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Feature Report

"*Constraining Iran's future nuclear capabilities*". By Robert Einhorn and Richard Nephew. Published by Brookings; March 2019

https://www.brookings.edu/research/constraining-irans-future-nuclear-capabilities/

The United States needs a new strategy for effectively constraining Iran's future nuclear capabilities. The Trump administration's current approach has little chance of succeeding. But simply returning the United States to the Joint Comprehensive Plan of Action (JCPOA) is not a long-term solution. By the time the United States would return to the 2015 deal, key nuclear restrictions would soon expire. Moreover, achieving the wide domestic support needed to make a nuclear deal with Iran politically sustainable in the United States would not be served by simply turning the clock back to before Trump took office.

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NUCLEAR WEAPONS

The Korea Times (Seoul, South Korea)

'US Will Keep Nuclear Deterrence on the Korean Peninsula'

By Jung Da-min

April 26, 2019

The United States will maintain its nuclear umbrella over South Korea as North Korea still possesses nuclear capabilities, according to a U.S. government official, Wednesday.

"In South Korea, uncertainty surrounding progress on denuclearization may foster concerns over the implications of the U.S.-North Korea dialogue for extended deterrence," the Washington-based Voice of America reported citing remarks by U.S. Deputy Undersecretary of Defense David Trachtenberg at a forum titled "The future of U.S. extended deterrence." Brookings Institute hosted the event.

The official said the U.S. Department of Defense "reiterated the U.S. commitment to maintain force levels necessary to defend South Korea," referring to the 50th U.S.-Republic of Korea Security Consultative Meeting (SCM) held last October.

The remarks are in sync with Washington's repeated commitment to push for a complete, verifiable and irreversible dismantlement of North Korea's nuclear arsenal. Pyongyang has suggested the "definition of denuclearization" may involve ending the U.S.' nuclear umbrella that protects Seoul, as well as Tokyo, or even the removal of U.S. troops from the region.

Trachtenberg also said that although North Korea has refrained from nuclear tests and ballistic missile tests for quite some time, the U.S. understanding is that North Korea "still possesses" nuclear capabilities.

An official at Seoul's defense ministry said South Korea stands together with the United States to maintain nuclear deterrence on the Korean Peninsula as nuclear threats still persist.

Political analysts in Seoul said Trachtenberg's remarks reaffirmed Washington's stance on the reverse of the North's understanding of denuclearization. The breakdown of February's summit between the United States and North Korea was mostly due to their failure on how to define "denuclearization of the peninsula."

Regarding the remarks, Go Myong-hyun, a research fellow at the Asan Institute for Policy Studies, said the recent summit between the North and Russia showed the two allies have the same stance on the denuclearization issue. Go said Moscow has been opposing Washington's deployment of its strategic assets including missiles such as intercontinental ballistic missiles.

"But the message from the U.S. was that it would keep its position regardless of what Russia and North Korea said on the matter during the summit, that it would be providing a nuclear umbrella to South Korea," Go said, adding Washington would want to use it as a means to keep vigilant against Russia and China.

Amid the continued economic sanctions imposed by the United Nations Security Council (UNSC), North Korea has been strengthening its regional ties in East Asia, especially with its traditional allies such as Russia and China, both permanent members of the UNSC.

Washington did not immediately announce its comments about the outcome of the North-Russia summit.

https://www.koreatimes.co.kr/www/nation/2019/04/205_267845.html

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USNI News (Annapolis, Maryland)

Official: U.S. Far Behind China, Russia in Modernizing Nuclear Arsenal

By John Grady

April 25, 2019

WASHINGTON, D.C. – China and Russia had their money on winning asymmetric advantages in conventional and nuclear forces in the last decade, and now the United States is playing catch-up in modernizing its sea, air and land nuclear forces, the Pentagon's top policy official said Wednesday.

David Trachtenberg, the Pentagon's deputy undersecretary for policy, said the United States put off modernizing the three legs of its nuclear deterrent for almost 20 years, he told USNI News following a presentation at the Brookings Institution.

"In the 2000s, we skipped a generation" in modernizing the triad – ballistic missile submarines, bombers and ballistic missiles. He added that the United Kingdom and France, both nuclear powers and NATO allies, reduced their weapons stockpiles while continuing to modernize their nuclear forces during that same time. The United Kingdom has sea-based ballistic missile submarines; France has both submarines and aircraft capable of delivery of nuclear weapons.

At the same time, North Korea, India and Pakistan established themselves as nuclear powers.

"Most of the nation's nuclear deterrence was built in the 1980s or even earlier," Trachtenberg said during the presentation. The triad was "aging into obsolescence."

Trachtenberg said in answer to a question during the forum that the United States is not engaged in a new arms race with Moscow or starting one with China, but "Russia is re-scoping" its nuclear and conventional forces, including using low-yield nuclear weapons to get its way in a confrontation.

During the presentation and follow-up conversation with USNI News, he emphasized that the Pentagon's move to modifying existing sea-launched cruise and ballistic missiles are designed to "close a gap" that Moscow is exploiting with its positioning of ground-based intermediate range cruise missiles on its borders. The United States has said their deployment violated the Intermediate-Range Nuclear Forces (INF) agreement between the two.

China was not a party to that treaty and has missiles of that range in its arsenal. The United States has announced is pulling out of the agreement. Whether that move will lead to the United States leaving other arms agreements is unclear.

In answer to an audience question, he said the administration has not yet decided on continuing in the Strategic Arms Limitation Treaty.

"We're not attempting to match Russia system for system," but "to close a gap" that the Kremlin believes gives it a "coercive advantage" in a European crisis. He said the American sea-launched systems "provide a mix and range of capabilities" needed in a changed security environment, do not violate any arms agreement and do not require congressional approval.

Trachtenberg said during the session that Russia's military doctrine accepts the use of "so-called tactical nuclear weapons and [nuclear-armed] cruise missiles" in resolving a confrontation. As for the United States' position on "first use" of nuclear weapons, he added it is one of "constructive ambiguity," the same as the United Kingdom's announced policy.

He specifically cited "the novel nuclear systems that President [Vladimir] Putin unveiled with great fanfare a couple of months ago" as yet another development designed to throw into question the United States' commitment to "extended deterrence" to its allies in Europe and the Indo-Pacific.

"Extended deterrence does not exist in a vacuum." That includes allies and partners wanting it, believing that it is there for their protection and would be employed if necessary, and a willingness to do their part, he said.

In addition to the nuclear arsenals of the United Kingdom and France to help deter Russian aggression, he cited the deployment of the F-35A Lightning II showing allied commitment to extended deterrence. For some nations, it will be replacing the dual-weapon capable F-15E.

For allies like Japan and Korea, the deterrence centers on their continued belief that the U.S.'s "nuclear umbrella" protects them as well as the American homeland and the placement of sophisticated air and missile defense systems like Patriot and Theater High-Altitude Area Defense on the peninsula and Aegis Ashore on the home islands.

He added Asian allies "may hold different view than our European allies" on the exact meaning of extended deterrence; and even among European allies, views may differ from one nation to another.

Trachtenberg linked the Nuclear Posture Review and the Missile Defense Review as showing the administration's commitment to extended deterrence and how the United States values allies and partners. The administration also has remained committed to spending 3.5 percent of the Pentagon's overall budget [or $25 billion annually] on its nuclear weapons programs, a percentage that would grow about 7 percent as costs of Columbia-class ballistic missile submarines and new bombers come more into play.

A modernized nuclear triad "is the ultimate guarantor of our security." Extended deterrence is "more challenging" now – especially with North Korea possessing nuclear weapons and long-range missiles.

https://news.usni.org/2019/04/25/official-u-s-far-behind-china-russia-in-modernizing-nuclear-arsenal

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Defense News (Washington, D.C.)

Not Dead Yet: Nuclear Weapons Agency Moves to Save Jason Advisory Group

By Aaron Mehta

April 25, 2019

WASHINGTON — The National Nuclear Security Administration is making a play to save a scientific advisory group, just days before its contract with the Pentagon is set to expire.

On Thursday, the NNSA quietly put a notice of a sole-source contract up on the FedBizOps website, to "award a short-term sole source contract to MITRE Corporation to provide management and logistics support to the Jason program and its members, referred to as 'The Jasons.'"

In essence, NNSA seeks to recreate the Pentagon's contract with the advisory group through the end of next January, in order to keep key research from falling apart.

"NNSA has issued a notice of intent to award a short-term sole source contract to MITRE Corporation to provide management and logistics support to the Jason program and its members through January 31, 2020," agency spokesman Gregory Wolf told Defense News.

"JASON is a group of elite scientists and engineers who advise NNSA and the United States Government on matters of science and technology, mostly of a sensitive nature, and has provided significant contributions to NNSA's mission of ensuring a safe, secure and reliable nuclear stockpile and preventing nuclear weapon proliferation around the world. NNSA cannot afford a contractual gap in the services MITRE provides."

The Jason program dates back the 1950s, when the Pentagon put together a panel of scientific experts to provide outside advice. That contract is now managed by the MITRE group, and run through the Pentagon's undersecretary of research and engineering.

According to a 2006 book written about the group, the panel played major roles in developing, or lambasting, technical ideas for the department, including pushing to sign the Comprehensive Test Ban Treaty on nuclear weapons and a controversial stretch of ideas during the Vietnam War. Much of their work, however, has been classified.

The latest contract for the group's work existed under an indefinite delivery, indefinite quantity contract, which allowed for an unlimited number of deliveries over a fixed time period. That contract was between the Pentagon's undersecretary of research and engineering and the MITRE corporation.

However, that contract was allowed to expire on March 31, with a final tasking order set to expire at the end of April. The Pentagon has said the move was made as a cost-saving measure and that the open-ended nature of Jason no longer makes sense.

And while the DoD said it intends to still use JASON for one-off contracts, critics have said that the financial setup for the panel requires a constant stream of work and that attempting to do piecemeal studies will lead to the closure of the group.

The NNSA's plan to keep JASON alive came together quickly, in just the last few weeks. While there will be some sort of gap between when the Pentagon contract expires and NNSA can get theirs off the ground, it is not expected to be a large gap in time.

The NNSA contract would mirror the ID/IQ nature of the Pentagon's legacy contract. Meanwhile, the agency will use the time to "perform market research to determine a long term strategy for obtaining JASON scientific support services," an indication that alternative solutions may be an option.

The cancellation of the Jason contract came to light during a hearing featuring NNSA head Lisa Gordon-Hagerty, who said she had asked her staff to look into what the Pentagon's cancellation of the contract would mean for her agency.

"I found their reports to be fulsome and the members of JASON to be knowledgeable about issues associated with our programs at NNSA," Gordon-Hagerty said during that hearing, when asked if the agency had benefited from the advisory panel.

The agency currently has three studies being considered and planned with Jason, related to "cyber security of operating equipment, nuclear detonation detection, and plutonium aging," according to Wolf.

https://www.defensenews.com/smr/nuclear-arsenal/2019/04/25/nuclear-weapons-agency-moves-to-save-jason-advisory-group/

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US COUNTER-WMD

Watertown Daily Times (Watertown, N.Y.)

Stefanik Aims to Force Army to Announce Preferred East Coast Missile Site

By Abraham Kenmore

April 27, 2019

WATERTOWN — U.S. Rep. Elise M. Stefanik, R-Schuylerville, said she would force the Army to announce its third preferred East Coast missile defense site through legislation if necessary.

Speaking before her Watertown "Coffee with the Congresswoman" event on Thursday, Ms. Stefanik said she thought the site would be announced voluntarily, and should go to Fort Drum. Camp Ravenna Joint Military Training Center in Ohio and Fort Custer Training Center in Michigan are also under consideration. Ms. Stefanik said that Acting Secretary of Defense Patrick M. Shanahan told her during an Armed Services Committee meeting that they do intend to release the preferred site.

"I've had numerous conversations with the missile defense agency leading up to that question that I asked Sec. Shanahan," Ms. Stefanik said. "I anticipate that we will voluntarily hear that from the Department of Defense, if they do not voluntarily keep their promise that Secretary Shanahan made, I intend, in the National Defense Authorization Act to compel them to release the third preferred site."

During the coffee hour, Ms. Stefanik also took a question on the quality of housing at Fort Drum after reports from soldiers and their families of mold in on-post housing.

"As individuals have raised concerns on social media, we have reached out to them," Ms. Stefanik said. "In this year's National Defense bill we are likely to have new provisions that require some type of testing or some type of way to monitor this."

Ms. Stefanik said she was still working to include the Fort Drum railhead in next year's military appropriations. Although it was not included in the requested appropriations submitted by the Army, it is on the list of unfunded projects to carry out if funding became available.

"I had a very positive conversation with Secretary Esper, Secretary of the Army," Ms. Stefanik said. "That's number one on their unfunded requests list, and that was a request I made to him personally talking about the importance providing the funding for the railhead."

The railhead was first identified as lacking capacity in 2008. The post is currently unable to load and unload trains simultaneously, instead holding incoming trains in the town of Watertown rail yard, and cannot deploy within the 72-hour target.

Ms. Stefanik also spoke about why she co-sponsored the "Ensuring a Secure Afghanistan Act" earlier this month, which prevents the number of American troops from dropping below 10,000 in fiscal year 2019 unless a set of criteria is met by the Taliban.

The proposal seemed directed at current peace negotiations between the Taliban and the U.S. government, preventing a withdrawal unless the Taliban explicitly rejected al Qaeda, recognized the Afghan Constitution, women's rights and provided assistance in future counterterrorism operations, among others criteria.

Ms. Stefanik said the purpose was not to hinder, but to protect negotiations, while frankly saying she did not support the negotiations.

"The intent behind that bill was the President talked about his desire to withdraw from Afghanistan, and then he adjusted his policy based on the advice he received from the Secretary of Defense," Ms. Stefanik said. "I think that when he said we should withdraw by Tweet, that that would have undermined our ability to negotiate."

Ms. Stefanik's concerns about the negotiations revolve around the lack of women and the fact that the elected government of Afghanistan is not part of the negotiations at this time.

"The fact that the people of Afghanistan, from my perspective, are not part of those negotiations, that's concerning to me," Ms. Stefanik said. "I certainly think we need to continue to set metrics for Afghans to reach, in terms of taking on their security on their own. We are in a train-advise-assist role, and I think that that is where we should be right now to make sure the Afghan forces are at the tip of the spear, learning the skills and gaining the military readiness they need to fight terrorist threats within their own country. But my issue with the negotiation is: no women at the table; elected Afghan government is not at the table."

https://www.watertowndailytimes.com/news03/stefanik-aims-to-force-army-to-announce-preferred-east-coast-missile-site-20190427

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US ARMS CONTROL

VOA (Washington, D.C.)

IMF: US Sanctions Cutting Iranian Growth, Boosting Inflation

By VOA News

April 29, 2019

The International Monetary Fund is forecasting Iran's economy to shrink by 6% this year as it faces pressure from U.S. sanctions.

In a report released Monday, the IMF said its estimates for Iran, which include the potential for inflation to top 40%, predate a U.S. decision to end waivers that have allowed some Iranian oil buyers to continue making their purchases despite new sanctions that went into effect last year.

The Trump administration is due to formally end the waivers on Thursday for some of Iran's top crude purchasers, including China, India, Japan, Turkey and South Korea.

The United States says it wants to deprive Iran of $50 billion in annual oil revenues to pressure it to end its nuclear and missile programs. The White House says it is working with top oil exporters Saudi Arabia and the United Arab Emirates to ensure an adequate world oil supply.

Turkey and China have attacked the U.S. action, but it is not clear whether they will continue to buy Iranian oil.

Iranian Foreign Minister Mohammad Javad Zarif said an interview broadcast on the U.S. cable show Fox News Sunday accused the United States of trying to "bring Iran to its knees" and overthrow its government by seeking to thwart its international oil trade.

He said U.S. officials are "wrong in their analysis. They are wrong in their hope and illusions."

Zarif said the fact that Trump withdrew the United States from the 2015 international agreement to curtail Iran's nuclear program "would not put the U.S. in the good list of law-abiding nations." Iran

state media reported that Zarif told Iranian reporters in New York that Tehran's withdrawal from the pact is one of "many options" it is considering in the wake of the U.S. end to the waivers on sanctions for countries buying oil from Iran.

Zarif said a team of Israeli Prime Minister Benjamin Netanyahu, U.S. national security adviser John Bolton, and leaders in Saudi Arabia and the United Arab Emirates is trying to push U.S. President Donald Trump "into a confrontation he doesn't want."

"They have tried to bring the U.S. into a war," Zarif said, with the goal, "at least," of Iranian regime change.

Bolton, appearing on the same Fox News program, said the U.S. goal is not regime change, but a change in behavior, specifically an end to Iran's nuclear weapons program and ballistic missile testing.

"The Iranian people deserve a better government," Bolton said.

He called Zarif's accusations "completely ridiculous, an effort to sow disinformation."

https://www.voanews.com/a/us-sanctions-on-iran/4895465.html

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The Hill (Washington, D.C.)

Bolton: Multi-party Talks with North Korea Not 'Our Preference'

By Chris Mills Rodrigo

April 28, 2019

National security adviser John Bolton said Sunday that multi-party talks with North Korea are not the Trump administration's preferred method for pursuing denuclearization.

"It's not what our preference is," Bolton said on "Fox News Sunday" when asked about multilateral discussions.

"I think Kim Jong Un, at least up until now, has wanted the one-on-one contact with the United States, which is what he has gotten," Bolton added.

Russian President Vladimir Putin suggested the revival of a past multilateral approach to denuclearization negotiations on Thursday after meeting with North Korean leader Kim Jong Un.

In 2003, the U.S., North Korea, China, South Korea, Russia and Japan began the so-called six-party negotiations.

North Korea accepted a deal in September 2005 to end its nuclear weapons program in exchange for security, economic and energy benefits. However, in 2006, North Korea conducted its first nuclear test after sanctions disagreements.

President Trump and Kim have held bilateral meetings twice during Trump's presidency, but progress on denuclearization has stalled and the most recent meetings ended abruptly after the two leaders failed to reach an agreement.

Bolton said Sunday that a third meeting is on the table, adding that the president "feels pretty strongly" about another meeting with Kim.

"He feels pretty strongly about it," Bolton said. "He's said repeatedly he thinks he has a good relationship with Kim Jong Un and the six-party approach failed in the past."

https://thehill.com/homenews/sunday-talk-shows/441048-bolton-multi-party-talks-with-north-korea-not-our-preference

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The Hill (Washington, D.C.)

Iran Says It May Withdraw from Nuclear Treaty after Trump Restores Sanctions

By Michael Burke

April 28, 2019

Foreign Minister Mohammad Javad Zarif said Sunday that Iran may withdraw from a nuclear treaty amid tightening U.S. sanctions.

"The Islamic Republic's choices are numerous, and the country's authorities are considering them ... and leaving (nuclear Nonproliferation Treaty) is one of them," Zarif was quoted as saying by a state broadcaster, according to Reuters.

The Nonproliferation Treaty (NPT) is an international treaty designed to slow the spread of nuclear weapons.

The comments come amid heightening tensions between the U.S. and Tehran, with the Trump administration announcing earlier this month that it would not renew sanction waivers that allowed several foreign countries to purchase oil from Iran.

The Trump administration this month also labeled Iran's Revolutionary Guard as a "foreign terrorist organization."

President Trump last year also withdrew the U.S. from the Obama-era Iran nuclear deal, which lifted sanctions on Tehran in exchange for limits on its nuclear program. Trump has since reimposed sanctions on the country.

https://thehill.com/policy/international/441020-iran-says-it-may-withdraw-from-nuclear-treaty-after-trump-restores

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COMMENTARY

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

A Different Use for Artificial Intelligence in Nuclear Weapons Command and Control

By Jaganath Sankaran

April 25, 2019

Artificial intelligence (AI) is expected to change the way the United States and other nations operate their nuclear command and control. For instance, a recent RAND report surveyed AI and nuclear security experts and notes that "AI is expected to become more widely used in aids to decisionmaking" in command-and-control platforms. The report also indicated the possibility that narrow AI could in the future act as a "trusted advisor" in nuclear command and control. In this article, I will examine the advice such an advisor might provide to decision-makers in a nuclear

crisis, focusing on the possibility that an algorithm could offer compelling evidence that an incoming nuclear alert was a false alarm, thereby counseling restraint rather than confrontation.

Decision-makers who stand guard at the various levels of the nuclear weapons chain of command face two different forms of stress. The first form of stress is information overload, shortage of time, and chaos in the moment of a crisis. The second is more general, emerging from moral tradeoffs and the fear of causing loss of life on an immense scale. AI and big data analysis techniques have already been applied to address the first kind of stress. The current U.S. nuclear early warning system employs a "dual phenomenology" mechanism designed to ensure speed in detecting a threat and in streamlining information involved in the decision-making process. The early warning system employs advanced satellites and radars to confirm and track an enemy missile almost immediately after launch. In an actual nuclear attack, the various military and political personnel in the chain of command would be informed progressively as the threat is analyzed, until finally the president is notified. This structure substantially reduces information overload and chaos for decision-makers in a crisis.

However, as Richard Garwin writes, the system also reduces the role of the decision-maker "simply to endorse the claim of the sensors and the communication systems that a massive raid is indeed in progress." While the advanced technologies and data processing techniques used in the early warning system reduces the occurrence of false alerts, it does not completely eliminate the chances of one occurring. In order to address decision-makers' fear of inadvertently starting a nuclear war, future applications of AI to nuclear command and control should aspire to create an algorithm that could argue in the face of overwhelming fear of an impending attack that a nuclear launch isn't happening. Such an algorithm could verify the authenticity of an alert from other diverse perspectives, in addition to a purely technological analysis. Incorporating this element into the nuclear warning process could help to address the second form of stress, reassuring decision-makers that they are sanctioning a valid and justified course of action.

Command and Control During the Cold War: The Importance of Big Data

In the world of nuclear command and control, the pursuit of speed and analysis of big data is old news. In the early 1950s, before the advent of nuclear intercontinental ballistic missiles (ICBMs), the United States began developing the SAGE supercomputer. SAGE, which was built at approximately three times the cost of the Manhattan Project, was the quintessential big data processing machine. It used the fastest and most expensive computers at the time – the Whirlwind II (AN/FSQ-7) IBM mainframe computers – at each of 24 command centers to receive, sort, and process data from the many radars and sensors dedicated to identifying incoming Soviet bombers. The SAGE supercomputer then coordinated U.S. and Canadian aircraft and missiles to intercept those bombers. Its goal was to supplement "the fallible, comparatively slow-reacting mind and hand of man" in anticipating and defending against a nuclear bomber campaign.

The proliferation of ICBMs in the 1960s, however, made the SAGE command centers "extraordinarily vulnerable." The U.S. Air Force concluded that Soviet ICBMs could destroy "the SAGE system long before the first of their bombers crossed the Arctic Circle." In 1966, speaking at a congressional hearing, Secretary of Defense Robert McNamara argued that "the elaborate defenses which we erected during the 1960s no longer retain their original importance. Today with no defense against the major threat, Soviet ICBMs, our anti-bomber defense alone would contribute very little…" The SAGE command centers were shut down.

McNamara formed a National Command and Control Task Force, informally referred to as the Partridge Commission, to study the problem of nuclear command and control in the early days of the ICBM era. The commission concluded "that the capabilities of US [nuclear] weapon systems had outstripped the ability to command and control them" using a decentralized military command and

control structure. The commission recommended streamlining and centralizing command and control with much stronger civilian oversight. The commission also advocated the formation of the modern-day North American Aerospace Defense Command, better known as NORAD, with its advanced computer and communication systems, early warning satellites, and forward-placed radars designed to track any missile launch on the planet before it could reach the continental United States.

NORAD and its computer and communication systems were designed to resolve the stress from information overload by compartmentalizing and automating the process of evaluating a threat. Depending on its particular trajectory, an enemy nuclear missile may take anywhere between 35 minutes to just eight minutes to reach its target. When the launch of an enemy missile occurs, it is first picked up by early warning satellite sensors within seconds. The satellites track these missiles while the engines are still ignited. Once the missile comes over the horizon, forward-deployed radars independently track them. The data from the two systems is then assessed in the context of the prevailing geostrategic intelligence by NORAD. NORAD would then pass the assessment up the military and political chain of command. This sequence of steps ensures that senior decision-makers are not overwhelmed with information. By the time decision-makers are notified, the decision to retaliate to an apparent attack "must be made in minutes." Future advances in AI might only add incremental improvements to the speed and quality of information processing to this already advanced nuclear early warning system.

Using AI to Prevent Inadvertent Nuclear War

These advances in nuclear command and control still do not directly address the second form of stress, one that emerges from the fear of a nuclear war and the accompanying moral tradeoffs. How can AI mitigate this problem? History reminds us that technological sophistication cannot be relied upon to avert accidental nuclear confrontations. Rather, these confrontations have been prevented by individuals who, despite having state-of-the-art technology at their disposal, proffered alternate explanations for a nuclear warning alert. Operating under the most demanding conditions, they insisted on a "gut feeling" that evidence of an impending nuclear war alert was misleading. They chose to disregard established protocol, fearing that a wrong choice would lead to accidental nuclear war.

Consider for example a declassified President's Foreign Intelligence Advisory Board report investigating the decision by Leonard Perroots, a U.S. Air Force lieutenant general, not to respond to incoming nuclear alerts. The incident occurred in 1983 when NATO was conducting a large simulated nuclear war exercise code-named Able Archer. The report notes that Perroots' "recommendation, made in ignorance, not to raise US readiness in response" was "a fortuitous, if ill-informed, decision given the changed political environment at the time." The report also states:

the military officers in charge of the Able Archer exercise minimized this risk by doing nothing in the face of evidence that parts of the Soviet armed forces were moving to an unusual level of [nuclear] alert. But these officers acted correctly out of instinct, not informed guidance.

Perroots later complained in 1989, just before retiring as head of the U.S. Defense Intelligence Agency, "that the U.S. intelligence community did not give adequate credence to the possibility that the United States and Soviet Union came unacceptably close to [accidental] nuclear war."

In the same year, Stanislav Petrov, a commanding officer involved in Soviet nuclear operations, also dismissed a nuclear alert from his country's early warning system. In the face of data and analysis that confirmed an incoming American missile salvo, Petrov decided the system was wrong. Petrov later said, "that day the satellites told us with the highest degree of certainty these rockets were on the way." Still, he decided to report the warning as a false alert. His decision was informed by fears

that he "didn't want to be the one responsible for starting a third world war." Later recalling the incident, he said: "I had a funny feeling in my gut. I didn't want to make a mistake. I made a decision, and that was it. When people start a war, they don't start it with only five missiles." Both, Perroots and Petrov feared the moral consequences of a nuclear war, particularly one initiated accidentally. They distrusted the data and challenged protocol.

Conclusion

Fred Iklé once remarked, "if any witness should come here and tell you that a totally reliable and safe launch on warning posture can be designed and implemented that man is a fool." If that is true, how close can AI get us to reliable and safe nuclear command and control? AI-enabled systems may aspire to reduce some of the mechanical and human errors that have occurred in nuclear command and control. Prior instances of false alerts and failures in early warning systems should be used as a training dataset for an AI algorithm to develop benchmarks to quickly test the accuracy of an early warning alert. The goal of integrating AI into military systems should not be speed and accuracy alone. It should also be to help decision-makers exercise judgment and prudence to prevent inadvertent catastrophes.

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https://warontherocks.com/2019/04/a-different-use-for-artificial-intelligence-in-nuclear-weapons-command-and-control/

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Brookings (Washington, D.C.)

With US-Russian Arms Control Treaties on Shaky Ground, the Future is Worrying

By Steven Pifer

April 25, 2019

Editor's Note: On its current path, the U.S.-Russia nuclear arms control regime likely will come to an end in 2021. That will make for a strategic relationship that is less stable, less secure and less predictable and will further complicate an already troubled bilateral relationship, argues Steven Pifer. This article originally appeared in The Ambassadors Review.

For nearly five decades, Washington and Moscow have engaged in negotiations to manage their nuclear competition. Those negotiations produced a string of acronyms—SALT, INF, START—for arms control agreements that strengthened strategic stability, reduced bloated nuclear arsenals and had a positive impact on the broader bilateral relationship.

That is changing. The Intermediate-range Nuclear Forces (INF) Treaty is headed for demise. The New Strategic Arms Reduction Treaty (New START) has less than two years to run, and the administration of Donald Trump has yet to engage on Russian suggestions to extend it. Bilateral strategic stability talks have not been held in 18 months.

On its current path, the U.S.-Russia nuclear arms control regime likely will come to an end in 2021. That will make for a strategic relationship that is less stable, less secure and less predictable and will further complicate an already troubled bilateral relationship.

FIFTY YEARS OF ARMS CONTROL

Bilateral nuclear arms control talks between Washington and Moscow began in 1969 with the Strategic Arms Limitation Talks (SALT). They resulted from a growing understanding that negotiated limits on the superpowers' nuclear arms competition served the interests of both. Over the next five decades, arms control treaties and unilateral force decisions led the sides to reduce their active arsenals to 4,000-4,500 nuclear weapons each—down from a U.S. peak of more than 30,000 in the 1960s and a Soviet/Russian peak that exceeded 40,000 in the 1970s.

Early treaties such as the 1972 Interim Offensive Agreement and the 1979 SALT II Treaty (which never entered into force but whose limits were observed into the mid-1980s) merely slowed the growth of nuclear arsenals. Later treaties had a more dramatic impact. The 1987 INF Treaty banned the entire class of U.S. and Soviet land-based missiles with ranges between 500 and 5,500 kilometers. The 1991 START Treaty required the sides to reduce their accountable strategic nuclear warheads by some 40 percent while cutting strategic missile launchers and bombers by about 30 percent.

Arms control agreements often had a beneficial impact on the broader relationship. SALT helped advance détente in the early 1970s; progress on INF and START spurred an improvement in the overall U.S.-Soviet relationship in the late 1980s; and the relatively quick conclusion of New START gave a positive impulse to the Obama administration's reset with Russia, even though the reset proved short-lived.

Today, the U.S.-Russian relationship has hit its lowest point since the end of the Cold War. Arms control, or the looming collapse of arms control, rather than helping, may contribute to a further deterioration of relations.

THE DEMISE OF THE INF TREATY

The INF Treaty is on a death course. Russia violated the treaty by developing and deploying the 9M729, a prohibited intermediate-range cruise missile. Neither the Obama nor the Trump administration employed an effective strategy to persuade Moscow to return to compliance.

On October 20, 2018, President Trump announced that the United States would terminate the treaty, surprising allies and administration officials alike. NATO subsequently backed the U.S. decision, though European officials privately grumbled about a fait accompli. In early February, U.S. officials stated that they had suspended U.S. treaty obligations and given Russia the required six months' notice of the U.S. intention to withdraw from the agreement. Russia then suspended its treaty obligations.

The United States could not remain forever in a treaty that Russia has violated. However, the way the Trump administration handled its departure amounted to diplomatic malpractice. Washington will get blamed for the treaty's end.

There was a smarter way. First, U.S. officials should have informed their European counterparts in early 2018 that the United States would have no choice in 12–24 months but to leave the treaty if Russia did not correct its violation and urge them to apply political heat on the Kremlin, including at the highest level. Russia's intermediate-range missiles cannot reach the United States; they threaten Europe and Asia.

Second, the U.S. military should have deployed conventionally armed air- and sea-launched cruise missiles to the European region to show that the Russian violation would not go unchallenged.

Third, NATO should have begun a study of long-term countermeasures, with one option being deployment in Europe of a conventionally armed U.S. intermediate-range ballistic missile. While the Alliance likely could not have found consensus to adopt that option, discussing it would have

reminded military leaders in Moscow how much they disliked the U.S. Pershing II, whose deployment in West Germany in the 1980s proved key to securing the INF Treaty.

Fourth, U.S. officials should have indicated to their Russian counterparts that, if they addressed U.S. concerns about the 9M729 violation, the United States would consider ways to address Russian concerns that the Aegis Ashore missile defense facility in Romania could launch offensive missiles.

Would such steps have brought Russia back into compliance? Perhaps not, but they certainly would have increased the odds. Even if they did not succeed, they would have positioned Washington far better with its allies and put it in a stronger position to lay blame for the treaty's end where it belonged—on Russia.

In the actual event, the Trump administration hardly tried. In January, Russian officials offered to exhibit the 9M729 to U.S. experts. U.S. officials could have taken that proposal and insisted on procedures for a meaningful exhibition. Instead, they flat out turned it down.

Much of the problem on the American side may lie with National Security Advisor John Bolton. He generally disdains arms control agreements as constraining U.S. capabilities and options (which is true, but they also constrain Russian capabilities and options). He had previously called for U.S. withdrawal from the INF Treaty.

Exhibitions of the 9M729 and Aegis Ashore facility could have opened a path to resolve each side's compliance concerns, but Moscow and Washington have not shown the needed political will. It looks like the treaty will meet its demise in August.

QUESTIONS ABOUT THE FUTURE OF NEW START

In contrast to the INF Treaty, Russia has complied with the limits of the 2010 New START Treaty, which required reductions by each country to no more than 1,550 deployed strategic warheads and no more than 700 deployed strategic missiles and bombers by February 2018. The United States also met the limits, though Russian officials question the adequacy of measures the U.S. military took to remove some strategic systems from treaty accountability.

New START by its terms will expire in February 2021, though the treaty allows extension for up to five years. Russian officials have proposed discussion of extension. In 2017, Trump administration officials said they would first have to complete the new nuclear posture review and see whether Russia met the February 2018 limits. Both of those boxes were checked more than a year ago. U.S. officials now say they are studying the question and see no rush.

New START extension should be a no-brainer. First, it would extend to 2026 the limits on Russian strategic forces and provide a mechanism to address new nuclear systems that the Russian military has under development. Second, extension would not affect U.S. strategic modernization plans, which the Pentagon designed to fit within New START's limits. Third, extension would continue the flow of information that the U.S. military and intelligence community receive about Russian strategic forces from data exchanges, notifications and on-site inspections. That information lets the U.S. military make smarter decisions about how to equip and operate U.S. strategic forces.

When asked about extension, however, Bolton has raised two alternatives: renegotiation of New START or a treaty modeled on the 2002 Strategic Offensive Reductions Treaty (SORT). Neither holds much promise.

Renegotiation would allow Washington to try to improve New START, perhaps with additional verification measures or expanded limits to capture nuclear weapons not now covered by the treaty. But Moscow would seek changes as well, starting with limits on missile defense and conventional strike systems, both of which are anathema to the Trump administration. Renegotiation would take a long time and have, at best, an uncertain prospect of success.

As for the SORT model, SORT limited just warheads (though with no verification measures); it did not constrain strategic missiles and bombers. While Moscow accepted such an agreement in 2002, Russian officials since 2008 have made clear that a strategic arms control agreement must limit missiles and bombers, as does New START.

Bolton opposed New START when the Senate discussed its ratification back in 2010. Neither Secretary of State Mike Pompeo nor Acting Secretary of Defense Patrick Shanahan seem to be advocates for the treaty. Although extension would be very much in the U.S. interest, the Trump administration appears inclined to let it expire.

NO STRATEGIC STABILITY TALKS

U.S. and Russian officials in the past have held strategic stability talks to take a broad look at developments that affect their strategic relationship. Such talks are useful, particularly when new developments, such as those in the cyber and space domains, emerge and when Russian nuclear doctrine has provoked concern in Washington and led to changes in the U.S. nuclear posture. Even if strategic stability talks do not spin off specific negotiations, they provide a venue for the sides to exchange views and better understand the concerns of the other.

During the Trump administration, a one-day session of strategic stability talks took place in September 2017. As of March 2019, it has not agreed to a second meeting.

AN UNSETTLING FUTURE

The Kremlin now faces a White House that attaches as little priority to reducing arms as it does—perhaps less.

For most of the five decades of U.S.-Soviet/Russian arms control negotiations, the American side took the lead. Moscow often struck a pose not of disinterest, but of less interest—likely for bargaining purposes. That is no longer the case. The Kremlin now faces a White House that attaches as little priority to reducing arms as it does—perhaps less. The U.S. President evinces no understanding of arms control, while his national security advisor apparently seeks to end it.

With the INF Treaty all but dead, New START's fate uncertain after 2021 and no sign of new initiatives on either side, arms control as practiced for some 50 years may be coming to an end or, at a minimum, to a pause. That occurs at a time when Russia and the United States have significant nuclear modernization programs underway. While the bulk of those programs aim primarily to replace old weapons with new ones, the sides are also developing nuclear capabilities that neither previously had in its arsenal. Economic constraints may limit an all-out arms race, but the strategic nuclear relationship seems headed for uncharted territory.

The end of the U.S.-Russian nuclear arms control regime would have wider impacts. If the two nuclear superpowers no longer are reducing—and no longer limiting—their nuclear arms, what credibility will they have to insist that other countries, such as North Korea, forgo nuclear weapons or that third countries sanction proliferating states? Will China decide to adjust its nuclear posture and move from its current modest stockpile of under 300 weapons toward a larger and more diverse arsenal?

The current course will lead to a less stable and secure world. The United States and Russia will be less able to predict future developments on the other side and thus will have to make expensive worst-case assumptions. It will make for a more complex and dangerous relationship. Perhaps then they will recall the lessons of the 1960s and 1980s that arms control, however imperfect, can offer a useful tool for managing great power competition.

https://www.brookings.edu/blog/order-from-chaos/2019/04/25/nuclear-security-arms-control-and-the-us-russia-relationship/

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Defense One (Washington, D.C.)

Was That a Small Nuclear Test…or Just a Football Game?

By Dale Anderson

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The international community relies on scientific analysis of seismic data to determine whether a country is conducting an underground nuclear test. With political decisions, diplomatic relations, and, potentially, military action at stake, it's critical that we make sure what we are seeing is what we think we are seeing. Our detection capability is especially important as proliferating nations' testing becomes more advanced, possibly allowing for smaller and smaller tests that are more difficult to detect. If we're going to be able to catch these bad actors, we cannot afford to be complacent. Staying ahead of the scientific and technological curve is imperative.

But first, how do we know a seismic reading is an underground nuclear test and not a mining explosion, an earthquake, or something else? It's harder to determine than you might think.

Take, for example, the earthquake that was recorded last summer when soccer fans all across Mexico City cheered their team's goal in a World Cup match. The initial assertion was that their collective jump-up-and-down energy shook the ground. It might have, but the energy was too dispersed. That earthquake measurement was caused by, well, an actual earthquake—in the city of Guerrero, about 140 miles southwest of Mexico City. Because they occurred around the same time, it tricked researchers into a false conclusion. In this case, no harm was done, but it clearly presents the problem seismologists all around the world face—particularly those who monitor for nuclear detonations.

An estimated 500,000 detectable earthquakes rattle the world each year. As our sensor networks get better, they observe smaller signals. While that's a positive development, it also complicates things. More "noise" ratchets up the risk of making determinations based on coincidence, not science.

Think of it like a criminal trial. Just because a person was in the vicinity of a crime and fits the description of the assailant doesn't mean they're guilty. And just as a good detective must comb through mountains of evidence to accurately identify the perpetrator, so must scientists scrutinize seismic data to pinpoint its source.

We do that using complicated math and physics and supercomputers, but it's not unlike a math problem you might have faced in school: If two trains left the same station traveling different speeds in different directions, when would they each arrive at their next stop? Those of us monitoring for nuclear tests have to answer this question—only in reverse, and with an added challenge: we don't know the originating station. We know what time the signals arrived at the monitoring stations, but we don't know where they came from. We need to work backwards to find out what time those signals left their source, and whether that source was one location or many.

To do this requires developing different computer calculations for different possible locations and figuring out how long it would take the signals to reach the monitoring stations. Do the calculated arrival times agree with the actual time recorded at the seismic stations? If so, then we have a "good association": we can be pretty certain the signals came from the same location.

We must do similar calculations related to the size of the seismic waves. As a wave travels through the earth to various sensors, the different paths will change the signal in different ways. By the time

it reaches a particular sensor, the wave size might have changed. To figure out the "true" size of a wave, we must undo the effects of distorting rock layers along the path. Then we can see the wave as it looked when it left the source. Again, we get a good association if the sizes of these "undone" sensor signals from different sensors are very similar to each other.

Good association requires an accurate physics understanding of how waves travel though the rock layers in the earth. Without it, we're just making assumptions.

For an example of good association, we have another sporting event to study: a 2011 playoff game between the Seattle Seahawks and the New Orleans Saints. In that football game, the Seahawks running back broke through multiple tackle attempts to run 67 yards for a touchdown. This cheering crowd's energy was concentrated enough to register on local seismic stations. In this instance, the researchers had good physics to point to a single source: the stadium.

We're not worried about underground nuclear testing on Puget Sound; those tests require massive infrastructure, including deep tunnels, heavy equipment, and sophisticated instrumentation. But when the earth rattles in a more suspect location and those seismic waves are traced back to a single source, we take a closer look—analyzing data from sensors that detect radionuclide gases in the atmosphere, low-frequency acoustic waves, and changes in water pressure caused by sound waves. Commercial satellites also provide imagery to look for changes in topography.

As claims of nuclear prowess are once again taking center stage in world affairs, all of this information and expertise is critical to inform decision makers. Teams of scientists in federal agencies and the top nuclear weapons laboratories—Los Alamos, Sandia, and Lawrence Livermore—are dedicated to continuing to refine and develop sensors and analyze the data they detect.

To catch countries that are trying to fly their nuclear weapons programs under the radar, it is imperative that we be vigilant—which means pushing the scientific boundaries. As we detect smaller events, we must make sure that we're directing our resources to track down real threats and not chasing "noise" that leads nowhere. Without state-of-the-art sensing and signature science, we're at greater risk. Simply put, as our adversaries' capabilities evolve, so must our own. That way, the next time the ground shakes, we know exactly what's causing it—and can respond accordingly.

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https://www.defenseone.com/ideas/2019/04/was-small-nuclear-testor-just-football-game/156569/

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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."