[H.A.S.C. No. 115–11]

MILITARY ASSESSMENT OF NUCLEAR DETERRENCE REQUIREMENTS

COMMITTEE ON ARMED SERVICES
HOUSE OF REPRESENTATIVES

ONE HUNDRED FIFTEENTH CONGRESS

FIRST SESSION

HEARING HELD
MARCH 8, 2017

U.S. GOVERNMENT PUBLISHING OFFICE
24–683 WASHINGTON : 2017

For sale by the Superintendent of Documents, U.S. Government Publishing Office
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MILITARY ASSESSMENT OF NUCLEAR DETERRENCE REQUIREMENTS

HOUSE OF REPRESENTATIVES,
COMMITTEE ON ARMED SERVICES,
Washington, DC, Wednesday, March 8, 2017.

The committee met, pursuant to call, at 10:02 a.m., in room 2118, Rayburn House Office Building, Hon. William M. "Mac" Thornberry (chairman of the committee) presiding.

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

The CHAIRMAN. Committee will come to order.

The Nation's strategic deterrent is the foundation upon which all our defense efforts are built. We simply cannot allow it to weaken or to crack, and yet we have neglected it for some time while other nations have not only invested in their nuclear systems but advanced their capability.

Our strategic deterrent consists of the delivery systems, the three legs of the triad, and also the nuclear weapons themselves and the command and control over those systems.

Our Minuteman III missiles were first fielded in 1970; our B–52 and B–2 bombers were first deployed in the 1950s and the 1980s; our ballistic missile submarines began entering service in 1981 and, like the other legs of the triad, have a limited lifespan. The warheads themselves were largely designed and built in the 1970s or before, and the last time a warhead was fully tested was 1991.

And so, for some years some of our most brilliant scientists and engineers have been working to keep these complex machines safe, secure, reliable, and credible without being able to test the entire weapon. They have done so in aging, neglected facilities with an aging workforce.

Similarly, the command and control systems for our deterrent have not received the attention something so vital should have received. And meanwhile, our potential adversaries develop and field new delivery systems and they develop and field new weapons. And confidence in the U.S. strategic deterrent erodes.

I am sure all of you have noticed articles over the last few days which reported that Europe was considering developing their own nuclear deterrent if they can no longer count on ours. The same may well be true in Asia, as well.

Some say we cannot afford to update this part of our defenses, but depending on how one allocates the cost of the new bomber, operating, sustaining, and updating our strategic deterrent never requires more than 6 to 7 percent of our defense budget.

As former Secretary of Defense Ash Carter and others have pointed out, this is affordable because it is our highest priority defense mission. Contemplating a world without a reliable strategic deterrent is a nightmare the modern world has never had to face, and I hope it never does.

The committee has a number of events over the course of this week focusing on this topic of strategic deterrence. Today we are grateful to have several of our top military leaders to help us consider what our strategic deterrent means for American national security.

Now, it may well be that members have some policy questions which uniformed military members are not able to answer. As you know we are—do not yet have people in place in the new administration to answer some of those questions. But they are here to talk about the military implications of our strategic deterrent.

This hearing and the committee's broader series on nuclear deterrence will remind us, the American people, our allies, and potential adversaries that the U.S. strategic deterrent must always be credible and must always be ready.

Before turning to our witnesses, I would yield to the ranking member for any comments that he would like to make.

[The prepared statement of Mr. Thornberry can be found in the Appendix on page 47.]

STATEMENT OF HON. ADAM SMITH, A REPRESENTATIVE FROM WASHINGTON, RANKING MEMBER, COMMITTEE ON ARMED SERVICES

Mr. SMITH. Thank you, Mr. Chairman. I appreciate you having this hearing. I appreciate the focus on our nuclear weapons deterrent for this week. I think it is incredibly important.

And the chairman is correct, it is a series of aging systems that need to be replaced, and we need to think about what our long-term nuclear strategy is.

The concern that I have, we absolutely have to have a nuclear deterrent because, unfortunately, there other countries—and hostile countries like Russia, North Korea—that have nuclear weapons. We have to have enough of a deterrent to make sure that they never use them because they know that it would lead to their own destruction because of the size of our deterrent.

My questions as we go forward is whether or not we need as many nuclear weapons as we have had to present that deterrent.

I have always pointed out that China has a very straightforward deterrent. They don't have anywhere near as many nuclear weapons as we do, but they have got enough. And if anybody challenges them, they have enough weapons to obliterate that person if they were to use nuclear weapons.

So I hope that as we go forward and try to figure out what the new nuclear deterrent needs to look like we don't imagine that we have to have absolutely everything, that we really look at it. What is a credible deterrent force?

We are coming down, but at the peak here a year or so ago—it wasn't the peak—but we had well over 5,000 nuclear warheads and, you know, plenty of delivery systems. Is there a way that we can do this in a more cost-effective manner?

And I say that because while I agree with the chairman that we have to have a nuclear deterrent, no question about it, we also have to have it fit within a budget because we have a lot of other priorities. When you look at what President Trump has said he wants, in terms of the size of the force—you know, the size of the Army, the size of the Marine Corps, the way we want to build out the Navy—at a certain point the numbers don't add up.

So if there is a way to do this in a more cost-effective manner, I think that is something we should look at. I don't think we should simply say, "Well, it is important so we are going to spend whatever it takes." I don't think we can afford that, and I don't think it is a credible deterrent.

And I also want to make sure that our policy going forward continues to be just that, that it is a deterrent force against any other adversary using nuclear weapons, that we don't dive into some of the conversations that have happened in our military circles over the course of the last 30 years that somehow we can use, quote, "tactical" nuclear weapons on a first-use basis. I think we should maintain our policy of not using them first and using them as a credible deterrent. And I worry that some of the discussions have moved us in that direction.

Now, I am aware that Russia has changed its tone on that and there is cause for worry about how they view the use of nuclear weapons. And that is the last point I will make: Credible deterrent is not just about how many nuclear weapons you have, but it is also about maintaining an open dialogue with as many of those adversaries as possible to make sure that they know about that credible deterrent and that discourages them.

This is not just a military issue; it is diplomatic as well, to make sure that we keep open those channels so there are not misunderstandings about what our nuclear deterrent is and what we are prepared to do with it. We certainly don't want a country like Russia to start thinking that they can do a first-use nuclear weapon attack and get away with it.

So with that, I look forward to testimony and the questions, and I yield back.

[The prepared statement of Mr. Smith can be found in the Appendix on page 49.]

The CHAIRMAN. Let me welcome our distinguished witnesses today.

We have the Vice Chairman of the Joint Chiefs of Staff, General Paul Selva; we have the Commander of U.S. Strategic Command, General John Hyten; Vice Chief of Naval Operations, Admiral Bill Moran; and Vice Chief of Staff of the U.S. Air Force, General Stephen Wilson.

Without objection, your full written statements will be made part of the record. Again, thank each of you for being here.

General Selva, the floor is yours for any comments you would like to make.

STATEMENT OF GEN PAUL J. SELVA, USAF, VICE CHAIRMAN, JOINT CHIEFS OF STAFF

General SELVA. Thank you, Chairman Thornberry and Ranking Member Smith and members of the committee.

Thanks for the opportunity to testify on the continuing relevance of our U.S. nuclear forces for our national security, the considerations that are influencing the size and shape of those forces, and the steps the joint force is taking to modernize or replace them. Given the gravity of these issues, I deeply appreciate the committee's interest, attention, and oversight.

With the President's recently directed Nuclear Posture Review to assess the existing nuclear policy, and through many details regarding U.S. nuclear capabilities and employment concepts, these are all highly sensitive. Although they are, I look forward to your questions in this public forum and my ability to answer them as appropriate.

As you know, the fundamental role of U.S. nuclear forces is to deter nuclear use against the United States, its allies, and partners. Simply put, nuclear weapons pose the only existential threat to the United States and there is no substitute for the prospect of a devastating nuclear response to deter that threat.

Our nuclear forces play important roles as well, to include reducing the risk of nuclear proliferation and contributing to the deterrence of large-scale conventional war.

These are longstanding objectives that have served U.S. national interests, but our ability to achieve them cannot be taken for granted. No one should doubt that our weapons, our delivery systems, the infrastructure that supports them, and the personnel who operate, monitor, and maintain them, are prepared to respond to any contingency.

Our current challenge, however, is to maintain this high level of readiness and capability as long as the policy and strategy of this Nation depends in part on nuclear weapons for its security. This hearing comes at a critical moment in meeting that challenge.

For more than two decades, the joint force has implemented a U.S. policy that calls for the reduction of the role of nuclear weapons and forces and our strategies and plans to decrease the number and types of those nuclear forces in our inventory. Yet a number of nations, including potential nuclear adversaries, have not followed our example.

They instead are increasing their reliance on nuclear weapons, improving their nuclear capabilities, and in some cases expanding their nuclear arsenals.

Our nuclear deterrent, as has already been stated, is nearing a crossroads. To date, we have preserved this deterrent by extending the lifespan of legacy nuclear forces and infrastructure, in many cases for decades beyond what was originally intended. But these systems will not remain viable forever.

In fact, we are now at a point where we must concurrently recapitalize each component of our nuclear deterrent: the nuclear weapons themselves, the triad of strategic delivery platforms, the indications and warning systems that support our decision processes, the command-and-control networks that connect the President to our fielded forces, and our dual-capable tactical aircraft that can be equipped with nonstrategic nuclear weapons.

Our joint force's ability to preserve these capabilities beyond their intended lifespan is indeed a technical achievement. However, nuclear modernization can no longer be deferred.

Any disruption in the current program of record for future acquisition plans will introduce the risk—significant risk to our deterrent. As a result of previous delays and deferrals, all well considered, we are currently depending on just-in-time modernization and replacement of many of the components of our nuclear triad.

The cost of these efforts is substantial. Even at their peak, however, they will still represent less than 1 percent of anticipated Federal spending and approximately 6 percent of the defense budget.

Moreover, there is no higher priority for the joint force than fielding all of the components of an effective nuclear deterrent, and we are emphasizing the nuclear mission over all other modernization programs when faced with that choice.

Mr. Chairman, I appreciate accepting my written statement into the record and I look forward to your questions.

[The prepared statement of General Selva can be found in the Appendix on page 52.]

The CHAIRMAN. Thank you.

General Hyten.

STATEMENT OF GEN JOHN E. HYTEN, USAF, COMMANDER, U.S. STRATEGIC COMMAND

General HYTEN. Good morning, Chairman Thornberry, Ranking Member Smith, members of the committee.

On behalf of the men and women of United States Strategic Command [STRATCOM], I would like to echo the thanks of the vice chairman and express our appreciation for the committee's continued support for the nuclear mission. I look forward to build upon this relationship on our shared objective of protecting the Nation.

Our mission at United States Strategic Command is to employ tailored nuclear, space, cyberspace, global strike, joint electronic warfare, missile defense, and intelligence capabilities. We deter aggression, decisively respond if deterrence fails, assure allies, shape adversary behavior, defeat terror, and define the force of the future.

Let there be no doubt, we have a safe, secure, reliable nuclear enterprise today, and our nuclear forces are ready to meet any challenge.

Nonetheless, much work is needed to make sure that this is the case as we look out into the coming decades. At STRATCOM peace is our profession, and one of the ways it is achieved is through strategic deterrence. That mission has been the bedrock of our national security for decades now. It is foundational.

As such, I have three priorities in my command.

My number one priority is to provide that strategic deterrence against any potential adversary. Our operations are ceaseless, deliberate, and enabled by a commitment to execute and modernize our C2 [command and control] and nuclear enterprise, which will enable us to meet the demands of the current and future strategic environment.

My second priority is to account for a deterrence failure, in which this Nation will count on us for a decisive response. That response

must defeat any adversary with our nuclear, space, cyberspace, missile defense, and other strategic capabilities.

Neither strategic deterrence nor decisive response will function, however, without a resilient, equipped, trained, and combat-ready force, which is my final priority.

Our fight is continuous, each and every day, across and around the globe. This requires our forces to have depth in capability and breadth in capacity.

We cannot do it alone. We must constantly challenge ourselves to integrate with allies, partners, the interagencies, the Department, the Joint Staff, and other commands to ensure we capitalize on the unique capabilities that STRATCOM can bring to bear.

Today's deterrent force remains safe, secure, reliable, and ready. However, the United States faces significant future challenges in sustaining the required capabilities to meet our enduring national security objectives and the extended deterrence commitments we have around the world.

At a time when others continue to modernize and upgrade their nuclear forces, nearly all elements of the nuclear weapon stockpile, our delivery systems, our other critical infrastructure are operating well beyond their designed service life.

Maintaining strategic deterrence, assurance, and escalation control capabilities requires a multifaceted long-term investment approach and a sustained commitment to maintain a credible nuclear deterrent. That nuclear deterrent is only as effective as the command and control that enables it to function. Therefore, our nuclear command and control communication systems, NC3, must be assured, reliable, and resilient across the full spectrum of conflict.

Maintaining a credible deterrent requires sustainment and modernizations of key systems and capabilities throughout the architecture. The unpredictable challenges posed by today's multi-domain, multi-threat security environment make it increasingly important to optimize our legacy NC3 systems and leverage new technologies and capabilities. Through continuing funding for NC3 modernization we can ensure effective command and control for these forces well into the future.

So I look forward to participating in the hearing today and the administration's recently announced Nuclear Posture Review, which will address many of the issues we will discuss.

And I thank the committee again for your support. I look forward to your questions.

[The prepared statement of General Hyten can be found in the Appendix on page 59.]

The CHAIRMAN. Thank you, sir.

Admiral Moran.

STATEMENT OF ADM WILLIAM F. MORAN, USN, VICE CHIEF OF NAVAL OPERATIONS

Admiral MORAN. Thank you, Mr. Chairman. I appreciate the opportunity to be here this morning, and I echo the comments by both General Selva and General Hyten.

And I am extremely proud to represent the men and women who man, operate, and maintain our strategic ballistic submarine force. And I look forward to your questions, thank you.

[The prepared statement of Admiral Moran can be found in the Appendix on page 68.]

The CHAIRMAN. Thank you.

General Wilson.

STATEMENT OF GEN STEPHEN W. WILSON, USAF, VICE CHIEF OF STAFF OF THE AIR FORCE

General WILSON. Chairman, the same. I look forward to any questions from the members here today. I represent the United States Air Force, that provides two-thirds of the Nation's triad and three-fourths of the nuclear command and control communications. We stand ready to answer your questions.

[The prepared statement of General Wilson can be found in the Appendix on page 74.]

The CHAIRMAN. Well, thank you all.

General Selva, yesterday I had the opportunity to tour Fort Campbell. It just reminds me that we have a lot of needs in this military, and—but did I hear you correctly, that there is no higher priority for the joint force than modernizing this part of our defense effort, our strategic deterrence?

General SELVA. Mr. Chairman, we in the joint force put our nuclear deterrent as the number one priority for modernization and recapitalization.

I would make two quick points.

One, we have made several—and I have referred to them as considered decisions over the last decade to defer some of the modernization of that force in order to address urgent needs while still maintaining a safe, reliable, and secure arsenal and delivery capability. But in making those decisions we have squeezed about all the life we can out of the systems we currently possess, and so that places an extra premium on a very deliberate long-term investment strategy to replace those systems as the existing systems age out of the inventory.

And that is the reason we use the terminology we place it as our number one priority. There is an urgency in terms of time and in terms of stable long-term investment in order to be able to deliver this capability.

The CHAIRMAN. Okay. Let me just ask one other question for either you or General Hyten to comment on.

A couple weeks there—ago there was an article by Peter Huessy, who is president of GeoStrategic Analysis and guest lecturer at the U.S. Naval Academy. Among other things he writes in this letter is that early in the next decade, around 2020 or 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 with mobile ICBMs [intercontinental ballistic missiles], a new missile-armed submarine, and long-range cruise missiles. New data now indicates that China can build a thousand new nuclear warheads quite rapidly. If the U.S. stays on its current projected course we will, at best, fully modernize our nuclear deterrent by the mid-2030s, some two decades hence.

He then goes on to say we are at about 10 percent of a number of warheads where we were at one time and talks about Russia's tactical nuclear weapons.

I am not asking you all to comment on the accuracy of information that may be, and probably is, classified. But I am asking relative to other nations, are they gaining in capability faster than we are? Where is the momentum here? Because if you—if he is in the ballpark of being right, that Russia will have modernized everything in a handful of years and at best we are two decades after that, it looks to me like we are behind in this race.

General SELVA. Chairman, thanks for the question.

There are two dynamics that are at play here. One is Russia has been and continues to modernize their nuclear force, and China continues to modernize and grow their nuclear force. Those are facts. We don't have to go to intelligence to determine those.

Having said that, the path that we have chosen to modernize and replace our existing nuclear arsenal, particularly the delivery systems, the indications and warning, and command and control, potentially puts us in a position not only to keep up—because we do have a qualitative advantage at this point—but to capitalize on that advantage over time by continuing to have a triad that gives us a ballistic missile force that confounds Russian and Chinese targeting; a bomber force that is resilient enough and capable enough to penetrate enemy air defenses and respond to a nuclear attack; and a survivable portion of that triad, in the case of our strategic ballistic missile submarines, that gives us an ability to respond even if an adversary were to believe that they could execute a decapitating attack on our nuclear capability.

So it is our strategy going forward to continue to modernize all three legs of the triad in order to continue to pose unsurvivable targeting challenges to adversaries that match us in number and very close to match us in quality to the delivery systems themselves.

The CHAIRMAN. Okay. General Hyten, you want to add anything?

General HYTEN. Thank you, Mr. Chairman.

I think the only thing I will add is that the key to a nuclear deterrent is safe, secure, reliable, and ready. It has to be able to work.

Now, I think the vice chairman used the term "just-in-time delivery," so if you look at all of the elements, each element, leg of the triad—our nuclear weapon system, our nuclear command—and you put them all on a table, they all deliver in just in time. And that is the risks that we have to make sure we monitor.

Because the forces that we have, the forces that we are projected to have in our budget, will provide that nuclear deterrent without a doubt as long as we can modernize according to that schedule. If those schedules slip, though, that is when we put risk in the system.

The CHAIRMAN. So back to what General Selva said at the beginning, we have no room for error here in getting this done because we have stretched things as far as we can.

General HYTEN. Yes, sir.

The CHAIRMAN. Okay.

Mr. O'Rourke.

Mr. O'ROURKE. Thank you, Mr. Chairman.

For General Selva, I would like you to talk a little bit about the long-range standoff capability for which you advocate. Talk about where it is in your priorities, what it gains the United States. And I would also like you to address some of the concerns raised about unintended consequences and, you know, things that we may want to know in terms of the total cost of ownership of these strategically, in terms of what our adversaries or potential adversaries will interpret by that and what that may invite from them.

General SELVA. Thank you, sir.

Several quick points. First of all, the long-range strike system is integral to extending the life and utility of our current bomber fleet, and it also increases the number of options for the use of our future bomber fleet.

In this respect, the missile itself imposes a cost on any potential nuclear adversary because in addition to modernizing their nuclear arsenal, they also have to modernize their air defense arsenals. This is a strategy that we used in the 1980s when we widely deployed the air-launched cruise missiles into our B–52 inventory.

We believe that over the course of time, to keep the B–52 viable and buy us enough time to deploy the B–21, we have to have a long-range standoff weapon in our inventory that poses a challenge to increasingly sophisticated air defense systems in any one of the potential adversary nations that we might face. And so in that respect, the missile itself is an integral part of our modernization and replacement strategy.

There are those who say that long-range standoff strike capabilities are inherently destabilizing. I disagree with that particular point for two reasons.

One, it ignores the fact of deployment of those same systems by our adversaries. If you look at Russian deployments in their bomber force, they are largely composed of long-range standoff air-launched cruise missiles launched from what we would consider relatively old legacy bomber platforms. That is a challenge we are going to have to face and they are going to have to face.

The second reason I think it is something we must introduce into our arsenal is if we don't have that capability in our arsenal, negotiating it out as a type and class of weapon over time becomes increasingly unlikely. So the places we have had success in negotiating types and classes of weapons out of adversary nuclear arsenals in our strategic arms reductions talks has been when we possess a similar capability that poses a tactical, operational, and strategic problems for our adversaries.

So I am very concerned that the open debate about abandoning the system in the interest of cost actually puts us at a strategic disadvantage over the length of time.

Mr. O'ROURKE. So there is the argument on cost. You referenced the argument that it may destabilize or introduce some ambiguity that could be—that could turn out badly for both sides. And your response to that seems to be that our adversaries have this capability, and it wouldn't be responsible for us not to match that.

Would you then say if our adversaries did not have this capability the United States would not seek to introduce it?

General SELVA. I think I would say that we should take that to the table and negotiate it in a bilateral, verifiable way so that we

don't give up the option and the strategic leverage that we have in the existence of the system a priori.

Mr. O'ROURKE. Thank you. Mr. Chairman, I yield back.

The CHAIRMAN. Couple of administrative notes.

We have obviously a lot of member interest. We need to try to just stay within the 5 minutes.

Secondly, if—when you all answer questions, if you would talk directly into the microphone. Sometimes it is hard to hear back here and that would help us.

Mr. Wilson.

Mr. WILSON OF SOUTH CAROLINA. Thank you, Mr. Chairman.

And thank you for being here today.

I am very grateful to represent the Savannah River Site, where multiple generations have been dedicated to promoting peace through strength by building our nuclear weapons capability. In fact, the staff and workers there have made, I think, a positive difference, as General Hyten has cited, protecting the Nation.

And so it really is very meaningful to me that you are here today and your success that we want to continue.

General Selva, over the course of the past 8 years the military has contributed to detailed efforts to examine various options for changing the structure of the U.S. nuclear forces. We know from a GAO [Government Accountability Office] study and review of these efforts that the Obama administration examined big changes, like eliminating one or more of the legs of the triad. After these reviews, President Obama ultimately concluded to retain the triad and continue pursuing the nuclear modernization plans laid out by his administration.

Did the Joint Chiefs of Staff and the services recommend and support the decision to retain the triad, and what was the reasoning?

General SELVA. Congressman, in advance of the consultations with President Obama's administration on the status and potential options for how to manage the triad the Joint Chiefs did meet. We did affirm the necessity to maintain a triad, largely for the reasons that I have already pointed out about managing the strategic risk not only with Russia as a potential adversary, but China as a potential nuclear adversary, with an increasingly aggressive North Korea and his pursuit of nuclear weapons, and based on the fact of JCPOA [Joint Comprehensive Plan of Action], that we have forestalled an Iranian entry into the nuclear arena but have not completely stopped it for the future.

So based on the collection of potential threats and adversaries that exist in the world, the Joint Chiefs affirmed—pardon me—the necessity to maintain a triad and to modernize the weapon systems, the indications of warning, and the command and control associated with that triad.

Mr. WILSON OF SOUTH CAROLINA. And I am grateful for President Obama's decision, although you referenced Iran, and I am so concerned about the continuing development of missile capability, ICBMs. Sadly, that can only be used for the purpose of, in my view, delivery of a nuclear weapon and a threat to the American people.

General Hyten, we sometimes hear arguments that the triad has too much redundancy, that it will not intentionally—it is not inten-

tionally designed, it is more by accident and grew up into what it is today. Do you believe we should retain and modernize the full triad? And additionally, what reasoning do you have on this?

General HYTEN. So, I believe we should retain and modernize the triad, Congressman, absolutely. I believe that is fundamental to deterrence.

In order to deter you have to have a capability that provides the adversary a calculus that he looks at and decides that his options will fail. If the adversary has capabilities to operate from the sea, from the land, from the air, then we have to be able to deter in all those elements. That is how the triad was developed and that is how we need to go.

And I will just end with the fundamental statement that I am fundamentally opposed to unilateral disarmament because that fundamentally changes the deterrent equation. In deterrence, parity—rough parity—is actually a good thing, not a bad thing, because that causes the adversary to pause when they are about to make a decision.

Mr. WILSON OF SOUTH CAROLINA. And I agree with your analysis just there of peace through strength. Thank you very much.

And, both General Selva and General Hyten, what are your view of the concerns that we are launching a new nuclear arms race with Russia by pursuing the nuclear modernization program?

General SELVA. Congressman, I would suggest that we are not entering an arms race because we bilaterally have a verifiable inspection regime for the weapons that are deployed; we have capped the number of weapons that are available. What we are doing in this modernization program—and I very bluntly try to call it a replacement program—we have to replace the systems that exist. We should replace them with systems that are viable.

The Russians understand that is what we are doing. They know it is a path we are on.

So we have a bilateral, mutually verifiable treaty cap at this point in our relationship, and I think that keeps us from entering an arms race.

General HYTEN. Congressman, I agree with the vice chairman. We have numbers of our force: 400 ICBMs, 240 SLBMs [submarine-launched ballistic missiles], 60 bombers, 1,550 accountable warheads. Those are defined numbers that we have to meet.

So we are not racing to increase that number; we are not racing to beat that number. We are working hard to make sure we can maintain that.

Mr. WILSON OF SOUTH CAROLINA. Thank you very much.

The CHAIRMAN. Mr. Moulton.

Mr. MOULTON. Thank you, Mr. Chairman. Gentlemen, thank you very much for joining us here today.

General, I was wondering—General Selva, I was wondering if you could talk about the Russian compliance with the Intermediate [Range] Nuclear Forces Treaty. There have been some concerns expressed in the press that they have not been complying. I would like to know what your view is on that situation.

General SELVA. We believe that the Russians have deployed—pardon me—a land-based cruise missile that violates the spirit and intent of the Intermediate Nuclear Forces Treaty. We have con-

ferred with the Russians in a bilateral consultation committee that exists underneath the New START [Strategic Arms Reduction] Treaty in order to confront them on that deployment, and we will continue to do so.

The system itself presents a risk to most of our facilities in Europe, and we believe that the Russians have deliberately deployed it in order to pose a threat to NATO [North Atlantic Treaty Organization] and to facilities within the NATO area of responsibility.

Mr. MOULTON. If those discussions do not bear fruit, what is the next step? What is the administration's plan to deal with what seems like a flagrant violation of a treaty?

General SELVA. We have been asked to incorporate a set of options into the Nuclear Posture Review, so it would be premature for me to comment on what the potential options might be for the administration to respond.

Mr. MOULTON. Okay. It seems that this is part of a broader move of Russian aggression throughout Europe and against NATO. One of things that concerns me is that as Russia continues to threaten the Baltic States, may not be deterred from further action in places like Ukraine, that a conventional conflict could escalate to the point where it becomes nuclear.

What is the U.S. doing to make sure that that doesn't happen, that Russia never crosses a threshold into using tactical nuclear weapons in a theater like Eastern Europe?

General SELVA. Congressman, never is a fairly absolute word, but our strategy in Europe is to maintain an inventory of nonstrategic nuclear weapons that are in the hands of both the United States and our NATO allies. They are operated on a category of aircraft we call dual-capable aircraft, where the aircraft are designed to actually accommodate the use of nuclear weapons.

Those aircraft are distributed in a very deliberate readiness process between U.S. forces and our NATO allies, and we believe that that capability poses a significant risk to Russia and, therefore, it helps deter Russia from employing nuclear weapons on the European continent.

Mr. MOULTON. General, I would hazard to say that using the word "never" is not going too far when we are talking about the existential threat of——

General SELVA. No, sir, I am not——

Mr. MOULTON [continuing]. Nuclear weapons.

General SELVA [continuing]. Not suggesting it is too far. It is just such an absolute word I avoid it.

Mr. MOULTON. Fair enough. What kinds of doctrine changes are we contemplating in the face of what appear to be doctrine changes on the side of the Soviet—of the Russians?

General SELVA. Sir, we have begun an investigation of a series of potential strategy changes, many of which will have to be incorporated into the Nuclear Posture Review. As you recall, in the prior administration we looked to limit the potential use and utility of nuclear weapons in any scenario with an eye towards reducing the numbers to a much smaller inventory than we have today—a noble goal, to be sure.

One of the things that happened in the context of that conversation is our adversaries started to articulate a doctrine of escalation

to deescalate. And we have to account for in our nuclear doctrine what that means and what the ladder of strategic stability implies as we look at an adversary that expresses in their rhetoric a willingness to use nuclear weapons where they may or may not actually be exercising the operational capability to do so.

So we are going to have to get to the bottom of what that means. We have done several war games and exercises over the last couple of years. We are not done with that process but this will be part of the Nuclear Posture Review.

Mr. MOULTON. General, I think you will find bipartisan support in this committee for making sure that we have an effective nuclear deterrent. But at the end of the day, I think you would also find bipartisan support for working towards strategic arms reductions.

What is the most effective thing we can do today to head down that path, because obviously those talks seem to be stalled?

General SELVA. Sir, I think there are two things we can do from a military perspective.

The first is maintain a safe, secure, reliable, and ready nuclear arsenal and project to the public and to our adversaries that we take this incredibly seriously. It is why it is our top priority.

The second is also emphasize that the existence of that arsenal need not be absolute, that we are open to negotiations but they must be bilateral, they must be verifiable, and we have to go into this completely open to the idea that there are now more than just two nuclear players at a strategic level in the world. We must accommodate in our bilateral relationships with any adversary the existence of other adversaries.

And so the inventory today grows. Russia and China present strategic threats to the United States if they chose to use their weapons, and our deterrent must be able to address both. If new nuclear adversaries enter the population of potential threats, we need to be ready to address them.

I think if we can balance those two things in our discussion both publicly and privately of what the implications are for maintenance of an arsenal and reduction of that arsenal in a measured and prudent way, we can be successful.

Mr. MOULTON. Thank you, General. Thank you, Mr. Chairman.

The CHAIRMAN. Mr. Turner.

Mr. TURNER. Thank you, Mr. Chairman. Gentlemen, I appreciate you talking today to us about what you have described, General Selva, as the top priority.

General Selva and General Hyten, I would like to talk to you for a moment about the nuclear command and control system component of that top priority. The PowerPoint we have been given describes the command and control as enabling national command conferencing, attack detection, strike planning, and dissemination of execution messages—all incredibly important. It also allows the President to have uninterrupted connectivity with nuclear forces.

Admiral Moran says maintaining a credible nuclear deterrent for the long term requires recapitalization of these key systems, so we know that it is essential for our concept of a credible deterrent.

General Hyten, in your written testimony you say that our command and control system is increasingly unreliable and in desper-

ate need of modernization. "Unreliable" and "desperate" are words that are in contrast to "credible."

General Selva, you say that the ability to preserve these capabilities beyond their intended lifespan is a technical achievement, acknowledging they are already past their lifespan. However, nuclear modernization can no longer be deferred.

Well, as we talk about the issue of deterrence I would like for you to describe to me some of the risks that we are facing by doing this, because it is not just that these might not work or that we can't respond if we are attacked. Doesn't it go right to the calculation of our adversaries as to whether or not we have a credible deterrent, as we have here what is an open hearing and we are hearing words such as "unreliable" and "desperate"? And we also don't have an ability to fix this tomorrow, right?

General Selva, General Hyten, could you describe the risk that we are taking and the situation we are in?

General HYTEN. Congressman, I will go first.

The nuclear command and control and communications, NC3, is my biggest concern when I look out towards the future. When I put all the modernization plans on the table I see the modernization plan for the submarine, for the bomber, for the long-range standoff munition, for the GBSD [ground-based strategic deterrent], I see—the new missile—I see all those coming together.

When I look out at the NC3, although everything we have today works very effectively, but it is very resilient, robust, and ancient. Ancient is the concern I have because an ancient command and control system in today's world is very, very hard to recapitalize.

Mr. TURNER. And, General, doesn't that mean that our adversaries know that and if they are taking a calculation as to whether or not we can credibly respond, don't they look at those issues as to our decaying infrastructure?

General HYTEN. I am sure they do. I am sure they look at those. We look at those very hard.

That is why it is my number one priority now inside the modernization piece to make sure we have a plan to modernize the nuclear command and control capability.

Mr. TURNER. In order to fix this—again, we can't just fix it tomorrow. You can't go down to Home Depot and buy a bunch of stuff and just plug it in and make this thing work. Let's talk about some of those components on the entire system.

Could you speak about the ITW/AA system, and what if it doesn't do its job of providing an early warning of attack?

General HYTEN. So the integrated tactical warning and attack assessment system, ITW/AA, is the—it is the integrated architecture that basically goes all the way from indications and warning from our space-based constellations to our ground-based radars into the command and control system and provides the picture of any threat that would come at the United States of America.

So it is exercised every time there is a launch on the planet, as recently as last Sunday night. We were up most of the night watching the North Korean launches of Scuds. Even though that did not present a threat to North America, we still exercised those same pieces.

The satellites see the threats. If it comes into the radar fans the radars will see it, and then the command and control system works.

But as we look at that structure and we look at it 10 years from now, when you have a 20th-century architecture that you are trying to maintain 10 years from now, 10 years from now is when my concern really is. It is not 2035 in the NC3 architecture. It is much more fragile than that. That is why we have to take a hard look——

Mr. TURNER. If it doesn't work or if there are deficiencies in it, does our adversaries, again, understand that that relates to our ability to respond?

General HYTEN. Congressman it works. It works every time we pull it together.

My concern is that we are creating fragility in the future, and that fragility in the future has to be addressed and it has to be addressed in the near term across the enterprise—that is in the Navy and in the Air Force.

Mr. TURNER. And can you talk about the assent system? And there are delays in this system that apparently we were not informed of, and how do we address that?

General SELVA. Congressman, all of the national command and control leadership communication systems have now been brought, with the help of this committee and the Senate Armed Services Committee, under the oversight of a single council in the Pentagon. I co-chair that council with the director of acquisition, technology, and logistics. It is——

Mr. TURNER. Do you believe that the services and DISA [Defense Information Systems Agency] should have to provide everything they know about delays in the system?

General SELVA. Yes, sir. And that is precisely what that oversight council does is it pulls all of the community of interest together so that we don't run the risk of looking at the process in "eaches"; we actually look at it as an entire end-to-end set of programs that are critical to providing nuclear command and control and connectivity to our most senior leadership.

The CHAIRMAN. Mr. Langevin.

Mr. LANGEVIN. Thank you, Mr. Chairman. I want to thank our witnesses for your testimony today, and most especially of your service to the Nation.

Gentlemen, as you know, our nuclear enterprise is aging, and we have spoken about that several times this morning, obviously. And like the previous member, I had the privilege of chairing the Strategic Forces Subcommittee a few Congresses ago, and so I was able to do a deep dive on this aging nuclear enterprise.

One of the things that I certainly find concerning is the work that our adversaries are doing in their nuclear programs, particularly China and Russia. And they are designing new delivery systems and warheads.

And I wanted to touch on a, you know, somewhat sensitive but important topic, and that is our nuclear warheads that we have in our arsenal.

I know we are going through the refurbishment program. I mean some of the components of our warheads don't even exist anymore.

It is not easy to replace them. And some of the materials are not easily obtainable.

So the question is obviously I—we are not interested in at all setting off an arms race, but does it make sense to continue to try to refurbish and make things work, or does it make more sense to design a more modern weapon?

And the question, if so, what does that do in terms of does that endanger us of setting off an arms race? And could we design a new warhead without testing?

General SELVA. Sir, one of the first priorities I engaged in when I took this job was to partner with Frank Klotz at the National Nuclear Security Agency, which is the arm of DOE [Department of Energy] that builds and does the actual physical maintenance of the warheads themselves. I took a trip to both Livermore and Sandia and talked to the scientists who are doing the work of design and prototyping of those—I will use the words "modernized repurposed warheads."

And their belief, and all of the information that they could present to me, is that there is sufficient life and resiliency left in the warheads that we currently possess that we can very deliberately modernize them with new technologies without building new warheads and essentially replicate the capability we have today in a safer, more secure, more reliable, and more resilient set of weapons without going into the detail of what that strategy looks like.

So the scientists themselves—and I spent a day at each location quizzing them and having them demonstrate their beliefs, not just in showing me their conclusions but actually showing me the math—they are convinced, as am I, that the path we are on is actually a reasonable path into the near future.

That doesn't ignore the fact that sometime in the future of these weapon systems we are actually going to have to replace the core components that still have lifetime left in them.

General HYTEN. And, Congressman, I will just add on that tomorrow we will have a classified session with this committee where we will actually bring in Frank Klotz and Charlie McMillan and myself, and we will sit down and we will walk through that entire nuclear weapons piece with you, as well as the threat information that we can't share in this hearing.

Mr. LANGEVIN. Okay, thank you.

Admiral Moran, being from Rhode Island and as co-chair of the Submarine Caucus with my good friends Congressman Courtney and Congressman Wittman, I understand the critical importance placed on our SSBN force in conjunction with our nuclear deterrence. Showing as the most survivable leg of the triad, the maritime force shoulders a significant burden and the *Ohio*-class submarines has primarily borne it.

The existing modernization projects that the *Columbia*-class submarines won't enter service until 2029 and that the Navy will only operate 10 SSBNs during the 2030s, reaching a full fleet of 12 SSBNs in 2041.

So, Admiral, how will we sustain our nuclear deterrence requirements while transitioning to the *Columbia*-class submarine, and what can Congress do to ensure the future requirements of the Navy's nuclear submarine fleet are met?

Admiral MORAN. Congressman, thanks for the question. We have worked out the requirements in the 2030s with STRATCOM and the joint force. Clearly, what will be done with re-cores of *Ohio* here in the not too distant future, so that is a major draw on our total force structure, if you will.

Then, as you indicated, in the late 2020s and early 2030s we start replacing *Ohio* with *Columbia* class. So we think we can accept that and we are going to have to maintain a ready status of fewer submarines during the 2030s, but working that through STRATCOM we believe we have enough to satisfy the requirement.

Mr. LANGEVIN. Thank you.

General Selva, for you I wanted to ask, what are the risks of launch on warning and what can be done to increase Presidential decision-making time in the midst of a crisis?

General SELVA. Thank you, Congressman.

As you are aware, the launch-on-warning criteria basically are driven by physics. The amount of time the President has to make a decision is based on when we can detect a launch, what it takes to physically characterize the launch, and the entire scenario is predicated on an adversary that believes they can attack us and decapitate our intercontinental ballistic missile fleet without us responding.

And so the only ways physically to buy more time for the President to make that decision are to increase the fidelity and the distribution of our radar and on-orbit detection systems.

But even those criteria face the facts of physics, which say while you may detect the launch, it—the weapon itself must cross through some sort of radar detection capability in order to characterize the launch as an attack on the United States.

The short answer to your question is, I don't believe the physics let us give him much more time. And so what we owe the President is a set of options ahead of time that he or she can consider and determine whether or not they are willing to take that shot, because they are not going to have the benefit of a long period of time to make that decision.

Mr. LANGEVIN. Thank you, General.

And in addition to that, obviously I have always been a big believer that good intelligence is always the very pointy tip of the spear, and the better our intelligence is the more standoff warning time we may have, as well. It adds to what we already have in place.

So, I want to be respectful of other people's time, so with that I will yield back.

The CHAIRMAN. Thank the gentleman.

Mr. Rogers.

Mr. ROGERS. Thank you, Mr. Chairman. Thank the witnesses for being here, for your service to our country.

In April of 2016 the State Department released its most recent Arms Control Compliance Report, and it found in there that Russia remains in violation of the Intermediate-Range Nuclear Forces Treaty, or the INF Treaty.

General Selva, in your professional military view, do you believe that Russia intends to return to compliance with this treaty?

General SELVA. Congressman, I don't have enough information on their intent to conclude other than that they do not intend to return to compliance absent some pressure from the international community and the United States, as a cosigner of the same agreement. There is no trajectory in what they are doing that would indicate otherwise.

Mr. ROGERS. And did I hear you say earlier in this hearing that Russia is now deployed?

General SELVA. Yes, sir.

Mr. ROGERS. What is the military's assessment of the impacts of this violation?

General SELVA. Sir, our assessment of the impact is that it more threatens NATO and infrastructure within the European continent than any other part of—area of the world that we have national interests in or alliance interests in.

And our intent is to factor that into the NPR [Nuclear Posture Review] and look for leverage points to attempt to get the Russians to come back into compliance. I don't know what those points are at this point in time.

Mr. ROGERS. Witnesses from the Office of the Under Secretary of Defense for Policy testified several times in the past several years that the U.S. was considering various responses, including active defense; two, counterforce; three, countervailing capabilities. What actions have been taken in each of these three to implement such capabilities?

General SELVA. Sir, I would like to give you a more fulsome answer in a classified environment, but basically it is the assessment of where the Russians are deploying and how they are deploying that system that provide for the latter option, which is a countervalue or counterforce option against the actual weapon system itself. But the balance of the capabilities I would have to talk to you about in a classified environment.

Mr. ROGERS. Okay.

General Hyten and General Selva, would you please provide this committee before the end of the month your recommendation on military options based on your best professional military advice for options that policy makers like this committee can choose to support?

General SELVA. Yes, sir.

Mr. ROGERS. Thank you. I yield back, Mr. Chairman.

The CHAIRMAN. Mr. Veasey.

Mr. VEASEY. Thank you, Mr. Chairman.

I wanted to ask General—all the generals that are here today about the F–35's Block 4 dual-capability platform, and with it being a—strictly a tactical complement to the strategic bomber fleet. And I was wondering, in your opinion, can this platform actually supplant some functions that the bomber fleet performs in the future, in conjunction with the new B–21, as our strategy evolves?

General SELVA. Congressman, I think it is possible they can work together. But given the relatively small numbers of dual-capable aircraft and the fact of that commitment only to our NATO allies, that we have not extended our dual-capable aircraft outside of the European area of responsibility in more than a decade, our capacity to provide for an extended nuclear deterrent umbrella over

other allies, partners, and friends principally comes from our capacity to deploy weapons from the United States to those locations.

So I am cautious that we not build the connotation that because the airplanes can operate together they would necessarily at a strategic level be built into the same plan.

Mr. VEASEY. Thank you. Anyone else? Okay.

My next question is to General Selva and Hyten. Each element of the nuclear triad requires significant investment and modernization. Of the three, how would you rank order with them, in terms of priority, to undergo modernization efforts?

General HYTEN. I will take that first, General. Thank you, Vice Chairman.

It is choosing among your children. It is impossible. It depends on your perspective.

You can come at from a perspective of which is the oldest. Which is the oldest? You probably go to the bomber. The bomber is the oldest. We need a modernized, penetrating bomber.

But then you look at the ICBM and the ICBM has a problem. You look at the submarine, the submarine—at some point in time the *Ohio* class will not be able to go under the surface of the water, and a submarine that can't go under the surface of the water does not have a significant use to the United States of America.

So as you walk through each of those you realize that under the current construct of what deterrence is, I can't give up any element of the triad. And that is why all three have to be modernized and all three have to be monitored as you go through that.

I think it is important that we look at it as each of these programs goes on and we make prudent decisions concerning where we are spending our money to make sure that they deliver in time, but I can't make a determination of which one today would be the most important.

General SELVA. Congressman, the way I would phrase it is not unlike my colleague, and that is: If you believe the triad is important, if you believe the existence of all three legs of the triad are necessary in order to deter an adversary from openly attacking the United States and denying them the capacity to be able to do that, then you have to put all three of them as a—as priorities and not pick and choose among the three.

There are schedule realities within the triad that drive us to pay particular attention to the modernization of each leg. The *Ohio*-class submarine is on a design and construction schedule that has almost no slack in it because of the dynamic that was just pointed out a few moments ago about the *Ohio* class reaching end of life and *Columbia* class having to be ready to replace her. And so that puts a premium on that design and construction schedule.

The B–52 fleet, as the chairman pointed out, that is the bulk of our air leg of the triad; that fleet was built in the 1950s and 1960s. The weapons that they employ, the air-launched cruise missile and the gravity bombs that they carry, were designed and built in the 1970s with a 10-year lifespan. We know today they remain relevant, but we can't continue to maintain them.

A decade from now those weapons will not be able to penetrate Russian air defenses. And therefore, there is an urgency to their replacement.

And finally, the Minuteman III missile system was put into silos in the 1970s with an expected 10-year lifespan. We have extended its lifespan and believe we can continue to do so for about another decade.

When we did the analysis of alternatives on what would be best—extending life again or replacing—the cost of extending life actually almost matches the cost of replacement. So that means all three of them must be addressed at the same time.

What we have to do, and what we owe you, is our considered judgment on where we put resources to make sure that all three of those replacement programs stay on a schedule for design and deployment that matches the time span that the weapons themselves will age out of the fleet.

Mr. VEASEY. Thank you. Thank you, Mr. Chairman.

The CHAIRMAN. Mr. Franks.

Mr. FRANKS. Well thank you, Mr. Chairman. And thank all of you gentlemen for your lifetime commitment to human freedom.

Let me begin by suggesting that the comments you have made here today as to the importance of our nuclear deterrent, I so deeply agree with, given that I think it has kept us out of involvement in a world war for 70 years. I mean, it is almost impossible to overstate its significance.

And with that, I will probably go ahead and bias my question deeply and suggest to you that I think that the long-range standoff capability is one of the strongest—one of the strong components for rationale and for leverage to keep the bomber leg of our triad.

And I know that the argument is made that somehow this is a destabilizing weapon—and, General Selva, you had mentioned earlier, and I thought you addressed it well, but I would like to kind of expand on it slightly because I think that this is one of those things that is in play.

And with that, you know, I have asked the Air Force many times now how many times—and, General Wilson, this is addressed to you too, sir, and General Hyten—how many times the ALCMs [air-launched cruise missiles], you know, has been fired and how many times that—in combat, and how many times it has been taken as a potential nuclear strike. And, of course, the answer was none.

And if, indeed, the LRSO [long-range standoff weapon] is destabilizing then so are dual-capable bombers. I mean, all of these things just don't make sense in my mind.

And so the questions I have for you—first—I am going to make a series of them because I don't want to run out of time here—what do you think of LRSO? Do you support the program? What is the military requirement for this program? Do you think it is destabilizing?

And, General Selva, I will point over to you specifically: Do the Joints Chiefs of Staff support the program? And do you believe LRSO is a good part of cost-imposing strategy on our adversaries?

That is a lot of questions. I am sorry to throw it all at the same time.

General SELVA. Congressman, the Joint Chiefs did consider the commitment to the LRSO and the development program when we looked at our recommendation to President Obama last year on whether or not to adjust the modernization and recapitalization

program and committed to the fielding and deployment of the LRSO. We do believe that it is a significant tool for imposing costs on our potential adversaries.

The requirements state in short that it be able to fly a specific range, which I won't talk about in this forum; that it be able to penetrate the sophisticated air defenses of an opponent; and deliver a nuclear weapon. And those are the three baseline requirements for the system that I can talk about in this room.

Mr. FRANKS. And you would reject again the notion that it is destabilizing?

General SELVA. Yes, sir.

Mr. FRANKS. And what emphasis do you put on the significance of that capability and maintaining in the future an effective rationale for keeping our bomber leg of our triad?

General SELVA. I think it does two things for us. We have already talked about the cost imposition on any potential adversary. That is a critical piece of keeping the bomber leg of the triad viable.

It is also critical to keeping the B–52 viable, as the airframe itself cannot penetrate Russian air defenses—or Chinese air defenses, for that matter—and, as a consequence, must have a standoff weapon that is capable of contributing to its leg of the deterrent.

Mr. FRANKS. Yes. General Hyten.

General HYTEN. Congressman, I will bring to the classified session tomorrow a detailed explanation. There is actually an integrated story when you put the bomber together with the LRSO that we can only talk about in a classified forum that actually explains the military requirement very specifically and why we need that.

There are a lot of policy discussions we have had today but I think the military requirement is actually the most powerful, and we can share that tomorrow.

Mr. FRANKS. Thank you, and I look forward to that. General Wilson, did you have anything to add?

General WILSON. Congressman, I would say the LRSO is the most flexible leg because when I match a weapon with all the bombers—in the future it will go on not only the B–52, the B–2, or the B–21—it provides lots of flexibility.

Mr. FRANKS. Yes.

General WILSON. When you put numbers on them, again, just as the other generals have said, it is a cost-imposing strategy against our adversaries. I think it is a very effective deterrent capability and will do so in the future.

Mr. FRANKS. Well, thank you. And, Mr. Chairman, I think that last point was very important: It gives our command capability the opportunity to make some additional decisions if they have to rather than having the bombers over enemy territory.

And finally, I think we should reject this notion of destabilization because Russia certainly has this capability and they continue to build on it and expand it.

So I appreciate you all being here today. And thank you, Mr. Chairman.

The CHAIRMAN. Ms. Hanabusa.

Ms. HANABUSA. Thank you, Mr. Chairman. And thank you, gentlemen, for being here.

One of the things that concerned me as I was reading through everything: Yes, there is an emphasis by all of you of the need for modernization and for replacement, and there is this concept of the triad. And I have heard the testimony before, and you seem to be just assuming that the triad is the way we must go. And I have heard your explanations and I, quite honestly, I am not necessarily convinced that that is the way that we must go.

For example, the warheads you talked about, 1971, I think, was when they were put together. You all realize that it took 10 years after that before you all graduated college.

So when we are talking about modernization, right, how or why are you all assuming that the triad system is like the essential threshold to modernization? And that is other than—if you will respond in this way—other than your respective jurisdictional areas.

General SELVA. Thank you, ma'am, for the question.

First of all, it is not that the triad is foundational to modernization. We believe the triad is foundational to deterrence. It is not about how we view the triad; it is how our potential adversaries view the triad.

So three times in the last 5 years the Joint Staff has been asked this question: Could we go to a dyad? Could we eliminate a leg of the triad? If you were to eliminate a leg, which leg would you eliminate?

The sum total of all of that analysis has resulted in a commitment on the part of the Joint Chiefs of Staff to maintain the triad because of its value in deterring our opponents.

It does several things for us. We have talked about the operational parts, where no single leg can be taken out at one time and that presents a targeting and strategic problem to an adversary.

The other thing it brings us is the ability, strategically, to hedge between legs of the triad, so if someone were to figure out how to completely defeat our bomber force we have a fallback position.

Ms. HANABUSA. But, General, you have all basically said that everything that we have in the triad needs to be modernized. And I believe General Wilson, in his testimony, said that, you know, the really peer that we have is Russia. There is China and North Korea who are coming on board, but our real peer in terms of this area is Russia.

So, I guess my issue is this: If we are looking at how we are going to battle into the, quote, "the modern era," or modernizing, shouldn't we be focusing on how they—our quote, "potential adversaries" and the ones that we anticipate are coming on board—how they will arm and what we must do to combat that?

Because it seems like we are sort of in this mode of, well, we—not necessarily that the triad is the essence of modernization but somehow it is sacrosanct right now, and this is what we think works best.

But we are talking about modernizing; we are talking about a new series of adversaries. And so how is it that you have thought about that potential and in then assuming that the triad is necessary and the way that you are all choosing to modernize within the triad is what is going to be the best way?

I understand the *Columbia* class coming on board. I do understand that. And I understand the essence of the—then the quote what we call the "deep blue sea" and what they need to do. However, I am wondering about the ICBMs, where we place them, and this bomber capacity.

General HYTEN. Congresswoman, we start from the adversary. That is where all the analysis starts.

We start looking at Russia. That is where the nuclear analysis starts.

Then we look at China, we look at North Korea, look at Iran. But we start from what they are doing, because the adversary gets a vote. They get a vote, and we don't get the vote on what they are going to do. So we have to look at what they are doing and figure out how to respond.

And if you look at the role of deterrence, the primary role of deterrence is to deter the use of nuclear weapons anywhere else on the planet. And if you eliminate one element of the triad, the challenge that creates for us as military officers is that now we are one failure, we are one problem away, we are one challenge away, we are one breach in intelligence away from an adversary thinking that they can possibly attack the United States with a nuclear weapon.

That fundamentally changes deterrence.

Ms. HANABUSA. General, I am going to run out of time, and what I would like is to have you respond to me in writing if you can.

I understand that. However, when your basic essentials, which is the weaponry that we have and all of that, may not be the proper deterrent, or the bombers may be something that can be detected, those are the issues that I would like to have you respond as to how that fits into modernization.

Thank you, Mr. Chair. I yield back.

The CHAIRMAN. Mr. Wittman.

Mr. WITTMAN. Thank you, Mr. Chairman. And, gentlemen, thank you so much for joining us, and thanks so much for your service.

General Hyten, I would like to discuss the military requirement for the long-range standoff cruise missile in a little more detail. I want to focus on the platforms.

And we have penetrating platforms like the B–2 and upcoming the B–21. Tell me why those platforms, with their capability and them going in to deliver a gravity nuclear weapon like the B–61 would not meet the standards or the requirements that have been set by LRSO.

General HYTEN. Sir, I can't talk about the specifics in an open hearing. I will bring those specifics into the closed classified session tomorrow so I can give you the number.

But in general, let me just describe that it is a mix of ranges. What is the range of the long-range standoff weapon? What is the range of the bomber? What is the target that we have to do?

And if you look at the globe and you look at Russia and China in particular, they are very large countries, and it is about an access issue. And so when we combine all those military requirements together and we meet the requirements that are in the air leg of the triad for what we have to do, that is how it comes together.

And I will show you the details tomorrow in the classified session.

General SELVA. Congressman, if you would let me add one more point to that——

Mr. WITTMAN. Yes, General Selva, yes.

General SELVA [continuing]. And this is something that is missed quite often in the LRSO conversation. In order for a bomber to deliver gravity—to deliver a gravity bomb it must fly over or approximate to the target. And it has to do that one target at a time.

If we find ourselves in a position where we have to strike multiple targets with relative simultaneity, the lack of existence of a long-range standoff munition means we have to dedicate more force to that same problem set.

And so part of the advantage in the LRSO—and it is one of the requirements—is that it be shot from some distance and that it can be released from the bomber in relative short order so that you can get that degree of simultaneity that you cannot get with the laydown of gravity bombs.

And again, until or unless we negotiate cruise missiles out of everyone's nuclear arsenal, the capacity to be able to do that adds value, brings flexibility, and it confounds the enemy's belief that they might be able to attack us and get away with it.

Mr. WITTMAN. Very good. Thank you. Thank you. Great point.

General Wilson, I wanted to go to you and get your perspective. We had heard some comments earlier about the aging inventory of our air-launched cruise missiles, and we know where they are today with their age, what they were planned for originally.

But tell me, what happens with the current age of these missiles and our ability to perform the mission if LRSO is not delivered on time, and do we have the same element of deterrence as that inventory of air-launched cruise missiles ages and if we don't get LRSO?

General WILSON. Yes, thank you for the question.

As you remarked earlier, our current cruise missiles were built in the early 1980s, designed to last 10 years. We are now on their fifth SLEP [service life extension program], their service life extension for those missiles. To meet General Hyten's requirements we talk about being safe, secure, effective, and ready.

As these missiles continue to age out they will become potentially unreliable and—on one piece and not able to reach their target. So there is an effectiveness piece and there is a reliability piece.

They are currently safe, secure, effective, and reliable. But looking 10 years in the future, we don't have much slack. Again, right now we are on our fifth service life extension and we need a new replacement for that ALCM missile, the LRSO.

Mr. WITTMAN. Very good. Thank you.

Admiral Moran, I wanted to talk to you about that extraordinarily important part of the nuclear triad, our *Ohio*-class submarines. We are today in the process of replacing those submarines with the *Columbia* class.

Give me your perspective. I know that we are pushed with having the proper number of 12 submarines, which is the projection, and being, for a period of time, as you spoke of earlier, at 11 submarines. Give me your perspective on what we will do to accommo-

date for that lower number of submarines through that period of time.

Is it longer deployments at sea? What do we do to make sure we have the proper presence there? Because as we know, we need 11 submarines to have a presence, I believe, at any one time of 6 submarines at sea.

Can you give us perspective about how you create that balance and why 11 is going to be sufficient for the mission through that timeframe?

Admiral MORAN. Thank you sir.

You captured it quite well there in terms of the length of deployments and how much longer we would be able to sustain a crew at sea or turn around a crew at sea, shorter durations. So there are several aspects of what you described that we can do to make up that delta.

The biggest one is the maintenance of those existing *Ohio* as they reach the end of their life and the new *Columbia* as they come in in the 2030s.

Mr. WITTMAN. Very good. Thank you, Mr. Chairman. I yield back.

The CHAIRMAN. Mr. Carbajal.

Mr. CARBAJAL. Thank you, Mr. Chairman. And thank you all for coming here today.

The Congressional Budget Office [CBO] estimates the cost of modernizing U.S. nuclear deterrent will cost about $400 billion over the next decade. Reports also indicate U.S. will spend $1 trillion over the next 30 years in order to modernize and maintain our nuclear triad.

All our witnesses have expressed the importance of modernizing our nuclear capabilities and the risks of continuing to use systems that are operating beyond their service life. To this end, I believe it is imperative for this committee to be informed of the long-term plans, timelines, and cost projections of implementing such a costly and extensive modernization program.

This is the National Nuclear Security Administration's annual report that covers DOE's costs and plans for nuclear warheads and related infrastructure over the next 25 years.

General Selva, can DOD [Department of Defense] provide this committee with its 25-year plan, timelines, and cost estimates in regards to its nuclear modernization efforts? If yes, when? And if no, why not?

General SELVA. Congressman, my understanding is we communicated those requirements in our President's budget in 2017. They will be re-communicated as part of our program.

But I will be happy to work with our team back in the Pentagon and come back to you with a more fulsome answer to your question over the next decade to decade and a half. Our numbers are slightly different than CBO's for a couple of reasons, but we will work through that with you and make sure you have the numbers.

Mr. CARBAJAL. Great. Thank you very much. I yield, Mr. Chair.

The CHAIRMAN. Mr. Scott.

Mr. SCOTT. Thank you, Mr. Chairman.

General Wilson, there are large differences in the opinion of the Air Force and the Office of Cost Assessment and Program Evaluation [CAPE] at the Secretary of Defense.

Why are there such large differences on the assessment of the ground-based strategic deterrent? Does the Air Force stand behind its service cost position? And when will the Air Force and CAPE have enough data to revisit and revise their cost estimates and narrow the range that we are seeing?

General WILSON. Congressman Scott, we certainly stand behind our projections. Quite frankly, the projections differ because we use different sources. We haven't built a new missile in many years, so we used Minuteman III and Peacekeeper data; CAPE used D5 [Trident II] data as well as MDA [Missile Defense Agency] data. Therefore, the differences in the two service cost positions.

We expect to have—we got our proposals in now and about a year from now, this March of 2018, we should have further data to be able to refine that and provide that forward.

Mr. SCOTT. Thank you.

General Hyten, would you please describe the military requirements driving the need for GBSD? What are the military effectiveness and cost implications of choosing to life-extend the current Minuteman III missile fleet and related ground infrastructure rather than pursue GBSD?

General HYTEN. So, the detailed military requirements are classified, sir. We can provide you with those in a separate forum. We would be glad to do that.

Mr. SCOTT. Okay.

General HYTEN. In general, the requirement for the land-based element of the triad is to be able to provide a survivable, responsive capability to any threat attack that is coming from any adversary around the globe. We have to be able to do that inside the timelines of what that adversary missile—and if you just do the math, the public math is it is about 30 minutes from Russia to the United States.

So that drives the timelines that we have to respond. That not only drives the missile capabilities, but it describes the infrastructure it has to be put into as well as the command and control with it.

Mr. SCOTT. General Selva, if you can't speak to it in this forum, perhaps tomorrow: What is the collective judgment of the Joint Chiefs on whether we should pursue the GBSD program and retain the land-based leg of the triad?

General SELVA. The Joint Chiefs have endorsed moving forward with the ground-based strategic deterrent program based in large part on an analysis of alternatives that was done for the Joint Requirements Oversight Council that incorporated in one of its excursions life extension of the Minuteman III versus deployment of a new missile, and the costs were seen to be equivalent if not prohibitive for the continued life extension of the Minuteman III.

Mr. SCOTT. Thank you.

General Hyten, we have seen a lot of GBSD acquisition details loaded into unclassified acquisition databases and run by the Air Force. We all know that Russia, China, and others scoop all this stuff up to the best of their abilities and analyze it intensively.

Why is all of this put out in the open? Should we reassess what is unclassified in these acquisition documents?

And could you speak to also the greatest cost and technical risk in the GBSD the program? For example, what is your view of the priority of possible mobile command-and-control concepts being considered?

General HYTEN. I hate the stuff that shows up in the press. I think we should reassess that.

Just to complete that thought, I hate the fact that cost estimates show up in the press as well. Because if you put a cost estimate out in the press it is not only our adversaries that are looking at it, but the people that are going to build the system are looking at that, and if that is what our cost estimates say, if we say it is going to cost $80 billion it is probably going to end up costing $80 billion. I hate that we go down that path.

Mr. SCOTT. And then some.

General HYTEN. And then some. So I would really like to figure out a different way to do business than that. I hate seeing that kind of information in the newspaper.

Now, as for the complications in the GBSD program, I think the—you know, we spend all our time talking about the missile. The missile, to me, is the easiest part of the structure. Everybody thinks about the missile and how much is the missile going to cost. How much is that?

At the last, just a couple weeks ago I was at F.E. Warren in Wyoming. I went down in one of the missile holes and the sign as you came in said, you know, this was created in 1963. That structure was created in 1963.

The command-and-control assets that go around with it were started in the 1960s, modernized in the 1970s. They have gone through multiple life extension programs. It is the infrastructure that is around the missile that will be the challenge of the program, not the missile itself.

Mr. SCOTT. Gentlemen, thank you for your service. My time is about expire so, Mr. Chairman, I yield back the 8 seconds.

The CHAIRMAN. And we will take it.

Mr. O'Halleran.

Mr. O'HALLERAN. Thank you, Mr. Chairman. Gentlemen, thank you for being here today.

General Selva, you had mentioned in your written comments about the 6.5 percent projection moving forward. How do we know that that is going to be enough money to be able to deal with the multitude of issues we have here, whether it is command and control or new systems coming onboard?

General SELVA. Sir, all I can tell you is that that is our best judgment of what resources we are going to need to do the modernization on the schedule that we have laid it out. So that 6.5 percent estimate is actually based on taking all of the design and build programs and projecting them forward as a percentage of our base budget.

Mr. O'HALLERAN. Admiral Moran, the *Columbia* class, the minimum are—the minimum that we need are 10 at a time—are 10. Two are going to be down because of reactors replacement at times?

Admiral MORAN. No, sir. The *Columbia* class has a reactor core that it will last for 40-plus years, so we will not have to re-core those unless we extend the life——

Mr. O'HALLERAN. Okay.

Admiral MORAN [continuing]. Beyond 42 years.

Mr. O'HALLERAN. I misread that then.

Admiral MORAN. Yes, sir.

Mr. O'HALLERAN. Thank you——

Admiral MORAN. The other two, the reduction from 14 to 12 is to account for the fact that the core lasts that long, and there is other maintenance that has to be done on any ship, and that is why we are able to do it with the 12 instead of the 14.

Mr. O'HALLERAN. Okay. Thank you.

And, General Hyten, the cyber warfare aspects of all this, command and control and the—how does that—has that factored into your cost estimates?

General HYTEN. So I will just say that, you know, we were having a conversation with Congressman Turner a while ago about the concerns about the NC3 capabilities that we have today. The good news about the nuclear command and control capability we have today is it is very cyber secure. When you build a system in the 1960s, before anybody knew what the term "cyber" was, you have inherently built in an amazing amount of cybersecurity.

The challenge that we have as we go into the future is that you can't build that again. We have to fundamentally build it now in a 21st-century architecture, which will have the cyber threat that we have to work through.

That is a significant element of our risk assessment as we go through and part of the design criteria as we look at how we are going to do this nuclear command and control in the future.

Mr. O'HALLERAN. And, General, you—I had mentioned cost, also. How does that factor in as far as being able to fund the other systems, which all require cyber issues, also?

General HYTEN. It is a significant element of the cost estimates. You would have to ask the services for the details that are in those cost estimates, but I have talked to the DOD CIO [Chief Information Officer] in particular about that capability. I have sat in on the panels that General Selva was talking about a while ago.

We look at those very close and that cybersecurity, cyber-resilience, cyber-defense architecture is involved in every one of the plans that we come up with, as well as the cost estimates.

Mr. O'HALLERAN. Okay. Thank you. And, Mr. Chairman, I yield.

The CHAIRMAN. Dr. DesJarlais.

Dr. DESJARLAIS. Thank you, Mr. Chairman.

General Selva, you spoke with a bunch of us yesterday regarding the aging of our nuclear forces and, you know, we have talked about a lot of the slippage issues that we want to avoid.

General Hyten, what are the impacts to the credibility of our nuclear deterrent if we see major schedule slips to any of these programs?

General HYTEN. Congressman, that is the risk in the program right now. I have been involved in this business long enough to know that if you have five different programs that all deliver just in time you have inherently put a risk in the program that is very

significant because, sadly, one of those programs, two of those programs, three of those programs, they won't all deliver on time.

Therefore, that is why we have to manage it very closely. And that is why stable budgets, stable planning, stable structure is so important to the entire Department of Defense, but in this area in particular, because without that stability we really do insert risk into the systems in the future.

Dr. DESJARLAIS. Okay. Chairman Thornberry mentioned earlier that—this—the cost for this deterrence program is usually about 6 to 7 percent of the budget. Considering that this has been called the Nation's highest priority defense mission, do you agree with CBO that roughly 6 percent is a proper amount?

General SELVA. Congressman, we have looked at the numbers for the better of the 18 months or so I have been in this job and have scrubbed them really hard. Part of the debate about how much is enough came from how much is it going to cost? So we scrubbed every program to take any excess cost out of it; 6.5 percent is where we land.

On any given day we spend almost 3.5 percent of our defense base budget on maintaining the existing strategic deterrent. So what we are talking about is a period of time, roughly a decade and change, where we have to double that investment to continue to maintain the existing deterrent and field its replacement, and that is the consequence of where those numbers came from.

Dr. DESJARLAIS. Okay. Well, I would like to thank all you gentlemen for being here today, and I yield back my time.

General SELVA. Thank you, sir.

The CHAIRMAN. Mr. Garamendi.

Mr. GARAMENDI. Gentlemen, thank you very much for your service and for the questions that you have answered. I look forward to the classified hearing. Hope we can get into this in much more depth.

But, General Hyten, a question for you. Last week Lieutenant General Jack Weinstein stated that the New START [Strategic Arms Reduction Treaty] has huge value for the United States and that the agreement has been good for us. He noted that the reason you do a treaty is not to cut forces but to maintain strategic stability among world powers, and the New START Treaty allows us to maintain that stability. Those are his quotes.

If the United States—and the question for you—if the United States withdrew from the New START or took steps which called into question our treaty obligation, what would be the effect on strategic stability?

General HYTEN. So, Congressman, I have stated for the record in the past and I will state again that I am a big supporter of the New START agreement. I believe that, especially when it comes to nuclear weapons and nuclear capabilities, that bilateral, verifiable arms control agreements are essential to our ability to provide an effective deterrent.

If you remove that effective deterrent structure, which is the New START Treaty, it makes it very difficult for us to know the levels. The risk would be an arms race.

We are not in an arms race now, to go back to a previous question. The concern would be what do we have to do in order to stay

at the same level as our adversaries, and that could be a very risky proposition. That is why I continue to support the New START levels that we are under right now.

Mr. GARAMENDI. Thank you, General. General Selva, are you of the same mind?

General SELVA. I am, sir. When the New START Treaty was brought to the Congress for ratification the Joint Chiefs reviewed the components of the treaty and endorsed it. It is a bilateral, verifiable agreement that gives us some degree of predictability on what our potential adversaries look like.

Mr. GARAMENDI. Now, keeping that in mind, there has been discussion about new tactical or new low-yield strategic weapons. Maybe they are both tactical as well as strategic.

The Defense Science Board, in their seven defense priorities for the new administration, recommended expanding our nuclear options, including deploying low-yield weapons on strategic delivery systems. Is there a military requirement for these new weapons?

General HYTEN. So, Congressman, that is a great conversation for tomorrow when I can tell you the details. But from a big picture perspective in a public hearing, I can tell you that our force structure now actually has a number of capabilities that provide the President of the United States a variety of options to respond to any numbers of threats.

Mr. GARAMENDI. And——

General HYTEN. I will also say that I don't agree with the term "tactical nuclear weapon." I just fundamentally disagree that there is such a thing as a tactical nuclear weapon. I believe that anybody that employs a nuclear weapon in the world has created a strategic effect and all nuclear weapons are strategic.

Mr. GARAMENDI. I thank you for that statement. I think it is accurate. And that goes to escalate to deescalate; that also goes to our deployment of tactical nuclear weapons in Europe.

General Selva, you spoke to this earlier about the dual-capable aircraft that we have in Europe. And the purpose of those apparently is to cause Russia not to invade, so that is an escalation to deescalate, or could be.

General SELVA. Congressman, not to be argumentative, the stated purpose of those weapons is to deter the Russians from escalating to nuclear warfare in order to prevent a conventional attack from going nuclear. They are—I use the NATO nomenclature—nonstrategic nuclear weapons, accepting what General Hyten just said. But I take your point.

The stated intended purpose of those weapons is to deter the Russians from using nuclear weapons if they were to attempt to escalate a conventional war.

Mr. GARAMENDI. All of which creates a conundrum. Thank you very much, gentlemen. I yield back.

The CHAIRMAN. Mr. Gallagher.

Mr. GALLAGHER. Thank you, Mr. Chairman.

I would like to zoom back out, if we could, to the strategic level. The last Nuclear Posture Review was published 7 years ago. The world, obviously, is very different today than it was in 2010, particularly when talking about countries like Russia.

Today, at least for my perspective, it is hard to see Russia as a partner and a friend, like the 2010 NPR envisioned. For instance, Russia continues to make dangerous and aggressive nuclear threats and exercises directed against the U.S., NATO allies, and neighbors. Russia has declared an openly discussed doctrine to use a Russian nuclear weapon early in a conflict to deescalate and get the United States to back down.

Russia continues to brazenly violate the INF Treaty, and a recent media report indicates its INF-violating cruise missile is now operational and deployed. Russia intentionally broadcast plans for its so-called Status-6 nuclear weapon, which is a high-speed unmanned underwater vehicle that would carry a megaton-class nuclear weapon into a U.S. harbor and detonate. Not to mention the invasion, occupation, and annexation of the sovereign territory of its neighbors.

Would you please, this is a question really for the entire panel starting with General Selva: Would you please provide, in your professional military views, what has changed in the world, in your professional opinion, since the 2010 NPR? And why, from a military perspective, does that matter?

General SELVA. Yes, sir. I would make two points.

One, I have been public with the notion that Russia and China are the two nations of the world that potentially pose an existential threat to the United States. I am on the record in my confirmation hearing as the vice chairman saying the same.

What has changed in the last 10 years is the—is a continuing realization that Russia intends to assert themselves as a great power and in doing so has changed the relationship in terms of our military-to-military qualitative and quantitative match. And we have to address that.

And so as we enter this first—the first NPR of this administration—Nuclear Posture Review of the Trump administration—one of the very key questions that will have to be asked as we start the process from the intelligence community is a definitive answer to what has changed since the last time we did this work.

To be fair to the Obama administration, there was a 2010 NPR. There were two major nuclear strategy reviews in 2012 and 2014 as well, but they didn't raise to the status of an NPR because the President didn't believe we needed to do one. So a lot has changed, Congressman, to your point.

General HYTEN. So, Congressman, the vice chairman hit pretty much all the points I wanted to make with the exception of one broad issue that has changed significantly since 2010.

Since 2010 our potential adversaries, particularly China and Russia, have not just looked at the nuclear enterprise; they have looked at space and cyber. And strategic deterrence in the 21st century is much bigger than nuclear deterrence was in the 20th century.

We have adversaries that are building weapons and capabilities to counter our advantages in space and in cyber. We have to look at the entire strategic landscape and make sure we consider all that action. The nuclear capabilities that we have is the backstop for all of that, but it is a much broader issue that has become very apparent since 2010.

Admiral MORAN. Congressman, I don't have much to add there except that when we look just navy-to-navy, and the capabilities that the Russians have deployed since the last Nuclear Posture Review are significantly better than what we saw leading up to that review. So we have to account for that in this next step.

General WILSON. Congressman, the only thing I would add on to tag onto General Hyten's comment is when we talk about the nuclear triad we have to realize it is bigger than just the bombers, the ICBMs, and the submarines. It is the command and control; it is space; it is tankers. It is a much bigger enterprise than just the three legs of the triad that we have got to be thinking about.

Mr. GALLAGHER. Thank you, gentlemen. Thank you, Mr. Chairman. I yield the rest of my time.

The CHAIRMAN. Mr. McEachin.

Mr. MCEACHIN. Mr. Chairman, my question has been asked and answered, and I have enjoyed listening and learning today, so I yield back.

The CHAIRMAN. Ms. McSally.

Ms. MCSALLY. Thank you, Mr. Chairman. Thanks, gentlemen. Good discussion today about the importance of investing in recapitalization of the triad.

I want to talk about an important element of that, which is the human capital and specifically, General Wilson, the missileers in the ICBM force. I mean, we have seen over the last year some challenges there.

You know, we are in a new time and we are with a different generation. I don't like to make generalizations, but the old SAC [Strategic Air Command] warriors that we all know and love are very different from the mindset of millennials coming into this role. There are real challenges. They are going to—no insult to my colleagues from these States—but challenging geographic locations.

F.E. Warren was our sister squadron when I was at the Academy. For many years, you know, often no deployment, and they see that they are working with old technology too, so that shows, I think, that, you know, hey, this isn't a priority for us to be further investing in that.

We have addressed some of these shortfalls very much in, I think, a punitive way. I mean, obviously it is appropriate to have zero-fail, but that doesn't help with morale, culture, motivation, and all the important things that we need for people to be motivated to do this important mission.

So as we are looking at modernizing parts of the infrastructure and the force, are we looking at modernizing the workforce? So are we thinking outside the box?

Does it need to be a dedicated career field anymore? Are there ways for them to become the deterrent experts for our military, not just in nuclear deterrence?

Is there a thought of how to do some innovative things for their leadership development while they are in these assignments that is not fake but actually very real and shows that value?

So I am just wondering, are we willing to shake up and look at some fresh ideas to modernize the workforce? It is very important.

General WILSON. The short answer is absolutely. And that is a key part of what you are hitting is this human weapon system.

So coming out of the Force Improvement Program, both the internal and external reviews hit upon this piece of culture. And I would say the culture had gone to a culture of micromanagement.

And so today's workforce we are focusing on this, how do I empower our airmen? And how do they see themselves in a future of which they believe what they are doing is important?

So for a long time our Nation didn't, I would argue, didn't value the nuclear force. We have to change that at all levels.

And so how do we then develop and grow airmen that realize that what they are doing is important and then they can do something about it? We have certainly lots of opportunities that we develop our missileers, and empowering them earlier, whether they become an expert in their weapon system, we make them flight commanders in our weapon system, we send them to weapon schools, we are sending them to very prestigious universities, to Stanfords to Harvards for training.

We stood up the School for Advanced Nuclear Deterrence Studies there at Kirtland Air Force Base, which is focused on how do I build a person who can understand and articulate what deterrence means in the 21st century?

So the short answer is yes. We think that this is a really important part of changing the culture, and you are hitting on a big piece of it.

Ms. MCSALLY. Thank you. General Hyten or General Selva, you got any other comments on that?

General HYTEN. I would like to add something, ma'am.

One of the things I do on holidays is I just pick up the phone, and I punch the number for the folks that are in the missile fields, because when I left the enterprise really in 2009 the morale was really bad. Really bad. And I saw that you couldn't miss it.

And now I—when I talk to lieutenants—and it is mostly lieutenants that are there—their morale is high. They are all excited about what they do. They understand the importance; they understand it is the most important thing.

But I think one of the things that you mentioned is that that can be a temporary issue. That is the power of leadership. And leadership is good, but we need to follow it up with real capabilities where they are operating on 21st-century equipment, they are operating those kind of pieces. And if we don't follow through on that I am afraid that the morale could go back the other direction.

But right now, through the power of leadership and focused effort, I am very pleased at how high the morale is in the missile fields.

Ms. MCSALLY. So you think the punitive culture that I am talking about is behind us? We need to hold people accountable, don't get me wrong; but when you feel like I am going to be punished for all the little things, that's a morale——

General HYTEN. So the change it's made is really good. It is because the no-fail is now a no-fail mission.

Ms. MCSALLY. Yes.

General HYTEN. It is not a no-fail person; it is a no-fail mission. And when you realize it is the entire team that has to come together, and if there is a glitch on one person in the team, whether that is a security forces or wherever it is, and the rest of the team

can overcome that and have a no-fail mission, that is what we are trying to get after. And that is the conversation I hear now with the lieutenants in particular.

Ms. MCSALLY. Great. General Selva, anything?

General SELVA. I think I would make two points very quickly.

One is a path to leadership and a continuing real emphasis on relevance and the importance of the mission. And what I see when I go out to missile bases, bomber bases, and submarine bases is a group of very motivated, very dedicated and disciplined sailors and airmen who see both of those right now.

That has not always been the case, particularly in some of the incidents that we saw inside the ballistic missile force and in a small element of the bomber force.

So I am optimistic—and I am generally not an optimistic person—that we have put in place a pathway that attends to the professional development and the future of the officers and the young airmen in the Air Force that we are asking to do this mission, and in the case of the Navy, the sailors and the officers who are manning our strategic ballistic missile submarines and the infrastructure that supports them.

Ms. MCSALLY. Great, thanks. I am over my time. I appreciate it.

The CHAIRMAN. Mrs. Hartzler.

Mrs. HARTZLER. Thank you, Mr. Chairman.

Our Oversight and Investigation Subcommittee is going to have a hearing next week on infrastructure problems at the Department of Energy's nuclear weapons enterprise. They have an almost $4 billion backlog in deferred maintenance and are operating facilities that date back to the Manhattan Project.

Now, I realize that the facilities still comply with nuclear safety requirements, but I am not sure how long that will last.

And so, General Selva and General Hyten, I know that you have both had the opportunity to visit some of these important DOE facilities. Can you tell us about the state of their infrastructure, any views that you have on the need to rebuild NNSA's [National Nuclear Security Administration's] facilities so that they can deliver on their mission to support the military?

General SELVA. Ma'am, I think it is really important that we get at the infrastructure shortfalls inside of DOE.

To that end, inside the Department we host every other month a group we call the Nuclear Weapons Council that looks at the safety, security, and reliability of the arsenal itself and then attends to the issues in partnership between the National Nuclear Security Agency, DOE, and DOD to the emerging infrastructure needs and human capital needs inside of that workforce that assembles and maintains the core parts of our nuclear arsenal, and those are the weapons themselves.

Mrs. HARTZLER. Very good. General Hyten.

General HYTEN. Ma'am, the Department of Energy has taken that on pretty seriously, but it has been about a year since I was at the three national labs, in particular Livermore, Sandia, and Los Alamos. And there are really two issues that you have to look at, and two issues that I look at when I go there. One is the people, and number two is the infrastructure.

And each of the labs has done a very interesting recruitment process on the people. And now they have this young set of physicists and engineers that have been brought onboard that are some of the best and brightest in the country that really set up for that structure.

But it goes back to the same conversation I was just having with Congresswoman McSally, is that it is—if you don't follow up with the infrastructure and all the other pieces that come with that, you put that at risk because people that are that bright have choices in this country today, and we want them to be able to do that.

So the infrastructure is a significant issue and we need to go after that as an enterprise. That is a national security issue. That is why the Department of Defense is interested.

General SELVA. Ma'am, if you would allow me to make a follow-up point——

Mrs. HARTZLER. Sure.

General SELVA [continuing]. And that is we tend to be focused on the physicists, the scientists, and the designers that do the work of designing and analyzing the weapons that we employ.

In point of fact, the infrastructure has a huge impact on the young mechanics and machinists who are the people that are touching the weapons and actually assembling them. And to see the discipline that they put into the work that they do to disassemble and reassemble nuclear weapons—and they know precisely what that means—and to have them working in infrastructure some of which dates back to the Manhattan Project, and they have to deal with not only the safety and security of the weapons but the physical environment that they work in, my worry is for that part of the workforce because they can come and go as they please.

And we have to address their capacity to do the work we are asking them to do, which is a fairly major process of remanufacturing weapons to meet the requirements for the future.

Mrs. HARTZLER. I really appreciate those comments. And those will help build into what we are going to look at next week, so thank you for sharing your views on that.

Let's talk about nonstrategic nuclear weapons because there is a gross disparity on that front between United States and Russia and they are not covered by any treaty.

So, General Hyten, would you please compare and contrast the U.S. stockpile of nonstrategic nuclear weapons versus that of Russia? And in general unclassified terms, would you describe our respective stockpiles as equal in size and capabilities?

General HYTEN. I believe our stockpile allows us to provide an effective strategic deterrent. Again, I have a unique perspective as the commander of Strategic Command, but I look at every nuclear weapon as having a strategic impact.

So as I look at what Russia is doing, I am very concerned about that. That is why I agree with the vice chairman in his discussions earlier about the need for future bilateral, verifiable arms control discussions with Russia, China, all of the players in—so that we can look at exactly where we are going in the future. And all of those things should be discussed.

Mrs. HARTZLER. So what about the numbers?

General HYTEN. The Russian numbers are huge and our numbers are small. We will show you the specific numbers tomorrow. But that is because we have—our nuclear weapons are a strategic deterrent.

Mrs. HARTZLER. Fifteen seconds, where are we in our modernization compared to Russian modernization of the weapons?

General HYTEN. The modernization of the weapons? I don't have a detailed insight into the nuclear weapon modernization in Russia or China, but I can tell you that they are, across the nuclear enterprise, ahead of us in some areas of modernization, behind in other areas.

But in general we can still provide the effective strategic deterrent we have to in this Nation, but we have to step forward quickly into the modernization realm.

Mrs. HARTZLER. Good. Thank you. Thank you, Mr. Chairman.

The CHAIRMAN. Mr. Bacon.

Mr. BACON. Thank you, Mr. Chairman.

And I want to thank all four of you for being here. We respect the leadership that you are giving your organizations and grateful.

I wanted to ask a question about unmanned aerial vehicles and protecting our strategic installations. We are seeing a growing threat, whether it is other countries or even terrorists buying commercial drones or whatever it may be, and it is the threat to our installations.

So in the fiscal year 2017 NDAA [National Defense Authorization Act] the Secretary of Defense was given authority to field and equip, train forces to defend our installations. So I had two questions, really.

One to the force providers, Admiral Moran and General Wilson: Are we starting the process of fielding and equipping this capability to defend our bases?

And then I wanted to ask General Hyten if he could comment about is he seeing the results? Do we need to do more? And how can we help?

Admiral Moran.

Admiral MORAN. Sir, thanks for the question.

As you know we have seen this issue around our submarine bases and it is very concerning. There is a lot of technical work going on to address the issue. I think the more important aspects of this discussion, though, are the policy and authorities to deal with them. So not only here in the U.S., but as well as overseas on the unmanned aerial threats that are developing worldwide.

Mr. BACON. Thank you, Admiral.

General Wilson.

General WILSON. Yes. Congressman Bacon, there is a big team looking at this from across the Joint Staff and interagency to be able to get at those questions that you just asked.

Are we fielding capability? I would say right now we are giving—delivering on the first initial tranche of capability, but there is a lot of work to do. This is a very complicated threat, and we are learning more every day.

So we have a bunch of projects under work with a bunch of different agencies, but in terms of actually delivering capability to the field, we are not there yet.

Mr. BACON. Yes. The threat is there and it is growing.

General WILSON. Right.

Mr. BACON. General Hyten, how are we doing and what can we do to help?

General HYTEN. We are going too slow. We are going too slow both on the material solution side as well as the policy and authority side.

The NDAA was enormously helpful in starting us down the policy and authority side. But, holy cow, the number of lawyers that are involved in this discussion right now are just—well, it is significant.

We have to get the right policy and authorities out so our defenders know exactly what to do. Then we have to give them the material solutions, allow them to react when they see a threat and identify that it is a threat so they do the right things. We are just going way too slow and we need to accelerate that process across policies, authorities, and material solutions.

Mr. BACON. Well, thank you, General Hyten. Hopefully this committee will help give a nudge on that, as well.

I wanted to ask one follow-up question or—on the command and control. I used to fly in the ABM CAP [Air Battle Management Combat Air Patrol], as you may know. I was one of the flag officers on there. It was really old technology.

And I wanted to get your opinion, General Hyten. Should we be recapitalizing that entire fleet? Do we have enough numbers to do 24-hour operations if you wanted to go to that again?

And how does this work with the alert force, doing it at Offut but based in another base? Do we need to relook at that? Thank you.

General HYTEN. So I believe that our airborne command and control across the board, including the ABM CAP and the TACAMO [take charge and move out], which is the same aircraft right now, both have a recapitalization initiative that is out in the future too, and we need to start looking at that right now. So I have asked the Navy to start looking at that.

I will ask Admiral Moran to talk about those kind of pieces, but I know they are going through an analysis right now to determine what the right way is to get after those. But that is really in the service line.

Mr. BACON. Just a quick follow-up: Do we have the right number, too, if you wanted to go back to 24-hour operations, God forbid, if the world deteriorates?

General HYTEN. So that is a good theoretical question because a theoretical question when you actually put it out on a whiteboard it works, but when you have an airplane that is that old, how long you can actually keep that going is the question.

There is no doubt that we could exercise it right now. We could go to 24/7 ops. But when you are operating in an aircraft that old, how long will they fly? And since we haven't done 24/7 ops for a while that is a risk issue.

Now when we look at it really hard, we believe that we can do that. We know we can execute it for a significant period of time but we don't know if it is a month, 2 months, 3 months, 4 months, because they are old airplanes.

Mr. BACON. Thank you. And, Admiral Moran, appreciate your follow-up.

Admiral MORAN. Yes, sir. We are jointly working on figuring out a common airframe to satisfy the missions of both services. We currently have a plan in place to extend the service life for A–6s out to 2038, which will make them 49 years old, so you know what that is all about.

That cannot be the final solution here. So we are looking, as the general indicated, at a way to get at a joint program or at least a common airframe to satisfy both missions.

Mr. BACON. Thank you. And, Chairman, I yield back.

The CHAIRMAN. Dr. Abraham.

Dr. ABRAHAM. Thank you, Mr. Chairman.

General Selva, thank you for hosting us—some of us yesterday on the—aboard the National Airborne Operations Center. It was instructional, educational, and it certainly highlighted how important it is to maintain and modernize the triad, that the dyad is not enough and we need all three legs of the stool to keep America safe. So thank you again for that.

I am going to ask some rapid-fire questions. A lot of these have been answered. I want to put them in one-question format so we can refer back when we talk to our colleagues and educate them of how important it is to fund these issues.

General Wilson, how old is the B–52?

General WILSON. B–52s were built, most of them, in 1960.

Dr. ABRAHAM. And how old will it be when we plan to retire it?

General WILSON. We are planning to fly it through 2050, so it will be 90 years old.

Dr. ABRAHAM. Wow. How old are the B–2s and how old will they be when they retire?

General WILSON. B–2s today are 24 years old. We are scheduled to fly them through 2058, so they will be in the mid-60s.

Dr. ABRAHAM. How old is the Minuteman III?

General WILSON. Built in 1970, but it is really built with Minuteman I parts, which are 1960.

Dr. ABRAHAM. How old will it be when it is retired in 2030?

General WILSON. Really old.

[Laughter.]

Dr. ABRAHAM. Okay. Sixty. What was it designed to do? What was its lifetime design——

General WILSON. Design life was 10 years.

Dr. ABRAHAM. Wow. Admiral Moran, how old will the *Ohio*-class submarines be when they are retired?

Admiral MORAN. They will be 42 years.

Dr. ABRAHAM. It is unusual for a submarine to——

Admiral MORAN. It was designed for 30 years, so we got a 40 percent increase in the service life through engineering.

Dr. ABRAHAM. And that brings risk, I am sure.

Admiral MORAN. Yes, sir. We can't go beyond 42.

Dr. ABRAHAM. I got you. General Hyten, what is the average age of our nuclear warheads?

General HYTEN. The average age of our nuclear warheads is 26 years old right now.

Dr. ABRAHAM. Okay.

And one more for you, General Wilson. On the nuclear weapons storage facility, I know most of them—or a lot of them are so outdated that we can't store there so we are having to store warheads in one place and Barksdale in Louisiana has to go pick those warheads up if they need to fly an operational mission. What does that do with readiness?

General WILSON. Well, it just puts a stress on the force. And we have got to—when we consolidate to one place it provides for vulnerabilities. We have a plan to get after that, to re-modernize all of our weapon storage facilities.

We will start here with the first one here at F.E. Warren. After that will become Barksdale and Malmstrom. And over the next 13 years we have a plan to replace all of our weapon storage facilities.

Dr. ABRAHAM. Okay. Thank you for your service, gentlemen. Mr. Chairman, I yield back.

The CHAIRMAN. General Wilson, I don't think anybody asked you directly today the status of the new bomber program. Is it on time, on schedule, moving ahead as it should?

General WILSON. Chairman, the chief of staff, the Secretary of the Air Force and I receive regular updates on it. They just finished a preliminary design review recently. It is making great progress, and we are pleased with the way it is headed.

The CHAIRMAN. And so it is where it should be at this point?

General WILSON. Yes, sir.

The CHAIRMAN. Okay. And Admiral Moran, let me ask you about the *Columbia* class. We have heard there is no slack. Today is it on time, on schedule? Are you satisfied with where it is today?

Admiral MORAN. We are on time and on schedule. I am not satisfied with how much margin we have and obvious impacts and risk to delivering on time. But I am very comfortable with where we are on the schedule and the costing today.

The CHAIRMAN. Okay.

General Hyten, a few moments ago you made an interesting point. We tend to think of strategic deterrence as nuclear deterrence, but it is broader than that. There are other implications. There are press reports, and actually I think some of this has been confirmed, that other nations are trying to deny our ability to operate in space and from space.

That has implications for the broader sense of strategic deterrence. I would ask you or General Selva, what should potential adversaries understand about attacks on our space system and how we would view such attacks?

General HYTEN. So attacks in space in general are bad—bad for the United States, bad for the world. Anything that creates debris in space lessens our ability to explore.

I think all nations of the world have the desire to explore the heavens, and if we contaminate the space environment then we can never do that. So it is important for us to protect that environment as we go forward.

When you look at what adversaries are doing, they are clearly building capabilities to deny us. Some of those capabilities could go after our strategic early warning systems. If there is an attack on our strategic early warning systems, our adversaries need to realize that they have just crossed a threshold that puts our under-

standing of what their actions are at risk and creates a potential issue that we may have to respond to in the broader strategic deterrent construct. Everything is integrated.

An attack against an overhead satellite of a tactical variety has one impact; of strategic variety had another impact. But they are all bad.

So our desire is to deter bad behavior in space, to deter any kind of activity in space that would harm the space environment.

And so the message to our adversaries that you ask is that they should know that we are watching very, very closely. And we are developing capabilities to allow us to continue to fight through and respond to any attack that would come in the space domain now and in the future.

The CHAIRMAN. General Selva, you have anything?

General SELVA. Chairman, just quite briefly, specific to the conversation we have been having today, the delineation between the indications-and-warning and command-and-control satellites is a signal we should send to our potential adversaries, that crossing that line in space denies us visibility into their actions and intentions and therefore creates ambiguity that is not helpful in terms of nuclear deterrence on both sides of the equation. I think that is a clear message we have to send every single day.

The CHAIRMAN. Okay.

General Hyten, on nuclear command and control, as you were talking about that being the thing you are most concerned about, it goes through my mind about what I describe as a ghost fleet phenomena. Are we better off to have 1960s technology that cannot be hacked into and have more reliability with that ancient sort of approach than if we were to update it?

General HYTEN. So, sir, I have asked that question myself, and there are two pieces to the answer.

Answer number one is that if you have the ability to provide the President of the United States and the Secretary of Defense better situational awareness because they can make better decisions, you should do that. You can't do that with the legacy infrastructure; we can do that with a new infrastructure.

And the second piece—and it sounds a little bit trite but it is actually true—is that with today's technology you really can't build what we built in the 1960s. The information technology today is fundamentally different.

If you try to go back and—you can't build 8-inch floppy disk drives. You can't buy those things anymore.

So you really don't have a choice. You have to modernize and you have to do it in a secure environment.

But what you can do and what you can learn from the 1960s is you can segment things off so that people can't get into it. There is no such thing as a fully closed network because there is always a human in the loop, but you can create as closed a system as possible to improve your cybersecurity.

The CHAIRMAN. Okay. One comment, and then I have one additional question.

My comment is having been—watching these issues for a long time, I have seen the interest of the Department of Defense wax and wane in the DOE's activities on the weapons.

You know, General Selva, you were just talking about visiting the labs, about the Nuclear Weapons Council meeting and those other things. For what it is worth, I would just encourage both you and General Hyten to keep the attention on this issue. It is not a situation where you can say, "Oh, that is their job, and I am not going to worry about it." And you talked about the infrastructure and the other challenges that are facing the NNSA mission.

So for what it is worth, I just want to encourage you both to stay on top of this because when DOD does not stay on top of it usually we degrade our capability and it is not a good thing. And we have seen this up and down over the last 20 years, so I would just mention that.

Last question I would like to ask each of you is just the state of our thinking on deterrence, because there is concern that after the fall of the Cold War we decided we didn't really have to worry about strategic deterrence as much, that, yes we had China but they weren't really a threat, and that we have put a lot of intellectual capital into counterterrorism and other problems but these issues have been neglected. And we were talking about that a little bit with the Air Force, about the importance that was put on these.

But talk about, if you will, your comfort level with the intellectual effort that is being put on what is deterrence and how do we know whether it is credible? And if something we think will deter Russia, do we automatically assume that will deter North Korea, or is that a different kind of deterrence that we—that is not a lesser included case.

I am just interested in y'all's perspectives on how much we have caught up in our thinking about these problems.

General SELVA. Sir, I won't say we have caught up. We are catching up.

The impact of the attacks on 9/11 on the focus of our intellectual capital going after CT [counterterrorism], I would argue right and appropriate. But we took our eye off of the strategic nuclear deterrence intellectual capital of the Nation in a way that may not have been healthy.

What I am encouraged by—and this is why I say we are making progress but we are not there yet—is the number of young men and women who are pursuing degrees in both physics and political science that are now beginning to study the components of nuclear deterrence and debate and seek graduate and post-graduate degrees. I have a young man working for me now who got his Ph.D. in political science and wrote about strategic stability in his dissertation.

Those are the kinds of young men and women we are going to have to seek out, bring into the circle of policymakers so they can benefit from the experience of some of our more senior policymakers who have been doing this for decades, and build that cadre of people that are going to carry us into the future.

General HYTEN. Chairman, I will—I think catching up is the proper characterization. We are in a good place catching up.

Where I think we have caught up is that inside the military we are having a very robust discussion now. We are talking about how do we integrate all of the plans between the various combatant

commanders, including Strategic Command, and with European Command and Pacific Command.

We are having a robust discussion of what deterrence means in Russia, in China, in space, in—but where we haven't caught up yet—and if you remember when we were all younger, when we were lieutenants and ensigns in the Air Force and the Navy, there was a robust academic discussion of what deterrence really meant. There were books written, there was debate. Even though we didn't have nearly as broad-based of a national media infrastructure, there was still this huge discussion in the academic community. That is just really starting back up right now.

In STRATCOM we have now formed an academic alliance with 35 different universities and think tanks to basically try to reenergize that broader discussion because it is a national discussion; it is not just a military discussion.

The CHAIRMAN. Well, I just think that is very important. And there have been some articles written about whether you can analogize cyber deterrence with strategic nuclear deterrence. And I am not making a point for or against that.

But the key kind of skills about thinking about what will deter an adversary in whatever realm you are talking about is something I think we have neglected. And it is encouraging to me to hear y'all think that that is getting going again and that, as you say, we are catching up.

Thank you, each of you, for being here today. I think this has been helpful.

And we will thank you ahead of time for the further discussions we will have this week and beyond.

Hearing stands adjourned.

[Whereupon, at 12:07 p.m., the committee was adjourned.]

A P P E N D I X

MARCH 8, 2017

PREPARED STATEMENTS SUBMITTED FOR THE RECORD

MARCH 8, 2017

OPENING STATEMENT – CHAIRMAN THORNBERRY
8 March 2017
HASC hearing on "Military Assessment of Nuclear Deterrence Requirements"

The nation's strategic deterrent is the foundation upon which the rest of our defense efforts are built. We simply cannot allow it to weaken or crack.

And yet we have neglected it for some time while others have not only invested in their nuclear systems, but advanced their capability.

Our strategic deterrent consists of the delivery systems—the three legs of the triad—and also the nuclear weapons themselves and the command and control systems.

Our Minuteman III missiles were first fielded in 1970. Our B-52 and B-2 bombers were first deployed in the 1950s and the 1980s. Our ballistic missile submarines began entering service in 1981, and like the other legs have a limited life span.

The warheads themselves were largely designed and built in the 1970s or before—and the last time a warhead was fully tested was 1991.

And so, for years some of our most brilliant scientists and engineers have been working to keep these complex machines safe, secure, reliable, and credible without being able to test the entire weapon. They have done so in aging, neglected facilities with an aging workforce.

Similarly, the command and control system for our deterrent has not received the attention something so vital should have.

Meanwhile, our potential adversaries develop and field new delivery systems, and they develop and field new warheads. And confidence in the U.S. strategic deterrent erodes. I am sure all of you noticed the articles over the last few days which reported that Europe was considering developing its own nuclear deterrent if they can no longer count on ours. The same may well be true in Asia.

Some say we cannot afford to update this part of our defenses. But, depending on how one allocates the cost of the new bomber, operating, sustaining, and updating our strategic deterrent never requires more than roughly 6 to 7 percent of our defense budget. As former Secretary of Defense Carter and others have pointed out, this is affordable because it is our highest priority defense mission.

Contemplating a world without a reliable American strategic deterrent is a nightmare the modern world has never had to face, and I hope it never does.

The Committee has a number of events this week focusing on this topic. Today we are grateful to have several of our top military leaders to help us consider what our strategic deterrent means for American national security.

This hearing and the Committee's broader series on nuclear deterrence will remind us, the American people, our allies, and our potential adversaries that the U.S. strategic deterrent must always be credible and must always ready.

# # #

Ranking Member Smith Opening Remarks
"Military Assessment of Nuclear Deterrence Requirements"
Full Committee Hearing – March 8, 2017

Strong nuclear deterrence is a cornerstone of national security. We are at a key decision point for investments that will shape U.S. nuclear forces for the next fifty years.

The first mission of the U.S. nuclear arsenal is prevention of a nuclear war. Achieving this goal requires strength, but in the last generation we have learned that it can also be advanced through diplomacy and innovation. Even massive nuclear superiority cannot prevent miscalculation, miscommunication, or accidents, while each of these dangers coupled with nuclear weapons threatens all of humanity. The truth is that deterrence does not occur on the battlefield; it occurs in the mind of the adversary. Robust deterrence, therefore, requires that we understand and communicate with our adversaries so that threats of nuclear destruction play an appropriately limited role in these crucial relationships. Reducing the dangers posed by nuclear weapons and avoiding nuclear proliferation remain an equally high priority.

I am increasingly concerned that we are moving in the wrong direction and that instead of enhancing U.S. security, we are taking unnecessary and dangerous risks with decisions where we cannot afford to make mistakes. When it comes to nuclear weapons policy, civilization hangs in the balance.

I am disappointed that, although several hearings and classified briefings are planned as part of the committee's focus on nuclear deterrence this and next week, not one witness has been invited to offer an alternative perspective to the need for full modernization of the nuclear triad and its associated enterprise. The weapons and production facilities we authorize today will shape our relationships with our adversaries and allies for two generations. I reluctantly concede that for the time being these must include massively destructive nuclear weapons capabilities, but I insist that our decisions must be informed by the possibility of negotiated stability through the proven tool of cooperative threat reduction.

While there is bipartisan agreement on modernizing the most survivable and reliable legs of the triad, several aspects of the nuclear weapons modernization plan are unwise and dangerous. For nearly a decade, we have improved our conventional forces and reduced reliance on nuclear weapons. The 2010 nuclear posture review stated the objectives of "reducing the role of U.S. nuclear weapons in U.S. national security strategy," "maintaining strategic deterrence and stability at reduced nuclear force levels," and it stated that "the fundamental role of U.S. nuclear weapons… is to deter nuclear attack."

However, lowering the yield on new nuclear bombs for example and envisioning nuclear weapons as war-fighting weapons, particularly in the

context of Russia's doctrine embracing limited use of nuclear weapons in a situation where Russia's vital interests are at stake to "deescalate" a conflict, risk reversing the trend to reduce reliance on nuclear weapons. Using nuclear weapons for any other purpose than to deter the use of nuclear weapons by others and creating the chance of miscalculation is an excessively risky approach and rests on the hubristic assumption that nuclear escalation can be controlled. This is one of the main reasons I have opposed the new Long-Range Stand-Off weapon. Similarly retaining a launch-on-warning posture increases the risks of hasty decisions to use nuclear weapons in response to false alarms. Increasing, rather than decreasing, ambiguity and the potential for miscalculation in a crisis amounts to playing with fire in a gas station.

In this context, I hope to hear your military advice on how we might be able to effectively sanction Russia for its violation of the Intermediate Nuclear Forces Treaty, and how we can ensure that we lock in legally-binding and verifiable Russian obligations to cap their number of deployed strategic weapons under the New START Treaty. Threat reduction and verifiable arms control are also relevant not only to strategic stability but also to cost: If negotiation can safely lower the price of deterrence, then it must be considered.

Second, I am deeply concerned that we have insufficient information on the full cost and plan for nuclear modernization. As we plan to spend over a trillion dollars sustaining and modernizing our nuclear forces and related infrastructure, which the Department of Defense has consistently described as our highest priority, *there is no long-term Department plan or cost estimate for this modernization.*

Several senior Defense officials, including Undersecretary Frank Kendall, the top acquisition chief, have publicly referred to an affordability problem and a former Deputy Undersecretary of Defense for Policy has referred to the lack of planning and accountability for these future investments. This lack of both long-term planning and understanding of the full-scope of the required investments cripples DOD's and Congress's ability to make informed decisions on which investments to prioritize and to start funding now. This is especially problematic when a number of these investments require allocating tens of billions of dollars in the near-term. That is why I have asked the Congressional Budget Office to provide an independent and comprehensive cost estimate of the effort to sustain and modernize U.S. nuclear forces.

Third, aspects of the nuclear modernization plan are redundant and unnecessarily expensive. What's more, we are seeing already significant cost increases. For example, as recently reported, the Department of Defense's independent cost estimating arm assessed the cost of the Ground-Based Nuclear Deterrent as between $85 billion and nearly $150 billion. That is a 50%-75% cost increase over the Air Force's earlier estimate of $62 billion. In another concerning example, the 10-year cost estimate report for nuclear

modernization contained—for the second year in a row—a cost estimating error. If nuclear modernization is supposed to be one of our top defense spending priorities, then shouldn't we care enough to get the math right?

The nuclear modernization plan also calls for significantly expanding, by a factor of about 8, the capacity to make additional nuclear weapons. This proposal would be costly, not to mention the potential environmental impacts and safety risks associated with expanding the fabrication of nuclear weapon components. Additionally, the plan envisions building new types of nuclear weapons without any analysis of the cost; of the military requirements for such programs; of feasible alternatives; or of whether these programs might exacerbate a nuclear arms race or risk requiring a resumption of nuclear explosive testing.

Nuclear modernization should not be about expanding our nuclear capabilities when we already have over 4,000 nuclear weapons, enough to destroy the world several times over. It should not feed an unaffordable nuclear arms race and increase risks of unintentional nuclear war. It is not something that should be decided on in 140-character tweets. Rather, it requires rigorous analysis, a clear understanding of what the highest priorities are, how we can enhance strategic stability—especially at a time of high tensions with Russia—and how we can reliably and credibly deter the use of nuclear weapons against the United States and our allies by our adversaries. I hope we can get to some of this information and analysis today. I thank the witnesses for being with us today.

STATEMENT OF

GENERAL PAUL SELVA, USAF

VICE CHAIRMAN OF THE JOINT CHIEFS OF STAFF

BEFORE THE 115TH CONGRESS

HOUSE ARMED SERVICES COMMITTEE

MILITARY ASSESSMENT OF NUCLEAR WEAPONS REQUIREMENTS

8 MARCH 2017

The fundamental role of U.S. nuclear forces is to deter a strategic attack against the United States, its allies, and its partners. Simply put, nuclear weapons pose the only existential threat to the United States and there is no substitute for the prospect of a devastating nuclear response to deter that threat.

Our nuclear forces play other important roles as well, to include reducing the risk of nuclear proliferation, allowing us to maintain escalation control during a crisis and contributing to deterring large scale conventional war. By extending a nuclear umbrella over allies and partners, many of which confront significant threats to their security, the United States decreases the likelihood that they might one day pursue nuclear weapons of their own. And by convincing adversaries that they cannot escalate their way out of failing conventional military campaigns, the United States can deter such conflicts in the first place or, failing that, keep them from escalating beyond the conventional level.

Deterrence, assurance, and escalation control are longstanding objectives that have served U.S. national security interests. But our ability to achieve these objectives cannot be taken for granted.

No one should doubt that our weapons, delivery systems, the infrastructure that supports them, and the personnel who operate, monitor, and maintain them are prepared today to respond to any contingency. Our current challenge, however, is to maintain this high level of readiness and capability as long as the policy and strategy of this nation depends in part on nuclear weapons for its security. This hearing comes at a critical moment for meeting that challenge.

For more than two decades, the Joint Force has implemented U.S. policy to reduce the role of nuclear forces in our strategies and plans and decrease the number and types of nuclear forces in our inventory. Yet a number of other nations, including potential adversaries, have not followed

our example. They are instead increasing their reliance on nuclear weapons, improving their nuclear capabilities, and, in some cases, expanding their nuclear arsenals.

Russia, for example, is not only modernizing its strategic nuclear triad and developing new nonstrategic nuclear weapons, but remains in violation of its Intermediate Range Nuclear Forces Treaty obligations and has threatened nuclear use against U.S. forces and allies in Europe. China continues to improve and increase its nuclear arsenal. North Korea has not relented in its drive to field a deliverable nuclear weapon that can reach the United States. And Iran's ballistic missile program, which is not covered under the Joint Comprehensive Plan of Action (JCPOA), still presents a danger to U.S. forces and partners across the Middle East and beyond.

Our nuclear deterrent is nearing a crossroads. To date, we have preserved this deterrent by extending the lifespan of legacy nuclear forces and infrastructure—in many cases for decades beyond what was originally intended. But these systems will not remain viable indefinitely. In fact, we are now at a point where we must concurrently modernize the entire nuclear triad and the infrastructure that enables its effectiveness.

To understand the scope and scale of this effort, it is necessary to appreciate all of the capabilities that comprise our nuclear deterrent. Two in particular often receive the most attention.

The first is nuclear weapons themselves, including the warheads that are carried by missiles and the cruise missiles and gravity bombs that are delivered by aircraft. Preserving the safety, security, and reliability of these weapons is crucial, and we work closely with our partners in the Department of Energy's National Nuclear Security Agency toward that end.

The second well-known element is the triad of strategic delivery platforms, including nuclear ballistic missile submarines (SSBNs), land-based intercontinental ballistic missiles (ICBMs), and nuclear-capable bombers. Each of these systems provides unique and complementary attributes that enhance deterrence. SSBNs at sea are highly survivable and guarantee that the United States will be able to respond to any nuclear attack. ICBMs on alert are highly responsive and, thanks to their numbers and dispersed locations, make a disarming strike extraordinarily difficult and extremely costly for any adversary. And bombers are highly visible, forward deployable, survivable once generated to alert, and have the flexibility to provide credible response options across a wide range of scenarios. Collectively, the three legs of the triad also provide a hedge against unforeseen technical problems or adverse changes in the security environment.

In addition to nuclear weapons and strategic delivery platforms, our nuclear deterrent also depends on three other capabilities: the indications and warning systems that provide early notice of a threat and give political leaders the opportunity to decide on an appropriate response; the command-and-control networks that ensure nuclear weapons will always be available if they are needed and that their use can only be directed by the President of the United States; and the dual-capable tactical aircraft that can be equipped with nonstrategic nuclear weapons, which enable the United States to credibly extend its nuclear umbrella to many of its closest allies.

The ability to preserve these capabilities beyond their intended lifespan is a technical achievement. However, nuclear modernization can no longer be deferred. Previous decisions to defer modernization have resulted in overlapping acquisition programs today, which present two major consequences.

First, any disruption to the current program of record or future acquisition plans will introduce risk to our strategic deterrent. In recent years we have used delays and deferrals to stretch our

original program of record until all remaining schedule slack has been removed. In other words, we are currently depending on "just-in-time" modernization and replacement of the nuclear enterprise.

Second, the cost of funding modernization and replacement of the entire nuclear enterprise all at once is substantial. According to current projections, the Department of Defense will increase spending on the nuclear deterrent from 3.2% of its FY 2016 budget to 6.5% of its annual budget in the late 2020s (based on the FY 2017 Future Years Defense Program), although this still represents less than one percent of total anticipated federal spending.

Despite these risks and costs, there is no higher priority for the Joint Force than fielding all components of an effective nuclear deterrent, including weapons, infrastructure, and personnel.

Perhaps the clearest indicator of this prioritization is how we have chosen to spend our resources and the tradeoffs we have been willing to accept. Although our current nuclear strategy and program of record were developed before the Budget Control Act imposed strict caps on defense spending, we are emphasizing the nuclear mission over other modernization programs when faced with that choice.

GENERAL PAUL J. SELVA

Gen. Paul J. Selva serves as the 10th Vice Chairman of the Joint Chiefs of Staff. In this capacity, he is a member of the Joint Chiefs of Staff and the nation's second highest-ranking military officer.

General Selva graduated from the U.S. Air Force Academy in 1980, and completed undergraduate pilot training at Reese AFB, Texas. He has held numerous staff positions and has commanded at the squadron, group, wing and headquarter levels. Prior to his current assignment General Selva was the commander of U.S. Transportation Command, Scott AFB, Illinois.

General Selva is a command pilot with more than 3,100 hours in the C-5, C-17A, C-141B, C-37, KC-10, KC-135A and T-37.

EDUCATION

1980 Bachelor of Science in Aeronautical Engineering, U.S. Air Force Academy, Colorado Springs, Colo.
1983 Squadron Officer School, Maxwell AFB, Ala.
1984 Master of Science in Management and Human Relations, Abilene Christian University, Abilene, Texas
1992 Air Command and Staff College, Maxwell AFB, Ala., distinguished graduate
1992 Master of Science in Political Science, Auburn University, Montgomery, Ala.
1996 National Defense Fellow, Secretary of Defense Strategic Studies Group, Rosslyn, Va.

ASSIGNMENTS

1. June 1980 - July 1981, student, undergraduate pilot training, Reese AFB, Texas
2. July 1981 - December 1984, co-pilot and aircraft commander, 917th Air Refueling Squadron, Dyess AFB, Texas
3. January 1984 - December 1988, co-pilot, aircraft commander, instructor pilot, and flight commander, 32nd Air Refueling Squadron, Barksdale AFB, La.
4. January 1989 - July 1991, company grade adviser to Commander, Strategic Air Command, later, manager of offensive aircraft systems and executive officer, Deputy Chief of Staff, Plans and Resources, Headquarters Strategic Air Command, Offutt AFB, Neb.
5. August 1991 - July 1992, student, Air Command and Staff College, Maxwell AFB, Ala.
6. July 1992 - June 1994, instructor pilot and flight commander, 9th Air Refueling Squadron, later, Commander, 722nd Operations Support Squadron, March AFB, Calif.
7. June 1994 - June 1995, Commander, 9th Air Refueling Squadron, later, Deputy Commander, 60th Operations Group, Travis AFB, Calif.
8. July 1995 - June 1996, National Defense Fellow, Secretary of Defense Strategic Studies Group, Rosslyn, Va.
9. July 1996 - August 1998, assistant to the Director, Office of the Secretary of Defense for Net Assessment, the Pentagon, Washington, D.C.
10. August 1998 - July 2000, Commander, 60th Operations Group, Travis AFB, Calif.
11. July 2000 - June 2002, Commander, 62nd Airlift Wing, McChord AFB, Wash.
12. June 2002 - June 2003, Vice Commander, Tanker Airlift Control Center, Scott AFB, Ill.
13. June 2003 - November 2004, Commander, Tanker Airlift Control Center, Scott AFB, Ill.
14. December 2004 - August 2006, Director of Operations, U.S. Transportation Command, Scott AFB, Ill.
15. August 2006 - June 2007, Director, Air Force Strategic Planning, Deputy Chief of Staff for Strategic Plans and Programs, Headquarters U.S. Air Force, Washington, D.C.
16. June 2007 - October 2008, Director, Air Force Strategic Planning, Deputy Chief of Staff for Strategic Plans and Programs, Headquarters U.S. Air Force, and Director, Air Force QDR, Office of the Vice Chief of Staff, Washington, D.C.
17. October 2008 - October 2011, Assistant to the Chairman of the Joint Chiefs of Staff,

Washington, D.C.
18. October 2011 - November 2012, Vice Commander, Pacific Air Forces, Joint-Base Pearl Harbor-Hickam, Hawaii
19. November 2012 - May 2014, Commander, Air Mobility Command, Scott AFB, Ill.
20. May 2014 - July 2015, Commander U.S. Transportation Command, Scott AFB, Ill.
21. July 2015 - present, Vice Chairman of the Joint Chiefs of Staff, Washington, D.C.

SUMMARY OF JOINT ASSIGNMENTS
1. September 1996 - August 1998, Assistant to the Director, Office of the Secretary of Defense for Net Assessment, the Pentagon, Washington, D.C., as a lieutenant colonel
2. November 2004 - July 2006, Director of Operations and Logistics, U.S. Transportation Command, Scott AFB, Ill., as a brigadier general
3. October 2008 - October 2011, Assistant to the Chairman of the Joint Chiefs of Staff, Washington, D.C., as a lieutenant general
4. May 2014 - July 2015, Commander U.S. Transportation Command, Scott AFB, Ill.
5. July 2015 - present, Vice Chairman of the Joint Chiefs of Staff, Washington, D.C.

FLIGHT INFORMATION
Rating: command pilot
Hours flown: more than 3,100
Aircraft flown: C-5, C-17A, C-141B, C-37, KC-10, KC-135A and T-37

MAJOR AWARDS AND DECORATIONS
Defense Distinguished Service Medal
Distinguished Service Medal
Defense Superior Service Medal
Legion of Merit with two oak leaf clusters
Defense Meritorious Service Medal
Meritorious Service Medal with three oak leaf clusters
Air Force Commendation Medal
Air Force Achievement Medal
Joint Meritorious Unit Award
Combat Readiness Medal with two oak leaf clusters
National Defense Service Medal with bronze star
Armed Forces Expeditionary Medal with two bronze stars
Southwest Asia Service Medal with bronze star
Global War on Terrorism Service Medal
Armed Forces Service Medal

EFFECTIVE DATES OF PROMOTION
Second Lieutenant May 28, 1980
First Lieutenant May 28, 1982
Captain May 28, 1984
Major Jan. 1, 1990
Lieutenant Colonel March 1, 1994
Colonel Sept. 1, 1998
Brigadier General Jan. 1, 2004
Major General June 2, 2007
Lieutenant General Oct. 8, 2008
General Nov. 29, 2012

(Current as of August 2015)

HOUSE COMMITTEE ON ARMED SERVICES

MILITARY ASSESSMENT OF NUCLEAR WEAPONS REQUIREMENTS

STATEMENT OF

JOHN E. HYTEN

COMMANDER

UNITED STATES STRATEGIC COMMAND

BEFORE THE

HOUSE COMMITTEE ON ARMED SERVICES

MILITARY ASSESSMENT OF NUCLEAR WEAPONS REQUIREMENTS

8 MARCH 2017

HOUSE ARMED SERVICES COMMITTEE

MILITARY ASSESSMENT OF NUCLEAR WEAPONS REQUIREMENTS

INTRODUCTION

U.S. Strategic Command (USSTRATCOM) counters diverse and evolving threats through the successful execution of its primary mission: detect and deter strategic attacks against the U.S. and our allies, and provide the President responsive military forces and flexible response options if deterrence fails. The three legs of the U.S. Nuclear Triad, our nuclear command, control and communications (NC3) systems, and the supporting nuclear enterprise infrastructure are critical components of a strategic deterrence force that provides the necessary capabilities to deter adversaries and assure our allies and partners. USSTRATCOM's number one job is to present our adversaries an intractable strategic problem and ensure they fully understand they cannot prevail in a strategic attack against the U.S., our allies or partners.

Today's deterrence forces remain safe, secure, effective, and ready, however the U.S. faces significant near- and long-term challenges in sustaining the required capabilities to meet our enduring national security objectives and strategic stability. At a time when others continue to modernize and expand strategic capabilities, nearly all elements of the U.S. nuclear delivery systems, weapons stockpile, NC3, and other critical infrastructure are operating well beyond their expected service life. Maintaining strategic deterrence, assurance, and escalation control capabilities requires a multi-faceted, long-term approach and sustained commitment to maintain a credible strategic deterrent.

We have made great strides in positively shaping the future by making critical investments in our forces and these investments must continue. Planned sustainment and modernization activities must be completed on schedule as any delay will impact the execution of our strategic deterrence mission and unacceptably degrade our ability – and ultimately our credibility – to deter and assure. Sustained Congressional support, combined with the hard work of the exceptional men and women who support USSTRATCOM, will ensure that we remain ready, agile, and effective in deterring strategic attack, assure our Allies and partners, and respond to both current and future threats.

NUCLEAR DELIVERY SYSTEMS

All three elements of our nuclear Triad delivery system are essential to the Nation's security as they provide our leadership the flexibility to appropriately respond to strategic attack. Our Intercontinental Ballistic Missiles (ICBMs), Ballistic Missile Submarines (SSBNs), and nuclear-capable heavy bombers provide unique and complementary attributes that underpin strategic deterrence and stability. The Triad's synergistic capabilities present adversaries with a complex, multi-prong strategic

challenge that changes their decision calculus, and together it provides a hedge against unforeseen technical problems or changes in the global security environment.

ICBMs

Today, our ICBM force provides the President with a highly reliable, secure, prompt response option and, with smart and consistent investment, will continue to provide an effective deterrent force for many decades. The Minuteman ICBM weapon system is decades past its intended lifespan and is facing aging, obsolescence, and asset depletion issues. To maintain Minuteman viability and effectiveness through 2030, USSTRATCOM supports ongoing Air Force weapon system sustainment efforts spanning warhead fuze modernization, the Airborne Launch Control System replacement, missile transporter-erector replacement, and a Launch Control Center Block Upgrade.

It is imperative we recapitalize the ICBM force through the Ground Based Strategic Deterrent (GBSD) program, which will begin initial deployment in 2028. The GBSD program is progressing as an integrated, weapon system solution, including the flight system, weapon system command and control, ground launch systems, and support facilities that will ensure we maintain an effective land-based strategic deterrence force. GBSD achieved a significant acquisition milestone last year and I continue to support the Air Force's efforts to leverage investments through cooperation with the Navy and industry to reduce technical development risk and cost.

SSBNs

The Ohio-class ballistic missile submarine and its Trident II D5 strategic weapon system represent the most survivable Triad leg and provide the Nation with the survivable nuclear response capability that underpins our ability to strike at any time, across myriad scenarios. USSTRATCOM continues to strongly support and work with the Navy as it sustains and modernizes the SSBN force.

While the Navy's robust maintenance and sustainment programs has allowed the Ohio-class SSBN to be life-extended from 30 to 42 years, there is no margin left to extend these submarines further. When they begin retiring at the end of the next decade, we must have a capable replacement SSBN ready to deploy. Ensuring the Columbia-class SSBN remains on schedule and fully funded throughout the next decade is vital to preventing capability gaps. Any further delay will put the continuity of our sea-based nuclear deterrent at unacceptable risk.

We have successfully fielded the Trident II D5 missile for more than 25 years and the Navy is taking the necessary steps to address aging and technology obsolescence to effectively extend the missile's

life. This life extension is absolutely critical as the Trident II D5 will transition from the Ohio-class SSBN to the Columbia-class SSBN as well as support our UK partners as they deploy their new Dreadnought-class SSBN.

Nuclear Capable Bombers

Our nuclear-capable bomber force represents the most flexible and adaptable leg of the nuclear Triad. They are critical to visibly demonstrating U.S. commitment and resolve across a wide range of crisis scenarios. The bomber force also provides a means to rapidly hedge against operational or technical challenges in other legs of the Triad. To ensure our bombers, and their associated weapons, provide a credible deterrence and assurance capability, ongoing sustainment and planned modernization activities must remain on track. The combination of greatly exceeding system design life, declining sustainability, and degraded survivability requires modern replacement systems.

The Air Force continues to execute modernization and life extension activities to ensure both bombers provide a viable long-range bomber presence to meet nuclear and conventional mission requirements while also preserving the ability to adapt to future challenges. For the B-2, these upgrades include the Defense Management System, which is critical to its survivability against advanced adversary air defenses. The Advanced Extremely High Frequency (AEHF) satellite will provide mission-critical anti-jam stealth-compatible beyond-line-of-sight communications for both nuclear and conventional missions. For the B-52, modernization programs include replacing the 1960s-era radar with a modern off-the-shelf capability to improve navigation, targeting, and weapons delivery. I also support the Air Force's studies to ensure that the B-52 remains a viable component of the bomber force in the face of technologically advanced threats.

As adversaries deploy increasingly sophisticated, integrated air defense systems, I fully support development and fielding of the dual-capable B-21 bomber. With its long range and enhanced penetration capabilities, the B-21 will directly support U.S. policy, strategy goals, and multiple combatant commander requirements by maintaining U.S. effectiveness in increasingly challenging anti-access/area denial environments.

The Long Range Stand-Off (LRSO) cruise missile and the B61-12 gravity bomb are critical to maintaining our current strategic capabilities, and extended deterrence and assurance commitments. The aging Air Launched Cruise Missile (ALCM) is several decades past its planned end-of-service life and facing increasing reliability and survivability challenges. The LRSO cruise missile will ensure no gap in air-delivered deterrence capabilities as it ensures bomber force effectiveness by providing credible

standoff attack options and holding heavily defended targets at risk. The LRSO is the first missile system developed in unison with a nuclear warhead in mind for many decades. Limiting resources or funding of either component will disrupt its entire concept-to-capability timeline.

The B61-12 gravity nuclear bomb consolidates several legacy B61 bomb variants and allows the retirement of the B83-1, reducing the size of the U.S. arsenal while still supporting both strategic and extended deterrence objectives.

Nuclear Security

Protecting our nuclear forces and facilities remains a top priority and we are continually assessing threats to ensure our security apparatus is capable of denying unauthorized access or use of nuclear weapons. I fully support the Air Force's efforts to replace the aged UH-1N Helicopter – which has become a capability gap – and ICBM Payload Transporter to ensure our weapons remain secure as threats evolve. Of recent concern have been the unauthorized flights of unmanned aerial systems (UAS) over Navy and Air Force installations. These intrusions represent a growing threat to the safety and security of nuclear weapons and personnel. Both the Navy and Air Force are working to field counter-UAS capabilities that can effectively detect, track, and, if necessary, engage small UAS vehicles.

NUCLEAR WEAPONS AND INFRASTRUCTURE

In concert with our delivery platforms, our nuclear weapon stockpile, and the unique facilities that sustain the stockpile, must be modernized to ensure our deterrent remains effective and credible. The Nuclear Weapons Council-approved Strategic Plan outlines the approach to sustain the stockpile, aligns warhead and platform modernization efforts, and identifies the essential NNSA industrial capacity required to maintain our deterrence capabilities. A key element of the stockpile plan is the '3+2' strategy that transitions the current stockpile of 11 distinct warheads to three common nuclear explosive packages on all Air Force and Navy ballistic missile reentry systems, and two air-delivered warheads. This strategy is fully consistent with U.S. strategic deterrence policies and non-proliferation objectives. Full realization of '3+2' requires sustained commitment to the modernization and recapitalization of NNSA's infrastructure, as well as continued development of the human capital and science-based stewardship tools needed to assess and certify the stockpile.

NC3 SYSTEMS

Commensurate with the U.S. Triad, stockpile, and infrastructure, the Nation's Nuclear Command, Control, and Communications (NC3) systems are facing obsolescence and component age-out challenges. These systems are not only essential for providing early warning and time critical information to the National Command Authority for decision making, but also to effectively direct Triad forces in response to a strategic crisis. A 21st century architecture is needed to address potential adversary's increasingly complex and capable threats. For example, current legacy communication systems, which are critical in providing assured / secure communications to our heavy bombers and command & control aircraft through all phases of conflict, are increasingly unreliable and in desperate need of modernization. The Nation's Milstar constellation has exceeded its design life by over 10 years and requires modernization to provide for early warning of a strategic attack. Any delay, deferment, or cancellation of NC3 modernization will create a capability gap potentially degrading the President's ability to respond appropriately to a strategic threat.

CONCLUSION

Our Nation is faced with capable, diverse, and evolving adversaries that have the ability to threaten the U.S. and its allies and partners. Our adversaries are watching and taking note of our resolve and commitment towards the nuclear enterprise. Continued Congressional support is paramount as we transition from an aged to a more modern and flexible deterrence force capable of meeting today's as well as tomorrow's strategic challenges.

GENERAL JOHN E. HYTEN
Commander of U.S. Strategic Command

Gen. John E. Hyten is Commander of U.S. Strategic Command (USSTRATCOM), one of nine Unified Commands under the Department of Defense. USSTRATCOM is responsible for the global command and control of U.S. strategic forces to meet decisive national security objectives, providing a broad range of strategic capabilities and options for the President and Secretary of Defense.

General Hyten attended Harvard University on an Air Force Reserve Officer Training Corps scholarship, graduated in 1981 with a bachelor's degree in engineering and applied sciences and was commissioned a second lieutenant. General Hyten's career includes assignments in a variety of space acquisition and operations positions. He served in senior engineering positions on both Air Force and Army anti-satellite weapon system programs.

The general's staff assignments include tours with the Air Force Secretariat, the Air Staff, the Joint Staff and the Commander's Action Group at Headquarters Air Force Space Command as Director. He served as mission director in Cheyenne Mountain and was the last active-duty commander of the 6th Space Operations Squadron at Offutt AFB, Nebraska. In 2006, he deployed to Southwest Asia as Director of Space Forces for operations Enduring Freedom and Iraqi Freedom. General Hyten commanded the 595th Space Group and the 50th Space Wing at Schriever AFB, Colo. Prior to assuming command of Air Force Space Command, he served as the Vice Commander, Air Force Space Command.

EDUCATION
1981 Bachelor's degree in engineering and applied sciences, Harvard University, Cambridge, Mass.
1985 Master of Business Administration degree, Auburn University, Montgomery, Ala.
1985 Distinguished graduate, Squadron Officer School, Maxwell AFB, Ala.
1994 Distinguished graduate, Air Command and Staff College, Maxwell AFB, Ala.
1999 National Defense Fellow, University of Illinois, Champaign
2011 Senior Managers in Government Course, Harvard University, Cambridge, Mass

ASSIGNMENTS
1. November 1981 - December 1985, Configuration Management Officer and Chief, Configuration Management Division, Automated Systems Program Office, Gunter AFB, Ala.
2. December 1985 - July 1989, Chief, Software Development Branch; and Chief, Engineering and Acquisition Division, Space Defense Programs Office, Los Angeles AFB, Calif.
3. August 1989 - July 1990, Special Adviser to the U.S. Army, Kinetic Energy Anti-Satellite Program Office, U.S. Army Strategic Defense Command, Huntsville, Ala.
4. July 1990 - August 1991, Deputy for Engineering, Strategic Defense Initiatives Program Office, Los Angeles AFB, Calif.
5. August 1991 - May 1992, Executive Speechwriter and Systems Analyst, Assistant Secretary of the Air Force (Acquisition), the Pentagon, Washington, D.C.
6. May 1992 - July 1993, Program Element Monitor, Advanced Technology Programs, Assistant Secretary of the Air Force (Acquisition), the Pentagon, Washington, D.C.
7. July 1993 - June 1994, Student, Air Command and Staff College, Maxwell AFB, Ala.
8. July 1994 - June 1996, Mission Director, Space Operations Officer, and Chief, Command Center Training, U.S. Space Command, Cheyenne Mountain Air Force Station, Colo.
9. August 1996 - August 1998, Commander, 6th Space Operations Squadron, Offutt AFB, Neb.
10. August 1998 - June 1999, National Defense Fellow, University of Illinois, Champaign
11. June 1999 - June 2001, Operations Officer, and Chief, Space Branch, Defense and Space Operations Division, Deputy Director for Operations (Current Readiness and Capabilities), J3,

Joint Staff, the Pentagon, Washington, D.C.
12. June 2001 - June 2003, Chief, Space Control Division, Directorate for Space Operations and Integration, Deputy Chief of Staff for Air and Space Operations, Headquarters U.S. Air Force, Washington, D.C.
13. June 2003 - July 2004, Director, Commander's Action Group, Headquarters Air Force Space Command, Peterson AFB, Colo.
14. July 2004 - April 2005, Commander, 595th Space Group, Schriever AFB, Colo.
15. April 2005 - May 2007, Commander, 50th Space Wing, Schriever AFB, Colo. (May 2006 - October 2006, Director of Space Forces, U.S. Central Command Air Forces, Southwest Asia)
16. May 2007- September 2009, Director of Requirements, Headquarters Air Force Space Command, Peterson AFB, Colo.
17. September 2009 - February 2010, Director, Cyber and Space Operations, Directorate of Operations. Deputy Chief of Staff for Operations, Plans and Requirements, Headquarters U.S. Air Force, Washington, D.C.
18. February 2010 - August 2010, Director, Space Acquisition, Office of the Under Secretary of the Air Force, the Pentagon, Washington, D.C.
19. September 2010 - May 2012, Director, Space Programs, Office of the Assistant Secretary of the Air Force for Acquisition, Washington, D.C.
20. May 2012 - Aug 2014, Vice Commander, Air Force Space Command, Peterson AFB, Colo.
21. Aug 2014 – Oct 2016, Commander, Air Force Space Command, Peterson AFB, Colo.
22. Nov 2016 - present, Commander, U.S. Strategic Command, Offutt AFB, Neb.

SUMMARY OF JOINT ASSIGNMENTS
1. July 1994 - June 1996, Mission Director, Space Operations Officer, and Chief, Command Center Training, U.S. Space Command, Cheyenne Mountain Air Force Station, CO., as a major
2. June 1999 - June 2001, Operations Officer, and Chief, Space Branch, Defense and Space Operations Division, Deputy Director for Operations (Current Readiness and Capabilities), J3, Joint Staff, the Pentagon, Washington, D.C., as a lieutenant colonel

BADGES
Master Space Operations Badge
Master Cyberspace Operator Badge

MAJOR AWARDS AND DECORATIONS
Distinguished Service Medal with oak leaf cluster
Legion of Merit with oak leaf cluster
Defense Meritorious Service Medal with two oak leaf clusters
Meritorious Service Medal with four oak leaf clusters
Air Force Commendation Medal
Army Commendation Medal
Joint Service Achievement Medal
Air Force Achievement Medal

OTHER ACHIEVEMENTS
1991 Recipient of the William Jump Award for Excellence within the Federal Government
1998 Recipient of a Laurels Award, Aviation Week and Space Technology Magazine
2009 Gen. Jerome F. O'Malley Distinguished Space Leadership Award

PUBLICATIONS
"A Sea of Peace or a Theater of War: Dealing with the Inevitable Conflict in Space," The Program in Arms Control, Disarmament, and International Security Occasional Paper, University of Illinois, 2000
"A Sea of Peace or a Theater of War," Air and Space Power Journal, Air University Press, 2002
"Moral and Ethical Decisions Regarding Space Warfare," with Dr. Robert Uy, Air and Space Power Journal, Air University Press, 2004

EFFECTIVE DATES OF PROMOTION
Second Lieutenant Aug. 23, 1981
First Lieutenant Aug. 23, 1983
Captain Aug. 23, 1985
Major May 1, 1993
Lieutenant Colonel Jan. 1, 1997
Colonel June 1, 2002
Brigadier General Oct. 1, 2007
Major General Nov. 10, 2010
Lieutenant General May 18, 2012
General Aug. 15, 2014

(Current as of November 2016)

NOT FOR PUBLICATION UNTIL
RELEASED BY THE HOUSE ARMED
SERVICES COMMITTEE

STATEMENT OF

ADMIRAL WILLIAM F. MORAN

U.S. NAVY

VICE CHIEF OF NAVAL OPERATIONS

BEFORE THE

HOUSE ARMED SERVICES COMMITTEE

ON

NUCLEAR FORCES

MARCH 8, 2017

NOT FOR PUBLICATION UNTIL
RELEASED BY THE HOUSE ARMED
SERVICES COMMITTEE

Mr. Chairman, Ranking Member Smith, and distinguished members of the committee, thank you for the opportunity to testify today on the undersea leg of the strategic deterrent triad.

The nation's nuclear triad of intercontinental ballistic missiles, strategic bombers, and submarine launched ballistic missiles is essential to our nation's well-being and will remain a necessary deterrent as long as nuclear weapons exist. Sea-based strategic deterrence is the Navy's #1 investment priority. It is the bedrock of our ability to deter aggression by major adversaries and to assure our friends and allies. In order to execute this mission, particularly as military competition continues to increase world-wide, we view maintaining and modernizing the undersea leg of the triad – our submarines, our missiles, and the command and control network that supports them as a national priority. This capability remains foundational to our survival as a nation.

Always Ready and On-call

The OHIO Class ballistic missile submarine (SSBN) and the Trident II (D5) strategic weapon system are the centerpiece of today's sea based strategic deterrence mission. We currently have 14 OHIO Class submarines executing this mission. Our oldest SSBN, USS HENRY M. JACKSON, was commissioned on October 6, 1984, completed her first patrol in 1985 and has executed over 90 patrols. She still has 10 more years of service until her mission is complete. As the OHIO Class ages, we remain vigilant in maintaining the same continuous coverage our nation has relied upon for over 5 decades.

All SSBNs are equipped with an accurate and reliable Trident II (D5) Strategic Weapons System. First deployed in the early 1990s, this system achieved its 165th successful test launch earlier this year. We are modernizing and extending the life of the D5 missile from 25 years to 50 years through sound engineering analysis and investment, and also modernizing the strategic weapons system that will be carried on the next generation SSBN, the COLUMBIA class. Just last month, Navy reached a significant milestone in this life extension program—the first two life-extended D5 missiles were loaded on an OHIO Class SSBN. It is critical that this program remains on track and aligned with the COLUMBIA Class acquisition program.

Building an Efficient Future Force

Our current platforms and life extension efforts will sustain a credible strategic weapon system until the 2040s. The COLUMBIA Class will be in service an additional 40 years, until well into the 2080s. With OHIO Class SSBNs starting to reach their end of life in the late 2020s, the COLUMBIA Class must be ready to start patrols early in fiscal year 2031. The Navy has already extended the OHIO Class service life from 30 years to 42 years. There is no engineering margin remaining for further extensions. Recapitalizing our ballistic missile submarines is a significant investment and something that happens only every other generation, making it critically important that we do it correctly. To meet COLUMBIA's first patrol in 2031, construction must begin in fiscal year 2021 – any further delay in the program will mean that for the first time in over 50 years, the U.S. would not have adequate ballistic missile submarines ready to meet Presidential requirements.

The COLUMBIA Class program will sustain the same level of at-sea presence we have today with the OHIO Class. To meet strategic requirements, the Navy must maintain a force of at least 10 ready-to-deploy SSBNs. Today we meet this requirement with 14 OHIO Class SSBNs. With the COLUMBIA Class SSBN's life-of-ship reactor core (which precludes a lengthy mid-life refueling overhaul) the Navy will be able to meet all at-sea requirements with only 12 submarines. This force of 12 submarines, each with 16 missile tubes, will provide sufficient flexibility and capacity to satisfy national strategic deterrent requirements in a cost efficient manner.

The Navy is taking aggressive steps to reduce procurement and life-cycle costs, while not compromising our investment in capabilities to stay ahead of the threat. Stealth is key among them. Stealth, largely built into the SSBN during construction and inherent in modern submarine design, ensures the submarine nuclear force is not detectable by our adversaries, and thus survivable. We are staying at the cutting edge of capabilities by leveraging technology from previous submarine classes, and by investing in new technologies specifically for the COLUMBIA Class.

In addition to reducing cost, we remain focused on the industrial base to ensure our partners are ready to support the delivery of COLUMBIA on time. As the program

matures, we continue to evaluate opportunities to stabilize the work force at private shipyards as well as the vendor base. The COLUMBIA Class is our #1 acquisition priority and we know our shipbuilding team and its infrastructure need to be prepared and stable in order to ensure success.

Finally, in addition to the submarine and missile aspects of the Navy's nuclear deterrent, the Nuclear Command Control and Communications (NC3) architecture provides the critical connection between the President and our nuclear forces. NC3 is a large and complex system comprised of numerous land-, air-, and space-based components. It provides survivable, secure, and enduring communications to our nuclear and conventional operations in all threat environments. Maintaining a credible nuclear deterrent for the long term requires recapitalization of key systems and capabilities throughout the NC3 architecture.

We've outlined some of the incredible technology we need to meet our strategic deterrent mission, but it is important to emphasize that all of this is at risk without an exceptional military and civilian workforce. From our industry partners and civil servants who design, build, and test our ships, to our shipyard workers who maintain them, to our Sailors who operate these ships day in and day out; our people – from all corners of the country – are what makes us the finest Navy in the world. They count on us to provide the tools, training, and resources to succeed.

Summary

Modernization of our triad and nuclear infrastructure are important to deter potential adversaries and to reassure allies of our continuing commitment to our extended deterrence. The Navy's top investment priority is to maintain and modernize the undersea leg of the triad. Our ballistic missile submarines and the weapon system they carry ensure no adversary can threaten the United States with nuclear attack without certain retaliation. A survivable, competent and professional deterrent underpins all other U.S. military operations around the globe and provides unique, invaluable assurance to our allies and partners.

The COLUMBIA Class acquisition program and the weapon system life extension efforts must remain on schedule to ensure an uninterrupted at-sea presence. We will

continue to work with industry and Congress to drive down costs while maintaining a credible, survivable nuclear deterrent capability. I cannot emphasize enough how these programs are fundamental to our survival as a nation. On behalf of our Sailors and civilians, thank you for your commitment and continued support, and I look forward to your questions.

5/31/2016 - Present
ADMIRAL BILL MORAN
Vice Chief of Naval Operations

Adm. Bill Moran is a native of New York and graduated with a Bachelor of Science from the United States Naval Academy in 1981 and a master's degree from the National War College in 2006.

As a flag officer, he has served as commander, Patrol and Reconnaissance Group; director, Air Warfare (N98) on the staff of the Chief of Naval Operations; and most recently as the 57th chief of naval personnel.

His operational tours spanned both coasts, commanding Patrol Squadron (VP) 46 and Patrol and Reconnaissance Wing 2. He served as an instructor pilot in two tours with VP-30 and as a staff member for Commander, Carrier Group 6 aboard USS Forrestal (CVA 59).

Ashore, he served as executive assistant to the chief of naval operations; executive assistant to Commander, U.S. Pacific Command; deputy director, Navy staff; and assistant Washington placement officer and assistant flag officer detailer in the Bureau of Naval Personnel.

Moran assumed duties as the Navy's 39th vice chief of naval operations, May 31, 2016. He is a senior naval advisor to the secretary of the Navy and the chief of naval operations.

He is entitled to wear the Distinguished Service Medal, Defense Superior Service Medal, Legion of Merit (five awards) and other various personal, unit and service awards.

Updated: 31 May 2016

DEPARTMENT OF THE AIR FORCE

PRESENTATION TO THE COMMITTEE

ON

ARMED SERVICES

UNITED STATES HOUSE OF REPRESENTATIVES

SUBJECT: MILITARY ASSESSMENT OF NUCLEAR DETERRENCE REQUIREMENTS

STATEMENT OF: GENERAL STEPHEN W. WILSON
VICE CHIEF OF STAFF OF THE AIR FORCE

MARCH 8, 2017

NOT FOR PUBLICATION UNTIL RELEASED BY THE ARMED SERVICES COMMITTEE AND MANAGEMENT SUPPORT UNITED STATES HOUSE OF REPRESENTATIVES

INTRODUCTION

Credible and effective nuclear deterrence capabilities remain foundational to US national security. As long as nuclear weapons exist, the United States must deter attacks against the homeland and assure our allies and partners, and maintain strategic stability. In support of this vital mission, your United States Air Force is responsible for: two-thirds of the nation's nuclear Triad, including more than 400 Intercontinental Ballistic Missiles (ICBMs), and 66 nuclear-capable bombers; approximately 75% of the nation's nuclear command, control, and communications (NC3) systems, and a force of dual capable aircraft (DCA)—fighter aircraft capable of carrying nuclear weapons. Most importantly, nearly 30,000 Airmen across the nuclear enterprise work tirelessly ensuring our nuclear capabilities remain safe, secure, effective, and ready. While our Airmen are standing watch to defend our Nation and deter potential adversaries today, Air Force nuclear capabilities must be modernized to ensure future strategic deterrence.

Today, the Air Force stands at a critical junction with regard to our ability to continue providing effective nuclear deterrence to the Nation and our allies and partners. The majority of our vital capabilities in this area—delivery platforms and weapons, NC3 systems, and the supporting infrastructure required to operate them—were last recapitalized in the 1980s and are now decades beyond their projected service lives. We are rapidly approaching a point where the series of costly and complex life extension programs we have relied on to sustain these systems will no longer be sufficient to maintain required mission capabilities. Therefore, nuclear enterprise modernization efforts are vitally important. **In other words, the stark**

choice the US faces today is not between modernizing these systems or continued life extension programs…the choice is between modernization or losing these foundational capabilities starting in as early as the late-2020s.

Air Force nuclear capabilities are vital elements of strategic deterrence. Our ICBMs, bombers, dual capable aircraft, and NC3 systems provide unique and complementary effects to deter potential adversaries and assure our allies. Our ICBM force is responsive, cost-effective, and provides stability by creating an extraordinarily high threshold and cost-imposing challenge for a large-scale conventional or nuclear attack on the US based on the size and dispersed nature of the ICBM forces. Our bomber fleet provides visible, flexible deterrent options to the President while remaining central to our long-range strike capability of holding any global target at risk within hours. Our dual-capable, forward-deployed fighter aircraft augment the strategic deterrent capability of the Triad, reassure allies, and are a core component of our NATO Alliance. Linking the nuclear enterprise together, Air Force NC3 architecture is critical to connecting the President with his senior advisors and nuclear forces.

While the Budget Control Act (BCA) and Bipartisan Budget Act of 2013 and 2015, respectively provided some relief to continue modernization efforts, the Air Force needs continued Congressional support to provide and maintain a credible nuclear deterrent well into the future, especially as we face significant modernization costs in the coming fiscal years. Providing necessary funding to maintain a safe, secure, and effective nuclear force is a national obligation. Three Congressional actions will support our efforts: 1) Congressional support to pass an appropriation, 2)

supporting a budget amendment, and 3) in FY18, repealing BCA while providing predictable future funding.

Finally, we need Congressional support to prevent a year-long continuing resolution (CR). Under a year-long CR, future NC3 manpower would receive $500 million less than our FY 2017 request. Further, five critical nuclear modernization programs would be delayed; including necessary upgrades to B-2 and B-52 bombers, ICBM life-extension efforts, and delays to our Long Range Stand Off Weapon (LRSO) and Ground-based Strategic Deterrent (GBSD) contract process, risking that replacement weapons will not be ready prior to Air Launched Cruise Missile (ALCM) and ICBM age outs.

STRATEGIC ENVIRONMENT

Today, the United States faces an extraordinarily complex and dynamic geopolitical landscape, one that requires the nation to maintain strategic stability with both existing and emerging nuclear powers. Nuclear forces play an increasingly important role in the security strategies of other state actors, such as Russia and China, who continue to develop new systems, and modernize existing arsenals. Today, in terms of nuclear capabilities, Russia is our only peer, and will likely remain so in the coming decades. Although not nuclear peers, China and North Korea continue to significantly enhance their nuclear weapons capabilities.

Russia's continued aggression and provocations, its demonstrated willingness to violate the sovereignty of its neighbors, and its disregard for its international commitments, poses a clear threat to global stability. Russia's robust nuclear modernization programs place strong emphasis on their ICBM forces, ballistic missile

submarines, nuclear-capable strategic bombers, and nuclear cruise missiles. Meanwhile, China continues to challenge international norms with the militarization of the South China Sea, while investing in enhanced nuclear capabilities, to include mobile ICBM systems and counter-US ballistic missile defense technology. Finally, North Korea's efforts to expand its nuclear stockpile and develop advanced ballistic missiles capable of threatening US and Allied interests, is deeply concerning. Potential adversary technological advances pose a credible and growing threat to US nuclear effectiveness. These nations continue to prioritize investment and progression of their own nuclear enterprises. To maintain strategic stability with Russia and China, and address the growing threat from North Korea, the US must accordingly invest in its foundational and critical nuclear capabilities.

MODERNIZATION IMPERATIVE

We cannot afford to wait until tomorrow. Today, the nation must preserve our foundational nuclear capabilities vital to a credible deterrent against any future threat. Significant obsolescence and asset attrition across our nuclear weapons systems threatens operational readiness and poses a growing challenge to our ability to sustain our capabilities. Across the board, current service-life extension programs (SLEPs) will not be able to preserve required mission capabilities indefinitely.

The Air Force requires additional resources to invest in our nuclear capabilities and infrastructure. Currently, all of our weapons storage areas are operating with waivers and deviations from our high standards. Although these storage areas are safe and secure, they are decades old and the infrastructure is failing. Furthermore, their locations do not meet operational bomber requirements. We must recapitalize to

address the recommendations identified in the 2014 Nuclear Enterprise Reviews for facility and weapons sustainment.

The Minuteman ICBM force was initially fielded in the early 1960s and upgraded with the Minuteman III missile in the early 1970s. The aging Minuteman infrastructure, command and control, and flight systems must be replaced with the GBSD. While the Minuteman will be sustained beyond 2030 as the GBSD capability is deployed, it is important to realize that it cannot be sustained beyond 2036. Current Air Force plans are to field GBSD starting in 2027 and continuing through 2035; once operational, the system will provide a low risk and affordable integrated weapon system through 2075.

Meanwhile, we must continue to invest in modernization of our air-based nuclear weapons systems. On average, our bombers are 45 years old and our nuclear weapons facilities are now over 40 years old, with many facility systems operating well past their designed service life. Our flexible dual-capable bomber fleet is the most visible leg of the nuclear triad. The B-2 and B-52 require upgrades, and we must ensure one of our main acquisitions priorities, the B-21 bomber, proceeds on schedule. Accordingly, NC3 must be modernized to support accompanying nuclear capabilities, as it underpins our national nuclear employment option.

We must also make the needed investments to support our weapons, specifically the B61-12 and the Long-Range Standoff programs in conjunction with the Department of Energy's National Nuclear Security Administration Both programs are vital to provide necessary options to the President in a range of scenarios, to deter our adversaries, and assure our allies. Though we are grateful for modest relief of

spending limitations that allowed us to address a scrutinized priority list of nuclear modernization efforts, we require additional resources to invest in foundational nuclear capabilities and infrastructure.

NUCLEAR PROGRAMS AFFORDABILITY AND PRIORITIZATION

DoD nuclear programs account for a relatively small percentage of current and projected defense spending. The DoD nuclear enterprise requires significant investment for critical modernization and recapitalization efforts: $350B - $450B over the next two decades for both Air Force and Navy systems. Based on OSD estimates, Triad programs (Air Force and Navy) account for an average of 3.7% of the Department of Defense budget over the approximate 20-year recapitalization timeframe. However, modernization costs represent a significant challenge to the Air Force budget under current constraints. Effective 21st Century deterrence demands properly balanced nuclear and conventional forces and current Air Force Total Obligation Authority is insufficient to accomplish both. Nuclear deterrence and conventional capabilities are both vital to national security requirements. The Air Force will continue to prioritize investment across our nuclear enterprise, investing in: ICBMs/GBSD, our bomber fleet (B-52, B-2, and B-21), weapons (B61-12 and LRSO), and NC3.

GROUND-BASED NUCLEAR DETERRENCE CAPABILITIES

We must invest in GBSD as the next major improvement to the land-based portion of our nuclear Triad. The GBSD program will reach initial capability in 2029, planned full capability by 2036, and continue to meet operational requirements through 2075. The program is comprised of three major efforts: missile flight systems,

weapon system command and control, and launch systems and will provide 400 operationally deployed missiles. Meanwhile, we are committed to investing in our aging ICBM Minuteman III systems, ensuring reliability and supportability through 2036, or until GBSD is fully operational. The Air Force is confident in its cost estimate analysis and is continually seeking innovative methods to reduce production costs throughout GBSD design and development. Ultimately, Minuteman III life-extension programs are costly—more costly than replacement—and will not meet combatant commander and national security requirements.

AIRBORNE NUCLEAR DETERRENCE CAPABILITIES

The Air Force nuclear bomber fleet, consisting of the B-52 and B-2, remains the most flexible leg of the nuclear Triad. Our 19 B-2 bombers, providing the nation's only low-observable, penetrating, multi-role capability, need multiple upgrades to remain viable into the late 2020s. Major modification programs include: an updated defensive management and threat warning system, survivable and high-bandwidth communications, weapons stores management, and logistics and maintenance improvements.

An enduring icon of American airpower, the B-52 remains a workhorse for the joint force, providing robust nuclear and conventional capability. We plan to invest in multiple B-52 major modernization programs to bring our aging technology up to par. From avionics and weapons upgrades to datalink and radar modernization, the B-52 requires significant investment, including five new-start programs in FY17. We must also explore options to replace the B-52's inefficient legacy engine. If we are to rely on the B-52 until at least 2050, these upgrades are essential.

Technology gaps between the US and potential adversaries are closing. The B-21 will support the nuclear Triad by providing an advanced and flexible deterrent capability, with the ability to penetrate modern and future air defenses. Further, the B-21 will provide flexibility across a wide range of joint military operations using long range, large mixed payloads, and survivability. Agile acquisition processes have been built into the B-21 development and procurement efforts, ensuring we deliver system capabilities for the best value, while integrating open architecture for ease of upgrade to future technology requirements.

The Air Force remains committed to B-21 affordability, with the average procurement cost of $564 million in base year 2016 dollars. We require a fleet size that will ensure sustained dominance well into this century and intend to procure a **minimum** of 100 B-21s. Procuring **at least** 100 B-21s will also reduce lifecycle ownership costs. Further, we are continuing to study the right size of the total future bomber force. Deterrence and demonstrated combat capability remain vital instruments of power, especially as our enemies are committed to denying our attacks from the air. Only 12% of our current bomber fleet is survivable in such an environment. Therefore, the B-21 remains an absolute national defense priority and we are grateful for your continued support of this critical program going forward.

Fielded in the 1980s, the AGM-86B ALCM is over 25 years beyond its life expectancy and is involved in its third life extension program. While the ALCM remains effective today, its aging subsystems, advances in enemy defenses, and a simple lack of numbers mandate we replace it. The Air Force plans to sustain ALCMs until our Long-range Stand Off (LRSO) weapon reaches operational capability in

2030. We plan to invest in continued life-extension programs including critical telemetry, encryption, and flight termination components. Meanwhile, we continue to invest in developing and fielding the LRSO. This weapon will retain nuclear penetrating cruise missile capabilities through 2060. To meet operational, testing, and logistics requirements, the Air Force plans to acquire approximately 1,000 LRSO cruise missile bodies. This quantity will both provide spares and supply sufficient non-nuclear missile bodies throughout ongoing flight and ground testing. The number of nuclear-armed LRSO cruise missiles (i.e., mated to a nuclear warhead), is expected to be equivalent to the current ALCM nuclear force.

.Finally, the B61 family of gravity nuclear weapons support the airborne leg of the Triad and is the primary weapon supporting our NATO allies under extended deterrence. Legacy B61s require service-life extensions. The B61-12 life-extension provides required digital weapons interfaces and adds a guided tail kit assembly. This warhead life-extension, through the Department of Energy's National Nuclear Security Administration, improves reliability, safety, and security, while reducing life cycle costs and enabling us to reduce the stockpile by consolidating four weapons versions into one.

UH-1N

The Air Force is committed to replacing the UH-1N fleet, which supports two critical national missions: nuclear security in support of the ICBM force and the Continuity of Operations mission in the National Capital Region. The UH-1N platform falls short of missile field operational needs—notably with speed, range, endurance, payload, and survivability. The Air Force is pursuing a full-and-open competition to

procure 84 replacement helicopters. We plan to release the final request for proposal in summer 2017, with delivery of the first operational helicopters anticipated in FY20 to 21.

NC3

Air Force NC3 systems connect the President to his senior advisors and nuclear forces. Many of our NC3 systems are well past their lifespans. Therefore, we are investing in several programs to support this connective architecture, ranging from communications systems improvements to upgraded digital processing and display improvements. NC3 also includes the modernization of our E-4B aircraft, providing airborne nuclear command and control capability. We need support to upgrade E-4B communications and surveillance systems.

NUCLEAR ENTERPRISE REVIEW IMPLEMENTATION

In 2014, the DoD Nuclear Enterprise Reviews (NERs), along with internal Air Force assessments, served as a catalyst for major improvements within the Air Force nuclear enterprise. Since 2014, the Air Force has applied deliberate and sustained focus towards addressing the identified shortfalls. Our ongoing efforts—spanning the full-range of personnel, management, oversight, mission performance, training, testing, and investment issues—continue to produce tangible and lasting improvements throughout the nuclear enterprise. Over time, Air Force follow-on efforts have transitioned from addressing urgent mission deficiencies to loner-term initiatives. As part of this evolution, the Air Force is placing renewed emphasis on establishing effective processes to continuously assess and oversee the health of the nuclear enterprise.

CONCLUSION

The technology and capability gaps between our nation and its adversaries are closing dangerously fast…and in some cases, have closed completely. Fighting a nuclear war is an unthinkable proposition, and has been for the last 70 years, precisely because the nation has been prepared to fight one. The best way to avoid unthinkable conflict is to be prepared to fight with modern and reliable forces. To do otherwise, by delaying modernization once more, is irresponsible and invites strategic instability, potential miscalculation, and the risk of a devastating nuclear exchange. We stand at a pivotal point in history where the American people and our allies are counting on Congressional action to fund our nuclear enterprise modernization.

We remain committed to innovative and cost-saving measures to ensure weapons system and acquisitions efficiency. However, we need your support to first, pass an appropriation in FY17 and support a budget amendment. Second, we must repeal BCA in FY18 and provide predictable funding for the future. This allows us to proceed with a strategy-driven budget and not the compromising budget-driven strategy consistent with BCA. Thank you for your continued support of our Air Force and our outstanding 660,000 Total Force Airmen, who relentlessly and professionally serve our great nation by providing two-thirds of the nation's nuclear capability.

GENERAL STEPHEN W. "SEVE" WILSON

Gen. Stephen W. "Seve" Wilson is Vice Chief of Staff of the U.S. Air Force, Washington, D.C. As Vice Chief, he presides over the Air Staff and serves as a member of the Joint Chiefs of Staff Requirements Oversight Council and Deputy Advisory Working Group. He assists the Chief of Staff with organizing, training, and equipping of 660,000 active-duty, Guard, Reserve and civilian forces serving in the United States and overseas.

Gen. Wilson received his commission from Texas A&M University in 1981. He's had multiple flying tours, and led bomber; intelligence, surveillance and reconnaissance; mobility; aeromedical evacuation; and airborne command and control operations supporting Iraqi Freedom, Enduring Freedom and Combined Joint Task Force-Horn of Africa. Gen. Wilson has also held numerous command positions, including the Joint Functional Component Commander for Global Strike and Air Force Global Strike Command. Gen. Wilson is a command pilot with more than 4,500 flying hours and 680 combat hours. Prior to his current assignment, the general was Deputy Commander, U.S. Strategic Command, Offutt AFB, Nebraska.

EDUCATION

1981 Bachelor of Science, Aerospace Engineering, Texas A&M University, College Station
1985 Squadron Officer School, Maxwell AFB, Ala.
1989 Master of Science degree, Engineering Management, South Dakota School of Mines & Technology
1993 Air Command and Staff College, Maxwell AFB, Ala.
1997 U.S. Air Force Weapons School, Nellis AFB, Nev.
2000 Master's degree in strategic studies, Air War College, Maxwell AFB, Ala.
2005 Leadership for a Democratic Society, Federal Executive Institute, Charlottesville, Va.
2007 Joint Force Air Component Commander Course, Maxwell AFB, Ala.
2009 Joint Flag Officer Warfighting Course, Maxwell AFB, Ala.
2010 Leadership Decision Making Program, John F. Kennedy School of Government, Harvard University, Cambridge, Mass.
2013 Pinnacle Course, National Defense University, Fort Lesley J. McNair, Washington, D.C.

ASSIGNMENTS

1. June 1981 - May 1982, student, undergraduate pilot training, Laughlin AFB, Texas
2. May 1982 - September 1986, T-38 Instructor Pilot, evaluator pilot and flight commander, 86th Flying Training Squadron, Laughlin AFB, Texas
3. September 1986 - May 1987, B-1 Student, 338th Combat Training Squadron, Dyess AFB, Texas
4. May 1987 - July 1991, B-1 Instructor Pilot and Flight Commander, 77th Bomb Squadron, Ellsworth AFB, S.D.
5. July 1991 - July 1992, Chief of Weapons and Tactics, 28th Operations Support Squadron, Ellsworth AFB, S.D.
6. July 1992 - July 1993, Student, Air Command and Staff College, Maxwell AFB, Ala.
7. July 1993 - September 1995, Joint Staff Officer, Doctrine, Concepts and Initiatives Division, Plans and Policy (J5), Headquarters U.S. European Command, Stuttgart, Germany
8. September 1995 - June 1997, Chief of Safety, 28th Bomb Wing, later, operations officer, 37th Bomb Squadron, Ellsworth AFB, S.D.
9. June 1997 - June 1999, Commander, B-1 Division, and Instructor Pilot, Weapons Instructor Course, USAF Weapons School, Ellsworth AFB, S.D.
10. August 1999 - June 2000, Student, Air War College, Maxwell AFB, Ala.
11. June 2000 - June 2002, Deputy Commander, 366th Operations Group, Mountain Home AFB, Idaho

12. July 2002 - March 2004, Commander, 608th Air Operations Group, Barksdale AFB, La.
13. March 2004 - June 2006, Commander, 14th Flying Training Wing, Columbus AFB, Miss.
14. June 2006 - July 2007, Deputy Director of Air, Space and Information Operations (A2/3), Headquarters Air Education and Training Command, Randolph AFB, Texas
15. July 2007 - July 2009, Deputy Commander, Canadian North American Aerospace Defense Region, Winnipeg, Manitoba, Canada
16. July 2009 - July 2010, Commander, 379th Air Expeditionary Wing, Southwest Asia
17. July 2010 - June 2011, Director for Joint Integration, Directorate of Operational Capability Requirements, Deputy Chief of Staff for Operations, Plans and Requirements, Headquarters U.S. Air Force, the Pentagon, Washington, D.C.
18. June 2011 - October 2013, Commander, Eighth Air Force (Air Forces Strategic), Barksdale AFB, La., and Joint Functional Component Commander for Global Strike, U.S. Strategic Command, Offutt AFB, Neb.
19. October 2013 - July 2015, Commander, Air Force Global Strike Command, Barksdale AFB, La.
20. July 2015 – July 2016, Deputy Commander, U.S. Strategic Command, Offutt AFB, Neb.
21. July 2016 - present, Vice Chief of Staff of the U.S. Air Force, the Pentagon, Washington, D.C.

SUMMARY OF JOINT ASSIGNMENTS
1. July 1993 - September 1995, Joint Staff officer, Doctrine, Concepts and Initiatives Division, Plans and Policy (J5), Headquarters U.S. European Command, Stuttgart, Germany, as a major
2. July 2007 - July 2009, Deputy Commander, Canadian North American Aerospace Defense Region, Winnipeg, Manitoba, Canada, as a colonel and brigadier general
3. June 2011 - October 2013, Joint Functional Component Commander for Global Strike, U.S. Strategic Command, Offutt AFB, Neb., as a brigadier general and major general
4. July 2015 – July 2016, Deputy Commander, U.S. Strategic Command, Offutt, AFB, Neb., as a lieutenant general

FLIGHT INFORMATION
Rating: Command pilot
Flight hours: More than 4,600, and 680 combat hours
Aircraft flown: T-37, T-38, B-1 and B-52

MAJOR AWARDS AND DECORATIONS
Distinguished Service Medal with oak leaf cluster
Defense Superior Service Medal
Legion of Merit with oak leaf cluster
Bronze Star Medal with oak leaf cluster
Defense Meritorious Service Medal
Meritorious Service Medal with four oak leaf clusters
Air Medal with oak leaf cluster
Aerial Achievement Medal
Air Force Commendation Medal with oak leaf cluster

EFFECTIVE DATES OF PROMOTION
Second Lieutenant June 2, 1981
First Lieutenant June 2, 1983
Captain June 2, 1985
Major June 1, 1993
Lieutenant Colonel Jan. 1, 1997
Colonel June 1, 2002
Brigadier General Dec. 3, 2007
Major General Sept. 1, 2011
Lieutenant General Oct. 23, 2013
General July 22, 2016

QUESTIONS SUBMITTED BY MEMBERS POST HEARING

MARCH 8, 2017

QUESTIONS SUBMITTED BY MR. SMITH

Mr. SMITH. You stated during the hearing that we "were not entering an arms race because we bilaterally have a verifiable inspection regime for the weapons that are deployed. We have capped the number of weapons that are available." However, is there a risk that a nuclear arms race could still occur because the New START Treaty, while it imposes caps on launchers, does not impose any limits on the number of non-deployed or reserve nuclear weapons? Why/why not?

General SELVA. The New START Treaty caps the number of deployed warheads and deployed and non-deployed launchers both sides can possess. Thus compliance with New START is preventing either side from "racing." There is always risk that a nuclear arms race may occur, but not because the New START Treaty does not impose any limits on the number of non-deployed warheads. For example, Russia could decide to breakout from New START limits and continue its ongoing modernization program beyond what is allowed under the Treaty. In fact, one of the purposes of the U.S. stockpile of non-deployed warheads is to deter such a breakout by enabling us to increase our forces as well.

Mr. SMITH. Secretary Work stated before our committee in June 2015, "Anyone who thinks they can control escalation through the use of nuclear weapons is literally playing with fire" and "Escalation is escalation, and nuclear use would be the ultimate escalation." Do you agree, and do you think escalation can be reliably controlled? What are the risks that using a lower-yield nuclear weapon would lead to a massive nuclear exchange?

General SELVA. As there has thankfully never been a limited nuclear exchange, we do not know whether such escalation can be controlled, and we cannot know for certain how reliable an effort to control escalation might be. The use of any nuclear weapon could lead to a large-scale exchange and the prospect of such uncontrolled escalation arguably enhances the deterrence of nuclear first use. However, just because we do not know for certain whether we can control escalation does not mean we should not attempt it if an adversary uses a nuclear weapon in a conflict. Were deterrence to fail in a limited way, it would be better for the President to have a full range of response options, including options to attempt to control further escalation and reestablish deterrence.

Mr. SMITH. Given the increasing costs for nuclear weapons modernization and the conventional capabilities requirements, could you provide a chart to the Committee showing the costs of nuclear weapons modernization/recapitalization as a percentage of the DOD acquisition budget over the next 10 years and next 25 years?

General SELVA. [See table below.]

Program	FYDP (2017–2021) Estimate ($B)	10-Year (2017–2026) Estimate ($B)
COLUMBIA-Class	13.2	43.7
Ground Based Strategic Deterrent	3.4	13.2
Long Range Stand Off	2.2	5.6
B–21 [1]	0.6	1.9
Nuclear Command, Control, and Communications (NC3) Investment [2]	10.7	20.4

Notes

1. These amounts represent the nuclear-related costs for the B–21 program which are estimated at 5%.

2. Includes procurement and research, development, test, and evaluation costs.

The Department is still compiling 10-year estimates based on the FY18 budget and cannot offer a 25 year plan.

Mr. SMITH. Secretary Work stated before our committee in June 2015, "Anyone who thinks they can control escalation through the use of nuclear weapons is literally playing with fire" and "Escalation is escalation, and nuclear use would be the ultimate escalation." Do you agree, and do you think escalation can be reliably controlled? What are the risks that using a lower-yield nuclear weapon would lead to a massive nuclear exchange?

General HYTEN. I agree with Secretary Work in that escalation management is a complex concept. In the scenario described, nuclear employment has occurred and, as an international community, we are in uncharted waters. That is one of the reasons I do not like to use the term "tactical nuclear weapons." In my opinion, the employment of any nuclear weapon is a strategic decision and will demand a strategic response. Although considerable thought has been paid to the theory of limited war over more than half a century, there remain considerable risks of misperception and misunderstanding leading to miscalculation; which is one reason why dialogue with foreign actors, arms control agreements, and other mechanisms are so important Again, regardless of the yield, any use of a nuclear weapon will have strategic implications

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QUESTIONS SUBMITTED BY MR. COOPER

Mr. COOPER. Are you concerned about the shift in Russian nuclear doctrine and potential consequences as a result of such a shift that could lower the threshold of using nuclear weapons? How can we increase strategic and regional stability, especially in the context of nuclear proliferation, modernization, and evolving nuclear doctrines?

General SELVA. Yes, I am concerned about Russian nuclear doctrine and the potential it creates for uncontrolled escalation in a crisis. A fully modernized U.S. nuclear triad and nonstrategic nuclear forces raise Russia's threshold for using nuclear weapons because it ensures our ability to respond should Russia seek to escalate its way out of a failed conventional conflict. Therefore one way for us to increase strategic and regional stability is to continue the nuclear modernization program of record to avoid capability gaps that might threaten the credibility and effectiveness of our nuclear deterrent. Another complementary way would be dialogue with Russia regarding strategic stability to reduce the likelihood of misperception and miscalculation.

Mr. COOPER. Should nuclear threat reduction and nuclear nonproliferation be considered as part of the discussions related to the nuclear posture review? Why/why not?

General SELVA. Yes, I believe the Nuclear Posture Review (NPR) should consider aspects of nuclear threat reduction and non-proliferation because they are important and related national security interests. I believe our nuclear deterrence policies, strategies and capabilities provide added insurance to achieve U.S. nuclear nonproliferation objectives, and are key enablers to reducing threats to the United States and our allies from nuclear and WMD-armed adversaries.

Mr. COOPER. Should nuclear threat reduction and nuclear nonproliferation be considered as part of the discussions related to the nuclear posture review? Why/why not?

General HYTEN. Yes, reducing the threat of nuclear weapon use and proliferation are essential elements to determining the adequacy of U.S. nuclear forces' ability to deter nuclear attack against the U.S., our allies, and our partners Beyond the nuclear posture review, the U.S. regularly participates in dialogue with other "P–5" members and the broader international community to improve understanding of nuclear capabilities and reduce the potential for miscalculation Similarly, consistent with our treaty obligations, the U.S., along with our allies and partners, continue to pursue nuclear non-proliferation policies and strategies to reduce escalatory risks and maintain strategic and regional stability.

Mr. COOPER. How could the Department increase the incentives for commonality between the Navy and the Air Force while minimizing risks, in order to reduce long-term costs for the planned nuclear modernization?

Admiral MORAN. The Navy and the Air Force are both addressing the challenges of sustaining aging strategic weapon systems in a fiscally constrained environment, and are working collaboratively to ensure these capabilities are retained in the long-term. We are seeking opportunities to leverage technologies and make the best use of scarce resources. The Navy and the Air Force assessed whether increasing commonality between the GBSD program and the Trident II (D5) life extension program could improve affordability while ensuring a safe, secure, effective and credible nuclear deterrent, as well as retain essential diversity to hedge due to unforeseen tech-

nical problems or vulnerabilities. The assessment identified some impediments to full commonality of major subsystems, like solid rocket motors; however, it also identified several D5 life extension candidate processes and components that showed promise for application in GBSD development. The Navy also expects to leverage, where possible and feasible, Air Force ICBM technologies in the longer-term for its own follow-on strategic weapon system capability.

Mr. COOPER. Four years ago, you were faced with bad morale and poor leadership in the ICBM missileer ranks and were called on to address this problem. What caused the breakdown in leadership? What are the milestones for improved morale and leadership?

General WILSON. In 2014, various internal and external assessments identified a number of factors within the Intercontinental Ballistic Missile (ICBM) force that had contributed to culture and morale issues. Some of the most frequently cited included a culture of perfection and micromanagement that had developed, manning and resource constraints that led to workarounds outside of accepted procedures, and excessive administrative requirements.

Since 2014, the Air Force has applied deliberate and sustained focus to strengthen the ICBM mission as well as the broader nuclear enterprise. Our ongoing efforts—spanning the full-range of personnel, management, oversight, mission performance, training, testing, and investment issues—continue to produce tangible and lasting improvements. We have institutionalized a culture of continuous improvement and have placed renewed emphasis on establishing effective processes to assess and oversee the health of the nuclear enterprise.

QUESTIONS SUBMITTED BY MR. ROGERS

Mr. ROGERS. The Congressional Budget Office recently said that we're planning to spend "roughly 6 percent" of the total defense budget on the nuclear deterrence mission over the next 10 years. In your professional military judgment, is 6 percent of our defense budget an appropriate level of spending for the nuclear deterrence mission—for what you termed in the hearing the nation's highest priority defense mission?

General SELVA. I will re-emphasize that the nuclear deterrent is the nation's highest priority defense mission and, as such, needs to be funded appropriately. The past sequestration and budget caps have negatively impacted the modernization of our nuclear weapon systems and infrastructure. We have delayed making investments in modernization which has driven our current systems to the end of their service lives. Further delays will cause gaps in our capabilities and jeopardize the nuclear deterrence mission as well as increase costs later. It is imperative that we fund the nuclear deterrence mission now to assure it is safe, secure, and effective for years to come.

Mr. ROGERS. The hearing touched on how cruise missiles are cost-imposing capabilities. We know how hard it is defend against cruise missiles. Please describe how LRSO is a cost-imposing capability/strategy on our adversaries?

General SELVA. LRSO complicates a potential adversary's air defense problem by presenting many more small and low-observable penetrators than a single bomber with gravity weapons can present on its own. In combination with a penetrating bomber, LRSO will significantly reduce a potential adversary's ability to achieve sanctuary within his borders.

Mr. ROGERS. The hearing touched on whether dual-capable air-launched cruise missiles (ALCM) are destabilizing. Does Russia deploy such dual-capable ALCMs? How many times has the U.S. fired an ALCM in combat and did any adversary ever mistake one of those conventional ALCMs for a nuclear one? Do you believe LRSO would be destabilizing—why or why not?

General SELVA. Russia currently has multiple types of dual-capable ALCMs. Russia has Kh-101 (conventional) and Kh-102 (nuclear) subsonic cruise missiles that are comparable to U.S. CALCMs and ALCMs. Russia also has Kh-32, a dual-capable air-launched supersonic cruise missile for which the U.S. has nothing comparable. Of note, the Kh-101 and Kh-102 have significantly greater range than their U.S. counterparts, and Russian press has reported that Kh-101 was launched from Russian strategic bombers (Tu-95 and Tu-160) into Syria over the past 6 months. The United States has employed over 300 CALCMs in various conflicts since 1991, most recently in 2003 in Iraqi Freedom. None have been mistaken as nuclear variants. I do not believe LRSO is destabilizing because, like the ALCM it is replacing, it does not provide a disarming first strike capability.

Mr. ROGERS. Did the Joint Chiefs of Staff examine eliminating LRSO during the review of nuclear deterrence last year? Did the Joint Chiefs ultimately recommend continuing to pursue LRSO? Why?

General SELVA. As part of the previous Administration's review of its nuclear policy last year, the Joint Chiefs of Staff evaluated a proposal to defer the current LRSO acquisition program. The Joint Chiefs recommended continuing the current program to ensure a replacement for the Air-Launched Cruise Missile (ALCM) is available before the ALCM ages out. When fielded, LRSO will sustain a nuclear standoff capability that the ALCM has provided for decades, and it is a critical element of our ability to enhance deterrence by enabling credible response options to an adversary's limited or large-scale nuclear attack.

Mr. ROGERS. Are there military requirements that the U.S. military cannot currently satisfy because we adhere to INF? What are they?

General SELVA. There are no military requirements we cannot currently satisfy due to our compliance with the INF Treaty. While there is a military requirement to prosecute targets at ranges covered by the INF Treaty, those fires do not have to be ground-based. However, ground-based systems would increase both the operational flexibility and the scale of our intermediate-range strike capabilities. We are continually monitoring emerging needs in the face of a rapidly changing security environment. If major shifts in the geopolitical landscape drive a specific requirement for a ground-based intermediate-range strike capability, our compliance with the INF Treaty would restrict our ability to field such systems.

Mr. ROGERS. Is there any compelling need to extend the New START treaty today? The treaty currently goes to 2021. What are some of the considerations that you, in your professional military opinion, believe must be addressed in any decision by policymakers to extend this treaty?

General SELVA. No, there is no need to extend New START today. It is too early to consider extending the Treaty. We are focused this year on completing our reductions under the Treaty and ensuring Russia meets its obligations by February 2018 when the Treaty's limits go into effect. Russia remains in compliance with New START, and I support continued implementation. New START continues to provide predictability of and transparency into Russia's strategic forces. However, I anticipate Russia's violation of its international commitments such as the INF Treaty will be a consideration in any future arms control discussions.

Mr. ROGERS. Nuclear disarmament advocates are attempting to build support for a treaty that would ban nuclear weapons around the world. What are the military ramifications if U.S. allies sign such a treaty? How might that affect our military, including alliance commitments to NATO and the ability to deter and assure in Europe?

General SELVA. If allies sign a treaty to ban nuclear weapons, it would undermine long-standing security relationships that have underpinned the international security structure in place since the end of World War II. Efforts to negotiate such a treaty also seek to delegitimize nuclear deterrence, which would be at fundamental odds with the extended deterrence guarantees that we provide to allies in Europe and Asia. Therefore, if NATO Allies were to sign such a treaty, it would undermine longstanding U.S. extended deterrence commitments, which are a core element of NATO's deterrence and defense posture.

Mr. ROGERS. Do you believe we should pause or defer development of LRSO to wait to see if we can successfully negotiate a treaty banning on cruise missiles? In your professional military judgment, do you see indications that Russia would negotiate, agree to, and abide by such a treaty, given their ongoing violation of the INF Treaty?

General SELVA. No, I do not believe we should pause or defer development of LRSO to wait for a successful negotiation of a treaty banning cruise missiles. As I stated in my testimony, we are currently depending on "just-in-time" modernization and replacement of our nuclear forces, and that is certainly true of LRSO replacing the aging Air-Launched Cruise Missile (ALCM). In my view, there is no chance Russia or any of the numerous countries who possess cruise missiles would negotiate or agree to such a treaty if the United States did not also have a credible and effective cruise missile capability.

Mr. ROGERS. The Congressional Budget Office recently said that we're planning to spend "roughly 6 percent" of the total defense budget on the nuclear deterrence mission over the next 10 years. In your professional military judgment, is 6 percent of our defense budget an appropriate level of spending for the nuclear deterrence mission—for what you termed in the hearing the nation's highest priority defense mission?

General HYTEN. Yes. Modernization underpins national security and will enable the U.S. to defend itself and Allies against existing and emerging existential

threats. Any further modernization delays will result in the loss of deterrent capability. Recapitalization last occurred in the 1980s and accounted for ~12% of defense spending.

Mr. ROGERS. The hearing touched on how cruise missiles are cost-imposing capabilities. We know how hard it is defend against cruise missiles. Please describe how LRSO is a cost-imposing capability/strategy on our adversaries?

General HYTEN. The combination of LRSO attributes (ability to launch beyond range of adversary defenses, hold large geographical area at risk, low observable signature, multi-axis routing, large attack packages) severely challenges the effectiveness of even the most advanced Integrated Air Defense System (IADS). Huge investments and technological advancements in detection, tracking, command and control, and area/point defenses are required to challenge LRSO viability.

Mr. ROGERS. The hearing touched on whether dual-capable air-launched cruise missiles (ALCM) are destabilizing. Does Russia deploy such dual-capable ALCMs? How many times has the U.S. fired an ALCM in combat and did any adversary ever mistake one of those conventional ALCMs for a nuclear one? Do you believe LRSO would be destabilizing—why or why not?

General HYTEN. Yes, Russia deploys dual capable cruise missiles. The United States has launched a total of 369 Conventional Air Launch Cruise Missiles (CALCMs) and over 2,000 Tactical Land Attack Missiles (TLAMs) in combat since 1987. None have been mischaracterized by an adversary as a nuclear ALCM/TLAM–N. I do not believe LRSO is destabilizing—nuclear cruise missiles have existed for decades.

Mr. ROGERS. Would you please describe the military requirements driving the need for GBSD? What are the military effectiveness and cost implications of choosing to life extend the current Minuteman III missile fleet and related ground infrastructure, rather than pursue GBSD?

General HYTEN. Minuteman availability and effectiveness is increasingly challenged due to system and component age-out, asset attrition, and facility degradation issues. As Minuteman III has done for over 40 years, GBSD will continue to provide a responsive, highly reliable, cost effective force as part of a credible strategic deterrent capability. GBSD enhances strategic stability by forcing potential adversaries to commit a large number of highly accurate ballistic missiles and warheads in order to defeat the force. This "barrier to entry" encourages restraint as no adversary could defeat GBSD without considering the consequences of a U.S. retaliatory response. 2014 GBSD Analysis of Alternatives determined the entire Minuteman weapon system, to include the C2 infrastructure, requires modernization beginning in 2028 and concluded executing the GBSD program is more cost effective than an additional Minuteman life extension.

Mr. ROGERS. Where do you see the greatest cost and technical risks in the GBSD program? For example, what is your view on the priority of possible mobile command and control concepts being considered for GBSD?

General HYTEN. From USSTRATCOM's perspective, the greatest cost and technical risk is executing a modernization program that goes beyond replacing the missile. GBSD must be a fully integrated weapon system spanning flight systems, weapon system command and control, missile facilities, and the supporting equipment. The U.S. has not conducted this level of work in the ICBM force for several decades and it will require years of dedicated work and consistent investment to execute the program successfully. USSTRATCOM supports the Air Force's integrated weapon system approach which focuses low technical risk solutions to deliver the required capabilities as the Minuteman force retires. The Technical Maturation and Risk Reduction (TMRR) phase's objective is to investigate technologies which reduce development and production risk while meeting strategic deterrence requirements. As part of this process, the TMRR will examine a full range of options, including mobile command and control concepts, to meet our requirements.

Mr. ROGERS. We've seen a lot of GBSD acquisition details loaded into unclassified acquisition databases run by the Air Force. We all know that Russia, China, and others scoop all of that stuff up and analyze it intensively. Why is all of this put out in the open? Should we reassess what is unclassified in these acquisition documents?

General HYTEN. We share your concerns regarding the amount of program information that is available. We need to assess our acquisition processes to strike a balance between protecting our national security and providing industry the information they need to develop our weapon systems while preventing the release of sensitive information. We will continue assessing the information we must provide to industry while safeguarding our classified information through DOD security procedures and safeguards.

Mr. ROGERS. Please explain why we must replace Vietnam-era UH–1N "Huey" helicopters that are currently used to help protect our ICBM fields? Is it the case that one of the two security requirements can't be met without new helicopters? Should this replacement be pursued with all possible speed? Why? When you rescinded your request for forces, what was your understanding of the date for issuance of the RFP for this program? Has that date shifted?

General HYTEN. The 1960's era UH–1N fleet does not have the required speed, range, endurance, payload or survivability to fully execute the emergency response mission. USSTRATCOM's rescinding the Request For Forces (RFF) was not intended to diminish the need for a replacement helicopter, but to support a focused effort on fielding a replacement aircraft as soon as possible. At the time of the RFF rescission it was my understanding that the Final Request For Proposal (RFP) release was to be February 2017. Due to industry feedback a second draft RFP was required and a final RFP is expected in summer 2017. The Air Force plans to award a contract in FY18 that will result in delivery of the first operational helicopter in the FY21 timeframe. I was very unhappy when the Air Force notified me of the need to reissue the RFP. This should be a simple and straight forward acquisition. I rescinded the RFF to ensure that the entire community was focused on the new helicopter. I will continue to monitor this closely.

Mr. ROGERS. At the hearing, you said that "rough parity is actually a good thing" in deterrence. I agree. In broad terms, how does Russia's ability to produce nuclear weapons compare to the U.S. capability at this time? Is this disparity in production capacity a risk to the United States?

General HYTEN. Russia is assessed to have a significantly greater production capacity than the U.S. due to the preservation of a large, modernized infrastructure (roughly comparable to Cold War era Soviet Union capability). This infrastructure has enabled the continuous modernization, expansion, and diversification of Russia's nuclear arsenal. The U.S. has moved to a much smaller infrastructure with a manufacturing capacity that limits our ability to address, within a relevant time-frame component age-out and advancing adversary capabilities. Although our nuclear stockpile is safe and secure, the disparity in manufacturing capability puts the U.S. at a possible future disadvantage from technical risks associated with an aging stockpile and geopolitical risks, if Russia were to abandon parity and seek to achieve supremacy.

Mr. ROGERS. At the hearing, you said that "rough parity is actually a good thing" in deterrence. You also said that for non-strategic nuclear weapons, "the Russian numbers are huge and our numbers are small." We also know that Russia operates many different types of non-strategic nuclear weapons while the U.S. operates essentially one. Is this disparity a risk to the United States?

General HYTEN. The distinction between tactical and strategic nuclear weapons is nebulous—anybody that employs a nuclear weapon in the world has created a strategic effect—all nuclear weapons are strategic. Our current force structure, i.e. the Triad, is sufficient to maintain strategic stability and manage the risk you are referring to. The disparity between U.S. and Russian non-strategic nuclear systems only becomes an issue if our nuclear modernization program is not implemented. I am, however, concerned with the recent Russia deployment of a ground-launched cruise missile (GLCM) in violation of the Intermediate Nuclear Forces (INF) Treaty. We will need to decide, as a nation, how to respond. I expect this will be addressed in the upcoming Nuclear Posture Review (NPR).

Mr. ROGERS. What are the impacts to the credibility of our nuclear deterrent if we see major schedule slips to any of these programs? How will such slips be seen by both our allies and our potential adversaries?

General HYTEN. All three legs of our TRIAD are serving well beyond their planned service life, experiencing age related degradation, with replacements characterized as just in time. There is no schedule margin remaining for any program slips. Any further delays and/or cancellations will result in the loss of deterrent capabilities and failure to meet our strategic objectives and extended deterrent commitments causing adversaries, allies and partners to doubt the credibility of the U.S. deterrent.

Mr. ROGERS. Do you agree with the characterization that we hear that our nuclear forces, particularly our ICBMs, are on "hair trigger alert"? Please tell us what open-ocean targeting is and why it is important?

General HYTEN. No, our nuclear forces are not on "hair trigger alert." Comprehensive and redundant personnel, technical, and procedural safeguards preclude the unauthorized use of TRIAD nuclear forces. U.S. nuclear forces proactively strive for the utmost safety and security standards, to include the practice of "open-ocean targeting." Our nuclear command and control system is constantly exercised to ensure that only the President, after consultations with his senior advisors and military

leaders, can authorize any employment of our nuclear forces. "Open-ocean targeting," is the practice of loading our ICBMs/SLBMs with target coordinates located in open ocean areas. The practice of "Open-ocean targeting," was implemented as part of the 1994 Moscow declaration with the stated purpose to protect the U.S. and Russia from an accidental or unauthorized nuclear strike by the other.

Mr. ROGERS. The Congressional Budget Office recently said that we're planning to spend "roughly 6 percent" of the total defense budget on the nuclear deterrence mission over the next 10 years. In your professional military judgment, is 6 percent of our defense budget an appropriate level of spending for the nuclear deterrence mission—for what you termed in the hearing the nation's highest priority defense mission?

Admiral MORAN. Yes. The 1–2% of the national defense budget for the sea based strategic deterrent is appropriate and consistent with what our nation previously invested to build both the "41 for Freedom" in the 1960s and the first nuclear modernization with the OHIO Class in the 1980s. Beyond deterring the threat of massive attack on the United States, having credible nuclear forces is essential to assuring our allies of our extended deterrence commitments, thereby convincing them that they don't need to pursue their own nuclear weapons.

Mr. ROGERS. The Congressional Budget Office recently said that we're planning to spend "roughly 6 percent" of the total defense budget on the nuclear deterrence mission over the next 10 years. In your professional military judgment, is 6 percent of our defense budget an appropriate level of spending for the nuclear deterrence mission—for what you termed in the hearing the nation's highest priority defense mission?

General WILSON. Making the necessary investments in modernization to ensure our nuclear forces remain credible and effective in the years ahead is of paramount importance. The level of investment is commensurate with the priority the Department of Defense places on this mission and its foundational role in our National defense.

Mr. ROGERS. The hearing touched on how cruise missiles are cost-imposing capabilities. We know how hard it is defend against cruise missiles. Please describe how LRSO is a cost-imposing capability/strategy on our adversaries?

General WILSON. Developing and deploying defensive systems capable of detecting, tracking, and defeating the Long-Range Standoff (LRSO) weapon would require a potential adversary to expend significant technical and financial resources. This investment in defensive systems diminishes the amount of resources a potential adversary can expend on the development and fielding of offensive capabilities.

Mr. ROGERS. The hearing touched on whether dual-capable air-launched cruise missiles (ALCM) are destabilizing. Does Russia deploy such dual-capable ALCMs? How many times has the U.S. fired an ALCM in combat and did any adversary ever mistake one of those conventional ALCMs for a nuclear one? Do you believe LRSO would be destabilizing—why or why not?

General WILSON. The Russian Federation possess dual-capable air-launched cruise missiles.

Since its first use during Operation Desert Storm in 1991, more than 350 conventional air launched cruise missiles (CALCM) have been employed by the Air Force in combat. The Air Force is not aware of any of these CALCM launches being mistaken for nuclear-armed air launched cruise missiles.

I do not believe the Long-Range Standoff (LRSO) weapon would be destabilizing. The U.S. has employed CALCMs in combat for more than 25 years without strategic miscalculation.

Mr. ROGERS. What are the military effectiveness and cost implications of choosing to life extend the current Minuteman III missile fleet and related ground infrastructure, rather than pursue GBSD?

General WILSON. Ground Based Strategic Deterrent (GBSD) is the only cost-effective solution that will fully meet Combatant Commander requirements through 2075. The GBSD program addresses the challenges of the future strategic environment that a life-extended Minuteman III (MM III) Intercontinental Ballistic Missile cannot and will do so for approximately the same cost. MM III was designed and fielded to counter 1970s-era threats; in the decades since, advancements in adversary capabilities have created a significant and growing threat to MM III's effectiveness.

Life extending MM III would not provide combat capability to 2075 and would also require multiple sub-system recapitalization programs, including the flight system (i.e. boosters, propulsion system rocket engine, and guidance and control), weapon system command and control, and associated physical infrastructure. In some areas, integration of remanufactured legacy components would create new and complex compatibility issues, lead to higher costs, and fail to provide critical capability

upgrades. These and other challenges—such as obsolescence and age-out of critical subsystems, asset depletion, and diminishing manufacturing sources—make GBSD the only cost-effective option that will deliver credible and effective combat capability through 2075.

Mr. ROGERS. Please describe the process the Air Force used during the analysis of alternatives (AOA) for the GBSD program. Did it thoroughly examine all options? Did it rigorously follow DOD and CAPE guidance on how to conduct an AOA?

General WILSON. Yes, the Ground Based Strategic Deterrent (GBSD) Analysis of Alternatives (AOA) rigorously followed Department of Defense processes, was structured in accordance with the Office of Cost Assessment & Program Evaluation (CAPE) study guidance and included direct Office of the Secretary of Defense (OSD) oversight through a Study Advisory Group (SAG) chaired by Acquisition, Technology, and Logistics and CAPE senior leadership. The GBSD AOA study team complied with all CAPE/DOD guidance as part of the assessment. The GBSD study team conducted the AOA based upon CAPE's GBSD AOA Guidance, dated August 28, 2013. Furthermore, CAPE provided sufficiency review and concurrence for the GBSD AOA on November 10, 2015.

The AOA explored trade space in performance, schedule, and cost across the full range of strategic options to include the impacts of not meeting validated GBSD Initial Capability Document requirements. The AOA was conducted in two parts: Part one was a basing mode analysis with a primary focus on survivability; Part two analyzed the Minuteman III (MM III) delivery system and focused on MM III recapitalization or replacement. Additionally, Part two assessed the entire range of validated gaps against several combinations of missile subsystems, to include propulsion (boost and post boost), guidance, navigation and control, re-entry systems, including existing and new technologies and associated industrial base.

While the aforementioned options thoroughly examined basing modes and delivery systems, the compression of the AOA timeline and funding (from 18-months to 10-months) did require additional post-AOA assessment of the Nuclear Command and Control (NC2) system to include detailed NC2 architecture definition and an industrial base interface analysis.

Mr. ROGERS. Is the Air Force looking at pursuing putting new engines on the B–52 fleet and leverage third party financing to do this? This seems like a smart way to get this done in the near-term while making the B–52 much more efficient and military effective for the long-term.

General WILSON. The Air Force is assessing options to re-engine the B–52 should it become a funded program.

Additionally, the Air Force is assessing the potential use of third party financing options for the production phase of a re-engine program. The initial B–52 re-engine Business Case Analysis (BCA) indicates significant benefits with lifetime savings exceeding program costs. Payback comes from a variety of engine related expenses; fuel only provides 23% of the savings. Several factors contribute to the BCA include: escalating engine overhaul and related costs; diminishing sources of supply; engine related repair costs; fuel costs; increased electrical power needs. New engines would also increase the B–52's electrical power generation, which would support future modernization efforts.

The Air Force requested $10 million in the Fiscal Year 2017 President's Budget (FY17PB) Amendment that was not received. The funds were to be used to continue more detailed analysis and pre-acquisition planning and preparation for a potential re-engine program. Efforts include, but not limited to, analysis of engine data to determine best value engines, scoping aircraft integration requirements for engines (avionics, structural, electrical), and initial program documentation preparation and support. The FY18PB requests $10 million for these efforts.

Mr. ROGERS. Do you agree with the characterization that we hear that our nuclear forces, particularly our ICBMs, are on "hair trigger alert"? Please tell us what open-ocean targeting is and why it is important?

General WILSON. The assertion that the Nation's Intercontinental Ballistic Missiles (ICBM) are on "hair trigger alert" is incorrect. The Minuteman III ICBM relies on extremely robust and secure command and control that ensures only the President can authorize a launch.

All U.S. ICBMs are targeted day-to-day against areas in the open ocean. Prior to launch, ICBMs must to be retargeted from the ocean to their land-based targets. The U.S. and Russia agreed to implement this confidence building practice in 1994.

QUESTIONS SUBMITTED BY MS. SPEIER

Ms. SPEIER. The President has called publicly for a "build-up" in our nuclear arsenal, claiming we've been "falling behind" our adversaries. I don't understand what metric he's using to make that assessment, and your statements mention nothing about an expansion being needed to meet our warfighting and deterrence requirements. Are you able to corroborate the President's claim that there's a valid requirement for new warheads? Do you have any idea on what he's basing his claim?

General SELVA. We are initiating a Nuclear Posture Review at the direction of the President. I anticipate this review will consider the changes in the global security environment since the previous NPR (2010) and assess U.S. nuclear policy, strategy, and capabilities against the current and future threat environment. Once the 2017 NPR is completed, we will have higher confidence in any recommendations that may result in changes to U.S. nuclear policy, strategy, and capabilities.

Ms. SPEIER. The President has derided the New START Treaty as "one-sided" and a "bad deal." This is in stark contrast to comments made last week by Lieutenant General Jack Weinstein, the Air Force Deputy Chief of Staff for Strategic Deterrence and Nuclear Integration. General Weinstein said that the agreement has been "good for us." He further explained that "The reason you do a treaty is not to cut forces but to maintain strategic stability among world powers . . . I think there is a huge value with what the New START treaty has provided." General Selva: Do you agree with General Weinstein? Is the Chairman prepared to offer his best military advice on this question to the President?

General SELVA. I believe the New START Treaty remains in the national security interest of the United States as long as Russia complies with its terms. Russia is currently in compliance with New START, and I support continued implementation. The Treaty has provided transparency, predictability, and stability over the past six years since the Treaty entered into force and has helped increase mutual confidence. The Chairman is prepared to offer his best military advice on this question to the President.

Ms. SPEIER. President Obama declared that the greatest threat to international security is a terrorist with a nuclear weapon—not a state program. From what we can tell so far, President Trump also seems to be prioritizing the terrorist threat. Yet we're talking here about spending—according to independent estimates—up to a trillion dollars over the next several decades on programs that have effectively zero value against terrorists. At the same time, I'm concerned that, following an intensive international effort during the Obama administration to lock down nuclear material that could fall into the hands of terrorists, our nuclear nonproliferation and nuclear threat reduction programs at the Departments of Energy and Defense will be getting short shrift under this administration. Are you prepared to recommend to the Secretary and the President a sustained—or even increased—level of funding for U.S. Government nuclear nonproliferation and threat reduction programs?

General SELVA. I support a continued multifaceted approach to countering nuclear proliferation, including adequate funding for the nuclear nonproliferation and nuclear threat reduction programs at the Departments of Energy and Defense.

Ms. SPEIER. The string of problems that led to the 2014 Nuclear Enterprise Review are a stunning example of how the Department can spend billions on bombers, missiles, and subs—and then have military readiness degraded by something incredibly stupid like mass cheating on competency examinations, or failing to properly maintain the equipment we already have. Can you please provide more details on how you will ensure that the fundamentals of maintenance, morale, and management don't get lost in the push to modernize?

Admiral MORAN. The Nuclear Deterrent Enterprise Review in 2014 included an internal and external review and resulting in the establishment of the Nuclear Deterrence Enterprise Review Group (NDERG) by the Secretary of Defense. The NDERG codified senior leader accountability and brought together all the elements of the nuclear force into a coherent enterprise. The efforts following the review strengthened the oversight and regulatory elements to ensure the fundamentals of maintenance, morale, and management are fully supported and integrated as we move forward with modernization.

In addition, the Department of the Navy took the following actions to further strengthen the actions we were already taking in oversight and management of the Navy's top mission.

– The Navy expanded the Nuclear Deterrence Mission Oversight Council (NNDMOC) to include support commands and nuclear command, control and communications (NC3). The council coordinates Navy nuclear weapon activities and provides oversight, operations, personnel, policy, and material support. The

council meets every two months and is updated on various aspects of the Navy's Nuclear Weapons Enterprise.

– Strategic Systems Program (SSP) was assigned the responsibility as regulatory lead, reporting directly to the Chief of Naval Operations (CNO) for the Navy nuclear deterrence mission. SSP performs a continuous independent end-to-end assessment, reporting annually to the CNO.

– Biennially the Navy continues to conduct a comprehensive Navy Nuclear Weapons Assessment (NNWA) and reports the results to the Chief of Naval Operations. The assessment includes specific site visits and inspections to assess compliance with higher level guidance and also the fundamentals of maintenance, morale, and management, as well as security, safety, operations and facilities.

Ms. SPEIER. The President has derided the New START Treaty as "one-sided" and a "bad deal." This is in stark contrast to comments made last week by Lieutenant General Jack Weinstein, the Air Force Deputy Chief of Staff for Strategic Deterrence and Nuclear Integration. General Weinstein said that the agreement has been "good for us." He further explained that "The reason you do a treaty is not to cut forces but to maintain strategic stability among world powers . . . I think there is a huge value with what the New START treaty has provided." General Wilson: Do you side with the comments made by your Deputy Chief of Staff, or with those by the President?

General WILSON. The United States has consistently maintained its obligations under the New START Treaty. It is a bilateral, verifiable agreement that provides the U.S. with some degree of predictability on Russia's capabilities and intentions concerning their strategic forces. The President recently directed a bottom-up review of the U.S.'s nuclear posture, an effort that may include a review of existing treaties and agreements.

Ms. SPEIER. The string of problems that led to the 2014 Nuclear Enterprise Review are a stunning example of how the Department can spend billions on bombers, missiles, and subs—and then have military readiness degraded by something incredibly stupid like mass cheating on competency examinations, or failing to properly maintain the equipment we already have. Can you please provide more details on how you will ensure that the fundamentals of maintenance, morale, and management don't get lost in the push to modernize?

General WILSON. The Air Force continues to apply deliberate and sustained focus towards strengthening the nuclear enterprise. In recent years we have implemented major organizational changes and streamlined authorities to ensure the nuclear mission receives the focus it deserves. We have institutionalized a culture of continuous improvement and are developing a comprehensive assessment tool to monitor and evaluate the health of the nuclear enterprise. Our goal is for this process to enable early identification of issues and elevate them to senior leadership before they escalate into problems.

QUESTIONS SUBMITTED BY MS. HANABUSA

Ms. HANABUSA. Given the significant modernization needs of the Triad, particularly the deterrent abilities of our ICBMs and our bomber fleet, how or why do you assume that fully modernizing the entire Triad system is the threshold we need to meet? If we are figuring out the best way to modernize our capabilities, shouldn't we focus on how our adversaries like Russia, China, and North Korea will arm and develop and how we can best counter them?

General SELVA. We work closely with our partners in the intelligence community to ensure that the decisions we make on the future of our nuclear deterrent are informed by the current and projected threat environment. In fact, it is this very uncertainty regarding the future, particularly with respect to adversary capabilities, that a triad of nuclear forces hedges against. Numerous reviews conducted over multiple Administrations have considered whether the United States still needs a triad of nuclear forces. Each one determined that a nuclear triad of intercontinental ballistic missiles, strategic bombers, and submarine-launched ballistic missiles provides the most effective deterrent against the only existential threat to our Nation, and is therefore essential to our national security. I have participated in some of these reviews, and I agree with this conclusion.

Ms. HANABUSA. Given the significant modernization needs of the Triad, particularly the deterrent abilities of our ICBMs and our bomber fleet, how or why do you assume that fully modernizing the entire Triad system is the threshold we need to meet? If we are figuring out the best way to modernize our capabilities, shouldn't

we focus on how our adversaries like Russia, China, and North Korea will arm and develop and how we can best counter them?

General HYTEN. Our nuclear modernization program has taken into account a range of factors with respect to potential adversary developments, not just offensive systems but defensive capabilities as well, to ensure the continued effectiveness of our deterrent forces. Moreover, because we cannot predict with absolute certainty the direction potential adversaries might choose to invest in their nuclear weapons programs; we maintain a flexible, responsive, and survivable force that can meet a diverse range of threats. Collectively, the comprehensive nuclear modernization program ensures an appropriate range of options for the President to deter and achieve his objectives if deterrence fails.

Ms. HANABUSA. Given the significant modernization needs of the Triad, particularly the deterrent abilities of our ICBMs and our bomber fleet, how or why do you assume that fully modernizing the entire Triad system is the threshold we need to meet? If we are figuring out the best way to modernize our capabilities, shouldn't we focus on how our adversaries like Russia, China, and North Korea will arm and develop and how we can best counter them?

Admiral MORAN. Our nation's nuclear triad of intercontinental ballistic missiles, strategic bombers, and submarine launched ballistic missiles are essential to our nation's security because they have been proven over time and we assess they will remain a necessary deterrent as long as nuclear weapons exist. Sea-based strategic deterrence is the Navy's #1 investment priority and is the bedrock of our ability to deter aggression by major adversaries and to assure our partners and allies. Maintaining our ability to deter threats against the U.S., our allies, and partners is critical to our national security and strategy. Recommendations for adjustments to the U.S. nuclear force structure and stockpile should be addressed after careful consideration of the current security environment and potential threats in the pending Nuclear Posture Review.

Ms. HANABUSA. Given the significant modernization needs of the Triad, particularly the deterrent abilities of our ICBMs and our bomber fleet, how or why do you assume that fully modernizing the entire Triad system is the threshold we need to meet? If we are figuring out the best way to modernize our capabilities, shouldn't we focus on how our adversaries like Russia, China, and North Korea will arm and develop and how we can best counter them?

General WILSON. Sustaining the Triad will best maintain the U.S.'s ability to preserve strategic stability, deter major conventional and nuclear attack against the homeland or our allies and partners in the 21st century security environment. Combined, the distinct attributes and capabilities of each of the Triad's legs creates valuable synergistic deterrence effects that provide superior risk-mitigation against geopolitical uncertainty and technical surprise. Multiple studies conducted by multiple administrations have shown that the triad is the best way to provide an effective nuclear deterrent and assurance to our allies. Accordingly, this structure has allowed the U.S. to make significant reductions in nuclear force posture over the decades while preserving confidence in the reliability, credibility and effectiveness of the nuclear force.

We are not modernizing the Triad to keep parity with modernization efforts of other nuclear weapon states. We are modernizing because it is long overdue and our capabilities must remain credible and effective in the eyes of potential adversaries.

QUESTIONS SUBMITTED BY DR. WENSTRUP

Dr. WENSTRUP. How do developments in foreign nuclear weapon programs, or other strategic weapon capabilities, factor into your recommendations and military assessments on the future of our nuclear deterrent? Specifically:

a) What developments in foreign programs or actions of foreign nations concern you, and how does that factor into your planning and programs for the U.S. nuclear deterrent?

b) Over the long term, when other countries continue to build new military nuclear capabilities, will our nuclear deterrent remain credible if we don't also continue to improve our nuclear capabilities?

General SELVA. In recent years, Russia has rejected our overtures to take the next step in arms control and is in the midst of modernizing its entire strategic triad, along with developing new nonstrategic nuclear systems and weapons. Russia is also violating the Intermediate-Range Nuclear Forces (INF) Treaty and has threatened to use nuclear weapons against our NATO Allies. Nuclear weapons have been assigned increased prominence in Russian strategy and doctrine. Meanwhile, China continues to modernize and increase its nuclear forces, and North Korea continues

its drive towards a nuclear weapon capability that can reach the United States. These threats underscore the urgency behind our nuclear modernization program of record, and the need to avoid further delays that would have severe impacts on the credibility and effectiveness of our nuclear deterrent.

Dr. WENSTRUP. How do developments in foreign nuclear weapon programs, or other strategic weapon capabilities, factor into your recommendations and military assessments on the future of our nuclear deterrent? Specifically:

a) What developments in foreign programs or actions of foreign nations concern you, and how does that factor into your planning and programs for the U.S. nuclear deterrent?

b) Over the long term, when other countries continue to build new military nuclear capabilities, will our nuclear deterrent remain credible if we don't also continue to improve our nuclear capabilities?

General HYTEN. a) The pursuit of offensive cross-domain and/or asymmetric capabilities (cyber, hypersonic, counterspace. . .) designed to challenge U.S. national security strategy drive the need to continuously evaluate and re-prioritize assumptions within existing plans and programs, to include the nuclear deterrent.

b) The U.S. nuclear deterrent will remain credible if we ensure sufficient flexibility, responsiveness, and survivability in the force structure. The current, Congressionally-funded modernization program is designed to achieve these ends. I anticipate the upcoming NPR will provide additional clarity and guidance on this subject.

Dr. WENSTRUP. How do developments in foreign nuclear weapon programs, or other strategic weapon capabilities, factor into your recommendations and military assessments on the future of our nuclear deterrent? Specifically:

a) What developments in foreign programs or actions of foreign nations concern you, and how does that factor into your planning and programs for the U.S. nuclear deterrent?

b) Over the long term, when other countries continue to build new military nuclear capabilities, will our nuclear deterrent remain credible if we don't also continue to improve our nuclear capabilities?

Admiral MORAN. The assumptions of Russia and other potential adversaries now and in the future on nuclear force structures, capability developments, and doctrines play a major role in our assessments of the current and future threat environment. Our assessments directly contribute to the strategy and force structure decisions of the future. Maintaining our ability to deter and, if deterrence fails, respond to future threats underpins our national strategy and is critical to this nation, our allies, and partners security. The results of the Nuclear Posture Review will inform any recommendations to the existing nuclear TRIAD program of record that will ensure our deterrent forces remain credible.

Dr. WENSTRUP. How do developments in foreign nuclear weapon programs, or other strategic weapon capabilities, factor into your recommendations and military assessments on the future of our nuclear deterrent? Specifically:

a) What developments in foreign programs or actions of foreign nations concern you, and how does that factor into your planning and programs for the U.S. nuclear deterrent?

b) Over the long term, when other countries continue to build new military nuclear capabilities, will our nuclear deterrent remain credible if we don't also continue to improve our nuclear capabilities?

General WILSON. I am concerned about Russian, Chinese, and North Korean military modernization efforts, continued aggression seeking to annex international borders or waters, and the increase in ballistic missile development from regional actors such as Iran. To maintain a credible deterrent against this ever-evolving threat, our planning and programs must provide flexible options for the President across the entire spectrum of conflict.

The credibility of our nuclear deterrent relies on the capability of our nuclear weapons; our Nation's will to use them; and also the perception of potential adversaries regarding our capabilities and will.

Foregoing modernization would send a strong message to potential adversaries that we are not serious about maintaining any strategic advantage or technological superiority. This will weaken our credibility and may incentivize other nations to challenge U.S. influence and the ability to operate around the globe. Furthermore, any changes in U.S. nuclear force structure directly impacts U.S. commitment to our allies.

QUESTIONS SUBMITTED BY MS. ROSEN

Ms. ROSEN. Given Russia's threats towards its neighbors, NATO, and the United States, its openly discussed doctrine to use nuclear weapons early in a conflict to "de-escalate" and get the United States to back down, its use of "hybrid warfare" against neighbors and potentially against NATO member states—what are the risks of a conflict in Europe involving the U.S. and Russia? What are the risks of such a conflict escalating to the use of nuclear weapons? Why has Russia adopted such a doctrine?

General SELVA. The risk of a conflict in Europe involving NATO and Russia is a function of the credibility of NATO's deterrence posture. U.S. and U.K. extended nuclear deterrence guarantees are critically important elements of that posture. This posture is designed to help convince the Russian leadership that they cannot escalate their way out of a failed conventional conflict. Exactly why Russia is pursuing its current defense doctrine is uncertain, but I believe it reflects a desire to compensate for Russia's perceived conventional inferiority vis-a-vis the United States and NATO. The President has directed a Nuclear Posture Review to ensure our nuclear policies, strategies, and capabilities continue to address an increasingly complex security environment.

Ms. ROSEN. Do you believe the U.S. should have parity with Russia in terms of numbers or capabilities regarding nuclear weapons? Why? What are the differences between U.S. and Russian nuclear force structures, sizes, and doctrine? How do they compare to those of other nuclear powers?

General SELVA. I believe maintaining rough parity with Russia in terms of nuclear capability is the surest way to maintain strategic stability. The United States and Russia have each designed their nuclear force structure and doctrine to meet their own perceived security needs. The Russians tend to rely more heavily on intercontinental ballistic missiles and non-strategic nuclear weapons, while the United States relies more heavily on submarine-launched ballistic missiles. The nuclear forces of the United States and Russia remain far larger than those of other nuclear powers.

Ms. ROSEN. What advice would you offer to the Nuclear Posture Review that President Trump has tasked Secretary Mattis to carry out? What threats, risks, or opportunities have changed since the Obama administration's Nuclear Posture Review was written in 2010?

General SELVA. I anticipate the review will consider the changes in the global security environment since the previous NPR (2010), and assess U.S. nuclear policy, strategy, and capabilities against the current and future current threat environment. Once we complete this NPR, we will provide informed recommendations on U.S. nuclear policy, strategy, and capabilities for the Secretary to present to the President for consideration. There have been significant changes in the security environment since 2010. Russia has been found in violation of the Intermediate-Range Nuclear Forces (INF) Treaty; invaded its neighbor, Ukraine; and publicly threatened nuclear use against our NATO Allies—all while continuing a comprehensive modernization of its nuclear forces. Additionally, China has become increasingly assertive in the South China Sea and is also modernizing and expanding its nuclear forces. North Korea continues its drive towards a nuclear weapon that can reach the United States, and the Iranian ballistic missile program, which is not covered under the Joint Comprehensive Plan of Action, continues to make progress on weapon systems that threaten our allies and partners in the region.

Ms. ROSEN. President Obama indicated that he was willing to further reduce U.S. deployed strategic nuclear weapons by up to one-third—to around 1,000. The Joint Chiefs of Staff indicated at that time that it would support these reductions if they are bilateral and verifiable. Do you believe we should pursue such reductions while Russia is in violation of the Intermediate-Range Nuclear Forces Treaty and other arms control obligations?

General SELVA. We are conducting a Nuclear Posture Review (NPR) which will include a review of our nuclear arms control policy. Even if the results of the NPR indicate that further reductions are desirable, we need to consider Russia's current non-compliance with several arms control agreements as well its disregard for other international obligations before pursuing new negotiations with Russia. Additionally, I would only support an effort to pursue further reductions if the resulting agreement was verifiable.

Ms. ROSEN. Given Russia's threats towards its neighbors, NATO, and the United States, its openly discussed doctrine to use nuclear weapons early in a conflict to "de-escalate" and get the United States to back down, its use of "hybrid warfare" against neighbors and potentially against NATO member states—what are the risks of a conflict in Europe involving the U.S. and Russia? What are the risks of such

a conflict escalating to the use of nuclear weapons? Why has Russia adopted such a doctrine?

General HYTEN. Russia's aggressive actions towards its neighbors and confrontational posture towards NATO have heightened the risk of conflict in Europe. U.S. and NATO actions are meant to deter further destabilizing Russian behavior and reduce the risk of conflict in Europe. Russia's "escalate to deescalate" doctrine is based on a belief that increasing the costs to an adversary, to include use of nuclear weapons, will induce termination of a conflict. Russia's assessment of American resolve in such a scenario and Russia's belief in its ability to manage escalation dynamics following any nuclear employment are deeply flawed.

Ms. ROSEN. Do you believe the U.S. should have parity with Russia in terms of numbers or capabilities regarding nuclear weapons? Why? What are the differences between U.S. and Russian nuclear force structures, sizes, and doctrine? How do they compare to those of other nuclear powers?

General HYTEN. I believe there is no distinction between the use of tactical and strategic nuclear weapons—anybody who employs a nuclear weapon in the world has created a strategic effect. While I acknowledge Russia maintains significantly more tactical nuclear weapons, I believe we have strategic parity and our current force structure is sufficient to maintain strategic stability and manage risk. Russian doctrine incorporates a broader range of nuclear employment scenarios, which is also expressed through its acquisition of non-strategic and novel nuclear weapons—this is the main difference in our doctrine and capabilities. Both Russia and the U.S. employ a nuclear Triad. However, Russia fields mobile ICBMs and configures their ICBM and SLBM forces with multiple warheads. Rough parity exists in the size of strategic forces as outlined by New START. Both Russian and U.S. nuclear stockpiles are larger than those of other nuclear armed nations

Ms. ROSEN. Please describe the force structure changes the Navy and Air Force are making to implement the New START Treaty.

General HYTEN. The Air Force is reducing 450 ICBM silos with missile bodies to 400, retaining the 50 empty silos. The Air Force reduced the number of nuclear-capable heavy bombers to 60, with 6 additional bombers for training and maintenance considerations. Each SSBN originally configured with 24 SLBM launch tubes now has 20 with 4 tubes sealed and inoperable.

Ms. ROSEN. What advice would you offer to the Nuclear Posture Review that President Trump has tasked Secretary Mattis to carry out? What threats, risks, or opportunities have changed since the Obama administration's Nuclear Posture Review was written in 2010?

General HYTEN. NPR assumptions and analysis should encompass the full range of variables associated with the external threat environment, Administration guidance, policy and strategy, the nation's industrial might, defense priorities and budget considerations to ensure the nation is properly positioned to address any future threat. Since 2010, potential adversaries have pursued qualitative advancements, quantitative, or both; while also broadening the range of scenarios with which they might consider nuclear employment.

Ms. ROSEN. President Obama indicated that he was willing to further reduce U.S. deployed strategic nuclear weapons by up to one-third—to around 1,000. The Joint Chiefs of Staff indicated at that time that it would support these reductions if they are bilateral and verifiable. Do you believe we should pursue such reductions while Russia is in violation of the Intermediate-Range Nuclear Forces Treaty and other arms control obligations?

General HYTEN. Any reductions must be bilateral and fully verifiable under transparent treaty inspection regimes. These violations are very concerning and must be fully accounted for in any future arms control discussions. We will also address them in the upcoming Nuclear Posture Review (NPR). A full and deliberative process is required to determine whether future strategic arms control agreements are in the best interests of the United States

Ms. ROSEN. Given Russia's threats towards its neighbors, NATO, and the United States, its openly discussed doctrine to use nuclear weapons early in a conflict to "de-escalate" and get the United States to back down, its use of "hybrid warfare" against neighbors and potentially against NATO member states—what are the risks of a conflict in Europe involving the U.S. and Russia? What are the risks of such a conflict escalating to the use of nuclear weapons? Why has Russia adopted such a doctrine?

Admiral MORAN. With the recent actions and rhetoric by Russia, the potential risk of conflict arguably is at its highest since the end of the Cold War. Maintaining our ability to deter this threat and, if deterrence fails, respond to Russian action is critical to NATO and the U.S. So the assumptions of Russian doctrine, the risks associated with their doctrine, and our intelligence assessments of the current and future

threat environment will be central to a proper understanding of the security environment for the upcoming Nuclear Posture Review. The results of the NPR will inform a strategy and future force structure decisions along with recommendations on how to best address the future threat environment.

Ms. ROSEN. Do you believe the U.S. should have parity with Russia in terms of numbers or capabilities regarding nuclear weapons? Why? What are the differences between U.S. and Russian nuclear force structures, sizes, and doctrine? How do they compare to those of other nuclear powers?

Admiral MORAN. Russian nuclear forces represent an existential threat to the United States. Maintaining the capacity of our nuclear arsenal provides the ability to deter this threat against the U.S., our allies, and partners is critical to our national security and strategy. Therefore, an analysis of Russian or other nuclear powers' force structures, capabilities, and doctrines will be a key to understanding the threat environment and informing the nuclear force needs in the upcoming Nuclear Posture Review.

Ms. ROSEN. Please describe the force structure changes the Navy and Air Force are making to implement the New START Treaty.

Admiral MORAN. In accordance with the nuclear force structure announced by the Secretary of Defense on April 8, 2014, the Navy has been reducing the number of SLBM launchers on SSBNs and warheads on deployed SLBMs in order to support U.S. security requirements and New START Treaty central limits.

The number of submarine launched ballistic missile launchers will be reduced from 24 to 20 launchers per SSBN, with no more than 240 deployed SLBMs and 280 deployed and non-deployed SLBM launchers total at any time. In addition, the Navy will reduce the overall number of deployed SLBM warheads on the OHIO class SSBNs to comply with New START Treaty central limits. The Navy is converting launchers pursuant to the Treaty so that they are incapable of launching an SLBM.

The Navy is aligning conversion efforts with the existing OHIO Class SSBN operational schedule to minimize the impact to the fleet. As of March 2017, conversions have been completed on eleven out of 14 SSBNs (a total of 44 converted SLBM launchers), and the Navy remains on track to complete conversions prior to the February 2018 Treaty deadline. Once the New START Treaty limits are achieved in 2018, the Navy will responsible for approximately 70% of the U.S. nuclear warheads deployed under the New START Treaty.

Ms. ROSEN. What advice would you offer to the Nuclear Posture Review that President Trump has tasked Secretary Mattis to carry out? What threats, risks, or opportunities have changed since the Obama administration's Nuclear Posture Review was written in 2010?

Admiral MORAN. The advice I would offer to the Nuclear Posture Review is to ensure a fresh review of the threats and assumptions made in the 2010 Nuclear Posture Review and how they have changed. The assumptions of adversary force structure, intents, and doctrines should be reviewed and if need, adjusted to match the current security environment. The review of changes in the underlying security environment will be a central aspect of how the next NPR will be performed and the conclusions that will be made.

Ms. ROSEN. President Obama indicated that he was willing to further reduce U.S. deployed strategic nuclear weapons by up to one-third—to around 1,000. The Joint Chiefs of Staff indicated at that time that it would support these reductions if they are bilateral and verifiable. Do you believe we should pursue such reductions while Russia is in violation of the Intermediate-Range Nuclear Forces Treaty and other arms control obligations?

Admiral MORAN. Potential continued reductions of nuclear forces should only be undertaken after a complete assessment of the current security environment, particularly in regards to our nuclear armed adversaries. Any future force adjustments based on arms control regimes should take into account prior actions, verifiability, and the arms control agreements contribution to maintaining strategic stability. These things, along with a full intelligence assessment of the present and future threat environment will be central to the upcoming Nuclear Posture Review. The results of the NPR will inform any decisions on adjustments to strategy, force structure, and recommendations on how to best address the future threat environment.

Ms. ROSEN. Do you believe the U.S. should have parity with Russia in terms of numbers or capabilities regarding nuclear weapons? Why? What are the differences between U.S. and Russian nuclear force structures, sizes, and doctrine? How do they compare to those of other nuclear powers?

General WILSON. The size and capabilities of U.S. strategic forces are a function of National policy and combatant commander requirements. Historically, the Air

Force has pursued technological advancements to win wars and maintain dominance in air, space, and cyber domains.

The United States and Russia both rely on a nuclear Triad consisting of strategic bombers, intercontinental ballistic missiles, and submarine launched ballistic missiles. Strategic warheads are limited to 1,550 operationally deployed warheads under the New START Treaty. However, Russia maintains a stockpile of tactical nuclear weapons that is an order of magnitude larger than that of the U.S. and NATO. These numbers are troubling—especially considered in light of Russia's continued non-compliance with the Intermediate-Range Nuclear Forces Treaty.

Ms. ROSEN. Please describe the force structure changes the Navy and Air Force are making to implement the New START Treaty.

General WILSON. To comply with New START Treaty requirements, the Air Force converted 29 operational and 12 non-operational B–52H strategic bombers to conventional only. In addition, the Air Force transitioned 50 Minuteman III intercontinental ballistic missile (ICBM) silos to operational non-deployed status, a process that involves removing the missile and maintaining the silo in a configuration that allows a missile to be reinstalled. Another 103 ICBM silos that were in "caretaker" or inactive test status were also destroyed. The Air Force is on track to meet its obligations well in advance of the February 5, 2018 Treaty deadline.

Ms. ROSEN. What advice would you offer to the Nuclear Posture Review that President Trump has tasked Secretary Mattis to carry out? What threats, risks, or opportunities have changed since the Obama administration's Nuclear Posture Review was written in 2010?

General WILSON. The Air Force remains actively engaged and ready to support the Nuclear Posture Review (NPR) directed by the President. Since the 2010 NPR release, the strategic environment has evolved as a result of rapidly advancing technology, geopolitical instability, constrained resources, challenges to global commons, and hybrid warfare. I believe the U.S. nuclear posture must account for these changes to the strategic environment to safeguard the security of our Nation now and in the future.

Ms. ROSEN. President Obama indicated that he was willing to further reduce U.S. deployed strategic nuclear weapons by up to one-third—to around 1,000. The Joint Chiefs of Staff indicated at that time that it would support these reductions if they are bilateral and verifiable. Do you believe we should pursue such reductions while Russia is in violation of the Intermediate-Range Nuclear Forces Treaty and other arms control obligations?

General WILSON. The President has called for a comprehensive review of our entire nuclear posture which should take into account the totality of current and future threats, strategy, policy, programs, readiness postures, infrastructure, nonproliferation and counter proliferation objectives, arms control goals, implementation and compliance, technology opportunities and the like. I fully support this review. The overall assessment of all these considerations should form the basis by which we judge the advisability of future strategic nuclear weapon reductions with Russia. Thus, I believe it is wise to await the results of this review before rendering a decision.

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