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## Feature Report

***“NUCLEAR WEAPONS: Action Needed to Address the W80-4 Warhead Program's Schedule Constraints”***. Published by U.S. Government Accountability Office; July 24, 2020

<https://www.gao.gov/products/GAO-20-409#summary>

### What GAO Found

The National Nuclear Security Administration (NNSA), a separately organized agency within the Department of Energy (DOE), has identified a range of risks facing the W80-4 nuclear warhead life extension program (LEP)—including risks related to developing new technologies and manufacturing processes as well as reestablishing dormant production capabilities. NNSA is managing these risks using a variety of processes and tools, such as a classified risk database. However, NNSA has introduced potential risk to the program by adopting a date (September 2025) for the delivery of the program's first production unit (FPU) that is more than 1 year earlier than the date projected by the program's own schedule risk analysis process (see figure). NNSA and Department of Defense (DOD) officials said that they adopted the September 2025 date partly because the National Defense Authorization Act for fiscal year 2015 specifies that NNSA must deliver the first warhead unit by the end of fiscal year 2025, as well as to free up resources for future LEPs. However, the statute allows DOE to obtain an extension, and, according to best practices identified in GAO's prior work, program schedules should avoid date constraints that do not reflect program realities. Adopting an FPU date more consistent with the date range identified as realistic in the W80-4 program's schedule risk analysis, or justifying an alternative date based on other factors, would allow NNSA to better inform decision makers and improve alignment between schedules for the W80-4 program and DOD's long-range standoff missile (LRSO) program.

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# NUCLEAR WEAPONS AND DETERRENCE

Defense News (Washington, D.C.)

## **Nuclear Official Says Warhead Modernization Program on Track despite COVID, GAO Concerns**

By Aaron Mehta

July 29, 2020

WASHINGTON — Replacements for components that caused cost increases and program delays for two multibillion-dollar nuclear warhead programs have passed tests, putting the programs on track for new production dates, according to a top official from the National Nuclear Security Administration (NNSA).

But Charles Verdon, deputy administrator for defense programs at the NNSA, pushed back Wednesday on a recent report from a government watchdog that warned the agency is moving too fast on another major warhead modernization project.

The issue, found within the B61-12 and W88 Alteration 370 warhead programs, was first revealed by Verdon during last September's Defense News Conference. It involved commercially available capacitors that, during stress testing, did not give NNSA confidence they could survive the 20-30 years needed for these designs. Verdon emphasized then that the parts were not at risk of failure under normal circumstances, but that the agency was acting out of an abundance of caution for the long-term life of the weapons.

All told, the B61-12, which was designed to replace America's existing nuclear gravity bombs, will cost an extra \$600-\$700 million. The W88, to be used on future submarine launched ballistic missiles, will cost about \$120-\$150 million because of the capacitor issue, per agency figures.

After the issue was discovered, the date for the first production unit for both warhead programs was delayed. The good news, Verdon said, is that those programs are now on track to hit the new targets and that the technical issues have been solved. The replacement components for the W88 have "passed all their tests," while the B61 parts "are on the same path — much more extensive because there are more parts. But we are successfully moving through those now," Verdon said.

The NNSA is a semiautonomous agency located within the Department of Energy. While the Pentagon develops the delivery systems for nuclear weapons, the NNSA produces and secures the warheads. Verdon's comments came at an event co-hosted by the Mitchell Institute and the Advanced Nuclear Weapons Alliance.

Two successful test launches of B61-12 designs mean the F-15E is ready to go with the newest nuclear gravity bomb design.

Last week, the Government Accountability Office (GAO) released a report warning that the NNSA is overly optimistic about the timeline for its W80-4 program, which would be the warhead for the Air Force's future air launched cruise missile, known as the Long Range Standoff weapon, or LRSO.

The GAO reported that the NNSA's plan to deliver the first W80-4 warhead by September 2025 is "more than a year earlier than the program's own analysis says is reasonable" for the \$11.2 billion program. Given the importance of aligning the warhead production with the Pentagon's development of LRSO, the government watchdog recommended using a later timeline target to avoid a program gap.

However, Verdon pushed back on the idea the NNSA is being too aggressive, saying the goal is a “good driver” for the agency to keep pushing hard on the project. He also said that NNSA and the Pentagon are aligned on potential risks.

“We always work to make sure that they understand that there could be a slip, and that they’re planning of what a slip could be or what a slip could empower slip could impact their work,” Verdon said. “They’re updated constantly about the progress. And if it becomes timing - if COVID becomes worse such that things do slow down - we’ll already have, kind of, courses of action in place of which we can begin to develop if we do have to slow down.

“But right now we don’t see a reason to take the foot off the gas pedal.”

GAO is also working on a report about the W87-1, which has a currently fiscal 2030 target operational date. That warhead is expected to go on top of the Air Force’s Minuteman III replacement program, known as the Ground Based Strategic Deterrent.

Verdon stressed “close coordination” between DoD and NNSA on the W87, noting the Pentagon’s needs “oftentimes drive when we have to have certain components ready to do early flight tests or early ground tests.” As to risks, he noted that agency leaders are looking at the lessons learned from the previous warhead delays, and have built in multiple schedule options to maintain flexibility.

“What we’re doing for the W87 is that we have baseline approaches, but we are carrying a number of different secondary and tertiary approaches to it, in case the baseline isn’t met,” he said, in order to “maximize the chances of success for these in all cases.”

However, he also noted that this program is particularly dependent on new production facilities coming online as planned, which could be impacted by COVID or budget delays.

#### Potential delays

Verdon said the agency has largely handled COVID well, with a plan implemented early that gave the laboratories flexibility to do as much telework as possible while focusing first on maintaining the current stockpile, and then prioritizing the nearest-term modernization programs. But he also pointed out that the pandemic could have unforeseen impacts down the line.

One factor that could cause disruptions to NNSA’s plan is the ongoing debate over the agency’s budget. The NNSA received a massive spike in funding under the president’s budget request, following an internal fight that leaked out into the press.

While the defense committees in both chambers have largely supported that funding, the House Energy and Water Development, and Related Agencies Subcommittee — which has jurisdiction over the DoE, and hence the NNSA — has voted to cut the agency’s budget, including stripping out \$53 million for early work on the W93 submarine launched warhead.

While the \$53 million in NNSA funds is not a significant figure, any delay in the development of the W93 could delay the expected deployment, not just for America, but for the United Kingdom, which plans to buy a version of the warhead. And there is speculation in the nuclear community that former Vice President Joe Biden, should he win the presidency in November’s election, would look to cancel the nascent program.

Any broad cuts to the NNSA budget request “will impact the warhead acquisition schedules,” Verdon said, as the money is needed to set up new facilities which in turn would impact when work on the warheads can get underway.

<https://www.defensenews.com/smr/nuclear-arsenal/2020/07/29/nuclear-official-says-warhead-modernization-program-on-track-despite-covid-gao-concerns/>



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Santa Fe New Mexican (Santa Fe, N.M.)

## **LANL to Increase Plutonium Lab Work Ahead of Pit Production**

By Scott Wyland

July 23, 2020

Los Alamos National Laboratory is planning to move its plutonium analysis into a radiology building where officials say the work can grow.

Relocating the plutonium work from a 1950s-era chemistry and metallurgy facility to the radiology lab will allow an increase in the amount of low-level radioactive material technicians can handle — to 400 grams from the current 38.6 grams — as LANL ramps up its production of nuclear weapons triggers.

The radiology lab is designed to house nuclear operations and is conveniently located near LANL's plutonium facility, said Toni Chiri, a spokeswoman for the National Nuclear Security Administration, a branch of the U.S. Department of Energy that oversees national labs.

“The project would allow NNSA to optimize the use of laboratory space for all plutonium work at Los Alamos,” Chiri said in an email.

But the move will require significant upgrades to the radiology facility.

Federal inspectors have found a variety of fire-safety deficiencies at the lab, including flaws in fire barriers, fire penetration seals, fire doors and sprinkler systems, according to a February report by the Defense Nuclear Facilities Safety Board.

In a report the safety board released in March, Triad National Security LLC, which contracts with the federal government to operate LANL, also noted five stairwells must be repaired to ensure safe emergency evacuation.

Triad estimated making all the fixes could take four to five years.

Chiri said she couldn't comment on how the fire deficiencies would affect the lab project.

The radiology lab will be reclassified as a Hazardous Category 3 nuclear facility, Chiri said.

That means it will have “the potential for significant but localized consequences.”

Such hazards are lower than Category 2, which can cause “significant on-site consequences” and risks of Category 1 facility, which could cause serious off-site impacts, such as those posed by nuclear reactors, according to an Energy Department guidebook.

There is no cost estimate or time frame yet for transforming the radiology lab to a plutonium research lab, Chiri said. The conversion will have minimal impact on employees who use the building, she added.

The conversion is part of a larger “chemistry and metallurgy research replacement” project outlined in the Energy Department's 2021 congressional budget.

A more ambitious replacement plan was scrapped during the Obama administration when estimated costs of the new facility ballooned from about \$500 million to more than \$6 billion.

Work in the overhauled radiology lab will include probing plutonium that will be used in producing so-called pits, the grapefruit-sized explosive centers in nuclear warheads.

Plans call for LANL to manufacture 30 plutonium pits a year by 2026 and the Savannah River Site in South Carolina to make 50 pits yearly by 2030. The most pits LANL has produced in a year was 11 for Navy missiles more than a decade ago.

Boosting LANL's capacity to analyze plutonium directly relates to the push to ramp up pit manufacturing as part of a national effort to modernize the nation's nuclear arsenal.

Jay Coghlan, executive director of Nuclear Watch New Mexico, a nonprofit research organization that has been critical of the plan for ramped-up pit production at LANL, said the project to overhaul the radiology lab is "very significant."

"It's a key piece of the puzzle of expanded pit production," he said.

Coghlan said he's not surprised LANL and the National Nuclear Security Administration would start a project like this amid unresolved fire-safety issues.

"They never do their homework," he said.

[https://www.santafenewmexican.com/news/local\\_news/lanl-to-increase-plutonium-lab-work-ahead-of-pit-production/article\\_6dacc7da-cd0c-11ea-8ffa-23cd82355a4f.html](https://www.santafenewmexican.com/news/local_news/lanl-to-increase-plutonium-lab-work-ahead-of-pit-production/article_6dacc7da-cd0c-11ea-8ffa-23cd82355a4f.html)

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Roll Call (Washington, D.C.)

## **Trump Team's Case for New Nuke Cites Risks in Current Arsenal**

By John M. Donnelly

July 29, 2020

The Trump administration, in a closely held memo to lawmakers this spring, justified developing the first new U.S. atomic weapon since the Cold War by citing vulnerabilities and risks in the current nuclear arsenal that are rarely or never acknowledged in public.

In an unclassified five-page white paper sent to Congress in May, the Pentagon and the Energy Department's National Nuclear Security Administration, or NNSA, affirm a point they have long minimized: the dangers of land-based missiles ready to launch minutes after a warning of enemy attack.

They also discuss threats to U.S. nuclear missile submarines that have previously been depicted as all but undetectable. They say, too, that a new class of ballistic missile submarines lacks the firepower of its predecessors, creating a need for a lighter and more powerful type of warhead — in addition to the two existing types. As for the current two sets of warheads, they say they have too few of the most destructive kind and too many of the less forceful variety — and excessively rely on the latter.

The document, which was obtained by CQ Roll Call and has not previously been disclosed, makes the fullest case yet for the \$14 billion W93 submarine-launched atomic warhead program and its MK7 reentry vehicle, which would cost several hundred million more dollars.

In the document, officials said the W93 warhead must be funded, starting in fiscal 2021, because of what it described as perils and vulnerabilities in the Navy's inventory of sub-launched weapons, as well as in the Air Force's land-based missiles and bombers. These arguments are rarely, if ever, aired in public and atomic arms experts question the validity of some of the points.



The new W93 warhead “will enhance operational effectiveness and mitigate a variety of risks that are present in the current force,” said the document, titled, “W93/MK7 Navy Warhead — Developing Modern Capabilities to Address Current and Future Threats.”

Essential or excessive?

The key to the W93 program's fate will be whether these arguments are convincing to whoever wins the 2020 presidential election and to the next Congress.

At stake are not just billions of dollars but also the world’s balance of military power and possibly America’s ability to talk other nations out of acquiring their first nuclear weapons.

The decision on whether to design and build the W93 is part of a larger debate about a planned \$1 trillion upgrade of the U.S. nuclear arsenal of aircraft, subs, missiles, bombs and warheads.

Often lost in abstract debates over U.S. nuclear weapons is how much firepower they represent. Just one of America’s 14 Ohio-class submarines — a fraction of the total U.S. nuclear force at sea, on land and in the air — could deliver explosive power nearly 10 times that of all the bombs dropped in World War II, including the two atomic ones. If just that one sub’s weapons were used, the blast and consequent climate changes would kill scores of millions of people, studies show.

The Armed Services committees have endorsed launching the W93 warhead program in fiscal 2021. But the House’s Energy-Water spending bill would provide no funding for the president’s \$53 million request to begin design work in the coming fiscal year, due to what House appropriators call NNSA’s management challenges. Senate appropriators have yet to weigh in.

On Tuesday, the House Rules Committee rejected for consideration an amendment to a package of spending bills by Michael R. Turner of Ohio, the ranking Republican on the House Armed Services Subcommittee on Strategic Forces, to restore the House Appropriations cut.

“As I have repeatedly said, there is no time to waste when updating the nuclear triad,” Turner told CQ Roll Call in a statement.

But critics say a new atomic weapon, coupled with the administration’s avowed aversion to arms control, could make nonproliferation harder to achieve.

Under the administration’s current plan, it will have gone from planning to upgrade, life-extend or replace five warheads in 2018 to nine today, despite the fact that the NNSA has had trouble staying on schedule and on budget on most of its major programs.

“There is already more than enough redundancy built into the U.S. nuclear arsenal,” said Kingston Reif, an expert on atomic arms at the Arms Control Association. “A third submarine-launched warhead at an estimated cost of at least \$14 billion would be unnecessary excess on top of excess.”

Rare critique of Air Force arsenal

The W93 program was only briefly mentioned in hearings earlier this year and has received just passing scrutiny in the press.

The new warhead would be produced in the mid-2030s. It would be launched from subs on Trident missiles. The United Kingdom would cooperate with the U.S. government on the planned development program.

The budget white paper justifying the W93 program makes several noteworthy statements that go far beyond U.S. officials’ previous public pronouncements — or even clash with the official line.

First, the document said the W93 “provides a technical hedge” against the risk that the current Navy warheads might have a hardware snafu.

What's more, it said, relying instead on either Air Force bombers or land-based missiles poses problems — a highly unusual critique from national security officials.

“Hedging with bomber weapons would reduce responsiveness, while hedging with fixed intercontinental ballistic missiles would increase reliance on a launch under attack posture,” it said.

That last reference is to the fact that America's Minuteman III ICBMs are maintained in a state of readiness to launch within minutes of a presidential command, which would be triggered by a report of an enemy missile attack — a “use them or lose them” posture that is driven by a fear that enemy ballistic missiles could target the ICBMs themselves.

Critics, including former Defense Secretary William Perry, have said this posture is dangerous, because it requires a president to decide quickly in a pressure-packed situation.

What's more, Perry and others have said, the attack warning could be false — but once the ICBMs are launched, they cannot be returned to their silos.

U.S. forces received incorrect warnings three times between 1979 and 1995, though the mistakes were discovered in time. The Soviet government also had false alarms during the Cold War that were caught in time.

Defense Department officials have regularly minimized the gravity of this issue. Now they are using a concern over the launch-on-warning posture to justify a new nuclear weapon.

For the future Air Force nuclear arsenal, Minuteman III ICBMs are being replaced by the \$85 billion Ground Based Strategic Deterrent. And B-52 and B-2 bombers are being supplanted by squadrons of B-21 Raiders for \$97 billion. The cost of updating Air Force warheads adds another \$20 billion or more to the tally.

However, it is not clear that these costly new systems or the planned modes of operating them will address the weaknesses sketched in the budget document.

A Pentagon spokesman said the Air Force programs are not risky.

“Collectively, the Triad seeks to ensure that no adversary believes it could launch a strategic attack that eliminates the U.S. ability to respond and inflict unacceptable damage — for any reason, under any circumstances,” said Air Force Lt. Col. Uriah Orland.

Purported Navy ‘imbalance’

The budget document said two-thirds of America's deployed nuclear warheads are on subs, making it the one leg of the so-called nuclear triad “where we can least afford risk,” it said.

However, officials argued in the document, there is plenty of risk.

The first danger is relying too much on one type of sub-launched warhead, they said.

The Navy has about 1,900 atomic weapons, according to Hans Kristensen, a leading analyst on nuclear weaponry with the Federation of American Scientists. The exact numbers of warheads are classified.

More than 1,500 of the Navy's nukes — the overwhelming majority — are W76 warheads, (up to 50 of the W76s are new, lower-yield versions), he said. The overwhelming majority of the W76 warheads that predominate in the Navy arsenal have a yield of approximately 90 kilotons. That is about six times the power in a single warhead of the Hiroshima bomb.

Yet that is not enough force in all war scenarios, the budget document suggested.

In addition to the W76s, the Navy possesses a much smaller store of W88s — fewer than 400. Each of these has a more massive clout than the W76s — some 455 kilotons, according to the scientific federation. That is 30 times as powerful as the Hiroshima bomb.

The budget document bemoaned the Navy's excessive reliance on less destructive W76s and called for a higher-yield alternative in the form of the W93.

To make sure there is a more powerful option in greater numbers and to guard against the possibility of an unspecified technical problem in either of the two existing naval warheads (especially in the more numerous W76s), a third option is required, the officials argued.

The “imbalance” must be addressed, they wrote, so the subs can “hold all targets in current plans at risk.”

Worries about Navy's main warhead

An NNSA spokeswoman, asked if there is any reason to expect a technical problem in the current inventory of naval warheads, said: “Maximum effort continues to be applied by both DoD and NNSA to minimize the chance of any significant technical problems with the W76. However, because of our dependence on the W76, prudence calls for us to have risk mitigation in place.”

The W76s that are the cause of such concern have just completed a \$3.5 billion life extension program that would keep them operational into the mid-2040s, according to an unclassified Pentagon report this year called “Nuclear Matters 2020.”

The W88, meanwhile, will not need to be replaced or undergo a life extension until the mid-2030s, the report said. Those W88s are undergoing a \$2.6 billion upgrade to improve the detonation system.

Moreover, either or both the current naval warheads could undergo a life extension in the 2030s or 2040s that would make them last for many more years, experts said.

Such life extensions would cost billions, but not as much as a new type of warhead, they said. And the W93 will almost certainly require costly new plutonium cores called pits, they add, though the administration spokespersons said that is not a given.

Less powerful new ‘boomers’

The over-reliance on lower-yield W76 warheads is not the only weak point of the Navy's atomic arsenal, the paper said.

The Navy is planning to replace its 14 Ohio-class ballistic missile subs — known as boomers — starting in 2031 with a new \$98 billion Columbia class of a dozen subs that are now starting to be built.

Despite the price tag, the Columbia class will lack the Ohio class's firepower. Besides the Columbia class comprising two fewer subs, each sub will have fewer missile tubes than the Ohio class, a more than one-third reduction in missile tubes across the boomer fleet.

Up to now, the Navy brass has called the reduction in missile tubes an acceptable risk.

But the budget document revealed that the less powerful Columbia class has now become an argument for the new W93 warheads.

The W93 is supposed to be a relatively lighter-weight warhead, which means a Trident missile can carry the W93 farther and hit a wider range of targets, the paper argued.

Because the Navy will be capable of launching fewer warheads from the Columbia subs, the document said, it must have enough lightweight, high-yield warheads to reach sufficient targets with adequate firepower.

The paper discusses still other vulnerabilities that are rarely aired.

Because the lighter W93 warhead gives the missiles greater range, the subs can stay farther away from enemy anti-submarine weapons, the officials said.

The argument is at odds with the longstanding official depiction of boomer subs as virtually undetectable and, so, essentially invulnerable.

Critics are skeptical about the argument.

They said the subs were able to perform their deterrence patrols during the Cold War, when Soviet attack submarines posed a virtually globe-spanning threat.

The boomers, experts add, operate thousands of miles away from their targets, which has previously kept them largely out of harm's way.

"There's no indication that Russia's current or foreseeable attack submarine fleet has the capability to take on the U.S. boomers on the open oceans — China even less so," said Kristensen of the Federation of American Scientists.

Next president's call

Once W93s are produced, officials will decide which of the current warheads should be taken out of the deployed inventory and in what numbers, the white paper said.

Officials have said publicly that the W93's introduction would not increase the inventory of deployed warheads. But neither the document nor government spokespersons who were asked about it would forswear the possibility of increasing the total stockpile, which includes backups. An increase in the total stockpile could make it harder to convince other countries to scale back their own atomic weapons programs, arms control advocates worry.

Officials have been reluctant in testimony and interviews to call the W93 a new weapon. But the document makes clear that it would be new. One section of the paper is even titled, "Why Do We Need a New Weapon?"

What's more, it would be strikingly advanced in multiple ways, the administration paper said. Besides its lighter weight, it would also be safer to store and better able to evade enemy missile defenses, the paper suggested. The weapon will not require explosive nuclear tests, it added.

The debate over whether to embark on a new nuclear capability will stretch into the next administration.

Prior to the Trump administration's advocacy for the W93, the last effort to design a new atomic weapon was the Reliable Replacement Warhead program, which Congress nixed during George W. Bush's administration.

When the Pentagon sought in 2009 to revive that program early in the Obama administration, one of the most influential voices against it was reportedly Joe Biden, then the vice president, who is soon to be this year's Democratic nominee for president.

<https://www.rollcall.com/2020/07/29/trump-teams-case-for-new-nuke-cites-risks-in-current-arsenal/>

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# US COUNTER-WMD

Breaking Defense (Washington, D.C.)

## **MDA Can Accelerate Next-Gen Interceptor: NORTHCOM Nominee**

By Theresa Hitchens

July 29, 2020

WASHINGTON: The nominee to take over Northern Command (NORTHCOM), Lt. Gen. Glen VanHerck, says he believes the Missile Defense Agency is taking steps that will speed acquisition of the Next-Generation Interceptor (NGI) to guard against a capability gap, as well as provide an “under layer” as backup.

“I’m encouraged, and will continue to work with the committee, the Missile Defense Agency, and the Department to minimize any gap,” he told the Senate Armed Services Committee yesterday during his confirmation hearing.

VanHerck explained that he discussed the issues last week with Vice Adm. Jon Hill, MDA’s director, noting that Hill “is looking forward” to receiving next month industry responses to the April 24 request for proposals for NGI.

“I’m optimistic based on my discussions with Jon Hill, that we’ll potentially see the Next-Generation Interceptor move further left and not have the significant gap that you’re referring to,” he said in reply to questions from Sen. Deb Fischer. The Republican Senator from Nebraska represents Vandenberg AFB where (along with Alaska) the aging interceptors making up the US Ground-Based Midcourse Defense System are housed.

VanHerck said that Hill also assured him that the planned service life-extension of the current ground-based interceptors would “bring additional capabilities and also redundancy to the system.”

“So I’m encouraged by that, that it would prevent any gap,” he added.

Further, he said, MDA intends to undertake a series of tests this winter to assess the potential of the Navy’s Standard-Missile 3 (SM-3) carried by the Aegis destroyers, and the Army’s Theater High-Altitude Area Defense (THAAD) system as possible backups for homeland defense purposes. Currently, SM-3 and THAAD are designated for regional missile defense.

“With regards to the under layer that you’re talking about,” he told Fischer, “I also talked to Jon about that. And there’s a test upcoming in the wintertime that’ll take a look at some additional capabilities — a Navy capability and potentially an Army capability, specifically the SM-3 and the THAAD — that will give us an additional under layer capability.”

He stressed, however, that a decision is “TBD,” noting that “we need to see that test first.”

NGI is intended to replace the troubled, multi-billion Redesigned Kill Vehicle program killed in a surprise move by former DoD head of research Mike Griffin in April. Speeding up NGI has been a top priority for outgoing NORTHCOM chief Gen. Terrence O’Shaughnessy. In testimony to the SASC in February on the Pentagon’s 2021 budget request, O’Shaughnessy blasted the current timeline for NGI that is not expected to see deployment until 2030.

“I am very dissatisfied that it is going to take us 10 years to actually produce the Next Generation Interceptor. Our adversaries are building capability and capacity, and so we have to be able to respond,” he said.

Both sides of Capitol Hill share that concern. The Senate and House versions of the 2021 National Defense Authorization Act contain a plethora of provisions designed to prod DoD action on NGI and a back-up system, as comprehensively laid out by colleague Jen Judson on Monday

VanHerck said he's convinced that 2030 is simply not acceptable for NGI deployment. "I remain concerned, just as Gen. O'Shaughnessy," he said.

VanHerck is expected to be confirmed easily, with SASC Chairman James Inhofe saying yesterday that "there is no opposition that I know of" to either VanHerck or the nomination of Lt. Gen. James Dickinson to head Space Command.

[https://breakingdefense.com/2020/07/mda-moving-to-speed-ngi-says-northcom-nominee-vanherck/?\\_ga=2.214616727.1263314979.1596082353-1980457234.1596082353](https://breakingdefense.com/2020/07/mda-moving-to-speed-ngi-says-northcom-nominee-vanherck/?_ga=2.214616727.1263314979.1596082353-1980457234.1596082353)

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Breaking Defense (Washington, D.C.)

## **INDOPACOM Wants Billions to Build, As Pentagon Plans Cuts To Overseas Presence**

By Paul McLeary

July 23, 2020

WASHINGTON: The head of the Indo-Pacific Command wants Congress to give him a powerful new missile defense system, modern training ranges, and billions more for exercises, troop rotations, and other programs designed to blunt China's growth.

"It's something I'm engaging on now," Adm. Philip Davidson told reporters in Washington earlier this week. "I would like to see it be part of FY22 discussions and I continue to have this discussion within the department."

The ask would be part of a \$20 billion, multi-year spending package Davidson delivered to Capitol Hill in April that has gained early bipartisan support from both chambers of Congress. The Republican-controlled Senate's version of the annual defense policy bill includes \$1.4 billion for an Indo-Pacific Deterrence Initiative emphasis new US weapons, while the Democratic-controlled House has \$3.6 billion for an Indo-Pacific Reassurance Initiative focused on shoring up allies and partners, but a conference committee will have to thrash out the differences and fill in almost all the details.

On Tuesday, Davidson revealed his top priority is finding money for an Aegis Ashore missile defense system in Guam by 2026. "The most important action we can take to rapidly and fully implement the National Defense Strategy, as a first step, is a 360-degree, persistent, integrated air-defense capability in Guam," he said.

While he touted the system's defensive capability, his April proposal suggested any air & missile defense system in Guam could eventually also provide offensive "long-range precision strike capability into the First Island Chain" dominated by China.

With China rapidly improving its arsenal, the admiral said that 2026 would be when "the threat will require us to have a much more robust capability than the combination of THAAD, which is deployed there now, and an Aegis ship in response can provide."

2026 is also significant because it's the end of the five-year planning cycle the Pentagon uses to measure its budgeting. If money toward the Aegis system started flowing in 2022, it could wrap up nicely within the five-year window.



But Davidson spoke of the Aegis system's timeline in terms of Chinese capabilities. "When you look at the way the threat capability, threat capacity, is manifesting from China in the future, whether it's ballistic missiles from the land, or whether it's ballistic or cruise missiles from air and maritime platforms, you are going to need a complete clock, a 360-degree coverage, in order to help defend Guam," he said.

Last month, Japan pumped the brakes on its own plans to build two Aegis Ashore systems on its territory. Japanese Defense Minister Taro Kono said the US government and Lockheed Martin could not find ways to ensure rocket debris won't fall on local communities.

Tokyo isn't out of the \$2.1 billion program altogether, as discussions continue to try and find a solution. The Japanese navy also operates a number of Aegis-equipped ships that assist in the regional missile defense framework.

Davidson's desire for a Guam-based Aegis system predates the Japanese waffling, though it might help his cause on Capitol Hill.

The admiral also wants to move offensive weapons forward, calling in his April proposal — first reported by Breaking Defense — for "highly survivable, precision-strike networks along the First Island Chain, featuring increased quantities of allied ground-based weapons," and a revamped network of training ranges for the US and its allies across the breadth of the region from Alaska to Japan.

Any such network "has got to be able to simulate a higher capacity and capability of potential opposing forces to you," he said Tuesday. "And then allow you to space the geography, and the networks to exercise and all that going forward."

It's unclear what investments Congress will make in the coming years to support Davidson's plans, though the Aegis Ashore in itself would require a larger American presence at an existing base, at a time when the White House and Pentagon are calling for a shrinking US footprint globally.

Defense Secretary Mark Esper has suggested the Pentagon is concerned that big bases make increasingly easy targets for Chinese and Russian precision weapons, and he's following President Trump's lead in formulating plans to shrink some of those overseas installations. Pentagon spokesman Jonathan Hoffman confirmed Tuesday that Esper's "goal is to remove some of the footprint of having forces forward deployed."

The use of rotational troops — US-based units that come and go on deployments abroad — could be a way for Pentagon leadership to find a middle ground between Trump's demands to curtail the US military's footprint overseas with the Pentagon's desire to maintain large bases across Europe and the Pacific as staging and logistics hubs.

<https://breakingdefense.com/2020/07/indopacom-wants-billions-to-build-as-pentagon-plans-cuts-to-overseas-presence/>

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National Defense (Arlington, Va.)

## **Military to Leverage New Biotech Fields to Gain an Edge**

By Mandy Mayfield

July 24, 2020

Agencies throughout the Defense Department are investing in biotechnologies and working initiatives to harness nature's processes to better support warfighters.

Biotech is an engineering discipline that uses living systems to create a wide range of products, said Michelle Rozo, assistant director for biotechnology at the office of the undersecretary of defense for research and engineering. "We can use that technology to produce an enormous range of things from food and medicines to textiles and fuels," she said.

It will have a large impact on the defense sector, Rozo said during the Biotechnology for Materiel and Defense Symposium. "The same core competencies that can unlock products and capabilities [have] the potential to transform military systems and mission spaces."

The need to develop new and more advanced biotech is identified as a modernization priority in the 2018 National Defense Strategy, which focuses on great power competition with advanced adversaries China and Russia

It is a "disruptive technology that will change warfighting and provide dominant capabilities to the department across multiple domains," Rozo said during the webinar hosted by the National Defense Industrial Association. Although the Pentagon has been developing biotech for years, it historically invested in medical and chemical biology projects.

However, researchers are branching out to include material applications, she noted.

"One of the opportunities here for the Department of Defense is its potential to provide new sources of critical materials," she said.

The COVID-19 pandemic, while demonstrating the nation's vulnerabilities to biothreats, has also shown the fragility of the supply chain. The United States relies on foreign suppliers for a number of critical components including commodity chemicals, rare earth elements and active pharmaceutical ingredients, she said. Ensuring a resilient domestic supply chain for these components is a major priority for the Pentagon.

One initiative is the Defense Advanced Research Projects Agency's Living Foundries program.

The initiative seeks to transform biology into an engineering practice by developing the tool technologies, methodologies and infrastructure to prototype and scale engineered microbes that can produce molecules that are of value for government and commercial use, said Melissa Rhoads, advocate for biotechnology at Lockheed Martin, during the webinar.

Renee Wegrzyn, DARPA's Living Foundries program manager, said the challenge for the Pentagon is that it lacks bio-manufacturing capabilities to generate molecules and materials that are cost effective, domestically sourced and have high-performance rates for a broad range of applications.

DARPA has an effort within the Living Foundries program called "1,000 molecules," which is dedicated to manufacturing molecules domestically that are relevant to the military, cost effective and customizable for enhanced performance, she said.

The focus is on "understanding where do current materials and molecules fail, and [where] we can make them better, make them domestically, and ... in an agile way," Wegrzyn said. The program is exploring various manufacturing methods as it pursues the technology, she noted.

Living Foundries is also aiming to improve the quality of biological medical countermeasures such as chemical weapon filtration capabilities.

“Think of a garment that could bind and neutralize chemical weapons” much like a filter, Wegrzyn said. “We have solutions now, but we know that there’s a gap — that we can make those capabilities better.”

As it works to meet its goals, the 1,000 molecules program is first focusing on the design aspect of biotech.

“Design here means finding what is the biosynthetic pathway — what are the genes that I need to layer on here and how can I design that very quickly,” she said. “We have multiple cases where we may in nature identify an enzyme that looks like it should do the trick, but we actually have to test 100 different variants before we find the one that really works the way that we want it to.”

Next the scientists build and synthesize DNA to insert it into organisms in order to produce molecules. They then grow and test the organisms, which can be a time consuming task, she said.

“The dirty little secret here is that most of the time it doesn’t work and we actually have to iterate on those designs over and over,” Wegrzyn said. “We have made millions of different variants to learn those rules and apply them and enhance performance going forward so that we can scale this foundry output.”

DARPA hit the 1,000 molecules goal more than a year ago and has since manufactured more than 1,500 of them, Wegrzyn said.

That has allowed the agency to “pivot our investing and say: ‘Well, now let’s actually start to make things and test them and see if they can perform better,’” she said.

DARPA is working with the Air Force Research Laboratory, the Naval Air Warfare Center Weapons Division and various cohorts in the Army on testing and evaluation, she said.

“This is really relevant to the whole military,” she said.

Meanwhile, the Army is working to produce materials using biotechnology through its Transformational Synthetic Biology for Military Environments Program, also known as TRANSFORME.

“One of the things that we’re really looking to exploit for the Army is if we can harness these low-costs, low-energy routes of production of materials in a forward [operating] context,” said Dimitra Stratis-Cullum, the essential research program manager at the Army Research Laboratory. “Then we can really start to change the equation on logistics and sustainment.”

TRANSFORME is a dedicated effort bringing together synthetic biology, biotechnology, scientists and engineers in a focused way, she said. “What we’re doing is trying to build the agility to adapt and push into the rapid genotyping to rapid prototyping space,” Stratis-Cullum said.

Researchers are looking to use biology to advance capabilities in the areas of coatings composites by improving corrosion resistance to protect military equipment, she noted.

“Where we’re pushing the boundaries right now is really the structure function property relationships, and the ability to do this will go beyond coatings,” she said. However, even in “areas such as stability of composites for propellants for long-range munition fires or many other aspects, once we start to tackle this space we can use these tools to more broadly impact design and production.”

Meanwhile, the Air Force Research Laboratory’s manufacturing directorate is working quickly to address an issue brought on by the COVID-19 pandemic.

The directorate is one of nine under the umbrella of AFRL and it focuses broadly on material science, manufacturing technology and system support for materials once deployed, said Maneesh Gupta, a materials engineer at the directorate.

One research thrust is looking at how to eliminate microbial contamination in a way that is compatible with the materials that are found onboard aircraft, he said.

“Over the last three or four months — as the pandemic has sort of kicked up into high gear — there has been a really important need for the DoD to figure out how they can decontaminate aircraft that had been moving personnel around that might’ve been potentially contaminated with the virus,” he said.

The directorate is examining appropriate solutions that will not degrade or hurt the materials that are onboard an aircraft, but will still safely eliminate the pathogen, he noted.

“The team has really been very quickly responding to that situation and providing some really critical answers,” he said.

The Office of Naval Research is also looking toward natural systems to support its mission.

The organization is working to identify and exploit key principles and organisms from nature and use them as the basis to design and control materials, sensors and devices, said Linda Chrisey, program officer for ONR’s synthetic biology for naval applications. It also wants to use the technology to provide new power strategies for the service. The service’s biocentric technology program is aiming to provide greater capabilities for powering platforms in a variety of environments, she said.

“We do think about undersea powering — the seafloor is becoming an important domain for us,” she said. “We have sensors and communication devices that would like to power for a long time and, of course, accessing those sites can be logistically challenging for many reasons.”

The survivability of platforms in austere environments is also a concern that the office is trying to address. ONR has focused on creating biologically inspired autonomous vehicles where it examines how marine and amphibious animals both move and navigate.

“Then [we] extract those principles to develop novel autonomous vehicles both from the platform itself, as well as the control algorithms that allow those vehicles to maneuver and operate in those environments,” she explained.

Overall, the Pentagon is investing in capabilities and initiatives that it believes across the board have the potential to reduce the threat to warfighters and increase mission readiness, Rozo said.

The Defense Department is imagining future scenarios and “projecting outwards to what biotechnology can provide, where we’ve mastered the discipline and the ability to do point-of-need production so that these same necessary items — these fuels, these lubricants, this food — can be produced at the point where the warfighters need it and relevant quantities and in mission relevant time frames,” she said.

<https://www.nationaldefensemagazine.org/articles/2020/7/24/military-to-leverage-new-biotech-fields-to-gain-an-edge>

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# US ARMS CONTROL

UPI (Washington, D.C.)

## **North Korea Security Concerns Not Being Addressed, Beijing Says**

By Elizabeth Shim

July 28, 2020

July 28 (UPI) -- China is calling for dialogue following a statement from Kim Jong Un on Pyongyang's nuclear arsenal.

Beijing's foreign ministry spokesman Wang Wenbin said Tuesday at a regular press briefing North Korea's security concerns are not being addressed in the international community, South Korean news agency Yonhap reported.

The Chinese statement comes after the Trump administration and South Korean President Moon Jae-in have repeatedly expressed a commitment to talks on denuclearization. North Korea has yet to respond to those offers of dialogue, however.

"The current peace process on the Korean Peninsula is in a challenging phase," Wang said. "That North Korea's reasonable concerns are not being respected is the main issue."

"We must make efforts to denuclearize the Korean Peninsula and to realize permanent peace on the Korean Peninsula and the region," Wang said.

China is reacting to North Korean statements after KCNA reported Tuesday Kim marked the 67th anniversary of the Korean War armistice with a speech highlighting North Korean advances in nuclear weaponry.

"With our reliable and effective self-defense of a nuclear deterrent, there will be no more wars on this territory, and our country's security and future will be forever guaranteed," Kim said on the day North Korea refers to as the day of "victory in the fatherland liberation war."

Kim also said the 1950-53 Korean War, which ended in a truce, was an event of "pain and grief" that must not be repeated.

North Korea has overcome "all kinds of pressure and challenges to walk the path of a self-developed nuclear power," Kim said.

The North Korean leader also referred to the United States and its allies as "imperialists" with "bestial characteristics," without mentioning those countries by name.

China was referred to as a true friend who deserves tribute, however.

Chinese authorities have been instrumental in the forced repatriation of North Korean defectors, the majority of them who are women.

On Tuesday, the United Nations High Commissioner for Refugees said the defectors are beaten, detained under unsanitary conditions and suffer from malnutrition in North Korea after being returned from China.

[https://www.upi.com/Top\\_News/World-News/2020/07/28/North-Korea-security-concerns-not-being-addressed-Beijing-says/5231595938711/](https://www.upi.com/Top_News/World-News/2020/07/28/North-Korea-security-concerns-not-being-addressed-Beijing-says/5231595938711/)

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RFE/RL

## **U.S., Russia Begin Three Days Of Nuclear Arms-Control Talks**

By RFE/RL

July 28, 2020

U.S. and Russian officials have opened three days of nuclear arms-control talks in Vienna less than a year before a treaty covering about 90 percent of the world's atomic weapons expires.

During a first round of talks last month in the Austrian capital, the United States and Russia discussed their last remaining nuclear arms-control agreement, the 2010 New Strategic Arms Treaty (New START), which caps the number of deployed long-range nuclear warheads each can have and which expires in February.

Under a new format agreed last month by U.S. Special Presidential Envoy for Arms Control Marshall Billingslea and Russian Deputy Foreign Minister Sergei Ryabkov, technical working groups will deal with military doctrines and potentials, transparency and verification, as well as with security in space, according to the Russian Foreign Ministry.

The nuclear talks come after a one-day dialogue on space security on July 27, the first on the topic held by the two countries since 2013.

The United States has proposed rules for responsible behavior in space, which would be modeled on existing rules of war that are based on the principles of proportionality and humanity.

Russia and China have been backing a rival effort to ban weapons in outer space in an international treaty.

No statement was issued after the one-day session.

U.S. Assistant Secretary for International Security and Nonproliferation Christophe Ford told a press conference on July 24 that the United States hoped the meeting would allow the sides to "explore ways to increase security and stability in outer space as well as to advance the cause of developing norms of responsible behavior."

He also said that Moscow and Beijing have already turned space into a "war-fighting domain."

The United States and Britain accuse Russia of having tested an anti-satellite weapon in space on July 15.

Moscow denied the accusation, describing the event as an inspection of one satellite by another.

"Russia has always been and remains a country that is committed to the aim of fully demilitarizing outer space and nondeployment of any kinds of arms in outer space," Kremlin spokesman Dmitry Peskov said on July 24 in comments carried by state news agency TASS.

The United States and Britain, however, said a Russian satellite fired a projectile that Ford described as the space equivalent of "a bullet."

Russia has now carried out such a test for the second time, Ford said. The first test took place in 2017.

<https://www.rferl.org/a/us-russia-to-begin-three-days-of-nuclear-arms-control-talks/30751645.html>

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# COMMENTARY

Bulletin of the Atomic Scientists (Chicago, Illinois)

## **Arms Control 2.0? With Open Source Tools, Desktop Sleuths Can Go Where Governments Won't**

By Henrietta Wilson, Olamide Samuel, Dan Plesch

July 27, 2020

The arms control community was outraged by the Trump administration's decision to withdraw from the Open Skies Treaty in May 2020. The treaty enhances transparency and builds confidence between the state parties, allowing them to conduct specified numbers of unarmed flights over each other's territories, under regulated conditions. The US decision to unilaterally leave this regime marks the latest in a set of international actions that undermine the complex mix of international treaties designed to engender global stability. But while geopolitical tensions mean that there is unlikely to be a quick breakthrough to reverse this trend, other means may support the transparency and confidence-building functions of internationally negotiated verification arrangements.

The potential for monitoring and verification has been transformed by new information technologies. The internet's capacity to generate and publish data, as well as make available tools for visualizing and analyzing it, means that activities and artifacts are discernible in a way never before possible. There are now numerous free-to-use tools for remotely tracking planes and ships, as well as ready access to commercial satellites and global systems for monitoring natural disasters. Global environmental remote sensing holds promise from an arms control perspective, since environmental monitoring lends itself to detection of emissions associated with weapons production and use. New technologies have also expanded the possibilities of previous investigative research tools, for example by increasing access to global news and improving global communications and networking.

Nongovernmental organizations are already using these and other means to identify and monitor weapons flows and related threats. Such efforts include the Vienna-based Open Nuclear Network's work to "identify, track, understand, and address emerging threats"; the London-based Royal United Services Institute's Project Sandstone, which works to reveal illicit North Korean shipping networks; and a proposed multi-agency Somali project enabling citizens to explore allegations of illegal radioactive waste dumping in Somalia and uncover illegal uranium smuggling in the country, via the development of a mobile phone application. Similarly, citizen journalists at Bellingcat have pioneered novel techniques for open source investigations revealing numerous illicit activities and are part of a wider set of organizations that have re-energized investigative journalism.

These initiatives have overtaken earlier understandings of what has been considered possible in terms of international monitoring and verification. Previously, verification options were tied to what was politically achievable—verification arrangements could only include provisions agreed by states. To reach agreement, negotiators from all sides had to balance transparency needs against the necessity of protecting sensitive commercial or military information. But the widespread accessibility of technological tools today means that transparency tasks are not limited to systems that can be agreed by governments within international negotiations.

Open source verification—nongovernmental monitoring of activities through publicly-available information—empowers transparency and accountability and has been linked to the achievement of discrete political goals. For example, the Armed Conflict Location & Event Data Project and the

investigative website Disclose have provided evidence that French tanks were central to the battle to control Hodeida, Yemen, in 2018, refuting the French Defense Minister's earlier claim that land-based equipment sold to Saudi Arabia was used only for defensive purposes at the border. Similarly, Forensic Architecture, an organization based at Goldsmiths, University of London, has built 3-D models of bomb craters to understand the details of chemical weapons use in Syria, allowing the international community to counter disinformation about the attacks and generating better knowledge about likely perpetrators.

International arms control, nonproliferation, and disarmament treaties demonstrate that the international community can devise innovative systems for managing the political complexities involved in international monitoring and verification. They also provide the means for the international community to generate transparency and build confidence between states, and demonstrate the benefits of doing so. For example, the Organization for Security and Cooperation in Europe has developed and implemented effective confidence- and security-building measures; the Chemical Weapons Convention has established systems for inspections that would build assurances without compromising sensitive commercial or defense information. UNSCOM and UNMOVIC, two UN Security Council-mandated special commissions that implemented inspection regimes in Iraq, demonstrated that the verified elimination of weapons of mass destruction is technically possible.

However, there is a recognized need for new approaches to regulating weapons systems. Existing arms control and disarmament achievements are at risk in several dimensions. Hard-earned, carefully negotiated agreements are being unraveled, with the Trump administration unilaterally withdrawing from the US-Russia Intermediate-Range Nuclear Forces Treaty, the Joint Comprehensive Plan of Action agreement with Iran, and the Open Skies Treaty. Meanwhile, many other treaties are seen as vulnerable, either because of a perceived inability to meet states parties' expectations, or because they are confined by the limits set in their negotiated and legally-binding texts. For example, the terms of the Chemical Weapons Convention have impeded the task of understanding and attributing use of chemical weapons in Syria; the New START treaty will expire automatically in February 2021 if the United States and Russia do not choose to extend it; the Nuclear Non-Proliferation Treaty members have not delivered enough progress on their Article VI disarmament commitments; and the Treaty on the Prohibition of Nuclear Weapons seems functionally confused, given that no nuclear weapons states are likely to support it in the near future.

In a world in which geopolitical realities are limiting the ability of the international community to reinforce—let alone extend—cooperative, treaty-based solutions to regulating armament and disarmament, open source verification can complement the transparency functions that were previously the remit of international treaties.

While it can't replace or exactly reproduce the scope of internationally negotiated verification regimes, open source investigative work can in some instances go beyond such regimes. Open source verification projects tend to be smaller, can be more flexible in meeting monitoring challenges, and may allow the international community to bypass the constraints of traditional verification. In some cases, open source analysts' local knowledge gives them access to more detailed social and geographical information than is possible for bigger organizations. On top of this, many open source verification projects are transparent in their methodologies, data, and findings, meaning that their work is reproducible and open to scrutiny, and that they have in-built processes for authenticating their work.

Existing open source verification shows that technologies for nongovernmental monitoring not only exist—they are pervasive, with numerous technologies already tracking illicit activities, global transport networks, and systems for disaster tracking. There is now an opportunity to recognize

these activities as part of a larger global weapons tracking service and consider how they can complement and support the work of high-diplomacy interstate efforts. In an age of Google Earth, it no longer feels like sci-fi speculation to envision a world in which governments and citizens can track the movement and use of weapons anywhere in the world virtually in real time.

<https://thebulletin.org/2020/07/arms-control-2-0-with-open-source-tools-desktop-sleuths-can-go-where-governments-wont/#>

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

## **Give Instability a Chance**

By Joshua Rovner

July 28, 2020

Technology and politics are conspiring to make the world dangerously unstable. The result: War and nuclear escalation are becoming more likely. These are the summary conclusions of a diverse group of scholars and policymakers who offer a grim list of reasons why stability is vanishing.

Advances in sensors and weapons make disarming counterforce strikes more tempting than ever. The threat of assured retaliation, which may have injected a dose of caution among those considering a preemptive attack during the Cold War, is disappearing. At the same time, the rapid spread of disinformation may lead to confusion and unpredictability during crises, as carefully crafted government signals give way to ad hoc tweets. New technologies blur the line separating conventional and nuclear weapons and create opportunities for weaker states and non-state actors. In this environment, as one Obama administration official recently put it, “classical notions of strategic stability offer scant guidance.”

The peculiar technological characteristics of cyberspace make everything worse. Military forces have spent years centralizing communications to maximize efficiency, but in so doing become more vulnerable to crippling information attacks. Nuclear command-and-control networks are similarly attractive targets for leaders seeking to disable enemy nuclear capabilities. Offensive cyber operations rely on secrecy to succeed, but this undermines deterrence, which requires that adversaries advertise their forces. The result is a powerful incentive to get the first shot in, whether in cyberspace or the real world.

Some analysts offer the potentially hopeful reminder that politics, not technology, drives decisions about the use of force. Innovation may have important social and political consequences, but it does not cause war. If international politics are sedate, war is unlikely and nuclear war is unthinkable. Unfortunately, today’s politics are defined by a series of deepening conflicts among existing and aspiring nuclear powers. Great powers are competing. Regional conflicts are becoming more hostile — and more violent. Status quo nuclear states are opting for “maximum pressure” against those they suspect of wanting to join the club. And the political agreements that have anchored arms control for decades are coming apart.

But not everyone is worried about instability. The U.S. nuclear force posture, in fact, seems to be based on the idea that a little instability can go a long way.

### Optimum Instability

This counterintuitive idea has a long history. Cold War leaders never accepted the idea that deterrence flowed from mutual vulnerability, and they spent years trying to gain an edge. Some

analysts argued that deterrence only worked if states could reduce damage in a hypothetical nuclear exchange. Who, they asked, would take “a threat to commit suicide” seriously? Moreover, perfect stability at the nuclear level might encourage conventional war: If states had no fear of escalation, they would be more willing to use force at lower levels. Somewhat paradoxically, these analysts argued that instability was a force for peace. Leaders needed to believe that a nuclear war was possible to be scared of starting one. Instability — the notion that there is no insurmountable firebreak separating conventional and nuclear war — would also force leaders to be cautious in a crisis. According to this school of thought, then, instability deterred conventional war and prevented intra-war escalation.

We are left with two opposite views of instability. The first warns that it encourages misperceptions and fear, with dangerous and unpredictable consequences. The second argues that instability is necessary and good, because deterrence is impossible if leaders believe they have nothing to fear.

Lying between these two claims is the notion of “optimum instability,” an idea that first appeared in a relatively obscure RAND Corporation report near the end of the Cold War. Optimum instability obtains when adversary leaders believes that their nuclear forces are just a little insecure. The goal is to generate enough instability to influence their behavior, but not so much that they will lash out in fear and frustration. It’s a “goldilocks” approach to coercion: Too little instability will encourage conventional aggression, but too much will invite disaster. Unlike the first school described above, it celebrates the benefits of instability. Unlike the second school, it is cognizant of the risks.

Optimum instability deters crises by disabusing rival leaders that they can act with impunity under the cover of nuclear weapons. Putting their arsenals at risk forces them to reconsider the value of whatever policy goals they seek. This may be particularly important for emerging nuclear powers that have outsized expectations of what their new weapons can provide. But it also injects caution in established nuclear powers by hinting that their large and variegated arsenals are not completely invulnerable. In this sense, it reverses the stability-instability paradox.

Ideally, optimum instability would force adversaries to shift to the defense, nudging them toward costly investments that stress their economies. It would also promote bureaucratic friction by forcing adversary organizations to scramble, encouraging nasty infighting among sharp-elbowed but thin-skinned officials whose ideas for defense have proven unsatisfactory. Ultimately, it would force rival leaders to question their own grand strategy. They may determine it is unsustainable.

In addition to these effects on adversary behavior, optimum instability would help manage alliance politics by making deterrence commitments credible and reducing allies’ need for their own nuclear arsenals. It pulls off something that at first glance seems paradoxical, demonstrating the coercive value of nuclear weapons while simultaneously convincing allies they are not worth having.

The Trump administration calls for strategic stability, but its nuclear posture suggests something different from the traditional meaning of the term. For nuclear analysts, crisis stability means that neither side has an incentive to strike first, because assured retaliation would lead to mutual disaster. For the Trump administration, however, stability is a function of superiority, and deterrence requires limiting damage through a combination of counterforce strikes and missile defenses. Adversaries must remain somewhat uncertain about the course of events in a crisis, or else U.S. deterrent threats will ring hollow. President Donald Trump himself has embraced this idea, which aligns with his basic view of business: “You want to be unpredictable.”

If optimum instability makes adversaries cautious, it also strengthens extended deterrence and relieves allies of the need to go nuclear. In this sense, the administration’s language has echoes of U.S. policy at the height of the Cold War. President John F. Kennedy unveiled the doctrine of “flexible

response” in 1962 in order to convince NATO allies that the United States had practical options for fighting the Soviet Union. At the time, critics questioned whether threats of massive retaliation were credible when U.S. security was not immediately at risk, and the Kennedy administration sought language that could convince allies that it could respond in ways that did not invite Armageddon. The purpose was managing alliance politics, not fundamentally changing the U.S. approach to warfighting.

The Trump administration also seems to believe that a broader nuclear strategy, which anticipates a number of different contingencies, will help keep proliferation in check. As the 2018 Nuclear Posture Review declared, “the United States will maintain the capabilities necessary to deter effectively and, if necessary, to respond effectively and decisively across the spectrum of potential nuclear and non-nuclear scenarios.” Making credible threats in non-nuclear scenarios requires investing in conventional counterforce weapons, which would allow the United States to strike first without breaking the nuclear taboo. It may also explain the reported White House interest in cyber-attacks against rival nuclear command-and-control networks, despite warnings from analysts that these are especially destabilizing.

#### How Much Instability Is Enough?

As with other aspects of Trump’s nuclear policy, these ideas long predate the current administration. Indeed, the logic of optimum instability informed U.S. nuclear targeting policy going back to at least the 1970s, though the term came later. Efforts to develop plausible nuclear warfighting strategies also contributed to nonproliferation, because they helped convince NATO allies that U.S. extended deterrence was credible. While Trump’s rhetoric seems outlandish, the essence of current U.S. nuclear strategy is much the same. Ongoing investment in all three legs of the nuclear triad as well as the president’s outspoken commitment to thinking the unthinkable are signals that Washington is betting on instability. Whether its confidence is justified is another matter.

Indeed, there are some knotty questions lying under the surface of all this optimism. One is whether it is possible to locate the optimum point. The logic is conceptually straightforward but difficult, and perhaps impossible, to implement with any kind of precision. Doing so will require not just creating the right amount of uncertainty among foreign leaders, but being able to assess their perceptions accurately in real time. This is a tall order.

A second question is whether it makes sense to think of an adversary state as a unitary actor, or as a constellation of officials and bureaucrats with their own goals. Optimum instability in the former case rests on an appeal to rationality. If the adversary is less sure of his second strike, it will become cautious and shift to the defense. But the latter case rests on the idea of injecting friction into the adversary’s political system and defense organizations. It creates disunity and irrationality. It is worth asking if these logics are mutually exclusive. That is, is it possible to use instability to influence another state’s rational judgment, when the act itself introduces irrational forces into its decision-making process?

A third question is whether optimum instability is a function of force posture, declaratory policy, diplomatic interactions, leadership psychology, or some messy combination of these factors. The RAND study that introduced optimum instability focused on the balance of forces. Military planners will pay close attention to the balance (and for good reason). But civilian policymakers are more likely to rely on their own beliefs about adversary intentions, and this will affect their approach to peacetime and crisis bargaining. So, we could end up in a situation in which instability has different impacts on different kinds of adversary behavior. Instability may have optimum effects on adversary long-term defense investment — a domain where military experts hold sway. But it may have suboptimal effects in crises, where leaders are forced to make critical decisions under stress.



Finally, when do the benefits of optimum instability exceed the risks? As with all competitive strategies, the deliberate pursuit of instability might make sense against some adversaries but not others. Determining the wisdom of this approach depends on technical and political factors. As Austin Long points out, the United States must have the forces to prevail in a hypothetical conflict, or at least convince adversary leaders that this is possible. Adversaries with large, dispersed, and well-protected forces are poor targets. Political dynamics also restrict the opportunities to control and exploit instability. Leaders who are relatively secure can safely back down in the face of threats, but leaders who fear internal enemies may be insensitive to foreign pressures. Worse, they might choose to escalate as a way of consolidating their own power, playing on nationalism to rally support at home. Creating instability in these cases would probably be counterproductive.

Because a favorable balance of forces must align with specific political conditions, optimum instability will only succeed in rare circumstances. Ideally, policymakers will know when to exploit instability, and when to embrace restraint. They will also need the political courage to walk away from an aggressive approach. In the face of sustained calls for great-power competition, this may prove most difficult of all.

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<https://warontherocks.com/2020/07/give-instability-a-chance/>

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Defense One (Washington, D.C.)

## **Force Won't Much Slow Iranian Nuclear Progress, But Something Else Can**

By Ariane Tabatabai and John Wolfsthal

July 20, 2020

On July 2, an explosion took place at Iran's Natanz nuclear complex, in a workshop that develops advanced centrifuges to enrich uranium. Perhaps it had nothing to do with other recent explosions at military and civilian sites around the country, including a Revolutionary Guards base in western Tehran. But many suspect that the Natanz incident may be part of a wider campaign — perhaps led by Israel, or aided by the United States — to disrupt Iran's nuclear and military capabilities.

Even if deliberate, the damage to Natanz and other sites is likely only a temporary setback to Iran's nuclear capabilities and one far shorter than that achieved by the more targeted effort by the last administration: the nuclear deal known as the Joint Comprehensive Plan of Action, or JCPOA. If outcomes are compared, it is clear that diplomacy backed by the threat of force is a more effective means to address nuclear risks than the use of force backed by some stated desire to negotiate.

Unsurprisingly, Israeli authorities have neither confirmed nor denied that their country is responsible. Jerusalem seems happy to let the idea grow that it was behind this incident regardless of the truth. The United States, in the person of Secretary of State and former CIA director Mike Pompeo, had “no comment” when reporters asked about the incident on July 8.

Israel has long feared an Iranian nuclear weapon, and with reason. For over four decades, Tehran has adopted a harsh anti-Israeli and anti-Semitic rhetoric; supported a host of non-state actors to counter Israel, including Lebanese Hezbollah, Hamas, and Palestinian Islamic Jihad; and increasingly built a presence in Israel's backyard. And until 2003, Iran had an active program to develop nuclear weapons technology, as verified by U.S. and Israeli intelligence and international inspectors. But while parts of the Israeli military and security establishment saw the Obama administration's diplomatic efforts to scale back Iran's nuclear program as a viable approach, Prime



Minister Netanyahu and his allies did what they could to torpedo the diplomatic process and its product, the JCPOA. They argued all along that diplomacy was at best a delaying tactic, one incapable of permanently ending Iran's nuclear potential.

Just months before the JCPOA was concluded in 2015, Netanyahu appeared before a joint session of Congress having bypassed the White House to lobby against the agreement. And once President Trump took office in 2017, Netanyahu reportedly sought to push the administration toward leaving the agreement. The following year, the president pulled out.

Since then, predictably, Iran has increased its ability to produce nuclear material that could be used in a nuclear weapon. Under the JCPOA, Iran remained at least one year from being able to enrich enough uranium for a bomb, and was complying with provisions that made doing so secretly much more difficult. Now, Tehran may only be a few months away from such a capability—a timeline that will continue to shrink unless Iran agrees to refrain from sensitive activities.

Netanyahu and the JCPOA's American critics appear to share the view that diplomacy—even when it works—shows weakness. Iran, they say, respects only “strength,” which they associate with economic sanctions and military action. But the record shows that these kinds of “strong” responses are objectively less effective than past diplomatic achievements.

At best, the result of the Natanz explosion is a pause, setting back Iran's future capabilities for some months. With a stroke of a pen, however, the JCPOA delayed Iran's nuclear ambitions over a decade and made intrusive inspections permanent. The nuclear deal also came without the inherent and very real dangers of increased tensions and escalation. The JCPOA also did not create political pressure inside Iran for both escalation and greater public support for a nuclear program that has no economic justification.

Threatening or undertaking covert action or sabotage may satisfy some, but the reality is that the hard, slow, and painstaking work of producing the JCPOA achieved more lasting limits on Iran's nuclear potential without firing a single shot. Moreover, diplomacy left military or other actions in reserve as a last possible resort should the regime violate its commitments, something Iran has been able to do because America did so first.

The JCPOA was hardly perfect. Many (including us) believed that follow-on diplomacy would be needed to extend provisions and make them even more permanent. But it achieved far more than recent developments, and at less cost. Whether Trump remains in power or Biden wins the presidency, America's interests would be best secured by returning to diplomacy and doing so before Iran decides that a nuclear weapon, rather than engagement, would best serve its interests.

<https://www.defenseone.com/ideas/2020/07/force-wont-much-slow-iranian-nuclear-progress-something-else-can/167013/>

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Strategist (Canberra, Australia)

## **Eliminating Israel's Bomb with a Nuclear-weapon-free Zone?**

By Ramesh Thakur

July 29, 2020

Nuclear-weapon-free zones (NWFZs) deepen and extend the scope of the Nuclear Non-proliferation Treaty and embed the non-nuclear-weapon status of NPT states parties in additional treaty-based arrangements. This is why several NPT review conferences have repeatedly affirmed support for existing NWFZs and encouraged the development of additional zones.

There are currently five zones: in Latin America, the South Pacific, Southeast Asia, Africa and Central Asia. At a minimum, all NWFZs prohibit the acquisition, testing, stationing and use of nuclear weapons within the designated territory of the zone. They also include protocols for pledges by nuclear powers not to use or threaten to use nuclear weapons against members of the zone.

Israel has seemed more interested in implementing a military solution to its security challenges, including the threat of a preventive strike on Iran, than in exploring diplomatic options. But it's simply not credible that Israel can keep its unacknowledged nuclear arsenal indefinitely, while every other regional state can be stopped from getting the bomb in perpetuity. The alternatives for Israeli security planners are regional denuclearisation or proliferation. The latter would entail the further risks of heightened tension and increased instability. Moreover, a nuclear-weapon capability is of no use to Israel in deterring or managing the threat of terrorism.

Because 'the logic of using force to secure a nuclear monopoly flies in the face of international norms', Israel could consider trading its nuclear weapons for a stop to Iran's development of a nuclear-weapon capability by agreeing to an NWFZ. Conversely, the confidence built among states through an NWFZ process can spill over into other areas of regional interactions. The experience of working together in negotiating a zonal arrangement, and then working together once the zone is operational, generates habits of cooperation and sustains mutual confidence, both of which are necessary conditions for resolving other regional security issues.

Can an NWFZ be used for nuclear disarmament of a non-NPT state?

When the NPT was extended indefinitely in 1995, the package deal included a resolution on the creation of a Middle East zone free of weapons of mass destruction. The resolution required all regional states (including those outside the NPT) to sign, and International Atomic Energy Agency safeguards to be applied to all nuclear facilities in the region. The 2010 NPT review conference—the last one that had an agreed final document—reiterated the importance of the 1995 resolution and requested the UN secretary-general and Russia, the UK and the US—co-sponsors of the 1995 resolution—to convene a conference in 2012 to that end.

Finnish diplomat Jaakko Laajava was appointed as the facilitator and Helsinki was named as the venue for the conference scheduled to begin on 17 December 2012. However, on 23 November Victoria Nuland of the US State Department said there would be no conference 'because of present conditions in the Middle East and the fact that states in the region have not reached agreement on acceptable conditions for a conference'. The failure contributed to the collapse of the 2015 review conference.

Like the Red Queen in *Through the Looking-Glass*, the UN has to run very fast just to stay where it is. The adoption of the Treaty on the Prohibition of Nuclear Weapons might be thought to have made another NWFZ redundant. Yet, by an 88 to 4 vote (75 abstentions), UN General Assembly decision 73/546 of 22 December 2018 called on the secretary-general to convene a conference at UN

headquarters in 2019 to elaborate a legally binding treaty for establishing a WMD-free zone in the Middle East. Importantly, however, in paragraph a(iii), the document stipulated that all decisions of the conference 'shall be taken by consensus by the States of the region'. The conference was held on 18–22 November 2019. Its political declaration affirmed 'the intent and solemn commitment' to pursue a treaty-based commitment, just like in 1995.

Not surprisingly, Israel is wary of the proposal's origins in a document to which it did not subscribe, adopted by a conference to review and extend a treaty that it has not signed, whose core prohibition it has ignored. In a formal letter to the secretary-general (document A/72/340 (Part 1), 16 August 2017), Israel emphasised 'the need for a direct and sustained dialogue between all regional States to address the broad range of security threats and challenges'. It's difficult to see how negotiations can begin until all states explicitly accept the existence of Israel. No NWFZ has previously been established among states that refuse to recognise one another and do not engage in diplomatic relations and whose number includes some that are formally at war.

The bleak security and political environment in the conflict-riven Middle East is particularly inauspicious for the creation of an NWFZ. There is no regional organisation to initiate and guide negotiations, nor is there a regional dialogue process that can form the backdrop to negotiations. An NWFZ in regions of high conflict intensity may have to follow rather than cause the end of conflicts. Syria is convulsed in a civil war. Egypt has yet to sign the IAEA Additional Protocol and the Chemical Weapons Convention, or ratify the Comprehensive Nuclear-Test-Ban Treaty, the Biological Weapons Convention and the African NWFZ. But it does strongly support a WMD-free zone in the Middle East.

Turkey is a NATO member. The possession and deployment of nuclear weapons are integral to NATO doctrine and command structure and US tactical nuclear weapons are based in Turkey. How can this be reconciled with Turkey's membership of an NWFZ? Alternatively, how meaningful would a Middle Eastern NWFZ be without Turkey?

Most crucially, Israel is already a nuclear-armed state. This immediately raises an obvious but critical question. Is the expectation that Israel will sign a protocol as a nuclear-armed state, or that it must sign the treaty after first eliminating its nuclear weapons? The latter would be without precedent and transform the Middle East NWFZ treaty from a normal non-proliferation treaty into a unique disarmament treaty. An NWFZ is traditionally established as a confidence-building measure among states that have already forsworn the nuclear option. It is unlikely to be established as a disarmament measure, or even to constrain the future potential of states like Iran that retain the nuclear option in their national security calculus.

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<https://www.aspistrategist.org.au/eliminating-israels-bomb-with-a-nuclear-weapon-free-zone/>

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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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