

**Transcript of
Hearing on Military Assessment of Nuclear Deterrence Requirements**

March 8, 2017

Witnesses:

General Paul Selva, Vice Chairman of the Joint Chiefs of Staff
General John Hyten, Commander of U.S. Strategic Command (USSTRATCOM)
Admiral Bill Moran, Vice Chief of Naval Operations
General Stephen Wilson, Vice Chief of Staff of the U.S. Air Force

THORNBERRY: 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've neglected it for some time while other nations have not only invested in their nuclear systems, but advance 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 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 some years some of our most brilliant scientists and engineers have been working to keep these complex machines say 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 competence in the U.S. strategic deterrent erodes.

I'm 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 were 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 uniform military members are not able to answer, as you know were -- 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 yield to the ranking member for any comments that he'd like to make.

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

SMITH: The chairman is correct, it is -- 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 had to present that deterrent. I've 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've 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 what is a credible deterrent force. We're 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 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 -- the size of the Army, the size of the Marine Corps, the way we want to build out the Navy -- at 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's something we should look at. I don't think we should simply say, well, it's important so we're going to spend whatever it takes. I don't think we can afford that and I don't think it's 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's the last point I'll 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's 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.

THORNBERRY: Let me welcome our distinguished witnesses.

THORNBERRY: 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'd like to make.

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 forces 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's 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 long-standing objectives that are served U.S. national interest. But our ability to achieve them, cannot be taken for granted. No one should doubt that our weapons, our delivery systems, the infrastructureship 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 main this -- 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 forces 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 to support our decision processes, the command-and-control networks that connect the

president to our field forces, and our dual capable tactical aircraft that can be equipped with nonstrategic nuclear weapons. Our joint forces' ability to preserve these capabilities beyond their intended lifespan is indeed a technical achievement.

However, nuclear modernization can no longer be deferred. Any disruption of 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 one percent of anticipated federal spending. And approximately six 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 -- I appreciate accepting my written statement into the record and I look forward to your questions.

THORNBERRY: Thank you.

General Hyten.

HYTEN: Good morning Chairman Thornberry, Ranking Member Smith, members of the committee. On behalf of the men and women of United States Strategic Command, I'd 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 unite -- 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 deterrents fails, assure allies, shape adversary behavior, defeat terror and define the force of the future.

Let there be no doubt, we have 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 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 deterrents 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 deterrents 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 inter- agencies, 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 deterrents commitments we have around the world. At a time when other 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 deterrents, 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, of 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 -- optimize our legacy NC3 systems and leverage new technologies and capabilities. Through continuing funding for NC3 modernization we can ensure an effective command and control for these forces well into the future.

So I look forward to participating in the -- in the hearing today and the administration's recently announced nuclear posture review, which will address many of the issues we'll discuss.

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

THORNBERRY: Thank you, sir.

Admiral Moran?

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'm 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.

THORNBERRY: Thank you.

General Wilson?

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 nations triad, and three-fourths of the nuclear command-and-control communications. We stand ready to answer your questions.

THORNBERRY: 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 then modernizing this part of our defense effort, our strategic deterrence?

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 refer 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 existing systems age out of the inventory.

And that's the reason we use the terminology we place it is 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.

THORNBERRY: OK, let me just ask one other question for either you or General Hyten to comment on.

THORNBERRY: A couple weeks 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 modernize 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, a new missile arm submarine and long-range cruise missiles.

New data now indicates that China can build a thousand new nuclear warheads quite rapidly. If the US 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're at about 10% of a number warheads where we were at one time and talks about Russia's tactical nuclear weapons.

I'm 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's the momentum here?

SELVA: Chairman, thanks for the question. There's 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 -- to determine those.

Having said that, the path that we have chosen to modernize and -- 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.

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

THORNBERRY: OK. John Hyten, you want to add anything?

HYTEN: Thank you, Mr. Chairman.

I think the only thing I'll add is that of the key to a -- a nuclear deterrent is safe, secure, reliable and ready. It has to be able to work now. 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 commanding; and you put them all on a table. They all deliver in just -- 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 slips (sic), though, that's when we put risk in the system.

THORNBERRY: So back to what General Selva said of beginning, we have no room for error here in getting this done. Because we've -- we've stretched things as far as we can.

HYTEN: Yes, Sir.

THORNBERRY: OK.

Mr. O'Rourke.

O'ROURKE: Thank you, Mr. Chairman.

For General Selva, I'd 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'd also like you to address some of the concerns raised about unintended consequences.

And -- you know, the things that you -- we may want to know in terms of the -- 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.

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 -- this a strategy that we used in the '80s when we -- when we widely deployed the Air Launch 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 -- 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 -- in any one of the potential adversary nations that we might face. And so, in that -- 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 launch cruise missiles launches from, what we would consider, relatively old legacy bomber platforms. That's a challenge we're going to have to face and they're going to have to face.

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

So I -- 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.

O'ROURKE: So there's the argument on costs -- you -- you referenced the argument that it may destabilize or introduce some ambiguity that could be -- that could turn out badly for both sides. And -- and your response to that seems to be that our adversaries have this capability and it wouldn't be responsible for us not to -- to match that.

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

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.

O'ROURKE: Thank you.

Mr. Chairman, I yield back.

THORNBERRY: Couple of administrative notes. We have obviously a lot of member interest. We need to try to just stay within the five minutes. Secondly if -- if -- when you all answer questions, if you'd talk directly into the microphone. Sometimes it's hard to hear back here and that would help us.

Mr. Wilson.

J. WILSON: Thank you Mr. Chairman and thank you for being here today. I'm 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 -- it -- it really is very meaningful to me that you're here today and your success that we want to continue. General Selva, over the course of the past eight 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 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 -- reviews, President Obama ultimately concluded to retain the triad and continue pursuing the nuclear (sic) 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?

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've 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 chipowa (ph) 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.

THORNBERRY: And I'm grateful for President Obama's decision, although you referenced Iran. And I'm so concerned about the continuing development of missile capability, ICBMs. Sadly, that can only be used for the purpose of, in my view, the 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's not intentionally designed, it's 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?

HYTEN: So, I believe we should retain and modernize the triad, Congressman, absolutely. I believe that's 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 turn all those elements. That's how the triad was developed and that's how we need to go.

And I'll just end with the fundamental statement, I'm fundamentally opposed to unilateral disarmament because that fundamentally changes the deterrent equation. We need to -- in deterrence parity, rough parity is actually a good thing not a bad thing because that causes the adversary to pause when they're about to make a decision.

J. WILSON: And -- and I agree with your analysis, just there (ph) of (ph) peace through strength. Thank you very much. And both General Selva and General Hyten, what are your view of the concerns that we're launching a new nuclear arms race with Russia by pursuing the nuclear modernization program?

SELVA: Congressman, I would suggest that were not -- 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. 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's what we're doing. They know it's a path we're on. So we have a bilateral, mutually verifiable, treaty cap at this point in -- in our relationship. And I think that keeps us from entering an arms race.

HYTEN: Congressman, I agree with the vice chairman, we have numbers of our force -- 400 ICBMs, 240 SLBMs, 60 bombers, 1550 accountable warheads. Those are defined numbers that we have to meet. So we're not racing to increase that number, we're not racing to beat that number. We're -- we're working hard to make sure we can maintain that.

J. WILSON: Thank you very much.

THORNBERRY: Mr. Moulton.

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 Nuclear Forces Treaty. There have been some concerns expressed in the press that they have not been complying. I'd like to know what your view is on that situation.

SELVA: We -- 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 conferred with the Russians in a bilateral consultation committee that exist underneath the New START 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 and to facilities within the NATO area of responsibility.

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?

SELVA: We've -- we've been asked to incorporate a set of options into the nuclear posture review. So it'd be premature for me to comment on what the potential options might be for the administration to respond.

MOULTON: OK. It seems that this is part of a broader move of Russian aggression throughout Europe and against -- 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 -- conflict could escalate. To the point where it becomes nuclear.

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

SELVA: Congressman, never's a fairly absolute word. But are our -- our strategy in Europe is to maintain a -- an inventory of nonstrategic nuclear weapons that are in the hands of both United States and our NATO allies. They are operated on a category of aircraft we called 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.

MOULTON: General, I would -- I would hazard to say that using the word never is not going too far when we're talking about the existential threat of...

SELVA: No, sir, I'm not...

MOULTON: ... nuclear weapons.

SELVA: ... not suggesting it's too far. It's just such an absolute word I avoid it.

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?

SELVA: Sir, we've 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 de-escalate. 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 be actually exercising the operation capability to do so.

So we're going to have to get to the bottom of what that means. We've 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.

MOULTON: General, I think you'll 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'd also find bipartisan support for working towards strategic arms reductions.

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

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 -- and project to the public and to our adversaries that we take this incredibly seriously, it's why it's 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. And 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.

MOULTON: Thank you General.

Thank you Mr. Chairman.

THORNBERRY: Mr. Turner.

TURNER: Thank you Mr. Chairman.

Gentleman, I appreciate you talking today to us about what you've described, General Selva, as the top priority. General Selva and General Hyten, I'd like to talk to you, for a moment, about the nuclear command and control component of that top priority. The PowerPoint we've been given describes the command and control as enabling national command conferencing, attack detections, 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's 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 desperate 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 life span is a technical achievement, acknowledging they're already past their -- their life span --- however nuclear modernization can no longer be differed. Well as we talk about the issue of deterrents, I would like for you to describe to some of the risks that we're facing by doing this.

Because it's not just that these might not work or that we can't respond if we're 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're hearing words such as unreliable and desperate. And we also don't have an ability to fix this tomorrow, right, gentlemen.

Could you -- General Selva, General Hyten, could you describe the risk that we're taking and the situation we're in?

HYTEN: Congressman, I'll go first.

The nuclear command and control and communications, NC3, is -- 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, the bomber, for the long-range standoff munition, for the GBSD. I see -- the new missile -- I see all those coming together.

When I look out of 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.

TURNER: General, doesn't mean that our adversaries know that and if they're taking a calculation as to whether or not we can credibly respond, don't they look at those issues is to our decaying of the structure?

HYTEN: I'm sure they do. I'm sure they look at those, we look at those very hard. That's why it's my number one priority now inside the modernization piece to make sure we have a plan to modernize the nuclear command and control capability.

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 -- 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?

HYTEN: So, the integrated tactical warning and attack assessment system, ITW/AA, is the -- it's 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 out United States of America.

So it is exercised every time there's 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 exercise those same pieces. The satellite 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're 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's why we have to take...

TURNER: And doesn't -- if it -- if it doesn't work, or if there's (sic) deficiencies in it, does our adversaries, again, understand that that relates our ability to respond?

HYTEN: So, Congressman it -- it works. It works every time we pull it together my concern is that we're creating fragility in the future. And that fragility in the future has to be addressed and has to be addressed in the near term across the enterprise; that's in the Navy and in the Air Force.

TURNER: And can you talk about the Ascent system, and there's delays in this system that apparently we were not informed of; and how do we address that?

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 Service Committee under the oversight of single counsel in the Pentagon. I co-chair that counsel with the director of acquisition, technology and logistics, it is ...

TURNER: Do you believe that the services and DISA should have to provide everything they know about delays in the system?

SELVA: Yes, sir. And that is precisely what that oversight counsel 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 eachs. We actually look at it as an entire end-to-end set of programs that are critical to providing nuclear command-and-control and conductivity to our most senior leadership.

THORNBERRY: Mr. Langevin.

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, it's -- as you know, our nuclear enterprise is -- is -- is aging. And we've spoken about that several this morning, obviously. 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 -- on this -- 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're designing new delivery systems and --

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

I know we're going to the refurbishment program. I mean some of the -- the components of our warheads don't even exist any more. It doesn't -- it's not easily (sic) to replace them. And some of the materials are not -- are not easily obtainable. So that the question is -- obviously I -- we're not interested in it all setting off an arms race. But does it make sense to continue to try to refurbish and -- and make things work? Or does it make more sense to design a -- a more modern weapon?

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

SELVA: Sir, one of the first priorities I -- 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 that builds and does the actual physical maintenance of the warheads themselves. I -- I took a trip to both Livermore and Sandia and talk to the scientists who are doing the work of design and prototyping of those, I will use the words "modernized repurposed heads."

At their belief and -- 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 -- in a safer, more secure, more reliable and more resilient set of weapons without going into the detail of what that strategy looks like.

SELVA: 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're convinced, as am I, that the path we're on is actually 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.

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

LANGEVIN: OK, thank you.

All right, 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 deterrents. Showing us the most survivable leg of the triad, the maritime force shoulders a significant burden and the Ohio-class Submarines has primarily born it.

The existing modernization projects that the Columbia-class Submarines won't enter service until 2029 and that the Navy -- Navy will only operate 10 SSBNs during the 2030s, reaching a full fleet of 12 SSBNs in 2041. So, Admiral, how will we -- how will we sustain our nuclear deterrent 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 our met?

MORAN: Congressman, thanks for the question. We have worked out the requirements in the '30s 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's a major draw on our total force structure, if you will.

Then, as you indicated, in the late '20s and early '30s we start replacing Ohio with Columbia-class so we think we can accept that and we're going to have to maintain a ready status of fewer submarines during the '30s but -- working that through STRATCOM we believe we have enough to satisfy the requirement.

LANGEVIN: Thank you.

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

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 -- 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 -- 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.

So -- so my 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're not going to have the benefit of a long period of time to make that decision.

LANGEVIN: Thank you General and, in addition to that, obviously I've 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 -- adds to what we already have in place so.

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

THORNBERRY: Thank the gentleman.

Mr. Rogers.

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?

SELVA: Congressman, I don't have enough information on their intent to -- 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 -- as a cosigner of the same agreement there's -- there's no trajectory in what they're doing that would indicate otherwise.

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

SELVA: Yes, sir.

ROGERS: What is the military's assessment of the impact to this violation?

SELVA: So our assessment of the impact is that it -- it more threatens NATO and infrastructure within the European continent than any other part of -- area of the world that we have national interest in or alliance interests in.

And -- and our intent is to factor that into the NPR 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.

ROGERS: Witnesses from the Office of the Undersecretary of Defense for Policy testified several times in the past several years that the U.S. was considering various responses, including active defense to counter force three countervailing capabilities. What actions been taken in each of these three to implement such capabilities?

SELVA: Sir, we have -- I'd like to give you a more fulsome answer in a classified environment. But basically it's the assessment of where the Russians are deploying and how they're deploying that system that provide for the latter option, which is a counter value or counterforce option against the actual weapon system itself. But the balance of the capabilities I'd have to talk to you about in a classified environment.

ROGERS: OK, 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 policymakers like this committee can choose to support?

SELVA: Yes, sir.

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

THORNBERRY: Mr. Veasey.

VEASEY: Thank you, Mr. Chairman.

I wanted to ask General -- all -- all the generals that are here today about the F-35's block forward 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 of the bomber fleet performs in the future in conjunction with the new B-21 as our strategy evolves?

SELVA: Congressman, I think it's 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 a 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'm -- I'm cautious that we not build the connotation that because the airplanes can operate together, they would necessarily, at a strategic level, be -- be built into the same plan.

VEASEY: Thank you, anyone else?

OK, 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?

HYTEN: Thank you, Vice Chairman.

It's -- it's choosing among the children. It's -- it's 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's the oldest. It -- we need a modernized, penetrating bomber.

But then you look at the ICBM and the 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 on 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 triad. And that's why all three have to be modernized and all three have to be monitored as you go through that.

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

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 in the triad that drive us to pay particular attention to the modernization of each leg. The -- 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 -- that puts a premium on that -- 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 '50s and '60s. The weapons that they employ, the air-launch 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's 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 -- 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.

VEASEY: Thank you.

Thank you, Mr. Chairman.

THORNBERRY: Mr. Franks.

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

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

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

And I know that the argument is made that -- that somehow this is a destabilizing weapon and General Selva you had mentioned that earlier and I thought you addressed it well, but I'd like to kind of expand on it slightly because I think that this is one of those things that's in -- in play. And with that -- you know I've asked the Air Force many times now and -- how many time -- and General Wilson this is addressed to you too sir, and General Hyten.

How many times the outcomes, you know, has been fired and how many times that, in combat, how many times it's been taken as a potential nuclear strike? And, of course, the answer was none. And if, indeed, the LRSO 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, you -- I want to make a series of them because I don't want to run out of time here -- what do you think of LRSO---LRSO -- do you support the program? What is the military requirement for this program? Do you think it's destabilizing?

And -- and General Selva I'll 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's a lot of questions, I'm sorry to throw it all at the same time.

SELVA: Congressman, the -- 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 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 defense -- defenses of an opponent and deliver a nuclear weapon. And those are the -- the three baseline requirements for the system that I can talk about in this room.

FRANKS: And you would reject again the notion that it's destabilizing?

SELVA: Yes sir.

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

SELVA: I think it does two things for us. We've already talked about the cost imposition on any potential adversary, that's 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's capable of contribution to its leg of the deterrent.

FRANKS: Yeah.

General Hyten.

HYTEN: Congressman, I'll -- I will bring to the classified session tomorrow a detailed explanation. There's 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 -- the military requirement very specifically and why we need that.

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

FRANKS: Thank you and I look forward to that too.

General Wilson, did you have anything to add?

S. WILSON: Congressman I'd 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-50 -- B-2 or the B-21, it provides lots of flexibility.

FRANKS: Yeah.

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

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 -- and -- and expand it.

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

THORNBERRY: Ms. Hanabusa.

HANABUSA: Thank you, Mr. Chairman, and thank you gentlemen for being.

One of the things that concerned me as I was reading through everything, yes, there's an emphasis by all of you of the need for modernization and for replacement, and there's this concept of the triad. And I've heard the testimony before and you seem to be just assuming that the triad is the way we must go.

And I've heard your explanations and I'm -- quite honestly, I'm not necessarily convinced that that's the way that we must go. For example, the warheads you talked about. In 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're 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.

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

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

So three times in the last five years, the joint staff has been asked this question. Could we go to a diad, 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've 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.

HANABUSA: But, General, you have all basically said that -- 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 -- my issue is this, if we are looking at how we're are going to battle into the -- the, quote, the modern era or modernizing, shouldn't we be focusing on how they are, 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 -- we are, sort of, in this mode of while we -- not necessarily that the triad is -- is the essence of modernization but somehow it's sacrosanct right now and this is what we think works best.

But we are talking about modernizing, we're talking about a new series of adversaries, and so how is it that you 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'm wondering about the ICBMs, where we replace them, and this bomber capacity.

HYTEN: We start from the adversary. That's where all the analysis starts. We start looking at Russia, that's where the nuclear analysis starts. Then we look at China, we look at North Korea, look at Iran. But we start from what they're doing. Because the adversary gets a vote -- they get a vote and we don't get the vote on what they're going to do.

So we have to look at what they're doing and figure out how to respond. And if you look at the role of deterrence; the -- the primary role of deterrence is to deter the use of nuclear weapons anywhere else on the planet.

And if -- if you eliminate one element of the triad, the challenge that creates for us as military officers is that now we're one failure, we're one problem away, we're one challenge away, we're 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...

HANABUSA: General, I'm gonna run out of time. And -- what I'd like is to have you of response in writing if you can. I understand that. However, when your basic essentials, which is still 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'd like to have you respond as to how that fits into modernization.

Thank you, Mr. Chair, I yield back.

THORNBERRY: Mr. Wittman.

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

General Hyten, I'd 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 into deliver a gravity nuclear weapon like to B61 would not meet the -- the -- the standards or the requirements of been set by LRSO.

HYTEN: Sir, I can't talk about the specifics in an open hearing. I will bring those specifics into the -- into the close 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 Russian and China in particular, they're very large countries. And -- and it's about an access issuance.

So we want to 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's all comes together. And I'll show you the details tomorrow in the classified session.

SELVA: Congressman, if you'd let me...

WITTMAN: Yes, yes, General...

(CROSSTALK)

SELVA: And this is something that's missed quite often in the LRSO conversation. In order for 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 the long-range standoff munition means we have to dedicate more force to that same problem set. And so a part of the advantage in the LRSO -- and it is one of the requirements, is that 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 -- 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 and it confounds the enemy's belief that they might be able to attack us and get away with it.

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 -- the aging inventory of our air-launch 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 -- as that inventory of air-launch cruise missiles ages and if we don't get LRSO?

WILSON: Yeah, thank you for the question. As you remarked earlier, our current cruise missiles were built in the early '80s, designed to last 10 years, we're now on their fifth SLEP, service life extension, for those missiles. To meet general heightened requirements we talk about being safe, secure, effective and ready.

As -- 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's -- there's an effectiveness piece and there's a reliability piece. They're currently safe, secure, effective and reliable. But, looking 10 years in the future, we don't have much slack. You know, right now we're on our fifth service life extension and we need a new replacement for that ALCA missile, the LRSO.

WITTMAN: Very good -- thank you.

Admiral Moran, I wanted to talk to you about that -- that -- that extraordinary important part of the nuclear triad are Ohio-class Submarines. We are, today, in the process of replacing those submarines with the Columbia-class. Give -- give me your perspective. I know that we are pushed with having the proper number of 12 submarines, which is a projection, and being, for a period of time, as you spoke of earlier, at 11 submarines.

Give me -- give me your perspective on what we will do to accommodate for that -- for that lower number of submarines through that period at 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 presence, I believe, at any one time of six 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?

MORAN: Yes, thank you sir.

You -- you captured it quite well there in terms of the lengths of deployments and how long -- 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 -- 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 Columbias as they come in in the '30s.

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

THORNBERRY: Mr. Carbajal.

CARBAJAL: Thank you Mr. Chairman and thank you all for coming here today.

The Congressional Budget Office 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 -- 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 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?

SELVA: Congressman, my understanding is we communicated those requirements in our president's budget in '17. 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 your question over the next decade to decade and a half.

Our numbers are slightly different than CBO's, for -- for a couple of reasons but we'll work through that with you in and make sure you have the numbers.

CARBAJAL: Great, thank you very much.

I yield, Mr. Chair.

THORNBERRY: Mr. Scott.

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 and (ph) 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're seeing?

WILSON: Yeah, Congressman Scott, we certainly stand behind our projections. Quite frankly, the -- the projections differ because we use different data sources. We haven't built a new missile in many years, so we used Minuteman-III and Peacekeeper data. The CAPE used D5 data as well as MDA data.

Therefore, the differences in the -- 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 '18, we should have further data to be able to refine that and provide that forward.

SCOTT: General Hyten, would you please describe the military's requirements driving 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?

HYTEN: So, the detailed military requirements for classified, sir. We can provide you with those in a separate forum.

SCOTT: OK.

HYTEN: Be glad to do that. And -- and in general, the requirement for the land-based element of the triad is to be able to provide a -- 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's about 30 minutes from Russia to the United States.

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

SCOTT: General Selva, if you can 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?

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.

SCOTT: Thank you.

General Hyten, we've 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 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?

HYTEN: So the -- I -- I hate the stuff that shows up in the press. I think we should reassess that. Just to -- to complete that thought, I hate the fact that costs us so much to open the press as well. Because if you put a cost estimate out in the press, it's not only our adversaries that are looking at it, but the people that are gonna build the system are looking at that.

And if that's what our cost estimates say, if we say is gonna cost \$80 million it's probably going to end up costing \$80 billion. I hate that we go down that path.

SCOTT: And then some.

HYTEN: And then some. So I -- I would really like to figure out a different way to do business than that. I hate seeing that kind of information newspaper. Now, as for the complications in the GBSD the 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 gonna cost. How much is that? At the last -- I -- just a couple weeks ago I was at F.E. Warren in -- in Wyoming. I went down in one of the missile holes and the sign as you came in and said, you know, this was created in 1963. That structure was created in 1963.

The command-and-control assets go round with it were started in the 60s, modernizing the 70s, they've gone through multiple life extension programs. It's the infrastructure that is around the missile that will be the challenge of the program, not the missile itself.

SCOTT: Gentlemen, thank you for your of service. My times about expire.

Mr. Chairman, I yield back by the eight seconds.

(LAUGHTER)

THORNBERRY: And we'll take it.

Mr. O'Halleran.

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. Is -- how do we know that that's going to be enough money to be able to deal with the multitude of issues we've heard? Whether it's command-and-control or new systems coming on board?

SELVA: Sir, all I can tell you is it that is our best judgment of what resources we're going to need to do the modernization on the schedule that we have laid it (sic) 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.

O'HALLERAN: Admiral Moran, the Columbia-class; the minimum are -- the minimum that we need our 10 at time -- or 10. Two are going to be down because of reactors the replacement at times?

MORAN: No sir, the -- the -- the Columbia class has a -- a reactor core that it -- it'll last for 40 or 40 plus years. So we will not have to recore those unless we extend the life...

O'HALLERAN: OK.

MORAN: ... beyond 42 years.

O'HALLERAN: I misread that then.

MORAN: Yes, sir.

O'HALLERAN: Thank -- thank you...

(CROSSTALK)

MORAN: The other two, the reduction from 14 to 12 is to account for the fact that the -- that core lasted long and -- and there's other maintenance has to be done on a ship. And that's why we're able to do it with the 12 instead of the 14.

O'HALLERAN: OK.

MORAN: Thank you.

O'HALLERAN: And General Hyten, the cyber warfare aspects of all this, command-and-control and -- and the -- how does that -- has that factored in your cost estimates?

HYTEN: So I'll just say that, you know, we were having a conversation with Congressman Turner a while ago about the concerns about the MC3 (ph) capabilities that we have today the good news about the nuclear command and control capability we have today is it's very cyber secure. When you build a system in the '60s before anybody knew what the term cyber was, you have inherently built in an amazing amount of cyber security.

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 well at how we're going to do this nuclear command and control in the future.

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 -- cyber issues also? cyber issues also?

HYTEN: It's a sell -- it's a significant element of the cost to us, Mitch (ph). You'd have to ask the services for the -- for the details that are in those cost estimates but I've talked to the DOD CIO in particular about that capability, I've sat in on the panels that General Selva was talking about awhile ago.

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

O'HALLERAN: Thank you and Mr. Chairman I yield.

THORNBERRY: Dr. DesJarlais.

DESJARLAIS: Thank you Mr. Chairman.

General Selva, you spoke with a bunch of us yesterday regarding the -- the aging of our nuclear forces and, you know, we've 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?

HYTEN: Congressman that is the risk in the -- in the program right now. I've been involved in this business long enough to know that if you have five different programs that all deliver just in time, you've 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's 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.

DESJARLAIS: OK. Chairman Thornberry mentioned earlier that -- this -- the cost for this deterrent program is usually about six to seven percent of the budget. Considering that this has been called the nation's highest priority defense mission, do you agree with CBO that roughly six percent is a proper amount?

HYTEN: Congressman, we've looked at the numbers for the better of that 18 months or so I've 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 -- we scrubbed every program to take any excess cost out of it, six and half 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're 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's the consequence of where those numbers came from.

DESJARLAIS: OK, well I'd like to thank all you gentlemen for being here today and I yield back my time.

HYTEN: Thank you sir.

THORNBERRY: Mr. Garamendi.

GARAMENDI: Gentleman, thank you very much for your service and for the questions that you've 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 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 cut forces but to maintain strategic stability among world powers. And the New Start Treaty allows us to maintain the 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?

HYTEN: So Congressman, I've stated for the record in the past, and I'll state again, that I'm a -- 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 move the -- 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's why I continue to support the New Start levels that we're under right now.

GARAMENDI: Thank you, General.

General Selva, are you of the same mind?

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

GARAMENDI: Now, keeping that in mind, there's been discussion about new tactical or new low yield strategic weapons. Maybe they're 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?

HYTEN: So Congressman, that's a great conversation to tomorrow when I can tell you the details, but from a -- from a big picture perspective in -- in a public hearing, I can tell you that our four 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.

GARAMENDI: And...

HYTEN: I will also say that I don't -- I don't agree with the term tactical nuclear weapon. I just fundamentally disagree that there is such 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.

GARAMENDI: I thank you for that statement. I think it's accurate, and that goes to escalate to de-escalate, 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 a escalation to de-escalate, or could be.

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.

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

GARAMENDI: All of which creates a conundrum.

Thank you very much, gentlemen. I yield back.

THORNBERRY: Mr. Gallagher?

GALLAGHER: Thank you, Mr. Chairman.

I'd like to zoom back out if we could to the strategic level. The last nuclear posture review was published seven 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's 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 exercise directed against U.S., NATO allies and neighbors. Russia has declared and openly discussed doctrine to use a Russian nuclear weapon early in the 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 it's INF violating cruise missile is now operational and deployed. Russia intentionally broadcast plans for it's so-called status sick -- 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 the 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?

SELVA: Yes, sir. I'd make two points.

One, I've 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'm on the record in my confirmation hearing is the vice chairman saying the same.

What's 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 -- has changed the relationship in terms of our military to military qualitative and quantitative match. And we have to address that. 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 you're point.

HYTEN: So, Congressman, the vice chairman hit pretty much all the points I want 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've 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 cyber. We have to look at the entire strategic landscape and make sure we did -- consider all that action. The nuclear capabilities that we have is the backstop for all of that, but it's a much broader issue that has become very apparent since 2010.

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 -- in this next step.

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

GALLAGHER: Thank you gentlemen.

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

THORNBERRY: Mr. McEachin.

MCEACHIN: Mr. Chairman, my question's been asked and answered and I've enjoyed listening and learning today so I yield back.

THORNBERRY: Mrs. McSally.

MCSALLY: Thank you Mr. Chairman. Thanks gentlemen.

Good discussion today about the importance of investing and recapitalization of -- 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've seen over -- over the last year some challenges there.

You know, we're in a new time and we're with a different generation. I don't like to make generalizations, but the old SAC (ph) warriors that we all know and love are very different from the mindset of millennials coming into this role. There's real challenges, they're going to, no insult to my colleagues from these states, but challenging geographic locations.

F.E. Warren was our sister squad room when I was at the academy. For many years, you know, often no deployments and they see that they're 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've addressed some of these shortfalls very much in, I think, a punitive way. I mean obviously it's 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're looking at modernizing parts of the infrastructure and the force, are we looking at modernizing the workforce so, are we (ph) 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 deterrents.

Is there a thought of how to do some innovative things for their leadership development while they're in these assignments, that's not fake but actually very real and shows that value. So I'm just wondering are we willing to shake up and look at some fresh ideas to modernize the workforce? It's very important.

S. WILSON: The short answer is absolutely. And that's a key part of concentrating 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 were focusing on this, how do I empower our airmen? And how do they see themselves in a future of which they believe what they're 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.

So how do we then develop and grow airmen that -- that realize that what they're 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 weapons schools, we're sending them to very prestigious universities, to Stanfords to Harvards for training.

We stood up the school for advanced nuclear deterrence studies here 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're -- we're -- we think this is a really important part of changing the culture and you're hitting on a big piece of it.

MCSALLY: General Hyten or General Selva any other comments on that?

HYTEN: I'd -- I'd like to add something ma'am. The -- 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 -- I -- when I talk to Lieutenants, and it's mostly Lieutenants that are there.

The morale is high. They're all excited about what to do, they understand the importance, they understand it is the most important thing. But I think one of things that you mentioned is that that can be a temporary issue. That -- that's the power of leadership and leadership is good. But we need to follow it up with real capabilities where they're operating on 21st century equipment, they're operating those kinds of pieces, and if we don't follow through on that I'm afraid that the morale -- morale could go back the other direction.

But right now, through the power of leadership and focused effort, I'm -- I'm very pleased at how high the morale is in the missile field.

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

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

MCSALLY: Yeah.

HYTEN: It's not a no fail person, it is no fail mission. And when when you realize it's the entire team that has to come together, and if -- if there's a glitch on one person in the team, whether that's a security forces

or wherever it is, and the rest of the team can overcome that and have a no fail mission, that's what were trying to get after. And that's the conversation I hear now, with the lieutenants in particular.

MCSALLY: Great.

General Selva, anything?

SELVA: I think I'd 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 we saw inside the ballistic missile force and in a small element of the bomber force.

So I'm -- I'm optimistic -- and I'm generally not an optimistic person -- that we have put in place a pathway that -- that attends to the professional development and the future of the officers and the young airman in the Air Force that we're 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.

MCSALLY: Great, thanks, I'm over my time. I appreciate it.

THORNBERRY: Ms. Hartzler.

HARTZLER: Thank you, Mr. Chairman.

Our oversight 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 in operating facilities that date back to the Manhattan project.

Now, I realize that the facilities still comply with nuclear safety requirements, but I'm not sure how long that'll last. And so, General Selva and General Hyten, I know that you've 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 facilities so that they can deliver on their mission to support the military?

SELVA: Ma'am, I think it's 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 -- that assembles and maintains the core parts of our nuclear arsenal, and those are the weapons themselves.

HARTZLER: General Hyten?

HYTEN: Ma'am, the -- the Department of Energy has taken that on pretty seriously. But -- it's been about a year since I was at the three national labs, in particular a Livermore, Sandia and Los Alamos. And there's 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 infrastructure. And each of the labs is done a very interesting recruitment process on the on the -- on the people. And now they have this young set of physicists and engineers that have been brought on board that are some of the best and brightest in the country that really set up for the structure.

But it goes back to the same conversation I was just having with Congresswoman McSally, is that it's -- 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 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's why the Department of Defense is interested.

SELVA: Ma'am, if you'd allow me to make a follow up point...

HARTZLER: Sure.

SELVA: ... and that is, we -- 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 it -- and to see the discipline that they put in to the work that they do to disassemble and reassemble nuclear weapons -- and they know precisely what that means.

And 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're asking them to do, which is a fairly major process of remanufacturing weapons to meet the requirements for the future.

HARTZLER: I really appreciate those comments. And those will help build into what we're gonna look at next week. So thank you for sharing your views on that.

Let's talk about nonstrategic nuclear weapons. Because there's a gross disparity on that front between United States and Russia and they're 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 is equal in size and capabilities?

HYTEN: I believe our stockpile allows us to provide an effective strategic deterrent. Again, I -- I have unique perspective as a commander of strategic command, but I look at every nuclear weapon is having a strategic impact.

So as I look at what Russia is doing, I'm very concerned about that. That's 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're going in the future. And all of those things should be discussed.

HARTZLER: So what the numbers?

HYTEN: The -- the -- the Russian numbers are huge and our numbers are small. We'll show you the specific numbers of tomorrow. But that's because we have -- our nuclear weapons are a strategic deterrent.

HARTZLER: 15 seconds, where we in our modernization compared to Russian modernization of the weapons?

HYTEN: The modernization of the weapons? I don't -- I don't have a detailed insight into the nuclear weapon modernization in Russia or China. But I can -- 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 effective strategic deterrent we have to in this nation. But we have to step forward quickly modernization room.

HARTZLER: OK, thank you.

Thank you, Mr. Chairman.

THORNBERRY: Mr. Bacon.

BACON: Thank you, Mr. Chairman. And I wanna thank all four of you for being here.

We respect the leadership that -- that you're giving organizations and grateful. I wanted to ask a question about unmanned aerial vehicles and protecting our strategic installations.

BACON: We're seeing a growing threat; whether it's of other countries or even terrorists buying commercial drones or whatever it may be. And -- and it's the threat to our installations.

So in the F.Y. '17 NDAA 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 comment about, as he seen the results? Do we need to do more and how can we help?

Admiral Moran.

MORAN: Sir, thanks for the question.

As you know we -- we have seen this issue around -- around our submarine bases and it is very concerning. There's 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 world wide.

BACON: Thank you Admiral.

General Wilson.

S. WILSON: Yeah, Congressman Bacon, the -- there's 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're -- we're giving -- delivering on the first initial tranche (ph) but there's a lot of work to do. This is a very complicated threat and we're 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're not there yet.

BACON: Yeah, the threat's there and it's growing.

S. WILSON: Right.

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

HYTEN: We're going to slow. We're going to slow both on the material solution side as well as the policy and authority side. The -- the NDAA was enormously helpful in -- 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's 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 materials solutions to allow them to react when they -- they see a threat and identify that it is a threat and so they do the right things. We're just going way too slow and we need to accelerate that process across policies, authorities and material solutions.

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 Avon (ph) Camp as you may know I was one of the flight officers down 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 off it but based in another base, do we need to relook at that? Thank you.

HYTEN: So I believe that our Airborne command and control across the board, including the Avon (ph) Camp and the TACAMO, which is the same aircraft right now, both have a recapitalization initiatives that's out in the future to -- and we need to start looking at that right now.

So I've asked the Navy to start looking at that. I'll ask Admiral Moran to talk about those kind of pieces but I know they're going through an analysis right now to determine what the right way is to get after those but that's really in the service line.

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?

HYTEN: So -- so that's a good theoretical question because a theoretical question when you actually put it out on a white board it works, but when you have an airplane that -- that old, how long you can actually keep that going is the question. There's no doubt that we could exercise it right now, we could go to 24/7 ops.

But when you're operating in an aircraft that old, how long will they fly and, since we haven't done 24/7 ops for awhile that is a -- that is a risk issue. Now 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's a month, two months, three months, four months because they're old airplanes.

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

MORAN: Yes sir we -- I -- we are jointly working on -- on figuring out a common airframe to satisfy the missions of both -- 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 -- you know what that's all about that. That -- that cannot be the final solution here, so were looking, as the general indicated, at a way to get at a joint program or at least a common airframe to satisfy both missions.

BACON: Thank you, and Chairman, I yield back.

THORNBERRY: Dr. Abraham?

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'm going to ask some rapid-fire questions. A lot of these of have been answered; I want to put them in one question format, so we can refer back when we talk to colleagues and educate them of how important it is to -- to fund these issues. General Wilson, how old is the B-52?

S. WILSON: B-52s were built -- most of them in 1960.

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

S. WILSON: We're planning to fly it through 2050. So it'll be 90 years old.

ABRAHAM: Wow, how old are the B-2's and how old will they be when they retire?

S. WILSON: B-2s today are 24 years old, we're scheduled to fly them through 2058; so, they'll be in the mid-60s.

ABRAHAM: How old is the Minuteman-III?

S. WILSON: Built in 1970, but it's really built with Minuteman-I parts which are 1960.

ABRAHAM: How old will it be when it's retired in 2030?

S. WILSON: Really old

(LAUGHTER)

HYTEN: Sixty.

ABRAHAM: What -- what -- what was it designed to do? What was it's lifetime design...

S. WILSON: Design life was 10 years.

ABRAHAM: Wow.

Admiral Moran, how old will the Ohio class submarines be when they are retired?

MORAN: They'll be 42 years.

ABRAHAM: It's unusual for a submarine to ...

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

ABRAHAM: And that brings risk, I'm sure.

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

ABRAHAM: I got you.

General Hyten, what's the average age of our nuclear warheads?

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

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

S. WILSON: Well, it just puts a stress on the force. And we've got -- when we consolidate to one place it provides (sic) vulnerabilities. We have a plan to get after that, to remodernize all of our weapons storage facilities.

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

ABRAHAM: OK, thank you for your service gentlemen.

Chairman, I yield back.

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

S. 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's making great progress and we're pleased with -- with the way it's headed.

THORNBERRY: And -- and so it's where it should be at this point?

S. WILSON: Yes, sir.

THORNBERRY: OK, Admiral Moran, let me ask you about the Columbia class. We've heard there's no slack today. Is it on time, on schedule, are you satisfied with where it is today?

MORAN: We are on time and on schedule. I'm not satisfied with how much margin we have. An -- an obvious impacts and risk to delivering on time, but I am very comfortable with where we are on the schedule and the costing today.

THORNBERRY: OK, General Hyten , a few moments ago you made an interesting point. We tend to think of strategic deterrence is nuclear deterrence, but it's broader than that. There are other implications; there are press reports and -- and -- and actually I think of 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'd -- I'd ask you or General Selva; what should potential adversaries understand about attacks on our space system and how we would view such attacks?

HYTEN: So attacks in space in general are bad; bad for United States, bad for the world. Anything that creates debris in space lessens our believed to explore. We all -- 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 -- we can never do that.

So it's 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 capable is could go after a strategic early warning systems. If there's an attack on a strategic early warning systems, our adversaries need to realize that they have just crossed the threshold of that puts our understanding of what their actions are at risk and creates a -- a potential issue that we may have to respond to in the broader strategic deterrent construct. Everything is -- is integrated.

An attack against an overhead satellite of -- of a tactical variety has one impact. Strategic ultraviolet has another impact, but they're all bad. So our desire is to deter bad behavior in space. To deter any kind of activity in space that would harm the -- the space environment.

And so the message to our adversaries that you ask is that they should know that we're watching very, very closely. And we're 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.

THORNBERRY: General Selva, you anything?

SELVA: Chairman, just quite briefly; specific to the conversation we've 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's not helpful in terms of nuclear deterrence on both sides of the equation.

I think that's a clear message we have to send every single day.

THORNBERRY: OK.

General Hyten, on nuclear command-and-control, as -- as you were talking about that being the thing you're most concerned about. It -- it goes through my mind about what I -- what I describe as a ghost fleet phenomenon.

Are we better off to have 1960s technology that cannot be hacked into and -- and have more reliability with that ancient sort of approach than if we were to updated it?

HYTEN: So, sir, I've asked the question myself. And there's two pieces to the answer. Answer number one is that if you have the ability to provide the president of the United States and secretary of defense better situational awareness so they can make better decisions, you should do that.

You can't -- 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's actually true, is that with today's technology, you really can't build what we built in the 1960s.

HYTEN: So the information technology of today is fundamentally different. If you try to go back -- and you can't build eight inch floppy disk drives. You can't buy those things anymore. So you really don't have 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 '60s is you can segment things off so that people can't get into it. There's no such thing as a fully closed network because there's always a human in the loop but you can create as closed a system as possible to improve your cybersecurity.

THORNBERRY: OK. One comment and then I have one additional question.

My comment is having been a -- watching these issues for a long time I have seen the interests of the department of defense wax and wane in the DOE's activities on the -- on the weapons.

You know, General Selva, you were just talking about visiting the labs, about nuclear weapons council meeting and those other things. For what it's 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's their job and I'm not going to worry about it. And you talked about the infrastructure and the other challenges that -- that are facing in the NSSA mission.

So, for what it's 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 -- we degrade our capability and -- and it's not a good thing and -- and we've seen this up and down over the last 20 years, so I'd just mention that.

Last question I would like to ask each -- each of you is, just the state of our thinking on deterrents. Because there is concern that, after the fall of the Cold War, we decided we didn't really have to worry about strategic deterrents as much that, yeah we had China but they weren't really a -- a threat. And -- and that we've put a lot of intellectual capital into counter terrorism and other problems but -- but these issues have been neglected and -- 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 deterrents and how do we know whether it's 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 -- I'm just interested in y'all's perspectives on how much we have caught up in -- in our thinking about these problems?

SELVA: Sir, I won't say we've caught up, we are catching up. The impact of the attacks on 9/11 on the focus of our intellectual capital, going after CT, I would argue right and appropriate. But were we took our eye off the strategic nuclear deterrents, intellectual capital of the nation in a way that may not have been healthy.

What I'm encouraged by, and this is why I say we're making progress, but we're 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 deterrents and -- and debate and seek graduate and post-graduate degrees. I have a young man working for me now who got his PhD in political science and wrote about strategic stability in his dissertation.

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

HYTEN: Chairman, I think catching up is the proper characterization. We're in -- we're in a good place catching up. Where we -- I think we've caught up is that inside the military we're having a very robust discussion now. We're talking about how to we integrate all the plans between the various combatant commanders, including strategic command with European command, Pacific command.

We're having a robust discussion of -- of what deterrence means in -- in Russia, in China, in space and -- but -- but where we haven't caught up yet -- and if you -- if you remember when we were all younger, when we were lieutenants and ensigns in -- in the Air Force and the Navy, there was a robust academic discussion of what deterrence really meant. There were books written, there was -- 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's just really starting back up right now.

In STRATCOM, we've now formed an academic alliance with 35 different universities and -- and -- and think tanks to basically try to re-energize that broader discussion because it is a national discussion, it's not just a military discussion.

THORNBERRY: Well, I just think that's very important and -- and there have been some articles written about whether you can analogize cyber deterrence with strategic nuclear deterrence. And -- and I'm not making a point for or against that.

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

Thank you, each of you, for being here today. I think this has been helpful and -- and we'll thank you ahead of time for the further discussions we'll have this week and beyond.

Hearing stands adjourned.