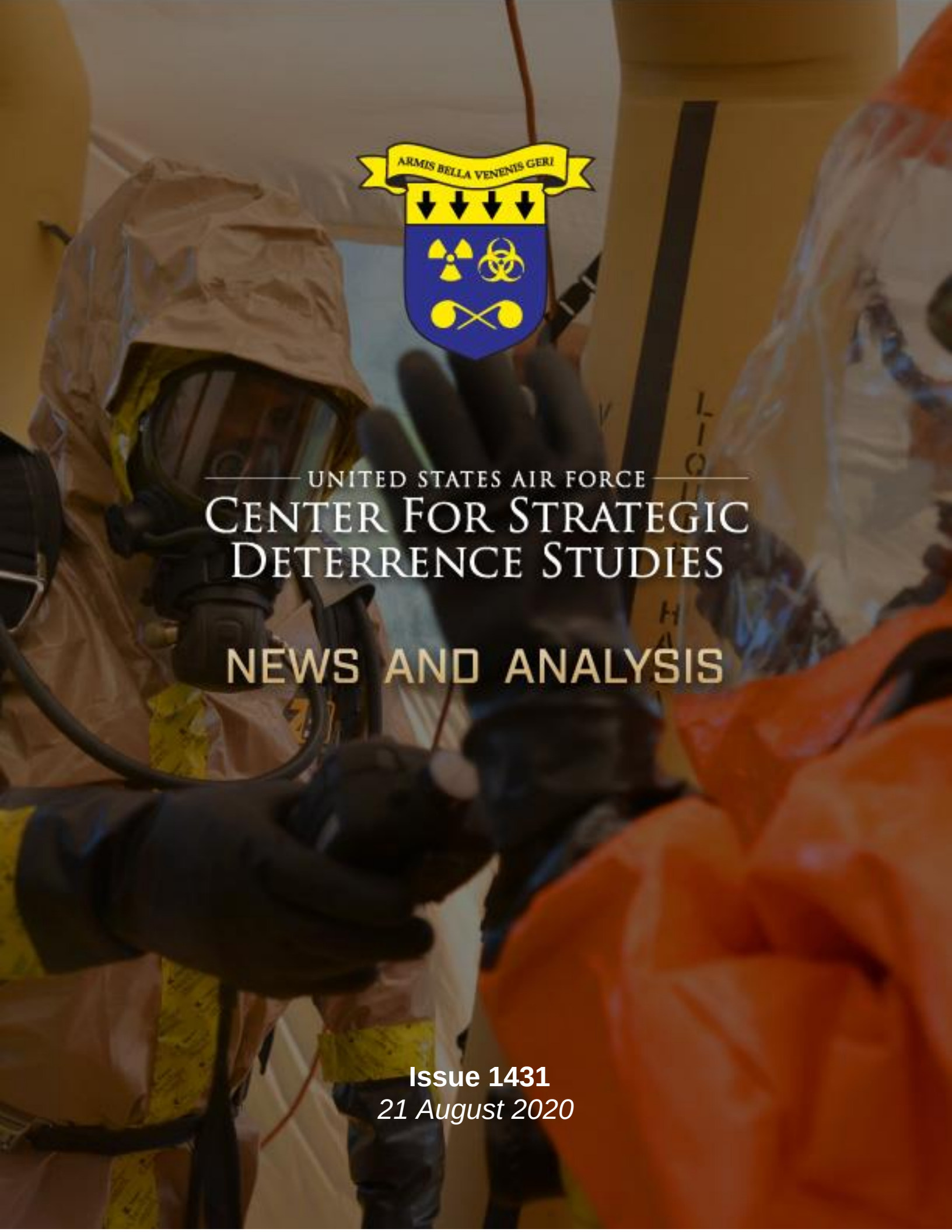

Issue 1431
21 August 2020

Feature Report

"*North Korean Decision-making: Economic Opening, Conventional Deterrence Breakdown, and Nuclear Use*". Published by RAND; Published Aug. 20, 2020

https://www.rand.org/pubs/research_reports/RRA165-1.html

This report is a compilation of three papers designed to stimulate discussion among those who are focused on North Korean decision-making. The first paper describes the experiences of North Korea and three similar authoritarian regimes — China, Vietnam, and Cuba — and provides a forecast of why and how North Korea might adopt a new economic model. The second paper describes decisions that the North Korean leadership might face in two scenarios in which conventional deterrence on the Korean Peninsula breaks down. The final paper provides an assessment of North Korean leadership decision-making about nuclear weapons doctrine. Despite the many unknowns surrounding the North Korean leadership decision-making process, these papers constructively outline the parameters of the North Korean decision-making "trade space" and the historical examples from which North Korean leaders might draw.

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NUCLEAR WEAPONS AND DETERRENCE

Breaking Defense (Washington, D.C.)

Air Force Flight Tests B-21 Avionics; Program 'On Right Track'

By Theresa Hitchens

Aug. 13, 2020

WASHINGTON: To get the highly-classified, high-priority B-21 bomber into the air as quickly and reliably as possible, airframe production is happening in parallel with software testing of avionics and other subsystems on a test-bed aircraft.

Despite some impacts from the COVID-19 pandemic on component suppliers, the B-21 Raider program is "on the right path" and Defense Secretary Mark Esper, who visited Northrop Grumman's B-21 HQ 10 days ago in Melbourne, Fla., is "happy with the progress we're making," says Randy Walden, head of the Air Force Rapid Capabilities Office (RCO).

And important program progress is being made using agile software development tools to speed those sensors' readiness for integration, he told the Mitchell Institute today.

"I've shared this in the past — we're in production today of test jet number one, and it's beginning to look like an airplane. The good news is all of the tough critical design, all of the hard engineering, is kind of behind us. Now it's a matter of actually producing the airplane, and actually rolling it out, and getting on with the development of flight test activities," Walden said.

In fact, he said, production of that first test jet is actually taking place on the actual production line that will be used to build the (first?) 100 bombers. "So, not only are we learning lessons on how to build the first B-21 and getting that behind us, we're also getting after learning all the lessons on the production line and getting that behind us as well."

"I know we're not going to be immune from design flaws," Walden added. "We're going to have to work through those, and we're doing some of that today. So, from my perspective, I want to find out what those design deficiencies were as fast as I can, get on with the solution, get that into the program in the development phase, and then get on with production."

Walden explained that the goal of designing and testing the subsystems via agile software tools at the same time production of the aircraft is beginning is to fix as many flaws as possible with them upfront, before integration with the bomber airframe.

"One of the things we're working on is we have a flight test aircraft that we've been hosting some of those subsystems on to buy down the risk. So the first time it's introduced into an air environment is not on the bomber," he said. "So we're doing a kind of an a parallel approach, working out some of the bugs with the software as well as the subsystems."

While Gen. Timothy Ray, head of Air Force Global Strike Command, has said that he is expecting the B-21 to enter the field in the mid-2020s, DoD has not released a specific date for initial operational capability.

In the past, Air Force leaders — for example in the F-35 Joint Strike Fighter program — have determined that "concurrency" between production and development has been at the heart of serious cost and schedule delays, Walden insisted that this approach is much less risky.

"I think the higher risk is not doing that and hoping that we get it installed correctly and it works day one on the flight test bed," he said. "One thing we have learned is, when you can buy down risks

with subsystems on even another platform, no matter what it is, and you get into the air and you test some of the software and work those bugs out, it goes a long way."

Long-time aircraft analyst at Teal Group, Richard Aboulafia, agrees. "It's certainly a promising approach," he said. "Historically, that combination of building and testing and redesigning has badly hobbled aircraft development programs, most notably the B-1. There are still uncertainties with an agile software development approach, but there are more reasons for optimism."

And while even the F-35's then-program head Vice Adm. David Venlet way back in 2011 called concurrency in that program a "miscalculation," the B-21 development program is very different from that of the F-35, said Mark Gunzinger, director of future aerospace concepts and capabilities assessments at the Mitchell Institute.

"Unlike the F-35 program, I like to say that the B-21 is more a matter of integration than invention," he told Breaking D in an email today. "To reduce costs and time, the program is taking maximum advantage of other programs, mature technologies, and probably even subcomponents developed for other weapon systems. In other words, it is far more mature at this stage in its development compared to the F-35 and certainly the B-2 program."

Walden said the B-21 program office is not just using "normal" DevSecOps — a software building process that combines software development, cyber security, and software operations side-by-side — on components on the ground in a lab, but is actually using those tools to iterate subsystem software while in the air. This, he said, is allowing developers to fix design flaws found every month or two, rather than the typical year or so it typically takes to fix those sorts of errors.

Further, he said the use of Kubernetes to break up "spaghetti code" into discrete modules for testing is allowing the program office to reduce the time it takes to assure that those fixes made to one function of a subsystem doesn't negatively interact with another set of code underlying a different function.

As Breaking D readers know, Air Force acquisition czar Will Roper is a huge fan of DevSecOps, Kubernetes and other agile software tools, and has praised the B-21 program and Northrop Grumman for how they are being used on "flight-ready hardware" to speed the Raider's development. Indeed, Roper told reporters in June, the program is pioneering a souped-up version of DevSecOps, called DevStar, that is trying to establish an autonomous testing capability.

Walden refused to be drawn into the debate about whether more than 100 B-21s would be needed, noting that while he has spoken to Ray and other senior leaders, the decision about the size of the fleet is not his to make.

"In fact, when Secretary Esper was down there, we talked about production lines and how many are needed etc., but, in general terms, my focus is the minimum of 100 and starting the production line on time, and building to the rate that I've guaranteed we could with that production line," he said. "So I don't focus on what the requirement is; I'm going to focus on how I meet that requirement. And if they want more, I believe this production line we're doing today will help them get more."

https://breakingdefense.com/2020/08/air-force-flight-tests-b-21-avionics-program-on-right-track/

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Air Force Magazine (Arlington, Va.)

Space Force Doctrine Raises Questions about Nuclear Missiles

By Rachel S. Cohen

Aug. 14, 2020

If a nuclear missile passes through space on its way to hit the Earth, should the Space Force own it?

That idea puzzled some policy watchers who read a section on orbital flight in the Space Force's first Space Capstone Doctrine paper, published Aug. 10. To them, it suggests that the Air Force's intercontinental ballistic missiles, which are fired from underground silos and arc above the atmosphere before plummeting to a target, would fall under the space jurisdiction instead.

"Orbital flight (also referred to as spaceflight) is the act of deliberately manipulating gravitationally curved trajectories in order to transverse beyond Earth's atmosphere and through space," the doctrine document said.

That definition covers "suborbital trajectories that travel into space but deliberately reenter the atmosphere before a complete circumnavigation," it added.

The section struck some policy experts as odd.

"Not sure why they included suborbital as a subset of orbital flight, as by definition, suborbital is NOT orbital. Does that mean ICBMs now do orbital flight?" Brian Weeden, program planning director at the Secure World Foundation, mused on Twitter.

"I think they're either confused on the physics or have decided to open a legal door for some sort of nuclear weapons delivery from 'near space,'" he added.

ICBMs and space operations have long been intertwined. Russia used the world's first ICBM, the R-7, to launch Sputnik, the first artificial satellite, in 1957. A modified R-7 missile also carried cosmonaut Yuri Gagarin's spacecraft into orbit in 1961.

"Flying atop a highly modified Titan II ICBM, NASA's Gemini Manned Spaceflight program achieved 100 percent mission success. Titan's exemplary record established a standard for perfection, safely launching two-man crews into orbit 10 times from 1965-1966, one of the most dynamic and fast-paced periods in the Space Race," Lockheed Martin said of the missile built by its predecessor, The Martin Company.

The Space Force today hosts ICBM tests at Vandenberg Air Force Base, Calif., where its launch range works with Air Force Global Strike Command to send missiles into the Pacific Ocean.

Kaitlyn Johnson, associate director of the Aerospace Security Project at the Center for Strategic and International Studies, argues the Space Force should not manage the land-based nuclear missiles—though its missions do include tracking and warning of enemy ballistic missiles. (Others say ICBMs are a better fit for the Army than the Air Force.)

Describing orbital flight as such may have other benefits.

"This might give them more claim to jurisdiction or the potential for future suborbital space travel for military logistics," like moving people or supplies, Johnson said.

According to the Space Force, the writing isn't an oversight or an attempt to swipe the ICBM mission. The doctrine is simply laying out what the space domain looks and acts like.

The Space Force is responsible for defining space's physical and operational characteristics, but it is not the only service that deals with the cosmos, Col. Casey Beard, commander of the operational group Space Delta 9 at Schriever Air Force Base, Colo., said in an email.

"The Air Force has a small contingent of land and maritime capabilities, and the Army and Navy have air assets," Beard said. "However, the Air Force is the only service designed and optimized for the air domain and is therefore responsible for defining that domain's physical and operational characteristics for the Joint Force, just as the USSF now is for space."

It appears the nuclear missiles will stay put.

https://www.airforcemag.com/analysts-ponder-whether-nuclear-missiles-should-move-to-the-space-force/

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Air Force Global Strike Command

Air Force Announces GBSD Locations at Three Existing Missile Bases

By Air Force Global Strike Command Public Affairs

Aug. 14, 2020

BARKSDALE AFB, La. -- The Air Force plans to begin military construction activities as early as 2023 at F.E. Warren AFB, Wyoming, as it moves forward in the process of replacing the aging Minuteman III ICBMs with the Ground Based Strategic Deterrent.

Malmstrom AFB, Montana, will be the second installation to begin military construction activities in 2026, with Minot AFB, North Dakota, beginning in 2029. The construction start dates are pending the completion of Environmental Impact Statements for each base in accordance with Federal laws and policies.

Military construction is phased ahead of the actual deployment of GBSD to allow time for initial beddown, ensure facilities are ready for any unique mission equipment, and support training and operational certification prior to the first sites obtaining operational status at each wing.

Using infrastructure at current locations allows both the Minuteman III and GBSD weapons systems to continue meeting all nuclear surety and safety standards throughout their operational lives, particularly during the transition period.

"Ensuring missile bases remain missile bases makes the most sense for the taxpayer and the mission," said Gen. Tim Ray, commander of Air Force Global Strike Command. "The Minuteman III is 50 years old; it's past time to upgrade the missile systems. Our goal is ensure our systems remain fully safe, secure and effective in the defense of our nation and allies."

GBSD is the most cost-effective option for maintaining a safe, secure and effective ICBM leg of the nuclear triad. The GBSD program's objective is to deliver a low technical risk, affordable, total system replacement, starting in the late 2020s, to improve the ICBM's capabilities and provide more efficient operations, maintenance, and security at lower lifecycle costs.

Air Force Global Strike Command is comprised of more than 33,700 Airmen and civilians assigned to two numbered air forces, 11 wings, two geographically-separated squadrons and one detachment in the continental United States, and deployed to locations around the globe. The command oversees two-thirds of the Nation's nuclear weapons including all bomber and Intercontinental Ballistic Missile operations for the U.S. Department of Defense. More information

can be found at: https://www.afgsc.af.mil/Library/Fact-Sheets/Display/Article/454593/air-force-global-strike-command-air-forces-strategic-air/.

https://www.afgsc.af.mil/News/Article-Display/Article/2313115/air-force-announces-gbsd-locations-at-three-existing-missile-bases/

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Air Force Magazine (Arlington, Va.)

USAF Rethinks Relationship between Conventional, Nuclear Weapons

By Rachel S. Cohen

Aug. 19, 2020

The Air Force is crafting new policy that envisions more fluidity between conventional and nuclear weapons, as well as a broader range of options to keep others from using their own nuclear weapons.

The U.S. has long treated conventional and nuclear warfare as separate concepts, but that's beginning to change, said Lt. Gen. Richard M. Clark, the Air Force's deputy chief of staff for strategic deterrence and nuclear integration.

Over the past year and a half, nuclear experts on the Air Staff have crafted an overview of "conventional and nuclear integration," in which American service members must be able to survive a conflict that involves a nuclear weapon.

"The multipolar world is presenting different challenges for us," Clark said at an Aug. 19 Mitchell Institute for Aerospace Studies event. "The lines are a bit more blurred between conventional and nuclear, so that's driven us to start thinking in ways that may be different than we thought about in the last 20 years or so."

A multipolar landscape, where China also poses a top nuclear threat, is the biggest difference from nuclear policy 30 years ago, when defusing tension with Russia was the singular goal, according to Maj. Gen. Michael J. Lutton, who oversees ICBMs as the head of 20th Air Force.

Now, adversaries see conventional and nuclear options as two points on a broader spectrum of conflict, rather than keeping nuclear warfare largely off-limits. Countries like Russia, China, and North Korea seem to understand they are outmatched by America's non-nuclear bombs and missiles, and are looking for ways to exploit other weaknesses.

"We have to be able to reconstitute our capability. We have to be able to plan and execute integrated operations, multidomain, whether conventional or nuclear, and most importantly, we have to be able to fight in, around, and through that environment to achieve our objectives," Clark said.

Russia appears to see so-called tactical nuclear weapons as one way to catch the U.S. off-guard in a regional fight, Clark said.

"It is very clear in their doctrine and in the capability, the non-strategic nuclear weapons that they have amassed over the years, it's evident that that's in their planning, that's in their strategy and their thought process," he said.

China is upgrading its own nuclear arsenal as well. The country has an "ambiguous no-first-use policy," Clark said, and the U.S. believes China may walk away from that policy for the sake of self-

preservation. He added North Korea is another wild card that could bring nuclear weapons to a conventional fight.

The Navy has in response started deploying its own tactical nukes, or those that have shorter ranges and lower yields than the nuclear missiles and bombs now owned by the Air Force and Navy. Experts disagree over whether a distinction should made between tactical and strategic nukes, given the power and long-lasting consequences either would wield. Proponents say tactical nuclear weapons could be an option without escalating to the all-out, last-resort nuclear war envisioned in policymaking.

This approach is different from the nuclear artillery of the Cold War, Clark added.

"What we're trying to prepare ourselves to do is to respond with whatever force is necessary in a nuclear environment. It's not so much to fight tactically. Really, the ultimate goal here is to deter," he said. "We want to raise that threshold of using nuclear weapons, whether strategic or non-strategic … to the highest level possible."

To do that, Clark argues the Air Force needs ways to stop others from using nuclear weapons in the first place, and options to retaliate if deterrence fails. Technology, training, and command-and-control requirements all need to be updated to support that approach. Legacy weapon systems are part of the puzzle, not just new designs, he said.

His remarks come as the Air Force marks 50 years since it placed the first Minuteman III intercontinental ballistic missile—the most recognizable Cold War weapon—on alert at Minot Air Force Base, N.D., on Aug. 19, 1970. Those ICBMs will be replaced starting in the late 2020s with Northrop Grumman's Ground-Based Strategic Deterrent, a modern nuclear missile that could eventually accommodate steerable, hypersonic warheads.

The Air Force is also spending billions of dollars on new nuclear cruise missiles, gravity bombs, and bomber aircraft to replace aging systems, arguing it would be more costly and less effective to update the existing assets and unsafe to ditch them altogether. It will also add nukes to dual-capable aircraft like the F-35 Joint Strike Fighter for more flexibility.

Clark left open the idea that the Air Force could create a non-nuclear version of the Long-Range Standoff Weapon cruise missile. The service has dismissed that suggestion in the past because it is already buying Joint Air-to-Surface Standoff Missile variants with increasingly longer ranges.

"Whether limited or large-scale nuclear, we have to be able to fight through that along the full spectrum of conflict," Clark said. "That's why we, as an Air Force and really the Department of Defense, are looking at this concept so we can be prepared to address the threat."

The Air Force will send a capstone report to Congress and the Defense Department on its efforts to move conventional and nuclear integration ideas forward, and is shaping its acquisition plans accordingly, he added.

https://www.airforcemag.com/usaf-rethinks-relationship-between-conventional-nuclear-weapons/

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US COUNTER-WMD

Defense News (Washington, D.C.)

Missile Defense Agency Director Lays Out Hurdles in Path to Layered Homeland Missile Defense

By Jen Judson

Aug. 18, 2020

WASHINGTON — The Missile Defense Agency is planning to develop a layered homeland intercontinental ballistic missile defense architecture, but it must clear a range of hurdles to get after an approach that addresses emerging threats and fills a gap while a next-generation interceptor is developed, according to the agency's director.

The agency unveiled plans in its fiscal 2021 budget request in February to create a more layered homeland defense system that would include regional missile defense capability already resident with the Navy and Army to bolster homeland defense against ICBMs.

The plan would include establishing layers of defensive capability relying on the Aegis Weapon System, particularly the SM-3 Block IIA missiles used in the system, and a possible Aegis Ashore system in Hawaii. The underlay would also include the Terminal High Altitude Area Defense (THAAD) system. The Army is already operating a THAAD battery in South Korea and Guam.

The layered approach would buy time while the Pentagon scrambles to field a new interceptor to replace older ground-based interceptors — after canceling its effort to redesign the kill vehicle for the GBIs — in its Ground-based Midcourse Defense system located primarily at Fort Greely, Alaska.

With little detail conveyed in MDA's budget request for a layered homeland missile defense plan, Congress is pressuring the agency to come up with a strategy and approach to putting the architecture in place in both the House and Senate passed FY21 defense authorization bills.

Much is riding on the success of an upcoming test of the SM-3 Block IIA missile, Vice Adm. Jon Hill said during a Heritage Foundation virtual event on Aug. 18. The missile has seen several test failures in the recent past.

"We're going to really stress the SM-3 Block IIA outside its design space," Hill said. "It was designed for medium and intermediate range. Now we're going against long-range intercontinental ballistic missiles. The analysis says we'll be successful, but nothing is real to any of us until we actually get the empirical data from being out in the flight range."

The test will involve several time zones on several different ranges and the same ICBM target used in the most recent GMD test, Hill said.

And while the test is still on track to happen by the end of the year, Hill said, challenges in coordination and travel due to the coronavirus pandemic could possibly have an impact on schedule.

When the pandemic hit, "we were ready and postured to go to the Pacific to execute" Flight Test Maritime-44, Hill said, "so we did get the target on station. So the target's out there in the Pacific and it's ready to roll."

Following FTM-44, the agency would like to execute another test against a very complex ICBM target unlike the "simple" one being used in the upcoming test. That target will have "a lot of separation debris and that has a lot of countermeasures," Hill said.

"We want to make sure that the system in total, from the space assets to the radar to the engage-on-remote capability that passes that information to the ship, that ship can actually sift through all that and say, 'That's the [reentry vehicle] and that's the where the missile's going to go,'" he added.

Success in the upcoming test doesn't mean the agency's work is done, Hill said. Upgrades will be required based on threats, combat system certifications will need to be conducted and work with the Navy to determine where Aegis ships would deploy will have to occur.

The agency will also have to determine how quickly it can ramp up its production line for SM-3 Block IIA missiles.

Then "if we succeed with Aegis, then we'll go right down the path with THAAD," Hill said.

The second big challenge, after ensuring all the parts work to provide layered coverage, is developing engagement coordination between the different layers, according to Hill.

"Let's just say that step one is a ship off the coast as a complement to GMD. Those systems today talk already, but they're not talking in terms of being layered defenders," Hill said. "So if GMD, for example, decides he's going to wait this first shot out and let the ship take it, we have to have the communication network to go do that. We have to have the technical architecture with the Command and Control Battle Management system, but in that context of layered defense and engagement coordination."

Aegis ships are already able to do engagement coordination among each other and the work the Pentagon is doing to get THAAD and the Patriot air-and-missile defense system to coordinate are "extensible to that problem," Hill said, "but we still need to do that kind of engineering and that sort of architecture work."

And while a layered missile defense architecture for the homeland is an intricate one, "you don't have to solve the whole problem" at once, Rebecca Heinrichs, a missile defense analyst at the Hudson Institute, said during the Heritage Foundation event. But she cautioned that she did foresee challenges in establishing such an architecture on the political front rather than on the technical side.

"Congress always wants to vet these kinds of things, so even though it is Congress that wanted the SM-3 Block IIA test, whenever you start talking about which district it is going to be in, where it's going to go and that kind of thing, that is a political challenge that takes a lot of debate and conversation."

https://www.defensenews.com/digital-show-dailies/2020/08/18/missile-defense-agency-director-lays-out-hurdles-in-path-to-layered-homeland-missile-defense/

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Defense One (Washington, D.C.)

Adding Sensors Saves Ammo, Army Network Testers Find

By Patrick Tucker

Aug. 13, 2020

The U.S. Army used a pair of short-range Sentinel radars to cue Patriot missiles and shoot down target drones on Thursday, a key test of its efforts to link more weapons, sensors, and gear in a seamless command-and-control web.

Operators in a battalion Engagement Operations Center at White Sands, N.M., used Northrop Grumman's Integrated Battle Command System, or IBCS — the linchpin of the Army's next-generation land-warfare network — to overcome "enemy" jamming and direct PAC-3 missiles to intercept simulated cruise missiles, service officials said.

Integrating a Patriot radar and missile battery with a Sentinel radar may not sound very important. But the additional sensors gave operators precious extra minutes to plan their defense, and ultimately to down their targets with just one interceptor missile apiece, half the normal number used in an engagement, officials said.

The demonstration also showed the Army is on track in its broader effort to link together more weapons and more sensors in order to take out any target with anything on the battlefield, as opposed to tasking one weapon with one target and then struggling to adapt when there's a miss. "Now imagine being able to take that with more sensors, more joint interceptors and with a joint command and control and now you have yourself the joint kill web," said Lt. Gen. Dan Karbler, commander of the U.S. Army Space and Missile Defense Command.

The more sensors that are on the network, such as Sentinel, the more options available to take out the threat. Eventually, these sorts of sensor to weapon networks will fit into a much larger web that expands across the services and across land, air, sea, space and cyberspace, a vision dubbed Joint All-Domain Command and Control. "It doesn't matter who owns the sensor… the ultimate vision, and we aren't there yet, is it doesn't even have to be an air defense sensor, as we integrate sensors into this network," said Gen. Murray, the commander of Army Futures Command.

https://www.defenseone.com/technology/2020/08/adding-sensors-saves-ammo-army-network-testers-find/167703/

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Maxwell AFB

AFIT Launches Online Graduate Certificate in Countering Weapons of Mass Destruction

By Katie Scott, Air Force Institute of Technology

Aug. 17, 2020

WRIGHT-PATTERSON AFB, Ohio - Weapons of mass destruction can be man-made or naturally-occurring in a chemical, biological, radiological, or nuclear form. Regardless of the source or type of agent, several U.S. government agencies are responsible for anticipating, evaluating, and countering WMD threats. Personnel with an understanding of the scientific principles behind WMDs are critical to advising leaders at all levels of government.

"The COVID-19 pandemic has brought back to light the fact that weapons of mass destruction, whether they be biological, chemical or nuclear, can make a huge impact on our way of life," said Dr. James Petrosky, professor of nuclear engineering and director of the Nuclear Expertise for Advancing Technologies Center at the Air Force Institute of Technology.

The Countering of Weapons of Mass Destruction graduate certificate is an online part-time program designed to be completed in one year. Students take one course each quarter that will provide a fundamental scientific knowledge base related to the production, use, effects, and mitigation of WMD.

"The graduate certificate programs at AFIT fill a niche with graduate-level, technical and achievable education for working professionals to complete part-time in about a year," said Dr. Jeremy Slagley,

assistant professor of industrial hygiene and environmental science and the director of the CWMD graduate certificate program.

What makes the AFIT CWMD certificate program unique is the graduate-level technical focus of the classes with a focus on both warfare and terrorism. "There are several programs offered throughout the country on CWMD, but none are technical. They are political science type programs based on policy and agreements," said Dr. John McClory, professor of nuclear engineering and chair of the nuclear engineering program at AFIT.

The ability for AFIT to launch the online certificate program is due to support received from the Department of Homeland Security whose leaders were looking for technical, graduate-level education in the WMD field. "There is a need for this technical education, especially in the folks who are looked to as experts to advise decision makers at all levels of the government," said Slagley.

The first course in the series this fall is biological weapons effects and technology. The course is particularly interesting at this time with the COVID-19 pandemic and the worldwide response. "A relatively quiet period in infectious disease was ended by the emergence of COVID-19. Biological weapons generally are simply infectious diseases and the world is affected all the time," explained the course instructor, Lt. Col. Casey Cooper, assistant professor of industrial hygiene.

AFIT first awarded the CWMD certificate in 2009 as part of an in-resident master's degree program. Thirty students earned the certificate before the master's program was suspended in 2018. This is the first time the certificate has been offered as a stand-alone program and executed fully online.

The CWMD graduate certificate program is open to government personnel at no cost. An initial call for applicants was extremely well received and more than 75 interested candidates have applied for the program.

More information on the CWMD Online Graduate Certificate is available on the AFIT website at www.AFIT.edu/EN/allprograms and prospective students can apply online at www.afit.edu/Admission/AFITApplicationProcess.

https://www.maxwell.af.mil/News/Display/Article/2316182/afit-launches-online-graduate-certificate-in-countering-weapons-of-mass-destruc/

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US ARMS CONTROL

Middlebury Institute (Monterey, Calif.)

Next-Gen Simulation on North Korea

By Nomsa Ndongwe

Aug. 18, 2020

As part of the Undergraduate Summer Nonproliferation Fellowship, 14 undergraduate students participated in an arms control negotiation and simulation exercise led by CNS Program Director for Education and Training Jean du Preez. Held from July 20–22, 2022, the exercise served as a basis for their immersion into the world of realpolitik, diplomacy, and world affairs in the format of a high-level preparatory meeting of an emergency summit between the leaders of South Korea, North Korea, the United States, Japan, China, and Russia.

The students had an opportunity to learn from a veteran diplomat and international civil servant the basics and foundations of concepts such as the best alternative to a negotiated agreement (BATNA), negotiation tactics and strategies, as well as the "do's and don't's" that are taught in foreign service institutions around the world.

The two-day simulation allowed these students to put into practice what they learned from a series of lectures on nonproliferation, US/Russia relations, and nuclear disarmament and international nonproliferation challenges. For this exercise, the students simulated a high-level meeting on North Korea's nuclear program and its destabilizing effects on the region.

The virtual element of the negotiations was just as novel to the students as it was to the moderators. Nevertheless, within hours, all participants had taken to their roles and responsibilities with impressive adeptness, and the realities of trying to compose a cogent document that captures the various competing interests of six countries had become very apparent.

Three days, a Slack channel, a slew of Zoom breakout rooms, a Twitter handle and thread #SummerSimNPT2020, numerous emails, as well as a very colorful Google document (or three) later, the high-level summit was brought to an end after "targeted airstrikes" scuttled the entire process.

The delegates learned useful lessons about the art and usefulness of diplomacy, and had shown an admirable commitment to resolving the security issues on the Korean Peninsula. These lessons would serve real world governments well, should these promising students decide to enter these fields in the future.

See also: A Hybrid Education Model in Practice

Several of the article's authors are involved in efforts to advance antineutrino detection technology.

https://www.nonproliferation.org/next-gen-simulation-on-north-korea/

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Radio Free Europe/Radio Liberty (Prague, Czech Republic)

UN Security Council Rejects U.S. Resolution to Extend Iran Arms Embargo

By RFE/RL

Aug. 14, 2020

The UN Security Council has rejected a U.S.-sponsored resolution to extend an arms embargo on Iran that is due to expire in October, setting the stage for Washington to act on threats that could kill the Iran nuclear deal and plunge the United Nations into a diplomatic crisis.

The August 14 vote on the resolution was widely expected to fail in the 15-member Security Council due to strong opposition from veto-wielding members Russia and China.

"The UN Security Council failed today to hold Iran accountable. It enabled the world's top state sponsor of terrorism to buy and sell deadly weapons and ignored the demands of countries in the Middle East. America will continue to work to correct this mistake," U.S. Secretary of State Mike Pompeo said after the vote.

In a diplomatic blow that reveals Washington's isolation at the UN over the issue, the resolution failed with two voting in favor and two against, while 11 members abstained.

Washington did not even receive the nine votes it needed in favor that would have required Russia and China to use their vetoes.

Tehran mocked Washington for winning just a single vote of support, from the Dominican Republic.

"In the 75 years of United Nations history, America has never been so isolated," Foreign Ministry spokesman Abbas Musavi tweeted.

"Despite all the trips, pressure, and the hawking, the United States could only mobilize a small country [to vote] with them."

China's UN mission tweeted that the "result shows again that unilateralism enjoys no support, and bullying will fail."

The U.S.-drafted resolution sought to extend an international arms embargo on Iran, which is set to be progressively eased beginning on October 18 under UN Security Council Resolution 2231, which enshrined the 2015 nuclear deal between Tehran and world powers.

Washington has threatened to trigger a "snapback" of all UN sanctions on Iran if the embargo vote failed, a move experts say will throw the Security Council into crisis.

Pompeo and Iran hard-liners in Washington claim the United States remains a "participant" in the nuclear accord because it was listed as such in the 2015 resolution and can therefore bring back sanctions, since Iran has not fully complied with its nuclear commitments.

"Under Resolution 2231, the United States has every right to initiate snapback of provisions of previous Security Council resolutions," U.S. Ambassador to the UN Kelly Craft said in a statement. "In the coming days, the United States will follow through on that promise to stop at nothing to extend the arms embargo."

Russia and China, as well as the European countries that were signatories to the nuclear pact officially known as the Joint Comprehensive Plan of Action (JCPOA), have questioned the U.S. claim it is able to trigger the snapback mechanism because it quit the nuclear deal in 2018 and reimposed sanctions on Iran. In response to the U.S. withdrawal, Iran gradually started breaching its nuclear commitments.

Britain, France, and Germany -- all signatories to the JCPOA who have sought to keep it alive -- have expressed worries about the arm embargo ending but opposed the U.S. resolution because they feared it would end the nuclear deal.

Iran has threatened to completely exit the JCPOA and hinted it will pull out of another key nonproliferation treaty if the arms embargo is extended or there is a snapback of sanctions.

Iranian UN Ambassador Majid Takht Ravanchi again warned the United States against trying to trigger a return of sanctions.

"Imposition of any sanctions or restrictions on Iran by the Security Council will be met severely by Iran and our options are not limited. And the United States and any entity which may assist it or acquiesce in its illegal behavior will bear the full responsibility," he said in a statement.

Russian President Vladimir Putin proposed that the next step should be an online summit gathering China, France, Russia, Britain, the United States, Germany, and Iran to try to avoid further "confrontation and escalation" at the United Nations over Iran.

"Further growth of tensions and greater risks of a conflict are the alternative," Putin said in a statement posted on the Kremlin's website before the vote. "This march of events must be avoided. Russia is open to constructive cooperation with all those interested in moving away from the dangerous line."

https://www.rferl.org/a/un-security-council-votes-on-u-s--backed-resolution-to-extend-arms-on-iran/30784118.html

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Bulletin of the Atomic Scientists (Chicago, Illinois)

The Strategic Consequences of Ending the Arms Embargo on Iran

By Farhad Rezaei

Aug. 14, 2020

In 2015, the UN Security Council passed Resolution 2231, endorsing the nuclear agreement between Iran and the major world powers, officially called the Joint Comprehensive Plan of Action. But the resolution also established a five-year embargo on conventional arms sales going in and out of Iran, replacing earlier resolutions that had levied more permanent restrictions on such sales. Five years on, the moratorium is set to expire on October 18, 2020, although the Trump administration is determined to extend it. If it does expire, Iran will, at least in theory, be allowed to import and export heavy weaponry such as tanks, combat aircraft, and missile systems virtually overnight.

This raises the questions: What are the implications for Iran if the ban is not extended? What are the strategic consequences to United States security and countries in the Middle East? Will Iran rush to rebuild its conventional military arsenal by purchasing new arms, possibly from Russia and China?

To answer these questions, an examination of the current state of Iran's military capability and strategy is imperative. Iran has made remarkable progress in producing domestic military weapons and hardware, meaning it may not rush to rebuild its conventional military arsenal by purchasing new arms from foreign suppliers. However, Iran will stand to profit from selling its locally produced military equipment to neighboring countries if the embargo expires.

It is important to acknowledge that even if the arms embargo on Iran falls away, the regime will remain under a web of other legal restrictions and sanctions that would likely reduce its ability to import and export conventional weapons. These restrictions and sanctions include the EU arms embargo on Iran, US sanctions on Iran's banking and financial sector, and the potential threat of secondary sanctions against Chinese or Russian companies that may try to sell arms to Iran, as well as the UN resolutions addressing potential buyers of Iran's arms like Yemen (through UN Resolution 2216) and Lebanon (through UN Resolution 1701). But, supposing Iran can circumvent these obstacles, what might the consequences of an expired arms embargo be?

Background on Iran's military strategy. The Islamic Republic of Iran has been under a US arms embargo, distinct from the various multilateral UN embargoes, since the 1979 Islamic Revolution. During the Iran–Iraq war, which began in 1980 and lasted eight years, that embargo limited Iran's ability to purchase arms with which to defend itself. The conflict also impoverished Iran, limiting its financial ability to create a strong conventional military force. To prevent such a bitter experience from ever happening again, Iran's post-war military doctrine called for a self-sufficient and radical deterrence posture in order to increase the costs to any would-be aggressor. As a result, today Iran's deterrence relies on a multi-layered asymmetrical approach consisting of missile systems, irregular naval warfare, and proxy networks that can carry out terror attacks on opponents in the region and beyond.

First, Iran has heavily invested in developing indigenous ballistic missile and missile defense systems to compensate for its limited and obsolete air force assets. Over the years, it has developed what the US Defense Intelligence Agency considers the largest missile arsenal in the region, comprising various types of ballistic and cruise missiles, most of them capable of carrying nuclear warheads.

Iran plans to continue prioritizing the development and acquisition of advanced ballistic missiles, and will continue the transition from liquid to solid propelled systems, which offer greater self-sufficiency—the country has begun producing its own solid fuel for its missiles at its Jajarm Aluminum Production Complex in the northeast. Solid-fuel propellants could also allow the Islamic Revolutionary Guard Corps, a branch of Iran's armed forces, to bury its missiles in sealed canisters for years without the need for underground bases.

Iran has also started working on developing strategic missile defense capabilities, using diverse launch points and hiding mobile systems, which would allow its army to intercept incoming targets from anywhere. The newest system, called the Khordad-15, is "capable of detecting fighter jets and combat drones from 150 kilometers away and of tracking them within a range of 120 kilometers and is able to detect stealth targets at a distance of 85 kilometers," according to Iran Defense Minister Brig. Gen. Amir Hatami. The Khordad-15 is credited with shooting down the US RQ-4A Global Hawk surveillance aircraft—one of the most sophisticated drones the United States has—over the Strait of Hormuz in June 2019.

Additionally, the Revolutionary Guard has developed the "Falaq" radar system, a local version of the Russian-made "Gamma" system, and the Bavar-373, an overhauled version of the Russian S-300 surface-to-air missile system. According to Russian military sources, the Bavar-373 "will not only replace the Russian-supplied S-300, but also surpass it."

Of course, these missile programs constitute only one component of Iran's air power. The Revolutionary Guards has also devoted a significant portion of military investments to the development of an advanced air industry, manufacturing fighter jets and drones. In fact, Iranian military officials credited their drones with having played a pivotal role in the victory of the Assad regime on the Syrian battleground, and US-based expert Seth Frantzman of the Middle East Center for Reporting and Analysis recently expressed concern that "Iran is becoming a drone superpower."

The second component of Iran's strategic doctrine that has received a substantial proportion of military investments is the asymmetrical hybrid naval approach, part of the so-called Anti-Access/Area Denial strategy. The purpose of these investments is to limit American naval operations in the Persian Gulf and beyond, in hopes of being able to disrupt select maritime choke points. In 2012, the Revolutionary Guard, in collaboration with the Imam Hussein University, published a document entitled "Strategic Maritime Triangle, Irregular Maritime Warfare," outlining the area denial strategy to prevent the US Navy from destroying Iran's critical targets.

The idea was derived from the lessons of Iran's efforts to mine the Straits of Hormuz during the "Tanker War" portion of the Iran–Iraq war in 1987. In April 1988, Iranian mines damaged a US Navy ship, resulting in the launch of the American Operation Praying Mantis. That operation destroyed two offshore Iranian oil terminals and several Iranian warships, contributing to Ayatollah Khomeini's decision to accept the cease-fire with Iraq several months later. Iran's naval failure, however, spurred the Revolutionary Guard to search for an improved area denial strategy.

Today, the naval branch of the Revolutionary Guard, in conjunction with the regular navy, still employs traditional area denial capabilities, such as land and sea-based anti-ship missiles and sea mines. But it also relies on asymmetrical guerrilla tactics such as the deployment of speed boats for swarming operations, man-operated suicide boats, and drone boats loaded with explosives.

To this end, the Revolutionary Guard has produced various types of submarines as well as military speed boats. Reportedly, it has manufactured over 1,500 of these fast boats, designed to carry out rapid swarming attacks in Persian Gulf waters.

The third component of Iran's strategic doctrine is to work through proxy networks, which extend to Iraq, Syria, Lebanon, and Yemen. Arguably, the Quds Force, the special Revolutionary Guard unit responsible for extraterritorial operations, has sway over 20 nonstate groups in the Middle East and Africa, including Lebanese Hezbollah, with an estimated 45,000 fighters, and the Iraqi Popular Mobilization Forces, with more than 100,000 fighters.

The proxy network provides Tehran with security benefits, including assistance with countering foreign intelligence threats, intelligence sharing, counterterrorism, and enabling the country to project its power beyond its borders. Furthermore, according to a 2018 Carnegie Endowment report, this strategy has enabled Iran to reduce the number of its combat fatalities in regional wars, particularly on the Syrian battlefield.

Effects of an expiring arms embargo. Because of Iran's remarkable advances in domestic defense and control systems, it is unlikely that lifting the arms embargo would make a significant difference in how the country maintains its conventional military capability. Most of Iran's military hardware is locally produced, meaning there is little pressure or demand for major systems.

Moreover, even if the Iranians do rush to purchase conventional weapons from Chinese or Russian suppliers, it would have little overall effect given Iran's recent history; Iran has not initiated a war with its neighbors in the last 150 years. But it has repeatedly fallen victim to military occupation, referred to by CIA strategists as Iran's "modern tradition of defeat." So any new arms procurement would likely be for defensive or deterrent purposes and would be perceived by Iranians as an insurance policy against any potential attack on Iran by its adversaries.

Plus, Iran's defense budget is a fraction of its regional rivals'. According to the Stockholm International Peace Research Institute, Iran's defense budget in 2019 was an estimated $12.6 billion. Compare that to the United States defense budget of $732 billion, the Saudi defense budget of $61.9 billion, and the Israeli defense budget of $20.4 billion. Iran's leaders are well aware that if they begin a buildup of conventional military capacity, the result would be that world powers, including the United States and European countries, would flood the Middle East with more advanced weaponry. Ironically, such a situation could end up restraining Iran, given that other countries are better able to engage in arms competition if the need arises.

It also remains unlikely that arms suppliers—such as Russia and China—would offer sophisticated and offensive weaponry to Iran for combative or defensive purposes, as long as Iran's rhetoric remains antagonistic toward its neighbors. The history of arms dealing between these countries also suggests that Russia and China will be cautious to sell any arms to Iran that may result in Israel and Saudi Arabia losing their qualitative edge over Iran. After all, China and Russia also maintain good relationships with Jerusalem and Riyadh.

But while an expiring arms embargo might not have much of an effect on Iran's imports, it is possible that Iran would become a major regional supplier of military hardware through its exports. Iran would stand to profit from selling its domestically produced arms and other military hardware at a much lower price than what other countries are able to offer, including missiles and defense missile systems, tanks, drones, submarines, speed boats, and multi-purpose tactical armored vehicles.

One of the first potential buyers of Iran's military hardware is likely to be Syria. On July 8, 2020, the two countries signed a defense pact to boost bilateral military cooperation, particularly in the realm of air defense. Likewise, in 2019, Iran offered to build up Iraq's air defense network, aiming to give

Baghdad the capability to counter air strikes from Israel. Iran has also expressed interest in supplying Yemen and Lebanon with defensive weapons as well, although the specific UN resolutions barring such transfers make it highly unlikely that Sana'a and Beirut would be able to import Iranian arms, at least for now.

It is precisely this concern about Iran's ability to export conventional arms that is partially motivating the United States to try and extend the embargo at the United Nations. But whether such exports would ever amount to much, or substantially change the dynamics of the region, is uncertain. What is certain, though, is that the fate of the arms embargo is inextricably linked with the fate of the 2015 nuclear agreement, and members of the UN Security Council will have to decide which is riskier—allowing Iran to supply its neighbors with arms, or dealing yet another blow to the already enfeebled nuclear deal.

https://thebulletin.org/2020/08/the-strategic-consequences-of-ending-the-arms-embargo-on-iran/#

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COMMENTARY

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

Book Review: Lessons from Conflicts between Nuclear and Non-nuclear States

By Alexander Lanoszka

Aug. 19, 2020

Editor's Note: This is an excerpt from "Book Review Roundtable: Tempting Fate" from our sister publication, the Texas National Security Review. Be sure to check out the full roundtable.

Paul Avey, Tempting Fate: Why Nonnuclear States Confront Nuclear Opponents (Ithaca, NY: Cornell University Press, 2019)

With Tempting Fate, Paul C. Avey makes an invaluable contribution to our understanding of nuclear politics. Written in clear and accessible prose, Avey explains why some non-nuclear weapons states have challenged and resisted nuclear weapons states despite the existential risks involved. Importantly, Avey never overstates his arguments — he is more willing than many writers to acknowledge the limitations of his scholarship. Moreover, his nuanced analysis helps correct potentially simplistic interpretations of key events. The result is a smart book that should interest academics and practitioners alike. The few questions I have concern the potential uniqueness of the Israeli-Egyptian case and the implications that Avey's analysis has for our understandings of the so-called nuclear revolution.

Avey's argument is straightforward: If the conventional military balance favors a nuclear-armed state to such an extent that it would not need to resort to nuclear weapons to defend itself and its vital interests, the non-nuclear state may challenge or resist it in a militarized dispute. A sort of "Goldilocks rule" is at play here. If the non-nuclear state is conventionally too strong vis-à-vis the nuclear state, then the latter may be tempted to use nuclear strikes to achieve favorable outcomes on the battlefield. The possibility of nuclear weapons use deters the non-nuclear state. If, however, the non-nuclear state is conventionally too weak vis-à-vis the nuclear state, then the former will not be able to initiate a military conflict in the first place. Avey claims that the non-nuclear state's leaders do not abide by the nuclear taboo while challenging a nuclear-armed adversary. These leaders believe that amoral strategic reasons — and not moral misgivings — will constrain the adversary from launching nuclear weapons. To support his argument, Avey examines Iraq's confrontational policies toward the United States in the 1990s, Israeli decision-making toward Egypt in the late 1960s and early 1970s, Beijing's hostility toward the United States in the 1950s, and Soviet-American tensions in the early days of the Cold War.

Although Avey uses a wide array of primary sources, the case studies in his book do not necessarily break new historiographical ground. The basic contours of each case will be familiar to subject-matter experts. Nevertheless, he views them through an original lens by focusing on how non-nuclear states grapple with the nuclear monopolies of their adversaries. Particularly notable are the efforts taken by these leaders to mitigate the effects of potential nuclear strikes against their countries. Iraq, for example, invested in expensive civil defense options at the time of the Gulf War.

And yet Avey, in presenting his main case studies, does not convincingly refute the nuclear taboo counterargument. The Soviet and Chinese confrontations with the United States took place early in the Cold War when norms governing the use of nuclear weapons were still inchoate. Israel had only just developed nuclear weapons in 1969 to 1973, the period that Avey examines. Although Israel has never publicly acknowledged its nuclear arsenal, these weapons were acquired too recently for

Israeli decision-makers to have fully internalized the nuclear taboo at the time of the October War. That leaves Iraq as the most recent case. One might not wish to make broad generalizations on the basis of a single case. Still, as I highlight further below, Avey is careful never to overstate his claims.

The Unique Case of Israel and Egypt

Israel's confrontation with its non-nuclear adversary Egypt stands out as a peculiar case in the book. No other non-nuclear state that Avey examines in the substantive chapters of his book could have realistically attacked the homeland of its nuclear-armed opponent, with the possible exception of Egypt and Israel due to their geographic proximity. The geographic distance that separates the nuclear and non-nuclear states discussed in Tempting Fate could have created more opportunities for challenging or resisting nuclear monopolies, especially early in the Cold War when missile and bomber capabilities were more limited. The United States was able to strike Hiroshima and Nagasaki with nuclear weapons delivered by B-29 bombers in 1945. Yet the airfields that those aircraft used fell into neglect shortly after World War II. The B-52 did not enter service until 1955 and many of the early nuclear-tipped missiles would only be deployed in the years after. Even contemporary observers wondered whether the United States could hit targets in mainland China with much precision, at least in the early 1950s. To his credit, Avey does acknowledge that a favorable nuclear balance may not necessarily translate to operational effectiveness.

Hence, looking at geographically contiguous rivals like Israel and Egypt is important because such technical constraints might be less potent as an alternative explanation. Still, I had questions with regards to Avey's case study on Israel's confrontation with Egypt. Avey writes that Egyptian leaders "believed that so long as they executed only limited campaigns, the benefits to Israel of using its nuclear weapons would be low." Thus, "[i]n 1973, Egypt launched a limited offensive that was more expansive than in 1969-1970." Avey admits that "while Egypt never planned to advance deep into the Sinai [Peninsula], Israel could not be expected to know that at the start of the hostilities." Egypt sought to use backchannels to convey its limited intentions, even though Egyptian President Anwar Sadat ultimately rejected Soviet appeals for a ceasefire. Avey's theory hinges on non-nuclear states having clear limited aims in such a conflict. In light of the unique geographical proximity that this case features, one wonders whether Israel understood that Egypt had only limited objectives when the October War (also known as the Yom Kippur War) began, not least because of the highly conflictual nature of Arab-Israeli relations at that time.

Whether Israel understood Egypt's limited aims is all the more important given that Israel had sought nuclear weapons in part because it believed its adversaries' aims were not limited. Israeli Defense Minister Moshe Dayan reportedly claimed that the surprise attack in October 1973 constituted the "end of the third temple," a reference to both the potential collapse of Israel and its nuclear weapons arsenal. In other words, if Dayan is to be taken seriously, Israeli decision-makers had trouble conceiving of a limited war that did not undermine Israel's vital interests and create existential risks. A limited territorial grab could presage more threatening advances into Israeli territory, or so they feared. Fortunately for Israel, it recovered quickly and launched a successful counterattack using its formidable conventional military strength. However, one can imagine the 1973 war ending differently: The example of the Korean War indicates that success on the battlefield can push belligerents to expand beyond their initial war aims or to cross the red lines of other states inadvertently. I wonder if the strategic logic that Avey neatly lays out truly explains Sadat's behavior.

The Nuclear Revolution

One question that looms large in Tempting Fate concerns the meaning of the nuclear revolution. Robert Jervis famously argued that nuclear-armed adversaries, once armed with second-strike capabilities, face powerful incentives to be cautious and to cooperate with one another. In recent

years, the notion that nuclear weapons have revolutionized international politics has come under major criticism: As some scholars have pointed out, states armed with second-strike nuclear capabilities still seem to engage in traditional power politics by building up their alliances, acquiring potentially destabilizing armaments, and being conflictual rather than cooperative on issues of global concern. Although I am admittedly partial to these criticisms, I still have the nagging feeling that something must have changed when nuclear weapons appeared. After all, how could international political life really have stayed the same after Hiroshima and Nagasaki?

Avey intimates a possible answer for this basic conundrum. As he writes, "a powerful NNWS [non-nuclear weapons state] must worry much more intently that nuclear weapons will be used in any war and thus is less likely to escalate a dispute." For its part, the nuclear state may choose not to use nuclear weapons because of various concerns about their military efficacy and the likely political ramifications. One wonders, therefore, whether this constitutes a distinct change in state behavior brought on by nuclear weapons. According to Jervis, having a mutual second-strike capability should induce caution among adversaries. Avey's analysis suggests that as states approach parity in the conventional military domain, they will likely exercise similar caution even if only one of them has nuclear weapons. Of course, power politics may still occur between these rivals — unequal though they may otherwise be — through other means. The implication of Avey's theory is that war might be more likely to break out if it were not for that nuclear monopoly. The absence of nuclear weapons could, for example, cause greater disagreements about the military balance, as Geoffrey Blainey has argued. Although Avey does discuss the nuclear revolution in the book's introductory chapter, there are more opportunities for deeper theorizing on the subject that are yet to be explored.

This is yet another sign that Avey has written a very good book. It gives inspiration for fresh theorizing and more empirical scholarship. Notwithstanding my questions about the nuclear revolution and the Israeli-Egyptian case study, Avey wisely hews close to the evidence and never overstates his arguments. Tempting Fate is a must-read for anyone interested in nuclear politics.

Alexander Lanoszka is assistant professor in the department of political science at the University of Waterloo and the Balsillie School of International Affairs. His research addresses alliance politics and military strategy, with a regional focus on Europe. His book, Atomic Assurance: The Alliance Politics of Nuclear Proliferation, was published by Cornell University Press in 2018.

https://warontherocks.com/2020/08/what-military-confrontations-could-mean-for-understanding-the-nuclear-revolution/

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Defense News (Washington, D.C.)

A Nuclear Sea-launched Cruise Missile Will Help Deter Nuclear Aggression

By Vic Mercado

Aug. 5, 2020

There is no higher security requirement than deterring a nuclear attack against the U.S. homeland or our allies and partners. Today, the United States is in the early stages of comprehensively modernizing the nuclear forces to protect the United States from such an attack. Redeveloping a nuclear sea-launched cruise missile, or SLCM-N, is a vital component of our modernization plan.

Since the end of the Cold War, the U.S. reduced the size of its nuclear stockpile by over 80 percent. This includes a more than 90 percent reduction in weapons carried by theater and tactical — or

"nonstrategic" — nuclear systems. The United States retired both the warheads and the systems that carried them, including the nuclear Tomahawk Land Attack Cruise Missile. The TLAM-N was deployed from 1983 to 1991 on surface ships and submarines before being retired in 2010. Unfortunately, Russia and China did not follow our example regarding this class of weapons, and are instead expanding their arsenals despite repeated U.S. overtures for negotiations.

Russia has approximately 2,000 "nonstrategic" nuclear weapons on a wide range of delivery platforms. These include nuclear armed torpedoes, depth charges, anti-ship missiles, anti-submarine missiles, gravity weapons, anti-aircraft missiles, ground-launched cruise missiles and short-range ballistic missiles. Russia has amassed this array of nuclear systems even though the comparable U.S. inventory only contains gravity weapons in quantities that are an order of magnitude less than Russia's. Russia's investment in and integration of these capabilities into its escalation doctrine and exercises raise the disturbing prospect that Russia perceives vulnerabilities in the current U.S. nuclear posture, exploitable by their "nonstrategic" nuclear arsenal during a crisis.

The SLCM-N is one of two supplemental capabilities recommended by the 2018 Nuclear Posture Review designed to address this risk. It accomplishes several goals. First, the SLCM-N demonstrates to adversaries that they cannot expect to conduct a limited nuclear attack without having to face the prospect of a U.S. nuclear response in kind or worse. The SLCM-N is not an attempt to match the size and diversity of the Russian nonstrategic nuclear arsenal. Rather, by providing the president with a wider range of credible response options, it strengthens deterrence of Russian nuclear use, however limited, in the first place.

Second, the SLCM-N assures allies in multiple theaters by providing or enhancing regional capabilities so important to our extended deterrence commitments. Importantly, the SLCM-N provides this assurance without exposing — or further exposing — allies to politically fraught basing decisions that potential adversaries will seek to exploit.

SLCM-N brings back significant advantages of TLAM-N to include the survivability of being deployed on either a covert, submerged platform, or spread out on several surface ships. Operating from highly survivable undersea platforms, SLCM-N will reinforce the credibility of tailored deterrent options in both Europe and East Asian contingencies. Sea-based systems can exploit an extensive operating area in which they will be difficult to find and destroy, preserving the ability to respond. In this way, SLCM-N will add to the flexibility and diversity of regional deterrence forces and provide an assured response capability in demanding operational environments.

Another timeless capability of SLCM-N is the gained advantage of having an in-theater, distributed surface fleet or submerged asset that provides the prompt response inherent in an ubiquitous system. SLCM-N provides the ability to strike a target quickly once the order to execute is received, removing time delays as a factor in a potential adversary's decision-making calculus for limited nuclear weapon employment.

Critics, including Russia, will inevitably label the decision to procure the SLCM-N as the start of an "arms race," but that charge is detached from reality. Rather than follow our lead and reduce the number and types of theater and tactical nuclear weapons, Russia is modernizing and expanding the full suite of its capabilities. The United States is looking to add a capability to fill a perceived gap in our deterrence posture.

The SLCM-N is a measured response to a growing threat and will be a crucial element to deterring the war that must never be fought. The deterrence effects it will provide are unique and essential to preventing adversarial nuclear attacks, which is the highest defense priority of the United States.

Vic Mercado is the assistant secretary of defense for strategy, plans and capabilities, and he is performing the duties of deputy undersecretary of defense for policy.

https://www.defensenews.com/opinion/commentary/2020/08/05/a-nuclear-sea-launched-cruise-missile-will-help-deter-nuclear-aggression/

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RAND (Santa Monica, Calif.)

In North Korea, The U.S. Could Take the Lead

By Bruce W. Bennett and Soo W. Kim

Aug. 17, 2020

In 2016 and 2017, North Korea carried out a series of nuclear weapons and ballistic missile test provocations that raised regional anxiety about the possibility of war. President Trump's "maximum pressure" campaign added to this anxiety. In early 2018, North Korean leader Kim Jong Un reduced this anxiety by offering to negotiate the dismantlement of his nuclear weapon program and promising to forgo all ballistic missile and nuclear weapon tests during the negotiation process.

President Trump has now had three meetings with Kim Jong Un, substantially reducing fears of war, but accomplishing no denuclearization. Indeed, quite the opposite: North Korea has reportedly ramped up its nuclear weapon production and has tested several dozen ballistic missiles. Most estimates suggest that North Korea now has dozens of nuclear weapons, many of which can be delivered by ballistic missiles, with the potential to kill millions of people and otherwise cause immense damage. North Korea also appears anxious to use leverage from its nuclear weapons to strengthen its regime and coerce its neighbors.

The complexity of the issues associated with North Korean denuclearization has limited its visibility in the midst of the coronavirus pandemic and the U.S. presidential election, but after November the elected President will need to face this threat. The lack of war might no longer be accepted as an adequate substitute for North Korean denuclearization.

What can a reelected Trump or a newly elected Biden do to overcome North Korea's resistance to meaningful negotiations? North Korea is hurting: its economy is stagnant and it is having trouble feeding even its elites because of the UN/U.S. sanctions designed to pressure North Korea toward denuclearization. A combined carrot and stick approach may help overcome some of North Korea's reluctance to negotiate the future of its nuclear weapons program.

In terms of carrots, the UN/U.S. could be more explicit about the conditional nature of the existing sanctions. For example, if North Korea were to freeze its nuclear weapons production, would North Korea be able to export a significant amount of coal and apparel to other countries? While the U.S. could negotiate such conditions with North Korea, it may be effective to simply announce what the United States is prepared to offer, recognizing that North Korea will still likely want to negotiate on the margin.…

The remainder of this commentary is available at nationalinterest.org.

Bruce Bennett is an adjunct defense analyst at the nonprofit, nonpartisan RAND Corporation and a professor at the Pardee RAND Graduate School. Soo Kim is a policy analyst at RAND.

This commentary originally appeared on The National Interest on August 17, 2020. Commentary gives RAND researchers a platform to convey insights based on their professional expertise and often on their peer-reviewed research and analysis.

https://www.rand.org/blog/2020/08/in-north-korea-the-us-could-take-the-lead.html

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European Leadership Network (London, U.K.)

Artificial Intelligence and Nuclear Weapons: Bringer of Hope or Harbinger of Doom?

By Jennifer Spindel

Aug. 17, 2020

In 2017, Russian President Vladimir Putin said whichever country leads in the development of artificial intelligence will be "the ruler of the world." Artificial intelligence is not unlike electricity: it is a general-purpose enabling technology with multiple applications. Russia hopes to develop an artificial intelligence capable of operations that approximate human brain function. China is working to become the world leader in AI by 2030, and the United States declared in 2019 that it would maintain its world leadership on artificial intelligence. Will the world's major powers seek to use AI with their nuclear weapons and command and control systems? Pairing nuclear weapons – arguably the previous ruler of the world – with this new technology could give states an even greater edge over potential competitors. But the marriage between nuclear weapons and artificial intelligence carries significant risks, risks that currently outweigh potential benefits. At best, using AI with nuclear weapons systems could increase time efficiencies. At worst, it could undermine the foundations of nuclear deterrence by changing leaders' incentives to use nuclear weapons.

Opportunities in data analysis and time efficiencies

Artificial intelligence could be a boon for drudgery type tasks such as data analysis. AI could monitor and interpret geospatial or sensor data, and flag changes or anomalies for human review. Applied to the nuclear realm, this use of AI could be used to track reactors, inventories, and nuclear materials movement, among other things. Human experts would thus be free to spend more of their time investigating change, rather than looking at data of the status quo.

Incorporating artificial intelligence into early warning systems could create time efficiencies in nuclear crises. Similar to the boon for data analysis, AI could improve the speed and quality of information processing, giving decision-makers more time to react. Time is the commodity in a nuclear crisis, since nuclear-armed missiles can often reach their target in as little as eight minutes. Widening the window of decision could be key in deescalating a nuclear crisis.

Challenges posed by risks, accidents, and nuclear deterrence

Incorporating artificial intelligence into nuclear systems presents a number of risks. AI systems need data, and lots of it, to learn and to update their world model. Google's AI brain simulator required 10 million images to teach itself to recognize cats. Data on scenarios involving nuclear weapons are, thankfully, not as bountiful as internet cat videos. However, much of the empirical record on nuclear weapons would teach an AI the wrong lesson. Consider the number of almost-launches and near-accidents that occurred during the Cold War; both U.S. and Soviet early warning systems mistakenly reported nuclear launches. Although simulated data could be used to train an AI, the stakes of getting it wrong in the nuclear realm are much higher than in other domains. It's also hard to teach an AI to feel the doubts and suspicions that human operators relied on to detect false alarms and to change their minds.

Accidents are also amplified in the nuclear realm. There are already examples of accidents involving automated conventional weapons systems: in March 2003, U.S. Patriot missile batteries shot down a British fighter plane and a U.S. fighter jet while operating in "automated mode," killing the crews

of both planes. Accidents are likely to increase as AI systems become more complex and harder for humans to understand or explain. Accidents like these, which carry high costs, decrease overall trust in automated and AI systems, and will increase fears about what will happen if nuclear weapons systems being to rely on AI.

Beyond accidents and risks, using AI in nuclear weapons systems poses challenges to the foundations of nuclear deterrence. Data collection and analysis conducted by AI systems could enable precision strikes to destroy key command, control, and communication assets for nuclear forces. This would be a significant shift from Cold War nuclear strategy, which avoided this type of counterforce targeting. If states' can target each other's nuclear weapons and command infrastructure, then second-strike capabilities will be at risk, ultimately jeopardizing mutually assured destruction. For example, AI could identify a nuclear submarine on patrol in the ocean, or could interfere with nuclear command and control, thus jeopardizing one, or more, legs of the nuclear triad. This creates pressure for leaders to use their nuclear weapons now, rather than risk losing them (or control over them) in the future.Even if states somehow agree not to use AI for counterforce purposes, the possibility that it could one day be used that way is destabilizing. States need a way to credibly signal how they will – and won't – use artificial intelligence in their nuclear systems.

The future of AI and nuclear stability

The opportunities and risks posed by the development of artificial intelligence is less about the technology and more about how we decide to make use of it. As the Stockholm International Peace Research Institute noted, "geopolitical tensions, lack of communication and inadequate signalling of intentions" all might matter more than AI technology during a crisis or conflict. Steps to manage and understand the risks and benefits posed by artificial intelligence should include confidence-building measures (CBMs) and stakeholder dialogue.

CBMs are crucial because they reduce mistrust and misunderstanding, and can help actors signal both their resolve and their restraint. As with conventional weapons, transparency about when and how a state plans to use artificial intelligence systems is one type of CBM. Lines of communication, which are particularly useful in crisis environments, are another type that should be explored.

Continued dialogue with stakeholders including governments, corporations, and civil society will be key to developing and spreading norms about the uses of artificial intelligence. Existing workshops and dialogues about the militarization of artificial intelligence, and artificial intelligence and international security show that such dialogues are possible and productive. The international community can consider building on existing cooperative efforts concerning cyberspace, such as the U.N.'s work on norms and behaviour in cyberspace, the Cybersecurity Tech Accords, and Microsoft, Hewlett, and Mastercard's CyberPeace Institute. This dialogue will help us understand the scope of potential change and should give us incentives to move slowly and to push for greater transparency to reduce misperception and misunderstanding.

The opinions articulated above represent the views of the author(s) and do not necessarily reflect the position of the European Leadership Network or any of its members. The ELN's aim is to encourage debates that will help develop Europe's capacity to address the pressing foreign, defence, and security policy challenges of our time.

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Cyber Doctrines and the Risk of Nuclear Crisis Instability. Part 1: Issues with U.S. Cyber Strategy

By Corbin Stevens

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Corbin Stevens is an intern in the Council on Foreign Relations Digital and Cyberspace Policy program and a graduate student at Princeton University's School of Public and International Affairs.

An increasing collection of research asserts that cyber operations could cause nuclear crisis instability by creating pressure on leaders to use nuclear weapons preemptively. State actors have developed cyber capabilities conceivably sophisticated enough to allow them to compromise the digital components of a country's nuclear weapon infrastructure, such as early-warning satellites, nuclear command, control, and communication (NC3) systems, and even possibly the delivery systems themselves. The findings of this research suggest that due to the secretive nature of cyber operations and the wide array of vulnerable targets, decision-makers have a justified fear that their nuclear deterrent could be compromised by a cyberattack at a moment's notice and, in a crisis situation, feel pressure to use nuclear weapons before they could be affected.

Two pathways have been identified for dealing with this escalatory risk: creating cyber norms limiting the targeting of nuclear systems and for states to demonstrate unilateral restraint when conducting cyber operations. However, current cyber doctrines by nuclear-armed states fail to acknowledge the risk of nuclear crisis instability and even actively undermine these two pathways toward strategic stability.

Looking at the United States' National Cyber Strategy [PDF], the main area of concern is the increasing lack of distinguishability between offensive and defensive cyber operations. On the offensive side, the Department of Defense's (DOD) cyber strategy [PDF] calls for "conducting cyberspace operations that enhance U.S military advantages" and has been pointedly silent about whether it would target nuclear systems as part of this mandate. On the defensive end, DOD and Cyber Command, acknowledging the difficulty of cyber deterrence, have recently adopted the doctrine of persistent engagement [PDF], which aims to enforce cyber norms through continuous cyber operations against adversary states to prevent cyberattacks from reaching U.S. networks. While much has been written about how many of these "defending forward" operations comply with and reinforce some of the explicit norms recognized by multilateral bodies, less has been said on how an adversary state is supposed to distinguish between these defensive operations and offensive ones. From a technical and normative standpoint, all a state sees is the United States conducting more cyber operations against its networks.

This behavior could fuel nuclear crisis instability due to the growing problem of nuclear entanglement, where a state's nuclear and conventional military forces are comingled, share components, or are considered dual-use in their functionality. For example, a state's NC3 systems would be entangled if they also directed non-nuclear military assets. Given that dual-use networks are not clearly delineated, even if Cyber Command was conducting defensive cyber operations, it could easily end up on dual-use networks. The adversary state, unable to distinguish this from an offensive operation, might interpret this as an attempt to undermine its nuclear deterrent and thus conclude that its nuclear weapons would be vulnerable in a crisis situation. With the United States placing a greater emphasis on continuous cyber operations, there is a higher likelihood of these sorts of incidents occurring and subsequently deteriorating perceptions of strategic stability.

The second main issue is that U.S. cyber strategy has apparently recently seen a reduction in civilian oversight, undermining efforts to demonstrate unilateral restraint. National Security Presidential

Memorandum-13 (NSPM-13), which codified persistent engagement, removed the Obama administration-era requirement for presidential approval for cyber operations. Despite being passed in late 2018, NSPM-13 was only made available to Congress in March 2020 after months of demands from lawmakers. Additionally, recent reporting indicates that President Trump issued a secret presidential finding in 2018 allowing the Central Intelligence Agency to engage in forms of covert cyber action without White House approval.

With the approval process for cyber operations increasingly delegated to government agencies and congressional access to the interagency process limited, senior U.S. civilian leadership cannot be sure what their country's cyber operations are targeting at a given moment. Consequently, even with the best intentions, they are unable to ensure that U.S. cyber operations do not lead to inadvertent escalation or fuel nuclear crisis instability. Further, they are unable to demonstrate to other states' leadership that they will have adequate control over the United States' cyber operations during a crisis situation.

It is important to acknowledge that the shift to more proactive cyber operations has addressed valid national security concerns and allowed the United States to better combat cyber threats. Still, despite these defensive gains, the U.S. government needs to address the risk of crisis instability caused by cyber operations and begin to incorporate adequate risk management into the interagency process. However, it is unlikely that such a policy change will gain traction until similar efforts are taken by the United States' main nuclear-armed adversaries, Russia and China. This poses a much more difficult situation that will be discussed in Part 2.

https://www.cfr.org/blog/cyber-doctrines-and-risk-nuclear-crisis-instability-part-1-issues-us-cyber-strategy

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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."