



UNITED STATES AIR FORCE
CENTER FOR STRATEGIC
DETERRENCE STUDIES

NEWS AND ANALYSIS

Issue 1368
31 May 2019

Feature Report

“Assessing the Arsenals: Past, Present, and Future Capabilities”. By Jacob Cohn, Adam Lemon, Evan B. Montgomery. Published by Center for Strategic and Budgetary Assessments; May 15, 2019

[https://csbaonline.org/research/publications/Assessing the Arsenals Past Present and Future Capabilities](https://csbaonline.org/research/publications/Assessing_the_Arsenals_Past_Present_and_Future_Capabilities)

As the modernization of existing nuclear arsenals, the spread of nuclear weapons, and the diffusion of new technologies make the nuclear landscape more complex, the time is ripe for a fresh examination of the nuclear balance. Toward this end, CSBA has been conducting a multi-year net assessment of the changing nuclear balance.

The first two products of this major ongoing analytic effort, **The Changing Nuclear Balance: a Net Assessment**:

- *Assessing the Arsenals: Past, Present, and Future Capabilities* by Jacob Cohn, Adam Lemon, and Evan Braden Montgomery
- *Understanding Strategic Interaction in the Second Nuclear Age* by Thomas G. Mahnken, Gillian Evans, Toshi Yoshihara, Eric S. Edelman, and Jack Bianchi.

Assessing the Arsenals: Past, Present, and Future Capabilities assesses the past, present, and planned nuclear arsenals all of the declared nuclear-weapons states. It then uses that data to identify key asymmetries across national nuclear arsenals, which could have major consequences for competition, crisis, and conflict.

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NUCLEAR WEAPONS

Air Force Magazine (Arlington, Va.)

OSD Official: B-52 Replacement Needs to Penetrate

By Rachel S. Cohen

May 23, 2019

The Air Force needs to look to new ways of penetrating enemy airspace as its idea of what should replace the B-52H Stratofortress takes shape, Peter Fanta, deputy assistant defense secretary for nuclear matters, said this week.

The B-52—a 1950s aircraft that is expected to fly for a century—hasn't been able to penetrate enemy air defenses for the last 40 or 50 years, Fanta said at a May 23 AFA Mitchell Institute breakfast, so its replacement would need to regain that capability.

“Do you find something that just carries volume and you use the weapon to penetrate, or do you actually build another bomber to do the penetration?” he asked. “I would suggest that will be assessed as we go through the next round of threat assessments and look at how these threats are evolving.”

BUFFs are flown for conventional strategic attack, close air support, air interdiction, offensive counter-air and maritime operations, as well as long-range nuclear strike missions. It can carry 12 nuclear Air-Launched Cruise Missiles externally and eight ALCMs or nuclear gravity bombs internally. On the conventional side, B-52Hs wield the non-nuclear ALCM variant, the Joint Air-to-Surface Standoff Missile, Joint Direct Attack Munitions, and a range of other bombs, such as cluster bombs, sea mines, decoys, and jammers.

The Air Force is planning to start retiring the B-1 and B-2 in the early 2030s, leaving only the B-21 and B-52 as the middle of the century approaches. It also wants to grow from nine to 14 bomber squadrons by 2030.

Fanta bets the next bomber won't look like the Stratofortress. The platform will be threatened by multistatic radars, integrated radar defenses, and fighter jet upgrades like artificial intelligence, he added.

To keep up with the pace of adversaries' technology, he said, stop replacing the bombers every 30 to 100 years. Instead, iteratively improve systems through a series of block upgrades every seven to 15 years.

“It may look like something that you can put up with the volume and fly for a long distance with a lot of ordnance on it and then make the ordnance penetrate,” he said. “The question is, how fast is the technology replacing what we are currently seeing? How fast are the integrated air defenses being built by potential adversaries, and then how fast do we need the technology matured?”

<http://www.airforcemag.com/Features/Pages/2019/May%202019/OSD-Official-B-52-Replacement-Needs-to-Penetrate.aspx>

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Lawrence Livermore National Laboratory (Livermore, Calif.)

Subcritical Experiment Captures Scientific Measurements to Advance Stockpile Safety

By Nolan O'Brian

May 24, 2019

Lawrence Livermore National Laboratory (LLNL) successfully executed its first subcritical experiment since 2003 on Feb. 13 at the Nevada National Security Site (NNSS) U1a facility. The experiment — dubbed “Ediza” — took place deep below the desert floor and was the culmination of a five-year campaign aimed at capturing high-fidelity plutonium data in support of nuclear stockpile safety.

Subcritical experiments allow researchers to study how nuclear materials react to high explosives without conducting a traditional nuclear test. The contained experiments are specifically designed to make sure they remain below the threshold of criticality. In the case of Ediza, researchers used high explosives to implode plutonium, capturing numerous, detailed scientific measurements that will be compared with supercomputer simulations.

“We are advancing safety science with this subcritical experiment,” said Barbara Kornblum, LLNL’s lead design physicist on the experimental series. “Ediza is the first experiment of its kind, and it provides us with unique plutonium data.”

As the plutonium imploded, researchers were able to capture high-quality radiographic images relevant to stockpile safety. These images are similar to X-ray images taken by a dentist, but are more than a thousand times more powerful than a dental X-ray. Those radiographs and data from other diagnostics will be compared with supercomputer simulations that predicted the implosion. Comparing those simulations with the experimental data allows scientists to improve the physics models, enabling more realistic simulations and, ultimately, more confidence when assessing stockpile safety.

Ediza was the final experiment in the “Sierra Nevada” series, which was a tri-lab collaboration between LLNL and its counterparts at Los Alamos National Laboratory (LANL) and the UK’s Atomic Weapons Establishment, with support and scientific collaboration from the NNSS. LLNL researchers worked closely with these collaborators, connecting weekly via teleconference over the five-year Sierra Nevada campaign, and daily with the combined NNSS team during Ediza experimental activities.

Leading up to Ediza, researchers conducted five preparatory experiments using mock components made of non-nuclear materials. In addition to providing valuable physics data, the preparatory experiments were essential to ensuring that experimental safety features and diagnostics would function correctly in the Ediza experiment. In the end, all safety, security and diagnostic systems performed as expected.

“Each experiment generated useful physics data, but Livermore doesn’t do ‘subcrits’ to study high explosives,” said LLNL physicist Reed Patterson, experimental team leader. “This experiment was all about answering questions about plutonium. In the end, we captured some exquisite data, and it will go a long way to improve the physics models we use to underwrite nuclear weapon safety.”

Each year, LLNL and LANL are responsible for assessing the U.S. nuclear stockpile to ensure the warheads always will perform as intended. This approach is known as stockpile stewardship. In the absence of conducting traditional nuclear tests, a science-based methodology is employed whereby a virtual testing ground is simulated with computer models. For this to work with confidence, the simulations are validated against real experimental data both from historical nuclear tests that produced nuclear yield and from modern subcritical experiments like Ediza.

This experiment will provide increased confidence in these annual assessments, make sure the safety of nuclear systems remains robust and also enable researchers to enhance safety, where possible, as they work to extend the life of the stockpile.

<https://www.llnl.gov/news/subcritical-experiment-captures-scientific-measurements-advance-stockpile-safety>

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US COUNTER-WMD

Defense News (Washington, D.C.)

Pentagon Hits Pause on Redesign of Critical Homeland Missile Defense Component

By Jen Judson

May 28, 2019

WASHINGTON — The Pentagon has hit the pause button on a troubled effort to redesign the kill vehicle on the Ground-Based Midcourse Defense system's interceptors after reporting a two-year delay in its development earlier this year.

The GMD system is designed to defend against possible ballistic missile attacks from North Korea and Iran.

Dr. Michael Griffin, the under secretary of defense for research and engineering, has decided to issue a stop-work order to Boeing on the development of the Redesigned Kill Vehicle — or RKV — which was first reported by Inside Defense last week.

Boeing was directed to stop work on the RKV on May 24, a company spokesman confirmed to Defense News.

The RKV is meant to replace the current Exoatmospheric Kill Vehicles on all current and future GMD interceptors — a total of 64 ultimately. The EKV, designed to destroy targets in high-speed collisions after separating from a booster rocket, has struggled in testing but has performed reliably in major test events in recent years including a complex salvo test earlier this year.

There are 44 GBIs in place at Fort Greely, Alaska, and Vandenberg Air Force Base, California, with plans to add 22 additional missile silos at Fort Greely to support 20 more GBIs.

The RKV was due out for a critical design review in 2018 but that CDR was delayed by two years in the Missile Defense Agency's fiscal year 2020 budget request released in March. The agency requested \$412.4 million in FY20 to develop the RKV. The plan was to conduct the first controlled flight test of the RKV in FY22 with an intercept flight test in FY23 and a second test in 2024. As a result of the delay of the RKV CDR, the plan was to finish up the installation of the 20 new GBIs at Greely in 2025.

"We came through a preliminary design review as we approached the critical design review at the end of last year," Rear Adm. Jon Hill, the MDA deputy director, said during a March Pentagon briefing. "We did not believe as a government team that we were ready to take that step into that critical design review, and so, through coordination in the department, all the way up to the undersecretary for research and engineering, we determined that the best thing to do was to go back and assess that design and take the time to do it right."

Hill added, alluding to the previous struggles with the GMD exoatmospheric kill vehicle: “We could do what some programs do and what the Missile Defense Agency did years ago, which was to go ahead and produce what we’ve got and then deal with reliability issues within the fleet and then erode the confidence of the war fighter. We know that is the wrong step.”

The Pentagon “recently encountered a technical issue in Missile Defense Agency’s redesigned kill vehicle development program,” Heather Babb, Defense Department spokeswoman, told Defense News in a May 28 statement. “The RKV team has been assessing and testing as needed, suspect components.”

After receiving recent test results, Griffin, “has determined that the current plan is not viable and has initiated an analysis of alternative courses of action,” Babb said. “To avoid unnecessary expenditures, USD(R&E) has directed the Missile Defense Agency to issue a stop work on the RKV activity within the current Boeing contract until a viable path forward is identified.”

The Pentagon did not say how long the analysis of alternatives might take to complete.

In the case of the current RKV program, Boeing was executing the MDA’s design plans.

“The government has indicated that they have initiated an analysis of alternative courses of action and we will support them in this effort as requested,” the company said in its statement. “Boeing will continue to support requirements for our customers and national decision makers set forth for effective missile defense, as we have for more than two decades.”

The Missile Defense Agency Director Gen. Samuel Greaves said, during a Senate Armed Services Committee missile defense hearing earlier this spring, that the issue was not contractor-related but a technical one, but he would not provide details because they are classified.

At the April hearing, MDA appeared to still be focused on proceeding with the RKV program with only the schedule in question. Greaves said the agency was testing components and the timeline for the program might be adjusted over the next few months. He said he believed once the component testing wrapped up the timeline could be shortened, but added, “it could go the other way.”

It’s unclear what alternative paths might be assessed during the strategic pause, but some options could be tweaking the design for the RKV to get it back on track or MDA could look at an alternate path that isn’t just outfitting all present and future GBIs with the current EKV or jumping straight to the development of a Multi-Object Kill Vehicle (MOKV), but one that addresses taking out multiple targets — or volume kills — with one vehicle. The MOKV is to follow the RKV effort, but preliminary work on its development has been ongoing for several years.

And the Pentagon could use this as an opportunity to restructure contracts or recompetite the entire GMD program, suggested Tom Karako, a missile defense analyst at the Center for Strategic and International Studies.

The decision could “represent an inflection point” for homeland missile defense in its entirety, Karako told Defense News.

It’s clear, he said, capability over and above the current kill vehicle is needed — the Defense Department has already spent a fair amount of money on the RKV program — but the Pentagon also has a chance to look at the overall balance of funding to address the North Korea threat and investments to deal with very different missile threats from Russia and China.

<https://www.defensenews.com/pentagon/2019/05/28/pentagon-hits-pause-on-redesign-of-critical-homeland-missile-defense-component/>

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US ARMS CONTROL

The Hill (Washington, D.C.)

Defense Intel Head: Russia ‘Probably’ Violating Nuclear Test Ban Treaty

By Rebecca Kheel

May 29, 2019

The top U.S. defense intelligence officer on Wednesday publicly accused Russia of “probably” violating an international agreement banning nuclear testing.

“The United States believes that Russia probably is not adhering to its nuclear testing moratorium in a manner consistent with the ‘zero-yield’ standard,” Defense Intelligence Agency Director Lt. Gen. Robert Ashley said in remarks at the Hudson Institute.

“Our understanding of nuclear weapon development leads us to believe Russia’s testing activities would help it to improve its nuclear weapons capabilities,” he added.

But when pressed by a reporter on the comment, Ashley said only that “we believe they have the capability to do it the way they are set up” without again saying Russia likely is doing the testing.

At issue is the Comprehensive Nuclear Test Ban Treaty (CTBT), a United Nations agreement negotiated in the 1990s to ban nuclear explosions. Not enough countries have ratified the treaty for it to enter into force, but world powers, including the United States and Russia, agreed to adhere to a ban on tests. The zero-yield standard in the agreement means any explosions, even those that produce a low yield, are prohibited.

Ashley said he “can’t really get into the details,” but said Russia has facilities where they have the ability to conduct explosions.

He added that “part of the concern” is Russia “is not willing to affirm they are adhering” to the zero-yield standard.

The U.S. accusation that Moscow could be violating its test ban commitment comes at a critical time for U.S.-Russian arms control.

The Trump administration is in the process of withdrawing from a Cold War-era treaty that banned the United States and Russia from having nuclear and conventional ground-launched ballistic and cruise missiles. U.S. officials dating back to the Obama administration have repeatedly accused Russia of violating that accord, known as the Intermediate-range Nuclear Forces Treaty.

Meanwhile, a separate Obama-era treaty known as New START that caps the number of deployed nuclear warheads the United States and Russia are allowed is up for renewal in 2021. The Trump administration has indicated it wants to expand the scope of the treaty in order to renew it, including folding in new weapons not covered by the deal and possibly including China.

Tim Morrison, senior director for weapons of mass destruction and biodefense on the National Security Council, said at the Hudson Institute on Wednesday that Trump will decide “next year” whether to extend New START.

Arms control advocates are worried the Trump administration is setting up negotiations on New START to fail, which would leave the world’s two biggest nuclear powers without treaty limitations on their arsenals for the first time in years.

Those advocates quickly criticized the administration Wednesday, saying Ashley presented no evidence to back up his accusation about the CTBT.

“The most effective way for the United States to enforce compliance with the zero-yield standard is for the Trump administration and the U.S. Senate to support ratification of the treaty and help to bring it into force, which would allow for intrusive, short-notice, on-site inspections to detect and deter any possible cheating,” the Arms Control Association said in a statement.

“In the meantime, if the U.S. has credible evidence that Russia is violating its CTBT commitments, it should propose, as allowed for in Articles V and VI of the treaty, mutual confidence building visits to the respective U.S. and Russian test sites by technical experts to address concerns about compliance,” the association added.

<https://thehill.com/policy/defense/446001-defense-intel-head-russia-probably-violating-nuclear-test-ban-treaty>

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MIT News (Cambridge, Mass.)

Plotting New Paths to a Nuclear ‘Yes’

By Leda Zimmerman

May 28, 2019

These are tough times for proponents of arms control and nuclear nonproliferation. Talks with North Korea seem to be at another impasse, and the United States and Russia are walking away from decades-old weapons agreements. But this state of affairs doesn’t seem to faze Mareena Robinson Snowden PhD ’17 in nuclear science and engineering.

“It’s exciting as a researcher to work on something that people are thinking about now, something with real-world implications,” says Snowden. A Stanton nuclear security fellow at the Carnegie Endowment for International Peace (CEIP), she is focused on bringing new ideas to the table on nuclear arms control.

“I try to understand how policymakers and negotiators think, explore current nuclear challenges, and then try to evolve technical frameworks to meet the world as it is,” she says.

Snowden’s work is part of a larger CEIP initiative, the “nuclear firewall” project. Through this effort, scholars hope “to distinguish between peaceful nuclear programs and those focused on weapons,” applying both technical and contextual analysis, explains Snowden. CEIP wants to help nations sidestep nuclear crises, and to stem the acquisition of nuclear weapons by non-nuclear states.

Since joining Carnegie last summer, Snowden has been looking especially hard at the question of nuclear verification, a problem that is quite different today than in years past.

With the United States and Russia — established nuclear states — verification frameworks permit reciprocal inspection of nuclear weapons systems. Under the 2015 Iran nuclear deal, an international agency goes on location to monitor progress on the accumulation of fissile nuclear materials used for bomb building.

But North Korea presents a new, hybrid challenge for verification, according to Snowden. “The U.S. does not consider North Korea a peer nation like Russia, and reciprocal nuclear inspections are not on the table here,” she says. And given North Korea’s sprawling, highly developed, and very secretive nuclear system — from missiles and mobile launchers to warheads and enrichment plants

— it seems implausible to establish a framework involving demands for the system’s complete dismantlement, and intrusive visits to ensure compliance with the framework.

So what kind of plan might work for the kind of evolving, emerging nuclear challenge represented by North Korea?

One concept, suggests Snowden, might require “the U.S. government and international community to prioritize what constitutes militarily significant activities within the larger program, and to ask for limits and demonstrations of compliance on just those activities.”

Under “probabilistic verification,” negotiators pose the question, “What’s enough?” says Snowden. They zero in on a cluster of technically critical features whose elimination or destruction would prove sufficient for the purposes of reducing nuclear weapons capability.

But it seems unlikely the current U.S. administration would embrace such a framework. “Today the expectation in the American mind, set by the current commander in chief, is to go big, go for an all-or-nothing deal,” she says. Successful agreements require lengthy negotiations between diplomats, says Snowden, noting it took 10 years to lay the groundwork for the 1987 Intermediate-Range Nuclear Forces pact between Soviet leader Mikhail Gorbachev and U.S. President Ronald Reagan. “One-and-done” — a single nuclear summit between two leaders — is unrealistic, believes Snowden.

Driven to succeed

It took just a single class on the history of nuclear non-proliferation to seize Snowden’s interest as a graduate student.

“I had so many questions: ‘Why were there such tensions between countries? What policies deal with these weapons?’” she says. “There are technical questions at the heart of nuclear disagreements between nations, and for a technical person, this was a clear lane for me,” she says.

Her thesis investigated whether natural radiation signals generated inside of plutonium-based warheads could be using to monitor them in a future arms control agreement.

Conducting this research wasn’t always smooth sailing. But Snowden found guidance and support from two key advisors. “Richard Lanza (a senior research scientist), a titan in the field of radiation detection, spent so much time brainstorming with me, and discussing my data and analysis,” she says. “And with Sidney Yip [emeritus professor of nuclear science and engineering], it went beyond technical mentorship to personal mentorship: He talked about how difficult the PhD process is, and gave me the encouragement to get through it.”

Snowden felt strongly driven to get through her graduate studies, which she describes as “an extended period of uncertainty.” She was the first black woman to receive a PhD from MIT’s nuclear science and engineering program. “I understood I existed in a unique space, and this was a complete motivator for me,” she says. “There was no license to lie down and give up, because who knows when the next person of color, particularly another black woman, will come in behind me.”

Dual missions

Snowden seeks to advance both the community she represents and her ideas in the arms control domain — sometimes simultaneously. In “Responsible Disruption,” a paper she recently published on the website N Square, she argues for greater inclusion of women and other marginalized voices in nuclear security debates.

“For a long time, gender was not considered a valid part of nuclear security discussions, but it’s now becoming a vibrant conversation,” she says. “There are biological impacts related to the ionizing radiation of nuclear weapons that affect women differently, as well as gendered impacts associated

with crisis and conflict during and following war.” She also notes that the impacts of most conflicts fall hardest on those pushed to the margins, whether along class, racial, or gender lines. So it is imperative, Snowden says, that “we have different voices at the table, especially when some are starting to entertain the premise of limited nuclear war.”

She sees popular culture as a way to lure interest to arms policy discussions, and to her field more generally. Just as the film and book “Hidden Figures” drew attention to black women in computer science, making the discipline more accessible, she believes that creative storytellers could “dig into the history of the nuclear security space and tell that story in a new way that really connects with people, especially with underrepresented communities,” says Snowden. “We need to reframe who this space belongs to.”

While Snowden might someday delve into such storytelling, she is at full throttle at Carnegie, currently preparing a paper on the necessary evolution of verification.

“I discovered I really love research, so I would like to find a full-time position continuing this work,” she says. “There is a lot of instability now between countries with a history of conflict, which worries me, but I hope I will be able to provide valuable suggestions that will make a useful impact on real-world conversations about nuclear security, and navigate to a future that’s more stable.”

<http://news.mit.edu/2019/plotting-paths-nuclear-arms-control-mareena-robinson-snowden-0528>

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VOA (Washington, D.C.)

Is Trump Still Pursuing a ‘Big Deal’ with North Korea?

By Ahn So-young and Patrick Park

May 24, 2019

Christy Lee of the VOA Korean Service contributed to this report.

WASHINGTON — By implying on Fox TV the U.S. knew of five North Korean sites, U.S. President Donald Trump may have sent a message to North Korean leader Kim Jong Un that the U.S. is pursuing a “big deal” approach toward denuclearization, experts say.

“He wanted to get rid of one or two sites,” said Trump while speaking about Kim during an interview on Fox News May 19.

“What about the other three sites?” Trump said on Fox. “That’s no good. If we’re going to make a deal, let’s make a real deal.”

Trump did not identify on air which five nuclear sites he was referring to.

Trump said Kim previously offered to close down the Yongbyon Nuclear Scientific Research Center.

At the Hanoi summit in March, Trump called on Kim to “fully dismantle North Korea’s nuclear infrastructure” by handing him a list of demands written on a piece of paper reviewed by Reuters at the time. Other demands listed included dismantling “ballistic missiles, launchers, and associated facilities” as well as a “chemical and biological warfare program.”

Kim refused this all-or-nothing or “big deal” approach that called for denuclearization all at once. North Korea has favored a phase-out approach of dismantling its nuclear weapons program in an incremental fashion. Kim responded to Trump by asking that all sanctions be lifted. The summit

quickly ended without any nuclear deal and denuclearization talks between Washington and Pyongyang have been stalled since.

Which is why Trump's "five sites" allusion is seen by some experts as a way to tell Kim that he still stands by his comprehensive "big deal" approach toward denuclearization that he took at the Hanoi summit.

"I think he was making it very clear [about] the U.S. position," said Joseph DeTrani, a former special envoy for nuclear talks with North Korea. "[Trump] wants that 'big deal' approach."

Gary Samore, the White House coordinator for arms control and weapons of mass destruction during the Obama administration, said, "The U.S. is saying to North Korea, 'we are not satisfied with dismantlement of Yongbyon.'" He continued, "That is not a sufficient step. We need to see all the facilities that produce fissile materials to be closed down and dismantled."

What five sites?

Still, the specific number of nuclear sites Trump suggested has confounded some experts.

Ken Gause, director of Adversary Analytics Program at the CNA, a research organization, said, "The fact that he mentioned five is a bit perplexing." He continued, "It's kind of hard to figure out what would be gained by that, other than potentially signaling to North Korea ... we want you to give up a significant chunk of what you have."

Christopher Hill, a chief negotiator with North Korea during the George W. Bush administration, said, "It's the first time a number has been put out there." He added, "This speaks to the fact that I don't think President Trump knows the difference between intelligence and information."

Nuclear experts are also wondering what Trump meant by five nuclear sites: Did he mean five locations that could hold several nuclear facilities? Or, did he mean five individual facilities? Or five test sites?

Michael Elleman, a senior fellow at the International Institute for Strategic Studies, said, "From [Trump's] brief comments, it is not possible to know precisely what he meant by five nuclear sites." He continued, "Does this include the test sites or research facilities?"

Olli Heinonen, former deputy director general of the International Atomic Energy Agency (IAEA), said, "Some sites could have several facilities, which are a matter of concern."

North Korea has approximately thirty nuclear facilities that have different nuclear capabilities located in sites scattered around the country including facilities in and around the Yongbyon nuclear complex, according to U.S. and South Korean intelligence agencies.

"Manufacturing of components wherever they are, that site needs to be closed," said Heinonen. "And then putting the nuclear warheads together -- assembly -- that needs to be closed."

Jeffrey Lewis, director of the East Asia Nonproliferation Program at California's Middlebury Institute of International Studies, said if Trump meant areas where several nuclear-related facilities are located, "I imagine that the administration had a priority list of five sites they wanted closed." He added, "That would include not just the Yongbyon Nuclear Research Center (which has many facilities) but also additional uranium enrichment sites such as Kangson."

The Yongbyon nuclear center is where facilities to enrich uranium and the country's only suspected facility for reprocessing plutonium are located. Reprocessing plutonium and enriching uranium are the two pathways for developing nuclear weapons.

North Korea is also believed to have a nuclear site at Kangson, a suspected uranium enrichment plant that Lewis and his team located based on high-resolution images pieced together.

Lewis said, "North Korea has many, many more nuclear sites than just five." He believes other possible nuclear sites are located in Hagap, Pyongsan, and Pakchon. Hagap in the country's North Hwanghae Province is a site for unidentified facilities that could potentially have an underground reprocessing facility. Pyongsan, which is also in North Hwanghae Province, is suspected to be a site for uranium core concentration plants and mines. Pakchon, in North Pyongan Province, is reportedly a site of North Korea's key uranium mine.

Additionally, North Korea has its only nuclear test site at Punggye-ri and the Sohae missile launch site in Tongchang-ri.

<https://www.voanews.com/a/trump-north-korea-denuclearization/4935525.html>

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The Hill (Washington, D.C.)

Iran: 'We Currently See No Prospect of Negotiations with America'

By John Bowden

May 28, 2019

Iranian officials on Tuesday said they see no benefit to negotiating with President Trump or members of his administration as tensions between the two nations have reached the highest point in years.

Abbas Mousavi, a foreign ministry spokesman, said at a news conference in Tehran that Iran's government currently sees "no prospect of negotiations with America," according to Reuters.

"Iran pays no attention to words; What matters to us is a change of approach and behavior," he reportedly added.

The comments come just a day after Trump reiterated his belief to reporters that Iranian officials would return to the negotiating table following the announcement of a U.S. deployment of around 1,500 troops to the Middle East alongside a carrier strike group that was previously ordered to the Persian Gulf earlier this month.

"I really believe that Iran would like to make a deal, and I think that's very smart of them, and I think that's a possibility to happen," Trump told reporters on Monday.

Iran's government and others have denounced the U.S. decision to deploy further forces to Iraq and other areas as an escalation of tensions, while the Trump administration has maintained that such a move is necessary to counter threats to existing U.S. holdings from Iran or Iranian-backed forces.

Trump said Monday that he would not push for regime change in the country, while reiterating the U.S. position against the acquisition of nuclear weapons by Iran.

"I'm not looking to hurt Iran at all. I'm looking to have Iran say, 'no nuclear weapons,'" Trump told reporters at a press conference in Japan.

<https://thehill.com/policy/defense/445704-iran-we-currently-see-no-prospect-of-negotiations-with-america>

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COMMENTARY

The Hill (Washington, D.C.)

National Security Stakes of US Nuclear Energy

By Thomas Graham Jr. and Richard W. Mies

May 25, 2019

The recent struggles of the U.S. nuclear energy industry may appear to be no more than the usual economic disruption caused by competition among technologies. But from our experience in diplomacy and the armed forces, we understand that a declining domestic civil nuclear industry has other ramifications. Critical U.S. national security interests are at risk.

We have dedicated our careers to controlling the destructive potential of nuclear weapons. But since the Atoms for Peace era, U.S. leadership in supplying peaceful nuclear energy technology, equipment, and fuel to the world has been important for world development and therefore critical for the United States to establish and enforce standards for nuclear safety, security and nonproliferation. But in recent decades, the U.S. share of international commercial nuclear energy markets has diminished, and so with it has the United States' ability to influence global standards in peaceful nuclear energy.

The critical moment for U.S. leadership in nuclear energy is when a country is developing nuclear energy for the first time. The supplier country and the developing country typically forge a relationship that endures for the 80- to 100-year life of the nuclear program. Unlike a coal or gas plant, nuclear reactors need specialized fuel and maintenance. Once established, the bilateral commercial relationship is not easily dislodged by a rival nation, providing the supplier profound and lasting influence on the partner's nuclear policies and practices.

Russia and China have identified nuclear energy as a strategic export, to be leveraged for geopolitical influence as well as for economic gain. According to a recent analysis, Russia is the supplier of more nuclear technology than the next four largest suppliers combined, and China is quickly emerging as a rival. If the United States fails to compete in commercial markets, it will cede leadership to these countries on nuclear safety, security and nonproliferation, as well as foreign policy influence.

As the competition intensifies to deliver the next generation of nuclear power technologies, U.S. nuclear leadership is approaching a watershed opportunity. Simpler, scalable, and less expensive, small and advanced reactors are commercially attractive to an expanded range of markets — particularly in Africa, Asia and the Middle East.

The United States has the world's best training and development programs, unmatched regulatory experience, and multiple small and advanced reactor designs; we should be the easy choice for the next generation of nuclear technology. But early U.S. engagement in these important geopolitical regions is critical. Without it, Russia and China will lock up future nuclear markets through MOUs and other bilateral agreements.

And for addressing the national security risks of climate change, nuclear energy is not just an option but a necessity. Developing nations that are planning to meet power and water needs for large and growing populations must have reliable, demonstrated, zero-emission nuclear power in order to meet global climate goals as well. Advanced reactors are integral to these goals.

In the United States, nuclear energy is responsible for a fifth of the United States' total electricity and more than 55 percent of our emissions-free energy, but the pace of domestic construction of new natural gas plants far exceeds the few nuclear plants under development, and the existing fleet is retiring prematurely at an alarming rate.

Which brings us back to the domestic nuclear industry. U.S. global competitiveness and leadership are inextricably linked to a strong domestic nuclear program. Without a healthy domestic fleet of plants, the U.S. supply chain will weaken against international rivals.

Russia has brought six new plants online in the past five years and has six more plants currently under construction. In the same period, China has brought 28 new plants online and has 11 others under construction. These domestic projects provide Russia and China with a robust supply chain, an experienced workforce, and economies of scale that make them more competitive in bidding on international projects. Unless we continue to innovate and build new plants, we will cease to be relevant elsewhere.

Even our own domestic energy security is supported by nuclear power. The nuclear plants operating today are the most robust elements of U.S. critical infrastructure, offering a level of protection against natural and adversarial threats that is unmatched by other plants. Because the nation's grid supplies power to 99 percent of U.S. military installations, large scale disruptions affect the nation's ability to defend itself.

We can regain U.S. leadership in nuclear energy. The key steps are to maintain the domestic reactor fleet, with its reservoir of know-how, and to assist American entrepreneurs in developing the next generation of the technology.

But the first step is to recognize what is at stake.

Ambassador Thomas Graham Jr. is a retired diplomat who helped negotiate every international arms control and nonproliferation agreement from 1970 to 1977.

Admiral Richard W. Mies is a former commander in chief of strategic command, the operational commander of U.S. nuclear forces, from 1998 until 2002, who helped shape post-9/11 U.S. nuclear strategy.

Ambassador Graham and Admiral Mies are co-chairs of the Nuclear Energy and National Security Coalition (NENSC).

<https://thehill.com/opinion/national-security/445550-national-security-stakes-of-us-nuclear-energy>

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

Book Review | Hope As a Method: Maxwell Taylor and America's Cold War

By Gregory Daddis and Jesse A. Faugstad

May 23, 2019

There is an inherently aspirational quality to strategic planning. Former U.S. Army Chief of Staff Gordon R. Sullivan may have famously argued that "hope is not a method," but strategy still centers upon hoping to achieve or avoid possible outcomes. Surely, due to the chaos unleashed when armed forces apply military power, there are few guarantees in war. As Colin S. Gray, one of the most thoughtful students of strategy, observes, "before undergoing trial by battle, no one really knows

how effective military power will be. ... A capability that appears lethally effective in peacetime exercises will not translate automatically into a violent elixir to solve political problems.”

Nowhere was this truer than in the Cold War, as American policymakers and senior military leaders grappled with the problems of nuclear warfare. And throughout these tense years of superpower rivalries and global hostilities, few U.S. Army officers stood more firmly in the center of debates over strategic planning than Maxwell Taylor.

In Ingo Trauschweizer’s accomplished hands, readers are treated to a rigorous and satisfying treatment of the American general. We accompany Taylor through his assignments as the U.S. commander in Berlin after World War II, his stint as the Eighth Army commanding general in Korea, and his tenure as the U.S. Army chief of staff. Trauschweizer, though, pays special attention to Taylor’s time as chairman of the Joint Chiefs of Staff and U.S. ambassador to South Vietnam in the early 1960s, in many ways because this monograph is “equal parts intellectual biography and a study of the national security state.”

And yet, at its core, Maxwell Taylor’s *Cold War* is a work about hope: hope that a more efficient and capable military bureaucracy could produce a U.S. grand strategy that best served the nation’s global political objectives.

Indeed, this aspirational quality of strategic planning seemed to pervade Taylor’s career from Berlin to Vietnam: hope that armed forces could survive, fight, and win on a nuclear battlefield; hope that airpower could achieve political aims in foreign revolutionary wars; hope that interservice rivalries would not impede, if not completely undermine, sound strategic decision-making. And hope that war, when entered into, would deliver.

Trauschweizer, an associate professor at Ohio University, demonstrates, however, that such hopes were consistently dashed during the 1950s and 1960s. Taylor thus emerges as a sort of Don Quixote character, tilting at strategic windmills despite his glittering military record and the respect he commanded because of that service. Not that Taylor was a visionary theorist or a master strategist. Indeed, Trauschweizer holds his subject accountable in an admirably dispassionate manner. This is far from a work of hagiography, refreshingly impartial when compared, for example, to biographies of Taylor’s contemporary, Creighton Abrams. Moreover, judging from his endnotes, Trauschweizer has done his homework in a wide array of national security archives.

As a brief aside, then, we might consider the imprimatur from the Association of the United States Army and ask how well this monograph fits within their “American Warrior” series. The series’ aim is to examine the “unique historical contributions” of those “whose legacies serve as enduring examples for soldiers and civilians alike.” Without question, Taylor served the nation with honor and distinction, but, upon reading this work, readers may question the general’s lasting legacy.

In this way, perhaps we should follow Trauschweizer’s lead and not be so adoring of our senior military leaders. Taylor was a complex figure. He was patriotic, intellectually inclined, and a selfless servant to the nation. Yet he was prone to over-optimism when evaluating the potential impact of military force, especially airpower. He was a micromanager and seemed, at least to some of his peers, as more of a political operator than a military general. And he advocated for using military power in Southeast Asia even as he remained uncertain how that power would translate into political constancy within the South Vietnamese regime.

Two decades before America’s full entry into the Vietnamese war, Taylor served as West Point’s superintendent, and it is here that Trauschweizer really begins his story. World War II is given short shrift and readers without a base of knowledge of Cold War history certainly would profit from a primer like John Lewis Gaddis’s classic work before tackling this book. In particular,

Trauschweizer presumes readers have at least a working understanding of Cuba, Laos, and other Cold War hotspots.

Yet Taylor's assignment as the superintendent of the U.S. Military Academy from 1945 to 1949 emerges as a useful starting point for larger questions about professional military education. How do we teach war in a way that is historically grounded, yet relevant for thinking about current and future war? In short, what is the purpose of military education? As Thomas E. Ricks has pointed out, far too many senior officers coming out of the Vietnam War intent on "rebuilding" the Army concentrated on tactical training rather than developing future generations of innovative, strategic thinkers. Such a focus may have been necessary for the task at hand, but was hardly sufficient for considering the deeper aspects of war and its consequences. Thus, even while Trauschweizer gives Taylor high marks for overhauling a West Point curriculum too heavy on engineering, he still suggests that thinking historically was a skill that eluded senior officers. Later in his career, for instance, Taylor optimistically held faith in a Korean War armistice repeating itself in Vietnam. History, though, never works out so neatly.

As Trauschweizer moves his subject from the halls of West Point to the Cold War's frontiers, he delivers a compelling case for why conceptualizing grand strategy is so hard, especially in an era of persistent conflict. Rebecca Friedman Lissner recently has done fine work articulating these challenges and Trauschweizer adds to this discussion by showcasing Taylor's role as strategic thinker and practitioner. The general's tour in Cold War Berlin highlighted the importance of propaganda and messaging in crafting strategic narratives, as well as the difficulties in finding the right balance between planning and crisis management. Service in Korea confronted Taylor with the real-world challenges of limited war and there, the general's predilections for checking enemy forces with firepower were reinforced. Yet in the months following the 1953 ceasefire agreement, reconstruction and rehabilitation of South Korea came to the forefront of Taylor's command priorities.

All of this unfolded as the very definition of war, at least for some, seemed to be changing. Here, Taylor the critic emerges, as a detractor of President Dwight D. Eisenhower's supposed absolute reliance on nuclear weapons. (Taylor held little back in his 1960 *The Uncertain Trumpet*, calling for a full reassessment of U.S. defense strategy.) Trauschweizer, though, makes clear Ike held a far more expansive definition of "war" and saw utility in employing military force below the nuclear threshold. He was not alone. For example, Adm. Robert Carney, Eisenhower's chief of naval operations, argued in a January 1955 National Security Council meeting that "if we tailored all our military forces to a single concept of warfare, it would be unsound. The U.S. forces should have sufficient versatility to enable them to meet various circumstances short of general war, as well as general war itself." Thus, Trauschweizer rightfully challenges popular conceptions of Ike's total reliance on nuclear weapons and a commitment to what later would be dubbed "mutually assured destruction."

There is still much to consider in the Taylor-Eisenhower debate. Those who elevate massive retaliation as the cornerstone of 1950s U.S. defense policy miss the obvious. Ike's emphasis on covert action, psychological warfare, and collective security show a president who believed he had few options but to confront communist expansion. Yet Eisenhower also believed that the Soviet leadership had tempered its ideology with pragmatism, much as the United States had. Thus, Ike argued it would be best for the nation to use nuclear weapons only in a retaliatory manner. The employment of covert operations and political warfare in places like Iran and Guatemala — not to mention the incredible growth of the CIA — indicate that Eisenhower was not solely reliant on nuclear war as a means of policy.

Taylor, however, articulated the president's grand strategy in far more simplistic terms. In advocating for what would become known as "flexible response," the general reduced Ike's grand strategy to an overly reductive formula that suggested nuclear deterrence "left the world vulnerable to limited and local aggression." Here, Trauschweizer implicitly asks us to consider deeper questions about the use of force. Strategic planners often are proficient at analyzing capabilities and considering how military systems might fare in future war, or extracting supposed "lessons" about what should have been done in the last war. Far too few, however, ask how war can accomplish stated political goals. Arguably, even fewer think deeply about the potential long-term consequences of American interventionism abroad.

Trauschweizer doesn't say if Taylor fully grappled with these important considerations. Instead, what surfaces is a senior military leader deliberating the ways in which the U.S. Army could effectively employ firepower on the modern battlefield. The general, for instance, believed that "limited war" included the use of tactical nuclear weapons. By the 1960s, now as U.S. ambassador to South Vietnam, Taylor argued vociferously for using airpower to solve a host of political and military problems that might offset the need for ground combat troops. Thus, Taylor appears as a contradiction. For an intellectually-minded officer promoting a "flexible response" to the problems of modern war, Taylor comes out a military leader wedded to traditional conceptions of industrial warfare.

To be certain, the military bureaucracy did not help matters. In all these debates, Trauschweizer describes — at least from Taylor's vantage point — a dysfunctional national security apparatus rife with service rivalries that undermined a clear conception of grand strategy best suited for the era of limited war. Those familiar with the works of Robert Buzzanco and H.R. McMaster likely will not be surprised by this Cold War infighting. Protecting service budgets has become an inherent part of the American way of war. The 1950s and 1960s were no different. Indeed, even after Taylor retired from active service he was lobbying senators for funding so the Army could wage his conception of limited war. Yet, in the global Cold War context, we might ask how these localized threats posed an existential danger to the United States.

And, to be sure, determining how best to respond to the threat of nuclear war made these service rivalries even more unsettling. Once more, Trauschweizer's sketch of Taylor offers valuable insights. Talking about nuclear retaliation requires placing that instrument of national power into context. You can propose the development of a capability but that does not necessarily mean you want to solely rely on that capability, or that the capability is even relevant to policy.

The U.S. Army, for example, possessed a wide range of competencies during the Cold War era, including, supposedly, fighting and surviving on a nuclear battlefield. Yet did the operational planning and training for nuclear war mean that nuclear weapons had strategic utility? As a tactical instrument, perhaps not. As a strategic deterrent, moral issues aside, arguably so. What Trauschweizer shows is the difficulty service-oriented officers faced in distinguishing between nuclear weapons as a deterrent and as a battlefield capability, especially when deterrence itself was tied to capability and intentions.

Taylor's own assignment in President John F. Kennedy's Camelot seemed only to complicate the discomfited nature of U.S. civil-military relations. While Taylor lambasted the national security system, his brief role as JFK's "Military Representative," a presidential advisor outside the formal chain of command, left unclear who exactly was formulating the nation's grand strategy. The Joint Chiefs of Staff unsurprisingly resented having a "watchdog" in the White House. Worse, the former general appears in this accounting ill-equipped to deal with the threats of revolutionary warfare. Trauschweizer likely will leave many readers wondering how the advocate of "flexible response" appeared so out of step in crafting effective, meaningful countermeasures to local insurgencies.

Indeed, the last 100 pages of Maxwell Taylor's Cold War focus on the general's struggles to find an appropriate response to the challenges inside South Vietnam. Here strategic aspirations arguably entered the realm of wishful thinking. For Trauschweizer, Taylor's optimism lay at the heart of a broader American search for local governmental stability that would allow the South Vietnamese to carry a greater load. And yet despite repeated disappointments, the general-cum-ambassador never wavered in believing American credibility was at stake in Southeast Asia. He, along with many of Lyndon Johnson's senior staff, worried that if the United States abandoned South Vietnam as a practical matter, other nations might be less willing or able to resist communist subversion.

Such views persisted even in the face of basic contradictions. "Throughout the Vietnam War," Trauschweizer shares, "Taylor stuck to the observation that devising strategy was not hard, yet it was impossible to execute in a time span tolerable to the American people."

Such unexamined optimism — some might call it hubris — may leave readers skeptical of Trauschweizer's claim that Taylor understood the context of the war in Vietnam. Did he? Did any senior U.S. policymaker, lacking a deep understanding of Vietnamese language and culture, truly observe the undercurrents of local politics in the war-torn and bitterly divided country of South Vietnam? How would Taylor have known, for instance, if there were viable alternatives to political leaders like Ngo Dinh Diem or Gen. Nguyen Khanh? In truth, the U.S. mission never fully explored such options and, arguably, never had the knowledge to do so. As Robert K. Brigham recently has shown, even during the Nixon years, American diplomats never surfaced names of groups or individuals that might have presented a viable alternative to either the communists or the entrenched Saigon government.

Taylor's views on airpower in Vietnam equally suggest a senior leader planning a war based on hope rather than calculation. In Trauschweizer's view, the ambassador "believed it was possible to fight a war for limited political objectives with airpower." Yet such aspirations rested on little to no evidence that bombing could achieve its projected results. In fact, senior planners could not even come to a consensus on what the use of airpower was intended to convey. If Emile Simpson is correct that "force is simply another way to communicate meaning, another language," it seems clear that U.S. policymakers failed in the basics of strategic prioritization. Worse, when the likes of Taylor began linking military action overseas to American prestige and credibility, the muddled bombing campaign raised some uncomfortable questions. What happened when airpower failed to deliver? Did the United States then look weak on the global stage because it could not break the will of Hanoi's leaders?

We might question then how much Taylor truly was an "architect" of the American war in Vietnam. Yet evidence suggests it was the U.S. military command rather than the embassy that developed military strategy as the Johnson administration inched closer to committing U.S. ground combat troops to Vietnam. True, Taylor and Gen. William C. Westmoreland maintained a respectful relationship, even as their views diverged on how best to counter the rising threat to the Saigon government. But Taylor never truly figured at the center of key debates, whether on the use of airpower — Trauschweizer says his views were "in the minority" — or on the employment of U.S. ground forces.

Ultimately, we might also question, as does the author, Taylor's depiction as a "wise man" who fully understood the role of military force in the post-World War II era. To be certain, there was much to consider for any strategic planner — the role of nuclear weapons in limited war; the efficacy of counterinsurgency in civil wars; and the long-term consequences of superpowers intervening in local affairs. Studying Taylor's career suggests that in many of these areas hope outpaced sensible strategic thinking. How was it, for example, that senior U.S. policymakers "agreed on the need to

deploy combat forces in Vietnam even though they did not foresee victory”? Could it be that hope is far too prevalent in how strategy is conceived, even today?

It seems that Taylor never fully wrestled with these questions after Vietnam, instead standing along other military officers who, in their postmortems on the war, placed blame on those outside the military establishment when victory could not be achieved. Perhaps it was just easier to impugn civilians. If the war was winnable, as Taylor believed, then faulting the bureaucracy or the system or the home front en masse left those in uniform shielded from criticism. Or so was the hope.

Trauschweizer concludes with an epilogue that, in itself, acts as a short primer on strategy. It is as pithy as it is thoughtful. Indeed, his four essential themes from Taylor’s experiences — ranging from tensions between individuals and bureaucratic systems to the role of strategy as “connective tissue” between operational art and policy — could serve as the baseline for any graduate course syllabus on U.S. grand strategy in the Cold War era. Perhaps the best compliment after reading this work is that it forces the reader to continue thinking long after putting the book down. And this is because, in the end, Maxwell Taylor’s Cold War leaves the reader asking: Why do we continue hoping that war will deliver as anticipated?

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<https://warontherocks.com/2019/05/hope-as-a-method-maxwell-taylor-and-americas-cold-war/>
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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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