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OUTSIDE PERSPECTIVES ON NUCLEAR DETERRENCE POLICY AND POSTURE UPDATE

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HOUSE OF REPRESENTATIVES

ONE HUNDRED SIXTEENTH CONGRESS

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OUTSIDE PERSPECTIVES ON NUCLEAR DETERRENCE POLICY AND POSTURE UPDATE

HOUSE OF REPRESENTATIVES,
COMMITTEE ON ARMED SERVICES,
Washington, DC, Wednesday, March 6, 2019.

The committee met, pursuant to notice, at 10:01 a.m., in room 2118, Rayburn House Office Building, Hon. Adam Smith (chairman of the committee) presiding.

OPENING STATEMENT OF HON. ADAM SMITH, A REPRESENTATIVE FROM WASHINGTON, CHAIRMAN, COMMITTEE ON ARMED SERVICES

The CHAIRMAN. Thank you, and I want to welcome our witnesses, members of the audience, members of the committee. We are here today to discuss the Nuclear Posture Review and nuclear policy going forward, in terms of our nuclear weapons.

Before we get to that, a couple of housekeeping issues.

For the hearing today, as I understand it, the witnesses don't have a hard stop. I do at 12:30. If there are still members around that want to ask questions at that point, I will have somebody else on the Democratic side take the chair to get through those questions, and we will go from there. We will stop at 12:30.

And tomorrow, when we have our first posture hearing, we are going to, for questioning purposes—and you should have gotten notice on this—go from the bottom up. So we will start with Mrs. Luria and work our way up for questioning. So just in terms of your planning tomorrow, we are going to try and do it—no, we are actually going to succeed, we are going to do it that way—have the more junior members get to go first, because we have so many members of committee, frequently we have hearings and they don't get an opportunity to ask their questions.

With that, we will start this hearing. I want to start by welcoming our witnesses: Ms. Joan Rohlfing, president and COO [chief operating officer] of the Nuclear Threat Initiative; Dr. Bruce Blair, who is research scholar, program on science and global security at Princeton University; and the Honorable Franklin C. Miller, principal at The Scowcroft Group.

I think this is an incredibly important topic to discuss. Two things I want to make clear at the start. I completely support a strong and robust nuclear deterrent. We need nuclear weapons in the world that we live in today in order to deter our adversaries and meet our national security objectives as a country.

Personally, I don't think that is debatable. We have, certainly, Russia, with their nuclear weapons; China, as well; rising threats from North Korea and Iran. And the best and most straightforward

way to deter people from using nuclear weapons is if you are in a position to assure that they will be destroyed if they do. So having a nuclear deterrent is incredibly important.

Second, our nuclear weapons have been around for a long time, and I have no question that we need to update and upgrade those weapons, look at what is working, what isn't working. We need to recapitalize our nuclear structure.

What I question is whether or not we need to do it to the tune of more than $1.2 trillion, as both the 2010 and the 2018 Nuclear Posture Review has called into question. And this hearing, I hope, will help us answer that question.

Do we have to have absolutely everything that we have had before, plus some of the weapons systems that the Trump administration is now talking about adding, including a new, long-range stand-off missile, which was requested before the Trump administration, and a new low-yield nuclear weapon, launchable from our submarines, which is new to the Trump administration?

The Congressional Budget Office just recently went through and analyzed all that is in the Nuclear Posture Review, and gave some options, in terms of we could not do that and here is how much money we would save. And I think those are questions that need to be asked, for several reasons.

First of all, we have a $22 trillion debt that is going up by about $1 trillion. In fact, it increased dramatically in the first quarter of this year over the first quarter of last year.

We also have a large number of needs within the national security environment. Forget for the moment everything else that the Federal Government does. Just within national security we have had a number of studies that have come out. We have heard the Secretary of the Air Force say that she needs 25 percent more aircraft for the Air Force. We just had a review of our missile defense program, which also said we need a dramatic increase. The Navy still says they need a 355-ship Navy, which is significantly more than we have now. The Army would like to build towards an end strength that is substantially larger than it is right now.

And the question I have is—well, not the question. The statement is, that math doesn't work. We are not going to have enough money to do all of that. So what we have to, at least in part, think about is what can we not do. Where can we save money?

And within the nuclear weapons area, I believe that a credible deterrent can be presented for less than is called for in the Nuclear Posture Review. Now, I understand that a bipartisan group of people disagree with me on that. But a bipartisan group of people to some degree agree with me. So we are here to have that discussion and that debate.

So number one is, you know, can we save money in here and still meet our national security objectives, still deter our adversaries? Because if we can, it is something we should talk about. And these are things that many people have contemplated. Former Secretary of Defense Jim Mattis, you know, when asked about whether or not the triad was necessary, said he wasn't sure, and talked about, well, if we had a dyad and didn't have the ICBMs [intercontinental ballistic missiles], then we would have a much smaller risk of miscalculation, based on a false alarm.

You know, very, very hawkish people have contemplated the notion that we don't need as many nuclear weapons as are contemplated in the Nuclear Posture Review, and that having that many is potentially destabilizing. And those are the other two points of this hearing that I really hope we will get into a discussion on.

Number one is the concept of arms control. We, I feel, need to have a discussion with the Russians and, yes, with the Chinese about that issue. A number of former defense officials, including former chairman of the Senate Armed Services Committee Sam Nunn, former Secretary William Perry, former Secretary George Schultz, have said that we are stumbling towards a nuclear catastrophe because we have not rebooted any sort of arms control discussion or any sort of discussion with the Russians since the end of the Cold War about how we prevent an accidental nuclear war.

So those are our other two—we are now pulling out of the INF [Intermediate-Range Nuclear Forces] Treaty, there is the potential for us to pull out of the New START [Strategic Arms Reduction] Treaty. And I am not presupposing at the moment that any one treaty is the exact right one, but I am deeply concerned about the fact that the administration right now has no interest in discussing any such treaty with China or Russia, not even having the conversation.

We are now about to kick off another nuclear arms race. Is that a smart thing to do, without at least talking to our adversaries, and which brings us to the third issue, and that is stumbling into a nuclear war.

Throughout the Cold War—and if you read Secretary Perry's book about the number of times during the Cold War when we were this close to having a nuclear war, based on false alarms, based on information that was wrong—how do we make sure that we prevent that?

Well, a big part of it is dialogue. And right now we don't have that dialogue with the Russians or the Chinese. We do have that dialogue with North Korea. But I think making sure that we have a dialogue, and we learn the lessons of the Cold War and what—frankly, President Reagan was the one who put those two things most in place: arms control treaties and open discussion with our then Soviet adversaries about how to prevent a nuclear war.

So I believe in the deterrents, I know we need nuclear weapons. But do we need $1.2 trillion's worth? And it may be more than that, once the final bill comes done. I have served on this committee long enough, I have a hard time remembering a single program that actually came in for less than they projected it, much less one that's spread out over 30 years and encompasses as many items as the Nuclear Posture Review does.

So how does that affect our other needs in the defense, and are we not able to meet our nuclear needs for less money than is contemplated? It is a discussion I hope to have today.

And with that, I will yield to the ranking member for his opening statement.

STATEMENT OF HON. WILLIAM M. "MAC" THORNBERRY, A REPRESENTATIVE FROM TEXAS, RANKING MEMBER, COMMITTEE ON ARMED SERVICES

Mr. THORNBERRY. Thank you, Mr. Chairman. I too want to welcome our witnesses here. I completely agree with your statement that this is a very important topic, and I believe it is useful to have some different perspectives on our nuclear deterrent.

I start from a few fundamentals that I believe have been at the center of U.S. strategic thought for 75 years in both parties. One of those fundamentals is that a strong nuclear deterrent is the cornerstone of American national security. And while various books may say we have come close—and obviously, there have been some instances, Cuban Missile Crisis, et cetera, that were far too close—it still is the fact that since the end of World War II nuclear weapons have not been used. And I believe that is largely the result of U.S. nuclear superiority made it clear that an aggressor could not benefit from it. We have had numerous Secretaries of Defense testify before this committee over the years that this was the highest priority of the Department of Defense.

A second fundamental is that the Russians and the Chinese are modernizing their nuclear forces. I would simply quote from an article in RealClearDefense by Peter Hussey that says, in fact, early in the next decade, around 2021, Russia will have modernized close to 100 percent of its bombers, land-based missiles, and submarines, and China will, by the end of the next decade, have a fully modernized and expanded nuclear deterrent as well, with mobile ICBMs, a new missile-armed submarine, and long-range cruise missiles.

Now, I hope that this committee will get into a classified session at some point with our intelligence community and get their assessment of what the Russians and the Chinese are doing. But the point is it is not just about us. It is about them, as well.

Third fundamental, I believe, is that our weapons and delivery systems were designed and built for a different time, with different circumstances, and need to be updated. Part of it is just because of aging. It is kind of like anything else in life. If you neglect your health, if you neglect your roof, sometimes the bills are going to come due. And unfortunately, we are still dependent upon delivery systems and weapons that were largely built during the Reagan era.

And so it makes sense that we will have to make up for past neglect, although at no point does that make-up require more than 6.4 percent of the defense budget. Now, can we afford 6 percent of the defense budget for the cornerstone of American national security? Well, that may be an issue where we have differences.

A couple other fundamentals. Number one—I mean number four in my list, we cannot wish away the existence of nuclear weapons. It seems to me that some of the writings that one comes across can kind of hope we can negotiate or wish away their existence. That is not going to occur. If we are going to fulfill our responsibilities to defend the country, we have to make sure that our deterrent is without question.

And that leads me to my fifth fundamental assumption that has been at the center of American strategic thought for 75 years, and that is America and our allies depend on a U.S. nuclear deterrent

that is credible, safe, and reliable without question. And I think the big issue before us this year, and at this time, is the credibility of that deterrent. And if you are allies in Europe or allies in Asia, if that credibility starts to wane, you start to think about other options.

And that is part of the reason, whether we modernize our delivery systems—in my view, all three legs of the triad—whether we modernize the weapons themselves is not just a question for us, it is a question of whether our allies trust that our superiority will be to such an extent that they can rest secured, and not having to have their own nuclear deterrent, that they can rest secured in depending on it, as well.

All of those are part of the reasons, Mr. Chairman, I agree with you that this is a big, important topic that we should not take lightly, or assume that slogans can somehow overcome the U.S. policy of the last 75 years. I look forward to hearing these witnesses and others to come.

I yield back.

The CHAIRMAN. Thank you. We will start with Ms. Rohlfing.

STATEMENT OF JOAN ROHLFING, PRESIDENT AND CHIEF OPERATING OFFICER, NUCLEAR THREAT INITIATIVE

Ms. ROHLFING. Good morning, and thank you. I come before you as the president of the Nuclear Threat Initiative, a non-partisan, global security organization——

The CHAIRMAN. I am sorry. You have to have that microphone, like, right here in front of you.

Ms. ROHLFING. Even closer?

The CHAIRMAN. Yes.

Ms. ROHLFING. Is that better?

The CHAIRMAN. Yes. Well, to the side. Just speak right into it, and that way we can hear you better.

Ms. ROHLFING. Great.

The CHAIRMAN. Thank you.

Ms. ROHLFING. I come before you as the president of the Nuclear Threat Initiative, a non-partisan, global security organization working to reduce the risk of use of weapons of mass destruction and disruption.

As a former professional staff member of this committee during Les Aspin's chairmanship, I am honored to appear before you, and I commend you for your leadership on this important issue.

The topic of today's hearing is one of critical importance for our country and the world. In the short time that I have for my opening statement, I want to highlight a few key points.

First, we have arrived at a very dangerous moment, where the risk of nuclear use is as high as it has ever been since the height of the Cold War. Today we live in an environment where new technologies like cyber pose significant challenges for the integrity of nuclear forces, where terrorists are trying to acquire nuclear capabilities, and where nuclear weapons have spread to nine states, some of which, like India and Pakistan, are engaged in ongoing regional conflict.

We have reached a nadir in our relationship with Russia, with no strategy for how to manage the existential nuclear threat be-

tween us, with no ongoing dialogue between the United States and Russia. And with regularly occurring close calls between our two militaries, we are at a high risk of blundering into conflict.

Second, we are headed in the wrong direction. Instead of focusing on policies, practices, and deployment decisions that move us out of danger and reduce the risk of nuclear use, we are taking actions that increase the chances of use. We have been increasing, rather than decreasing, our reliance on nuclear weapons. The administration is proposing to move forward with new types of weapons and new scenarios for their use.

And, perhaps most troubling, we have been systematically removing the guardrails that have regulated nuclear competition and reduced nuclear threats for more than five decades: the agreements, treaties, dialogue, negotiations, and verification that have helped to keep us safe. We are now at a point where the only protective guardrail still in place is the New START Treaty, which will expire in less than 2 years, unless it is extended, something the United States and Russia can and should do on a priority basis.

Finally, Congress has a critical role to play in supporting policies, forces, and actions that reduce the risk of use, prevent proliferation pressures, and keep in place the guardrails of nuclear stability, predictability, and transparency that keep our country safe.

What can Congress do to help reduce nuclear dangers? Several specific recommendations for your consideration include: number one, Congress must take the lead in creating the political space for re-engagement with Russia on nuclear threat reduction.

Despite all of our differences with Russia, we still have an existential common interest in preventing a nuclear weapon from being used by accident, mistake, or blunder. Congress should work with the administration to encourage the resumption of dialogue and negotiations in multiple channels: diplomatically, militarily, and among legislative leaders on both sides.

Second, Congress should work to increase leadership decision time for nuclear use by supporting the removal of nuclear weapons from prompt launch. Our most vulnerable, least survivable force, the ICBM force, would be a logical place to begin this effort. The United States and Russia should move on this together.

Third, the United States does not need to build or deploy new low-yield weapons. We have a robust nuclear deterrent today, one that is capable of being used anywhere on the globe. Deploying new low-yield weapons lowers the threshold for nuclear use, increases our reliance on nuclear weapons, and undermines U.S. efforts to prevent the further spread of nuclear weapons. It is folly to bet our children's future on the premise that a use or exchange of nuclear weapons could remain limited and controllable.

Fourth, Congress should encourage the administration to extend New START this year.

And fifth, and finally, on nuclear use policy, Congress should consider legislation to ensure that any decision to authorize the use of a nuclear weapon is deliberate, justifiable under international law, and consistent with authorities granted in the Constitution. Legislating a congressional role in the authorization of the use of nuclear weapons, in particular one that would limit the executive

branch's ability to use a nuclear weapon first, is one option that should be considered.

I will stop here, and look forward to taking your questions. Thank you.

[The prepared statement of Ms. Rohlfing can be found in the Appendix on page 57.]

The CHAIRMAN. Thank you.

Dr. Blair.

STATEMENT OF BRUCE G. BLAIR, RESEARCH SCHOLAR, PROGRAM ON SCIENCE AND GLOBAL SECURITY, PRINCETON UNIVERSITY

Dr. BLAIR. Chairman Smith, Ranking Member Thornberry, and other distinguished members of this committee, thank you very much for the invitation to appear here today. It is a great honor for me to testify.

Like many other Americans of my generation, I first learned about nuclear weapons in 1962, when President Kennedy threatened the Soviet Union to—that we would unleash our nuclear might against them if they were to launch nuclear weapons from Cuba against the United States. At that time it was quite reassuring to me to hear that we had a secure second-strike force capable of inflicting unacceptable damage in retaliation to such an attack.

Now I first learned that simply being able to destroy Russia as a viable country was not, in fact, the reality of our nuclear weapons policy when I became a nuclear missile launch officer and a support officer for the Strategic Air Command's Looking Glass airborne command post. Our planners saw nuclear weapons quite differently. They saw them as tools for the actual or coercive use during a nuclear conflict, primarily to destroy the deterrent capabilities of the Soviet Union and China/North Korea.

This warfighting strategy thus ran contrary to and contradicted the idea of stability based on mutual deterrence, which is the very foundation of our nuclear security. And as we tried to neutralize each other's second-strike forces, we managed only to fuel an arms race and increase the chances of nuclear war by design or by accident.

Thousands of U.S. and Russian strategic nuclear weapons aimed largely at each other stood—and still stand today—ready for immediate first use or launch on warning. Back then, as now, the President would have just a few minutes to authorize launch on warning, on the basis of enemy attack indications that could be false or misleading, and today possibly caused by cyber interference.

We heard during the opening remarks about false alarms during the Cold War. None of them rose to the level of a President of the United States. Over the last 10 years we have had, on multiple occasions, ambiguous ballistic missile threats that have risen to the level of Presidents. So this is not a historical concern.

Our and Russia's hair-trigger launch postures, driven by vulnerabilities of our own making, continue to run the risk that fear, miscalculation, misperception, accident, or false warning could trigger a nuclear exchange. As you have heard—and I agree—the risk of

blundering into nuclear war presents what is, by far, the greatest immediate threat to the United States today.

So what do we do? I agree with all the suggestions that I have heard from Joan. But I would also propose that we return to first principles, and design for ourselves a posture for assured retaliation that is smaller, but is more survivable and more stable than the one we presently have and the one that we currently plan to have.

This posture would hold at risk Russia's, China's, and North Korea's key elements of state power, economy, and leadership. It would require, by my estimation—and I think the Pentagon planning is in—aligned with this—it would require covering about 450 aim points in those 3 countries, coverage that, in my view, would easily meet any reasonable judgement of actual deterrent requirements.

But pivoting away from targeting opposing forces and from the fantasy of controlling and dominating nuclear escalation would allow us to eliminate most of the 4,000 weapons in the current active stockpile. Only five or six of the planned *Columbia*-class submarines would be needed to be built. That is it.

All other existing and planned U.S. nuclear weapons could be scrapped. This would mean eliminating the land-based missile force, the ICBMs. But it is a vulnerable force that weakens, not strengthens the triad. We are better off without it.

If you want a stable triad that includes land-based missiles, then a mobile basing mode is required. Are you prepared to go that way?

The most important project in this modernization program should be fixing our vulnerable command, control, communications, and intelligence systems, C3I. It has always been the Achilles heel of our posture. It would likely collapse within hours into a nuclear conflict. So fixing this is essential for any strategy, including assured retaliation, and for enabling the President to intelligently choose a response if deterrence should fail.

So instead of modernizing the—all three of these legs, I think it is most important that we—as Joan indicated—increase Presidential decision time. That should be our top priority.

And last but not least, pivoting away from warfighting means recognizing that the sole purpose of nuclear weapons is to deter their use by others. It is not to deter conventional aggression. We have ample capabilities with our allies to deter, defeat, and punish conventional aggression.

And the flip side, the operational side of sole purpose, is no first use. No first use is axiomatic and true deterrence because it means threatening to respond to an attack, not to initiating one. No first use is further justified by the absence of foreseeable scenarios, in my view, that would ever motivate a U.S. President to use nuclear weapons first.

Let me close there, and thank you for your attention and look forward to questions, discussion.

[The prepared statement of Dr. Blair can be found in the Appendix on page 69.]

The CHAIRMAN. Thank you.

Mr. Miller.

STATEMENT OF HON. FRANKLIN C. MILLER, PRINCIPAL, THE SCOWCROFT GROUP

Mr. MILLER. Chairman Smith, Ranking Member Thornberry, members of the committee, I appear before you today in my capacity as a private individual, not representing or speaking for any other individual, institution, or entity. And the answers and positions I take before you reflect solely my personal views, except when I quote specifically official U.S. policy.

I thank you for inviting me to discuss a subject to which I have dedicated my entire professional life, and I spent most of three decades actively formulating deterrence in defense policy in the Department of Defense and at the National Security Council.

In the two Bush administrations I led reviews that lowered the number of U.S. strategic nuclear weapons by 65 percent and 37 percent, respectively. Those reductions created the START II Treaty, enabled the 2002 Moscow Treaty, and resulted, cumulatively, in about an 80 percent cut from U.S. force levels in 1989.

So I sit before you this morning as neither an advocate of massive arsenals, nor an opponent of arms control. My principal purpose this morning is to distinguish fact from rhetoric and fiction.

For starters, the nuclear deterrence policy and posture of the United States today is squarely in the mainstream of U.S. policy as it has existed in Democratic and Republican administrations for over almost 60 years. That policy and that posture is premised on the firm belief that a nuclear war cannot be won and must not be fought.

That recognition on our part, however, is not sufficient. It is essential that potential enemy leaders understand and accept that, as well. And the greatest risk of nuclear war today lies in a potential enemy leadership miscalculating and believing it can carry out a successful attack against ourselves or our allies.

As a result, U.S. policy seeks to deter, to prevent nuclear and major conventional attack against ourselves and our allies. It is not what some call a warfighting policy. It is a deterrence policy.

Deterrence rests on the premise that we will maintain the capability to retaliate against the assets which potential enemy leaders value most. In the case of Russia and China, those valued assets are the elements of state power: the senior leadership itself; yes, their military forces; their internal security forces; their ability to command and control their nation; and the industrial potential to sustain war.

For almost 60 years the United States has accomplished this goal principally by maintaining a triad of nuclear forces undergirded by a command and control infrastructure in a nuclear weapons complex. And that triad has been recognized by all administrations since President Eisenhower, Democratic and Republican alike, as unique and vital. Its combination of three basing modes, each with unique strengths and different but offsetting vulnerabilities, separate attack azimuths, and complementary alert postures, presents potential enemy offenses and defenses with insurmountable obstacles. It is that combination which provides for deterrent stability, because an aggressor cannot preemptively destroy the triad or prevent the retaliation it would impose. That is why it is the underpinning for our nuclear forces today.

And Mr. Chairman, you mentioned Secretary Mattis's doubts about the triad when he came to office. But this is what the nuclear posture—as you said, using Secretary Mattis's voice, "I have questioned the triad and I cannot solve the deterrent problem reducing it from a triad. I have been persuaded that the triad, in its framework, is the right way to go."

Due to deferrals of modernization that should have started about 15 years ago, our nuclear forces are well beyond their expected service lives, and they must either be modernized or retired. History has demonstrated that modernization is the surer path towards limiting the chances of nuclear war.

There are two fundamental facts with regard to that modernization I would like to point out to the committee. First, the U.S. program is not creating a nuclear arms race. Russia and China began modernizing and expanding their nuclear forces in the early 2000s, and they have been and continue to field many new and advanced nuclear systems.

In sharp contrast, the United States will not begin to field replacements for its Cold War-era triad until the mid to late 2020s. And any notion, therefore, that the U.S. modernization is spurring a new arms race is counter-factual and wholly without merit.

Second, modernizing the triad is eminently affordable. Critics of modernization have dramatically inflated that cost, throwing around a 30-year life cycle to produce a sticker shock.

The truth is that the cost of maintaining the nuclear modernization program, even when in full swing by the 2020s, is not expected to exceed between 3 to 4 percent of the defense budget. When including the cost of operating the deterrent, the total cost of protecting America and our allies from nuclear and major non-nuclear attack is between 6 to 7 percent of the defense budget, not too much to pay to prevent an existential threat.

I look forward to elaborating on these points and other topics of the committee. In particular, I look forward to elaborating on why the concepts of de-alerting our nuclear forces and adopting a policy of no first use, while of superficial and popular appeal, will in fact produce instability, undercut deterrence, and cause great concern among U.S. allies, while having no effect on Russia or China.

Importantly, I look forward to discussing arms control, the New START Treaty, the INF Treaty, and I look forward to discussing why the introduction of a small yield—a small number of low-yield Trident warheads into our force is so very important today. I cannot think of another weapons system in the recent past which is so misunderstood, mischaracterized, or demonized as the low-yield Trident.

I have submitted formal written testimony to the committee and respectfully request that it be included in the record.

[The prepared statement of Mr. Miller can be found in the Appendix on page 87.]

The CHAIRMAN. Thank you. I have more questions than I have time for. I will try to be quick about it.

On the triad issue, the ICBMs are stationary, they are easily identifiable by the enemy, in terms of knowing where they are. And also, since they are not as survivable as, you know, the bombers and the nuclear subs, which can—which they will not know where

they are, in all likelihood, you know, if they are launched on, it is sort of use it or lose it at that point. If you think there is missiles coming in, you had better launch them, or the ICBMs are gone.

So what exactly do the ICBMs add to that deterrence? And I completely agree with you, we have to have the capability that they know that even if they try and strike us, that they can't take out our weapons. That is the beauty of the submarines and the bombers, is that they are far easier to conceal. But what exactly do the ICBMs add to the deterrents?

Yeah, I will start with Mr. Miller and then go to Dr. Blair.

Mr. MILLER. Thank you, sir. First of all, I point out that, on a day-to-day basis, we only have two legs of the triad. The bombers are not on alert, they are not armed, and so you are basically dealing with ICBMs and submarines.

Second, we don't have a launch under—attack launch-on-warning posture that the deterrent relies upon.

Many, many years ago we came up with plans and procedures so that the President has the option to launch ICBMs or not. But our deterrent does not rely on launch on warning.

The CHAIRMAN. Right.

Mr. MILLER. Third, 400 ICBM silos scattered across the United States. If an enemy wants to neutralize those, that means putting at least 400 to 800 warheads in the air. There is no question that that is a massive attack on the United States, which will draw a massive response. And that is an important indicator of what is going on in the world at that time.

And last, the ICBMs are single-warhead systems. So that provides flexibility in a crisis, as a single warhead.

The CHAIRMAN. Dr. Blair.

Dr. BLAIR. As Frank mentioned, we actually have a monad today because the bombers are off alert and vulnerable. The ICBM force is vulnerable, and offers nothing to second-strike deterrence. Our second-strike deterrence capability resides entirely in our submarine force at sea.

What is worse is that it not only doesn't contribute to deterrence as the way I define it, as opposed to, let's say, the use of those weapons in a first strike, in a warfighting capacity, that those weapons on hair-trigger alert—and I will define that, if you would like, because I use the term in a very specific sense—create pressure on the President to consider the launch of those weapons very quickly, if there are indications of an attack against North America.

And I use the term "hair-trigger" in the following sense.

First, those Minuteman missiles are armed, they are targeted, they are fueled, and their gyroscopes are spinning. And they will fire instantly upon receipt of three short bursts of computer code. The weapons themselves, they will fire if they get that code. Hopefully, it only would come from authorized sources directed by the President.

Secondly, because of the pressure to use or lose those forces, we would start a launch emergency procedure involving the President that—it is almost like, you know, showdown at O.K. Corral at high noon. You get indications of a possible attack against us, or even a flinch or a false alarm, a process begins that I describe as the

rote enactment of a prepared script. There is no deliberation involved.

The CHAIRMAN. I have got to move on, because I want to get some other people.

Dr. BLAIR. Right, okay.

The CHAIRMAN. Dr.——

Dr. BLAIR. Sorry.

The CHAIRMAN. Ms. Rohlfing, sorry, do you have anything?

Ms. ROHLFING. Thank you. So I would go back to first principles, and just note that we, as a nation, ought to be really focused on preventing the risk of use of nuclear weapons. And when I evaluate the ICBM leg of the triad, I am concerned about its lack of survivability.

And I agree with Bruce. The fact that they are use it or lose it weapons puts pressure on a decision maker to make a rapid decision in a very short amount of time——

The CHAIRMAN. And I think that that is the ultimate question from all three. There is not a lot of disagreement here, in terms of what the purpose of the nuclear weapons are. The question is how much is enough. And that is really what I am debating.

And yes, when you look at the number of nuclear weapons that we had during the height of the Cold War, we have a lot less now. But the number of nuclear weapons we had during the height of the Cold War—and this may be—it was enough to, like, destroy the world, like, seven times over or something.

So, you know, a nuclear weapon packs a hell of a lot of punch. And China's approach—and I know they are modernizing their force, but China has less than 300 nuclear weapons, and they figure that is enough to inflict an enormous amount of damage on anyone who would try to attack them, enough to discourage them. And that is what I question.

And I know the New START Treaty has pulled it way down. I think the number is 1,550 delivery systems. But keep in mind delivery systems—there is an unlimited amount of weapons that you can have in storage. There is no limit on that. These are merely the ones that are "deployed."

So you got 15—and also 1,550 delivery mechanisms. That is not 1,550 warheads. It can be more warheads than that.

So—and I guess, Mr. Miller, I will close with you and two questions. One, 1,000 nuclear weapons, I mean, that is a pretty powerful amount, in and of itself. And we have a lot more than that. What is the calculus that says that we need more than that?

And then I will ask you a quick question about the low-yield thing.

Mr. MILLER. The calculus as to what it takes to deter is something that is worked out by Strategic Command and given to the President through the Secretary of Defense, based on what are the strategic valued assets of the Russian and Chinese leaderships, not mirror imaging what we hold dear, but what they hold dear, what——

The CHAIRMAN. See, do you think that we couldn't sufficiently discourage that? I mean if we dropped 100 nuclear weapons on Russia, that wouldn't be enough of a discouragement?

Mr. MILLER. I think that the Russian leadership looks at nuclear war differently than we do. And I am not going to give you a number. You can always say take the 10 least important weapons off. I mean I did that. I cut the force dramatically in——

The CHAIRMAN. You did.

Mr. MILLER. But the question is what do you need to hold that risk? And I think the current answer is what you get from Strategic Command. It is what you need to hold Russia and China and a reserve force for other contingencies.

The CHAIRMAN. Just quick—one thing I have learned on this committee is within the Defense Department and within the people who make the weapons and lobby them, I have never had them come up and say, "We are good, don't buy any more." There is a certain bias built into that system that says we always need a little more.

And to some extent, as chairman of the committee, that is something I am trying to do differently. I have been here for 22 years, and that is what we do. We come in, oh my gosh, we are not ready. We need more, more, more, more, more.

So I hear what you are saying. But I have seen that bias over and over again. So I want that bias balanced against some actual numbers. And, you know, when I asked you if 100 nuclear weapons would discourage Russia, the look on your face was basically yes. I mean you didn't say it, but, you know, that is a pretty powerful punch. So that is what I am trying to balance out.

Now, quickly on the low-yield thing, the problem with the low-yield thing is when you start contemplating—the argument is you contemplate the discussion that you could win a nuclear—that you could launch a low-yield nuclear weapon and it wouldn't trigger a catastrophic response. Okay? I don't agree with that.

Mr. MILLER. I don't, either.

The CHAIRMAN. I think it is unbelievably risky if you——

Mr. MILLER. I agree with that.

The CHAIRMAN. So the benefit of a low-yield nuclear weapon, supposedly, is, well, if they hit us with a low-yield, we can have a proportionate response.

When it comes to nuclear deterrents, I don't really care about a proportionate response. I think we need to make it clear if you use a nuclear weapon, it is a nuclear weapon. And if the smallest thing we have is bigger than the one you launched at us, well, too damn bad. Okay? We are going to hit you with it.

So I don't get the notion that a low-yield nuclear weapon does anything other than potentially make people think wrong, and doesn't add anything to our deterrent capability.

Mr. MILLER. Well, back to the broad discussion, Congressman Smith, I agree with that. You and I may absolutely agree on that point.

But I think where we start is the fact that, beginning at the—in the late 1990s, early 2000s, the Russian military devised a strategy for the use of low-yield nuclear weapons to win on the battlefield. They then went out and bought new weapons to carry out that strategy, and they have practiced that strategy. And they did all of that in the face of our existing triad——

The CHAIRMAN. Got that. Sorry to interrupt, but why don't we tell them that, okay, if you do that, we are going to hit you with a nuclear weapon——

Mr. MILLER. Well, again——

The CHAIRMAN [continuing]. And we don't care what size it is.

Mr. MILLER. My point is they seem to be convinced that they—that there was a gap in our deterrence structure, and that they spent a lot of money to go out and build these weapons.

Now, deterrence is about getting in the mind of the other person. Not in your mind, sir, or in mine. And if they spent that money, and if they have exercised it, and if they have threatened it, the point is to have something that goes back and says, "We are not going to match your whole theater nuclear force structure. We are going to have a small number of these weapons that can respond to meet what you thought was a deterrent gap." That is all.

Don't go there in the first place, don't use a nuclear weapon, because it could escalate out of control. Are you prepared to bet Mother Russia on a small piece of Latvia?

The CHAIRMAN. All right, fair enough. I have got to get to Mr. Thornberry.

Mr. THORNBERRY. Thank you, Mr. Chairman. And Mr. Miller, I thought that was a helpful conversation.

One of the largest problems we have, I think, in thinking about nuclear deterrents, is that credibility is in the mind of the adversary. And we can make all sorts of proclamations, and we can sign all sorts of pieces of paper and do all sorts of things, but it—the question is what is in their mind, in their calculation, what do they see as vulnerabilities, and what do they see that they can get away with. If they think we are just a little bit better than they are, then the tendency is to test it. If we are a whole bunch better than they are, then you have less of a tendency to test it. At least that is part of my theory.

I may stretch you for a second in going back in history, so tell me if you are not comfortable with this. Ms. Rohlfing talked about coming—working on the committee during Les—Secretary Aspin's time. My staff time in Washington goes back a little further than that, when Glickham and Pershing II deployments were being debated. And it—I am struck by the fact, with all of this debate on the INF Treaty, that so little discussion occurs around the vicious opposition that President Reagan got to deploying the intermediate-range systems in Europe to begin with.

We heard a lot of the same arguments: "Well, this will lower the threshold of nuclear weapons," "This is provocative to the Russians," even though the Russians already had their systems there. All sorts—that there is less flying time, so that will make it more likely that there will be a nuclear exchange.

There were demonstrations here, demonstrations in Europe—some of which we later found out were paid for by the KGB [Soviet Committee for State Security], by the way—but the tremendous opposition to those deployments. And yet NATO [North Atlantic Treaty Organization] stuck together, NATO deployed those systems, and it was only because NATO deployed the systems that an INF Treaty was able to be signed by Reagan and Gorbachev.

I would be interested in your historical reflection, because sometimes I think we get the cart before the horse. We think the paper is the thing that matters, but what really matters is the military strength that leads both sides to believe that it is in their best interest to sign some sort of treaty, or reach some sort of agreement. To me, that is the lesson of INF.

But again, I am stretching you. I don't know. We didn't talk about this. Do you have reflections over your 30 years?

Mr. MILLER. Mr. Thornberry, I think you are right. I think that was an interesting time, when the Russians thought they could intimidate the NATO allies and that they could break the consensus on deployments.

What I find disturbing is that, in a period where after the Bush 41-Gorbachev initiative, where we virtually eliminated our theater-based nuclear forces, the Russians who had signed that same pledge decided in the late 1990s to start building those forces up.

Again, one can say that the Russians are foolish, that they waste their money, that this is a wrongheaded thing, that the leadership didn't know what the military was doing. I don't believe any of that. What I am concerned about is the Russian military believes that there are advantages that they could obtain by putting those weapons in the field and threatening our allies.

So again, a small deterrent capability in the form of a limited number of low-yield Trident, I believe, answers that without having to return to a whole panoply of theater nuclear weapons to defend the alliance. And I think the lessons apply. Yes, sir.

Mr. THORNBERRY. Thank you, Mr. Chairman. I will give other folks a chance.

The CHAIRMAN. Mr. Courtney.

Mr. COURTNEY. Thank you, Mr. Chairman. And thank you for the witnesses and, you know, very thoughtful hearing, important, because the Nuclear Posture Review kind of came over late last year, and it really, I think, had some substantive changes that really need to be drilled down and explored much more deeply.

And one point I just would like to get clarification from you, Mr. Miller, is that, you know, as Ms. Rohlfing said, New START, the clock is ticking, in terms of its expiration. Do you support extending New START?

Mr. MILLER. I believe that New START is a necessary, but not sufficient approach to our current condition.

If I could describe, New START caps the traditional strategic forces of both sides. New START does nothing to cover the threat of the exotic weapons that Mr. Putin has been waving around. New START does nothing to cover the short-range threat to our allies.

I would like to see New START extended in the context of a new negotiation which captures all U.S. and Russian nuclear weapons of all ranges and all types. That, I think, would cover our security——

Mr. COURTNEY. Well, actually, I think there would probably be agreement across the table about the fact that New START should be enhanced, as well as extended. But, I mean, frankly, I think we are—with this administration, I mean, we may be looking at a situation where there is no effort made to extend it. And I just think it is important to really emphasize that, you know, that is a foun-

dational backdrop to this, you know, nuclear posture policy of the country.

In terms of low-yield, which, again, was really, I think, one of the real differentiating aspects of the review that came over last year, you know, coming from a district where there is a submarine force, and talking to folks there—and maybe, you know, I will talk to one of the other witnesses about this—is that—I mean one of the concerns that I have heard is just that if you have got a submarine out there that has got, you know, sort of mixed and matched missiles, in terms of low-yield/high-yield, if the decision is made to fire one of those, it is really—for the adversary, it is impossible to determine what kind of missile is coming at them. I mean they are not sort of color-coded.

And I guess, you know, again, Ms. Rohlfing, I just sort of wonder if you would sort of talk about, you know, that question about whether or not you can really control a nuclear conflict once the missiles start flying, regardless of whether they are high-yield or low-yield.

Ms. ROHLFING. Thank you. I want to reply and say, first of all, I don't believe there is a deterrence gap at low-yield. We have other low-yield options in the arsenal. And even setting that aside, I think our deterrent today is robust, comprehensive, and is perfectly capable of deterring a nuclear attack at any yield.

So you raised the question of could an adversary discriminate, if we were to launch a submarine-launched ballistic missile, whether it is a low-yield or a regular-yield weapon, and the answer is no. I think, from the standpoint of watching an incoming launch, our adversary would expect—would have to anticipate that it is a regular—that is, high, you know, highly capable weapon, capable of enormous destruction. So that is another issue.

But I think we are also focused on the wrong question here. We are putting so much emphasis into figuring out what does it take to persuade the adversary that we have a credible deterrent. And while that is certainly important, I believe we have today a robust comprehensive deterrent. I believe that a reasonable modernization program can sustain that deterrent over time, and we need to step back and balance our investments in our deterrent force against not only other needs of the Defense Department and our military, but also we need to look at the implications of our current posture for increasing the risk of use and the spread of these weapons.

Mr. COURTNEY. Thank you.

And actually, just to follow on that point—and you know, again, Dr. Blair, you talked about a possible smaller fleet of subs, of SSBNs [ballistic missile submarines]. I think it is important to note that the fleet today is 14 SSBN *Ohio*-class. They are going to be over 40 years old. The hull life is giving out. So, I mean, it is really not even a question of nuclear policy, it is really a question of just—you know, they are not going to be safe for sailors.

And the number of subs that are going to replace it is 12, so we are actually reducing the fleet from 14 to 12, and reducing the missile tubes from 24 to 16. I mean if you do the math, I mean, we are actually going to have a smaller fleet. But maintaining that second-strike capability does seem to be somewhat of a consensus issue here. I just wanted to make that point before yielding——

The CHAIRMAN. The gentleman's time has——
Mr. MILLER. Mr. Courtney, may I make a factual——
The CHAIRMAN. The gentleman's——
Mr. MILLER. May I make a factual statement?
The CHAIRMAN [continuing]. Time has expired. I am sorry.
Mr. MILLER. A factual statement, may I, please?
The CHAIRMAN. Oh, sure. But I just—I try not to do this, because if this happens we wind up in big trouble. Go ahead.
Mr. MILLER. Mr. Courtney, right now the Trident force carries two different types of warheads. One, a W76 warhead, and a W88 warhead, a much larger warhead. So if you are talking about discrimination problems, that exists right now today.
The CHAIRMAN. Thank you.
Mr. MILLER. And it is contextual.
The CHAIRMAN. Mr. Wilson.
Mr. WILSON. Thank you, Mr. Chairman, and thank all of our witnesses for being here today.
And Mr. Miller, I want to thank you for your decades of service with the Department of Defense and the National Security Council. And with your background, in your testimony you identified the overall age of our nuclear deterrent capabilities as a weakness in the strategic triad, and argue for the modernization of nuclear forces.
U.S. nuclear weapons are surpassing their intended service lives, with the average age of our nuclear warheads at 26 years.
The Nuclear Posture Review addressed the importance of tritium production and the increase of pit production to 80 pits per year by 2030. Both of these critical missions are connected to the Savannah River Site that I am very grateful to represent.
What negative impacts do you see if the U.S. fails to modernize our nuclear inventory?
Mr. MILLER. Mr. Wilson, the United States today is the only nuclear weapon state that cannot produce a nuclear pit to be placed into the operational force. The nuclear enterprise, run by DOE [U.S. Department of Energy], is on its back legs. It is—it desperately needs to be modernized. We need to be able to replace weapons, some of which are 60, 70 years old, in the arsenal. So the infrastructure in DOE must be upgraded, or the deterrent over time will not have credibility.
Mr. WILSON. And then that relates to the next question, and the National Defense Strategy rightfully addresses the great power competition and dynamic threats the U.S. faces. I believe this provides a clear path for the U.S. to modernize, reform, and build partner capacity through an emphasis on peace through strength. Deterrence, specifically nuclear deterrence, is critical to protect the U.S. and our allies across the globe by projecting strength.
Can you discuss how essential it is for a nuclear triad to maintain both a first- and second-strike capability, with a flexible response option? How does this deter a massive conventional or nuclear attack by the enemy?
Mr. MILLER. I think that the triad, in its overall strength, as I have described earlier, is capable of deterring a massive Russian or Chinese attack.

I believe that our capability to respond flexibly is necessary to assure our European allies that a Russian land grab, where they have conventional superiority to date all along the NATO-Russia border would not succeed, and it could not succeed because they can't use a nuclear weapon to cement their victory. So they—the tie between our strategic forces and the defense of NATO is, I believe, a critical element of our deterrence.

Mr. WILSON. And the deterrence is so absolutely critical.

In 2016 the Secretary of Defense, Ash Carter, and General John Hyten both testified that funding for nuclear weapons modernization of the nuclear triad was affordable. Secretary of Defense James Mattis then made it his number one priority, since our inventory has atrophied.

Can you discuss how modernizing our nuclear triad over 30 years is a minimal percentage of the defense budget and explain the urgent need for the investment in our nuclear inventory?

Mr. MILLER. As far as the urgency, as Mr. Courtney pointed out, the submarines are getting old and will, at some point in the 2020s and beyond, have to be retired, one by one. They are not safe to operate.

Minuteman systems are about 1970s vintage. They have been upgraded, but they are to the point where they can't be upgraded. The air-launched cruise missile, introduced in 1980, had a projected service life of 10 years. So the modernization of the force is critical. You either have to modernize it or retire it. You can't afford to retire it.

And even the CBO [Congressional Budget Office] agrees that the full modernization program in the 2020s is going to cost between 6–7 percent of the defense budget.

Mr. WILSON. And——

Mr. MILLER. Six to seven percent.

Mr. WILSON. And it should be known by the American people that the Russian state-owned media has reported that hypersonic missiles that Russia is developing would be able to hit multiple sites in the United States, and they actually identified Maryland, California, and Washington. These threats only reinforce the need for an effective deterrent strategy.

General Hyten recently testified to the Senate Armed Services Committee that our defense against hypersonic missiles is our nuclear deterrent. What component of the nuclear triad is most in need of modernization to counter and deter the use of hypersonic missiles?

Mr. MILLER. I don't think any—again, sir, each leg is getting to the end of its service life. If you believe in a triad—and I do—because we didn't do it during the George W. Bush administration, the force needs to be modernized. The entire force needs to be modernized.

Mr. WILSON. And again, I appreciate your efforts, because it is so clear it is peace through strength. And it comes from—and Congressman Thornberry has identified how that has been successful in the past. Thank you very much.

The CHAIRMAN. Thank you.

Mr. Moulton.

Mr. MOULTON. Thank you, Mr. Chairman.

Mr. Miller, you stated that a no first use policy would be destabilizing. In other words, would create a higher likelihood of nuclear conflict. Why is this the case?

Mr. MILLER. I think there are four points, Mr. Moulton.

The first is our allies have, for decades, depended on a U.S. policy that we would escalate to nuclear use to end a conventional war in Europe. If we were in these very tumultuous transatlantic times to remove that guarantee, we would cause allies to doubt the U.S. guarantee of their safety.

Second, because some of those allies can build their own nuclear weapons, if we remove that guarantee, we could well lead to the proliferation of nuclear weapon states in the world.

Third, we are not going to change Chinese and Russian views. The Russian view is first use. The Chinese say they have a no first use policy, but there is enough intelligence to indicate that that is a very questionable condition, and it could change in a moment, with an authoritarian government.

And fourth, there is absolutely no reason in the world why the Russian or Chinese leaderships would believe in a no first use pledge on our part. So it wouldn't have any effect in managing a crisis. Those are the four reasons no first use makes no sense.

Mr. MOULTON. Ms. Rohlfing, how would you respond to Mr. Miller's argument? I hate the idea that a single person, especially this President, could make a decision to launch nuclear weapons in a matter of minutes. But how else do we defer a—we deter, rather, a preemptive attack on us?

Ms. ROHLFING. So I think no first use is the right goal. It is the right aspiration for United States policy.

Mr. MOULTON. Well, it is wonderful if it is an aspiration, but we live in a real world, where we have an adversary that advocates first use. So how do we deter first use——

Ms. ROHLFING. So I think we need——

Mr. MOULTON [continuing]. Without having that in our——

Ms. ROHLFING. You know, we need to step back and think about, again, what are the consequences of continuing with a first use policy, in terms of implications for the spread of these weapons to other states, in terms of increasing the risk of use——

Mr. MOULTON. That is all well and good, but that is not my question, Ms. Rohlfing. My question is how do you deter a preemptive attack from an adversary that has a policy of being open to first use, if you do not—if you require——

Ms. ROHLFING. So——

Mr. MOULTON [continuing]. Congressional authorization for a response?

Ms. ROHLFING. We have a policy of deterrence, and we have the world's most powerful conventional forces. We also have said that we will retaliate using nuclear weapons.

Mr. MOULTON. Okay, I mean——

Ms. ROHLFING. That is a——

Mr. MOULTON. I just don't——

Ms. ROHLFING [continuing]. That is a very solid deterrent——

Mr. MOULTON. The argument that—so we respond to a Russian first use, a massive attack, with conventional forces? I mean it just seems totally unrealistic. Now——

Ms. ROHLFING. Well, that is where our policy of retaliating comes in. I mean that is at the heart of our deterrent——

Mr. MOULTON. Okay, so let's get to the heart of that. You have criticized ICBMs as a "use it or lose it weapon." But isn't that the fundamental purpose, that if the Russians were to launch a massive attack on our ICBM force, we would, in fact, respond immediately? And that is what prevents, that is what deters that attack?

Ms. ROHLFING. So the issue with ICBMs is twofold. One is it increases the risk of use, because these are weapons that, because they are so vulnerable, decrease crisis stability and could invite an attack.

And, by the way, I would just——

Mr. MOULTON. How would they invite an attack, Mr. Rohlfing?

Ms. ROHLFING. Well, because they are sitting-duck targets. They are vulnerable. They are not survivable. So we have to worry that in today's world, where——

Mr. MOULTON. But the point of having them is that it deters an attack because that is how we respond. So if we just get rid of them, or we say we are not going to use them on the hair-trigger we have now, how does that make it less likely for the Russians to attack us?

Ms. ROHLFING. So I think if we could stand down with the Russians and, frankly, all other nuclear weapon states, we would be in a much safer world.

Mr. MOULTON. Okay.

Ms. ROHLFING. We would be——

Mr. MOULTON. So I agree with you on that point.

Ms. ROHLFING. And I think that——

Mr. MOULTON. I mean that is not——

Ms. ROHLFING [continuing]. Is why we should——

Mr. MOULTON. That is not an answer to my question. But I agree with——

Ms. ROHLFING. That is why we should set it as a goal, and work toward it.

Mr. MOULTON. That is wonderful, it is a goal. But we live in a real world where the Russians have hundreds of nuclear weapons targeted at us, and a policy of being willing to——

Ms. ROHLFING. Correct.

Mr. MOULTON [continuing]. Use them for—use them preemptively.

Ms. ROHLFING. And I believe the United States threat to retaliate using the full force of our nuclear arsenal is plenty of deterrent capability.

I also cannot imagine a world where we, as the world's strongest superpower, would be prepared to use nuclear weapons first in a preemptive way, and be willing to bear the——

Mr. MOULTON. Well, I agree with you.

Ms. ROHLFING [continuing]. The opprobrium that would come with that——

Mr. MOULTON. The fact—it is pretty clear from this discussion that the Russians are less likely to attack us because we have ICBMs than if we were to just get rid of them.

Now, Mr. Miller, with regards to low-yield weapons, you stated that the Russians there see a deterrence gap, where they don't see it with ICBMs, as we just discussed with Ms. Rohlfing.

But what is wrong with Chairman Smith's argument? You can't tell whether it is a low-yield weapon or a high-yield weapon as it is being used. If they think that we have a deterrence gap, it is about the fundamental willingness to use nuclear weapons. It shouldn't matter what size they are.

Mr. MILLER. It—because they have invested so much in a new strategy and have fleshed that out with new weapons systems, I believe they think we have a weakness in our posture.

Why would they do this, from a standing start, without any good reason? They don't invest money foolishly. And the——

The CHAIRMAN. Sorry, Mr. Miller. I hate to keep doing this to you, but we are again over time.

Mr. MOULTON. I think the Russians do invest money foolishly sometimes, Mr. Miller. But thank you.

The CHAIRMAN. I am sorry, I have to address a couple issues here.

On the no first use issue, the point there, the reason that no first use makes sense is we are saying that the purpose of our nuclear arsenal is to stop nuclear war. And I think this point has not been yet made at the hearing, that nuclear war is one of the few things that can actually destroy the planet. Wars are like—stopping us from getting into an all-out nuclear war is enormously important.

Now, I get all the arguments about can you really trust the no first use policy, can you—and then back and forth, what good is it going to do. I don't agree with the argument that somehow there is ever a scenario where we need to use nuclear weapons first. I simply don't agree with that. Our nuclear weapons should exist to stop nuclear war, not to start it. That is the purpose of no first use.

And as far as the ICBMs, and whether or not they are useful or not, the problem with them is they are identifiable targets. And also, I don't think they are necessary for deterrence because of the submarines we have. And the bombers you mentioned, yes, they are not deployed. They are quickly deployable, and can be used.

That is the answers—I think Mr. Moulton raised some very good questions, but those are the answers that I think would better address that.

Mr. Turner.

Mr. THORNBERRY. Mr. Chairman? Mr. Chairman?

The CHAIRMAN. Sorry, Mac, go ahead.

Mr. THORNBERRY. Yeah. And I know it is tempting to get into a back-and-forth debate on a whole variety of things.

I would say, for my standpoint, I don't want to simplify the calculations of the Russians on any issue. I—you know, are we going to be the first to use nuclear weapons? I cannot imagine such a scenario. Do I want to tell the Russians what we are never going to do? No. I want them to guess. I want to have a wide panoply of nuclear deterrents, and I want to not say what we are not going to do, so that they are more cautious in making their decisions.

So I do think—back to the point of getting into the minds of the adversaries—I don't want to make that easier.

The CHAIRMAN. Yeah. The only thing I would raise on that issue, in the spirit of good conversation here, is that having an adversary completely freaked out, not knowing what we are going to do with a whole lot of nuclear weapons, and not sure when they would use them——

Mr. THORNBERRY. I don't want to completely freak them out.

The CHAIRMAN. That has a downside, as well.

Mr. THORNBERRY. I want to have uncertainty.

The CHAIRMAN. That is fair.

Mr. Turner.

Mr. TURNER. Mr. Chairman, I come here usually to hear the witnesses testify. If we have every member ask questions and then the chairman intervene, I think it is certainly going to make for a very, very long hearing. I appreciate——

The CHAIRMAN. It is. I did it once.

Mr. TURNER [continuing]. The time that I have received.

The CHAIRMAN. I apologize. Go ahead——

Mr. TURNER. I do want to associate myself with Mr. Moulton's comments and certainly Mac Thornberry's. It is the threat, not the use of the weapons that keep us safe. And the proof that they have kept us safe, obviously, is that they have kept us safe the entire time that we have had the triad.

So to all of our witnesses, I am going to ask you a series of questions and ask if you—I am going to make a series of statements and ask if you agree or disagree. They are actually fairly simple statements, there is no tricks here.

And then after we go through these agree or disagrees, then I am going to ask for your comments on them, and have a discussion with you. But I want to get these agree-disagree to see to the extent that we have a disagreement among the members.

My first statement is, over the last 20 years the United States has reduced its number of nuclear warheads. Agree or disagree, Mr. Miller?

Mr. MILLER. Agree.

Mr. TURNER. Dr. Blair.

Dr. BLAIR. Agree.

Mr. TURNER. Ms. Rohlfing?

Ms. ROHLFING. Agree.

Mr. TURNER. Over the last 50 years the United States has decreased its number of nuclear warheads.

Mr. Miller.

Mr. MILLER. Yes, sir.

Mr. TURNER. Dr. Blair.

Dr. BLAIR. Yes.

Mr. TURNER. Ms. Rohlfing.

Ms. ROHLFING. Yes.

Mr. TURNER. Okay. Over the last 20 years the number of nuclear warheads on the planet have increased. Over the last 20 years the number of nuclear warheads on the planet have increased.

Mr. Miller.

Mr. MILLER. Yes.

Mr. TURNER. Dr. Blair.

Dr. BLAIR. Yes.

Mr. TURNER. Ms. Rohlfing.

Ms. ROHLFING. The total number of warheads——
Mr. TURNER. Yes.
Ms. ROHLFING [continuing]. On the planet?
Mr. TURNER. Yes.
Ms. ROHLFING. No.
Mr. TURNER. Over the last 20 years, the number of nuclear warheads on the planet has not increased.
Ms. ROHLFING. Yes.
Mr. TURNER. Yes. Okay. Over the last 50 years, Mr. Miller, has the number of nuclear warheads on the planet increased?
Mr. MILLER. No, not given the large—no.
Mr. TURNER. Dr. Blair.
Dr. BLAIR. No.
Mr. TURNER. Okay, Ms.——
Ms. ROHLFING. No.
Mr. TURNER. Ms. Rohlfing, no. Okay. So my next statement is a statement based upon the answers that you just gave.

There appears to be no relationship between the reduction of the number of United States nuclear warheads and the reduction of the total number of nuclear warheads on the planet. You both—all of you just answered yes at the number—you agreed that the number of nuclear warheads in the United States over the past 20 years has decreased, and you have all agreed the number of nuclear warheads on the planet over the last 20 years has increased.

Therefore, the conclusion of there is no correlation between the reduction of the United States nuclear warheads resulting in the total reduction in nuclear warheads on the planet. Do you agree, Mr. Miller?

Mr. MILLER. Yes, sir.
Mr. TURNER. Dr. Blair.

Dr. BLAIR. I didn't quite follow that. I would have to think about that, sorry.

Mr. TURNER. If we reduced our nuclear warheads and the total number on the planet did not go down, there is no correlation between our reduction of our nuclear warhead numbers and the aggregate number on the planet. Correct, Dr. Blair? Agree?

Dr. BLAIR. I think so, yes.
Mr. TURNER. Yes. Mr. Rohlfing.

Ms. ROHLFING. I don't buy the logic of it. I think it is the wrong——

Mr. TURNER. It is just math, Ms. Rohlfing. It is not logic.
Ms. ROHLFING. I think it is the wrong question.
Mr. TURNER. It is just math. If our number goes down and the number——
Ms. ROHLFING. I don't dispute the math.
Mr. TURNER [continuing]. On the planet does not go down——
Ms. ROHLFING. I dispute——
Mr. TURNER [continuing]. There is no correlation between the aggregate number——
Ms. ROHLFING. I dispute the conclusion that you are making.
Mr. TURNER. And that is why I ask these questions, because, Ms. Rohlfing, your answer is fantasy. I mean it is absolutely total numbers. It is just math.

Let's go to the next one. Would you rather—if the United States was forced to use a nuclear weapon, would you rather that the United States use a high-yield nuclear weapon or a low-yield nuclear weapon?

Mr. Miller.

Mr. MILLER. I would rather deter any Russian use in the first place.

Mr. TURNER. I am just saying if the United States was forced to use a nuclear weapon.

Mr. MILLER. Low-yield.

Mr. TURNER. Would you rather them use a high-yield or a low-yield?

Mr. MILLER. Low-yield.

Mr. TURNER. Mr. Miller.

Dr. Blair.

Dr. BLAIR. A nuclear weapon is a nuclear weapon, and a low-yield weapon is a misnomer, because it is actually a very high-yield weapon.

Mr. TURNER. So you say there is no difference.

Ms. Rohlfing.

Ms. ROHLFING. I agree with Bruce.

Mr. TURNER. That there is no difference.

The Russian nuclear policy states that they will use nuclear weapons to escalate a conflict for the purposes of de-escalating the conflict. It has been said that the fact that they have low-yield nuclear weapons factors into this nuclear posture statement, and that it is because they believe that if they use a low-yield nuclear weapon and the only thing we have to respond with is a high-yield nuclear weapon, that, in fact, we would not respond. That, in fact, we would be forced to pause.

Now, Mr. Miller, do you agree with that?

Mr. MILLER. Yes, sir.

Mr. TURNER. Dr. Blair, do you agree with that?

Dr. BLAIR. Totally disagree.

Mr. TURNER. Ms. Rohlfing, do you agree with that?

Ms. ROHLFING. I disagree, as well.

Mr. TURNER. Well, I am going to now do my portion of testimony, as the chairman has.

I agree with Mr. Miller. If you are Putin, and you think we only have big ones and we are not going to use them because they are big, I think that you actually change the calculus of first use for Russia.

Now, on no first use, since Russia believes in escalating to de-escalating, wouldn't our adopting a no first use have no effect on their nuclear posture? Because their calculus is use to—escalate to de-escalate. So if we say we are no first use, it has no calculus in their military strategy to use or not use nuclear weapons.

Correct, Mr. Miller?

Mr. MILLER. That is absolutely correct.

Mr. TURNER. Dr. Blair.

Dr. BLAIR. That is right, because the Russians rely on the escalation to the use of nuclear weapons to compensate for their conventional weakness.

Mr. TURNER. Ms. Rohlfing.

Ms. ROHLFING. So I am not sure I am following the question about the linkage——

The CHAIRMAN. The gentleman's time has expired.

Mr. Carbajal.

Mr. TURNER. Well, let me just say I agree with Dr. Blair in what he has just said, because it is very important that it does not affect the Russian calculus if we have no first use.

Thank you——

The CHAIRMAN. Mr. Carbajal.

Mr. CARBAJAL. Thank you, Mr. Chair.

Mr. Miller, you reiterate in your testimony that we have to have confidence in our deterrent and potential adversaries must have respect for it. Currently, the U.S. nuclear force consists of nearly 4,000 deployed and non-deployed nuclear weapons.

Mr. Miller, do you have confidence in our current deterrent, in our retaliatory capability?

Mr. MILLER. I have confidence in it today. I have a lack of confidence in it in 10 to 15 years, if those systems aren't replaced. Two commanders of Strategic Command, the retired admiral—retired previous admiral and currently General Hyten say those forces are going to have to leave the inventory, replaced or without replacement. That is a simple fact. Not modernizing will leave us without a triad.

Mr. CARBAJAL. Thank you.

Dr. Blair and Ms. Rohlfing.

Dr. BLAIR. So yes, we have ample forces to underwrite deterrence. I think the number of primary aim points in our current nuclear planning is on the order of 1,000 aim points in Russia, China, and North Korea, in total. And we have at sea in our *Ohio*-class submarine force enough warheads to cover all of those aim points.

So we have the forces, but I do have serious reservations and concerns about the viability and performance and resilience of our nuclear command and control system. This, as I said in my testimony at the opening, has always been the Achilles heel of our nuclear deterrent.

So yes, it is extremely robust, in terms of forces. But it is creaky and somewhat fragile and worrisome, from the standpoint of command and control.

Mr. CARBAJAL. Ms. Rohlfing.

Ms. ROHLFING. I have confidence in our force today, and I think here the issue is not whether or not we modernize. We must continue to support a safe, secure, effective nuclear deterrent for our security.

But the issue is, you know, what do we invest in, and how much do we need?

Mr. CARBAJAL. I am interested to hear from all of you how you think Russia and China are perceiving us, the United States, moving forward with a significant nuclear modernization effort, while at the same time disengaging in the arms control front. All of you.

Mr. MILLER. First of all, Russia and China have been modernizing their forces for the last 10 years. And they continue to do so. We won't have new forces in the field until the middle of the next decade, at the beginning. So there is no suggestion of an arms race

here. Ash Carter, former Defense Secretary, said there is a nuclear arms race, it is between Russia and China. We are not playing.

On arms control, and specifically with respect to the INF Treaty, the treaty was killed by the Russians. It was a clear, cynical act by the Russian Government beginning in about 2013 to develop and field a system that broke the treaty. And despite the fact that the United States has been engaged in negotiations with the Russians since 2013 on that, the only thing those negotiations have produced is over 100 of these treaty-busting SSC–8 missiles in the field. So we didn't disengage from the INF Treaty, the Russians killed it.

Mr. CARBAJAL. But wouldn't you agree that the INF Treaty provides more opportunities than just this treaty to have some objectives in it, provides for ongoing communication——

Mr. MILLER. The INF Treaty was a vitally important treaty, which the Russians have gone out and killed. We were fully within the treaty. We respected the treaty. The Russians covertly developed a cruise missile. They tried to hide it from us. Our intelligence caught it. There are 100 of these things in the field, and the Russians still claim that they are part of the treaty.

Mr. CARBAJAL. But wouldn't you agree that that was a vehicle for ongoing communications, to try to come back——

Mr. MILLER. Until——

Mr. CARBAJAL [continuing]. To the table, and to address those challenges?

Mr. MILLER. We tried for 5 years under the Obama and Trump administrations to engage them in diplomacy in that treaty. And all they did was produce more missiles.

Mr. CARBAJAL. Well, I disagree with you in that it wasn't of utility to continue to stay in it.

Mr. Blair.

Dr. BLAIR. I think we pulled out too abruptly, and it did not give an adequate opportunity for further work to try to save the treaty, nor did we consult adequately with our allies in NATO. So I think that it was a mistake.

There are consequences from pulling out of these treaties, as well. We pulled out of the ABM [Anti-Ballistic Missile] Treaty very abruptly in 2002. That was John Bolton's wrecking ball for arms control. And, as a result, today we are seeing appear on the scene all these novel nuclear weapon systems that President Putin has been brandishing over the last several months: the hypersonic vehicles, the cruise missiles, the undersea autonomous nuclear submarine that can travel for 6,000 kilometers. All these systems were stimulated by Putin's desire to deal with the elimination of the ABM Treaty and develop weapons that could defeat it. And it took them about 15 years.

So we have to keep in mind these timescales. Russia, China, the United States, we all know that we have been going through overlapping modernizations for, like, 40 years.

Mr. CARBAJAL. Thank you——

Dr. BLAIR. Every 25 years we all modernize. And as long——

The CHAIRMAN. Sorry, the——

Dr. BLAIR. [continuing]. As we keep these weapons——

The CHAIRMAN [continuing]. Gentleman's time is expired.

Dr. BLAIR [continuing]. We have to modernize——

Mr. CARBAJAL. Thank you, I yield back.

The CHAIRMAN. Mr. Lamborn.

Mr. LAMBORN. Thank you, Mr. Chairman, for having this hearing. Thank you all, witnesses, for being here. And I would like to speak to Ms. Rohlfing and Mr. Miller about the low-yield option first, and then I have another follow-up question for Mr. Miller.

If we are in a context where a low-yield tactical nuclear weapon is used by Russia against us or one of our NATO allies or a country under our nuclear umbrella, and we have to use a submarine-based response, we cannot make a proportional response. So, to me, that leaves only three options: we use a conventional response, we use a high-yield nuclear response, or we make no response.

Ms. Rohlfing, do you prefer one of those three options to a proportional, low-yield response that we would otherwise have?

Ms. ROHLFING. I think there is little difference between a so-called proportional, low-yield response and a response of another kind. I think Bruce hit the nail on the head when he said a nuclear weapon is a nuclear weapon, and even these so-called low-yield weapons are still quite powerful in their destructive power.

So I think we should not be sanguine that a low-yield response is not going to yield massive retaliation. And therefore, it is very risky. Lowering the threshold for nuclear use is risky business, and very destabilizing.

Mr. LAMBORN. Mr. Miller, how do you respond to that?

Mr. MILLER. My response is the Nuclear Posture Review says a small number of these weapons will raise the nuclear threshold as a matter of official policy, not seek to lower it.

I think that your description is exactly right. I don't think there is any doubt that anybody in this room would disagree with the fact of what Bruce said: a nuclear weapon is a nuclear weapon. That is a huge, explosive charge.

Sadly, we are not trying to get agreement among ourselves on deterrents. We are worried about the Russian military, which has come up with a doctrine and forces and exercises which seem to indicate they believe they can use a low-yield nuclear weapon. That is my concern.

Mr. LAMBORN. Well, I—and I have to agree with that. If our threat of a high-yield response hasn't deterred them for all the work that—and money that you say has been invested, why would it deter them in the future?

Mr. Miller, I want to ask you about the triad versus a dyad. If we were to get rid of our land-based nuclear missiles, the Minutemen, in 3 fields, 450 or so missiles around the U.S., and only relied on a dyad of bombers and submarines, would that make us more vulnerable because of either a technological problem that we had with bombers or submarines that came up in the future, or a technological breakthrough on the part of an adversary that would make either of those forces more vulnerable?

Mr. MILLER. Mr. Lamborn, you have described the reason why we have had a triad since the Eisenhower administration, that the various potential vulnerabilities of each leg offset the other.

As we were saying, if we only have today ICBMs and SLBMs [submarine-launched ballistic missiles] on alert, if there was a

breakthrough in ASW [anti-submarine warfare], then all you have got is the ICBMs. And a massive attack on the ICBMs triggers an all-out war, which no one wants to go to. So the Russians shouldn't go there. You have described exactly the reason for the triad, sir.

Mr. LAMBORN. So you wouldn't be in favor of a unilateral disarmament, going from a triad to a dyad?

Mr. MILLER. No, sir. I would maintain the triad.

Mr. LAMBORN. Okay, thank you.

Mr. Chairman, I yield back the balance of my time.

The CHAIRMAN. Thank you.

Mr. Keating.

Mr. KEATING. Thank you, Mr. Chairman. This has been a very important and enlightening hearing. And even though there are differences of opinion on these issues, I really respect the way they are being discussed. But I think there is an area where I can find some common ground, and I want to get back to the comments of Dr. Blair, when he talked about the issues of miscalculation.

Just a couple of weeks ago I was in Europe as part of an international discussion with Senator Nunn and former cabinet officials, international leaders, discussing this issues. So I want to just gear in on one specific area.

What would you say, Doctor, is the importance of interagency coordination and communication within the administration on these issues? And what is the importance of intelligence agencies and the coordination and communication and integrity of the security of those different agencies to try and prevent miscalculation? What are the dangers in that—if that doesn't happen?

Dr. BLAIR. Well, we are living in an era that is becoming increasingly fraught with risk. And one of the reasons for that is the proliferation of ballistic missiles around the world. Everybody wants a ballistic missile, and everyone is getting them.

There are thousands of ballistic missiles that didn't exist 10 years ago that have been deployed. They have technological features that make it difficult to predict where they are going to land, because they are more maneuverable. They can take a right turn at the apex of their trajectory, and we don't know where they are going to land.

So, as a result of that, we have entered an era in which we face false alarms, ambiguous ballistic missile threats all the time that we didn't during the Cold War. As I said earlier, some of them have risen to the level of Presidents, which never happened during the Cold War.

So we have—we are—have to creatively solve the problem of developing confidence-building measures and other mechanisms that involve the intelligence community and require——

Mr. KEATING. I am just talking about——

Dr. BLAIR [continuing]. Interagency——

Mr. KEATING. I understand that. I think you are bringing up some good points that exacerbate the situation. But I am talking within our own administration, when there is gaps, interagency gaps in communication and coordination. When there is gaps in the intelligence field, what are the dangers there?

And do you think that Congress has a role in oversight to really do our best to make sure those gaps don't exist?

Dr. BLAIR. Well, I guess I am not exactly clear what you are talking about——

Mr. KEATING. Within our own administration——

Dr. BLAIR [continuing]. In terms of a gap. Hmm?

Mr. KEATING. There has been instances where there is gaps that I don't think we have seen before in the administration, in our intel people, in our intelligence agencies. Now, if those gaps are there, and the communication isn't seamless, isn't that a major factor in miscalculation?

Dr. BLAIR. Yeah. I mean one of the important factors in assessing the nature of the threat, assessing whether North America is under attack or if there are other nefarious activities underway, we rely heavily on our intelligence community to be able to provide the decision maker——

Mr. KEATING. And——

Dr. BLAIR [continuing]. With the background——

Mr. KEATING [continuing]. Is the role of Congress as an oversight agent critical in that regard, to maintain that we are doing all we can so those gaps do not exist between different agencies and our intel agencies?

Dr. BLAIR. Well, yes, I think so. I think that you have the power of the purse over space and other assets——

Mr. KEATING. Thank you, Dr. Blair.

Dr. BLAIR [continuing]. That are critical——

Mr. KEATING. I yield back my time.

The CHAIRMAN. Thank you. Thank you.

Mr. Wittman.

Mr. WITTMAN. Thank you, Mr. Chairman. I would like to thank the witnesses for joining us today.

Dr. Blair, I wanted to go to you first. In your testimony you had spoken about reducing the number of ballistic missile submarines down to 5, and strategic bombers down to 40.

I am troubled by that, because if you look at the availability of those submarines, we have the number we have to be able to put at sea any one time the necessary number to deter. Some of those are in port being overhauled, some of the sailors are on break or in training. So to have five, you don't have five at one time. And the same with bombers. Bomber availability today is based on the maintenance schedules for the aircraft, the bomber crews, deployment.

So having 5 and 40 doesn't get us 5 and 40 at one time. It gets us significantly less than that. And obviously, that is a classified number, but significantly less than what is available in those raw numbers.

Secondly is that our adversaries today are building attack submarines to take out our ballistic missile submarines at a record pace. In fact, some of the most advanced submarines in the world are the attack submarines, like the *Severodvinsk* class that the Russians are building. And they are doing everything they can to build those, as well as the Chinese.

I am wondering how you believe that those will be significantly impactful deterrents to our adversaries, as they are building up, having more opportunities to take those assets out, and we have

fewer of those assets. And even with the numbers there, fewer of those assets ever available at one time.

I am wondering how the strategic deterrents adds up with those. I wanted to get your perspective on that.

Dr. BLAIR. In general, you take the number of submarines that you build, and you can safely deploy roughly two-thirds of those at sea. So two-thirds of the 14 we have now is around 9. We can put nine at sea——

Mr. WITTMAN. But—no, but your number is five. So——

Dr. BLAIR. So, yeah, I am just saying——

Mr. WITTMAN. Two-thirds, so you——

Dr. BLAIR. I am just giving you the——

Mr. WITTMAN. No, you deploy three——

Dr. BLAIR. I am giving you the formula, and then—of—so I guess we would need—if we wanted to have five at sea, we would probably have to have roughly eight, all together. So——

Mr. WITTMAN. But that is——

Dr. BLAIR [continuing]. Two-thirds of——

Mr. WITTMAN. That is not what your number says. Your number says 5 SSBNs and 40 bombers. It doesn't qualify that——

Dr. BLAIR. Five with—actually, with five SSBNs, if you could keep three at sea, that would be sufficient to cover the aim points that I have defined as constituting a fully adequate deterrent threat.

Mr. WITTMAN. In the face of the multiples of attack submarines so they could deploy out there. If all I had to worry about was three of our submarines being out there at any one point, don't you think that they would try to hunt those down and destroy them? Doesn't that take it out with the——

Dr. BLAIR. I think——

Mr. WITTMAN. Literally——

Dr. BLAIR. I think both sides try to do that, and we are actually very good at——

Mr. WITTMAN. We are actually on the down side of attack submarines. We are going to be down to 42 in 2028, so we don't even have a deterrent to go after their ballistic missile submarine——

Dr. BLAIR. Well, the Russians and the Chinese are the sides that have to worry about the attack submarine problem, not us at the present time.

Mr. WITTMAN. I——

Dr. BLAIR. You can get a classified briefing from the Navy, and they may refute what I say, but I think that there is no credible intelligence for now or in the foreseeable future that would suggest that a ballistic missile submarine on patrol at sea is vulnerable to any form of Russian or Chinese attack.

Mr. WITTMAN. That—really? That—there is no risk to our submarines by the attack submarines from our adversaries?

Dr. BLAIR. I think that the Navy—you can ask them, but I think that they would say that the submarines that we have on——

Mr. WITTMAN. Well, if——

Dr. BLAIR [continuing]. Patrol, on launch-ready status, are——

Mr. WITTMAN. If there is no risk there, then why do we have submarines and ships to try to hunt——

Dr. BLAIR [continuing]. Invulnerable to any—are completely invulnerable for the foreseeable future.

Mr. WITTMAN. Mr. Miller, I would like to get your perspective on that.

Mr. MILLER. Sir, I believe that the best way we hide those submarines is to give them vast amounts of ocean to patrol in.

A force of 12 gives you 10 operational boats. That is enough to have a Pacific base and an Atlantic base. I think if that number came down much smaller, we would be driven to one base, which means we would lose an ocean's worth of patrol area.

Second, if you want to maintain the same number of warheads at sea with a much smaller number of submarines, you have to put more warheads on each missile. By the basic physics, that reduces the range of the missile and it again reduces the patrol area.

All of this moves towards instability and threatening the overall force. So I believe what the posture review says, that a minimum of 12 SSBNs is required, is in fact the—where we should go.

Mr. WITTMAN. Okay, very good.

Mr. Chairman, I yield back.

The CHAIRMAN. Thank you.

Mr. Kim.

Mr. KIM. Thank you, and thank you so much, the three of you, for coming out and talking about such a critically important issue.

Dr. Blair, I would like to start with you. Something that caught my attention during your opening statements, and it is something that I have seen in previous work that you have, talking about the command, control, communications, the C3 component of this.

You have previously said that it is required that we have a C3 network that is highly survivable, flexible, impervious to cyberattack, and fail-safe. Yet you also recognize that—and have pointed out that our network was last comprehensively updated some three decades ago. In fact, some of the components, you have said, date back to the 1950s, especially with some of the Minuteman capabilities that we have.

So I just wanted to dig into this some more, and just ask how confident are you in our current nuclear command, control, communications, especially with regards to cybersecurity?

Dr. BLAIR. I am not confident at all. And I don't think anyone knows the answer to that question with any degree of high confidence, because we have lost control over the chain of supply of our electronic components and our command and control system writ large, including our nuclear, from the level of the President of the United States all the way down to the cell towers built by Huawei that are deployed around our Minutemen missile fields.

The—every now and then we conduct a study and we find new and worrisome vulnerabilities in this arena. The last study that I am aware of happened after a squadron of 50 ICBMs went black in 2010 because of a breakdown in our obsolete command and control systems. No one could monitor those weapons, no one could launch them on authority, or prevent their unauthorized launch.

When President Obama ordered a study of the possible cyber vulnerability of Minuteman, it took a year. And they came up with some pretty interesting findings, including the fact that we had ac-

tually wired our nuclear launch facilities, our silo complexes, with the internet, and created a vulnerability to outside hackers.

So there are ongoing concerns about this, and we are not really going to get a handle on it unless and until we can figure out a way to actually manage the chain of supply of these components.

Mr. KIM. And that is very helpful. I mean, certainly from my perspective, when I try to think of worst-case scenarios, when it comes down to it, the possibility of a foreign agent, you know, to be injected into the launch procedures of this, or about a launch could be set off by false early detection and early warning, these are the same concerns that you share, it sounds like.

Dr. BLAIR. That is right. And I think, if you talk to professionals in this arena, they would tell you that one of the most worrisome parts of this C3I complex, in terms of cyber vulnerability, is the early warning network. Because there are so many apertures in that network: satellites that have to link with ground sites, et cetera.

And there is concern that the President, who has only about 5 minutes under current strategy, to make a decision on whether and how to retaliate to an attack, 5 minutes, may have to rely on information that has been corrupted.

Mr. KIM. When I am thinking about what can we do today to make sure we are moving in that process, where we have greater control over this and a more secure system—you have mentioned just now the supply chain and making sure that we can better understand where that is coming from, and having control over that.

What are some of the other steps that we should be taking right now to be able to get this——

Dr. BLAIR. We——

Mr. KIM [continuing]. In a better place?

Dr. BLAIR. We really have to look at the whole question of the insider threat.

We have a threat model that is about 50 years old for assessing whether an insider could cause something really bad to happen with nuclear weapons. That threat model doesn't work, because a single insider, which is the threat model, aided by some outsiders today could cause far more damage, as we know from the case of Edward Snowden. A single insider could cause much more damage than ever.

The C3I system is more vulnerable because of these new technologies coming along that defeat the ability to detect an attack. Space is becoming more vulnerable. We rely extremely heavily on space for our nuclear command and control systems. The list goes on and on and on.

We are falling behind. That has to be the first priority of our nuclear modernization program. That and modernizing the submarines.

Mr. KIM. Thank you——

Dr. BLAIR. Don't bother with the ICBMs.

Mr. KIM. Well, thank you. This is critically important, and an area where I hope all of us can find common agreement on.

I yield back the balance of my time.

The CHAIRMAN. Thank you.

Mr. DesJarlais.

Dr. DESJARLAIS. Thank you, Mr. Chairman. There seems to be, you know, a bit of debate on whether the low-yield nuclear weapons are effective as a deterrence. But let's assume that we say they are.

Mr. Miller, are we currently at a significant disadvantage, in terms of tactical, low-yield nuclear weapons, in—compared with Russia?

Mr. MILLER. The Russians, sir, have about 2,000 low-yield weapons of all types: artillery shells, land mines, torpedoes, cruise missiles, short- to medium-range ballistic missiles. The United States has a very small number of air-drop weapons that are carried by aging aircraft in Europe, period, full stop.

But the United States made a decision in the late 1980s, early 1990s, that we did not need to match the Russian arsenal. That is in the Nuclear Posture Review, we don't need to mirror or match that. We simply need to deter Russian use of their tactical arsenal. That is where the low-yield Trident weapon comes in.

Dr. DESJARLAIS. Do you feel that their intention is to arm the hypersonic glide weapon with a nuclear warhead, as well, perhaps low-yield——

Mr. MILLER. It is a possibility. I can't tell you. I don't know what Putin's—what his intentions are.

Dr. DESJARLAIS. I have heard your colleagues say that a low-yield and a high-yield, there is really no different—they are both very destructive. But if you talk about the Russians having capabilities to arm an artillery shell, certainly that wouldn't pack the same punch as some of the other low-yield weapons that you have described.

Mr. MILLER. I keep saying, sir, that what we think here doesn't matter. What the Russian planner and the Russian leadership believes does matter. And the Russian leadership and the Russian planners seem to believe that there is tactical utility, battlefield utility, in low-yield weapons. And that concerns me. And that we have to deter.

Dr. DESJARLAIS. Okay. Well, the chairman made a statement earlier in his opening, I guess, that all we simply need to do is tell Russia that if they use a low-yield weapon, we are going to respond with a high-yield. Does that hold water?

Mr. MILLER. I don't think it holds water in Moscow.

Dr. DESJARLAIS. Okay. Why is that?

Mr. MILLER. Because, given all of our capabilities, in the late 1990s, early 2000s, they began to develop the new weapons to support the new strategy.

Dr. DESJARLAIS. So you are saying——

Mr. MILLER. So clearly——

Dr. DESJARLAIS. In your mind they believe that they can use a low-yield tactical weapon without us doing what the chairman said, that perhaps we would pause, and that we would not retaliate with a large-scale, because if we did that would ultimately lead to nuclear annihilation, in all likelihood.

Mr. MILLER. I believe that is the essence of Russian strategy today.

Dr. DESJARLAIS. Okay. So getting back to the importance of our needs, we have a gravity bomb that can be dropped from an airframe, but nothing that can be delivered in any other fashion. Is that right?

Mr. MILLER. That is correct. It cannot get there with an assured payload.

And the other thing is we are not interested in fighting a nuclear war on any battlefield. The Trident weapon indicates that we are prepared to escalate this war, which means to Mr. Putin, "Are you prepared to try to seize a piece of the Baltics, and are you prepared to bet Mother Russia in the gamble? Don't use a nuclear weapon at all." And that is what the low-yield Trident does.

Dr. DESJARLAIS. Okay. And back to our current delivery system, is it capable of penetrating Russian air defenses as well as a cruise missile or Trident III?

Mr. MILLER. Russian air defenses are extraordinarily capable. We have got brave young pilots and very old airframes. In 10 years, when the F–35 is in the field, then it will be a more capable force. But again, the legs are much shorter than what a Trident could cover.

Dr. DESJARLAIS. And do we have air defenses in Eastern and Western Europe that are comparable to what Russia has around Moscow?

Mr. MILLER. No.

Dr. DESJARLAIS. So they could perceivably launch a strike of a low yield on Eastern Europe, and we would really have no means to stop it?

Mr. MILLER. Yes, sir.

Dr. DESJARLAIS. Okay. So I guess your point is that there is a deterrence factor that would be beneficial in advancing the low-yield nuclear weapon. Is that right?

Mr. MILLER. Yes, sir.

Dr. DESJARLAIS. Okay. Do you think that having these weapons and deploying them in Europe would strengthen our hand in negotiating the—Ranking Member Thornberry went down this road with you and how Reagan used that in the 1980s to bring Gorbachev to the table on the INF. Do you feel that if we did that again we could see a similar result?

Mr. MILLER. No, not in this case, because it is 30 years later. The allies would fracture over whether or not we were going to deploy a new nuclear weapons system. That is exactly what Mr. Putin wants. He would like to fracture the NATO alliance.

So the need to deter Russian low-yield weapon use has to be an offshore platform, and that is why the Trident is the best way to do it.

Dr. DESJARLAIS. Okay. So you are saying that the only course of action that we really have right now—and that we should take this course of action—is to build the low-yield weapon you are talking about.

Mr. MILLER. Yes, sir.

Dr. DESJARLAIS. All right. I guess my time has run out. I was going to ask you a question about the nuclear infrastructure modernization, but hopefully we will get to that.

I yield back.

The CHAIRMAN. Thank you.

Ms. Hill.

Ms. HILL. Thank you, Mr. Chairman. This is to the entire panel.

As I understand it—and again, I think I feel a little bit like I am behind the curve, in terms of understanding a lot of this, but what is being referred to as a low-yield nuclear warhead has about a third the power as the atomic weapons dropped on Hiroshima and Nagasaki. Can you help put that into perspective for me, how widespread the damage would be from the blast, and how long-lasting the radiation fallout would be?

Dr. BLAIR. I will start.

Ms. HILL. And, I guess, does it matter?

Dr. BLAIR. If this 5 kiloton weapon is being produced for the submarine force were detonated over the White House right now, it would kill about 100,000 people and injure about 125,000 people. It is extremely powerful. It is 2,500 times more powerful than that big bomb that destroyed Oklahoma City, by Timothy McVeigh.

So we are really not talking about, you know, a low-yield nuclear weapon. It would be a horrendous amount of devastation that would be—that would result just from the immediate effects. That is what I am talking about. There would be the potential, you know, fires and other things that could cause even more damage than what I described.

Ms. HILL. Mr. Miller.

Mr. MILLER. The first point about the low-yield weapon is to prevent any nuclear weapon use at all. Russian nuclear use in the theater would have catastrophic effects.

But your—Dr. Blair's description of what this weapon would cause assumes that it would be aimed at a population center. And again, if one wants to get into the nuclear exchange game—and I don't recommend doing that, I think the risk of escalation is too high—then it would be insane to fire that weapon at a populated area.

Is it destructive? Yes. The point is to deter nuclear use by the Russians so the nuclear weapons are never used and the nuclear war cannot be fought.

Ms. HILL. So it is having the effectiveness of that tool that would deter it. Is that the idea?

Mr. MILLER. Yes, ma'am.

Ms. HILL. Okay. So a kind of unrelated question. France and Germany recently signed a treaty where the French agreed to use their nuclear deterrent to protect Germany. What—am I—is that an incorrect assessment? Do you—why do you feel they felt the need to do this, on top of the existing NATO alliance?

Mr. MILLER. Well, there were obvious transatlantic problems at this time. But the news article, in my estimation, is completely wrong. And having checked with friends in the Quai d'Orsay, France will never fully extend its nuclear deterrent to any other country.

The French deterrent is based on the principle that it is—it responds to France's vital interests. And if you ask a senior French official, "What are France's vital interests," you will be told that the president of the republic will determine that at the moment of crisis. That is not a strong reed to bend—to lean on.

Ms. HILL. Do either of you have any thoughts on—I guess, to me, I am—my question is whether that is an indication of this broader instability, and what we need to do to sort of——

Dr. BLAIR. Well——

Ms. HILL [continuing]. Attempt to——

Dr. BLAIR. Yeah, I think there is clearly a sign this—even having that kind of a discussion amongst semi-serious people is a clear sign of a splintering of the NATO alliance that is underway. And if it continues, it could become a very serious problem for alliance maintenance, and could lead to all kinds of unanticipated and adverse consequences.

We are not managing NATO alliance very well, in the way that we have pulled out of INF abruptly, the way that the President talks about the importance of the alliance, et cetera. So this is something that is worrisome, but it is symptomatic of some deeper issues here.

I just would like to comment once—I think we have missed the boat on this whole question of Russian strategy. You know, their escalate to de-escalate strategy has really emerged in the year 2000 under Putin in response to the NATO bombing of Yugoslavia in 1999 in the Balkans. And the Russians looked at that and said, "Wait a minute. What if this happens to us? We are inferior, we can't match NATO. What do we do?" This is when Russia was on its knees, of course.

And so they came up with a last-ditch approach to use nuclear weapons under this strategy that has been discussed, that it was—really highlights their—the weakness of their hand, and the fact that they would only resort to such use of weapons as a, you know, as a last resort, because they are losing a conflict with NATO. It is not like they have said, "Wow, we can come up with some new weapon that, you know, fills some gap in the spectrum of Western—of U.S. nuclear weapons and exploit it and, you know, we can go forward with that." That is just not the way that this comes down.

Now, if Russia were to use a so-called low-yield weapon because they are losing a conventional conflict, we could—we have several options. One is just to let them continue to use——

Ms. HILL. Sorry——

Dr. BLAIR [continuing]. Lose the conventional——

Ms. HILL. Dr. Blair, I just have a little bit of time left. I wanted to—I appreciate that, but in the remaining time I just want to ask all three of you. Top line, as we are going into this next phase of planning, new Congress, we have got—we are looking at 2 years, but we are also looking at the long term. What are the top one or two things that we need to consider, and recommendations as we move forward?

Just really, really top line, as we are going back and explaining to our constituents why we are choosing to invest money in this regard, as opposed to anything else. And given the dynamics with this administration, with the weakening of the NATO alliance, or the perceived weakening of the NATO alliance, and everything else.

Ms. ROHLFING. So I would like to give just two recommendations to that question.

Number one is Congress needs to create space for re-engagement with Russia on this issue of existential common interests. We have got to get back to the negotiating table if we are going to try and lower tensions and maintain the guardrails around nuclear forces that have served us well over 50 years.

Ms. HILL. I am going to cut you off in, like, six——

Ms. ROHLFING. That is not much time for another answer.

Just number two, you need to filter your investments in modernization through the prism of reducing nuclear risk and stability of forces.

Ms. HILL. Thank you——

Ms. ROHLFING. And I think that will lead you to certain answers.

Ms. HILL. Thank you. Mr. Miller, and then I will go back to Dr. Blair.

Mr. MILLER. Quickly, modernize the triad and its supporting command and control, which has preserved the peace.

Second, understand that there is no place today on the NATO-Russia border where Russia does not have military superiority.

And third, if we are concerned—and I am—about keeping the NATO alliance together, no first use will create a huge schism.

Ms. HILL. Dr. Blair.

Dr. BLAIR. I think no first use is the first order of business, by far, along with modernization and fixing of the command and control weaknesses that we have.

The CHAIRMAN. I am sorry, the——

Dr. BLAIR. Thirdly, reviving our relationship with Russia and restoring a dialogue that could lead to real arms control talks.

The CHAIRMAN. You will have to——

Ms. HILL. Thank you all.

The CHAIRMAN [continuing]. Close there.

Mr. Bacon.

Mr. BACON. Thank you, Mr. Chairman.

I appreciate all three of you being here today. In my 16 assignments in the Air Force, my very first one was at SAC [Strategic Air Command] headquarters, and I remember General LeMay, who was retired at the time, walking in, quite the sight to see. And as a general officer, I was airborne emergency officer in case the ground command and control was taken out. So I was the person airborne to make sure that we had the second-strike capability.

But from that I have made the assessment that I do think we need to modernize our nuclear inventory, our nuclear enterprise, to include all three legs of the triad. I think it is important for deterrence that we do that. Russia and China are clearly modernizing their forms of the triad, as we speak, while we have been falling behind. And I think if we continue this, or make the decision we are going to go from a triad to a dyad or a triad to a monad, if you will, I think that makes us vulnerable.

And do we want to—how close do we want to make it? You know, I believe in—in my 30 years in the Air Force I never wanted a close fight. We want to win overwhelmingly. But in a nuclear deterrence we don't want to fight at all. How close do you measure what deterrence is? I would rather make sure that we have clear deterrence. I don't want to just make it close. A nuclear war should never be fought, and I think that—the triad provides us that assurance.

And this modernization is very critical. If you look at our B–52s, they are created under—or built largely under John F. Kennedy's era. We have granddaughters today flying them that their grandfathers used to fly. Our Minuteman III was primarily built with Lyndon Baines Johnson era. Our nuclear C3 under Jimmy Carter's era. And we got our B–2s and our submarines that are 20 to 30 years old now. I think it is clear that we need to start this modernization. So, with that, my first question is with Mr. Miller.

I believe the nuclear command and control—the nuclear C3 is very important. Can you just explain to us why this has to be included into this nuclear modernization plan? We think of the triad a lot. We tend to forget the nuclear C3. Can you give us a little more reasons why we've got to make this as an emphasis?

Mr. MILLER. I absolutely agree with Bruce, that the nuclear command and control system is the backbone of the triad. If you can kill the nuclear command and control system, the forces don't work.

The airplanes are old, the communication systems are old. The satellites are old and vulnerable. And so one of the key elements of the Nuclear Posture Review is to modernize the nuclear command and control system.

You probably know that General Hyten was put in charge of that recently by——

Mr. BACON. Right.

Mr. MILLER [continuing]. Then-Secretary Mattis. That is absolutely critical.

Mr. BACON. When I flew on it, it was 1970s technology, and that is what we still have today.

I am concerned about our airborne NC3 [nuclear command, control, and communications]. We used to have the ability—we, for decades, always had an airborne alert or capability airborne—not just alert—on the ground. I am not sure we can sustain that. Do we need to invest more to ensure that we have a 24-hour airborne capability?

And I just open that up to any of you three.

Dr. BLAIR. You know, I think you have served in the 55th STRAT RECON [Strategic Reconnaissance] wing?

Mr. BACON. In fact, I was the commander. Best wing in the Air Force.

Dr. BLAIR. Well, I was in that wing, myself.

Mr. BACON. I digress.

Dr. BLAIR. I was in that wing, and I supported——

Mr. BACON. Awesome.

Dr. BLAIR [continuing]. The Looking Glass.

Mr. BACON. Right.

Dr. BLAIR. So I know what you are talking about. And as you know, the endurance of the airborne system in an environment of nuclear war is not going to be very long. So I don't think the airborne system should be the backbone of our command and control system.

We—in the 1980s, under Reagan, we started to look at ground mobile systems to support continuity of government and all the rest. I think we need to completely relook at the architecture of our command and control system. Airplanes don't last nearly as long

as our forces. Submarines can operate for months at sea. And our command system collapses in 24 hours. It doesn't make sense.

So yeah, and then we modernize—if you like the triad, you really want to have a triad, Congress, I think, should ask for some new ideas beyond and besides putting new ground-based strategic deterrent missiles, 642 of them, available to put into vulnerable silos. That doesn't make—that is not eliminating vulnerability, that is just compounding a problem that already exists.

Mr. BACON. If I may, I would just like to ask you a separate question, Dr. Blair, and it is something that you mentioned earlier.

I feel like what Russia is doing, they are producing more cruise missiles, nuclear-armed cruise missiles, hypersonic weapons. They admit to having low-yield weapons. They have almost fully modernized their ICBMs, they are looking at bombers. Who—sometimes—and I hear the critical—or people being critical towards the President, as if he is creating an arms race. Isn't Russia initiating an arms race? And so far we have not really been participating. What is your thoughts on that?

Dr. BLAIR. Like I say, I think, going back for half a century, you will see cycles of modernization that we like to call an arms race, but they are actually just replacing aging and obsolete systems.

The CHAIRMAN. And we are, unfortunately, out of time, this witness. I apologize.

Ms. Houlahan.

Ms. HOULAHAN. Thank you very much to the panel for coming and speaking to us on this really important topic. Similarly, I served in the Air Force, as well. Also in the late 1980s and early 1990s was my time in the military. And actually, in terms of what my job was, was about command and control decisions in the event of a nuclear apocalypse, or Armageddon, and helping to think about human-in-the-loop, and what sort of information was needed by whom at what point in time to make really good decisions.

And interestingly, I was there being told that my job was to predict and build for the next generation's worth of technologies. So 25 years later, here I sit. And so, theoretically, what I was working on in the field then should be deployed now, hopefully—or maybe not hopefully. So here I am. Everything old is new again; 20, 25 years later I am having a conversation about a threat that I thought went away in the early 1990s.

And so, my questions have to do a little bit with Chairman Smith's statement that we need to figure out what we need to do, and where we don't need to spend money, we shouldn't be spending money, how we can be most effective in modernizing, how we can be most effective in helping the President and other decision makers make effective decisions with modern technology, specifically with C3I.

And so I know that Andy Kim, Representative Kim, asked you questions about cyber, cyber vulnerabilities. My questions have to do with artificial intelligence, and whether or not we have thought about the use of AI in the command and control structure as we are modernizing.

If we are using something like AI as it is currently evolving, is that something that would help us minimize costs at all?

Or it is something that is not yet kind of developed enough that we can effectively think about employing it because it is not really this generation when we are thinking about something as terrifying as nuclear weapons and their deployment?

Should we be developing these technologies that—can they save us any money in testing? And what are the risks?

And my next question has to do with whether our adversaries are, in fact, thinking about AI, since they are ahead of the curve, in terms of modernization with command and control issues.

Ms. ROHLFING. So I would like to jump in on that, if I could. I would just observe that the deployment of new technologies is outpacing our understanding of the threats they pose at the same time as, you know, we know that they bring benefits.

And I think on AI, as well as with cyber, we need to be sitting down with our adversaries and having a much better understanding of potential implications and red lines.

On cyber, I would just say, echoing what we have already heard a number of people in the room say, I think it is essential that we invest in secure communications. That is an important priority for this committee and the Congress' investments in general.

But I would just note that, even as we do that, we should not be sanguine that we can buy our way out of the cyber vulnerability of nuclear systems. And this is a really important point. And I don't think it is one that has had any airtime here today, and that is in 2013 the Defense Science Board issued a report that basically said we cannot have confidence that any of our nuclear weapons systems have not been compromised, meaning——

Ms. HOULAHAN. No, and I——

Ms. ROHLFING [continuing]. Right, they all have.

Ms. HOULAHAN. Trust me, I understand. And I am also concerned about cyber. But I am also, in terms of emerging threats and uses of technologies, concerned about artificial intelligence, too, and making sure that it is sophisticated enough and developed enough to be useful.

So I would love it if we could focus on artificial intelligence and the deployment of that, in terms of command and control. If—to the degree that we have any understanding of whether we are going to be implementing it or not.

Ms. ROHLFING. So in that—I would just say to that I think what we need to be doing is talking with Russia, with China, with others on making sure we understand red lines, rules of the road. And we should also be looking at, if we cannot come up with the perfect technical solution, what kind of policy and posture changes should we be thinking about putting into effect to make us safer. And that goes for both cyber and AI in the future.

Ms. HOULAHAN. Mr. Miller, do you have anything to add?

Mr. MILLER. Congresswoman, there is nobody in this room more ignorant on AI than I am.

[Laughter.]

Mr. MILLER. That said, it does—I would be concerned that, in the process of a nuclear launch decision or execution, that AI is involved. These are hugely life-shattering events. I think a human in the loop is absolutely critical.

Ms. HOULAHAN. And I agree with you. And when I served, human-in-the-loop was absolutely—you know, and it sounds like to this day, you know—kind of a important procedure.

But if we are talking about seconds, you know, milliseconds that can be saved by decisions that can be helped by AI that are helping the human-in-the-loop, that is what is alarming and concerning to me that I would love to hear a little bit about.

Mr. MILLER. I agree with that. But I do think that we have overloaded our people. And, you know, we don't want robotics to take over the nuclear decision and execution process. But they can be very useful, I think, in——

The CHAIRMAN. We are out of time, we have to move on.

Mr. MILLER [continuing]. Relieving the overload.

The CHAIRMAN. I completely agree with you, don't want a robot in charge of launching nuclear weapons. I think that——

Mr. MILLER. The Russians have one.

The CHAIRMAN. Yeah, fun thought.

Mr. Waltz.

Mr. WALTZ. Thank you, Mr. Chairman. And I just want to reiterate my colleagues that—statements, that U.S. modernization, or anticipated modernization, is not kicking off a renewed arms race. It is Russian and Chinese modernization that have already occurred, or is occurring that is kicking off this new arms race, and that also—the United States didn't withdraw from INF unilaterally; the Russians withdrew effectively about 10 years ago. And we have since matched that withdrawal. And then also need to address the Chinese continually growing missile threat.

So, question on low-yield, because I am still a little confused where you are, and I know we beat this dead horse, but just one more question on it.

Do you believe, as expert witnesses, that if the Russians launched low-yield—meaning carrier battle group, port, took out critical capability—that the United States would and should—and should signal that we will mount a full retaliation, and then, therefore, that is our—should be our posture, going forward?

Do you believe the United States would essentially destroy the world in response to a low-yield attack?

Ms. Rohlfing.

Ms. ROHLFING. Well, again, I think the goal here—and I agree with Frank—is to prevent these weapons from——

Mr. WALTZ. Totally agree, but the Russians——

Ms. ROHLFING [continuing]. Ever being used.

Mr. WALTZ. Getting in the Russian mindset——

Ms. ROHLFING. But I think——

Mr. WALTZ [continuing]. If they are going to launch it, and they do launch it——

Ms. ROHLFING. I think——

Mr. WALTZ [continuing]. Our response?

Ms. ROHLFING. I think we have an arsenal today that is a fully capable deterrent, capable of deterring any kind of nuclear use by the Russians.

Mr. WALTZ. Do the Russians believe that?

Ms. ROHLFING. That——

Mr. WALTZ. In your estimation.

Ms. ROHLFING. That is a debatable proposition that is—there is, in fact, one thing that has not even come up, whether the Russians even truly have adopted a policy of escalate to de-escalate is under debate within the community of people who follow this very closely.

Mr. WALTZ. Dr. Blair.

Dr. BLAIR. That is right. And I think that they have been working hard to dig themselves out of that hole.

I think they did have a escalate to de-escalate, or—early on, but that they recognized that that is a liability, that Russians, like us, would like to reduce reliance on nuclear weapons.

And so they have developed a very sophisticated doctrine of attacking critical civilian infrastructure using special operations, cyber, and conventional forces that I think they understand would be even more devastating——

Mr. WALTZ. Let me ask you differently. Do you——

Dr. BLAIR. So if they did——

Mr. WALTZ. If we had a——

Dr. BLAIR [continuing]. If they did use a low-yield——

Mr. WALTZ. Sorry, I have very limited time, so——

Dr. BLAIR. If they did use a low-yield weapon, I think we have three choices.

One is to continue to win the conventional conflict and keep the burn of escalation on the Russians. Second——

Mr. WALTZ. Right.

Dr. BLAIR [continuing]. We have a lot of low-yield weapons. We could use those.

And third, if—Russians believe escalate to de-escalate is a——

Mr. WALTZ. But we have testimony that many of our current low-yields are not effective.

Dr. BLAIR. If they think it is a viable doctrine, then they must understand that we could escalate to de-escalate. And——

Mr. WALTZ. Dr.——

Dr. BLAIR [continuing]. And we are in an infinite loop. Everyone loses, because the ultimate escalate to de-escalate is an all-out nuclear war.

Mr. MILLER. I think, Congressman, you have described the reason that the Russians have proceeded to develop a new generation of low-yield weapons, a doctrine to support that use, and the exercise of those weapons.

Mr. WALTZ. Dr. Miller, do you think that the Russians would be less likely and, therefore, to your point, Ms. Rohlfing, to go to the bargaining table, or back to the bargaining table, if we had a credible low-yield deterrent——

Mr. MILLER. I think——

Mr. WALTZ [continuing]. For them to use low-yield nuclear weapons? And therefore, I think we would be in a safer place.

Mr. MILLER. Bargaining table, sir?

Mr. WALTZ. Well, would the Russians be less likely to use their now-modernized—if we modernized ours, as well, and matched——

Mr. MILLER. That is the purpose of the low-yield Trident. The Nuclear Posture Review says that. It is to raise the nuclear threshold and to discourage any miscalculation by the Russian leadership.

Mr. WALTZ. We are moving towards the expiration of New START, as we have talked about. We are—we have moved beyond an era. We have bilateral treaties, and now a—in a previous bilateral nuclear world. Now we have a multi-lateral nuclear world.

Should we move—I mean where do you think we should go? Obviously, we have talked about extending New START, we have talked about broadening it to get the full capability of weapons, including China.

Mr. MILLER. I think we should continue to talk to the Chinese, but there is absolutely no indication that they have any interest in entering into any arms control discussion.

The Russians have violated—are violating, as we sit here—nine arms control agreements. I think that we need to proceed ahead to try to get our arms around their strategic weapons, their novel weapons, and their non-strategic weapons.

Mr. WALTZ. Doctor——

Dr. BLAIR. Global Zero——

Mr. WALTZ. Please, very quickly.

Dr. BLAIR [continuing]. My organization, convened a panel at the Munich Security Conference, at which a senior Russian—sorry, Chinese—general laid out their position, which is that the United States and Russia need to deeply reduce their nuclear forces.

Mr. WALTZ. I am sure they do think so.

Dr. BLAIR. And then they would be prepared to enter into—this is a long-standing position that goes all the way back to Huang Hua in 1982. What the Chinese are willing to talk about are confidence-building measures at this point. And they propose a no first use agreement to everyone.

Everyone has spurned it, except for the Russians. And so the Chinese and the Russians have a no first use agreement to—with each other right now. And so they are——

Mr. WALTZ. Which I have very little confidence in.

But finally, do you—just very quickly, do you agree the number of countries marching towards a full nuclear capability, or even a partial, is growing in the world.

Back to my colleague's questions, Iran, of course, North Korea, Pakistan, with its growing arsenal, potentially the Saudis, is that—a proliferation and a growing, fully capable missile command and control and nuclear threat, is that increasing or decreasing, in terms of the threat around the world?

Ms. ROHLFING. Increasing.

Dr. BLAIR. Definitely increasing, particularly in South Asia.

Mr. MILLER. Actually, I think the non-proliferation treaty has worked, and I think—I worry about Iran and North Korea, but I don't see major nuclear programs developing at this time.

The CHAIRMAN. Thank you.

Mr. WALTZ. Thank you. I yield my time.

The CHAIRMAN. Mrs. Luria.

Mrs. LURIA. Well, thank you for being here today. In the recent nuclear review, the 2018 Nuclear Posture Review, the review found that "the nuclear triad supported by the North Atlantic Treaty Organization, NATO, dual-capable aircraft, and a robust nuclear command, control, and communications system is the most cost-effective and strategically sound means of ensuring nuclear deterrence."

One could read this statement and think, of course, coming from the current administration, but I also want to point out that the 2010 Nuclear Posture Review under President Obama said, quote, that the "nuclear triad continues to play an essential role in deterring potential adversaries, and reassuring allies and partners around the world. And thus, maintains strategic stability at a reasonable cost."

As a committee we should be steadfast in our support for maintaining and modernizing the nuclear triad. So while I appreciate the differing points of view today, I think it is dangerous to allow someone to come before this committee and suggest that the United States should reduce or completely eliminate its nuclear stockpile, and I base that off reading previous writings that some of the committee members had previously published.

And to suggest that other countries would follow suit out of goodness of their heart—in fact, I think we have seen the opposite in the past 10 years. The 2010 Nuclear Posture Review contained the following quote: "Russia and the United States are no longer adversaries, and prospects for military confrontation have declined dramatically."

Mr. Miller, do you agree that Russia and the United States are no longer adversaries?

Mr. MILLER. I think that the Russians think that we are adversaries. I think that the threats that Putin is making, which are reminiscent of the Khrushchev-like threats, are utterly out of place in the 21st century world. And I worry about where the Russian leadership is going.

Mrs. LURIA. So I take that you think we are still adversaries.

Mr. MILLER. Yes, ma'am, I do.

Mrs. LURIA. Okay. And I liked a quote that you used earlier. You said that deterrence is about getting in the mind of the other person, or not. And to use that, do you think that the 2010 statement of what I would see as appeasement contributed to the global security situation we find ourselves in today with Russia, such as their continuing modernization of their nuclear arsenal, the invasion of Crimea, meddling in our election process, et cetera?

Mr. MILLER. I think President Obama made a bold move to try to get the Russians to—to try to lead. I think 8, 9 years later, we find ourselves in the position where the evidence is overwhelming that the Russians have rejected that idea, as they have rejected other ideas to move towards nuclear stability, like moving to single warhead ICBMs. The Russians rejected that. They rejected getting out of the business of tactical nuclear weapons.

So the notion that we can lead the Russians to some path where they will lay down their arms or become more peace-loving has been disproven over the last 10 years.

Mrs. LURIA. Okay. And do you think that the testimony we have heard today from Mr. Blair and Ms. Rohlfing could be construed by our allies and our potential adversaries as a lack of commitment on the part of the United States to modernization of our nuclear triad?

Mr. MILLER. No, I don't, because I think the strength and the essence of our democracy is that we have contesting views back and forth, and that is—we are a democratic alliance in NATO. And I

think this is—this debate is good. And for this committee to hear this debate—and as we did last week in front of the Senate, this is an important part of democracy.

Mrs. LURIA. Okay. Well, thank you. And I just want to close by clearly stating my position is that I think the United States should be committed to maintaining and modernizing all three legs of the nuclear triad, and continuing to provide an effective and modernized nuclear umbrella—both the protection of ourselves and of our allies.

Thank you. I yield my time.

The CHAIRMAN. Ms. Cheney.

Ms. CHENEY. Thank you very much, Mr. Chairman. Thank you to our witnesses.

Mr. Miller, one of the threads that you hear frequently among those who advocate Global Zero is this notion that somehow, if we just cut our arsenal, our adversaries will follow suit. We saw this very clearly, for example, when President Obama was in Strasbourg, France, in 2009. And he actually said if the United States would just cut the size of its nuclear arsenal, we could then convince the Iranians and North Koreans to do the same.

Have you seen any evidence in all of your years of work that this is an approach that would yield fruit?

Mr. MILLER. No, absolutely not. In fact, under your father's strong leadership, the Department of Defense, we dramatically reduced our non-strategic nuclear forces. The Russians pledged they would do the same thing, and they maintained their forces. And now they have modernized them.

We said we would move to single warhead ICBMs to be more stable. The Russians have maintained multiple-warhead ICBMs and are now going back to this large, heavy ICBM, which is clearly known to be destabilizing.

So I see no evidence that the Russians have bought into anything that we do in this area.

Ms. CHENEY. Thank you. And with respect to treaties, to INF, to New START, to some of the other treaties that we have discussed today, do you see any historic evidence of a treaty increasing American security if the United States is the only party to the treaty that is, in fact, adhering to the limitations of the treaty?

Mr. MILLER. If the United States is the only party in a treaty, it is unilateral restraint, it is not a treaty. And that is what happened to INF. It was a treaty. The Russians moved out, leaving us in a position of unilateral restraint. The treaty was dead.

Ms. CHENEY. Thank you. And I know all of us on this committee share the view that we have to ensure that a nuclear war is never fought. And part of that is, obviously, making sure that, in terms of deterrents, we also have the ability to have an effective extended deterrence.

Could you talk about the impact on our ability to provide extended deterrence if we are, in fact, seen as failing to modernize our own strategic forces, if we are seen as failing to make the investments that are necessary, with respect to our own stockpile?

Mr. MILLER. I think it would break NATO. I think it could lead to the development of other nuclear weapon states inside the alli-

ance, as they went to save themselves. I think it would be a terribly destabilizing thing.

Ms. CHENEY. Thank you. And then on no first use, that is another thing that we hear repeatedly, in terms of—that is supposed to bring some sort of stability to this entire issue. Could you talk about the damage that a no first use policy would do?

Mr. MILLER. I think it would have four effects.

One, it would fracture NATO. This is the wrong time to get into more transatlantic angst, and it would create angst.

Second, it could create a movement in some of our NATO allies to think about building their own weapons.

Third, it would not change Russian and Chinese doctrine in the slightest.

And fourth, I don't believe Russia or China would believe that we actually did it, because they are conspiratorial, and so it wouldn't change crisis management behavior.

Ms. CHENEY. Thank you. And then finally, in testimony by one of the other witnesses today ICBM—the ICBM force was referred to as "sitting ducks that invite attack." Could you respond to that, and explain to me whether or not you view that as an accurate description of our ICBM force?

Mr. MILLER. The ICBM could, obviously, be fired if it was under attack. And any—an enemy leadership would have no confidence that it could preempt that force. That is a powerful deterrent. Launching 400 or 800 warheads to destroy that force is an unmistakable signal the United States is under massive attack. And therefore, again, it raises the bar to aggression and attack against us.

I think the ICBM force is a critical part of the triad, the triad is a critical part of the deterrent.

Ms. CHENEY. Thank you very much. I had the opportunity to spend time on Friday with General Hyten at STRATCOM. I think that our strategic forces underpin absolutely everything we do. I think it would be the height of irresponsibility for us to be in a position where we decide that we are going to unilaterally disarm. We have to modernize. I think that we ought to be in a position where we are all absolutely affirming the importance of the triad.

And I look forward very much to General Hyten coming to testify, and I hope that will be soon, Mr. Chairman, in front of this committee, the way he has in front of the Senate Armed Services Committee.

Thank you to our witnesses, and I yield back my time.

The CHAIRMAN. Thank you. I am not sure of the exact timing, but as part of our posture review hearings he is scheduled to testify.

Ms. Gabbard.

Ms. GABBARD. Thank you, Mr. Chairman.

Thank you all for being here today. We have heard a lot of discussion about how we must maintain our nuclear weapons systems, not to—not designed to be used, but to act as a deterrent because they are so powerful, so dangerous, and the effects of using these nuclear weapons would be so devastating that they are not actually intended to be used. Would you agree with that?

[Nonverbal response.]

Ms. GABBARD. So if we understand that, then we must also understand that low-yield nuclear weapons are not designed to act as a deterrent, but are instead actually designed to be used.

Mr. MILLER. I—Russian low-yield weapons are designed to implement a Russian strategy of use. The low-yield Trident that the NPR [Nuclear Posture Review] calls for is designed to prevent the Russians from reaching for that low-yield nuclear weapon and using it in the field.

Ms. GABBARD. Dr. Blair.

Mr. MILLER. It is a deterrent.

Dr. BLAIR. Well, I think it is—I think it—I think the Russians clearly understand, and I have been there dozens of times over many decades, and talked to their experts and their generals. I think they clearly understand that any use of nuclear weapons would run the risk of escalation to all-out use, and that the role—the Russians, essentially, accept that the role—sole purpose of nuclear weapons is to deter the use of nuclear weapons by others.

But they also leave open the possibility that they could use nuclear weapons to defeat or to complicate conventional aggression against Russia.

Ms. GABBARD. Ms. Rohlfing, you have anything to add on that?

Ms. ROHLFING. I agree with what Dr. Blair just said.

Ms. GABBARD. I think it is very clear to me that a nuclear weapon is a nuclear weapon. And if you are talking about a nuclear weapon as a deterrent, but then you want to develop low-yield nuclear weapons, it is clear that they would not be necessary if you see that a nuclear weapon is a nuclear weapon, and that the system that we currently have acts as a deterrent.

Secretary of State George Shultz said, as they were negotiating and signing the INF Treaty, "A nuclear weapon is a nuclear weapon. You use a small one, then you go to a bigger one. There is an inevitable chain of nuclear escalation that puts the world at risk," which is why these low-yield nuclear weapons being developed are so dangerous.

I want to switch over to the INF Treaty. Mr. Miller, where do you see the path forward? You have said the INF Treaty is dead. What is the path forward?

Mr. MILLER. The INF Treaty is dead because the Russians now have 100 of the systems that are——

Ms. GABBARD. But what is the path forward?

Mr. MILLER. I would think that a new negotiation, which encompasses an extension of New START, in conjunction with new negotiations that cover all U.S. and Russian nuclear weapons, would be a preferred path forward.

Ms. GABBARD. So it is the wrong move for the United States to withdraw from this INF Treaty——

Mr. MILLER. I——

Ms. Gabbard [continuing]. Because of the repercussions that we are seeing already beginning.

Mr. MILLER. I dispute the—the treaty was dead. The Russians killed the treaty. There are 100 new treaty-busting missiles in the field, period, full stop. They have been—developed them since 2013. We have been asking them about it since 2013. The end result is the fielding of at least 100 of these missiles, and more are coming.

Ms. GABBARD. President Trump's withdrawal from this INF Treaty exacerbates the situation, and kicks off—and increases this nuclear arms race.

Gorbachev and George Shultz wrote a piece on this, very clearly stating that they participated in INF negotiations, and abandoning this treaty threatens our very existence. They said, "The answer to the problems that have come up is not to abandon the INF Treaty, but to preserve and fix it. Military and diplomatic officials from the U.S. and Russia should meet to address and resolve the issues of verification and compliance. Equally difficult problems have been solved in the past, once the two sides put their mind to it. We are confident this can be done again." That is quoting them.

This is the direction that we need to take, not to add more fuel to the flames, but instead seek to strengthen, address the issues that have been raised, strengthen this treaty, and bring in others to join.

Thank you, Mr. Chairman. I yield back.

The CHAIRMAN. Mr. Garamendi.

Mr. GARAMENDI. Mr. Chairman and members of the committee, as well as our three witnesses, I want to thank you for an extraordinarily important discussion, perhaps more important than any other thing this committee will consider over the next 4 or 5 months, as we put together the NDAA [National Defense Authorization Act]. So thank you very much.

I do want to pick up on Mr. Moulton's questions, insofar as you were able to answer. One of the questions that he raised is do the ICBMs deter Russia's attack more than our other nuclear weapons, specifically the SSBNs.

Mr. Blair.

Dr. BLAIR. I think the SSBNs are a secure second strike. They are what underwrites deterrence. The ICBM force is a vulnerable force. I don't see how anyone could make any sense out of the view that they are a force to be replaced.

Mr. GARAMENDI. With regard to that question, it also appears as though Russia and China both would agree with you that the ICBMs in a silo are vulnerable. And therefore, they have gone to mobile ICBMs.

Dr. BLAIR. That is right. And we try very hard——

Mr. GARAMENDI. I think that is going to be a yes or a no, because I want to get on——

Dr. BLAIR. Oh, we try very hard to find, fix, and track their—both Russian and Chinese ICBMs. This is part of the——

Mr. GARAMENDI. And North Korea.

Dr. BLAIR [continuing]. Warfighting mindset that is pervasive in both——

Mr. GARAMENDI. But with regard to the question of vulnerability, are—China, Russia, and North Korea have all decided that it has to be mobile, otherwise it is vulnerable. Is that correct, Mr. Miller?

Mr. MILLER. [Nonverbal response.]

Mr. GARAMENDI. Okay, thank you. And I take that as a yes.

Mr. MILLER. Yes, but that Russia does maintain silo-based missiles, and the new monster SS–18 follow-on will be silo-based. And some Chinese missiles are still silo-based. But your point is correct.

Mr. GARAMENDI. We are going to go around and around on this very, very fundamental issue for some time. We are going to have to deal with the issue. There may be questions, ultimately, of how fast we move forward with the new ICBM, and we will deal with that.

However, there appears, Mr. Blair, that you have one thing very, very much in mind that the three of you would agree to, and that is the command and control systems. If we are to do anything useful, aside from the negotiations, which I think all three of you say we ought to push forward as far and as fast as possible—is that a yes from all three of you on negotiations, get on with it?

[Nonverbal response.]

Mr. GARAMENDI. Thank you. So that—take that as a yes from the three of you.

Command and control. If we do anything useful in the upcoming NDAA, would you recommend that the command and control system be at the priority and the top of that list?

Mr. MILLER. Yes, sir.

Ms. ROHLFING. Yes.

Dr. BLAIR. Yes.

Mr. GARAMENDI. Well, I have got 3 minutes to go back and plow this field again, but I heard very clearly that—well, let me just state my position.

We are not going to solve this very, very fundamental debate about the very important differences—ICBMs and low-yield and the rest—in the near term. It seems to me that that is a fundamental negotiating thing. And I think, from my—listening to this, that all three of you would say, "Get on with the negotiations."

There are things in the—and there are things that we can do in the next 4 months or 5 months, and that is command and control, put the money there, put the emphasis there, and get on with it.

Is that correct?

Mr. MILLER. It is certainly part of the modernization of the triad, and I support the triad and the modernization, the C3.

Dr. BLAIR. Top priority.

Mr. GARAMENDI. I knew you were going to go there, Mr. Miller, but I take that as a yes, get on with the command and control.

Mr. Miller.

Dr. BLAIR. Yes.

Mr. GARAMENDI. Mr. Blair, rather.

Dr. BLAIR. Totally agree.

Ms. ROHLFING. Yes, I would prioritize command and control.

Mr. GARAMENDI. Very good. Beyond that, there are elements in the current law that make it very difficult for our military to have discussions with our counterparts in Russia, specifically, and somewhat in China.

I think it was your—two of you, anyway, maybe all three of you—that we eliminate those hindrances for discussion. Is that agreed amongst the three of you, that we should eliminate those?

Ms. ROHLFING. I would say yes. Those prohibitions embedded in the NDAA over the last several years should be repealed. And in fact, the administration should be encouraged to pursue military-to-military dialogue.

Mr. GARAMENDI. Mr. Blair.

Dr. BLAIR. Chairman Dunford has just recently just met with the chief of the general staff of Russia, Gerasimov, and I think that that kind of dialogue is absolutely critical in this period of tension.

Mr. MILLER. And CNO [Chief of Naval Operations] Richardson has just been to China. So yes, the military-to-military contacts are important.

Mr. GARAMENDI. Okay. Well, there is at least agreement that there is something that we can accomplish in a positive way.

My final point in the next 53 minutes is—or 53 seconds—is that we do not have an agreement on what deterrence is, nor the definition of deterrence. And until we have some sort of an agreement on what that is, it is going to be a round and round, and not much resolution.

With that, I yield back, Mr. Chairman.

The CHAIRMAN. Thank you.

Mr. Langevin.

Mr. LANGEVIN. Thank you, Mr. Chairman.

And I want to thank our witnesses for your testimony this morning. And let me begin with saying that, as you know, the United States has demonstrated strong leadership over the past decade to minimize and, where possible, all but eliminate the use of highly enriched uranium for civilian purposes. And I advocated for continued assessment to identify the feasibility of using low-enriched uranium in naval reactor fuel that would meet military requirements for aircraft carriers and submarines.

So as I see it, using low-enriched uranium in naval reactor fuel has the potential to bring significant national security benefits related to nuclear non-proliferation, and lower security costs. It also supports naval reactor research and development at the cutting edge of nuclear science.

Other nations do use low-enriched uranium to power their vessels, including submarines.

Moreover, unless an alternative to using low-enriched uranium fuel is developed in the coming decades, the U.S. will have to resume production of bomb-grade uranium for the first time since 1992, ultimately undermining, I believe, U.S. non-proliferation efforts.

So with all that being said, is this something that you considered in your research? And what are the risks associated with the recommencement of HEU [highly enriched uranium] production in the United States?

Dr. BLAIR. It is not in my wheelhouse, but I have a colleague at Princeton, Professor Frank von Hippel, who has persuaded me of everything that you just said. So I think that you are on the right—totally on the right track with that set of proposals.

Ms. ROHLFING. I would just add to that this is something that we have looked at at the Nuclear Threat Initiative, and I think that it would be a very important investment to see if we can develop a next-generation reactor that maintains only, you know, as much as possible, current operations with the low-enriched uranium fuel for our naval reactors. So I would encourage it. It is an important plank in our non-proliferation policy.

We need to prevent the spread of these materials around the world. And if we are continuing to produce it ourselves, and stockpile it in large numbers, that is hard to do.

Mr. MILLER. Sir, in my time in the Navy I was on a conventionally powered ship. I am not competent to talk about HEU, LEU [low enriched uranium], and reactors, but I think it is a mistake to think that if the United States does something, the rest of the world will follow. I think the sad history of the past 20-odd years indicates that we have proposed bold initiatives and, except for the British and the French, it is very difficult to bring other countries along with us.

Mr. LANGEVIN. But I am primarily focused on U.S. use of LEU. As long as it is going to meet military requirements—and again, certainly France is already doing it, powering their nuclear submarines, as I understand it. So it is technically feasible, it is happening, and I see no reason why the United States should not pursue that, and that type of technology and use in our aircraft carriers and submarines. But——

Mr. MILLER. Sure, and——

Mr. Langevin [continuing]. I appreciate your——

Mr. MILLER. I am sure Admiral Caldwell will have a time in front of the committee. You can talk to that.

Mr. LANGEVIN. I thank you for your input on that topic.

Next, though, the use of emerging technologies, such as machine learning to conduct predictive maintenance and additive manufacturing to help defray costs is something that we should be considering.

The Defense Department has seen some success with these types of technology. However, the effort is in a nascent state. Do you see a place for these technologies in the nuclear force? And what do you think they will—what effect do you think they will have?

Ms. ROHLFING. I think we need to do more research to better understand both the benefits and the disadvantages of pursuing those technologies as part of the nuclear force before I could make a recommendation.

Dr. BLAIR. You know, I think existing technology, even 10 years old, it could be incorporated into our systems, including our nuclear command and control system, which operates on—in some cases, on 1950s technology. So I don't think we have to leap too far into the future with new technology to fix a lot of the problems that we currently confront.

Mr. MILLER. I am not competent to answer your question, sir.

Mr. LANGEVIN. Okay. Thank you all very much. I yield back.

The CHAIRMAN. Thank you. I want to thank our witnesses. I think it was a very, very informative discussion, and I appreciate your expertise and your answers to our questions. And we learned a great deal.

I just want to close by saying that I don't think there is anybody on this committee—there is probably people in the country, but there is not anybody on this committee who is not in support of modernizing our nuclear force. And I don't think there is anybody on this committee who is not in support of the idea that we need to have a nuclear deterrent.

To the extent that some of the questions from members implied that somehow, if we don't do everything in the Nuclear Posture Review that means that we are in favor of unilateral disarmament and being weak, is exactly—the type of argument that has always troubled me on this committee is you can always build more. Well, okay if the Nuclear Posture Review is the gold standard for what makes you strong, why not another 1,000 missiles, you know?

I mean what if someone came up with a Nuclear Posture Review that said no, you are wrong, you know, we need five more submarines. So then the Nuclear Posture Review becomes evidence that you are weak.

So I am very—the only thing that really troubles me about the discussion is people say that if we don't build absolutely everything we say we are going to build, that means that our adversaries are going to perceive us as weak and attack us. That is—I think the analogy I have heard in the military—the ultimate self-licking ice cream cone. It will never stop.

So I think a robust discussion about what is actually in the Nuclear Posture Review and whether or not it makes sense to maintain that deterrence, that is the debate we were having. I understand in politics it is always easier if you can set up a straw man and then knock it down—the straw man being that, you know, well, let's not be weak. That is not the discussion here. The discussion here: what is a credible nuclear deterrent? And I completely agree that that is what we need.

I would point out that, over the course of the next 15 years, the nuclear modernization plan that we are talking about is going to add somewhere between $10 and $15 billion a year to what we already spend on nuclear weapons, and we already spend a great deal. That is $10 to $15 billion that isn't going to go to anything else.

So we need to have that discussion, in my view. But it is not a matter of disarming or, you know, standing down. I think we need to have a strong nuclear deterrent, and we need to modernize. But we will continue to have this debate, going forward.

Again, you were all excellent, and I really appreciate you taking the time to help inform our committee on this crucially important issue.

With that, we are adjourned.

I forgot something. I am going to ask unanimous consent to include into the record all members' statements and extraneous material.

Without objection, so ordered.

And now we are adjourned.

[Whereupon, at 12:31 p.m., the committee was adjourned.]

A P P E N D I X

MARCH 6, 2019

PREPARED STATEMENTS SUBMITTED FOR THE RECORD

MARCH 6, 2019

JOAN ROHLFING, PRESIDENT, NUCLEAR THREAT INITIATIVE

WRITTEN STATEMENT FOR HOUSE ARMED SERVICES COMMITTEE HEARING ON OUTSIDE PERSPECTIVES ON NUCLEAR DETERRENCE POLICY AND POSTURE

MARCH 6, 2019

Chairman Smith, Ranking Member Thornberry, members of the committee, thank you for the opportunity to appear before you today on an issue that affects the lives of every American and indeed the security of our world.

I serve as President and Chief Operating Officer of the Nuclear Threat Initiative, a non-partisan non-profit global security organization dedicated to reducing risks from weapons of mass destruction and disruption.

Today, we face the highest risk of use of a nuclear weapon since the Cold War, but, in contrast to that dangerous period in our history, today, this risk is not front and center in the minds of most Americans or their leaders.

We live in an era where a fateful error or miscalculation -- rather than an intentional act -- is the most likely catalyst to nuclear catastrophe. Reducing this risk demands the priority focus of those who are entrusted to represent the American people and ensure their security. I commend you for your leadership on these issues and thank you for the opportunity to share my views. As a former staff member of this committee, I know the important role this committee and the congress play in shaping our nation's nuclear policies to reduce nuclear risks and ensure a safer, more credible nuclear policy and posture that is responsive to today's threats.

In this testimony I urge Congress, and in particular, this committee to focus on action in four areas:

1. Advancing a U.S. nuclear policy and posture intended to prevent the use of nuclear weapons and reduce reliance on them in our national security policy;
2. Supporting policies and postures that increase decision time for U.S. and Russian presidents to respond to a warning of an incoming missile;
3. Ensuring robust U.S.-Russia nuclear dialogue and crisis management mechanisms; and

4. Encouraging steps to enhance strategic stability, including through the preservation of existing arms control mechanisms like the New Strategic Arms Reduction Treaty (New START) and the negotiation of additional verifiable bilateral and multilateral agreements.

U.S. Nuclear Policy for Preventing Nuclear Use

Although our vital national security interest in preventing nuclear use is clear, the world is now moving in the wrong direction, and U.S. nuclear policies have not kept pace. Today's nuclear world—including a growing number of nations with nuclear arms in volatile regions, technological advances, the continuing threat of nuclear terrorism and cyberattacks—poses high and potentially unmanageable risks, including the dangerous possibility of an accident, mistake, miscalculation, or blunder by one of many nuclear-capable actors leading to nuclear use.

The United States should maintain a safe, secure and reliable nuclear deterrent as long as nuclear weapons exist. But in today's era of growing nuclear risks, this alone will not guarantee the safety and security of the American people.

The nuclear policy and posture course Washington sets influences other nations. If the United States – the world's greatest military power -- decides it cannot defend itself without new nuclear weapons and threats of nuclear use, and forgoes our historic—and moral—commitment to reducing and ultimately eliminating nuclear dangers, it will encourage other nations to increase their dependence on nuclear weapons. This will come at a time when international efforts to discourage the spread of nuclear weapons are under severe challenge.

The 2020 Nuclear Nonproliferation Treaty (NPT) Review Conference will mark the 50th anniversary of the entry into force of the NPT, which remains the cornerstone of the global nonproliferation regime. Its legal obligations provide the regulatory framework for the peaceful uses of nuclear energy and help ensure responsible behavior by new and emerging nuclear suppliers. However, there is growing frustration and concern among states about the potential collapse of the nuclear nonproliferation order so painstakingly cultivated by the Treaty and its signatories over decades.

The United States has a unique responsibility and imperative to lead and set the right course. We must recognize that U.S. nuclear policies and deployment decisions that emphasize U.S. reliance on nuclear weapons, and that call for new, more capable or more "usable" types of nuclear weapons, are at odds with our

national security interest in dissuading other states from pursuing nuclear weapons programs.

With these objectives and concerns in mind, I believe U.S. nuclear policy should:

1. **Reaffirm our vital national security interest in preventing nuclear use and state that the purpose of U.S. nuclear weapons is to deter the use of nuclear weapons by others**. We should avoid issuing nuclear threats or a strategy for limited nuclear use, as this will encourage others to do the same. We should not expand the range of threats against which nuclear weapons might be used, as the 2018 Nuclear Posture Review does. For instance, explicitly or implicitly threatening nuclear response against "strategic" cyberattacks greatly increases the risks of miscalculation or blunder.

   NTI has called for the U.S. and Russian presidents to issue a Presidential Joint Declaration reinforcing the principle articulated by President Reagan in 1984 that a nuclear war cannot be won and must never be fought. This initiative could include other states with nuclear weapons, in particular the UK, France, and China.

2. **Reconcile strategic modernization of our nuclear forces in the context of our deterrence needs, overall defense budget priorities, and emphasis on increasing stability and reducing reliance on nuclear weapons over time.** The President and Congress should support what is necessary for maintaining a safe, secure, and credible nuclear posture, while reducing the risk of nuclear use and avoiding unnecessary costs. Effective deterrence involves more than nuclear forces, and we must ensure that the difficult budgetary choices we make reflect the priorities that will allow us to deter and defend against the full range of threats to our national security and that of our allies, including sustaining the competitive edge of our conventional forces.

3. **Forgo new nuclear weapon types, capabilities, or basing options.** Today, the United States has a robust nuclear deterrent—with a significant number of warheads on day-to-day alert—a flexible capability to deter nuclear use or destroy any potential nuclear adversary. The most immediate priority should be to structure and posture U.S. and Russian nuclear forces to deter nuclear use and reduce the risk of an accidental, mistaken or unauthorized launch. Against this backdrop, doctrines and/or postures that envision a warfighting role for nuclear weapons or a way to make these weapons more

"usable" are particularly troubling. In this regard, the reported (and debated) Russian concept of "escalate to de-escalate" -- i.e., limited nuclear use designed to create a pause in the conflict and open a pathway for a negotiated settlement on Moscow's terms – and U.S. calls for more "usable" nuclear weapons make the world vastly more dangerous. Even taking into account Russian modernization programs, the United States does not need to build new nuclear weapons types with new capabilities, or to expand nuclear missions. Plans for new, more "usable" low-yield nuclear weapons increase the probability and risk of nuclear war.

4. **Reaffirm the vision of working toward a world free of nuclear weapons through practical, concrete steps that improve our security today.** Continuing support for the vision of a world free of nuclear weapons is essential for America's national security interests. It also helps us meet our commitments under the NPT. Every president of both parties since Richard Nixon has reaffirmed the commitments made in the Treaty to pursue nuclear disarmament, but non-nuclear weapon states have grown increasingly skeptical of the sincerity of the nuclear weapon states. To make progress on the vision, countries must implement a series of practical, achievable steps that continuously reduce the risks of nuclear use.

Increasing Decision Time for U.S. and Russian Presidents to Respond to a Warning of an Incoming Missile

Today, U.S. and Russian ballistic missiles armed with nuclear warheads deployed on prompt-launch can be fired and hit their targets within minutes. Once fired, a ballistic missile cannot be recalled. Leaders may have only minutes between warning of an attack and nuclear detonations on their territory that are intended to eliminate their capacity to respond. This puts enormous pressure on leaders to maintain "launch on warning/launch under attack" options, which, when mutual tensions persist or in a crisis, increases the risk that a decision to use nuclear weapons will be made in haste after a false or misinterpreted warning—blundering into nuclear catastrophe.

New cyber dangers to warning and command and control systems exacerbate that threat. Malicious hackers could simulate an attack – giving leaders in Washington or Moscow only minutes to decide whether to use or lose nuclear weapons in response to the potentially false warning of an incoming nuclear weapon.

Washington should work with Moscow to eliminate Cold War-era capabilities and force postures that generate fears of a disarming first-strike. Working with Russia

to take nuclear missiles off prompt launch status would increase time for leaders to assess their options and make a more considered decision in response to a suspected or actual nuclear attack. This would significantly reduce the risk of a bad decision leading to nuclear use and set a precedent for all states with nuclear weapons to pull their finger back from the nuclear trigger.

Disengaging the Cold War autopilot would in no way diminish the U.S. military capability to deter and defend against any nation or combination of nations; even with these steps, the United States will continue to have sufficient if not excessive capacity in its nuclear arsenal. Over the years, Republican and Democratic presidents have expressed support for moving away from prompt-launch status. It is time to take this important step with Russia.

Possible options for increasing warning and decision time and removing weapons from prompt-launch include:

- **Reciprocal U.S.-Russian commitments to remove a percentage of missiles and warheads from prompt-launch.** The United States and Russia could announce plans to take a percentage of their strategic nuclear forces off prompt-launch within three to five years. Initial steps would also include discussions on procedures, observations, and inspections to build confidence and trust, which will be necessary to address the challenges involved in eventually removing all weapons from prompt-launch.

- **Agreed tiered U.S.-Russian strategic force postures.** The United States and Russia could limit the number of warheads on prompt-launch status to several hundred as part of a tiered force posture. This posture would have a first tier with a limited number of weapons on prompt-launch status, a second tier with delayed response of days or perhaps weeks, and a third tier that required longer periods to be brought back to readiness. The objective would be to move most strategic forces to the second and third tiers while ensuring against a situation where there is pressure in a crisis to rush to move forces back into the first tier.

- **Set the goal of removing all nuclear weapons from prompt-launch status globally over the next decade.** Progress on removing nuclear weapons from prompt-launch status in the United States and Russia could be the basis for a global norm against retaining or adopting prompt launch postures. The United States and Russia could begin a dialogue with other states with nuclear weapons in anticipation of a subsequent agreement not to deploy warheads on prompt-launch.

Complementary to removing weapons from prompt launch to increase warning and decision time for leaders, the United States should as a matter of policy promote secure, reliable, and survivable strategic nuclear warning and command and control systems. This should include discussions with Russia and other states with nuclear weapons for reaching understandings on reducing cyber threats to these systems.

Establishing ongoing U.S.-Russia Nuclear Dialogue and Crisis Management Mechanisms

Today's situation of drastically curtailed channels of communication on nuclear issues between the United States and Russia is dangerous and must end. We have stark differences with Russia, but we have an existential common interest in reducing the risk of a nuclear mistake or blunder and avoiding a nuclear catastrophe. We need to be able to manage our considerable differences and engage on nuclear issues to protect the American people. If we could do it during the Cold War, we should be able to do it now.

Engaging Russia on crisis management, nuclear risk reduction and strategic stability is the crucial first step to reducing the risk of military conflict and nuclear use between the United States and Russia. We should re-establish as a core principle the goal of reducing the role and risks of nuclear weapons in global security policies as an essential part of Washington's and Moscow's overall security posture without jeopardizing the security of either country or their allies—and develop specific steps consistent with this core principle. In addition to nuclear forces (strategic and nonstrategic), renewed dialogue on strategic stability must include over time missile defenses, prompt-strike capabilities, conventional forces, cybersecurity, and activities in space.

The United States and Russia should work bilaterally to begin and advance key elements of an agenda to reduce the risks of nuclear use, but Europe and Asia, as well as all nuclear states, will also need to be engaged, and their perspectives taken into account.

An immediate priority should be to identify concrete, practical, near-term initiatives designed to reduce risks, rebuild trust, and improve today's global security landscape. These near-term steps should be presented so that publics understand how they enhance mutual security.

Leaders must act to resume and broaden military-to-military communication in multiple channels and at multiple levels. Elevating bilateral military-to-military

dialogue between the United States and Russia, essential throughout the Cold War, should be an immediate and urgent priority. Within the Euro-Atlantic region, NATO-Russia channels should be better utilized, and they could be augmented by a new military crisis management group that could include other regional states. The focus of these initiatives should be on reducing risks of a catastrophic mistake or accident by restoring communication and increasing transparency and trust—an initiative that publics would understand and support.

As NTI Co-Chairs former Senator Nunn and former Secretary of Energy Moniz wrote in their February 1, 2019 op-ed in Politico, Congress has a unique role and responsibility to help shape U.S. policy on Russia at a time when this set of issues is so fraught in our domestic politics. They recommended establishment of a bicameral, bipartisan liaison group to work with the administration on a shared approach to policy on Russia and nuclear risk reduction, modeled loosely after the Senate Arms Control Observers Group in the1980's.

The administration and Congress should agree to support restoration of robust crisis-management and nuclear stability discussions in military and diplomatic channels and must also work together to ensure sanctions are both effective and flexible. Specifically, Congress must give the President flexibility to lift sanctions if progress is made on restoring security in Ukraine and to our elections – sanctions are only an effective incentive to change Russia's actions if Moscow believes those sanctions can and will be lifted in response to positive steps by Russia. Finally, Congress should lead a resumption of U.S.-Russian inter-parliamentary exchanges to have more face to face discussions between members of Congress and their Russian counterparts to discuss the challenges in the bilateral relationship as well as opportunities to advance mutual interests. These matters are too important to be caught up in partisanship or to await the outcome of the Mueller investigation.

Another priority is to restore cooperation and rebuild trust between the U.S. and Russian nuclear establishments. The U.S. Department of Energy (DOE) and Rosatom no longer cooperate in essential areas, such as nuclear security, nuclear safety, and nuclear environmental remediation. Attention should be focused on re-establishing the legal basis for DOE and Rosatom to work together to reduce nuclear danger, including by repealing congressional limitations on mutually beneficial DOE-Rosatom engagement and by encouraging the Administration to take steps to resume bilateral engagement under the 2013 U.S.-Russia Nuclear Research & Development Agreement.

In that spirit, I'd like to note some concrete things this committee could consider as you develop the FY2020 National Defense Authorization Act (NDAA).

- First, repeal limitations on military-to-military contact between the United States and Russia. While the FY2019 NDAA usefully included language exempting dialogue for the purpose of reducing the risk of conflict from the limitations, in practice the general restriction continues to suppress U.S.-Russian engagement that can contribute to strategic stability. I respectfully urge you to consider adding language to the NDAA specifically encouraging such urgently needed dialogue, which should take place more regularly and at multiple levels in DoD and State Department channels, as well as at NATO.

- Second, repeal provisions that prohibit the availability of funds for DOE programs in the Russian Federation. As the world's largest nuclear powers, the United States and the Russian Federation have a shared responsibility to manage the destructive forces of the atom while directing those same forces toward positive applications. Restrictions such as those found in prior year NDAAs have had a chilling effect on both the U.S. and Russian bureaucracies, well beyond their literal application, and have prevented mutually beneficial cooperation on nuclear-related matters.

At the Munich Security Conference last month, more than forty former and current senior officials and experts (including three former Supreme Allied Commanders of Europe) issued a statement expressing support for crisis management dialogue and strategic stability in the Euro-Atlantic region. With your permission, I will submit for the record this statement by the Euro-Atlantic Security Leadership Group (EASLG).

The statement was discussed at an event during the Munich Security Conference attended by over 70 participants including Speaker Pelosi and several House Members, NATO's Supreme Allied Commander, the Russian Deputy Foreign Minister, and many other senior current and former officials from the United States Europe and Russia. Based on the discussion at Munich, we believe there is a basis for governments to engage productively on this issue as a practical concrete step to reduce risks and begin the process of rebuilding trust in Europe. This could not be more urgent.

Enhancing Strategic Stability and the Role of Arms Control and Verification

In addition to resuming robust dialogue in military-to-military channels, the United States should continue to support and advance practical, concrete steps that reduce nuclear dangers, increase security, and sustain progress toward a world free of

nuclear weapons. Historically, bilateral and multilateral nuclear arms control and confidence-building measures have played a significant role in advancing these objectives. However, the foundation of arms control and confidence building that has curbed the nuclear arms race and enhanced strategic stability between the nuclear superpowers during and after the Cold War is eroding and in danger of collapse.

Preserving and revitalizing this foundation is critical to continue progress in verifiably reducing global nuclear stockpiles, preventing proliferation, and increasing stability—including specific steps that could supplement legally binding treaties. To this end, the United States should: 1) extend the New Strategic Arms Reduction Treaty (New START) with Russia and pursue further verifiable nuclear reductions with Russia; 2) work with allies and Russia on an approach that will seek to avoid worst case destabilizing outcomes if, as it seems now, the Intermediate-Range Nuclear Forces Treaty (INF) will expire following U.S. withdrawal in response to Russia's violation; 3) invigorate dialogues with Russia, China, the P-5, and all states with nuclear weapons to advance strategic stability as well as the reductions and limitation process; and 4) continue to collaborate with other states and experts to develop the verification tools needed for agreements that should in the future address not only delivery vehicles, but also nuclear warheads and the entire nuclear fuel cycle.

To advance some of these objectives, we recommend steps including:

- **Preserving and Extending the New START Treaty.** Through its numerical limits, robust verification and transparency measures including numerous on-site inspections and exhibitions; data exchanges and notifications related to strategic offensive arms and facilities covered by the Treaty; and provisions to facilitate the use of national technical means for Treaty monitoring, New START contributes immeasurably to the national security of the United States. Both sides are complying with New START and would benefit by extending its duration through 2026, as the Treaty permits. This is even more important if, as now seems likely, the INF Treaty will go out of force. The implementation issues that each side has raised with New START – pertaining to U.S. conversion procedures and the Treaty's applicability to new kinds of strategic systems such as those Russia is developing – can and should be discussed in the Treaty's implementing body. The loss of New START's limits, verification regime, and the predictability it provides would do irreparable harm to mutual security. This can and must be avoided. Moreover, New START provides an essential foundation of limits and verification upon which additional measures

can be pursued, and it can be supplemented or superseded by a future agreement that must have similarly robust verification and would, ideally, entail further nuclear reductions.

- **Supporting Further Reductions.** Reducing nuclear dangers and advancing nuclear nonproliferation requires that the United States continue to plan for, pursue, and help create the conditions conducive to further bilateral and multilateral nuclear arms reductions and limitations, and other measures such as a multilateral fissile material cut-off treaty, to advance step-by-step progress toward the ultimate goal of a world free of nuclear weapons. Further progress on nuclear reductions with Russia will require addressing a broader set of issues affecting strategic stability. As the reductions process proceeds, it will be necessary and desirable to involve additional countries with nuclear weapons and to address not only nuclear weapons delivery vehicles but also nuclear warheads and materials.

- **Strengthening Verification.** Verification is a critical component for strategic stability and for confidence in the nuclear reductions process. The challenges and requirements for verification become more demanding to support reduction agreements with lower numbers that regulate not only weapons delivery vehicles but also nuclear warheads and the materials required for producing and maintaining them. Significant effort and resources are being devoted across governments, academia, and other non-governmental organizations to strengthening verification. This work should be intensified and allocated sufficient resources to ensure the verification challenges are understood and met as progress on bilateral and multilateral reductions and limitations proceeds.

  To that end, NTI is engaged with the U.S. Department of State in leading efforts with a group of more than 25 States with and without nuclear weapons on the International Partnership for Nuclear Disarmament Verification (IPNDV). This collaborative effort is focused on identifying the challenges associated with nuclear disarmament verification and identifying potential procedures and technologies to address those challenges. The IPNDV is an example of how the public and private sectors can join together on a global basis to make practical contributions to the field of disarmament and its essential verification component.

- **Engaging in Nuclear Dialogue with China.** Regular and sustained bilateral nuclear dialogue between the United States and China is also essential for building transparency and trust and reducing risks of miscalculation and

blunder. This is all the more important as China modernizes its nuclear forces, and in light of the potential for miscalculation or conflict with regard to the South China Sea or Taiwan. In addition, North Korea's nuclear and missile programs continue to be a top priority for discussions. Washington and Beijing must be actively engaged on regional security issues and on goals and strategy for negotiations with North Korea.

Conclusion

I commend the committee for holding this timely hearing. Congress has a critical role to play through oversight and priority-setting through budgets to ensure that the United States is at the forefront of global efforts to prevent nuclear proliferation and to ensure that the 74-year record of non-use of a nuclear weapon since Hiroshima and Nagasaki continues indefinitely. The focus today must be on reducing the risk of an accident, mistake or miscalculation. There is much that can be done to prevent nuclear use and continue on the step-by-step approach of practical steps to reduce and ultimately eliminate nuclear weapons, but it will take U.S. leadership and global political will to get there.

Ms. Joan Rohlfing

Joan Rohlfing is the President and Chief Operating Officer of the Nuclear Threat Initiative, which she has been involved with since its launch. Before joining NTI, she held senior positions with the U.S. Department of Energy. Her career spans thirty years, and she has been awarded for her work in the field of nuclear policy.

Joan Rohlfing is the President and Chief Operating Officer of the Nuclear Threat Initiative. She is responsible for managing all NTI programs and operations, overseeing an annual operating budget of $15-$20 million.

She was part of the original team that created the mission and scope for NTI in 2000. Once the organization launched in 2001, she played strategic roles in several of NTI's hallmark projects including the Nuclear Security Project – an effort to galvanize global action to reduce urgent nuclear dangers and build support for reducing reliance on nuclear weapons, ultimately ending them as a threat to the world. Before joining NTI, she held senior positions with the U.S. Department of Energy, as Senior Advisor for national security to the Secretary of Energy and as Director of the Office of Non-proliferation and National Security. In 1998, when India and Pakistan tested nuclear weapons, Rohlfing advised the U.S. ambassador on nuclear security issues. Earlier, she served on the staff of the U.S. House Armed Services Committee and at the U.S. Department of Defense.

Rohlfing is a member of the U.S. Department of Defense Threat Reduction Advisory Committee as well as the Directorate Advisory Committee of the National Security Directorate at Pacific Northwest National Laboratory. She has served as an advisor to the Nuclear Industry Summit, a companion event to the global Nuclear Security Summits.

She was awarded the Department of Defense Civilian Service Medal in 1989. In 2011, the University of Maryland School of Public Policy gave her the Distinguished Alumnus of the Year Award, citing her career in public service. Rohlfing is a member of the Council on Foreign Relations.

She specializes in nuclear policy.

Rohlfing holds a Master's degree from the University of Maryland and a Bachelor's degree from the University of Illinois.

Testimony
Dr. Bruce G. Blair
House Armed Services Committee Hearing on Outside Perspectives on Nuclear Deterrence Policy and Posture
March 6, 2019

Chairman Smith, Ranking Member Thornberry and other distinguished members, I am honored and grateful for this opportunity to testify today.

Overview

Like many Americans of my generation I first learned about nuclear weapons in 1962 when President John F. Kennedy threatened to unleash the full might of U.S. nuclear forces against the Soviet Union if we were hit by nuclear-tipped missiles fired from Cuba. I was relieved to learn we had a secure second-strike force capable of inflicting unacceptable damage in retaliation to a Soviet attack.

I learned that simply being able to destroy Russia as a viable country was not, in fact, the reality of our nuclear weapons policy when I became a U.S. Air Force Minuteman missile launch officer and support officer for the Strategic Air Command's (SAC) "Looking Glass" airborne command post. Our planners saw nuclear weapons not simply as tools of deterrence but also as tools for actual or coercive use during a nuclear conflict.

By far the majority of our targets were the adversary's nuclear forces, and that remains true today in the case of Russia. Back then, as now, thousands of strategic nuclear weapons aimed largely at each other stood ready for immediate first use or launch on warning. Back then, as now, the president would have just a few minutes to authorize launch on warning, and he would be pressured, "jammed," to do so on the basis of early-warning information that could be false or misleading, today possibly due to cyber interference. We spent, and still spend, billions of dollars on space and undersea surveillance and attack submarines to track and target the most survivable components of Russia's and China's strategic deterrent – their mobile intercontinental ballistic missiles (ICBMs) and their strategic ballistic-missile submarines (SSBNs). Then, as now, our war planners devised a warfighting posture that makes bald assumptions about command and control, seeing through the fog of war and dominating escalation while hundreds or thousands of nuclear weapons are exploding on the territory of the belligerents.

This warfighting strategy may look good on paper, but it is infeasible. All it really accomplished was to fuel an arms race and increase the chances of nuclear war by design or accident. Our hair-trigger launch posture, which the Russians matched, continues to run the risk that fear, misperception, miscalculation, accident or false warning could trigger a nuclear exchange. This risk of blundering into a nuclear war, rather than a cold-blooded sudden attack, presents what is by far the greatest immediate physical threat to the United States today.[1]

[1] William J. Perry, *My Journey at the Nuclear Brink* (Stanford: Stanford University Press, 2015).

I propose that we return to first principles and design a posture for assured retaliation that is smaller but more survivable and stable than the one currently planned. This posture would hold at risk Russia's, China's and North Korea's key elements of state power, economy and leadership. I estimate there are about 450 primary aimpoints in these categories in total for these three countries – the only ones that could conceivably threaten to use nuclear weapons against the United States in the foreseeable future. Assuring retaliation against these key elements would easily meet any reasonable judgment of actual deterrent requirements.

Pivoting away from targeting opposing nuclear forces and from the fantasy of controlling escalation would allow us to eliminate most of the four thousand weapons in the current active stockpile. Only five or six of the planned fleet of 12 new Columbia-class SSBNs would need to be built in order to credibly threaten the destruction of our potential adversaries' key elements of state control. All other existing and planned U.S. nuclear weapons could be scrapped, including the destabilizing new missiles slated for deployment in vulnerable old silos, and the so-called "low-yield" weapons allegedly needed to neutralize Russia's doctrine of "escalate to de-escalate." The result, besides huge savings, would be more stability and less danger of blundering into a nuclear conflict.

Defenders of the Triad claim that the ICBM force is essential, but a vulnerable leg does not strengthen the Triad, it weakens it. If you want a strong and stable Triad that includes ICBMs, then a mobile basing mode is required.

Proponents of the so-called "low-yield" weapon in the pipeline for deployment on Trident II missiles on SSBNs also have not thought it through. Never mind that a 5-kiloton weapon like the one being planned would kill 80 thousand people and injure 120 thousand if exploded above the White House right now.[2] If the Russians use such a "low-yield" weapon or two in a conventional conflict in a bid to "escalate to de-escalate," chances are they are losing that conflict. It is their conventional inferiority that drives them to consider such use. There is no more evidence that the Russians are seeking to exploit some "yield gap" any more than they would a mine-shaft gap. Russian weakness has driven them toward overreliance on nuclear weapons and strenuous and successful effort has been made to create viable non-nuclear options to supplant "escalate to de-escalate." In any case, the United States possesses ample conventional and nuclear weapons with which to respond effectively to the use of one or two Russian "low-yield" nuclear weapons.

Pivoting away from warfighting also means adopting "No First Use" (NFU). NFU is axiomatic in true nuclear deterrence, which means threatening to respond to a nuclear attack, not initiate one. Universal NFU would have a stabilizing effect during a crisis,

[2] Estimates based off a burst height of 400 m, Alex Wellerstein, "Nukemap," accessed February 25, 2019, https://nuclearsecrecy.com/nukemap/?&kt=5&lat=38.89742&lng=-77.0365211&hob_opt=2&hob_psi=5&hob_ft=1312&casualties=1&psi=20,5,1&zm=14.

relieving pressure on both sides to launch first before the other side does and reducing the risk of launching on false warning.

NFU is further justified by the absence of foreseeable scenarios that would convince a U.S. president that the first use of nuclear weapons is warranted. Our allies need to understand this but they can be assured that our conventional capabilities and commitment to second-strike deterrence will provide for both their and our defense.

The most important project will be fixing our vulnerable and deficient Command, Control, Communications and Intelligence (C3I) systems. C3I has long been the Achilles' heel of our nuclear posture. When I was attached to the unit that maintained the last-ditch "Looking Glass" airborne command post, we harbored real doubt about our ability to retaliate at all to a Soviet attack, even though the general onboard possessed pre-delegated nuclear launch authority. Any notion that the airborne post-attack command and control system could orchestrate a strategy of escalation dominance was completely unrealistic, indeed ludicrous.

Those doubts persist even today. C3I would likely collapse within a few hours of nuclear conflict. Fixing this is essential to supporting assured retaliation and enabling the president to intelligently choose a response if deterrence should fail. Instead of modernizing overkill, increasing presidential decision time should be our top priority. One goal is to increase C3I endurance to a period of months in order to match the endurance of our SSBN force.

Members of Congress, you and the American people are being asked to fund a makeover of our nuclear forces at a cost of at least 1.7 trillion dollars.[3] The time has therefore come to choose between these competing worldviews. Should unrealistic and dangerous notions of warfighting continue to drive our nuclear investments and shape our posture, or should we pivot to a secure second-strike deterrent posture and leave warfighting to other weapons?

The latter is the more feasible and prudent approach to reducing nuclear risk. It is time to jettison nuclear 'first use,' hair-trigger alert, launch on warning and other destabilizing features and fantasies of our current warfighting posture.

True Deterrence: First Principles

The major strands of mainstream American thinking about the role of nuclear weapons are the following:

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[3] In 2017, the Congressional Budget Office estimated the cost of nuclear forces from 2017 to 2046 at $1.2 trillion in 2017 dollars ($1.7 trillion with inflation). Congress of the United States, Congressional Budget Office, *Approaches for Managing the Costs of U.S. Nuclear Forces, 2017 to 2046* (Washington, DC, October 2017), 1, https://www.cbo.gov/system/files?file=115th-congress-2017-2018/reports/53211-nuclearforces.pdf.

- The sole purpose of nuclear weapons is to deter their use by others;
- It is legitimate to respond to a nuclear attack, but not to initiate one; 'No First Use' is axiomatic in the schema of deterrence;
- A nuclear weapon is a nuclear weapon. An atomic weapon with one-third the explosive power of the Hiroshima bomb should not be considered "low yield" as some describe it. It would be a very powerful and lethal device that could inflict horrendous devastation;[4]
- Crossing the nuclear threshold is cataclysmic and fraught with risk of escalation to large-scale nuclear conflict causing the deaths of at least tens of millions of innocent civilians;
- The first use of these weapons is strictly a civilian political decision that should never be driven by military expediency;
- "A nuclear war cannot be won and must never be fought," in the immortal words of Presidents Ronald Reagan and Mikhail Gorbachev;[5]
- Deterring a rational adversary can be assured with a relatively small number of nuclear weapons;[6]
- We should deploy survivable forces backed by robust C3I systems capable of inflicting unacceptable damage in retaliation to a nuclear attack.[7] Deterrence calls

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[4] Consider the 5-kiloton atomic weapon being built today for deployment on SSBNs and look at the scale of destruction it could produce if detonated above the White House on a typical weekday morning. A single weapon would destroy practically the whole of downtown Washington, D.C., kill 80 thousand people and injure another 120 thousand. Wellerstein, "Nukemap," op. cit. It is clearly a misnomer to call such a device a "low-yield" weapon.

[5] "Joint Soviet-United States Statement on the Summit Meeting in Geneva," (November 21, 1985), Ronald Reagan Presidential Library & Museum, https://www.reaganlibrary.gov/research/speeches/112185a.

[6] In 2019, no nuclear-armed state has strong intrinsic reason to attack the United States. Nevertheless, the world remains anarchic and the United States considers deterrence a sine qua non of its security and that of its allies. Deterrence is clear about the need for significant, extreme damage. Deterrence works because an adversary will feel pain. So much pain that they will not attack if they are rational.

The number of nuclear weapons and the consequent scale of second-strike destruction required to deter is inherently subjective and cannot be precisely determined but our understanding of what motivates other states and our adversaries makes clear the number need not necessarily be large – certainly less than the 4,000 plus weapons in the current U.S. stockpile (1,550 allowed under the New START agreement with Russia plus additional "backups" in the hedge or active reserve stockpile), much less the 30,000 weapons we once deployed during the Cold War. Today's arsenal carries the explosive power equivalent to 80 thousand Hiroshima bombs (a 15-kiloton atomic bomb). The numbers we maintain remain a longstanding anachronism from the Cold War-era of nuclear overkill.

[7] C3I includes early-warning sensors (satellites and ground radar) designed to detect the launch and flight of ballistic and other missiles. A long-range ballistic missile can fly halfway across the planet in 30 minutes. Infrared satellites detect the hot plume of the missile's rocket motor during the boost phase of flight. Ground radar sites detect the metal frame of the missile and/or its reentry vehicles.

for a secure second-strike force able to deliver significant destructive capability even after an adversary has attacked; this capability to respond forcefully is essential to ensuring that no one dares launch a nuclear first strike against the United States and its allies;

- This threat of "assured destruction" if replicated on the other side creates a state of mutual assured destruction, or MAD, which works to stabilize both the strategic nuclear balance and U.S. relations with its potential nuclear adversaries. MAD is robust against evolving changes in the U.S., Russian and Chinese nuclear arsenals;

- The limitations imposed and the verification and inspection rights provided by nuclear arms control agreements are invaluable in ensuring that any major developments that could upset the strategic balance will be detected in time to counter them.

Those core beliefs remain alive today. Opinion surveys show overwhelming American public support for maintaining a secure second-strike capability so that the United States could always retaliate with a major nuclear strike. At least two-thirds of the public also eschew the first use of U.S. nuclear weapons.[8]

If this consensus had actually guided our nuclear actions, our nuclear arsenal today would be much smaller and more survivable than it is and our nuclear posture would be more stable and run lower risks. But it was sidetracked by a "nuclear priesthood" who, partly thanks to excessive secrecy that kept their plans in the dark and beyond public scrutiny, pursued a very different course described below as a nuclear-warfighting posture.[9]

I propose in my 2018 Alternative U.S. Nuclear Posture Review that we return to the original, and generally accepted, basic premise of nuclear weapons emphasizing secure second-strike forces and assured retaliation.[10] The analysis lays out a new force posture that is more survivable and stable than ever achieved – whether during the Cold War, under the present force or under the nuclear modernization program envisioned by the Trump administration.

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[8] YouGov/Huffington Post, "Poll Results: Nuclear Weapons," August 4-7, 2016, YouGov, https://today.yougov.com/topics/politics/articles-reports/2016/08/11/poll-results-nuclear-weapons.

[9] By "nuclear priesthood" I mean the inner precincts of the nuclear-planning community, mostly confined to the Joint Strategic Target Planning Staff (JSTPS) based at Offutt AFB near Omaha and parts of the Joint Chiefs of Staff Joint Staff in Washington, D.C., but also certain key civilian leaders within the Department of Defense and some defense intellectuals affiliated with government-funded think tanks such as the RAND Corporation. In almost all cases these individuals possessed clearances for access to special compartmented intelligence (SCI) known as Single Integrated Operational Plan (SIOP) Extremely Sensitive Information (ESI). This rarefied information was strictly off limits to the vast majority of U.S. government officials responsible for defense and security programs and evaded oversight and scrutiny by broader government officialdom in all branches.

[10] Bruce G. Blair with Emma Claire Foley and Jessica Sleight, *The End of Nuclear Warfighting: Moving to a Deterrence-Only Posture* (Washington, DC: Global Zero, 2018).

My proposed posture requires a much smaller arsenal than currently planned, reflecting its essential role in protecting the sovereignty of the United States and our allies from nuclear aggression but leaving warfighting to other forces. It also recognizes the miniscule contribution of nuclear weapons to solving emerging 21st-century security challenges ranging from cyberwarfare to terrorism to mass migration and border security. But while smaller, it reflects a conservative view of deterrent requirements and fully satisfies the Pentagon's current targeting objectives for holding at risk Russia's, China's and North Korea's key elements of state control, power, wealth, economy and leadership. It thus provides for the capability to credibly threaten unacceptable damage in response to an adversary's nuclear aggression even in a worst-case context of full-scale enemy attack.

The proposed new force posture includes a mix of conventional and nuclear forces. The high lethality of modern U.S. conventional weapons (supplemented by offensive cyber capabilities) with pinpoint accuracy enables large-scale strikes against targets in urban areas to conform to the laws of war. The proposed posture also vastly upgrades C3I performance and endurance to allow the president to respond intelligently and deliberately if deterrence should fail.

The Tenacious Grip of the Nuclear Warfighters

Unfortunately, the mainstream American view of deterrence was rejected by our nuclear war planners in favor of developing intricate but infeasible plans for warfighting. Their agenda took us to a completely different place, a universe I once occupied in the Strategic Air Command that went well beyond a policy of assured retaliation by a secure second-strike force and resulted in the deployment of a massive, globally-dispersed nuclear arsenal oriented to a strategy of "escalation dominance" and "deterrence by denial." This required inflicting high levels of "damage expectancy" against opposing nuclear forces, a "counterforce" operation into which the bulk of historical investment in U.S. nuclear forces and related programs was channeled. Related programs in this warfighting enterprise included space surveillance and attack submarines assigned to track and hold at risk the adversaries' strategic deterrent forces such as mobile ICBMs and SSBNs.

This warfighting ethos is alive and well and rests on tenets that are antithetical to the original fundamental understanding of the role of nuclear weapons. They are as follows:

- It is legitimate and rational to entertain the first use of nuclear weapons out of military expediency, indeed to pressure presidents at critical moments to put military expediency first in their nuclear deliberations.[11] In my view, nuclear first use would transport us to a world its leaders – politicians and generals alike – know virtually nothing about. No one has ever fought a nuclear war in which the other side also has nuclear weapons. The societal and geopolitical shock would be tremendous and global, likely much greater than the shock of the terrorist attacks

[11] I am referring here to the military pressuring ("jamming") the president to get approval to use nuclear weapons under circumstances of apparent large-scale enemy nuclear attack. See discussion below on launch-on-warning procedures. See also the corroborating interview with General (ret.) George Lee Butler in Jonathan Schell, *The Gift of Time*, (New York: H. Holt & Co., 1998).

on September 11, 2001 even if only a single nuclear weapon explodes. There would be enormous unanticipated aftershocks. The decision to cross the nuclear Rubicon must therefore never be taken out of military expediency.

- Warfighters assume, incorrectly, that a president can be assured that the underlying intelligence supporting a first-use decision would be foolproof, that only nuclear weapons and not conventional or cyber weapons could do the job, that losses to innocent civilians would be acceptable, and that first use would not escalate to cataclysmic proportions. In reality, it is extremely doubtful that all of these premises would be true simultaneously. There are no foreseeable scenarios that would pass all these tests and convince a rational U.S. president that the first use of nuclear weapons was warranted. (A rational Russian leader contemplating first use against the United States or China would also have reason to fear that such use would trigger catastrophic escalation.)

- Warfighters incautiously require U.S. strategic forces to be constantly ready to initiate an attack to destroy opposing strategic forces. Such threats undermine stability. They would exert pressure on both sides to jump the gun and launch a preemptive strike during a crisis out of fear of the consequences of allowing the other side to go first. First-strike plans and capabilities are highly destabilizing and hold out hopes of escaping devastating retaliation that are likely to be false.

- Warfighters unrealistically plan to seek bargaining advantage and dominate escalation in the midst of a nuclear conflict in order to persuade an adversary that it has more to lose than gain by prolonging the conflict. This is the essence of the warfighter's philosophy and strategy of "escalation dominance" and "deterrence by denial." It is the subject of prolific armchair speculation about climbing the "ladder of escalation" and succeeding in coercing an enemy to throw in the towel in the middle of a nuclear war.

  But it ignores the fact that the C3I networks on both sides are nowhere close to being capable and survivable enough to support such a strategy. Also, top U.S. political leaders rarely study and understand the potential consequences of their own nuclear choices.[12] Although presidential launch protocol involves a briefing by the head of Strategic Command (or a subordinate) on the president's options and their consequences, it is a "quick and dirty" briefing that may confuse or mislead.[13] During the Cold War, a president who ordered a major nuclear-strike

[12] In the words of Richard Betts: "Although theorists and bureaucrats have speculated ad nauseam about nuclear strategy and the situations in which nuclear weapons could or should come into play, top political leaders have rarely dwelt on these questions at any length or in any detail, or seriously pondered in advance what to do in a crisis. Nor have the circumstances of particular crises been congruent with theorists' scenarios." Richard K. Betts, *Nuclear Blackmail and Nuclear Balance* (Washington, DC: Brookings Institution Press, 1987), 19.

[13] The president's military aide carrying the satchel known as the 'football' which contains details of the nuclear war plans is also trained to explain the options and their consequences. Until the tail end of the Cold War, U.S. military planners refused access to the "football" to civilians wishing to ensure the options

option that supposedly avoided Soviet cities in a bid to end a nuclear conflict before it escalated to all-out proportions would have been in for a big surprise. He would have discovered that all major Soviet cities had been obliterated due to ill-designed target plans.[14] Furthermore, we cannot predict an adversary's mindset, resolve, wartime aims and game plan if nuclear war erupts.[15] We do not even know what leaders in Moscow and Beijing were thinking during past Cold War crises involving U.S. attempts to threaten nuclear use to coerce them.[16] It would be foolhardy in the extreme to presume that we could anticipate President Vladimir Putin's, President Xi Jinping's or Leader Kim Jong-un's nuclear behavior in wartime.

- Warfighters believe victory is possible in nuclear war and a "victory" that leaves tens of millions of American civilians dead is considered by some to be acceptable under some circumstances.[17] This view is stunning in its cavalier

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outlined in it matched the actual war plans. See Bruce G. Blair, "Mad Fiction," *Non-Proliferation Review* Vol 21, No. 2, (2014): 3.

[14] Ibid. The imperfect execution of a launch order could have the same consequence. The entry of a single wrong digit into the launch computer during execution could have spelled the difference between striking opposing nuclear forces and destroying cities wholesale.

[15] It is difficult to envision how a nuclear warfighting strategy designed for dominating escalation would unfold. Perhaps a personal anecdote will help illustrate past internal thinking about how to achieve such dominance and thereby impose 'deterrence by denial.'

During my stints in SAC, the nuclear war plan called for a series of massive salvoes punctuated by pauses over the course of two days. Regardless of which side struck first, the initial U.S. strike was to be directed against thousands of Soviet nuclear forces at the outset of strategic nuclear conflict. Then we would have suspended execution for several hours. If the Soviets did not throw in the towel during this firebreak, we would have launched a huge salvo against Soviet industrial facilities like steel plants and oil refineries. Pause again. No one expected the war to end there either, at which point we planned to escalate to the hilt and destroy all Soviet leadership facilities, including the Kremlin in the heart of Moscow.

In all our training and exercises these scenarios always ended in an all-out exchange, an apocalypse that would kill more than 100 million people on each side and leave our countries and much of Europe in total ruin. In all likelihood, soot rising into the stratosphere would block out the sun for years and lower the global temperature to a level that would cause frosts during the growing season and therefore starvation of many more. Despite our attempted preparations for limiting escalation at some point short of all-out nuclear war, nobody I knew in the operations world believed it was realistic to terminate a conflict on terms favorable to the United States, in part because of the vulnerabilities, weaknesses and likely early collapse of the U.S. post-attack nuclear C3I networks. For 24 hours after the onset of the conflict, the last-ditch airborne command system would operate largely in the dark, unable to orchestrate a coherent strategy of phased escalation keyed to Soviet behavior. After 24 hours, the system would cease functioning and no leader would have been able to direct U.S. nuclear forces to coherent national purpose. Also, de-classified Soviet documents show clearly that this U.S. strategy of "escalation dominance" was completely out of sync with Soviet nuclear strategy and that escalation to full-scale nuclear war was almost inevitable. See documents at the Nuclear Security Archives under William Burr's curation, including William Burr and Svetlana Savranskaya, eds, "Previously Classified Interviews with Former Soviet Officials Reveal U.S. Strategic Intelligence Failure Over Decades," *The National Security Archive,* September 11, 2009, https://nsarchive2.gwu.edu/nukevault/ebb285/index.htm.

[16] Betts, op. cit., 18.

[17] See Colin S. Gray and Keith Payne "Victory is Possible," *Foreign Policy*, No. 39 (Summer 1980): 14-27; and interview with Charles Kupperman (current U.S. Deputy National Security Advisor) in Robert

attitude toward human suffering and citizens of a democratic polity would doubtless categorically reject any such definition of victory. Underlying this warfighter's view are two controversial assumptions usually kept hidden from public view: (1) the big advantage in gaining an upper hand in warfighting goes to the side that can pull off a massive surprise strike against vulnerable opposing nuclear forces and (2) losing that advantage can be partially offset by launching one's own vulnerable forces on warning before they are destroyed on the ground by the side that jumped the gun. These tactics are potential catalysts for igniting a nuclear war by fear, miscalculation or misinformation. But both remain central features of the U.S. (and Russian) nuclear posture.

- Warfighters contend that asymmetries in nuclear capabilities such as so-called low-yield weapons may be exploitable by an adversary such as Russia. But history is not kind to this assertion. The top scholars of Cold War history have not found a single example of an effective Soviet nuclear threat during a crisis. Indeed, these threats were counterproductive.[18] The overall balance of strategic capabilities was far more influential than any asymmetry in specific types of nuclear weapons. Furthermore, this history also shows that although U.S. presidents regularly played nuclear brinksmanship with the Soviets and Chinese, they relied most on incautious risk-taking and political resolve rather than any assessment of the nuclear balance.[19]

  If Russia used a "low-yield" weapon or two in a conventional conflict in a bid to "escalate to de-escalate," chances are it is losing that conflict. It is their conventional inferiority that drives them to consider such use. There is no evidence that the Russians consider a "yield gap" to be exploitable and in any case the United States possesses ample countervailing weapons.

  The U.S. would have three basic choices in response. It could continue to win the conventional war, because one or two Russian nuclear weapons will not fundamentally change the course of battle, and keep the ball of nuclear escalation in Russia's court. Or the U.S. could respond by using one or two of its own "low-yield" weapons, of which it already possesses many hundreds. Or a risk-prone U.S. president could respond with a high-yield weapon – our own version of "escalate to deescalate." If the Russians believe in this doctrine, they must surely recognize that nothing prevents an adversary from playing the same game, upping the ante and putting both sides on a path of further escalation toward full-scale nuclear war. The final step on the escalation to de-escalate ladder would be an all-out strike resulting in massive destruction. But all these steps are the inventions of armchair nuclear theorists whose imaginations have outrun the realities of C3I and elided the enormously high risk that a nuclear conflict once started would rapidly spin out of control. Every Russian I have discussed this with understands

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Scheer, *With Enough Shovels: Reagan, Bush, and Nuclear War* (New York: Random House, 1982), 130-31.

[18] Betts, op. cit., 218.

[19] Ibid., 13.

full well that the risks of "escalate to de-escalate" outweigh any conceivable advantage. This doctrine is a weak reed on which to hang our weapons programs.

Indeed, it is also a severe liability for Russia, which has strived with considerable success to escape its reliance on the early first use of nuclear weapons by developing viable non-nuclear options. Enormous effort and resources have been invested in a "hybrid-warfare" doctrine and implementing tools designed to paralyze critical civilian infrastructure in the West. Cyber, special operations, and conventional forces would attack civilian energy, communications, financial and transportation grids with the aim of galvanizing people to demand a cessation of conflict with Russia. This sophisticated and potent capability has allowed Russian planners to put nuclear "escalate to de-escalate" on the back burner.

- Warfighters believe vulnerable forces can contribute to "escalation dominance" by planning and enabling them to be launched quickly on warning if sensors report an incoming attack, despite the grave risks entailed of triggering a nuclear war on the basis of false warning due to human or technical mistakes, or the corruption of early-warning data by cyber intrusion.[20]

- And last, a warfighting strategy derives U.S. strategic requirements from the size of opposing nuclear forces, even though this approach spurs arms racing that once led the United States to deploy nearly 30,000 nuclear weapons aimed at 16,000 targets in the Soviet bloc. Throughout the Cold War, and to this day, U.S. strategic forces have been primarily aimed at opposing nuclear forces.[21] Warfighters sought and still seek far more capacity for destruction than just being

[20] The United States experienced several false alarms during the Cold War that brought it close to the brink of inadvertent nuclear war with the Soviet Union, but none rose to the level of presidential notification in real time. In recent years, however, ambiguous ballistic missile threats have resulted on multiple occasions in real-time notifications of the president and the initiation of the early stage of launch authorization procedures. These alarms have stemmed from the widespread proliferation of ballistic missiles around the world, the lack of adequate pre-launch notification agreements and the advent of ballistic and cruise missile maneuvering technology that renders problematic the prediction of impact points and arrival times. (Russia has also experienced false alarms in recent years, typically caused by Chinese launches). Cyber vulnerabilities compound the risks. Critical C3I electronic components are suspect and cannot be certified as 'bug-free' throughout the early-warning network and chain of nuclear command down to the level of components in individual warheads.

[21] I estimate that the current nuclear war plans against the countries of interest (Russia, China, and North Korea) specify almost 1,500 aimpoints (including 900 primary and 600 secondary) including 100 aimpoints in the greater Moscow metropolis. (I assume Iran and Syria were targeted for much of this decade with about 50 aimpoints in each country. They quite possibly have been removed from U.S. nuclear war plans as a result of Iran's accession to the Joint Comprehensive Plan of Action and Syria's relinquishment of the bulk of its chemical weapons.) Most of the primary aimpoints consist of opposing nuclear forces and other weapons of mass destruction. During the Cold War, planners designated 400 aimpoints in the Moscow area, including one aimpoint (the Pushkino Anti-Ballistic-Missile battle management facility) in the Moscow suburbs that planners assigned 69 nuclear warheads to strike. See Bruce G. Blair, "Trapped in the Nuclear Math", *New York Times*, June 13, 2000. This op-ed instigated the first and only joint Democratic-Republican Senate hearing to receive a highly classified SIOP briefing. The briefing was given at the Capitol by the then-head of Strategic Command Admiral Richard W. Mies and the Under Secretary of Defense Walter B. Slocombe. The source of the 69 warheads assigned to Pushkino is a former senior officer in Strategic Command.

able to destroy in retaliation a nuclear aggressor's leadership, economy and other mechanisms of state control and power.

Implications for Congress' Nuclear Agenda

This committee and Congress as a whole are being asked to fund a wholesale makeover of our nuclear forces at a cost of at least 1.7 trillion dollars. The time has therefore come to choose between these competing nuclear worldviews. Should expansive notions of warfighting continue to drive our nuclear investments and posture, or should we pivot to a deterrence posture that reflects mainstream American thinking and values about the narrow and limited role of nuclear weapons and leave warfighting to conventional weapons?

The implications of this choice are profound. If you choose the mainstream path, the Congressional agenda would look like the following:

- Seek to codify the principle that deterrence does not countenance initiating nuclear attack and, therefore, ensure the adoption of NFU. Congress also has a role in supporting diplomatic and military-to-military efforts to reassure allies that the United States remains fully committed to and capable of (1) extending deterrence to defend them against conventional aggression using non-nuclear U.S. forces and (2) deterring nuclear aggression against them by maintaining U.S. nuclear capabilities to respond to any Russian, Chinese or North Korean nuclear strike. NFU will apply whether the United States is under attack by non-nuclear weapons or U.S. allies are under attack. The same rule applies to all.

- Eliminate destabilizing weapons systems and operational plans associated with warfighting. This means cancelling weapons the warfighters incorrectly claim are needed for managing nuclear escalation – namely, the "low-yield" submarine-launched ballistic missile warheads and the cruise missile weapons in the pipeline. There is no need for these weapons in light of the infeasibility of maintaining control over escalation during a nuclear conflict. In any case, there already exists thousands of lethal conventional and "low-yield" nuclear weapons sitting in the current U.S. stockpile.[22]

[22] The United States already possesses about 1,000 weapons (air-launched cruise missiles and gravity bombs) that can be dialed down to the same 5-kiloton yield of the new sea-launched ballistic missile (SLBM) "low-yield" warhead, or even lower. The aggregate explosive power of this stockpile of existing "low-yield" weapons is equal to all the bombs dropped by the United States and Great Britain on Europe and Japan during World War II. The 600 cruise missiles are also more accurate than the new sea-launched ballistic missile (SLBM), and the 500 gravity bombs will also become more accurate than the new SLBM as they are modified with tail fins rendering them a precision-guided munition. The gravity bombs also can be dialed down to 300 tons of explosive yield, or one-twentieth of the power of the Hiroshima bomb, compared to the new SLBM warhead's yield of one-third of the Hiroshima bomb. Furthermore, the United States possesses thousands of conventional weapons such as the Tomahawk IV cruise missile that are more accurate than the new SLBM weapon and capable of destroying the full spectrum of targets including very hard missile silos. The exception to this assessment is deeply buried targets such as command posts inside mountains; conventional weapons cannot destroy them with high confidence but they can severely degrade

- Scrap the vulnerable, destabilizing silo-based Minuteman missile force. In projecting a preemptive first-strike threat to Russian land-based rockets and C3I and posing tempting targets for Russian or other missiles, Minuteman missiles undermine mutual restraint and encourage preemption by an adversary during a crisis. The claim that this force of 400 missiles in silos adds redundancy and stability to a nuclear Triad succumbs to the fact that its vulnerability represents a weakness, not a strength. In fact; this third leg undermines the Triad's overall stability.[23] This weakness forces the other legs to compensate in ways that degrade their own capabilities. That the silo-based ICBM force is kept on hair-trigger alert and runs the risk of triggering a mistaken launch is no less a liability. It depends on quick launch for its survival, a tactic that would exert tremendous pressure on the entire nuclear chain of command to act at warp speed. That includes the president, who could be rushed into a decision authorizing their use on the basis of false warning.[24] Many of the close calls for accidental nuclear war have come because of the systemic pressure on leaders to use vulnerable land-based forces before they can be destroyed. Last, the Minuteman force is inflexible

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their functionality by destroying their entrances and disabling their external communications. Deeply protected radio transmitters, such as the Very Low Frequency transmitter inside Kozvinski Mountain where the Russian Strategic Rocket Forces maintain their last-ditch semi-automatic 'Dead Hand' doomsday device, are less vulnerable to conventional strikes and may require a nuclear strike to disable. Numbers and yields of U.S. low-yield nuclear weapons from personal communication with Hans M. Kristensen, February 15, 2019.

[23] The related claim that the 400 silos present a very large target set for the attacker to destroy is also misleading in that (a) the 40 primary launch centers in the missile fields are even more vulnerable than the silos and (b) the destruction of the three main Minuteman bases would severely degrade the ability to maintain the missiles and launch centers in the field beyond a day or so.

[24] Under the current launch-on-warning authorization and execution protocol, the timelines imposed at all levels are extremely compressed. The early-warning teams in Colorado and Nebraska are expected to declare their level of confidence that North America is under attack within three minutes. The president and his/her key advisors must be notified immediately if confidence is medium or high. The one and only "talker" in the emergency missile attack conference is the head of the Strategic Command (or the duty officer if the four-star head or his deputy are unavailable), who must brief the president on the nature of the enemy attack, the president's response options and their consequences and his recommendation. This briefing may have to be given in less than a minute, at which time the president would have between 5-12 minutes for "deliberation" and consultation with advisors before deciding whether and how to respond. (In exercises with presidential stand-ins the decision-maker is typically "jammed" by the military commanders to quickly approve a nuclear counter-strike.) A few seconds are then allotted for the president to authenticate his/her identity with the Pentagon "war room" or its alternate, using so-called Gold Codes, whereupon the war room takes a couple of minutes to prepare and transmit the launch order (replete with authorization and unlock codes) through multiple communications channels directly to the individual commanders of the Minuteman silo-based missiles, strategic bombers and submarines. These commanders would be under intense pressure to fire quickly after receiving the order which has fewer characters than a 'tweet.' Minuteman missiles are on hair-trigger readiness meaning they would fire instantly upon receiving several short bursts of computer code from underground or airborne launch crews. The underground crews are required to be able to fire up to all 50 missiles in their squadron within three minutes. The submarine crews would take an additional 12 minutes to begin firing their missiles out of undersea tubes. In short, this entire checklist-driven process must be executed within about 20 minutes. Once the president gives the order, missiles would start flying out of underground silos within approximately five minutes. There is no way to recall them. See Dave Merrill, Nafeesa Syeed and Brittany Harris, "To Launch a Nuclear Strike, President Trump Would Take These Steps," *Bloomberg*, January 20, 2017, https://www.bloomberg.com/politics/graphics/2016-nuclear-weapon-launch/.

and is not needed to cover the targets in the current U.S. nuclear war plans.[25]

- Reallocate funding for programs geared to supporting launch-on-warning to C3I programs designed to increase the time available to the president to decide whether and how to respond to enemy attacks. Decision time should be increased from the current time frame of minutes to a much longer period measured in days, weeks or months.

- Greatly scale back the current nuclear weapons modernization plan while scaling up programs to rectify the dire condition of our nuclear C3I systems.

Let me elaborate on these last two implications of pivoting to a true deterrence policy, beginning with fixing the C3I system.

The Urgency of C3I Modernization

Vulnerabilities and other deficiencies in this system have long been the bane of any nuclear strategy.[26] It has certainly been an Achilles' heel for warfighting which requires at minimum a sophisticated high-performance and enduring C3I system. But it has also been the weak link in basic deterrence. During the Cold War, those intimately familiar with its deficiencies doubted whether the United States could respond at all to Soviet nuclear strike, including a small-scale surgical strike aimed at key C3I assets, even though the pre-delegation of presidential launch authority to dispersed senior military commanders was widespread.[27]

After the Cold War ended, the C3I system was allowed to atrophy over the subsequent decades of neglect except for an infusion in the 1980s. Now the bill has come due. The vintage system is in terrible shape.[28] Fixing it must therefore become the top priority of

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[25] SSBNs and bombers by comparison do not have to fly over Russia to strike targets in China, North Korea and Iran, and thus offer much greater flexibility in their target programming.

[26] The word 'system' masks what in reality is a patchwork of more than 100 distinct mostly obsolete subsystems cobbled together to form a complex, almost unfathomable hodgepodge that often requires emergency workarounds to keep operational and that regularly fails to perform satisfactorily in exercises.

[27] This acute vulnerability (which existed on the Soviet side as well) was a greater source of instability than the vulnerability of the strategic forces themselves throughout the Cold War. It led to the extensive pre-delegation of presidential launch authority to senior military commanders. Every president from Dwight Eisenhower to Ronald Reagan signed pre-delegation instructions. I once worked for a SAC officer who was promoted to a senior position and given pre-delegated authority to order the execution of the full SIOP under conditions of communications outage with the president (or legal successors) and confirmed nuclear detonations on U.S. soil. A general with pre-delegated authority was always onboard "Looking Glass," the most survivable high-level command post in the nuclear C3I system, but the level of confidence was low that even this "last-ditch" link to the surviving nuclear forces would survive a nuclear war long enough to successfully transmit the "go-code" (execution message). (Pre-delegation was rolled back in the early 1990s). C3I vulnerability also bore considerable responsibility for the heavy U.S. reliance on launch on warning and for the compressed timeline of the presidential nuclear-use authorization procedures described earlier. See Bruce G. Blair, *Strategic Command and Control* (Washington, DC: Brookings Institution Press, 1985); *Logic of Accidental Nuclear War* (Washington, DC: Brookings Institution Press, 1993).

[28] The obsolescence of critical parts is illustrated by the fact that the ICBM launch control computers use 1950s technology in a time-sharing protocol that was responsible for the black out in 2010 of 50 ICBMs for

our nuclear modernization plans regardless of the nuclear posture pursued in the future. C3I deserves to take precedence over building more weapons. If C3I fails, nothing else matters.[29]

This project will need to be comprehensive in providing for continuity of government including protection of successors and robust military command and communications at all levels. A critical deficiency is the C3I system's lack of endurance, which severely shortens presidential decision time. Under the stress of a large-scale nuclear and cyberattack it can be expected to collapse by the 24-hour mark if not earlier, while SSBNs at sea – the backbone of the survivable U.S. strategic forces – could survive for months. This gap needs to be closed without resorting to pre-delegation.

By extending decision time well into a post-attack environment, a president would be better equipped to reassess the situation, determine national objectives and intelligently and deliberately direct the operations of surviving forces if deterrence should fail. This would require capabilities to reconstitute an elaborate 'thin-line' C3I network.

This is a daunting but feasible project that will need to address myriad emerging threats ranging from cyber to anti-satellite warfare to stealthy vehicles capable of severely degrading, perhaps even decapitating, today's C3I system. It will be expensive. The effort will require increasing our current annual spending on C3I from $8 billion to perhaps $12 billion or more, even if we substantially reduce the size and diversity of our nuclear forces and pivot to a deterrence-only posture.[30]

A robust enduring C3I system would improve situational awareness and enable the president to intelligently choose a response but this is not to suggest that a strategy of escalation control and dominance could be supported regardless of the scale of investment. The basic challenge of the C3I system is to underwrite assured retaliation. Anything much more sophisticated than that is beyond realistic aspiration. Exquisite warfighting is the stuff of armchair theory that has scant relevance to the real world.

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almost an hour, during which time the missiles could not be monitored, launched on authorized command or prevented from unauthorized launch. The elimination of the ICBM force would significantly simplify C3I modernization. Noah Shachtman, "Communication with 50 Nuke Missiles Dropped in ICBM Snafu," *Wired,* October 26, 2010, https://www.wired.com/2010/10/communications-dropped-to-50-nuke-missiles-in-icbm-snafu/.

[29] In the recent words of Admiral (ret.) Dennis Blair, "Without reliable and secure surveillance and communications systems, our leaders may find themselves well-armed, but blind and dumb. A weakness in our nation's sensing and communications systems undermines the entire deterrent." Admiral Dennis C. Blair (ret.), "Why the US must accelerate all elements of space-based nuclear deterrence," *Defense News*, February 7, 2019, https://www.defensenews.com/opinion/commentary/2019/02/07/why-the-us-must-accelerate-all-elements-of-space-based-nuclear-deterrence/.

[30] Estimated annual spending on C3I from Congress of the United States, Congressional Budget Office, "Year-by-Year Data Underlying CBO's Estimate of Nuclear Costs," *Congressional Budget Office,* January 24, 2019, https://www.cbo.gov/publication/54914.

Future Nuclear Force Structure Under True Deterrence

Regarding the U.S. nuclear modernization plan, a pivot toward true deterrence would result in the elimination of most of the four thousand weapons in the current active stockpile including the vulnerable and destabilizing silo-based missile force deployed in the western Plains states. It would also produce savings of many hundreds of billions of dollars (a chunk of which should be re-allocated to fixing C3I).

Only about one-half of the planned fleet of 12 new Columbia-class SSBNs would need to be built.[31] All the rest of the weapons programs dedicated to nuclear missions could be cancelled: 642 new land-based missiles (Ground-Based Strategic Deterrent), 400 of which are slated for deployment in old vulnerable silos; 100 new stealthy B-21 bombers (putting aside any built strictly for conventional missions, which the Air Force contends would actually justify building all 100); 75 older B-52s slated for refurbishment (which the Air Force also contends would be needed for conventional missions); plus hundreds of new nuclear cruise missiles as well as those new "low-yield" weapons meant to make nuclear weapons more usable at an early stage of conflict. None of these are needed on top of a small fleet of SSBNs.

The analysis behind these conclusions is grounded in the Pentagon's own targeting requirements. If the United States would acknowledge that a nuclear war cannot be won, only deterred, and concentrate solely on deterring such a war, then we would need only about five or six new SSBNs. The firepower on board these survivable boats would be sufficient to destroy in retaliation the vital elements of state control, power and wealth in Russia, China and North Korea. While reduced by 75 percent, this threat of "assured destruction" could still hold at risk many dozens of the adversaries' major cities and thus deter any conceivable nuclear attack by a rational adversary against the United States or its allies.

The Pentagon's current target requirements assign U.S. strategic forces to strike an estimated 905 primary aimpoints in those countries, of which 450 are war-sustaining industries and leadership.[32] This target set of 450 can be reliably held at risk with a smaller and far more secure and affordable nuclear force. Roughly speaking, these missions could be carried out successfully using less than one-eighth of the firepower in the current U.S. arsenal. Four new SSBNs deployed survivably at sea would alone be capable of responding at the required scale of destruction. And in light of the fact that most of the targets are vulnerable to precision-guided conventional weapons and cyber attack, the at-sea SSBN force could be reduced to three.[33] A fleet of 5-6 SSBNs could maintain three at sea at all times.

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[31] Blair, "End of Nuclear Warfighting," op. cit., 7.
[32] Ibid.
[33] I conservatively estimate that at least one-third of the aimpoints could be severely damaged by U.S. conventional and cyber weapons deployed currently. Financial networks and other critical infrastructure could be easily disabled with non-nuclear weapons. Ibid, 84.

This shift of posture to a monad comprised of SSBNs does raise legitimate concern about their long-term invulnerability. The fear that breakthroughs in intelligence, surveillance and reconnaissance (ISR) and big data analysis tied to advances in anti-submarine warfare might render the oceans transparent and put the U.S. SSBN force at risk is likely a long way off. Informed experts heavily discount this prospect. (The U.S. already puts Russian and Chinese SSBNs at considerable risk due to high-performance ISR and anti-submarine warfare capabilities.)

However, an insurance policy may be warranted. One option worth considering involves modernizing the strategic bomber force and its weapons payloads to form a nuclear reserve force. This hedge would consist of 40 bombers (half new B-21s and half refurbished B-52s) kept off alert with 450 nuclear payloads in national storage unless and until an emergency involving the SSBN force dictated increasing the bomber force's readiness from reserve to full-alert status.[34]

As a consequence of shifting to a primary deterrent force consisting of 5-6 SSBNs backed up by a reserve force of 40 bombers, U.S. strategic nuclear arms could be reduced to a level of approximately 1,000 total U.S. nuclear weapons – 640 operationally deployed submarine warheads and 450 bomber weapons stored in reserve.[35] This stockpile would be augmented by highly lethal U.S. conventional capabilities such as Tomahawk IV cruise missiles, which could provide non-nuclear options to minimize non-combatant casualties in urban areas.

About 1,000 weapons capable of delivering the equivalent of 20 thousand Hiroshima bombs, which could destroy the key elements of state control, economy and leadership in Russia, China, and North Korea, would surely be deemed 'more than enough' to meet reasonable deterrence requirements. This pivot to true deterrence reinstating the primacy of "assured destruction" over warfighting would allow the United States to reduce its warhead stockpile by 75 percent, cut the number of weapons types by half, and require a much less costly warhead-production and maintenance complex in terms of weapons surveillance, warhead life extensions and possible plutonium pit production. Putting the U.S. complex on a sustainable footing would finally be within reach if broad bipartisan support can be mustered.

If the current warfighting strategy is kept intact against the advice of this witness, the modernization program still can and should be scaled down. It is a little-known fact that the United States today has far greater nuclear firepower than is needed to meet the Pentagon's own targeting requirements for Russia, China and North Korea combined, and in future these same requirements could be fully satisfied with a fraction of the strategic forces now planned.[36]

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[34] Ibid, 10. The main national storage site is located near Albuquerque. Strategic bombers are currently deployed to three main bases in North Dakota, Louisiana and Missouri and could be dispersed to multiple bases in a crisis.

[35] Ibid, 7, 10.

[36] The Pentagon could hold its complete target set at risk using only ten or fewer SSBNs, dispensing altogether with the silo-based Minuteman missile force and the strategic bomber fleet. This number of

Conclusion

For more than half a century a general understanding of the fundamental purpose of nuclear weapons has been rooted in our civic institutions and body politic.[37] These terrible weapons are for deterrence – the mission is to dissuade attacks that cannot be physically prevented. Warfighting, on the other hand, should be left to other weapons.

Unfortunately, these "maxims" did not prevail within the professional nuclear-planning community, which pursued nuclear-warfighting goals such as "escalation dominance" and, in doing so, increased the risk of nuclear war erupting by design or inadvertence. I respectfully propose that we return to first principles and design a nuclear posture that is smaller but more survivable and stable than today's posture and the one currently planned.

This proposal may enjoy popular support but it goes against the grain of insider thinking. The major general in charge today of maintaining all U.S. Minuteman forces in launch-ready condition recently referred to this force's "maturing identity as a competing force, rather than a deterring force."[38] For over 50 years, this warfighting mindset has not only provided esprit de corps to nuclear operations personnel but also has driven the size, posture and war plans well outside and beyond the mainstream public and political understanding of the proper role of nuclear weapons. It is time for Congress to return our nuclear thinking and policy to the basic principles that gelled in American society a long time ago. The nation needs only a small but secure second strike force whose sole purpose is to deter. It does not need to continue its costly, futile and destabilizing preparations to prevail in a nuclear conflict.

The cornerstone of U.S. deterrence policy should be to adopt No First Use and deploy only survivable forces and C3I systems capable of inflicting unacceptable damage in retaliation to any enemy nuclear attack.

Assured destruction is an unsatisfactory solution compared to a world without nuclear weapons, but it offers a more stable and reliable approach to nuclear security than the infeasible and risk-prone alternative posture of warfighting. And a No First Use policy is a prerequisite for any serious pursuit of a nuclear-weapon-free world.

Thank you again for inviting me and I look forward to your questions.

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SSBNs alone would suffice to cover the 900-plus nuclear and other weapons of mass destruction, war-sustaining industry and leadership primary aimpoints in the current warfighting operations plans. Ibid, 9.

[37] I am referring to the prevailing view in general public discourse and the major institutions of American society – the media, academia, Congress, etc.

[38] Major General Ferdinand B. Stoss III, "The Proud Heritage of the ICBM Mission," *Air Force Missileers Newsletter* Vol. 26, No. 4 (December 2018): 8. Also see Major Alex Rich, "Why I Don't Deter (and Never Did)," *Air Force Missileers Newsletter* Vol. 26, No. 4 (December 2018): 8.

Dr. Bruce Blair, Research Scholar

Dr. Bruce Blair joined the Program on Science and Global Security in May, 2013. His principal research interests are in technical and policy steps on the path toward the verifiable elimination of nuclear weapons – global zero – with a focus on deep bilateral nuclear arms reductions, multilateral arms negotiations, and de-alerting of nuclear arsenals.

Blair holds a Ph.D. in Operations Research from Yale University (1984) and has taught security studies as a visiting professor at Yale and Princeton universities. He served as a U.S. Air Force Minuteman intercontinental ballistic missile launch control officer (1972-74), as a project director at the U.S. Congressional Office of Technology Assessment from 1982 to 1985, and from 1987 to 2000 was a senior fellow in the Foreign Policy Studies Program at the Brookings Institution, Washington D.C. In 1999, Blair was awarded a MacArthur Fellowship Prize for his work on nuclear arms control.

Prior to his appointment at Princeton University, Blair was the founder and president of the World Security Institute and helped establish the Pulitzer Center on Crisis Reporting at WSI. He is the Founding Board Chairman of the Center on Global Interests, a nonprofit organization focusing on U.S.-Russian relations. He is also the Co-Founder of Global Zero, an international movement seeking the universal elimination of nuclear weapons, and the principal author of its policy reports. He served as a member of the U.S. Secretary of State's International Security Advisory Board from 2011-2017.

Prepared Remarks

United States House of Representatives
Committee on Armed Services

Outside Perspectives on Nuclear Deterrence Policy and Posture
March 6, 2019

Testimony Prepared By:
The Hon. Franklin C. Miller

United States House of Representatives
Committee on Armed Services
Hearing on Outside Perspectives on Nuclear Deterrence Policy and Posture

2118 Rayburn House Office Building
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Hon. Franklin C. Miller

"Deterrence is not, and cannot be bluff. In order for deterrence to be effective we must not merely have weapons, we must be perceived to be able, and prepared, if necessary, to use them effectively against the key elements of [an enemy's] power. Deterrence is not an abstract notion amenable to simple quantification. Still less is it a mirror of what would deter ourselves. Deterrence is the set of beliefs in the minds of the [enemy] leaders, given their own values and attitudes, about our capabilities and our will. It requires us to determine, as best we can, what would deter them from considering aggression, even in a crisis—not to determine what would deter us." The Scowcroft Commission Report (The Report of the President's Commission On Strategic Forces, April 1983, pages 2-3)

I thank the Committee for inviting me to appear this morning to discuss U.S. Nuclear Deterrence Policy, a subject in which I have been involved professionally for over four decades, almost three of which were spent actively formulating that policy in the Department of Defense and on the NSC Staff. I will use this written testimony to answer the six questions posed by Committee staff. I am appearing before you today in my capacity as a private individual. I am not representing and

do not speak for any other individual, institution or entity. My answers, and the positions I take during the hearing, reflect solely my personal views except for those instances when and where I specifically quote official U.S. policy.

- *What role do nuclear weapons play and what is the objective of nuclear deterrence?*

  The fundamental purpose of U.S. nuclear weapons has been, and continues to be, to deter -- that is, to prevent -- nuclear or massive conventional attack on the United States and on a select group of our treaty allies. There is a straight bipartisan line in this policy which begins in the 1950s and continues to today. Over time, the means by which the United States has made this policy actionable have evolved because, as former Secretary of Defense Caspar Weinberger once observed:

  "Deterrence is dynamic, not static. In order to deter successfully our capabilities must change as the threat changes, and as our knowledge of what is necessary to deter improves". (Testimony, Senate Foreign Relations Committee, December 14, 1982)

  As a result, the United States moved from "Massive Retaliation" in the 1950s, to "Flexible Response" in the Kennedy Administration, and has ever since adjusted the latter incrementally to accommodate changes in the threat environment, including in potential enemy leaderships and in their capabilities. But the purpose has always remained the same: to deter nuclear or massive conventional attack. U.S. policy is premised on the belief, as President Ronald Reagan made clear, that "A nuclear war cannot be won and must never be fought."

In his preface to the 2018 Nuclear Posture Review (NPR), then-Secretary of Defense Jim Mattis provided the most recent authoritative reaffirmation of this:

> "nuclear weapons have and will continue to play a critical role in deterring nuclear attack and in preventing large-scale conventional warfare between nuclear-armed states for the foreseeable future. U.S. nuclear weapons not only defend our allies against conventional and nuclear threats, they also help them avoid the need to develop their own nuclear arsenals. This, in turn, furthers global security." (NPR p iii)

- *Are there risks of miscalculation leading to nuclear war; if so, how can we decrease these risks? How can we increase strategic stability?*

As my quote from the 1983 Scowcroft Commission makes clear, deterrence is the product of capability and will. This means we have to have confidence in our deterrent, and potential adversaries must have respect for it. Critical to maintaining an effective nuclear deterrent, therefore, is our ability to communicate or signal to potential enemies a credible retaliatory capability which threatens potential enemy leaderships' most valued assets, even in worst case scenarios for us. In the case of Russia and China, those "valued assets" are the elements of state power: the senior leadership itself, their military forces, their internal security forces, their ability to command and control the nation, and the industrial potential to sustain war.

Deterrence is mostly about what goes on in the heads of potential enemy senior leaders, not in our own heads. We need to be certain they understand what we will fight for and what we consider our vital interests to be. They must understand we

have the capability to destroy the things and assets they value most, and that we have the will to do so if we are attacked.

Deterrence cannot and must not be based on mirror-imaging.

To cite former Secretary Weinberger once again:

We, for our part, are under no illusions about the consequences of a nuclear war: we believe there would be no winners in such a war. But this recognition on our part is not sufficient to ensure effective deterrence or to prevent the outbreak of war: it is essential that the Soviet leadership understands this as well. We must make sure that the Soviet leadership, in calculating the risks of aggression, recognizes that because of our retaliatory capability, there can be no circumstance where the initiation of a nuclear war at any level or of any duration would make sense. If they recognize that our forces can deny them their objectives at whatever level of conflict they contemplate, and in addition that such a conflict could lead to the destruction of those political, military, and economic assets which they value most highly, then deterrence is enhanced and the risk of war diminished. It is this outcome which we seek to achieve. (SFRC testimony, Ibid)

If one substituted "Russian or Chinese" for "Soviet" in the above paragraph, one would have essentially a fully up-to-date statement of U.S. deterrence policy.

The greatest risk of nuclear war and to deterrence stability, therefore, lies in a potential enemy's leadership believing it can carry out a successful attack, in a short war scenario, against us or our allies, using either conventional or nuclear weapons. Again, turning to the most authoritative recent statement of U.S. deterrence policy, the 2018 Nuclear Posture Review, we read that "Russia and China are pursuing asymmetric ways and means to counter U.S. conventional capabilities, thereby increasing the risk of miscalculation and the potential for military confrontation with the United States, its allies, and partners."

More specifically, with respect to Russian miscalculation, the 2018 NPR states:

> "Russia has significantly increased the capabilities of its non-nuclear forces to project power into regions adjacent to Russia and, as previously discussed, has violated multiple treaty obligations and other important commitments. Most concerning are Russia's national security policies, strategy, and doctrine that include an emphasis on the threat of limited nuclear escalation, and its continuing development and fielding of increasingly diverse and expanding nuclear capabilities. Moscow threatens and exercises limited nuclear first use, suggesting a mistaken expectation that coercive nuclear threats or limited first use could paralyze the United States and NATO and thereby end a conflict on terms favorable to Russia. Some in the United States refer to this as Russia's "escalate to de-escalate" doctrine. "De-escalation" in this sense follows from Moscow's mistaken assumption of Western capitulation on terms favorable to Moscow.
>
> Effective U.S. deterrence of Russian nuclear attack and non-nuclear strategic attack now requires ensuring that the Russian leadership does not miscalculate regarding the consequences of limited nuclear first use, either regionally or against the United States itself. Russia must instead understand that nuclear first-use, however limited, will fail to achieve its objectives, fundamentally alter the nature of a conflict, and trigger incalculable and intolerable costs for Moscow. Our strategy will ensure Russia understands that any use of nuclear weapons, however limited, is unacceptable.
>
> The U.S. deterrent tailored to Russia, therefore, will be capable of holding at risk, under all conditions, what Russia's leadership most values. It will pose insurmountable difficulties to any Russian strategy of aggression against the United States, its allies, or partners and ensure the credible prospect of unacceptably dire costs to the Russian leadership if it were to choose aggression." (NPR p30)

With respect to Chinese miscalculation, the NPR observes:

> "China is developing capabilities to counter U.S. power projection operations in the region and to deny the United States the capability and freedom of action to protect U.S., allied, and partner interests. Direct military conflict between China and the United States would have the potential for nuclear escalation. Our tailored strategy for China is designed to prevent Beijing from mistakenly concluding that it could secure an advantage through the limited use of its theater nuclear capabilities or that any use of nuclear weapons, however limited, is acceptable.
>
> The United States will maintain the capability to credibly threaten intolerable damage as Chinese leaders calculate costs and benefits, such that the costs incurred as a result of Chinese nuclear employment, at any level of escalation, would vastly outweigh any benefit.
>
> The United States is prepared to respond decisively to Chinese non-nuclear or nuclear aggression. U.S. exercises in the Asia-Pacific region, among other objectives, demonstrate this preparedness, as will increasing the range of graduated nuclear response options available to the President. Both steps will strengthen the credibility of our deterrence strategy and improve our capability to respond effectively to Chinese limited nuclear use if deterrence were to fail." (NPR p32)

Since one element of deterrence is potential enemies' perceptions of our capabilities to carry out our stated policy, the adequacy – in their eyes – of our nuclear forces and the resiliency of our nuclear command, control, and communications (NC3) systems is critically important. Because most of the systems comprising the three legs of the U.S. strategic Triad are reaching the end of their respective service lives and must be retired, with or without replacement, the modernization of our nuclear forces and their associated command and control

and warning systems is of vital national importance. I will discuss the modernization program in my answer to a subsequent question.

- *Can nuclear escalation be controlled and can you win a nuclear war?*

No serious U.S. policymaker in recent memory has believed that a nuclear war could be controlled. Indeed, the risk that the military use of a small number of nuclear weapons might escalate into an all-out civilization destroying exchange is one of the great deterrents to any leader contemplating nuclear or conventional aggression against us or our allies. Perhaps one of the best statements in the recent past on this subject was made by the late Harold Brown, one of America's foremost nuclear strategists, in his final year as Secretary of Defense:

> "we have no more illusions than our predecessors that a nuclear war could be closely and surgically controlled. There are, of course, great uncertainties about what would happen if nuclear weapons were ever again used. These uncertainties, combined with the catastrophic results sure to follow from a maximum escalation of the exchange, are an essential element of deterrence."
>
> "My own view remains that a full-scale thermonuclear exchange would constitute an unprecedented disaster for the Soviet Union and for the United States. And I am not at all persuaded that what started as a demonstration, or even a tightly controlled use of the strategic forces for larger purposes, could be kept from escalating to a full-scale thermonuclear exchange." (Annual Report to Congress, January 1981)

Once again, we return to Reagan's dictum that a nuclear war cannot be won and should never be fought.

The Committee might fairly ask, however, in light of all of the above, why U.S. policy since the early 1960s, and especially from the mid-1970s to the present day in both Democratic and Republican Administrations, places such great stress on providing a President a wide range of options. The answer is twofold:

- First, because potential enemy leaderships clearly have multiple nuclear options, it is essential that the United States maintain a flexible set of alternatives so that those leaderships understand that the U.S. has a credible counter to whatever they have developed – i.e., there is no circumstance in which they could believe they have an asymmetric advantage at any level of nuclear weapon employment -- and thereby to deter their resort to such options.

- Second, in the event that nuclear deterrence were ever to fail initially, it would be incumbent on a President to seek to halt the amount of violence and destruction at the lowest possible level. Once again, to cite former Secretaries Weinberger and Brown:

    - Our basic strategy, in direct support of our policy of deterrence has been, and remains, the prevention of any aggression, nuclear or conventional. But it would be irresponsible - indeed immoral - to reject the possibility that the terrible consequences of a nuclear conflict might be limited if deterrence should fail. To be sure, there is no guarantee that we would be successful in creating such limits. But there is every guarantee that restrictions

cannot be achieved if we do not attempt to do so. (Weinberger, SFRC Testimony, Ibid.)

- "it should be in everyone's interest to minimize the probability of the most destructive escalation and halt the exchange before it reached catastrophic proportions". (Brown, Annual Report to Congress, January 1981, Ibid)

- *What are the relative characteristics of proposed US nuclear modernization systems with regard to stability and the risk of inadvertent or interlocking escalation?*

The NPR calls for modernizing all three legs of the US nuclear Triad, essentially endorsing the previous Administration's plan to do so. So the first question must be "why a Triad?" The Triad started life, admittedly, as the offspring of inter-service rivalries of the 1950s. During the 1960s, however, strategists recognized that the combination of three different basing modes, each with unique strengths and different but offsetting vulnerabilities, separate attack azimuths, and complementary alert postures presented potential enemy offenses and defenses with insurmountable obstacles. It is that combination which provides for deterrent stability, because an aggressor cannot pre-emptively destroy the Triad or prevent the retaliation it could impose. This is why the Triad's underpinning of nuclear stability continues to guide U.S. force planning today. Indeed, former Secretary of Defense Jim Mattis is quoted in the NPR as saying:

- "I have also looked at – I have questioned – the Triad and I cannot solve the deterrent problem reducing it from a Triad. If I want to send

> the most compelling message, I have been persuaded that the Triad, in its framework, is the right way to go." (NPR, p43)

To credibly degrade or destroy our retaliatory capability would require a substantial act of nuclear aggression, beyond China's current capabilities and arguably challenging for Russia. Today, an enemy planner contemplating a first strike against the United States must take account of the 450 Minuteman silos, the two strategic submarine bases, Washington, Omaha, and possibly the three nuclear bomber bases. This would obviously be a massive strike and would draw a major response – a deterring prospect for any rational opponent. This is why such an enemy attack is most unlikely to occur. If you eliminate the 450 ICBM sites, an enemy planner's job becomes vastly simpler: two SSBN bases, Washington and Omaha (and by the way on a day-to-day non-crisis basis, none of our bombers are armed and on alert). A massive strike is no longer necessary and nuclear stability would have been weakened significantly.

Over the decades, several theoretical schemes have been advanced to try to improve stability by modifying U.S. nuclear policy or posture. Nearly all of these, however, would have the perverse and unintended effect of weakening and undercutting stability. Two in particular stand out for their longevity and their ill effects:

- Despite a general belief in both the US and Soviet/Russian governments that maintaining missiles in an alert status did not create instabilities, for more than twenty years an element of the disarmament community has worried about alert intercontinental ballistic missiles (ICBMs). This has led to calls for taking the U.S. Minuteman force off alert, in the hope that the Russian government will take similar steps with its ICBM force. As Moscow's response to the 1991-1992 Presidential Nuclear Initiatives or to President

Obama's Prague Initiative makes abundantly clear, there is no reason to believe the Russian leadership would take a reciprocal step in this regard. Furthermore, despite years of study by the U.S. Government, no verification scheme has yet been devised to provide confidence that a missile either has been taken off alert or returned to alert status. Should a crisis develop, moves by each side to return disabled nuclear forces to an alert status would further heighten tensions and raise the specter of one side launching first in the belief that the other side had not completed its re-alerting activities. In other words, this supposed stability enhancement actually provides a possible tactical advantage that might provoke an adversary to believe that it could escalate to nuclear attack without suffering significant consequences. A Fact Sheet published by the U.S. Department of State during the second term of the Obama Administration summed this up as follows:

> During [the] 2010 Nuclear Posture Review we studied in detail whether we should de-alert further any portion of our nuclear forces. That analysis took into account the impact further de-alerting would have on strategic stability and deterrence day-to-day, and in crisis or conflict. …our assessment of the impact of further de-alerting on strategic stability in crisis led us to the conclusion that further de-alerting would be destabilizing, not stabilizing…. ("U.S. Nuclear Force Posture and Dealerting", Fact Sheet. Bureau of Arms Control, Verification, and Compliance, December 14, 2015)

- A second notion is that the U.S. should declare that it would never use nuclear weapons first (this is known colloquially as a "No First Use" – or "NFU" policy.) Should the U.S. adopt such an approach, it would be

read, correctly, by our allies as removing our pledge to deter massive conventional attack against them. The U.S., through NATO, has since the 1950s threatened to escalate to nuclear use if a massive Soviet or Russian attack threatened the cohesion of NATO's defenses. Withdrawing that promise would shake the Alliance and perhaps cause some allies who could but don't build nuclear weapons to consider building their own. When members of the NSC staff raised the prospect of adopting NFU during the last year of the Obama Administration, strong letters of objection came in from senior officials in the United Kingdom, France, NATO Headquarters, and Japan; the Secretaries of Defense, State and Energy also strongly opposed the idea, and it was dropped. Furthermore, if NFU ever became U.S. policy, the Department of Defense would ensure that it was followed, whereas potential enemies would have a different approach. Russia refuses to rule out first use today; it's instructive to note that the USSR had a public policy of NFU, but when Soviet plans fell into our hands it was clear that the USSR was actively planning for First Use. Similarly, China's current NFU policy is highly nuanced, and may well mean that China would feel entitled to attack pre-emptively if its leaders felt threatened. Finally, even if the US were to adopt such a policy, it is highly likely that the leaderships in Moscow, Beijing, and Pyongyang would not believe that it was real, thereby vitiating any change in crisis behavior such a policy might be designed to foster

One good idea which came close to fruition but ultimately failed was de-MIRVing ICBMs, i.e. having ICBMs carry only one warhead. The idea

was to eliminate any advantage an attacker might gain by hitting a silo housing a missile with multiple warheads with a single warhead (in the jargon, to eliminate a "favorable exchange ratio"). The U.S. and Russia agreed in the START II treaty in 1993 to eliminate MIRVed ICBMs, but the treaty never entered into force. Nevertheless, the United States moved to de-MIRV the Minuteman force; Russia, to the contrary, still deploys large numbers of MIRVed ICBMs and, in fact, is about to deploy a new, heavily MIRVed large ICBM – the RS28 "Sarmat" -- as a follow-on to its existing large, heavily MIRVed SS-18.

In short, the answer to ensuring strategic stability is ensuring that a strong and modern US Triad exists, and equally, that the nuclear command and control system which undergirds it is equally modern and resilient.

- *Are there gaps in U.S. nuclear deterrent capabilities?*

US nuclear deterrent capabilities today suffer from two weaknesses. One, referred to earlier, is the overall age of the force. The original strategic Triad was created in the late 1950s and early 1960s. Twenty years later, that original force was modernized across the board by the Reagan Administration in the 1980s. The Reagan Triad should have been modernized by the George W. Bush Administration, but the perception of a benign Russia and events in the Middle East/South Asia diverted focus from this task. Many of the force elements – the Minuteman III missiles and their command and control facilities, the Ohio-class SSBNs, the AGM 86B air-launched cruise missile and the NC3 architecture which supports them –

have all surpassed their intended service lives. As former Defense Secretary Ash Carter put it in April 2017:

> "the Defense Department cannot further defer recapitalizing Cold-War era systems if we are to maintain a safe, secure, and effective nuclear force that will continue to deter potential adversaries that are making improvements in their air defenses and their own nuclear weapons systems. The choice is not between replacing these platforms or keeping them, but rather between replacing them and losing them altogether. The latter outcome would, unfortunately, result in lost confidence in our ability to deter. The United States cannot afford this in today's security environment or in any reasonably foreseeable future security environment." (American Interest, Volume 12, Number 6, April 2017)

Accordingly, as noted earlier, the 2018 Nuclear Posture Review calls for modernizing all three legs of the U.S. nuclear Triad (basically endorsing, with a few key changes, the Obama Administration's plan to do so). That said, new U.S. systems will not begin to be fielded until at least the mid-2020's, which given the age of our forces, will be, as the current commander of U.S. Strategic Command General John Hyten USAF says, "just in time". (remarks, Mitchell Institute Triad Conference, July 17, 2018.)

As an aside, given that Russia and China began modernizing (and in China's case expanding) their nuclear forces in the 2008-2010 time frame and that they are now annually placing tens of new strategic nuclear missiles in the field, new SSBNs in the water, and deploying other new nuclear capabilities (including Russia's deployment of the new INF treaty busting cruise missile), any notion that the U.S. modernization program has spurred a new arms race is ludicrous. Again, to quote former Secretary Carter:

> "Indeed, those worried about the start of a new arms race miss the lesson of the past two decades: Despite decades of American and allied reserve—for 25 years our nations have refrained from building anything new—many countries, including Russia, North Korea, and more, have been doing just that. And some of these nations are even building some new types of weapons. So those who suggest that the U.S. recapitalization is a major stimulus to other powers to build more do not have the evidence of the past 25 years on their side." (American Interest, Ibid)

> "But the Russians are also very rapidly modernizing their own nuclear arsenal. I don't associate that with what we're doing. I associate it with the dynamics of their own feelings that nuclear weapons are one of the only things that guarantee their status in the world. …But it's not what I think is best for the Russian people, but they're fueling their own nuclear modernization. It's a mistake to think that we're fueling it." (Vox interview with Max Fisher, Apr 13, 2016)

Because essentially the entire Triad must be modernized, the financial cost of doing so is not insubstantial. That said, critics of modernization have dramatically inflated that cost, throwing around a 30 year life cycle cost to produce a sticker shock reaction. This criticism, however, obscures two points:

- First, 30 year costs always look large, regardless of the program.
- Second the cost of the modernization program, even when in full swing by the 2020's, is not expected to exceed 3-4% of the defense budget (before sequester caps were lifted). Current operating costs of the existing deterrent (which will continue) also run about 3% of the

> defense budget, so the total cost of protecting America and our allies from nuclear and major non-nuclear attack is between 6-7% of the defense budget (and less than 1% of the Federal budget) – not too much to pay to prevent an existential threat.

The Committee will hear people testify that even that amount of money is a great deal to spend for weapons we never use. But the truth is we use those weapons every day.

The second weakness in our deterrent capabilities relates to Russia's development of a military doctrine which envisages the threat or even the actual use of low-yield nuclear weapons to "win" a conventional war. (This is commonly called the "escalate to win" or "escalate to de-escalate" strategy.) This Russian doctrine, which began to emerge in the late 1990's, explains why Moscow has modernized its shorter range nuclear forces – in order to provide the means to implement this doctrine – and why Russia has carried out field exercises which feature the use of these weapons in this type of scenario. The intended effect is to increase the readiness of Russia's armed forces to carry out such attacks while simultaneously to coerce and intimidate NATO member states. That the Russian government embarked upon this effort, in the full face of existing U.S. nuclear forces, suggests strongly that the Russian military believes the U.S. and NATO lack an appropriate counter. To quote the NPR:

> "Russia's belief that limited nuclear first use, potentially including low-yield weapons, can provide such an advantage is based, in part, on Moscow's perception that its greater number and variety of non-strategic nuclear systems provide a coercive advantage in crises and at lower levels of

> conflict. Recent Russian statements on this evolving nuclear weapons doctrine appear to lower the threshold for Moscow's first-use of nuclear weapons. Russia demonstrates its perception of the advantage these systems provide through numerous exercises and statements. Correcting this mistaken Russian perception is a strategic imperative." (NPR p 53-54)

To remove any such destabilizing doubt in the minds of Russia's leaders, the Department of Defense has moved to build and deploy a limited number of modified Trident II W-76 warheads to provide a low-yield option to counter the Russian strategy and to dispel miscalculation and misperceptions about US will and capability. This modest step – deliberately eschewing any notion of mirroring the Russian investment in a wide series of low-yield tactical nuclear systems – is designed to enter service in the near future.

The low-yield Trident warhead has been attacked on a number of different grounds. One particularly pernicious suggestion is that the weapon is designed to lower the nuclear threshold, thereby making nuclear war-fighting a real possibility. This criticism flies in the face of official policy which is stated clearly and unambiguously in the NPR:

> "To be clear, this is not intended to, nor does it enable, "nuclear war-fighting." Expanding flexible U.S. nuclear options now, to include low-yield options, is important for the preservation of credible deterrence against regional aggression. It will raise the nuclear threshold and help ensure that potential adversaries perceive no possible advantage in limited nuclear escalation, making nuclear employment less likely." (NPR, p 54)

- *What role do nuclear weapons play in U.S. alliances? Do we need to forward-deploy nuclear weapons in theater?*

The U.S. extended nuclear deterrent serves to reassure allies that we are fully committed to defend them and to deter nuclear and major conventional attack against them. It also serves as an "anti-proliferant" for allies capable of developing their own nuclear weapons, convincing them that they do not in fact need to develop independent nuclear deterrents.

Due to different histories, geographies, and threats in the two regions, forward deployments of U.S. nuclear weapons in Asia and Europe during the Cold War differed significantly.

In the Asia/Pacific region, U.S. forward deployments were almost exclusively maritime and did not involve allied participation. Given this, there is no imperative currently for forward deployments of US non-strategic nuclear weapons to this theater, although our Pacific allies today very much rely on U.S. strategic forces to help keep them safe.

In NATO, Europe, while U.S. Navy ships did deploy with nuclear weapons, the predominant nuclear deployment was on land and involved allied forces through "programs of cooperation". At the height of the Cold War, the US had up to 7,000 weapons forward deployed in NATO Europe. The fall of the Berlin Wall, the demise of the Warsaw Pact, and the breakup of the USSR created conditions in which the U.S. and its NATO allies felt comfortable slashing the forward based stockpile dramatically, and

restricting it exclusively to a relatively small number of gravity bombs. Those weapons remain in NATO today, and four allied nations participate in nuclear burden sharing by maintaining nuclear certified dual capable aircraft (DCA), while other nations contribute to nuclear burden-sharing by supporting aspects of the DCA mission.

While it is true that some allied political figures in NATO countries, citing the relaxed tensions with Russia in the early 2000's, called for the removal of the US nuclear weapons, no allied government adopted that view as official policy. Indeed, as the Russian government stepped up its campaign of intimidation and nuclear saber-rattling against NATO beginning about 2010, the Alliance began to emphasize the importance -- both to deterrence and to reassurance – of keeping the weapons in Europe.

NATO's 2012, "Deterrence and Defense Posture Review", endorsed by all NATO heads of government at the Chicago Summit, stated:

> "Nuclear weapons are a core component of NATO's overall capabilities for deterrence and defence alongside conventional and missile defence forces. The review has shown that the Alliance's nuclear force posture currently meets the criteria for an effective deterrence and defence posture." (para 8)

The Communique issued by NATO leaders at their 2014 Summit in Wales stated:

> "Deterrence, based on an appropriate mix of nuclear, conventional, and missile defence capabilities, remains a core element of our overall strategy." (para 49)

The Communique issued by Alliance leaders at 2016 NATO Summit in Warsaw was even more explicit:

> "As long as nuclear weapons exist, NATO will remain a nuclear alliance. … NATO's nuclear deterrence posture also relies, in part, on United States' nuclear weapons forward-deployed in Europe and on capabilities and infrastructure provided by Allies concerned. These Allies will ensure that all components of NATO's nuclear deterrent remain safe, secure, and effective. That requires sustained leadership focus and institutional excellence for the nuclear deterrence mission and planning guidance aligned with 21st century requirements. The Alliance will ensure the broadest possible participation of Allies concerned in their agreed nuclear burden-sharing arrangements." (para 53)

Last year's July Summit in Brussels strengthened the 2016 statement:

> Following changes in the security environment, NATO has taken steps to ensure its nuclear deterrent capabilities remain safe, secure, and effective. As long as nuclear weapons exist, NATO will remain a nuclear alliance. … NATO's nuclear deterrence posture also relies on United States' nuclear weapons forward-deployed in Europe and the capabilities and infrastructure provided by Allies concerned. National contributions of dual-capable aircraft to NATO's nuclear deterrence mission remain central to this effort. Supporting contributions by Allies concerned to ensure the broadest possible participation in the agreed nuclear burden-sharing arrangements further enhance this mission. Allies concerned will continue to take steps to ensure sustained leadership focus and institutional excellence for the nuclear deterrence mission, coherence between conventional and nuclear components of NATO's deterrence and defence posture, and effective strategic communications. (para 35)

It is difficult to imagine a more convincing demonstration of allied support for nuclear deterrence and for the current NATO force posture. In these turbulent times, the withdrawal of forward based nuclear weapons would be viewed, unquestionably, by both NATO members and by Russia, as a strong indication that the U.S. had weakened its commitment to its allies.

- Concluding comment:

  I look forward to elaborating on these answers and on other topics of interest to the Committee during the hearing.

The Honorable Franklin C. Miller
Principal, The Scowcroft Group

Frank Miller is a Principal at The Scowcroft Group in Washington, D.C. He joined The Scowcroft Group in August 2010, after five years as a member of the Cohen Group, first as a Vice President and then as a Senior Counselor. He had joined the Cohen Group in March 2005 from the White House, where he had served since January 2001 as a Special Assistant to President George W. Bush and as Senior Director for Defense Policy and Arms Control on the National Security Council staff. At the White House he was responsible for a wide range of Presidential policy in the fields of nuclear deterrence policy, strategic arms reductions, national space policy, defense trade reform, land-mines, transforming the American and NATO militaries, and coordinating interagency support of Operation Enduring Freedom and Operation Iraqi Freedom. His White House assignment capped a 31 year career in the U.S. Government which included two years at the Department of State and twenty two years serving under seven Secretaries in a series of progressively senior positions in the Department of Defense. His final assignments in DoD were as Acting Assistant Secretary for International Security Policy from September 1996 to November 1997; Principal Deputy Assistant Secretary for Strategy and Threat Reduction from November 1997 to October 2000; and again as Acting Assistant Secretary from October 2000 until January 20, 2001. During his career, he had unusual influence on the evolution of national deterrence and nuclear targeting policy, on the START 1 and START 2 treaties, and was instrumental in forging critically important new relationships with the British Ministry of Defence. He was deeply involved in improving U.S. capabilities to counter, defend against, and defeat, biological and chemical weapons, in building the basis for U.S. and NATO strategic and tactical missile defense programs, in national reconnaissance and space policy and in submarine operations policy. He also served as the chair of NATO's nuclear policy committee ("the High Level Group") from September 1996 to January 2001 and of NATO's counter-proliferation policy committee ("the Defense Group on Proliferation") from September 1996 to December 1997.

For his service, Mr. Miller has been awarded the Defense Department's highest civilian award, the Defense Distinguished Civilian Service Medal, five times, and received the Department's Distinguished Public Service Medal in lieu of a sixth award. His other U.S. awards include the Department of State Distinguished Honor Medal, the Department of the Navy's Distinguished Public Service Medal, the Chairman of the Joint Chiefs of Staff Joint Distinguished Civilian Service Medal, the National Nuclear Security Administration Administrator's Gold Medal for Distinguished Service, and the Defense Intelligence Agency's Director's Medal. Promoted to the Senior Executive Service in 1984, he was awarded the Presidential Rank of Distinguished Executive in 1997. In addition, Mr. Miller has been awarded the Norwegian Royal Order of Merit (Grand Officer) and the French Legion of Honor (Officer). In December 2006 he was awarded an honorary knighthood -- a Knight Commander of the Order of the British Empire (KBE) -- by Queen Elizabeth II in recognition of his many contributions to US-UK relations during his decades of government service.

Mr. Miller is a member (and Chairman Emeritus) of the Board of Directors of the Charles Stark Draper Laboratory in Cambridge, Massachusetts. He also serves on the Board of Directors of Airbus Defense and Space Inc and on the Board of Sandia National Laboratory. He is a member of the Defense Policy Board and the U.S. Strategic Command Advisory Group. He is a member of the Council on Foreign Relations and a Director of the Atlantic Council of the United States. He served on the Board of Directors of the Sandia National Laboratory from 2014 through 2017.and also on the Board of the Naval Historical Foundation from 2012-2017. He was a member of the 2008 Secretary of Defense Task Force on DoD Nuclear Weapons Management

and also of the 2013-2014 Congressional Advisory Panel on the Governance of the Nuclear Security Enterprise.

Mr. Miller served from 1972 to 1975 as a Surface Warfare Officer aboard the USS Joseph Hewes, a Knox-class frigate, with deployments in the Mediterranean, the Indian Ocean, and the Atlantic. He served in the naval reserve from 1975 to 1980. Mr. Miller received his BA (Phi Beta Kappa) from Williams College in 1972. He received an MPA from Princeton University's Woodrow Wilson School in 1977.

January 2019

QUESTIONS SUBMITTED BY MEMBERS POST HEARING

MARCH 6, 2019

QUESTIONS SUBMITTED BY MRS. DAVIS

Mrs. DAVIS. The Trump administration Nuclear Posture Review notes that the administration will "seek arms control agreements that enhance security, and are verifiable and enforceable." The administration has also noted as recently as this month that Russia is in compliance with the Treaty. Do you believe the New START Treaty meets that threshold?

Ms. ROHLFING. [The information was not available at the time of printing.]

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QUESTIONS SUBMITTED BY MR. KIM

Mr. KIM. How confident are you in our current nuclear command, control, and communication (C3) systems, especially regarding cybersecurity? If no, why not? What can be done in the short and long term to reduce these cyber vulnerabilities?

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