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## Feature Research

***“Inducements in Interstate Relations”***. By Paige Cone and Rupal N. Mehta. Published by Oxford Research; Nov. 2019

<https://oxfordre.com/politics/view/10.1093/acrefore/9780190228637.001.0001/acrefore-9780190228637-e-1730?rskey=5Hh67o>

The literature on inducements directly impacts ongoing policy debates, which in turn ultimately highlights the need for more research on nuclear-specific inducements. This article offers the first in-depth, systematic analysis of these inducement options, starting with their general use and then focusing specifically on inducements in the nuclear proliferation arena.

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A third answer might be that, from the British perspective, there is nothing to deter. If a large-scale war caused by Russian aggression is inconceivable, then deterrence and retaliation are irrelevant.

# NUCLEAR WEAPONS

Seapower Magazine (Arlington, Va.)

## **Undersecretary Affirms Need for Low-Yield Nuclear Weapons to Counter Russian, Chinese Arsenals**

By Otto Kreisher

Dec. 4, 2019

A senior defense official reaffirmed the importance of the nuclear deterrent triad and the need for new sea-based, low-yield nuclear weapons to counter increased nuclear arsenals by Russia and China and Russia's professed doctrine of early use of low-yield weapons to prevent a U.S. nuclear response.

Undersecretary of Defense for Policy John Rood noted the findings by last year's Nuclear Posture Review (NPR) that "the United States was reducing our reliance on nuclear weapons, reducing the size of our nuclear stockpile, while at the same time Russia and China are moving in the opposition direction, increasing their reliance on nuclear weapons ... and increasing the numbers and types of nuclear weapons."

While the NPR endorsed the need to recapitalize the existing nuclear triad of land-based Minuteman III and submarine-launched Trident D-5 ballistic missiles and nuclear-capable U.S. Air Force bombers, it also "recommended pursue of some complementary capabilities," Rood told a Defense Writers' breakfast Dec. 4. President Trump then supported development of "a sea-launched cruise missile and a submarine-launched ballistic missile" with low-yield nuclear capability, he added.

"The ballistic missile is more advanced, utilizing the existing submarine-launched ballistic missile, the D-5, with a modified warhead for low yield. That program, we think, is going well. But for the [ship-launched] cruise missile, we are not as advanced," and were still going through an analysis of alternatives, Rood said.

Rood said the need for the new low-yield weapons came from intelligence reports of Russian emphasis on use of nuclear weapons earlier in a conflict, "and the mistaken belief that they have the ability to use a low-yield nuclear weapon earlier in the conflict in a way to deter response." He cited Russian President Vladimir Putin's public statements advocating the early use of low-yield nuclear weapons "as a way of deterring an adversary."

"We saw the need of aggressive action to restore deterrence, which had gotten weaker than we would like ... with these supplemental capabilities" that would show "we had a variety of capabilities that were more survivable than the existing low-yield weapons" that are aircraft delivered. "We see this as very stabilizing" and in no way supporting the concept of early use of low-yield nuclear weapons, Rood said, countering the warnings from arms-control advocates.

Rood also supported the administration's withdrawal from the Intermediate-Range Nuclear Missile Treaty because Russia fielded land-based missiles with a range beyond the INF limits, and the subsequent U.S. work to develop similar weapons. He said there has been some testing of a possible medium-range cruise missile but none for a ballistic missile. He avoided answering a question about whether any European ally has indicated willingness to host such a weapon by saying there had been no decision yet on developing any specific system.

And he restated the administration's adamant position that Turkey's possession of the Russian-built S-400 air- and missile-defense system "could never be compatible" with NATO, but added that Turkey remains an ally and member of the alliance. He did not answer a question of what Turkey could do to regain access to the F-35 program, for which it had been a component producer and intended buyer.

<https://seapowermagazine.org/undersecretary-affirms-need-for-low-yield-nuclear-weapons-to-counter-russian-chinese-arsenals/>

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National Defense (Arlington, Va.)

## **Plans for Low-Yield Sea-Launched Nukes Moving Forward**

By Yasmin Tadjdeh

Dec. 4, 2019

Plans to acquire sea-launched cruise missiles and submarine-launched ballistic missiles armed with low-yield nuclear weapons are moving forward, said the undersecretary of defense for policy Dec. 4.

The controversial weapons — which many Democrats oppose — were called for in the Trump administration's Nuclear Posture Review that was released in February 2018.

As part of the review, the administration said there needs to be an increased focus on refurbishing the nation's nuclear triad, which is made up of land-based intercontinental ballistic missiles, long-range bombers and ballistic missile submarines.

In addition, there is also a need for supplementary capabilities, said John Rood during a breakfast meeting with reporters in Washington, D.C. These include sea-launched cruise missiles and submarine-launched ballistic missiles both armed with low-yield nuclear weapons.

The ballistic missile effort — which utilizes an existing submarine-launched ballistic missile, the D5, and would feature an existing warhead that is modified to be low-yield — is "going well," he noted.

As for "the submarine-launched cruise missile, we are not as advanced in the development of that," Rood said. "That's still going through an analysis of alternatives and other work."

The United States has had low-yield nuclear weapons in its arsenal for decades, but those systems have been air-delivered, he noted.

However, based on threats from great power competitors such as Russia and China, there is a need for more delivery options, Rood said.

The United States and countries like Russia and China have been moving in opposite directions, he said. "The United States [has been] reducing our reliance on nuclear weapons, reducing the size of our nuclear stockpile."

At the same time, both Moscow and Beijing have been increasing their reliance on nuclear weapons, the number of systems, and the types of weapons and delivery vehicles as well, he added.

"The whole point of having a robust, capable nuclear arsenal is to deter behavior by others and aggressive action," Rood said. "In order to restore deterrence where we thought it might be becoming weaker than we like, we have asked for these supplementary capabilities in order to send

a signal that we have a variety of means that are more survivable than the existing low-yield nuclear weapons aboard aircraft," he said.

That would result in an ability across the spectrum of potential conflict to deter and, if necessary, respond to nuclear use against the United States or its allies, he added.

Critics of the weapons have said that the systems are too expensive, but Rood quoted former Secretary of Defense Jim Mattis who said, "the nation can afford survival."

"Nuclear deterrence is critical to our future and being able to defend against and deter potential adversaries," he added.

Meanwhile, Rood also discussed Turkey's removal from the F-35 joint strike fighter program, noting that there is a path forward for its re-entrance should Ankara forgo the Russian-made S-400 surface-to-air missile defense system, which it received over the summer.

"We've been very clear about our concerns about Turkey continuing to proceed with the S-400 integration in their forces," he said. "Of course, these are sovereign decisions and we respect the ability of the Turkish government to make sovereign decisions about its future. Nonetheless, those sovereign decisions have consequences and we are very concerned about the continued pursuit of that."

There have been many conversations between President Donald Trump, members of Congress and senior NATO leaders with Turkish President Recep Tayyip Erdoğan, he noted.

"We haven't given up on the issue and it's something that we remain engaged with the Turks, with the aim of persuading them to pursue another path," he said.

"There's an old proverb, 'No matter how far you've gone down a wrong road, it's never too late to turn back.'" To that end, the United States is continuing to work with Ankara in hopes of a positive outcome, he said.

<https://www.nationaldefensemagazine.org/articles/2019/12/4/plans-for-low-yield-sea-launched-nukes-moving-forward>

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Air Force Magazine (Arlington, Va.)

## **Air Force Global Strike Command Eyes Changes in Second Decade**

By Rachel S. Cohen

Nov. 27, 2019

Air Force Global Strike Command's second decade in business will be a busy one.

Created in 2009 as Strategic Air Command's post-Cold War replacement, Global Strike oversees the bulk of the Pentagon's nuclear weapons and provides bomber aircraft for combat operations and deterrence flights around the world.

More than 70 years since a nuclear weapon was last used, and three decades after the Cold War ended, Global Strike is making changes to take on a new era of deterrence—one that spans not just nuclear assets but faster weapons and growing space, cyber, and electromagnetic spectrum concerns as well.

In a recent interview with Air Force Magazine, Global Strike Commander Gen. Timothy Ray discussed what the command is trying as it heads into the 2020s, facing a world in which Russia is not the standalone strategic concern for the US.

The command on Oct. 18 announced it had created a new, classified strategic plan to position itself for the coming decades, calling it the “largest redirection in the command’s 10-year history.”

“The need for a clear way ahead is more prevalent now than ever with the rising tensions between Russia, China, North Korea, Iran and transnational violent extremism, and the increase in our adversaries’ nuclear capabilities and innovations,” AFGSC said in a release. “This plan directly aligns command forces more closely with the 2018 National Defense Strategy.”

Among the roadmap’s nine overall goals is an effort to grow the services Global Strike can offer US Strategic Command, which oversees daily operations of nuclear forces, as its air component.

“I want to have the operational concepts and how we present the forces redone in the next six to nine months,” Ray said.

Global Strike and STRATCOM practiced what that might look like during Exercise Global Thunder earlier this fall, trying approaches that “have not been done since the Cold War ended” and—in some cases—offer more capability than the military had at that time, Ray said.

Global Thunder is an annual exercise where the US and allied nations like Australia, Canada, and the United Kingdom train for conflict scenarios involving nuclear forces.

“We don’t have sanctuary in the United States based on lots of different threats,” Ray said. “We start thinking about hypersonics, cruise missiles, ballistic missiles, submarines, space, and cyber, all those things will be a dimension of this. How do we operate with those particular challenges working against us? That’s probably been more relevant than we’ve done in a very long time.”

He added that the exercise incorporated newer aspects like space, cyber, and electronic warfare “probably more correctly,” but said the details are classified.

Global Strike is considering changes to how it supports STRATCOM as it prepares to bring on the B-21 bomber, Ground-Based Strategic Deterrent missiles, the Long-Range Standoff Weapon, refurbished B61 bombs, the MH-139 helicopter, and modern command-and-control technologies and aircraft in the next few decades. The command wants all those new assets to come together seamlessly so it can properly partner with STRATCOM.

Holistically thinking about that portfolio now “drives how we operate on a day-to-day basis, our command and control on a daily basis, and how the wings report and how they manage their alert force,” Ray said. “A few small changes for how we’re managing the schedule has given tremendous stability to the maintenance and security and operations teams.”

He acknowledged that the service can’t grow its bomber squadrons to the extent envisioned in the “Air Force We Need” plan. Even though the command is working through implementing its bomber roadmap now—with plans to retire the B-1 and B-2 so the B-52 can fly for 100 years alongside the new B-21—Ray said it’s imperative to think about the fleet in new ways, not just in numbers.

A recent report by the nonprofit research organization RAND Corp. argued that to successfully modernize its enterprise while facing financial and technological challenges, Global Strike needs to craft master plans for the transition between old and new missiles and bombers and to draw on the experience of older USAF groups like Air Combat Command.

“Nuclear-specific tasks related to testing and certification have not been performed at scale for many decades and will need to be relearned and revised for the current conditions,” the report said. “The sheer scale of the programs is daunting. And this ambitious set of programs will be fielded by

[AFGSC], a relatively young command with a relatively small staff that has limited experience in fielding new systems.”

A workforce of about 34,000 people manages the nuclear enterprise, though that number will never be as big as the Air Force wants, Ray said. For a more productive and efficient staff, Global Strike is creating cross-functional teams that will focus on broad issues like modernization, sustainment, and human capital.

“Instead of it being a platform-by-platform discussion, talk about how we drive through this with enterprise partners and ... be able to help ourselves across the board,” Ray said. Building combat readiness isn’t about making the flightline work harder, he said: “This is about moving the big levers of the enterprise.”

For example, Global Strike said a team of people from across the command, Defense Department, and federal government were able to drive down the cost of new weapons generation facilities that support bomber maintenance, training, and storage. The price of a B-52 facility dropped from \$750 million to \$229 million, and a B-21 facility fell from \$580 million to \$199 million, according to command spokeswoman Linda Frost.

“These facilities will be the backbone for the generation of Air Force combat lethality,” Frost said. “Modernized designs improve safety, security, and capability and meet the requirements for current and future weapons. Our goal is to have five bomber WGFs and with the reduction of costs, it allows for the right weapons generation footprint.”

Global Strike also hopes for a better future for its missileers and bomber crews. Its first decade was marred by a major operations test cheating scandal, periodic reports of drug use, and even several lost weapons.

Now, the Air Force is beefing up its nuclear education and leadership development, charting missileer career paths for Reservists, and trying to be mindful of operations stress, the need for a sense of purpose, and other health concerns. As the service tries to cut its suicide rate, Ray noted his command can draw on the knowledge of a nearby Department of Veterans Affairs hospital in Louisiana.

“This plan encourages Strikers to know their part of the mission and execute it with the knowledge that their leaders, through the four-star level, has their back,” CMSgt. Charles Hoffman, Global Strike’s command chief, said in the release.

<http://www.airforcemag.com/Features/Pages/2019/November%202019/Air-Force-Global-Strike-Command-Eyes-Changes-in-Second-Decade.aspx>

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# US COUNTER-WMD

Breaking Defense (Washington, D.C.)

## **Killing Cruise Missiles: Pentagon to Test Rival Lasers**

By Sydney J. Freedberg Jr.

Dec. 2, 2019

PENTAGON: The Army, Air Force, and Navy may be only three years away from a 300-kilowatt laser weapon, one powerful enough to shoot down cruise missiles — using the same basic technology as the checkout counter at your local supermarket.

“We are in the process of negotiating contracts with three different performers for three different electrically powered laser concepts,” Thomas Karr, who works for Pentagon R&D chief Mike Griffin as assistant director for directed energy, said. (DE includes both lasers and high-powered microwaves). These will be demonstration models for testing, not prototypes of operational weapons, he emphasized in an interview with Breaking Defense.

Industry has proposed several designs that “have all been demonstrated at lower power levels, 50 to 150 kilowatts,” Karr said. Those power levels are enough to burn through drones and rockets, but not larger, faster and tougher targets like cruise missiles.

“We want to have a 300-kilowatt laser by 2022. We’d like to get up to 500 kilowatts by 2024,” he said, “and then, if we still haven’t hit the limit of anything, it’s on to the megawatt class.

From Tanks of Chemicals to Commercial & Competitive

“Those are aggressive objectives,” Karr acknowledged, “[but] we have high confidence that one or more of these different fiber or slab approaches will scale up to 300 or beyond. I don’t think we’ve seen the limit yet.”

The Pentagon actually flew and test-fired a one-megawatt Airborne Laser in 2009-2011, but that system required a 747 full of toxic chemicals, hardly practical in a war zone, not to mention a very easy target. By contrast, today’s designs build on widely available and rapidly advancing commercial technologies.

“The electrically-driven lasers we’re scaling up exploit a lot of commercial technology,” Karr told me. “They’re all pumped by semi-conductor diodes, which is a multi-billion dollar industry. It’s not just off-the-shelf. It’s not the semiconductor laser that’s in your supermarket scanner, but we’re building off that huge investment in commercial industry.”

Two of the three demonstrators Karr plans to build use bundles of fiber-optic cables – like the ones probably connecting your computer to the internet as you read this – to channel beams of coherent light, which are then combined into a single powerful blast. “There’s a large commercial industry in these fiber lasers for cutting, welding, material processing,” Karr said, “and they’re up to kilowatts and very good in quality.”

The third demonstrator will use small lasers to “pump” energy into slabs of specially formulated material that amplify their power. “Again, that’s been scaled up to the point where we think we’re ready to go,” Karr said. “We believe we can add additional amplifier stages and each amplifier adds more power [and can] still maintain the beam quality.”

Karr made clear he doesn’t need all three designs to work. In fact, the project might survive all three failing, because he’s put out another request for proposals for designs in the 300-500 kW range.

“We have three good proposals to start with,” he said, “[but] we think we will add additional contractors in the future.

“It’s mostly a bunch of backward-looking colonels at DoD” causing the problems, said one industry source, “not the IC.”

“We have enough money to fund multiple competing technical concepts, as well as multiple performers,” Karr said. (The effort’s 2019 budget was \$70 million; the 2020 budget remains in limbo). “The POM [five-year Program Objective Memorandum] number is adequate to carry multiple contractors over the finish line to 300 [kW] level.”

“When we do reviews, every performer will see, on the key performance metrics, where they rank compared to their competitors,” Karr said, although no competitor will get to see details of its rivals’ performance. “You’re in the green zone or you’re in the red zone.... It will stimulate competition.

“Most of my career has been in the private industry, more in private industry than in government. I love competition,” he said. “I like the fact that we have lots of competition in this program.”

### Joint Coherence

While Karr is encouraging industry to compete, he’s also getting the armed services to cooperate. “In the past, every service that wanted to scale up a laser, it picked the laser and it invested to try to scale that up,” he said. “Now... we have for the first time a unified laser scaling program that’s led by OSD [the Office of the Secretary of Defense] with the concurrence and participation of all the services.

“I think it’s much more efficient,” he said. “Maybe it’s not one size fits all. Maybe there’s two or three sizes, but there’s a limited number of government-controlled interfaces... common standards that all of the services could agree to,” governing such things as how to couple the laser to its external power source and cooling.

“One of the things that OSD wants the whole community to move towards is a more open architecture for all these systems, so that there are interchangeable or at least similar major subsystems, instead of everything being custom designed,” Karr told me.

### Concept drawing for a laser-armed AC-130 gunship

There are definitely opportunities for the services to share, he said. “They face a lot of similar challenges,” he said, “so there’s a lot of exchange of information between Army, Navy, Air Force, and DARPA or SOCOM [Special Operations Command].”

“One of the nice things about sitting in OSD is I can look down the stovepipes to all the services and see there’s a lot in common,” Karr said, “particularly in beam control” – the difficult science of getting the laser beam from the weapon to the target without losing power or focus. “There’s room for a joint beam control experiment [that] everybody can spin off.”

At the same time, there are definite differences between putting a laser on an airplane – as the Air Force and SOCOM plan to do – versus a ship or a vehicle.

“The airflow over these systems introduces some special challenges that the Air Force Research Lab is moving on,” he said. “The absorption of the beam in the maritime environment” – with lots of humidity and salt – “is different than you would have in a land environment.

“Size, weight, and power efficiency requirements are most stressing for the airborne cases,” he summed up. “It’s somewhat easier on land vehicles and on ships, but it still is not a trivial issue.

But the military's existing aircraft, ships, and vehicles were never designed to carry weapons that suck up hundreds of kilowatts of power in seconds and emit much of that as heat. "We'll learn how to manage that," he said, but it will require a customized solution for each ship, plane, and ground vehicle.

Military lasers have made major advances since the Navy field-tested its Laser Weapon System (LaWS) aboard a ship in the Persian Gulf five years ago. The 30-kilowatt LaWS was basically six commercial lasers bolted together, their six separate beams converging on one spot. Today's lasers are still built of multiple modules, but they combine the beams from those modules into a single coherent laser, and their overall power is much higher.

"We have laser technology getting onto platforms in the 50-60 kilowatt class," Karr said, such as the Navy's HELIOS, the first laser fully integrated into a warship's combat systems. "Those are adequate for engaging small boats, small UAVs [drones], bringing those down or blinding the sensors."

Then, in cutting edge experiments, he went on, "we have electrically powered lasers in the 150-kilowatt class. One has just been lifted onto a ship in San Diego harbor[:] the Laser Weapon System Demonstrator.

"The next level of targets is harder, faster things like cruise missiles," Karr continued. "They move a lot faster, you have to engage farther away. So you need, we believe, a 300kw class [laser] – that's sort of a consensus across the services... to start doing those harder, longer range missions."

"That's why everybody agreed, let's try for 300 kW in 22," he said.

"There will be some challenges to cleverly handle all of this additional power," Karr acknowledged. "You've got more heat, you've got more thermal loading, [and] typically the way people deal with that is that they'll make stuff bigger. We don't want to grow the size and mass of things arbitrarily. We want to keep things small and compact as possible."

As OSD and the services strive to scale up electrical lasers, will they hit a point of diminishing returns, beyond which further power increases are unaffordable or impractical? At some point. But Karr thinks he get to viable missile defense lasers first.

"If I look back over multiple decades, [across] many different concepts – starting with CO2 Laser, CO lasers, chemical lasers, free-electron lasers, chemical oxygen-iodine," Karr said, "every one of those... at some point we hit a level where problems were very, very challenging."

"I don't know where that will be with electrical lasers," Karr said. "We haven't hit that yet."

[https://breakingdefense.com/2019/12/exclusive-three-ways-to-kill-cruise-missiles-pentagon-to-test-rival-lasers/?\\_ga=2.187095531.2130413408.1575406858-1762416622.1574686886](https://breakingdefense.com/2019/12/exclusive-three-ways-to-kill-cruise-missiles-pentagon-to-test-rival-lasers/?_ga=2.187095531.2130413408.1575406858-1762416622.1574686886)

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Global Biodefense (Seattle, Wash.)

## **Threat Detection in Your Pocket**

By Global Biodefense

Nov. 25, 2019

Size, weight and power – when it comes to chemical and biological detection in the field, keeping these requirements to a minimum can make a very big difference.

With individual detection instruments adding up to ten pounds or more to a Soldier's already full pack, U.S. Army Combat Capabilities Development Command Chemical Biological Center scientists

Jennifer Sekowski, Ph.D., and Kelley Betts wanted to know if there might be a better way. Could something small, lightweight, power-free and inexpensive perform as well as traditional detection equipment, but also be small enough to fit in a Soldier's pocket?

The idea for the Pocket Detection Pouch (PDP) came about when Betts, a scientist with a spouse serving in the Army, began to question why so many biological detection technologies require tubes or cassettes to operate. With the average Soldier carrying at least 60 pounds of equipment, Betts understood that every ounce added to a Soldier's gear matters, and wondered – was there a way to put a combination of both chemical and biological detection technologies into something lightweight and cheap, like a plastic bag?

"I questioned the traditional paradigm that threat agents can only be analyzed using a test tube or cassette," said Betts. "I wondered if we could test using something different, like perhaps a pouch.

To make it work, the pouch had to be designed with a one-way flow so that a single liquid sample could be squeezed into individual compartments, each containing a unique detection test. Also, because the device was designed to require no power to operate, any test results would have to be colorimetric and readable by eye. After a lot of trial and error, an assortment of heat sealers and plastic bags, and a very messy kitchen, a prototype for the Pocket Detection Pouch was born.

The idea for the pouch was further developed when Sekowski proposed the technology to the Chemical Biological Center IDEAS Program, where she was awarded \$65,000 and six months to develop the technology to simultaneously test for the presence of synthetic opioids and chemical agent by using lateral flow immunoassays as well as M8 and pH paper-based assays.

Short for Innovative Development of Employee Advanced Solutions, the IDEAS program was started in 2012 to award seed money to Center researchers with promising ideas. Under this program, Sekowski, Betts, and colleague Dan Angelini, Ph.D., who is experienced in sample collection, further refined the Pocket Detection Pouch's design to be about the size of a credit card when folded and also included a variety of sampling devices that could be tailored to different user requirements. They also made the outer layer of the pouch out of a thicker plastic bag material to provide a better level of containment.

The PDP is made to easily fit inside a Soldier's pocket, and at less than half an ounce, is so lightweight it can be carried anywhere without adding to a Soldier's already heavy load. To use the device, a sample of suspected material is placed inside the primary compartment where water or a buffer is added. The liquid is then squeezed down into the individual testing lanes containing the individual colorimetric tests.

After about 10 minutes, if a color change occurs, the yes/no results are compared to a key card included in the pouch and the Soldier can immediately alert his or her commander whether more determinative sensors need to be brought to bear. The PDP is designed to provide presumptive identification of agents in the field, but is also designed to store a sample for any needed follow-on testing.

Under the 2019 IDEAS program, the PDP was successfully shown to detect the presence of synthetic opioids and chemical agent, but Sekowski and Betts don't want to stop there. They hope to adapt commercial DNA-based biological detection, as well as existing up-and-coming paper-based explosives, chemical, and radiological detection methods into the PDP to provide what they refer to as "the full CBRNe" in one shot.

Sekowski and Betts would also like to develop the PDP for wide area surface sampling by connecting the PDP with the Mano, a one-handed wide area environmental surface sample collection device developed at the Center. The Mano was designed to simplify sampling while wearing mission oriented protective posture (MOPP) gear in hazardous environments. By attaching

the PDP to the Mano, immediate testing of samples in the field could be performed to help soldiers and their commanders make immediate operational decisions, as well as allow for follow-on testing of those samples back in the laboratory.

The PDP was championed by Sgt. 1st Class Robert Olson, the Center's technical noncommissioned officer. "It is imperative that the warfighter is included in the beginning idea stage," said Olson. "Doing so allows researchers to learn directly from the warfighter how their idea can improve the overall performance of the Soldier's mission."

Additionally, Carrie Poore, Ph.D., the Center's Advanced CBRNE Training Branch chief, was able to get the pouch into the hands of National Guard Soldiers taking courses offered by her branch. The Soldiers provided valuable constructive feedback to help refine the PDP's practicality and design. For example, they suggested adding a strip of tape to both sides of the sample holding compartment at the top of the bag so that someone in the field wearing protective gear could collect the sample using heavily gloved hands.

Olson also supported the PDP's participation in DTRA's FY19 Chemical/Biological Operational Analysis (CBOA) Technology Concept Feedback Tent where it received positive and constructive feedback by participating warfighters.

Adapted from original by the U.S. Army Combat Capabilities Development Command Chemical Biological Center.

<https://globalbiodefense.com/2019/11/25/threat-detection-in-your-pocket/>

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## US ARMS CONTROL

BBC (London, U.K.)

### **Iran Developing Nuclear-Capable Missiles, European Powers Warn UN**

By BBC

Dec. 5, 2019

A letter sent by the UK, France and Germany says Iran tested a Shahab-3 missile variant "equipped with a manoeuvrable re-entry vehicle" that could deliver a nuclear weapon.

Such activity is "inconsistent" with a resolution endorsing the 2015 Iran nuclear deal, it argues.

Iran has denied the allegation.

Foreign Minister Mohammad Javad Zarif said the letter was a "desperate falsehood" put out by the European powers "to cover up their miserable incompetence in fulfilling bare minimum" of their obligations under the nuclear deal.

Security Council Resolution 2231 "calls upon" Iran not to "undertake any activity related to ballistic missiles designed to be capable of delivering nuclear weapons, including launches using such ballistic missile technology".

Iran has insisted that its nuclear programme is entirely peaceful and denied that its ballistic missile programme violates the resolution.

But the European letter says that video footage of a test posted on social media on 22 April showed the use of a Shahab-3 booster that was "a Missile Technology Control Regime Category-1 system", according to the Associated Press.

As such, it was "technically capable of delivering a nuclear weapon".

The Missile Technology Control Regime, which was established to address nuclear proliferation, says Category 1 systems are capable of delivering a payload weighing at least 500kg (1102lbs) a distance of at least 300km (186 miles).

AP said the letter also listed three other examples of Iranian activities that the UK, France and Germany considered to be "inconsistent" with resolution 2231:

- The launch of a ballistic missile, reportedly a Shahab-3, on 24 July
- The launch on 2 August of a Borkan-3 liquid-propelled medium-range ballistic missile by Houthi rebels in Yemen, whom Iran has been accused of arming
- The unsuccessful launch of a Safir satellite launch vehicle on 29 August

Israel's Foreign Minister Israel Katz welcomed the letter, and instructed Israeli diplomats to present a "complete list of Iranian violations of the nuclear agreement" at a Security Council meeting on 19 December that is expected to discuss Iran.

Iran has breached a number of commitments under the deal in recent months in response to US President Donald Trump's decision last year to abandon the deal and reinstate economic sanctions.

Mr Trump wants to force Iran to negotiate a new agreement that would place indefinite curbs on its nuclear programme and also halt its development of ballistic missiles. Iran has refused to negotiate unless the US first lifts its sanctions.

The five other parties to the deal - the UK, France, Germany, China and Russia - have tried to keep it alive. But the sanctions have caused Iran's oil exports to collapse, the value of its currency to plummet and the inflation rate to soar.

In a separate development, US officials said a US Navy warship deployed in the Gulf of Oman had seized advanced missile parts believed to be headed from Iran to Yemen. The parts were on board a small boat stopped last week, they said.

The US defence department also denied a report in the Wall Street Journal that it was considering sending dozens more warships, other military hardware, and as many as 14,000 additional troops to the Middle East to counter Iran.

<https://www.bbc.com/news/world-middle-east-50671003>

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The Hill (Washington, D.C.)

## **North Korea: US Will Choose What 'Christmas Gift' It Wants**

By Jessica Campisi

Dec. 3, 2019

North Korea said on Tuesday that it's up to the U.S. to choose what "Christmas gift" it wants from Pyongyang as an end-of-year deadline for nuclear talks inches closer.

Ri Thae Song, a North Korean vice foreign minister handling U.S. affairs, emphasized in a statement that the Trump administration is running out of time to salvage the talks and offer a deal that the two can agree on, The Associated Press reports.

"The dialogue touted by the U.S. is, in essence, nothing but a foolish trick hatched to keep the DPRK bound to dialogue and use it in favor of the political situation and election in the U.S.," Ri said in comments reported by state media, using the acronym for North Korea's official name. "What is left to be done now is the U.S. option and it is entirely up to the U.S. what Christmas gift it will select to get."

Ri added that North Korea has no intention of resuming talks unless it gets something significant in return, the AP reports.

In April, North Korean leader Kim Jong Un set a deadline for the end of the year to reach a denuclearization deal with the U.S. But negotiations have stalled for months, spurring further increased tensions in its relationships with both South Korea and the United States.

Negotiations for a denuclearization deal first crumbled in February after the U.S. refused to lift sanctions for North Korea to partially relinquish its nuclear weapons. Talks also deteriorated last month after North Korea called the U.S. proposals for negotiations "sickening."

North Korea said last month that the U.S. had offered to resume talks in December, but it is unclear if Pyongyang will accept the proposal to continue negotiations.

Read more from The Hill:

Trump resurrects 'Rocket Man' nickname for North Korean leader

<https://thehill.com/policy/international/472736-north-korea-us-will-choose-what-christmas-gift-it-wants>

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Defense News (Washington, D.C.)

## **Trump Upbeat on Nuclear Talks with Russia and China, but Lawmakers Warn of 'Blow Up'**

By Joe Gould

Dec. 4, 2019

WASHINGTON — U.S. President Donald Trump was optimistic on Tuesday about notional negotiations with Russia and China on a new nuclear weapons treaty, but State Department officials painted a murkier picture in testimony to skeptical lawmakers on Capitol Hill.

The conflicting accounts came as arms control advocates and some lawmakers worry that the Trump administration could let a 2010 arms reduction treaty, New START, expire in 2021, leaving no limits on the world's two largest nuclear arsenals.

With time running out for Trump to achieve his ambitious goals of a new trilateral agreement with Russia and China that sets new limits on Russia's shorter-range "tactical" nukes, lawmakers told administration officials that a lack of progress is no reason to let New START expire.

"I think what we don't want to see is China used as an excuse to blow up the existing or potential extension of an agreement with Russia that contributes to international security, and of course in the nuclear realm that's important to our survival," Sen. Jeff Merkley, D-Ore., told State Department officials Tuesday during a Senate Foreign Relations Committee hearing on Russia.

Though the treaty, which limits the number of strategic weapons, has been in doubt since Trump pulled the U.S. out of the Intermediate-Range Nuclear Forces Treaty this year, Trump said at NATO's London meeting that his conversations with Russian President Vladimir Putin and Chinese officials on nuclear arms control had gone well.

"With respect to nuclear weapons, I've spoken with President [Vladimir] Putin, and I've communicated with him. He very much, and so do we, want to work out a treaty of some kind on nuclear that will probably include China at some point, and [France] by the way, but it will include China and some other countries," Trump said.

Top Chinese officials previously made clear that Beijing will not participate in trilateral talks, but Trump on Tuesday said that when he raised the issue with Chinese officials during separate trade negotiations, "they were extremely excited about getting involved. ... So some very good things can happen with respect to that."

The U.S. previously argued that Russia was out of compliance with the INF Treaty — something Russia denied. However, Washington's position is that Moscow is in compliance with New START, which restricts each country to a total of 1,550 warheads deployed on bombers, submarines and in underground silos.

There is an option to extend the treaty for up to five years should the U.S. and Russia agree, but the Trump administration has not committed to doing so.

Proposed bipartisan legislation in both the House and Senate is a signal that some in Congress want the government to extend New START, so long as Russia is in compliance, but neither bill has been taken up in committee.

At the Russia hearing, testimony from Assistant Secretary of State for International Security and Nonproliferation Christopher Ford suggested the administration's efforts had not made significant headway, even as the official warned Russia and China have expanded their nuclear arsenals.

The State Department has thus far convened teams of experts on a possible New START extension and other issues, Ford said in written testimony. He made no mention of any dedicated negotiation strategy, team or dedicated talks.

"We are hard at work on these issues and hope to have more to say about this soon," Ford said.

Senate Foreign Relations Committee Chairman Jim Risch, R-Idaho, opposed New START before it was ratified 2010, and he recently said that it should be allowed to lapse under current circumstances. After Tuesday's hearing, he described himself as "very cautious and skeptical" about the administration's process, and he stopped short of saying it was moving forward.

"I wouldn't characterize it as that at this point. I'm hopeful that will happen. I don't think we're there yet," Risch said.

In one key exchange during the hearing with Sen. Todd Young, R-Ind., Ford said there had been two engagements with Russia on arms control broadly since the start of the Trump administration but no date yet for a third dialogue.

Young asked whether there is enough time for the administration to meet its goals before New START lapses in 15 months. Ford suggested the treaty could be renewed “very quickly” for a period of less than five years, but he also said “three-way dynamics” associated with adding China would take more study.

“We have conceptual templates from the Cold War that are bilateral, and those don’t make sense in an at-least trilateral world,” Ford said.

China’s nuclear arsenal is thought to be modest compared with the respective American and Russian arsenals. Would a new treaty have China grow to meet America, have the U.S. shrink to meet China, or can China can be locked into differential numbers with the U.S., Merkely asked pointedly.

“Those kinds of questions are just the kind of thing we need to be and should be talking about with our Russian and Chinese counterparts,” responded Ford, adding that both countries need to come to the table.

Merkley fired back: “OK, but you haven’t engaged in those serious conversations yet, and I know from past arms control negotiations that it can take many years to work out the details when there are actually fairly uniform relationships between two powers – and this is not a uniform relationship.”

Along similar lines, Sen. Ed Markey, D-Mass., worried the administration would let the treaty lapse and sacrifice the on-site inspections of deployed and non-deployed strategic systems that New START provides. He suggested that the agreement’s expiration would trigger a new arms race.

“My concern is if we mishandle this, we could wind up with a new nuclear arms race that could cost us trillions of unnecessary dollars because we missed the opportunity for a negotiated agreement first with the Russians,” Markey said. “If we don’t take that opportunity, I think we will wind up with a deficit that is just ballooning.”

<https://www.defensenews.com/congress/2019/12/03/trump-upbeat-on-nuclear-talks-but-lawmakers-warn-of-blow-up/>

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## COMMENTARY

Defense One (Washington, D.C.)

### **Is US Deterrence against Iran Doomed to Fail?**

By Katie Bo Williams

Dec. 4, 2019

Pentagon officials are warning that Iran continues to pose a threat to U.S. forces in the region, despite the additional 14,000 troops deployed there in the last six months.

“We also continue to see indications, and for obvious reasons I won’t go into the details, that potential Iranian aggression could occur,” John Rood, the Pentagon’s number-three official, told reporters on Wednesday morning.

Rood spoke in the wake of a recent report from the Defense Intelligence Agency that warned that Tehran is producing “increasingly capable ballistic and cruise missiles” with better accuracy, lethality and range.

Those warnings come just days after Gen. Kenneth McKenzie, the leader of U.S. Central Command, told reporters traveling with him that even if the additional troops, jets, and defensive missiles were enough to deter Iran from attacking American targets, he did not expect them to stop Iran from attacking allied Gulf nations.

“My judgment is that it is very possible they will attack again,” McKenzie said.

All this has revived a question raised by a series of Iranian attacks over the summer: Is U.S. deterrence against Iranian aggression in the region “working”?

“I’m not disagreeing with Gen. McKenzie, but I think there’s more to the response than saying they are deterred or they are not deterred,” Rood said Wednesday.

“Deterrence is always a difficult thing to measure,” he said. “Whether [the current deployment level] is ultimately sufficient or not — deterrence is dynamic. We have not made the decision that this is some plateau or fixed point at which U.S. forces will stay.”

What happens when deterrence fails?

U.S. deterrence against Iran in the Gulf has failed before. In the late 1980s, in the midst of the Iran-Iraq War, the U.S. began reflagging Kuwaiti tankers transiting through the Gulf in an effort to deter Iranian attacks — the expectation being that Tehran would not strike a U.S.-flagged vessel.

But on the very first escort mission, in July 1987, the reflagged Kuwaiti oil tanker Bridgeton struck an Iranian underwater mine placed at a depth that could have sunk an escorting warship. The tanker was damaged but there were no injuries. The Bridgeton went on under its own power to Kuwait, while the U.S. Navy escorts followed behind it to avoid hitting another mine.

Rear Adm. Harold Bernsen, the commander of the U.S. Middle East Force in the Persian Gulf from 1986 to 1988, later said that he believed that Tehran was watching Washington and had come to the conclusion that the reflagging operation lacked domestic political support — a key ingredient to any deterrent deployment.

“I think they came to a decision, and I think they bet. The bet that they made was that there was better than a 50-50 chance that if they successfully mined a United States ship, not necessarily a tanker, but a warship, that we might just turn around and leave,” Bernsen said, according to Lee Allen Zatarain’s account, *Tanker War*. “Those mines, the mine that hit the Bridgeton, were set at a depth such that the USS Kidd or any one of the other escorts could just as likely have been hit and blown sky-high.”

Some close watchers of the Trump administration’s Iran policy suggest that a similar dynamic is playing out in 2019: Iran is betting that because there is little national appetite for a war in the United States, as long as it avoids killing an American, it can continue to target U.S. interests in the area and seek to divide smaller Gulf allies by proving Washington doesn’t care about its regional partners.

The evidence of America’s anemic appetite for a military conflict with Iran is plastered across one of the most public spectacles of American politics, the 2020 presidential election. Democratic primary candidates are vowing to end “forever wars” and President Trump has campaigned on bringing U.S. soldiers “home.” Meanwhile, polling over the summer has shown support for military intervention in Iran to be low. There are few signs that support is rising.

“At the heart of this entire matter is a question of interests and Iran knows that the U.S. is currently in the process of rank-ordering its interests,” said Behnam Taleblu, an Iran policy specialist at the hawkish Foundation for the Defense of Democracies. Preventing an attack on a U.S. interests in the region — like the September drone and cruise missile attack on Saudi Arabia’s oil production

facilities, for example — is lower on America's list than protecting the homeland and its own forces in the region.

Trump may have exacerbated that image when the White House ordered, then canceled, air strikes on Iran in response to the downing of a U.S. drone over the summer. The incident sent the message that the only red-line that Iran could not cross is the death of an American, Taleblu and other analysts say.

"In the Gulf, it's how much escalation are you willing to absorb before kinetic action is taken?" Taleblu said. "Do you really want to signal that the only red line is the death of an American servicemember?"

America's key Gulf allies, Saudi Arabia and the United Arab Emirates, seem to have gotten that message, said Chris Bolan, a professor of Middle East Security Studies at the U.S. Army War College and a former foreign policy advisor to former Vice Presidents Bush and Gore. The two Gulf kingdoms, he said, "appear to be backtracking on their willingness to confront Iran directly," disengaging from the ongoing conflict in Yemen.

"How much of that is a result of failure of a U.S. conventional response to what Iran has been doing — they're certainly coincidental, whether there's a cause-and-effect there is a little bit tougher to say," he said.

But there's little question that Iran viewed Trump's decision not to retaliate for the downing of the U.S. drone as a green light, Bolan said.

"He's responded in sanctions and cyber, but he's not responded in terms of a conventional military response and I think the hardliners will read that as, 'we have more freedom of maneuver to push further if we need to.'"

#### Asymmetric challenges

"The other fundamental challenge for the U.S. in the Middle East is deterring Iran, which is an asymmetric power, through conventional forces alone," Taleblu said. Since the Trump administration first began warning of a heightened threat from Iran, it has sent Patriot batteries, fighter jets and troops it has dubbed "defensive" to Saudi Arabia and other regional bases. It also launched an offensive cyber attack on Iran in response to the attack on the Saudi oil facilities.

Iran's "way of war," according to the DIA report, "emphasizes the need to avoid or deter conventional conflict while advancing its security objectives in the region, particularly through propaganda, psychological warfare, and proxy operations."

U.S. officials told Reuters that the cyberattack on Iran targeted Tehran's ability to spread propaganda. That offensive suggests that U.S. deterrence against Iran may be broader than is publicly known, said Bolan.

"What we should be doing is looking at deterrence across the spectrum of conflict. You do that in different discrete ways, but you have to have a much broader approach to deterrence," he said, agreeing with McKenzie's assessment that conventional deterrence is probably limited to preventing a direct attack on U.S. forces.

What's lacking from the current deterrence model for Iran, he said, is not an understanding of how to use asymmetric tools, but an off-ramp for Iran — an incentive for Tehran not to escalate the tensions.

Still, like Rood, he cautioned that it's next-to-impossible to determine in real time whether deterrence is "working."

“You don’t know it’s working until it doesn’t work,” he said. “If there’s an attack on a U.S. military force, then you know deterrence has failed.”

Katie Bo Williams is the senior national security correspondent for Defense One, where she writes about defense, counterterror, NATO, nukes, and more. She previously covered intelligence and cybersecurity for The Hill, including in-depth reporting on the Russia investigations and military ...

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Bulletin of the Atomic Scientists (Chicago, Illinois)

## **UK Parliamentary Debates: Some Brits Throw Nuclear Deterrence under the Coach**

By John Krzyzaniak

Dec. 4, 2019

It would be easy to miss from this side of the pond, but there’s a parliamentary election coming up in the United Kingdom on December 12. Last week, the BBC held a seven-way debate, pitting senior representatives from the major parties against one another. The debate moderator posed a seemingly straightforward question about nuclear policy, asking, “If our country was under nuclear attack, would you (or the leader of your party) use our nuclear weapons to defend our country?” Four participants said yes—but three said no.

Nicola Sturgeon, the first minister of Scotland and leader of the Scottish National Party, gave the most noteworthy answer. Her response was: “No. Absolutely and emphatically not, because it would lead to the deaths of possibly tens of millions of people and wipe out swaths of our civilization. So no, under no circumstances would I use nuclear weapons.”

For an American, to hear this coming out of a politician’s mouth might be a bit shocking. Why?

First, in the United States, the current political debate on nuclear use is very different. Some 2020 presidential candidates, such as Elizabeth Warren, are advocating a no-first-use policy, which says the United States would never be the one to initiate a nuclear war. This would be a change from current US policy; there are smart arguments on both sides. But no candidate is questioning whether the president should launch a retaliatory attack if another country initiates a nuclear war against the United States.

Second, taking retaliation off the table would appear to fly in the face of deterrence theory. By definition, deterrence requires a threat of credible retaliation. By declaring “absolutely and emphatically” that there would be no retaliation, Sturgeon seems to be undermining deterrence, which is arguably the whole point of having nuclear weapons in the first place.

So what gives? Steven E. Miller, director of Harvard’s International Security Program and a member of the Bulletin of the Atomic Scientists Science and Security Board, thinks there may be a few plausible explanations. One answer lies in NATO. The British nuclear force is a small component of the larger NATO deterrence system. So a politician in the United Kingdom could forswear retaliation without undermining deterrence, because the US doctrine, under which the United States would respond to any military attack on the United Kingdom, would remain intact. Better to let the Americans do the dirty work.

Another explanation could be that retaliation would be strategically disastrous. If the United Kingdom were to come under nuclear attack from Russia, its own retaliation options would not be

good. They would not have enough nuclear weapons to knock out all of Russia's, so any retaliation would probably be aimed at Russian cities. And such an attack would almost certainly prompt an even larger Russian nuclear attack against British cities.

A third answer might be that, from the British perspective, there is nothing to deter. If a large-scale war caused by Russian aggression is inconceivable, then deterrence and retaliation are irrelevant. That's hard to buy though, since on the continent, European leaders are seeing a greater need for nuclear deterrence, not a lesser one.

Perhaps the best explanation, however, is not strategic, but political. Although a majority of British citizens support nuclear weapons, a consistent minority has long opposed having or using them. So Nicola Sturgeon might just be telling her base what they want to hear.

John Krzyzaniak is an associate editor at the Bulletin of the Atomic Scientists. Before joining the Bulletin, he was an associate editor at the journal Ethics & International Affairs, based...

<https://thebulletin.org/2019/12/uk-parliamentary-debates-some-brits-throw-nuclear-deterrence-under-the-coach/>

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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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