overview of the politics and logic of seven decades of U.S. nuclear war planning that is gripping, illuminating, and ultimately frightening. This book should have wide readership, including in the classroom.

The title of Kaplan's latest book is slightly misleading. It is not about nuclear war but rather about U.S. war plans and planning, as well as the efforts of U.S. leaders to avoid nuclear war in crises. As Kaplan's own account drives home, the Pentagon's war plans may or may not have any meaningful relationship to any actual nuclear war a president might wage. Since nuclear weapons have not been used since 1945, nuclear war planning is an abstract exercise conducted in the absence of any real evidence about how nuclear exchanges might actually take place. Presidents and their military planners can only imagine such a war, leading one scholar to refer to nuclear strategy as the "imaginary science." The numerous unknowns of nuclear war planning give rise to many of the political dynamics and the tortuous strategic logic explored in Kaplan's book.

The book focuses on the ambitious and often unsuccessful efforts of presidents and their civilian advisers to impose some restraint on the size of the nuclear arsenal and to shift the targeting plans away from a massive, all-out strike to more "controllable" options. Kaplan introduces us to the people and personalities who have shaped the U.S. nuclear arsenal and plans for its use, while taking us into discussions deep inside the Pentagon, at the White House, and at Strategic Air Command (SAC) headquarters in Omaha. Throughout, Kaplan tells dramatic stories of presidents often standing up to their hawkish military advisers to avoid getting into a nuclear war or even just to pursue arms control. He provides new details about how John Kennedy faced crises in Berlin and Cuba, Jimmy Carter dealt with arms control, Ronald Reagan at first embraced nuclear warfighting and then nuclear abolition, Bill Clinton and George W. Bush dealt with North Korea, and Barack Obama put disarmament on the agenda.

Interservice rivalries between the Army, Navy, and Air Force drove nuclear policy in the early years after 1945 and helped set the precedent for a steady nuclear arms build-up and a U.S. nuclear war plan that threatened massive, all-out nuclear strikes on the Soviet Union and China.

Subsequent chapters then delve into the efforts of presidents and their advisers, beginning with Kennedy, to seek alternatives to the massive first-strike plan of the Single Integrated Operational Plan (SIOP) for nuclear war, that would have killed millions of Soviet and Chinese citizens. The civilian leaders also faced steady resistance from the generals at SAC and the Joint Chiefs of Staff who would actually control the nuclear strikes. Kennedy's defense secretary, Robert McNamara, famously toyed with the idea of a "counterforce" doctrine that would target Soviet missiles rather than cities, but abandoned it when he realized that it would lead the military chiefs to ask for even more weapons. In the end, McNamara compromised by letting them have 1,000 intercontinental ballistic missiles, more than he thought necessary for deterring the Soviet Union. He also accepted a public declaratory doctrine that emphasized "assured destruction," a policy he knew to be inconsistent with the SIOP's first-strike plans.

Inconsistency and contradiction became dominant themes. In the 1970s, President Richard Nixon and Secretary of State Henry Kissinger were frustrated by the lack of options in the SIOP and wrestled with the puzzle of how to fight a "limited" nuclear war to protect allies in Europe and Asia. Given that no one could figure out how to keep a limited war limited, however, they could not come up with a scenario in which the United States was better off using nuclear weapons first. Kaplan traces how Carter, who abhorred nuclear weapons, reluctantly approved medium-range missiles in Europe because they were politically useful although of marginal military value. Ironically, as Kaplan shows, it was under the hawkish Reagan administration, which advocated "prevailing" in a nuclear war, that the first effective effort to take a scalpel to the SIOP began, resulting in the biggest cuts in the nuclear arsenal until then.

Kaplan brings important new detail to both familiar and lesser-known cases. Particularly notable are his expansive account of Deputy National Security Advisor Carl Kaysen's first-strike planning during the 1961 Berlin crisis, as well as the fascinating and detailed story of the successful efforts of Frank Miller and a group of civilians in the Pentagon during the late 1980s to make deep cuts in the number of strategic weapons. Closer to the present, drawing on recent reporting and interviewing, he provides an illuminating account of how Obama, the "disarmament" president, was beaten back by the defense establishment and its strategic dogmas. He also traces the writing of and arguments behind the Trump administration's 2018 Nuclear Posture Review and its controversial revival of the concept of limited nuclear war.

Kaplan's sympathies clearly lie with the civilian leaders trying to reel in overkill in the face of resistance from recalcitrant generals. Yet, even former Obama Defense Secretary Ashton Carter, once the boy wonder of "nuclear winter" analysis in the 1980s, comes in for criticism for drinking the Kool-Aid on the need to maintain a threat of first use and resisting Obama's efforts to move to a "sole use" policy.

Overall, the book provides a devastating portrayal of the insanity of the nuclear targeting process. In one case, 69 warheads were targeted on a single Soviet anti-ballistic missile site. In 1990, SAC commander Jack Chain told Congress that he needed 10,000 weapons because SAC had identified 10,000 targets, rather than defining any strategic goal. Achieving excessive destruction was a goal in itself. As Kaplan writes, "The SIOP was a broken machine, the discombobulated aggregate of compartmentalized calculations."

Kaplan's account makes clear that civilian leaders from Kennedy to Obama, as well as some military officers, were appalled by the massive overkill of the war plans. Kissinger called the SIOP a "horror strategy." Yet, every president faced stiff resistance in trying to wrest control over the nuclear arsenal from SAC and the Joint Chiefs. Regardless of the publicly stated nuclear doctrine, the generals have pushed for a first-strike capability from the beginning and remained skeptical of graduated options. People who knew better, such as McNamara, argued for larger than necessary arsenals simply for political and bureaucratic reasons. Still, even those who advocated for "controlled" options had to admit that, in the end, this was magical thinking.

The take-home message of Kaplan's book is sobering. Despite the much-vaunted civilian control over the military that supposedly exists in the United States, the story told here suggests the opposite. The SIOP did not necessarily reflect the president's desires or policies. Even when there was guidance for limited options, SAC did not follow it. Moreover, when war plans might have looked like they contained options, a closer look would reveal that even the smallest strike was still massive, and SAC consistently had ways of understating the damage.

This is not a very reassuring story for the command and control of the nuclear arsenal today. At the same time, it may reflect a point on which, ironically, the hawkish generals and the pro-nuclear abolition advocates might agree: the notion of a limited nuclear war is simply meaningless.

It also suggests that, in the end, there seem to be no answers to the paradoxes of nuclear strategy. Kaplan employs the metaphor of "going down the rabbit hole" to describe the effort to parse nuclear abstractions or to resolve the paradox of threatening a catastrophically destructive war you would never really want to fight, until you finally give up because the questions, such as whether there is such thing as a limited nuclear war, are ultimately unanswerable. As this masterful book shows, every U.S. administration has begun with an effort to get a rational grip on the nuclear arsenal and, in the end, like every administration before it, has gone down the rabbit hole of nuclear abstractions.

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<https://www.armscontrol.org/act/2020-06/features/bomb-presidents-generals-secret-history-nuclear-war>

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The Strategist (Barton ACT, Australia)

Nuclear-armed Submarines and Strategic Stability in the Indo-Pacific

By Stephan Fruehling

June 4, 2020

No other weapon system embodies the menacing, but also out-of-sight, presence of nuclear weapons better than the stealthy nuclear-powered ballistic missile submarines (SSBNs) that have, for six decades, ceaselessly prowled the world's cold ocean depths, waiting for an order that has never come. SSBNs on continuous at-sea deterrence missions remain the mainstay of the nuclear forces in the United States and France, and the sole platform carrying British nuclear weapons. Despite Russia's significant investment in road-mobile missiles, SSBNs also remain an important element of its nuclear forces.

In Asia, however, nuclear-armed submarines are a newer phenomenon. China has had a longstanding interest in developing SSBN technology, but has only in recent years put them into service, in numbers comparable to Britain's and France's. Israel has reportedly fielded nuclear-

armed (cruise) missiles on its conventionally powered submarines, and India, Pakistan and North Korea have also all shown an interest in moving nuclear weapons under the sea. As these countries' programs mature, undersea nuclear deterrence will cease to be a preserve of the major powers. The relevance of nuclear-armed submarines for strategic stability in the Indo-Pacific area will thus increase—but what will their impact be?

A common idea in the international commentariat on nuclear weapons and international affairs is that strategic stability could be 'assured' by 'mutually assured destruction', based on a relatively small number of large-yield, survivable warheads, such as those carried on an SSBN. But while using submarines to strike the land promises survivable nuclear forces, it also provides long reach and the ability to conduct surprise attacks with short warning, and from unexpected angles—factors much less prone to promote stability. Indeed, the latter two considerations were particularly important for the development and geographic deployment of SSBNs during the Cold War, especially by the Soviet Union. They may be so again as countries in Asia look to overcome the missile defence capabilities fielded by the United States and its allies.

The survivability of SSBNs has also recently been called into question by many commentators, especially in the debates on the replacement of the Trident nuclear submarines in the United Kingdom. A confluence of new technologies, such as unmanned vehicles and big-data analytics, with improved sonar, signals and imagery sensors, and the potential for completely new sensing technologies based on, for example, quantum effects, may render the oceans 'transparent' to anti-submarine forces.

The historical record on the vulnerability of SSBNs is already more ambiguous than often acknowledged in these debates. Technology is but one factor influencing the survivability of SSBNs, which has historically differed widely for different countries based on their geographic situation and adversary capabilities.

During the Cold War, the US developed long-range passive sonar systems that could track specific tonal frequencies of Soviet submarines in the North Atlantic and Pacific oceans. These systems made Soviet undersea capabilities far more vulnerable than realised by the public at the time and, until the 1970s, even by the Soviet Union. Insofar as there was an undersea 'arms race', it occurred not between adversaries' nuclear forces, but between Soviet SSBNs and US anti-submarine warfare (ASW) forces.

In this and future contests, geography remains a central factor, because it conditions the ability of countries to make use of (or counter) new ASW technologies that might increase the risk to SSBNs. Moreover, only the US and Russia openly seek the ability to hold other countries' nuclear forces at risk as part of their deterrence posture, and hence have an operational need to counter adversary SSBNs.

There are also other ways of protecting SSBNs than relying on stealth alone. Once the Soviet Union realised that its SSBNs were vulnerable and that the range of its submarine-launched missiles allowed it to target the continental US from the Arctic Ocean, it began to confine its SSBN deployments to 'bastions' in the Barents Sea and Sea of Okhotsk that were actively defended against allied submarines by the Soviet navy and by land-based aircraft.

But if the survival of SSBNs depends not on stealth but on one's own defensive ASW capabilities to protect them from adversary hunter-killer submarines, the implications of radical improvements in ASW for SSBN survivability and crisis stability also become less clear-cut. Indeed, this dynamic may in fact make SSBNs more survivable, not less—if at the cost of significant investment in defensive ASW forces—such as that which we might now see underway by China in the South China Sea.

Whether the increased deployment of SSBNs in the Indo-Pacific will thus be stabilising or destabilising—in arms competition as well as in crises and war—remains an open and important question for regional security. Given the multiple centres of power in the Indo-Pacific, its connected conflict dyads, and its regional order that lacks both the informal rules and clear dividing lines of the Cold War, conceiving of a regional concept for ‘stability’ is fraught in general.

When assessing the current and future impacts of SSBN technology and deployments on strategic stability in the Indo-Pacific, we thus need to look beyond superficial readings of Cold War history that equate SSBN forces with a supposedly stabilising way of deploying nuclear forces as a secure second-strike capability—for they may be neither intended for second strike, nor particularly secure.

Rather than being a technologically deterministic relationship, the consequences of changes in ASW technology and of the deployment of SSBNs in the region will reflect the particular geographic and strategic circumstances of each adversarial dyad, and defy easy generalisation.

This piece was produced as part of the Indo-Pacific Strategy: Undersea Deterrence Project, undertaken by the ANU National Security College. This article is a shortened version of chapter 3, ‘SSBN, nuclear strategy and strategic stability’, as published in the 2020 edited volume *The future of the undersea deterrent: a global survey*. Support for this project was provided by a grant from Carnegie Corporation of New York.

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<https://www.aspistrategist.org.au/nuclear-armed-submarines-and-strategic-stability-in-the-indo-pacific/>

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Beyond Parallel/CSIS (Washington, D.C.)

Pyongsan Uranium Concentrate Plant (Nam-chon Chemical Complex)

By Joseph Bermudez and Victor Cha

May 29, 2020

Key Findings

- Recent satellite imagery shows that the Pyongsan Uranium Concentrate Plant remains operational and continues to be updated, despite the absence of any nuclear testing by North Korea since 2017.
- This facility is critical as it is the sole known source of feedstock for uranium hexafluoride (UF₆) used for the production of highly enriched uranium for North Korea’s advanced nuclear weapons program.
- Its dismantlement would be an essential component of any meaningful denuclearization agreement.
- These commercial satellite images and the full CSIS Beyond Parallel report to follow next month are among the first to provide details about this element of North Korea’s nuclear program.

- Located 45 kilometers from the DMZ, the Pyongsan Uranium Concentrate Plant represents a critical component within North Korea's nuclear research and weapons development programs as it has been the sole known producer of uranium concentrate (yellowcake) in the country since the mid-1990s, when it superseded the Pakchon Pilot Uranium Concentrate Facility.
- The plant's importance to the North Korean leadership and its critical position within the nuclear research and weapons development programs is attested to by the fact that scarce human and financial resources have been consistently allocated to actively maintain, refurbish or modernize the plant since 2003, and probably since its construction.
- Given the current level of development and activity observed at the plant and its associated facilities, it is highly likely to remain active for the foreseeable future.
- Although the International Atomic Energy Agency (IAEA) has not been able to visit the Pyongsan Uranium Concentrate Plant since 1992, satellite imagery and open source material indicate that the plant is operational and although production tempo has fluctuated—due to maintenance and modernization requirements, the needs of the nation's nuclear programs, the operational status of its reactors and gas centrifuge plants and the availability of electricity—it has proceeded relatively steadily.
- Given known North Korean industrial practices, observed waste storage practices, and health and safety concerns raised by defectors and outside observers, there are numerous health, safety and environmental issues surrounding its operations.

The Pyongsan Uranium Concentrate Plant (38.318369 N, 126.432360 E) is located in Pyongsan-gun (평산군, Pyongsan County), Hwangbuk-do (황북, North Hwanghae Province), approximately 45 kilometers from the DMZ and 96 kilometers northwest of Seoul—the capital of South Korea. Since approximately 1990 it has occupied an critical role in the Democratic People's Republic of Korea's (North Korea) nuclear research and weapons programs as the sole known provider of uranium oxide (yellowcake) to these programs for fuel fabrication or enrichment. While the information remains to be verified, experts, defectors and early South Korean sources estimate that the yellowcake produced by the plant contains 80% triuranium octoxide (U₃O₈) by weight. According to what the North Koreans told Hans Blix, Director General of the IAEA, during his May 1992 familiarization visit, the plant also produces other products such as vanadium and nickel.

During the early-1990s, both Chon Chi-pu, reportedly the chief engineer of Yongbyon Fuel Rod Fabrication Plant, and Kim Tae-ho, a defector who worked on a "waste water disposal team" at the Pyongsan plant have stated that the yellowcake produced at Pyongsan was shipped to the Yongbyon Nuclear Research Facility where it was ultimately used to produce fuel assemblies for the 5MWe and IRT reactors. Today, it also provides the feed stock for both uranium hexafluoride (UF₆) production for the Centrifuge Enrichment Plant and likely for future fuel assemblies to be used in the Experimental Light Water Reactor.

Control and subordination of the Pyongsan Uranium Concentrate Plant is challenging to delineate. Kim Tae-ho, a defector who worked at the plant, has stated in several May 1994 press conferences that while the plant was managed by the Ministry of Atomic Energy Industry, it was under the direct control of the direct control of the Korean Workers' Party's Machine Industry Department's Second Economic Committee – specifically, the Second Economic Committee's 5th Machine Industry Bureau. If correct, it is unclear what roles the Academy of National Defense Sciences' Nuclear Bureau and State Academy of Sciences and its Hamhung Branch play. The Ministry of Mining Industry's is believed to operate the mining complex but it is likely under the direct control of the direct control of the 5th Machine Industry Bureau.

Due to its critical position within the nation's nuclear program it is believed that security for the facility (and the associated mining complex) is provided by a combination of the Ministry of State Security and the Guard Command—directly subordinate to Kim Jong-un.

While it is unclear if the subject came up during the abortive February 27–28, 2019 Hanoi Summit, the dismantlement of the Pyongsan Uranium Concentrate Plant should be an essential component to any meaningful future “complete, verifiable, irreversible dismantlement” nuclear agreement between the United States and North Korea.

The tailings pond south of the Pyongsan Uranium Concentrate Plant as of March 22, 2020. In 2019, reports emerged concerning potential contamination of the Nam-chon (Nam Stream) from an alleged broken pipe at the plant leaking a “black sludge” and leakage from the tailings pond seeping into the ground water and Nam-chon. (Copyright © 2020 by Maxar Technologies)

Joseph S. Bermudez Jr. is an internationally recognized analyst, award-winning author, and lecturer on North Korean defense and intelligence affairs and ballistic missile development in developing countries. He is concurrently senior fellow for Imagery Analysis at the Center for Strategic and International Security (CSIS); senior adviser and imagery analyst for the Committee for Human Rights in North Korea (HRNK); author for IHS Markit (formerly the Jane's Information Group); and publisher and editor of KPA Journal. Formerly, he has served as founder and CEO of KPA Associates, LLC, senior imagery analyst for 38 North at Johns Hopkins SAIS, chief analytics officer and co-founder of AllSource Analysis, Inc., and senior all-source analyst for DigitalGlobe's Analysis Center.

Victor Cha is a senior adviser and the inaugural holder of the Korea Chair at the Center for Strategic and International Studies.

<https://beyondparallel.csis.org/pyongsan-uranium-concentrate-plant-nam-chon-chemical-complex/>

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US COUNTER-WMD

Defense News (Washington, D.C.)

Inhofe, Reed Back New Military Fund to Confront China

By Joe Gould and Aaron Mehta

May 28, 2020

WASHINGTON — As the U.S. Congress hardens against Beijing, two key lawmakers publicly added their support for a new military fund to boost deterrence against China in the Pacific, virtually assuring a Pacific Deterrence Initiative of some kind will be in the next defense policy bill.

Senate Armed Services Committee Chairman Jim Inhofe, R-Okla., and ranking member Jack Reed, D-R.I., announced their new stance in a War on the Rocks op-ed Thursday. They said their version will back investments in land-based, long-range strike capabilities, but also “theater missile defense, expeditionary airfield and port infrastructure, [and] fuel and munitions storage,” to enable new modernized platforms, rather than buying more of the platforms themselves.

“With the stakes so high, the time for action is now,” Inhofe and Reed wrote. “The Pacific Deterrence Initiative will enhance budgetary transparency and oversight, and focus resources on key military capabilities to deter China. The initiative will also reassure U.S. allies and partners, and send a

strong signal to the Chinese Communist Party that the American people are committed to defending U.S. interests in the Indo-Pacific.

“The Pacific Deterrence Initiative will focus resources on these efforts and others with the aim of injecting uncertainty and risk into Beijing’s calculus, leaving just one conclusion: ‘Not today. You, militarily, cannot win it, so don’t even try it.’”

The Senate leaders follow House Armed Services Committee Chairman Adam Smith, D-Wash., and ranking member Mac Thornberry, R-Texas, in supporting the idea of a PDI. Smith has backed the idea in concept but has not publicly disclosed his priorities for the fund, while Thornberry has proposed spending \$6 billion in fiscal year 2021 on priorities that include air and missile defense systems and new military construction in partner countries.

As Congress looks to replicate the multi-year European Deterrence Initiative — which consumed \$22 billion since its inception after Russia invaded Ukraine and illegally annexed Crimea in 2014 — it has yet to be negotiated how much could be spent in the Pacific, what it would buy there and how long the fund would endure. Those questions will likely be part of talks within the Armed Services and Appropriations committees.

“I expect to see some new money applied to these priorities in the budget,” said Center for New American Security analyst Eric Sayers, who has advocated for the fund. “The real challenge now will be convincing the appropriators to join them and then the Pentagon building it into their 2022 budget.”

Speaking in the afternoon at a Center for Strategic and Budgetary Assessments event, Heino Klinck, deputy assistant secretary of defense for East Asia, said that he personally thinks the idea of a PDI is one that will work.

“Obviously when the National Defense Strategy came out, it very clearly stated that the priority theater is, for us, the Indo-Pacific,” Klinck said. “But all of us also recognize that strategy is budget, and budget is strategy, and the budget numbers have not supported, to date, the Indo-Pacific’s role as the primary theater.”

Though Defense Secretary Mark Esper has said China tops DoD’s adversaries list, the Pacific spending proposals reflect some frustration within the Armed Services Committees that the Pentagon has not prioritized the region in line with the National Defense Strategy’s emphasis on great power competition. Inhofe and Reed’s op-ed criticized the Pentagon’s emphasis on platforms when they argue it should be emphasizing missions and the force posture, capabilities and logistics that would enable those missions.

To that end, Inhofe and Reed are seeking funding in categories similar to the EDI: Military construction, fuel and munitions storage and deployable air-base kits. That is to say, runways and fuel depots a war plane might need, but not extra planes.

“It doesn’t matter how many F-35s the military buys if very few are stationed in the region, their primary bases have little defense against Chinese missiles, they don’t have secondary airfields to operate from, they can’t access prepositioned stocks of fuel and munitions, or they can’t be repaired in theater and get back in the fight when it counts,” Reed and Inhofe wrote.

Whatever final shape the fund takes will likely draw from a landmark report Congress required from Indo-Pacific Command, delivered to Congress in early April. That report, penned by the command’s chief, Adm. Phil Davidson, called for \$1.6 billion in funding in FY21 and an additional \$18.46 billion over FY22-FY26.

That funding was broken into five categories: Joint force lethality, force design and posture, strengthen allies and partners, exercises, experimentation and innovation, and logistics and

security enablers. It included a 360-degree persistent and integrated air defense capability in Guam, for \$1.67 billion cost over six years, new radars and the development of small bases around the Pacific to break up large targets for Chinese weapons.

Thornberry's plan featured similar categories, but increased the near-term funding request dramatically. One congressional staffer said that Thornberry, who is retiring come January, has been realistic that the whole \$6 billion request is unlikely to survive the coming budget fights. The goal, the staffer said, is to get something through that creates the account, in hopes it can grow moving forward.

Smith hasn't made his own proposal, but his spokesperson said last month that he favors an account to "responsibly fund activities that are fully supported by DoD, avoid budgetary gimmicks, and require DoD to provide additional information to ensure DoD is strategically aligning resources toward the challenges and objectives in the Indo-Pacific."

<https://www.defensenews.com/congress/2020/05/28/inhofe-reed-back-new-military-fund-to-confront-china/>

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Breaking Defense (Washington, D.C.)

Army Invites Air Force ABMS To Big Network Test: Project Convergence

By Sydney J. Freedberg Jr.

May 28, 2020

WASHINGTON: Damn the pandemic, full speed ahead. The four-star chief of Army Futures Command plans to hold a high-tech field test in the southwest desert this fall, COVID-19 or no.

Called Project Convergence, the exercise will test sharing of targeting data amongst the Army's newest weapons, including aerial scouts, long-range missile launchers and armored vehicles. The Army also wants to plug in its new anti-aircraft and missile defense systems, AFC head Gen. Mike Murray told reporters, but those technologies are at a critical juncture in their own individual test programs – some of which was delayed by COVID – and they may not be ready on time for this fall.

"I'm going to try to drag them all into this," Murray said. The experiment, set to begin in late August or early September, will definitely include the Army's Artificial Intelligence Task Force, as well as four of its eight modernization Cross Functional Teams. That's Long-Range Precision Fires (i.e. artillery), Future Vertical Lift aircraft (including drones), and the tactical network, he said, plus the Next Generation Combat Vehicle team in "a supporting role."

What about the Air & Missile Defense team? "We'll see," Murray said. "Right now... I'm very cautious, because of the two major tests they've got going on this fall in terms of IBCS and IMSHORAD." IBCS is the Army's new command network for air and missile defense units, which had to delay a major field test due to COVID. IMSHORAD is an 8x8 Stryker armored vehicle fitted with anti-aircraft missiles and guns, which Murray said is now delayed "a few months" by software problems.

The IM-SHORAD prototype anti-aircraft Stryker test-fires a Hellfire missile in February, 2020.

Meanwhile, the Air Force – with some input from the other services – will be testing its own nascent data-sharing network. That's the ambitious Advanced Battle Management System, the leading candidate to be the backbone of a future Joint All-Domain Command & Control (JADC2) network-of-networks linking all the armed services.

The Air Force's ABMS experiment will be separate from the Army's Project Convergence exercise happening at roughly the same time this fall, Murray said. But he wants to hold a Convergence test each year from now on, he told reporters, and he wants to bring in ABMS in 2021.

"In '20, we're parallel, not interconnected," he said. "Our desire is to bring them closer and closer together, beginning in '21."

Murray spoke via phone to the Defense Writers Group, along with the Army's civilian chief of acquisition, Bruce Jette. While the two men's roles and organizations are kept distinct by law, they've been joined at the hip on modernization, and Jette – a scientist, engineer, and inventor — is clearly enthused about the experiment.

"I have great hopes that this administration, with its bold unilateral actions on so many fronts, would take unilateral action with this regime on UAVs," says Keith Webster, former DoD head of defense cooperation.

"We are looking at the potential integration of all of our fires into a fires network," Jette told the listening reporters. Currently, he explained, the Army has one network, AFATDS, to pass data about ground targets to its offensive artillery units – howitzers, rocket launchers, surface-to-surface missiles. Meanwhile, it's developing a different network, IBCS, to share data on flying targets – incoming enemy rockets, missiles, and aircraft – amongst its air and missile defense units.

The two networks and the sensors that feed them must meet very different technical demands, since shooting down a missile requires split-second precision that bombarding a tank battalion does not. But there's also great potential for the two to share data and work together. For example, the defensive side can figure out where enemy missiles are launching from, then tell the offensive side so it can blow up the enemy launchers before they fire again.

"If I can bring the two of them together," Jette said, you can use a sensor the Army already developed, bought and fielded to spot targets for one weapon – say, the Q-53 artillery radar – to feed targeting data into a totally different type of weapon – say, a Patriot battery. Artificial intelligence could pull together data from multiple sensors, each seeing the same target in different wavelengths or from a different angle, to build a composite picture more precise than its parts.

"We're moving past just simple concepts of sensors and shooters," Jette said. "How do we get multiple sensors and shooters [integrated] such that we get more out of them than an individual item could provide?"

Looking across the Army's 34 top modernization programs, Murray said, "an individual capability is interesting, but the effect is greater than the sum of the parts. There have to be connections between these [programs]. And that's really the secret sauce I'm not going to explain in detail, ever."

Testing, Testing

What Murray would share, however, was that the Army got to test a slightly less ambitious sensor-to-shooter link in Europe earlier this year, as part of NATO's Defender 2020 wargames. The field experiment fed data from a wide range of sources – in space, in the air, and on the ground – to an Army howitzer unit, he said.

However, the Army had also wanted to experiment with new headquarters and organizations to command and control ultra-long-range artillery, Murray said, and those aspects of the massive exercise had to be cancelled due to COVID. The service is looking at alternative venues, such as its Combat Training Centers, but "it's just hard to replicate what Defender 2020 offered us," he said. "What we lost was the largest exercise we've done and the largest deployment of forces in a very, very long time."

That makes the stakes even higher for Project Convergence. “You can call it an experiment, you can call it a demonstration,” Murray said. “Right now, the plan is we’re going to do this every year... every fall as we continue to mature... this architecture that brings the sensors to the right shooter and through the right headquarters.”

ABMS construct

While this year’s Convergence exercise will focus on the Army, Murray is already working with the Air Force to meld the two next year. “We have been in discussion with the Air Force for the better part of the year on how we integrate with the effort they have going on,” he said. “I was actually out at Nellis the last time they had a live meeting on JADC2 [Joint All-Domain Command & Control] with all of the architects of ABMS.”

Those discussions made very clear to both the Army and the Air Force participants that “it all comes down to data and it all comes down to the architectures you build,” Murray said.

“As Bruce [Jette] talked about, it’s not a specific sensor to a specific shooter,” he said. “On a future battlefield... just about everything is going to be a sensor. So how do you store that data and how do you enable a smart distribution of data to the right shooter? Because we can’t build architectures that are relying upon huge pipes and just massive bandwidth to make it work.”

<https://breakingdefense.com/2020/05/army-invites-air-force-abms-to-big-network-test-project-convergence/>

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US ARMS CONTROL

Arms Control Today (Washington, D.C.)

IAEA Nuclear Oversight Grew in 2019

By Kelsey Davenport

June 2020

The International Atomic Energy Agency (IAEA) monitored a growing amount of nuclear material in 2019, but persistent security and political challenges prevented the agency from understanding the full scope of nuclear activities in some nations. The agency circulated its annual report of its safeguards activity in April, disclosing that its personnel conducted 2,179 inspections in 183 states in 2019. It now oversees over 8 percent more nuclear material than the previous year. Overall, the material would be enough for more than 216,400 nuclear weapons, which the agency calls “significant quantities.”

IAEA Director-General Rafael Mariano Grossi (left) tours the agency’s Nuclear Material Laboratory in January. The lab is one of the tools the agency uses to monitor nuclear activities around the world. (Photo: Dean Calma/IAEA) IAEA Director-General Rafael Mariano Grossi (left) tours the agency’s Nuclear Material Laboratory in January. The lab is one of the tools the agency uses to monitor nuclear activities around the world. (Photo: Dean Calma/IAEA) The annual safeguards implementation report reflects the global scale of the IAEA’s role in ensuring that nuclear materials in peaceful facilities are not diverted to military uses. It summarizes the agency’s activities to implement safeguards across member states and its conclusion about the status of nuclear materials in states where safeguards are conducted. The agency has given the report only to its member states. A copy of the document was provided to

The report also highlights difficulties in meeting those safeguards goals. In the case of Libya, for example, the IAEA was no longer able to confirm that there was “no indication of undeclared nuclear material or activities” or any diversion of nuclear material. According to the report, the IAEA cannot verify “the actual status of nuclear material previously declared by Libya” at a particular location. It is likely that the country’s unstable security situation has made it difficult for IAEA inspectors to conduct their routine work.

The report also highlighted difficulties in understanding all nuclear activities in North Korea and Syria. The agency has not conducted any on-site inspections in North Korea since April 2009, when IAEA inspectors were asked to leave. But the agency intensified its efforts in 2019 to enhance agency readiness “to play its essential role in verifying” the country’s nuclear program once a political agreement is reached, according to the report.

The report concluded that there were “no indications of the operation” in 2019 of North Korea’s five-megawatts electric reactor, which produces plutonium for nuclear weapons, or at a facility that separates plutonium from the reactor’s spent fuel. But there have been “indications consistent with the use of the reported centrifuge enrichment facility.”

In Syria, IAEA inspectors visited the nation’s Miniature Neutron Source Reactor, which contains less than one kilogram of weapons-grade uranium, and another site in Damascus in 2019, but the agency continues to press Syria to cooperate with the agency’s investigation into a building destroyed in 2008 that “was very likely” a nuclear reactor that Syria failed to declare to the IAEA.

The nuclear Nonproliferation Treaty (NPT) requires its states-parties to implement a safeguards agreement with the IAEA to ensure that nuclear activities are peaceful. The safeguards agreements are to be negotiated within 180 days of ratifying the treaty, but the 2019 report noted that 10 states have not yet completed safeguards agreements with the IAEA.

Since 1997, IAEA member states have had the option to implement a more intrusive additional protocol to their safeguards agreement, which gives inspectors more information about a country’s nuclear program, expands access to sites, and allows for shorter-notice inspections. Of the 183 NPT states with safeguards agreements, 131 also implemented an additional protocol in 2019, an increase from the 129 states with additional protocols in 2018.

The IAEA concluded that, in 69 of the 131 states, “all nuclear material remained in peaceful activities” and that there was “no indication of undeclared nuclear material or activities” or any diversion of nuclear material. Libya was the only country that was included in that list for 2018, but not 2019.

For 62 of those states that implement a safeguards agreement and an additional protocol, the IAEA determined that “declared nuclear material remained in peaceful purposes” in 2019 but that “evaluations regarding the absence of undeclared nuclear material and activities” remain ongoing. Iran is one of the 62 countries.

The IAEA noted that some states that have negotiated additional protocols have yet to provide the agency with all of the required information under the agreement and that some states restricted access to inspectors, but that progress is being made in providing more timely information.

The safeguards report also said that three states did not allow inspectors to access certain areas within declared facilities, only one of those cases was resolved in 2019, and five states did not provide “timely access” for inspectors. The report did not specify the states.

Forty-four states are implementing safeguards but not additional protocols. The IAEA noted that, for these states, “declared nuclear material remained in peaceful activities” and conducted 146 inspections at sites in these countries.

States that are not party to the NPT can also conclude safeguards agreements with the IAEA. India, Israel, and Pakistan have all negotiated safeguards agreements for specific locations.

The IAEA conducted 93 inspections at locations under safeguards in those three countries in 2019, a slight increase from the 78 inspections the prior year. The agency also recorded an increase in the nuclear materials under safeguards in those countries, from 3,938 kilograms in 2018 to 4,260 kilograms in 2019.

The IAEA also conducts safeguards inspections in the five nuclear-weapon states (China, France, Russia, the United Kingdom, and the United States), which are not required to implement safeguards under the NPT. All five, however, have negotiated what are called “voluntary offer” safeguards and additional protocols with the IAEA, which covers more than 35,000 significant quantities of nonmilitary nuclear materials and facilities. The agency conducted 79 inspections at sites in the five nuclear-weapon states in 2019.

In addition, the report contains information about IAEA efforts to address new technical challenges. According to the report, the IAEA continued to work on safeguards applications for new types of facilities, including small modular reactors and geological repositories for spent fuel. One of the new technologies successfully tested in 2019 is an unattended monitoring system for cylinders of uranium gas at enrichment facilities.

The report also documents IAEA sampling and deployment of technologies used for conducting safeguards inspections. According to the report, the IAEA collected 442 uranium samples, 40 plutonium samples, and 405 environmental samples in 2019. The report noted that the total installation of surveillance cameras was 1,425 by the end of 2019, including new underwater cameras for spent fuel ponds, and that inspectors tested new software for reviewing data collected by IAEA surveillance systems.

<https://www.armscontrol.org/act/2020-06/news/iaea-nuclear-oversight-grew-2019>

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Lawrence Livermore National Laboratory

Experiment Improves Predictions of Uranium Dispersion

By Anne M. Stark

May 4, 2020

The predictive models that describe the fate and transport of radioactive materials in the atmosphere following a nuclear incident (explosion or reactor accident) assume that uranium-bearing particulates would attain chemical equilibrium during vapor condensation.

In a new study, funded by the Office of Defense Nuclear Nonproliferation Research and Development (DNN R&D) within the U.S. Department of Energy’s National Nuclear Security Administration and the U.S. Department of Defense’s Defense Threat Reduction Agency (DTRA) Basic Science Grant, researchers from Lawrence Livermore National Laboratory (LLNL) and the University of Illinois at Urbana–Champaign (UIUC) demonstrated that kinetically driven processes in a system of rapidly decreasing temperature can result in substantial deviations from chemical equilibrium. This can cause uranium to condense out in metastable oxidation states that have different vapor pressures than the thermodynamically favored oxides, significantly affecting uranium transport.

“This new study will improve our ability to predict uranium’s multiphase transport in nuclear incident scenarios,” said LLNL research scientist Batikan Koroglu, lead author of a paper appearing in Analytical Chemistry.

The physical and chemical processes that occur during the condensation of a nuclear fireball are approximated using fallout models. These models generally assume that atomized elements heated to extremely high temperatures will reach a state of chemical equilibrium as the fireball cools and thermodynamically favored oxides will form once the temperature drops below their boiling points. Uranium oxide is assumed to condense in its most stable form after cooling below its boiling temperature.

However, condensation patterns observed in fallout samples reveal that some fraction of the uranium is “held up” in the vapor phase relative to refractory actinides and fission products.

“This work provides the first, detailed experimental insights able to help explain the long-standing problem of why uranium can exhibit variations in volatile behavior during nuclear fireball condensation -- it’s a big first,” said LLNL nuclear scientist Kim Knight, principal investigator for the DNN R&D effort.

The research team synthesized uranium oxide nanoparticles using a plasma flow reactor under controlled conditions of temperature, pressure and oxygen concentration. They also developed a laser-based diagnostic to detect uranium oxide particles as they formed inside the flow reactor. Using this approach, the researchers gathered direct experimental evidence for a change in the molecular composition of uranium oxide condensates as a function of oxygen concentration. According to the researchers, these results indicate that kinetic models are required to fully describe uranium transport after nuclear incidents.

“Our collaboration with UIUC is part of a DTRA Basic Science Project and allows us to model the data obtained from our plasma flow reactor, which is a unique instrument developed here at the Lab,” says LLNL DTRA principal investigator Harry Radousky. The experimental results are compared to UIUC’s kinetic model describing plasma phase oxidation of uranium. The comparison highlights the competition between the kinetics of gas-phase oxidation of uranium and nucleation of uranium oxide nanoparticles.

Other LLNL scientists supporting the project are Zurong Dai, Michael Armstrong, Jonathan Crowhurst, David Weisz and Timothy Rose.

<https://www.llnl.gov/news/experiment-improves-predictions-uranium-dispersion>

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Middlebury Institute (Monterey, Calif.)

Engaging China on Bioweapons and Beyond

By Richard Pilch

May 28, 2020

Over the past several weeks, Western governments have increasingly called attention to the uncertain origin of COVID-19.[1] While most experts and analysts believe that the pandemic stemmed from natural zoonotic spillover,[2] many also acknowledge that a laboratory accident cannot be ruled out.[3] The laboratory origin hypothesis holds that peacefully directed research at a laboratory in Wuhan, China, could conceivably have led to a worker infection or inadvertent release, for example in infectious waste, that sparked person-to-person spread in the surrounding

community. To be clear, the laboratory origin hypothesis in no way suggests that COVID-19 may be the result of illegal biological warfare (BW) experiments; however, some media outlets as well as members of the Trump Administration have on occasion failed to make this distinction, conflating peaceful and illicit laboratory activities and thus sending mixed messages to their constituencies and the general public.[4]

Could vs. Would

In today's world, virtually every country has access to the building blocks necessary to make a biological weapon.[5] The question is whether a country would attempt to do so. Moral and ethical arguments aside, biological weapons are prohibited by the Biological Weapons Convention (BWC), a multilateral disarmament treaty of 183 states parties that bans biological weapons development and related activities. While countries such as Iraq and the Soviet Union have breached the BWC in the past, an argument can be made that each country's breach was strategic: Iraq to counter superior military manpower and perceived WMD threats in the region (e.g., on the part of Iran),[6] and the Soviet Union to gain an asymmetric advantage over the US in the great power competition that characterized the Cold War. Would pursuing an offensive biological weapons capability similarly fit the prevailing strategy of the People's Republic of China (PRC)?

China's grand strategy is founded upon technological superiority and economic expansion in the Global South. That strategy has enjoyed remarkable success: China's corresponding Belt and Road Initiative has engaged more than 60 countries and invested over \$200B to corresponding infrastructure development of to date.[7] However, one enduring risk to the strategy's ultimate success is China's perception on the global stage. A negative perception would undermine China's ongoing soft power investment, which might explain the PRC's concerted efforts during the ongoing COVID-19 pandemic not only to project strength but to emerge as a global leader in the area of global health security.

The discovery of a covert offensive BW program in China would threaten not only China's external relationships with both partner nations and key international organizations like the World Health Organization (WHO), World Trade Organization (WTO), and World Bank, but also China's internal stability. Biological weapons are widely abhorred, perhaps nowhere more so than in China, where the Chinese people suffered BW attacks at the hands of the Japanese during the Second Sino-Japanese War that coincided with World War II.[8] COVID-19 can only be expected to exacerbate those sentiments, placing long overdue emphasis on China's central role in preventing future outbreaks with pandemic potential.[9] And China has other, more predictable military options for area denial and deterrence, which form the basis of its national military strategy.[10]

Biological weapons development requires a conscious decision to invest money, human and material resources, and time in contravention to interventional law. There is no indication in the open source domain – including statements from Chinese leadership, state media reports, government budgetary allocations, and scientific publications or lack thereof – that China has made any such decision, despite its access to the necessary building blocks. Accordingly, the US State Department's 2019 report on Adherence to and Compliance with Arms Control, Nonproliferation, and Disarmament Agreements and Commitments assessed that “[i]nformation indicates that the People's Republic of China (China) engaged during the reporting period in biological activities with potential dual-use applications, which raises concerns regarding its compliance with the BWC.”[11] However, the only way to know for sure is to engage China collaboratively.

A Win-Win Approach

The United States and China share a responsibility to ensure the health security of the global community. This requires, at a minimum, transparent information sharing, as was witnessed with

the early sharing of SARS-CoV-2's genomic structure by Chinese scientists that enabled scientists in other nations, including the United States, to begin developing targeted countermeasures. More beneficial would be the establishment of a global surveillance and detection system to provide both early warning of public health events of international concern (PHEIC) and an immediate conduit for that same level of information sharing and rapid countermeasure development. The ideal would be an era of unprecedented government-to-government partnership, the foothold for which is already established in academia, to better understand and prevent transboundary infectious disease threats from being realized in the first place.

To get there, we need to rebuild mutual trust. This starts with an open scientific exchange that fosters collaboration and transparency; it is imperative that both nations allow such exchange to continue unimpeded. From there, the United States and China should identify and implement a series of bilateral confidence-building measures (CBMs) focused on global health security, beginning with a scientific and policy dialogue to incrementally establish mutual goals for the safety and prosperity of each nation as well as the global community. CBMs would be expected to include near real-time information-sharing on qualifying infectious disease outbreaks in accordance with the WHO's International Health Regulations (IHR 2005) as well as technical exchanges that might include international working groups, laboratory visitations and exchanges, and joint training exercises on an international scale.

A Model of Success

The US Department of Defense's Cooperative Threat Reduction (CTR) program offers a model and precedent for such engagement. For more than two decades, CTR has built relationships with nations around the world, including China, to reduce the threat of weapons of mass destruction (WMD).[12] On the biological side, the program's purview has extended to natural threats in the wake of SARS 2003, H5N1 and H1N1 influenza, and the 2014–15 West Africa Ebola outbreak, effectively bridging scientists and public-health professionals around the world for the welfare of the global community.

If CTR's designation as a defense program presents insurmountable challenges, the program may take on a partner agency such as the US Department of Health and Human Services, as it has successfully done in the past, or be fully ported to a more suitable agency like the Department of State. Which US agency takes the lead matters little; what is important is that such cooperation exists, it has enabled the US and partner nations like Russia and China to overcome past differences for the common good, and China, having benefitted from the program directly, understands its value. If nothing else, the program offers a starting point.

To this end, I ask the US to take the first step. Engage. Open our doors. Demonstrate our commitment to the fundamental principle that we are all accountable for the gravest threats of both nature and our own making – because only together can these threats be overcome.

If we set such an example, China will follow.

Dr. Richard Pilch is the Director of the Chemical and Biological Weapons Nonproliferation Program at the James Martin Center for Nonproliferation Studies (CNS), Middlebury Institute of International Studies at Monterey (MIIS).

Notes

[1] See, for example, <https://www.sciencemag.org/news/2020/05/pressure-grows-china-independent-investigation-pandemic-s-origins>.

[2] See, for example, <https://www.nature.com/articles/s41591-020-0820-9>; <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7194821/>

[3] See, for example, https://www.washingtonpost.com/opinions/global-opinions/how-did-covid-19-begin-its-initial-origin-story-is-shaky/2020/04/02/1475d488-7521-11ea-87da-77a8136c1a6d_story.html; <https://www.newsweek.com/controversial-wuhan-lab-experiments-that-may-have-started-coronavirus-pandemic-1500503>.

[4] <https://www.nytimes.com/reuters/2020/05/03/world/asia/03reuters-health-coronavirus-usa-pompeo.html>;

[5] Building blocks for a biological weapon include (1) the hazardous biological agent itself; (2) the equipment/infrastructure necessary for its acquisition, production, formulation, and delivery as a weapon; and (3) the expertise necessary for the same. Most biological agents are widely available in both nature and the laboratory (where legitimate research, e.g., on pathogenesis and therapy, is performed). As well, both the equipment/infrastructure and expertise necessary to produce a bulk amount of agent, formulate it, and deliver it are largely dual use in nature, meaning that the same materials and thus knowledge required for the peaceful development and production of experimental and commercial products like food additives, pesticides, pharmaceuticals, and vaccines can be diverted toward weapons-related applications with relative ease.

[6] Republic of Iraq, Biological Full Final and Complete Disclosure (FFCD) to the United Nations, September 1997, Chapter 1.8.1.

[7] See, for example, <https://www.cfr.org/backgrounders/chinas-massive-belt-and-road-initiative>

[8] See, for example, <https://www.nytimes.com/1997/02/04/world/germ-war-a-current-world-threat-is-a-remembered-nightmare-in-china.html>. Guillemin J. Hidden Atrocities. New York: Columbia University Press, 2017.

[9] COVID-19, H5N1 and H7N9 influenza, and SARS all originated in China, where longstanding cultural practices at the animal-human interface are widely acknowledged to increase the risk of zoonotic spillover. See, for example, https://www.nejm.org/doi/full/10.1056/NEJMp2002106?query=featured_home

[10] See, for example, <https://www.csis.org/analysis/chinas-new-2019-defense-white-paper>; https://www.rand.org/content/dam/rand/pubs/conf_proceedings/CF145/CF145.chap7.pdf

[11] <https://www.state.gov/2019-adherence-to-and-compliance-with-arms-control-nonproliferation-and-disarmament-agreements-and-commitments-compliance-report/>, pp. 45-46. Of note, the report also states that “the United States does not have sufficient information to determine whether China eliminated its assessed biological warfare (BW) program, as required under Article II of the Convention... The United States assesses China possessed an offensive biological warfare program from the early 1950s to at least the late 1980s. Although China has submitted BWC Confidence Building Measures (CBMs) each year since 1989, China’s CBM reporting has never disclosed that it ever pursued an offensive BW program.” Information either to support or refute this assessment is inconclusive in the open source domain, and China’s submitted CBMs are locked to the public (https://bwc-ecbm.unog.ch/?field_form_year_tid=555).

[12] <https://www.energy.gov/articles/us-energy-secretary-moniz-and-chinese-atomic-energy-authority-open-new-nuclear-security>; <https://obamawhitehouse.archives.gov/the-press-office/2016/03/31/us-china-joint-statement-nuclear-security-cooperation>

<https://www.nonproliferation.org/engaging-china-on-bioweapons-and-beyond/>

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AP via Defense News (Washington, D.C.)

New Russian Policy Allows Use of Atomic Weapons against Non-nuclear Strike

By Vladimir Isachenkov, The Associated Press

June 2, 2020

MOSCOW — President Vladimir Putin on Tuesday endorsed Russia's nuclear deterrent policy, which allows him to use atomic weapons in response to a conventional strike targeting the nation's critical government and military infrastructure.

By including a non-nuclear attack as a possible trigger for Russian nuclear retaliation, the document appears to send a warning signal to the U.S. The new expanded wording reflects Russian concerns about the development of prospective weapons that could give Washington the capability to knock out key military assets and government facilities without resorting to atomic weapons.

In line with Russian military doctrine, the new document reaffirms that the country could use nuclear weapons in response to a nuclear attack or an aggression involving conventional weapons that "threatens the very existence of the state."

But the policy document now also offers a detailed description of situations that could trigger the use of nuclear weapons. They include the use of nuclear weapons or other weapons of mass destruction against Russia or its allies and an enemy attack with conventional weapons that threatens the country's existence.

In addition to that, the document now states that Russia could use its nuclear arsenals if it gets "reliable information" about the launch of ballistic missiles targeting its territory or its allies and also in the case of "enemy impact on critically important government or military facilities of the Russian Federation, the incapacitation of which could result in the failure of retaliatory action of nuclear forces."

U.S.-Russia relations are at post-Cold War lows over the Ukrainian crisis, the accusations of Russian meddling in the U.S. 2016 presidential election and other differences.

Last year, both Moscow and Washington withdrew from the 1987 Intermediate-range Nuclear Forces Treaty. The only U.S.-Russia nuclear arms control agreement still standing is the New START treaty, which was signed in 2010 by U.S. President Barack Obama and then-Russian President Dmitry Medvedev. The pact limits each country to no more than 1,550 deployed nuclear warheads and 700 deployed missiles and bombers and envisages sweeping on-site inspections to verify compliance.

Russia has offered to extend the New START, which expires in February 2021, while the Trump administration has pushed for a new arms control pact that would also include China. Moscow has described that idea as unfeasible, pointing at Beijing's refusal to negotiate any deal that would reduce its much smaller nuclear arsenal.

In a call with members of his Security Council over the weekend, Putin warned that the New START treaty is bound to expire, but "the negotiations on that crucial issue, important not just for us but for the entire world, have failed to start."

<https://www.defensenews.com/global/europe/2020/06/02/new-russian-policy-allows-use-of-atomic-weapons-against-non-nuclear-strike/>

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COMMENTARY

War on the Rocks (Washington, D.C.)

You Can Teach a Marine Deterrence: Understanding Coercion Requires Changing PME

By Benjamin Jensen and Matthew Van Echo

June 4, 2020

There is a disturbance in the force. A return to great-power competition requires an understanding of the competition continuum. Generals want a new breed of officer that is able to generate global campaign plans and propose operations, activities, and investments that compete with and deter rivals while reassuring partners and allies. These same leaders want staff who can visualize and describe joint campaigns integrating cyber and space with air, land, and maritime effects to create multiple dilemmas for rivals. Such officers must balance an understanding of warfighting with an appreciation for employing military forces in support of broader campaigns that fuse multiple instruments of power and depart from traditional war plans. This logic also applies to containing regional powers and disrupting global terror networks. Multiple commenters in War on the Rocks have discussed this new demand signal. From calls for implementing new Joint Chiefs of Staff guidance on professional military education to reflections on the difficulty of teaching coercion to field grade officers, there is a sense that the schoolhouse — and possibly the military profession itself — is not keeping up.

In her recent article and podcast, Professor Tami Davis Biddle offers the military officer a good introduction to the concept of coercion. As professionals who have talked about coercion theory and topics like deterrence to elected officials and senior appointees through the Cyberspace Solarium Commission, and have worked on global campaign and contingency plans, we can attest to a widespread lack of understanding of deterrence and compellence. Biddle should be applauded for seeking to connect theory and practice.

We agree with the majority of Biddle's perspective less two points. First, the better place to find the latest thinking on coercion is in the series of publications linked to the concept of a competition continuum and new global integration, and in the campaigning model used by the Joint Staff. These documents lay out a vision more aligned with coercive diplomacy, to include the use of positive inducements and cooperation mechanisms similar to the work of Alexander George, than classic coercion as described by Thomas Schelling, the main subject of Biddle's article. The military manual that Biddle cites often lags new concept notes and doctrine. While it should be updated and corrected per Biddle's points, there is a growing literature on coercion set in motion by the National Defense Strategy and a deep concern that existing phasing constructs for war are outdated.

Second, Biddle contends that "military culture and identity thus prevent many practitioners from embracing a body of theory that offers them crucial insights into the nature and practice of their own profession." From our vantage point, theory actually follows practice and is usually an attempt to systematize the chaotic attempts of professionals to muddle through. Contrary to Biddle, this lack of understanding is not reducible to military culture or the military mind and has more to do with outdated approaches to teaching coercion. Specifically, how contemporary professional military education approaches planning exercises and wargames tends to reinforce a tired, ideal type of war as a decisive struggle. There is a formulaic plot arc that takes combatants from a distinct beginning through a climatic struggle and deposits them at a clear endpoint. While that trajectory is helpful for training, it obscures more than it clarifies with regards to great-power competition.

Helping military professionals understand coercion and the broader competition continuum therefore requires a new approach to conducting planning exercises and wargames in professional military education. This article recounts our experiment to do so over the last year. Traditional planning exercises tend to reduce complexity for the sake of clear instruction. They focus on war — not competition — and value tangible products over creativity and higher-order thinking. To overcome this deficiency, the School of Advanced Warfighting developed a new breed of planning exercise. This exercise series, called Agile Competition, was supported by seminars on coercion and military power as well as perspectives on deterrence and crisis management that extended beyond Cold War-era constructs. The exercise forced students to develop flexible deterrence options, experiment with contingency planning from the perspective of Chinese planners, and deal with the complexity of great-power competition. Students had to compete with other students and deter a larger war while supporting alliance commitments and flowing forces into the theater for follow-on operations during the opening stages of contingency in the South China Sea.

It's Not the Student, It's the Teacher

For over a generation, attendance at resident professional military education institutions has entailed a mix of academic seminars and functional planning classes that certify officers for joint assignments. In this respect, professional military education is more like a law school or Master of Business Administration program than a graduate degree in history or international relations — the two disciplines upon which it predominantly draws for academic instruction.

The way military and civilian instructors teach often forgoes coercion and narrowly focuses on warfighting. Planning exercises in professional military education tend to focus on products over the development of creative options appropriate for senior leaders considering wartime contingencies or managing crises. Planning problems typically present students with fixed means and circumstances. The structure puts students in a box, giving them a large military force to defeat a clear enemy. As students are given detailed task organization, they know exactly what forces are available for planning and execution. These forces are already postured for conflict. This simplification means that students don't have to consider vital aspects of force generation and force flow with regards to resourcing their plans. The scenario presumes that they have uncontested power projection into the operating area. The adversary is too weak to challenge the United States globally. Local partners provide key bases, overflight rights, and even military forces. The small box in which students plan places them in a conflict without them having to think about how they got there. They are not shown the diplomatic context, how deterrence failed, or the escalation pathway that brought them to the precipice of war. The net result is a formulaic approach to warfighting that skips the nuances of competition and how to set conditions or define the tempo of operations while shaping adversary decision-making.

Planning exercises inside this small box result in planning for planning's sake. They pit student teams against hypothetical countries like "Indolaysia" or "Donovia," missing opportunities for the in-depth exploration of contemporary challenges based on geography, alliances, and economic considerations. Exercise designers often struggle to update orders of battle with new capabilities and then default to either dice rolling for space, weather, electronic warfare, and cyber or simply wishing them away. It's as if the single battle concept only applies within the box provided to the students rather than presenting them with problems that instigate deeper thinking through multiple levels of war, across all domains, and throughout multiple regions if not globally.

However, there is a deeper problem. The way military and civilian faculty teach is etched with unspoken assumptions that breed, often inadvertently, dangerous myths. War is decisive, with clear phases and a beginning and an end. Good strategy is easy and about alignment. Disruptive capabilities offset adversaries. There are levels of war that connect clear strategic guidance with

aggressive tactics, making war and competition more functional and technical (i.e., science) than art.

Civilian and military faculty should not reduce a key strategic decision, campaign, or battle to a simple choice devoid of context. Such a reduction is the pedagogic equivalent of armchair quarterbacking. Yet, in search of great men and command decisions, classes tend to reduce complexity to caricature. There is little about the enemy, the environment, or social history — just a modern military version of Whig history: great men doing great things and showing us the way.

There is a solution: Take the training wheels off and develop a new type of planning exercise that stresses competition and strategic ambiguity — one that balances global commitments with limited resources and complex mobilization dynamics, and focuses on crises that emphasize escalation management as much as they do warfighting. This new, more realistic type of exercise should be grounded in case studies on coercive campaigns as well as literature from security and strategic studies about how different states approach crisis management.

A Novel Experiment: Agile Competition

In 2020, the School of Advanced Warfighting shifted from a single “one and done” capstone planning exercise to a series of events exploring integrated campaigning. Consistent with the National Defense Strategy, the exercise put students in various U.S. Indo-Pacific Command planner roles to develop competitive plans against China. While war with China is not inevitable or even likely, competition is assured.

The exercise had three successive modules: competition, emulation, and response. The first module, competition, had students replicating joint planning groups to develop a theater campaign order specifying operations, activities, and investments that would help deter Chinese aggression in the region while assuring partners and allies. There was no box. Students could propose a wide variety of options, to include non-military instruments of power, and had to consider how their activities ensured peace while posturing to limit Chinese military options. Students began the competition stage with a series of seminars on Chinese strategy and military capabilities. Over the next three months, students met periodically to refine their steady-state plan and develop theories of competition. The competition stage culminated with a final presentation by the planning teams to a “strategic opportunity board” run by faculty and external subject matter experts from the Joint Staff. This presentation gave students a chance to brief their concepts and request additional resources in a manner consistent with global integration.

The second module, emulation, had students flip the map to consider how the Chinese would respond to a United States-led coalition challenging territorial claims in the South China Sea. This design helped students develop a Joint Intelligence Preparation of the Operating Environment assessment based on a likely crisis scenario. It also combined critical red team techniques to help students evaluate the scenario. Additional seminars on Chinese strategic thinking, domestic politics, doctrine, and new military concepts helped the students evaluate different perspectives. Of note, this module’s design helped students understand the pressures on Chinese leaders, how such leaders see deterrence, and key bureaucratic changes affecting crisis decision-making. The emulation stage culminated with a wargame in which students role-played the Chinese Southern Theater Command responding to a territorial incursion that Beijing perceived as hostile in the South China Sea. By approaching a crisis from a Chinese perspective, students gained a new appreciation for escalation risks and military capabilities. After this module, students discussed the inherent challenge of balancing tactical initiative and firing effectively first with the strategic risk of expanding the conflict.

The third module, response, had half of the students return to their role as a joint planning group in U.S. Indo-Pacific Command and placed them in a crisis scenario involving an escalating dispute between China and the Philippines. Each team had their scenario modified to reflect their earlier competition planning. The other half of the students remained planners for the Chinese Southern Theater Command. Each side developed a series of flexible deterrent options to manage the crisis and seek favorable outcomes. The faculty used a matrix game to exercise these dueling deterrence options, altering military posture and diplomatic influence in the region. The results of the matrix game set the stage for the final confrontation: a limited, conventional engagement between a United States-led coalition and China.

This segment of the response module involved a three-day wargame that featured a mix of strategic messaging — students sending public and private diplomatic messages to each other — and theater-level joint planning. Each side had to manage force flows and integrate air, naval, land, space, and cyber effects. The game used the Command software developed by Matrix Games, with external experts providing additional adjudication support. The student teams started each day with a strategic dialogue, discussing viable response options with their national command authority to develop new plans. These plans were then submitted to the adjudicators, who ran them through the Command software. In the morning, students would receive a crisis update packet containing the results of the Command run and then begin the cycle again. During their moves, students experimented with new military concepts like expeditionary advanced base operations, mosaic warfare, and the Chinese concept of systems confrontation. They even tested new force structures like the Marine Littoral Regiment.

At the end of the three days, the students briefed each other on their plans, theories of competition, and overall military response options. They discussed the challenges of balancing the global risks of escalation — the ever-present shadow of nuclear confrontation — with the desire to gain local tactical initiative. Students discussed how they developed targeting lists to break alliance cohesion and signal other states globally. They debated which capabilities, from strategic cyber attacks to broader offensive space operations, should be held back to preserve response options and limit non-nuclear strategic escalation. The U.S. teams in particular discussed the challenge of deploying forces and sequencing air and maritime effects relative to Chinese rocket forces, electronic and cyber attacks, submarines, and long-range air-launched cruise missiles. They also discussed a 21st-century maritime Verdun: a vain bid for a quick victory that digressed into a painful and attritional struggle. In the end, students not only learned coercion theory but also experienced the inherent challenges of practicing the latent diplomacy of violence in a precision-strike era.

Conclusion: Best Military Advice in Great-Power Competition

Contrary to the view that teaching coercion theory is hard because of the military mind or culture, a large part of the problem resides in legacy professional military education practices. The Agile Competition exercise continuum is one effort to overcome this stagnation. The experiment shows how to combine seminars on deterrence, naval integration, and Chinese strategy with joint planning exercises and wargames. Going forward, there are a number of refinements that would further strengthen this approach.

First, the exercise would benefit from additional strategic dialogue. Planning teams need additional meetings that give them an opportunity to provide best military advice and shape larger strategic debates. This advice should be based on a better assessment of the strategic messages the planning teams receive from their competitor and whether they think they are signaling an escalatory or de-escalatory posture and why. During Agile Competition, the faculty noticed a decoupling between military actions and strategic messaging. Forcing students to balance rhetoric and reality will help them further appreciate strategic ambiguity, uncertainty, and the challenge of signaling.

Second, the exercise would benefit from more detailed intelligence and deception planning. Because the student teams were small and knew they only had a few turns, some rushed to attack and suffered the consequences. Future iterations will require more emphasis on early-stage intelligence collection to reveal enemy disposition and composition. In addition, faculty will require deception plans and have students factor sacrificing resources for deception and how military deception might undermine their broader strategic messaging and signaling efforts associated with flexible deterrence options.

Third, the exercise would benefit from additional strategic role-players and a dedicated green cell to role-play neutral countries in the region as well as partners and allies. To simplify the exercise, the faculty emulated the national command authority and partner nations. Having students work through intermediaries to conduct negotiations for basing rights and access while managing alliance operations with shifting rules of engagement would be more realistic. This approach would force students to appreciate that alliance warfare is slow by design and deliberate, and tends to limit military options in the short run. In the long run, alliances produce significant strategic advantages and increase military options. Understanding this trade-off will help students better appreciate global campaigning and military strategy.

Agile Competition represents a step towards replicating the challenges of global integration and coercing rivals short of armed conflict. It was not about warfighting in a small box. It was a competitive planning exercise. The idea was not to go to war with China, America's third-largest trading partner. The idea was to explore coercion and setting conditions in a theater of operation in a manner that provided multiple credible and flexible deterrence and military response options to national decision-makers. As a result, students gained a better understanding of new concepts like the competition continuum and were able to evaluate them in relation to a larger body of literature on coercion, military power, and crisis management. These linkages are critical. In great-power competition, victory only goes to those that successfully deter war in their pursuit of national interests.

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<https://warontherocks.com/2020/06/you-can-teach-a-marine-deterrence-understanding-coercion-requires-changing-pme/>

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Yale Global Online (New Haven, Conn.)

Keeping an Eye on the Nuclear Ball

By Richard Weitz

May 14, 2020

WASHINGTON: The international community cannot become so preoccupied with the Covid-19 pandemic, a dire but transient threat, that enduring global challenges go overlooked – especially nuclear non-proliferation or arms control. Covid-19 already forced cancellation of this spring's Nuclear Non-Proliferation Treaty Review Conference and suspension of the Russian-US arms-control dialogue. A recent US State Department report on global arms adherence warns that North Korea continues nuclear-weapons development, the Iranian government has declined to resume nuclear talks with Washington, and China and Russia may have resumed low-level nuclear-weapons testing. Zoom, Skype and other means of remote communication among mid-level officials and expert communities cannot substitute for the senior-level intervention needed to overcome the accumulating challenges.

Global arms control is at a crossroads. The New START Treaty, adopted in 2011, will expire in less than 10 months. Moscow and Washington remain divided on how to proceed on the treaty and beyond. Besides the pandemic, the US presidential election, Vladimir Putin's proposed constitutional rewrites and other issues could impede the need for timely measures to reinvigorate great power arms control. The priority should be including more countries and strategic capabilities. If this is not possible, countries should at least sustain some limits – even if not enshrined in treaties – on various nuclear-weapons systems, means of delivery and practices that could lead to nuclear crises.

Failing renewed global arms control, the international order could become characterized by an absence of formal legal limitations on nuclear force modernization. In this scenario of unbounded nuclear arsenals, the world's most powerful countries would abandon arms control agreements. Instead, they would prioritize enhanced force capabilities achieved through researching, developing and deploying a large and diverse portfolio of nuclear delivery systems, including non-strategic weapons. They would also strive for qualitative and quantitative advantages to their offensive and defensive capabilities, for example, missiles and interceptors, to dominate all possible nuclear-escalation ladders.

Furthermore, the great powers would decline to place restraints on their capabilities in the hope of exploiting first-mover advantages of even fleeting nuclear advances. They would vigorously pursue emerging strategic offensive capabilities such as cyber weapons, hypersonic systems and counter-space weapons that could help achieve such superiority. The United States and other allies would not welcome this outcome. Such developments would adversely affect global nonproliferation dynamics since they would magnify frustrations among the non-nuclear-weapons states with the great powers and intensify pressure on Non-Proliferation Treaty restraints. The nuclear force buildups, resumption of nuclear-weapons testing, overt threats to employ nuclear weapons against other states and greater salience of nuclear weapons in military doctrines would encourage other states to pursue similar capabilities.

A more benign vision, espoused by both disarmament enthusiasts and the current US administration, would expand the scope of limitations to cover more capabilities and more countries than the Cold War-based Russian-US strategic arms control process. The Trump administration wants to include China within future negotiations and address novel strategic weapons as well as the non-strategic nuclear capabilities hitherto excluded from the Russian-US treaties. Disarmament advocates, including some working with Democratic US presidential

candidate Joe Biden, favor great-powers arms control as a tool to transition from a world characterized by mutually assured destruction to one guided by mutually assured security. Despite their differences, both want to reconsider old truths and seek new paths to a safer nuclear future.

Arms control: Total nuclear weapons in the world declined after the Cold War, from about 70,000 in the mid-1980s to fewer than 14,000 in early 2020, but China, Pakistan, India, and North Korea increase their small stockpiles (Source: Federation of American Scientists)

Moscow, Beijing and Washington differ on many key arms-control issues. These include Russian and Chinese concerns about US conventional superiority; the US desire to reduce Russia's tactical nuclear weapons; and mutual unease pertaining to each other's artificial intelligence, cyber, space and other emerging capabilities. Nonetheless, the nuclear powers could commit to a grand compromise in which they accept that they can achieve additional security through asymmetrical advantages and equivalent capabilities rather than through equal force totals in all categories. Such asymmetric arms control could employ either unbalanced reductions, as the USSR did when accepting the INF Treaty in 1987, or agreements in which parties could flexibly choose which types of forces to deploy under the overall agreed ceilings.

The resulting treaty limits would apply to a larger array of weapon types than in previous treaties, such as non-strategic tactical nuclear weapons, non-deployed and reserve warheads, space-based weapons, long-range conventionally armed hypersonic glide vehicles, and ballistic-missile defenses. Moreover, there would be restrictions on emerging strategically disruptive technologies and missile defense efforts in order to enhance stability, decrease security risks and reduce costs. Verification regimes could involve extensive onsite inspections in addition to other forms of multinational and national monitoring that would encompass nuclear warheads as well as their means of delivery.

Such a comprehensive approach would extend the previous Russian-US process into a multilateral format, bringing in China and perhaps other countries. In contrast to the first scenario, the positive elements of this alternative world would convince the non-nuclear-weapons states that the nuclear-weapons states were making progress towards meeting their stated NPT obligations. This would increase international support for the NPT regime and steer states away from quixotic proposals such as an immediate nuclear-weapons ban.

Unfortunately, a world of complete, verifiable and irreversible global arms control will not soon be realized. A less ambitious but more attainable scenario for arms control than near-term disarmament or comprehensive controls would be the pursuit of arms control primarily as a means to enhance strategic stability and decrease war risks. The mutually assured destruction paradigm would still shape countries' strategic nuclear policies and doctrines. Still, they would consider even imperfect agreements as valuable if they led to net security gains rather than absolute security.

In this third scenario of reduced risk if not reduced weapons, the great powers mostly would achieve limited deals in areas of common interest that would not require ratification of new formal treaties or legally binding accords. They would instead focus collaboration on achieving less formal executive agreements, informal parallel unilateral actions or greater reliance on strengthened norms of behavior such as that of the non-use of nuclear weapons.

Steps towards this end could include decreasing incentives for nuclear escalation through reducing risks of miscalculation, removing first-strike vulnerabilities and other measures to dampen pressures to escalate major conflicts between the great powers. Additional initiatives to increase great-power transparency and mutual understanding without formal treaties could encompass regular strategic stability dialogues, aimed at developing concrete measures to address the destabilizing potential of new weapons or nuclear doctrines; limiting the proliferation of nuclear

and other strategic offensive arms; and identifying and averting dangerous operational practices like deploying nuclear-armed missiles near one another's territories.

Under these circumstances, other nuclear-weapons states such as Britain and France would accept some unilateral limits on their force, make their nuclear activities transparent and participate in some multinational confidence-building measures. They would also work with the three great powers to launch joint initiatives toward addressing the concerns of the non-nuclear weapons states, especially by coordinating their defense of the NPT against immediate nuclear ban proposals. The world could expect to see more cooperation on countering horizontal rather than vertical proliferation of nuclear weapons.

Nuclear weapons experts can help the nuclear powers advance toward the more positive scenarios, such as by developing means to better distinguish between missiles armed with nuclear or conventional warheads. Nonetheless, the fundamental challenge for global leaders is not to drop the ball on these enduring concerns.

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<https://yaleglobal.yale.edu/content/keeping-eye-nuclear-ball>

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Bulletin of the Atomic Scientists (Chicago, Illinois)

The Postponed 2020 NPT Review Conference: A Modest Proposal

By Tariq Rauf

June 2, 2020

On May 13, the Bulletin published a detailed and sober assessment by Robert Einhorn on the situation regarding the Nuclear Non-Proliferation Treaty (NPT) and its review conference, originally scheduled to begin April 27, 2020 but postponed to next year due to the coronavirus pandemic. Einhorn wisely advised that the parties who will be attending use the time between now and the proposed new conference dates of January 4–29, 2021 to work on narrowing their differences over key issues—such as the pace of nuclear disarmament, or the establishment of a Middle East free of all weapons of mass destruction.

To recap what was contained in the article, it described the US perspective on some of the problems between China, Russia, and the United States that are holding up progress in nuclear disarmament; supported the Trump administration's initiative on Creating the Environment for Nuclear Disarmament (CEND); and downplayed the significance of the 2017 Treaty on the Prohibition of Nuclear Weapons, or TPNW—also known as the “ban treaty”—a treaty which has been adopted by 122 non-nuclear weapon states but opposed by the nuclear-armed ones.

To build bridges between the various sides, Einhorn advised that they adopt the International Atomic Energy Agency (IAEA) Additional Protocol as the universal safeguards verification standard; agree on criteria governing withdrawal from the NPT; highlight peaceful uses of nuclear technologies; and (to mix metaphors) bring to the table some “gift baskets”—voluntary commitments by individual countries to strengthen their implementation of the NPT. And he outlined possible alternatives to the traditional goal of the review conference, which has always been to produce a consensus-based final document.

While all these proposals merit consideration, achieving them requires overcoming some significant differences in perspectives. Let's take up in turn each potential pitfall that I foresee: nuclear disarmament, the IAEA Additional Protocol, gift baskets, and so-called outcome documents. I also make a modest proposal: Postpone the next NPT conference until 2022—and hold it in Vienna.

Nuclear disarmament. The US-sponsored CEND initiative, involving some 40-to-50 hand-picked states, is fatally flawed because it totally ignores the various steps, measures, and actions that have already been agreed by consensus in the NPT review conferences of 1995, 2000, and 2010. Even though several of the items that were agreed-upon back in those heady years—such as the Anti-Ballistic Missile Treaty, the 2002 Strategic Arms Reduction Treaty II, and the Intermediate-Range Nuclear Forces Treaty, to name just a few—have subsequently been discarded by Russia and the United States (or never entered into force, in the case of START II), there is still room to implement other measures. These measures include reductions in nonstrategic nuclear weapons, reducing the operational status of strategic nuclear weapons, diminishing their role in security policies, placing excess fissile material under IAEA monitoring, providing security assurances for nuclear-weapon-free zones, and ensuring that any reduction in the number of nuclear weapons is irreversible.

Though implementing these measures will not be easy in the current political climate, efforts must still be made to honor past commitments.

IAEA Additional Protocol. The good news is that the Additional Protocol has already been adopted as the “verification standard” by 125 non-nuclear weapon states, as can be seen in the latest IAEA Safeguards Implementation Report.

The bad news is that Argentina and Brazil still have not adopted the protocol, maintaining that their bilateral safeguards system is the protocol's equivalent—a position that has been accepted by the United States.

Meanwhile, Egypt has conditioned its acceptance of the protocol on Israel's becoming a non-nuclear weapon state.

And by dumping the Joint Comprehensive Plan of Action, the United States put Iran's provisional implementation of the protocol in jeopardy.

Gift baskets. The purely voluntary commitments known as “gift baskets” are a fairly recent development, invented for the four Nuclear Security Summits initiated by President Obama in 2010. But while laudable in intent, they are essentially an uncoordinated conglomeration of efforts by different states, and are not uniformly applicable or accepted by all states. Consequently, the outcomes of the four Nuclear Security Summits were not accepted by the IAEA Member States that were not invited, so IAEA Ministerial Conferences on nuclear security had to be subsequently convened to promote uniform acceptance of certain measures through minimalist ministerial declarations. This may seem like a semantic point, but ministerial declarations reflect the minimum possible level of agreement.

In contrast, the NPT is a near-universal treaty with an established review process that has yielded consensually agreed measures to strengthen its implementation. The introduction of gift baskets therefore would bring a mishmash of different commitments and destroy the practice of commonly agreed NPT commitments.

Outcome documents are essential. The success of an NPT review conference ultimately rests on the adoption of an agreed final document.

Einhorn's essay claimed that the time-consuming search for the consensus required to produce an outcome document often leads to the lowest common denominator. To remedy that, Einhorn has

suggested that, among other possibilities, a report be submitted that lists all recommendations and proposals that were submitted; this report would then be circulated at the end of the review conferences, without putting them up for adoption or approval.

He also made the case for a high-level, or ministerial, statement reaffirming commitment to the NPT at the next review conference, with the idea that this would avoid the appearance of a band-aid solution, such as the unwieldy compromise final document of 1985 that included both divergent views on nuclear disarmament and dissenting statements by states.

It is my view—and also that of Jayantha Dhanapala, president of the 1995 NPT Conference—that merely listing or restating positions without seeking agreement through consensus would be acting contrary to the precepts of the strengthened review process established in 1995–2000. This existing process, which has been in place for over a decade now, has successfully produced far-reaching final documents in 2000 and 2010.

Consequently, a ministerial statement would not suffice.

Postpone the next NPT Review Conference until 2022. Despite the continuing differences between states, we must persevere in defending the NPT and implementing the remaining elements of the previous consensus outcome documents.

To do so it may be time to think outside the box and try something ambitious: Hold the review conference in 2022, not 2021, during the April–May time frame previously scheduled for the first session in Vienna of the Preparatory Committee for the 2025 review conference—and to add two weeks to the regular proceedings to enable 20 working days.

The reasoning is simple: There is no overly pressing matter that needs to be resolved at the review conference, which in any case has been postponed to 2021. So, instead of scrambling for dates in 2021 that might still need to be changed at some point down the road due to the coronavirus, we could plan on holding the review conference in 2022. This would relieve some of the scheduling pressure and take away the uncertainty of dates in 2021. (In addition, a one-day Preparatory Committee session could be included in that same time period, to agree on procedural matters for the next set of sessions.)

As for choice of venue, the only international organization to which the NPT accords a formal role is the Vienna, Austria-based International Atomic Energy Agency—which is mandated to implement safeguards or verification of the nonproliferation obligations of the non-nuclear weapon states. Using nuclear technologies for peaceful purposes by such states—especially developing countries—in practice has come to be implemented through the technical cooperation program of the IAEA.

And there are many states involved in these programs; currently, there are 848 active technical cooperation projects at the IAEA underway, covering development priorities in areas such as nuclear safety, nuclear security, nuclear power generation, nuclear waste disposition, and nuclear sciences. So, the organization holds an established track record, with a high level of awareness of the issues involved with nuclear weaponry.

Furthermore, compliance with the NPT's nonproliferation obligations is not done in the NPT review process but in Vienna by the IAEA; its assessment is released in the annual Safeguards Implementation Report. The IAEA's annual reports on nuclear safety, nuclear security, the technical cooperation program, and nuclear technology are reviewed in Vienna at the General Conference. And the Comprehensive Nuclear Test Ban Treaty Organization in Vienna is the logical venue to discuss any issues related to nuclear weapon testing.

At present, the required conditions are absent to hold the review conference in January 2021 or even later that year in New York City. Consequently, the NPT review conference can easily be

postponed to April–May 2022 in Vienna without any adverse implications for the NPT review process. There are no insurmountable obstacles to holding the review conference in 2022 in Vienna, other than mental blocks and policy inertia.

<https://thebulletin.org/2020/06/the-postponed-2020-npt-review-conference-a-modest-proposal/>

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War on the Rocks (Washington, D.C.)

Has the United States Abandoned Arms Control?

By Joshua Rovner

June 2, 2020

“This is insane.”

So declared former CIA Director Michael Hayden on hearing the news last week that President Donald Trump was considering pulling out of the Open Skies Treaty. In place since 1992, the treaty permits member states to conduct reconnaissance flights over each other’s territory to verify compliance and increase mutual trust. But Trump accused Russia of acting in bad faith and cheating on its commitments. “Until they adhere,” he announced, “we will pull out.” The president’s statement was the latest in a series of moves that have caused critics like Hayden to worry that he is dismantling arms control agreements that have kept the peace for decades.

Trump’s record, however, suggests he sees little value in the existing regime. As a candidate, Trump railed against the Joint Comprehensive Plan of Action — the 2015 deal to limit Iran’s nuclear program. As president, he withdrew from the deal, and the administration has kept up the rhetorical assault ever since. Just this month, Secretary of State Mike Pompeo called the Iran deal “a failed attempt to appease terrorists.”

The administration also withdrew from the Intermediate-Range Nuclear Forces (INF) Treaty — President Reagan’s signature arms control agreement with the Soviet Union. This treaty was unique because it outlawed a whole class of weapons, rather than simply reducing numbers. But critics claimed that Russia was routinely violating the agreement and called on Trump to let it go. He did.

Finally, Trump is hinting that he will let the New START treaty expire next year, rather than negotiate a long-term extension with Moscow. Signed in 2010, New START placed limits on a range of missiles, bombers, and nuclear warheads. Arms control advocates are urging the administration to act quickly, but White House officials complain that the treaty doesn’t include China and allows Russia to pursue a range of alternative technologies. Critics suspect the administration is simply looking for ways to let New START die, as it did with other arms control agreements.

Why does Trump reject these deals? Perhaps his ego makes him reluctant to enforce any agreement that doesn’t have his name on it. Or maybe he just doesn’t like the Obama administration. “Trump got rid of the Iran nuclear deal,” said a former State Department official, “because it was Barack Obama’s agreement.”

There is probably truth to this. Trump has spent his whole career trying to be the center of attention and he has done little to hide his disdain for Obama. But these arguments cannot account for the longer-term trend in U.S. foreign policy. Recent administrations had mixed records on arms control. In some cases, they tried to strengthen existing agreements, but at other times they argued that it was time to move past Cold War regime. The George W. Bush administration famously abrogated the Anti-Ballistic Missile Treaty in 2002 despite intense criticism. Bush later signed a

landmark nuclear-sharing agreement with India, which was not a member of the Nuclear Nonproliferation Treaty. This latter effort was particularly troubling for arms control advocates who believed that it was key to maintaining nuclear stability.

Obama also got crosswise with arms control advocates who expected a stronger commitment to disarmament. He started out by promising to take “concrete steps towards a world without nuclear weapons,” and he worked hard to complete the New START treaty with Russia. But Obama also shepherded a massive nuclear modernization program during his second term. His plans included life-extension programs for the current generation of aerial bombs and warheads, along with a new generation of cruise missiles, inter-continental ballistic missiles, bombers, and submarines. Obama did so to win support for New START from Senate Republicans, but his actions nonetheless struck observers as a betrayal of his earlier promises and left arms control advocates in dismay.

Seen in this light, Trump’s actions are not such a radical break from the past. As with other issues, his outlandish rhetoric obscures areas of policy continuity. U.S. presidents since Dwight Eisenhower have publicly aspired to disarmament while simultaneously invested in a nuclear posture built around increasingly accurate and lethal weapons. The United States has consistently sought to stay ahead of all other nuclear-armed countries, friends and rivals alike, and has pushed for arms control treaties that lock in U.S. advantages. Ike’s original Open Skies proposal, after all, promised an intelligence windfall at a time when Soviet security depended on keeping the Americans in the dark about its relative weakness. And if the Kremlin rejected a deal that promised transparency and peace, then Washington could claim a propaganda victory. In this and other cases, U.S. leaders favored arms control when they believed they could use it to achieve an American advantage. Trump’s talk is unsubtle, but his commitment to maintaining nuclear superiority is not unusual.

What does all this suggest about the future of nuclear weapons in international politics? And what does it mean for the future of U.S. nuclear policy? The answer to both questions depends in large part on how we define “arms control,” a term whose meaning has divided scholars for decades. Broadly speaking, there are three schools of thought.

The first school envisions arms control as a path to disarmament. This appeals to common sense, given that arms control agreements seek to freeze the production of new weapons, limit the deployment of new forces, reduce the size of arsenals, and in some cases eliminate whole classes of weapons. Arms control agreements, seen in this respect, are piecemeal steps towards the ultimate goal of disarmament. It takes seriously Article VI of the Nuclear Nonproliferation Treaty, which calls for nuclear-armed states to make a good faith effort to eliminate their arsenals. Arms control is both a practical path towards that end, and a sign of good faith.

The second school envisions arms control as a path to strategic stability. This means reducing the incentives for states to engage in peacetime arms racing, and removing the temptation to strike first in a crisis. Arms control agreements that make it difficult for anyone to plausibly “win” a nuclear war serve both purposes. Stability will obtain when states agree to build and deploy only weapons that guarantee retaliation rather than promise victory. Public justification of the Anti-Ballistic Missile Treaty (1972) emphasized this logic. The reason for banning missile defenses was to demolish any fantasies that the superpowers could win a nuclear exchange in any meaningful sense.

The third school envisions arms control as a path to comparative advantage rather than collective security. States use arms control negotiations to achieve relative gains, either in terms of numbers or technology. For example, the Washington Naval Treaty (1922) obligated signatories to limit their naval tonnage according to an agreed ratio. Although advocates portrayed negotiations as an effort to avoid repeating the pre-World War I naval arms race, states used the treaty to lock in national advantages.

Similar motives lay just under the surface of Cold War arms control negotiations. Some observers celebrated the era of détente in the 1970s as the time when superpowers sought to let the air out of their dangerous rivalry. New research, however, shows that successive U.S. administrations sought to use arms control diplomacy to maneuver the Soviet Union into a position of qualitative weakness. For the United States, success at the bargaining table would produce benefits that went beyond the nuclear balance. It would discourage Moscow from adventurism, and in so doing enhance the credibility of extended deterrence. In the event of war, it would allow the United States to reduce the costs in lives and treasure. And it would prompt Moscow to spend extravagantly on countermeasures, putting its economy under stress it could not bear.

Past presidents viewed arms control talks as a form of competition, not a forum for comity. In this sense, Trump is not so different from his predecessors, who also sought negotiations to maximize U.S. qualitative advantages. What makes Trump different is that he is dispensing with the pretext that arms control serves other purposes, or that strategic stability is intrinsically valuable. Trump sees himself as a dealmaker, not an institutionalist, and craves flexibility above all. Stability implies sacrificing flexibility on the altar of predictability, and that is something the president cannot abide.

Some observers applaud this approach. From their perspective, the devotion to stability leaves the United States vulnerable to authoritarian rivals who have no qualms about cheating on arms control agreements. In their view, adversaries will grow stronger as America sits idle, emboldened by Washington's passive response to treaty violations and other provocations. Embracing stability even in the face of their deception is a recipe for disaster.

Trump's bluntness might also help the United States escape charges of hypocrisy. U.S. presidents since Eisenhower have pledged to work toward disarmament; they have also expanded and improved the U.S. arsenal. Observers naturally wonder if they mean what they say. Trump's straightforward appeal to the U.S. national interest might put some of those questions to rest, at least as long as he stays in office.

For the time being, the most important argument in support of Trump's approach is that it creates bargaining leverage. Negotiating strength, according to this logic, comes from a demonstrated willingness to walk away. Trump has repeatedly and loudly declared his willingness to do so, while holding out the prospect of renewing discussions later to achieve a better deal. Trump's flexibility means the door is never completely closed, so long as negotiating partners are ready to make concessions. This has been the case for Iran, North Korea, and now Russia. "We're going to pull out," the president said last week, "and they're going to come back and want to make a deal."

The question, however, is whether this gamble for leverage will pay off. So far it has not. Iran has increased its stockpile of enriched uranium despite "maximum pressure" from the White House. Russia has continued to pursue what the Department of Defense calls a "comprehensive modernization of its nuclear arsenal." China is also investing more in nuclear weapons, as the administration acknowledges. There have been no better deals with Iran or North Korea, and it is unclear why Russia would agree to one today. The administration's swagger has not caused U.S. adversaries to turn back the clock on enrichment or scuttle weapon-modernization plans. At best, the White House can point to North Korea's testing moratorium in place since 2017, but Pyongyang has recently intimated that it may start again.

One likely reason for these poor results is that an outspoken commitment to flexibility makes it hard to convince other states that the administration will honor its promises. Compelling adversaries to voluntarily reduce their capabilities is only likely to work if they are confident they will not be punished as a result. Trump's message — that everything is always open to renegotiation — implies that he is temperamentally unwilling to accept a long-term commitment to restraint. Under these conditions, they have no reason to accept meaningful limits.

Trump's unapologetic embrace of nationalism also makes it hard to explain why arms control agreements are mutually beneficial. The White House has repeatedly argued, for example, that any future START treaty must include China. But by casting its arguments only in terms of U.S. gains, it is probably impossible to convince Beijing to cap its growing nuclear stockpile. As Caitlin Talmadge recently pointed out, Chinese leaders will almost certainly be wary of such an overture unless the administration can talk credibly about Chinese interests.

The irony is that Trump's nationalist bluster works against the national interest. The United States has used arms control for a number of purposes over the years, including the pursuit of its own parochial goals. The process has required U.S. concessions, but the long-term results have been overwhelmingly positive: The number of nuclear powers has stayed the same, the number of nuclear warheads has gone down, and the U.S. qualitative lead has increased. By publicly eschewing the pretense of mutual gains, Trump is putting U.S. gains at risk.

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National Interest (Washington, D.C.)

Minding the Missile Defense Gap

By Richard Johnson

May 30, 2020

As the coronavirus-caused lockdowns begin to wind down and life gradually returns to normal, it's time to shift our focus back to other grave threats to our health and security that have mostly fallen off the radar.

The creation of the Space Force at the end of December has been a positive step in meeting new threats, even if it has been relatively under reported in competing for attention with coronavirus. While public attention returns to national defense initiatives like the Space Force, the closely related area of missile defense can't be overlooked.

History shows us that reliable national defense is built on layers of complementary and redundant systems. This layered architecture provides America with holistic protection from adversaries should any one piece of equipment or system fail or suddenly become obsolete.

Within missile defense, these layers are a complex, yet vital, system of systems, each piece critical to providing optimal efficiency and eliminating single points of failure. Components are replaced as new technology is developed.

In 2016, for example, the Pentagon began to develop a more reliable replacement kill vehicle for our current ground-based interceptors which are exclusively based in Alaska and California. Originally scheduled to go operational this year and delayed until 2025, it was scrapped in August 2019 at the convenience of the government due to fundamental technical issues.

But the project didn't die in vain; much of the intellectual knowledge was funneled into a new effort, dubbed the Next Generation Interceptor.

When fielded, the new interceptor will be a phenomenal improvement to our ballistic missile defense shield. But there's a catch. Any number of setbacks can occur during testing and development which could push back by years the anticipated 2027 to 2028 fielding date. Using the

delays of the now-shelved replacement kill vehicle as a benchmark, we're probably looking at a nearly fifteen-year gap between when we need improved missile defense for the entire country—today—and when we will get it.

While we wait for new technology, we could field existing and reliable systems such as the Aegis Ashore package of SM-3 IIA interceptors and Spy-6 radar currently used in Europe.

This is particularly important considering the current gap in physical protection along the East Coast. The forty-four ground based interceptors which can shoot down incoming intermediate and long-range ballistic missiles are all on the West Coast and thus well positioned to strike launches coming physically from North Korea, China, and launch sites in Russia.

But what about trajectories from Iran? The regime is racing for the capability to strike us with ICBMs. And what about their ally Venezuela? If Iran manages to place intermediate range missiles outside Caracas, potential strikes could come over both East and Gulf Coasts. Venezuela recently announced its military will escort Iranian ships carrying petrol, so it's important to consider what else they may carry. It's not hard to imagine when we consider the Cuban Missile Crisis of 1962. Just switch the hostile countries while the same principle applies.

Thus, bolstering the use and number of missile defense systems not only covers a vulnerability in our layered defense, but falls right in line with the mantra of fiscal responsibility delivered by every senior defense acquisition leader. We're not faced with an either-or situation. We can spend research and development dollars for a new interceptor, while making use of the products and capabilities we already have. That's a gap-sound national security investment.

Throughout my time in the Pentagon working directly with senior Air Force intelligence and space acquisition leaders, we relentlessly focused on tech advances to improve our ability to fly, fight and win. Yet we also factored all existing assets into the equation to ensure America's ground and surface forces would never face an opponent bigger or more capable.

Low-tech but high-threat antagonists continue to improve their military architecture, including developing and testing their ballistic programs. Iran is fresh off of actually using its short-range ballistic missiles to attack American forces in Iraq, firing at least twelve at two U.S. base camps. Just last month it launched its first successful military satellite, signifying a giant development leap forward in its intercontinental ballistic missile program.

Considering the aggression of North Korea, Iran and potentially other hostile dictatorships, can America really wait until the end of this decade or possibly later to eliminate vulnerability in our homeland missile defense? Cost-effective investment in reliable and currently fielded intercept platforms must bridge the gap to future defense technology.

Richard Johnson is an Air Force retiree and graduate of National Intelligence University. He served combat and peacekeeping tours supporting Afghanistan, Iraq, East Timor, and Africa.

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ABOUT THE USAF CSDS

The USAF Counterproliferation Center (CPC) was established in 1998 at the direction of the Chief of Staff of the Air Force. Located at Maxwell AFB, this Center capitalizes on the resident expertise of Air University — while extending its reach far beyond — and influences a wide audience of leaders and policy makers. A memorandum of agreement between the Air Staff's Director for Nuclear and Counterproliferation (then AF/XON) and Air War College commandant established the initial personnel and responsibilities of the Center. This included integrating counterproliferation awareness into the curriculum and ongoing research at the Air University; establishing an information repository to promote research on counterproliferation and nonproliferation issues; and directing research on the various topics associated with counterproliferation and nonproliferation.

In 2008, the Secretary of Defense's Task Force on Nuclear Weapons Management recommended "Air Force personnel connected to the nuclear mission be required to take a professional military education (PME) course on national, defense, and Air Force concepts for deterrence and defense." This led to the addition of three teaching positions to the CPC in 2011 to enhance nuclear PME efforts. At the same time, the Air Force Nuclear Weapons Center, in coordination with the AF/A10 and Air Force Global Strike Command, established a series of courses at Kirtland AFB to provide professional continuing education (PCE) through the careers of those Air Force personnel working in or supporting the nuclear enterprise. This mission was transferred to the CPC in 2012, broadening its mandate to providing education and research on not just countering WMD but also nuclear operations issues. In April 2016, the nuclear PCE courses were transferred from the Air War College to the U.S. Air Force Institute for Technology.

In February 2014, the Center's name was changed to the Center for Unconventional Weapons Studies (CUWS) to reflect its broad coverage of unconventional weapons issues, both offensive and defensive, across the six joint operating concepts (deterrence operations, cooperative security, major combat operations, irregular warfare, stability operations, and homeland security). The term "unconventional weapons," currently defined as nuclear, biological, and chemical weapons, also includes the improvised use of chemical, biological, and radiological hazards. In May 2018, the name changed again to the Center for Strategic Deterrence Studies (CSDS) in recognition of senior Air Force interest in focusing on this vital national security topic.

The Center's military insignia displays the symbols of nuclear, biological, and chemical hazards. The arrows above the hazards represent the four aspects of counterproliferation — counterforce, active defense, passive defense, and consequence management. The Latin inscription "Armis Bella Venenis Geri" stands for "weapons of war involving poisons."

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