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HEARING

ON

NATIONAL DEFENSE AUTHORIZATION ACT FOR FISCAL YEAR 2022

AND

OVERSIGHT OF PREVIOUSLY AUTHORIZED PROGRAMS

BEFORE THE

COMMITTEE ON ARMED SERVICES
HOUSE OF REPRESENTATIVES

ONE HUNDRED SEVENTEENTH CONGRESS

FIRST SESSION

FULL COMMITTEE HEARING

ON

DEPARTMENT OF THE AIR FORCE FISCAL YEAR 2022 BUDGET REQUEST

HEARING HELD
JUNE 16, 2021

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DEPARTMENT OF THE AIR FORCE FISCAL YEAR 2022 BUDGET REQUEST

HOUSE OF REPRESENTATIVES,
COMMITTEE ON ARMED SERVICES,
Washington, DC, Wednesday, June 16, 2021.

The committee met, pursuant to call, at 11:01 a.m., in room 2118, Rayburn House Office Building, Hon. Adam Smith (chairman of the committee) presiding.

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

The CHAIRMAN. Good morning. We will call the meeting to order.

Once again, as members are now aware, we are back to allowing as many members who want to come into the committee to come into the committee. We are, however, still doing it remotely for those who prefer to participate virtually. So, towards that end, we have rules for that virtual participation, which I will read to get us started.

Members who are joining remotely must be visible on screen for the purpose of identity verification, establishing and maintaining a quorum, and participating in the proceeding and voting. These members must continue to use the software platforms's video function while in attendance, unless they experience connectivity issues or other technical problems that render them unable to participate on camera. If a member experiences technical difficulties, they should contact the committee staff for assistance.

A video of members' participation will be broadcast in the room and via the television/internet feeds. Members participating remotely must seek recognition verbally, and they are asked to mute their microphones when they are not speaking.

Members who are participating remotely are reminded to keep the software platform's video function on the entire [time] they attend the proceeding. Members may leave and rejoin the proceeding. If members depart for a short while for reasons other than joining a different proceeding, they should leave the video function on. If members will be absent for a significant period or depart to join a different proceeding, they should exit the software platform entirely, and then rejoin it if they return. Members may use the software platform's chat feature to communicate with staff regarding technical or logistical support issues only.

And finally, I have designated a committee staff member to, if necessary, unmute unrecognized members' microphones to cancel any inadvertent background noise that may disrupt the proceedings.

Thank you.

This morning we are having our full committee hearing on the Department of the Air Force for fiscal year 2022. And with us this morning we have John Roth, who is the Acting Secretary of the Air Force; General Charles Brown, Chief of Staff of the Air Force; and General John Raymond, Chief of Space Operations.

Let me say, right off the bat, you have the coolest flag back there. I don't know if it is because it is new, or whatever, but it pops. So, we look at that, and it is like it has got that new flag smell to it.

[Laughter.]

Good luck.

Welcome, gentlemen. We appreciate it.

And these are very challenging times, as we know, and I think the dominant theme that has come out of the Biden administration is to really focus on Russia and China, and China, in particular, as the phrase has gone, the "pacing threat" that we face.

And I think the most interesting challenge in all of this, as we're dealing with—the other challenges haven't gone away: the transnational terrorist threats, Iran, North Korea, climate change, instability throughout the globe. They are still there, and your job, and the job throughout the Pentagon, is how do you continue to meet those ongoing threats while making that pivot to recognize the rise of China and, to a different extent, the challenges that Russia presents.

And you will hear a lot this morning about all that you do not have. There is considerable concern that there is not enough money in this year's Pentagon budget. I will say I have been doing this for a little over 25 years now; I have not yet met the Pentagon official who would not like to have more money, and I understand that. And sometimes that is the case, and sometimes that is necessary.

But what I really want us to focus on, or what I have written about here recently, is how we can get more out of the money that we are spending. I think there is a considerable concern, when you look at the last 20 years, and you see a number of the big-ticket programs that haven't worked out as planned, that have been over budget. In many cases, they have wound up being cancelled before they were even used. We need to get better at that.

Even if we had all the money in the world, it is not a good idea to waste it, to not have products and platforms that are actually doing what we intended them to do. In this area, certainly, we have had the conversations about the expense of the F–35. Recognizing how important that platform is to our future, what can we do to get it at a more cost-effective rate? The cost of maintenance, the operating costs that come with it are much higher than we expected; and also, we have not, as yet, achieved the capability that we were hoping to get.

So, what happened? How are we doing better? And what is the future of fighter attack aircraft? As we know, the NGAD [Next Generation Air Dominance] program is in development now. How does that mix? We have had conversations about, then, how to use the—I forget; F–15EX, I think it is—to extend the life and capability of some of our older platforms. How is that mix working out?

We have also, of course, had trouble with the tanker program. What have we learned from all of that and what are we doing better now? Because, I will tell you this much, I am absolutely convinced, if we could go back the last 20 years and get after those programs that wound up being incredibly wasteful, did not perform, way over budget, we wouldn't have anything to worry about in terms of money.

Now I do understand that waste is part of all human endeavors. It is not like you can't go over to the Medicaid/Medicare programs and find waste. Or we all experienced what happened with unemployment this past year. It happens. But we have to do better going forward to meet those challenges.

And in particular, I want to emphasize the work of the Future of Defense Task Force, and now, the Supply Chain Task Force that is focused on how we can meet the emerging threats and the emerging needs—aside from Russia/China, the information warfare environment that we find ourselves in that makes the simple massing of firepower not the be-all and end-all anymore. If they can shut down, if our adversaries can shut down all of our systems by taking out one satellite or by using one cyberattack, then we have got a problem. We have got to update those systems, make them more survivable, and we also have to increase our capability of making the information systems of our adversaries vulnerable. We would love to hear how that works out going forward.

On the Space Force side, obviously, it is a new entity. I really want to thank Ranking Member Rogers and subcommittee Chairman Jim Cooper for their leadership in creating this. I think it was absolutely necessary. As mentioned, space is central to everything we do. We have to make sure that our satellites are survivable, redundant, and that, basically, they continue to do the critical work that they do. So, we would be really interested in hearing how we are doing on improving the quality of those satellites, space launch, everything that goes into making sure that we have the architecture up there that we need and that we can protect it, even in times of conflict.

So, I appreciate you all being here, look forward to testimony. There is a lot to work on, a lot to talk about, and I know the members will have a lot of questions. So, we will look forward to that discussion.

And with that, I will turn it over to Mr. Rogers for his opening statement.

STATEMENT OF HON. MIKE ROGERS, A REPRESENTATIVE FROM ALABAMA, RANKING MEMBER, COMMITTEE ON ARMED SERVICES

Mr. ROGERS. Thank you, Mr. Chairman.

And I really appreciate the witnesses being here and taking the time it takes to prepare for this. It is very helpful to us. And I appreciate your service to our country.

I remain gravely concerned about the President's defense budget proposal. The defense top line constitutes a cut of over $4 billion in real dollars. With this budget, it appears risk is being driven by the top line instead of the top line being driven by risk. That means our warfighters are being deprived of the resources they

need to deter and, if necessary, win a war against China or other adversaries.

Even with an overall increase, the Department of the Air Force is still forced to make unnecessary sacrifices due to an inadequate top line. The Air Force is slashing its procurement budget by more than 12 percent and divesting over 200 aircraft. They tell me this will produce $4.5 billion in so-called savings—savings the Air Force says it needs to invest in modernization, except that is not what is actually happening. Only half of the $4.5 billion is invested in research and development of modernized systems. I am not sure what is happening with the other part of that $4.5 billion. I guess it is being spent on school bus electrification or some other non-defense priority the President has.

These cuts and divestments greatly increase near-term risk by exacerbating gaps in capabilities. To put it bluntly, we are gambling that China, or some other adversary, won't force us into a conflict before 2030. That makes many of us uneasy.

Making matters worse is the lack of a Future Years Defense Program. Without it, Congress and the American people have no way of knowing whether these risks are being properly balanced. I strongly encourage the witnesses to produce a FYDP as soon as possible.

Acting Secretary Roth, I continue to be disappointed with the slow implementation of the acquisition changes for the Space Force. Not only have you failed to get us the required reports, but the space acquisition position required by law remains unfilled. I remain very focused on these issues and expect to hear today how you plan to make it up for lost time.

This budget does have a silver lining: the bipartisan agreement to invest in and modernize all three legs of the nuclear deterrent seems to have held with this budget. Key programs such as the B–21 bomber, the Long Range Standoff Weapon, and the Ground Based Strategic Defense [GBSD] are fully funded. I also understand that GBSD will now be $38 billion cheaper than extending the aging Minuteman III. Obviously, this is good news.

These programs began under President Obama and continued under the last administration. Now, the bipartisan support from both Democrat and Republican Presidents for these programs speaks volumes. I look forward to working with Chairman Smith, Chairman Reed, and Ranking Member Inhofe to ensure that continues.

With that, Mr. Chairman, I thank you and yield back.

The CHAIRMAN. Thank you.

Mr. Roth, you are recognized.

STATEMENT OF HON. JOHN P. ROTH, ACTING SECRETARY OF THE AIR FORCE

Mr. ROTH. Thank you, Chairman Smith, Ranking Member Rogers, members of the committee. It is a pleasure to be here today.

I am also honored to have General Brown and General Raymond join me here in representing the nearly 700,000 airmen and guardians that defend our Nation. We are thankful for your consistent and persistent support over the years that has enabled us to build the world's greatest Air and Space Forces.

As an integrated force, our airmen and guardians stand ready, willing, and able to meet responsibilities to our Nation and continue defending the high ground. From 300 feet to 300 miles off the ground, we protect the homeland; we project power, and we defend democracy.

The long-term strategic competition with China and Russia demands that we focus on the capabilities we need to invest in today to win tomorrow. Our Nation's competitive strategic advantage relies on air and space superiority which is underpinned by rapid technological advancement and the extension of space as a warfighting domain.

In line with Secretary Austin's priorities to defend the Nation, take care of our people, and succeed through teamwork, our fiscal year 2022 budget is the beginning of a journey to the Air and Space Forces of 2030. It builds the capabilities that allow the Department to modernize while continuing to meet national security objectives and defend the high ground. Specifically, we are committed to investing in, one, empowering airmen and guardians; two, capability-focused modernization; three, connecting us to the joint force; and four, expanding partnerships.

First, our airmen and guardians remain the heart of our ability to deter and, if necessary, defeat our competitors. We are transforming our talent management systems to ensure we develop and train leaders with competence, character, and skills required to win high-end fights. And we remain devoted to recruiting and retaining a diverse corps of multi-capable, innovative talent to outmaneuver our adversaries today and in the future. We owe it to our force to provide them with an environment where all can thrive. That is why we are directing critical resources to rid of our ranks of any corrosive elements and injustices that degrade our ability to provide a lethal, ready force.

Second, to remain the world's greatest Air and Space Force, we must look to the future through a lens of capability-focused modernization. Evidenced by nuclear modernization and the next-generation air dominance platforms, our digital acquisition approach revolutionizes how we design and field capabilities to the warfighters. Moving forward, we will expand on these digital revolutions while also investing in next-generation space systems that are resilient and defensive. Space is no longer a benign domain. Our U.S. Space Force is purpose-built to deter and protect free access to space.

Third, combatant commanders require an agile military that operates seamlessly across all domains at both speed and scale. That is why we continue to invest in capabilities like the Advanced Battle Management System, our contribution to the Joint All-Domain Command and Control, which will connect every sensor to every shooter across all domains.

Likewise, access to and freedom of action in space is central to connecting us to the joint force. In its second year, the U.S. Space Force is laser-focused on integration. Investments in space capabilities increase the effectiveness of operations across all domains. The result is a U.S. military that is better connected, better informed, faster, and more precise.

Finally, U.S. Air and Space Forces do not fight alone. We benefit from the expertise and capabilities of our sister services and coalition forces, as well as from the whole of government, commercial industry, and academia. We will continue to invest in enduring relationships while expanding new partnerships to transform how we fight future wars.

Members of the committee, thank you for inviting us to testify. I look forward to your support and am confident that, with your help, the Air and Space Forces will be armed with the capabilities necessary to protect our Nation and defend the high ground. We welcome your questions and ask that this opening statement be entered into the record.

The CHAIRMAN. Without objection, so ordered.

[The joint prepared statement of Mr. Roth, General Brown, and General Raymond can be found in the Appendix on page 65.]

The CHAIRMAN. General Brown, you are recognized.

STATEMENT OF GEN CHARLES Q. BROWN, JR., USAF, CHIEF OF STAFF, UNITED STATES AIR FORCE

General BROWN. Good morning, Chairman Smith, Ranking Member Rogers, and distinguished members of this committee.

I am humbled to serve as the Nation's 22nd Air Force Chief of Staff and to represent the 689,000 total force airmen serving today. The support of our airmen and their families is greatly appreciated.

It is an honor to appear before you today with Acting Secretary Roth and my fellow service chief and long-time friend of many years, General Raymond.

As a general officer, I have spent the last decade-plus in joint positions overseas and/or supporting operations in the Middle East, Europe, Africa, and most recently, the Indo-Pacific. With this context, and being able to look at the Air Force from varied perspectives, I have personally seen the re-emergence of strategic competition and how the character of war has changed. The strategic environment has rapidly evolved and we haven't changed fast enough.

The People's Republic of China has recognized that modern warfare is a contest among systems, not individual units or platforms. Accordingly, Secretary Austin has prioritized China as our pacing threat. Meanwhile, Russia continues to modernize its armed forces, increasing the capability of its missiles, strike aircraft, warships, artillery systems, and nuclear weapons. Competition in future warfare will be conducted across all domains simultaneously. It will be transregional and a global undertaking with complex actions and actors intertwined.

To account for these changes, our Nation and our Air Force must change faster than we have been. If we continue on a path of incremental change, our advantage erodes and losing becomes a distinct possibility.

The Air Force recently updated our mission statement to fly, fight, and win anytime, anywhere. To execute this mission now and into the future, we must transition our Air Force and our operational concepts from today to tomorrow, and we must do so much faster. That is why I wrote "Accelerate Change or Lose," to call attention to the changes in the strategic environment, because the mix of the capabilities that our Air Force has now that were good

enough yesterday or good today will likely fail tomorrow. Our future Air Force must be agile, resilient, and connected, with the ability to generate near-instantaneous effects anytime, anywhere; not just sometime in some places, but anytime, anywhere.

The Air Force is the only service that provides our joint teammates, allies, and partners the assurance of air superiority, the advantage of global strike, and the agility of rapid global mobility, through a range of capabilities most requested by today's combatant commanders. Additionally, the Air Force's ISR [intelligence, surveillance, and reconnaissance] and command and control capabilities provide the ability to sense, make sense, and act.

But, while our past and current capabilities have sufficed for the last three decades, they will not effectively perform in tomorrow's highly contested environment. To address these challenges that will endanger our national security tomorrow, the transition to the future Air Force design must start today.

Finally, we must have a foundational responsibility to our airmen and their families. I remain focused on ensuring we are ready and that we have the tools and infrastructure and talent management systems to provide an environment where all can reach their full potential. The future Air Force design advances our core missions and new approaches to warfighting that will holistically support every combatant commander and benefit every service chief. Investing in the Air Force is an investment in the joint force. Ladies and gentlemen, the bottom line is simple. We must modernize for the future and focus on capabilities that maintain our advantage both today and tomorrow.

For decades, we collaborated with Congress and our industry partners to modernize for the future. Now, to fulfill our responsibility to ensure our national security, we must be willing to change—to make the tough choices required to deliberately transform our Air Force to the future force we need to compete, deter, and win. We have done it before and I am confident together we can do it again.

Thank you for the opportunity to be here with you today, and I look forward to your questions.

The CHAIRMAN. Thank you.

General Raymond.

STATEMENT OF GEN JOHN W. RAYMOND, USSF, CHIEF OF SPACE OPERATIONS, UNITED STATES SPACE FORCE

General RAYMOND. Thank you, Chairman Smith, Ranking Member Rogers, and distinguished members of this committee. It is an honor to appear before you today with Secretary Roth, the Acting Secretary of the Air Force, and General C.Q. Brown, the Chief of Staff of the Air Force, a long-time friend and teammate. On behalf of the guardians stationed worldwide, let me begin by thanking you for the continued leadership and strong support that you have provided to the Space Force.

The United States is a space-faring nation. We have long understood that our Nation is strongest economically, diplomatically, and militarily when we have access to and freedom to maneuver in space. For the past three decades, we have been able to take that access and freedom to maneuver for granted.

Unfortunately, as the National Defense Strategy and the newer Interim National Security Strategy identified, this is no longer the case. Both China, our pacing threat, and Russia are doing two things to eliminate the lead that the U.S. currently enjoys in space.

First, they are rapidly developing their own space capabilities for their own use, giving them that same advantage that we enjoy.

And secondly, they are building weapon systems specifically designed to deny U.S. capabilities in space and our access to space. These threats include robust jamming of GPS [Global Positioning System] and communication satellites; directed-energy systems that can blind, disrupt, or damage our satellites; anti-satellite weapons, both in space and launched from the ground, that are designed to destroy U.S. satellites in orbit; and cyber capabilities that can deny our access to the domain.

Thankfully, with the strong support of this Congress, and especially this committee, the United States seized on the opportunity to make needed changes to stay ahead of that growing threat by establishing the United States Space Force. This leadership is resonating globally and is already delivering results for our Nation.

We have slashed bureaucracy at every level in order to empower our guardians to move at speed and to increase the accountability necessary to operate in this domain. We have put together a forward-leaning human capital strategy, allowing us to build a more highly trained, educated, and developed warfighting force while taking care of guardians and their families throughout their career.

We wrote our first doctrine to clearly articulate the independent value of space power to joint and coalition forces, and this importance is fully captured in the Department's new joint warfighting construct that is being developed.

Our international partnerships are stronger, with many of our partner nations following our lead by elevating space in their militaries.

We have created a new end-to-end capability development process from force design and requirements to acquisition and testing, enabled by a digital thread to move at speed while driving unity of effort across the Department.

We have rejected stovepipes by actively working with the joint force, other government agencies, and industry to compete, deter, and win at an affordable cost.

The Space Force cannot, and will not, tolerate business as usual. Our demanding mission and lean force demand nothing less than a new standard of efficiency. This budget reflects the shift of many Department of Defense space activities into the Space Force. Yet, we remain roughly 2.5 percent of the overall Department of Defense budget. We are committed to stretching every dollar to its limit to buy as much capability as possible for our Nation.

Our joint force does not close on its warfighting requirements without space. Space is the force multiplier that we must continue to invest in, so we can compete, deter, and win, and without it, we risk losing.

This fiscal year 2022 budget balances the need to protect capabilities that we have on orbit while shifting and modernizing to a more defendable architecture in the future. It is an investment that

provides assured space capabilities to our sister services, our Nation, and our coalition partners.

These demanding tasks would not have been possible without the sustained support from Congress, including this committee, and for that, I thank you. Again, we cannot afford to lose space.

I am absolutely honored and humbled to serve as the first Chief of Space Operations and to have the opportunity to serve side by side with the incredible guardians that I am privileged to lead. It is because of them that our Nation enjoys the benefits of space today, and it is because of them, America's sons and daughters, that we will compete, deter, and win in the future.

I look forward to your questions.

The CHAIRMAN. Thank you.

General Raymond, on the satellite issue that I raised, in simplest terms, what do we need to do, what are the most critical steps necessary to make sure that we have the architecture in space that we need and that we can protect it?

General RAYMOND. Yes, sir. We have to shift to a new architecture. We have to modernize our forces. The capabilities that we have in space today are exquisite. They are the world's best. They are expensive. But they are not defendable. They were built for a different domain. We have to shift, and we have to shift to a more diversified architecture. And we have to shift to an architecture that has resiliency built into it and not bolted on as an afterthought.

As you mentioned in your opening comments, sir, we have got to figure out how to do this and what we might do differently to leverage our advantage. And I think there are two things we can do in space. The first thing is we can leverage a burgeoning commercial industry to greater capability than we are doing today, and we need to. The other thing that we need to do is we need to leverage our international partners to a greater extent. The way we get after this is by designing a force structure that allows all to play, to be coalition-friendly from the beginning, and to allow these small, innovative companies to have more of a premier role in that architecture.

The CHAIRMAN. What is in the budget this year that you would point to and say, "This is what is moving us in that direction?" What are your biggest priorities in this year's budget?

General RAYMOND. The biggest priorities in this year's budget, if you look at the budget, we balance four things. We balance protecting what we have. We have been working on that for the last couple of years. We balance shifting to a new architecture, and there are examples in the budget where we are doing that. Third is we have to develop an offense to be able to deny benefits to an adversary, to impose costs. And fourth, we have to look at what other missions that currently are being done in other domains that should shift to space, and you will see examples of that as well. It is that balance that we are trying to get right. And again, by developing an architecture that is more diversified, we think we can do it in a way that doesn't break the national treasury.

The CHAIRMAN. And, General Brown, as I mentioned in my opening remarks, what is your vision 5, 10 years—well, from now through the next 5 or 10 years—for our fighter attack aircraft, be-

tween the F–35, the NGAD, proposals for more F–15EXes? How does that mix work?

General BROWN. What we want to do as an Air Force is have a mix of multi-role capability across the fleet of fighters. And right now, we have a seven-fighter fleet going down to a four-plus-one. And in that four-plus-one, the F–35 is the cornerstone of that capability. It is the only fifth-gen [generation] capability that we are building today. Tied to that is the NGAD.

Then we have a replacement for the F–22. The F–22 we will continue to modernize to ensure that it has the capabilities to meet the threat over the next 10 to 15 years, as we bring NGAD on, which brings on additional systems that provide range and reach, particularly for air superiority. The F–15E that we currently have today will be complemented by the F–15EX, and the F–15EX will be a replacement to the F–15C, again, a multi-role capability. It will actually be able to carry a much larger weapons load on this particular air platform and provide us some additional capability, with a newer platform to help us drive down our average age of our fleet.

The CHAIRMAN. And are you confident that this budget supports that vision?

General BROWN. I am. I am. And as I mentioned in my opening comments, we are in a position of transition, and that is the aspect of starting down the path of, really for the F–15EX to replace the F–15C, because the F–15C has been around for a period of time and it is starting to really show its age.

The others, the F–16 is part of this four-plus-one. The newer F–16s will retire some of the older block F–16s, but the newer block still has another 15 to 20 years of service life on it as well.

And then, the last one is the A–10. The A–10 has been a great platform, particularly in the past 20 years in our fight in the Middle East. We will take a small reduction in A–10s in this particular budget, and then modernize and re-wing the remaining A–10s. And the A–10 will be with us really into the middle of the next decade.

The CHAIRMAN. Thank you very much.

Mr. Rogers.

Mr. ROGERS. Thank you, Mr. Chairman.

General Brown, I have made it pretty clear in my opening statement that I am unhappy with this top line. Yesterday, we had your naval counterparts sitting at that table, and General Berger said, and I quote, "If our budgets don't even match inflation, then the risk is high that at some point in the future we are overmatched, and that's not a place I want to be." Close quote. Admiral Gilday said, quote, "If the Navy's top line remains flat or lower, the fleet will decrease." Close quote. Do you share their concerns about this top line and what it would mean to our readiness and capabilities?

General BROWN. Ranking Member Rogers, I do. And this is exactly why I wrote "Accelerate Change or Lose," because I do see risk if we do not—whether you increase the budget or not, and realize that increasing the budget will be helpful, but, as the chairman mentioned, we have got to do things differently, but smarter in executing the budget we do have.

And part of that is, actually, in this fiscal year 2022 budget, the ability to modernize, which includes retiring and making a transi-

tion from where we are today to a more modernized fleet in the future—aircraft fleet in the future and capabilities in the future, to ensure that we do not have future risk. And that is a balance of risk between where we are today with today's combatant commanders, in addition to ensuring not all of the risk is incurred 10–15 years from now, not only for the Air Force and the joint team, but also for the Nation.

Mr. ROGERS. Yes, well, I completely agree with the chairman's view about being smarter. And one of the ways we have got to be smarter is with the F–35 and getting the problems worked out there where we don't have the problems that we suffer now.

But, going back to Admiral Gilday and General Berger, both indicated their support for the National Defense Strategy Commission's recommendation for a 3–5 percent increase in defense spending. Do you share their support of that recommendation?

General BROWN. I do.

Mr. ROGERS. All right. And I want to ask, you heard me say in the opening statement that your fiscal year 2022 procurement request is 12 percent lower than fiscal year 2021. Explain to me how we are going to be able to maintain readiness to meet peer threats with that reduction.

General BROWN. Ranking Member Rogers, it is combination of—we have actually increased our RDT&E [research, development, test, and evaluation] and some of our research and development. And part of that research and development is going to help us make that transition to additional capabilities at the same time we are looking to modernize with our procurement. It is important that, as we procure, that we are procuring capabilities that are going to be relevant for the future, and that is where the RDT&E comes into this as well.

So, from my perspective, to be able to balance between the procurement and the research and development to ensure we are getting the right capabilities, particularly as you look at a more software-focused approach with our digital acquisition, with digital engineering, open mission systems, and agile software. Moving down that path is where we will be able to be very responsive against the threats we expect, that we see today and the threats we expect to see in the future.

Mr. ROGERS. Right.

Secretary Roth, when can we expect to see someone nominated to fill the Assistant Secretary for Space Acquisition and Integration?

Mr. ROTH. Yes, we need to fill the position. So, I concur with everybody's concerns that that position has not been filled. I think as you are aware, it is a Senate-confirmed political appointee. So, we would have to await a nominee, and the nominee would have to go through the confirmation process.

Mr. ROGERS. When are you going to nominate somebody?

Mr. ROTH. Well, as you well know, it is not my call. So, I would hope sooner rather than later. I mean, for the time being, we are looking forward to actually getting the Secretary of the Air Force confirmed, and then, after that, to your point, filling in the rest of the team. That is an important position, and we really do need to fill it.

Let me make one point. One issue, perhaps why it wasn't filled previously, is that position is supposed to be the service acquisition executive for space, but not until 1 October 2022. And so, our thought is maybe to amend the language a little bit to say, "no later than 1 October 2022". Because you want the person who takes that position to hit the ground running in terms of taking charge of space acquisition.

Mr. ROGERS. Yes, and not screw it up.

Mr. ROTH. Yes, sir.

Mr. ROGERS. When are we going to get the FYDP?

Mr. ROTH. Yes, that, too, I have to defer to OSD [Office of the Secretary of Defense]. You have to understand that, as we prepare this fiscal year 2022 budget with the Office of the Secretary of Defense, the focus, given the short timeframe—and we were late to begin with—but given the short timeframe, the focus was entirely on fiscal year 2022. There were no decisions made about the outyears. So, there really isn't an outyear FYDP to be provided at this point in time.

Mr. ROGERS. My last question is, Secretary Roth, over half of the KC–46A fleet is under contract and we still don't have an aircraft that can reliably hold or deliver fuel. The earliest these fixes are projected to be ready is 2024. Has the Air Force considered recompeting that contract?

Mr. ROTH. We have not considered recompeting that contract. We think the best way forward—there are things the airplane can do today, including refueling, air medical kinds of things, and also, passengers and that type of thing. So, it is participating in exercises and doing a real job. But we think we would be best served taking delivery of the aircraft that are under contract, and then, proceeding, as you indicated, to fix the things that need to be fixed.

Mr. ROGERS. All right. Thank you, Mr. Chairman.

The CHAIRMAN. Mr. Langevin is now recognized for 5 minutes.

Before I do that, we stick to a strict 5-minute thing here. So, if you are in the middle of an answer, I am not being rude, but I will cut it off to get to the next person. So, if you can try to hit that 5-minute mark to the extent possible, that will be helpful to the committee.

Mr. Langevin, you are recognized.

Mr. LANGEVIN. Thank you, Mr. Chairman. Can you hear me okay?

The CHAIRMAN. Got you loud and clear.

Mr. LANGEVIN. Very good. Thank you, Mr. Chairman.

I want to thank our witnesses for your testimony today and for your service to the country.

I would like to start with General Brown, if I could. General, the Air Force continues to make great progress with directed energy. The THOR [Tactical High Power Operational Responder] system was successfully tested overseas, and I applaud the establishment of the Directed Energy Utility Concept Experiment for airborne laser systems. General, how do directed-energy weapons fit into the Air Force of the 2030s?

General BROWN. First of all, I appreciate the question. As you highlight it, we have made some progress using directed energy against our small unmanned aerial systems. But what I think

about, this capability has great potential when you look at the critical infrastructure and base defense in the future. There is work to be done in the aspect of technology, but the thing that makes it attractive to me is the cost curves using directed energy against—much less expensive directed energy versus a missile interceptor, against the incoming threats we might have in various locations. So, it is not only putting it on aircraft, but even for ground-based defense around our bases, I think it will be important how we develop and continue to use directed energy.

Mr. LANGEVIN. Thank you, General. Another area, the Air Force's written testimony states that the Air Force is prioritizing ABMS [Advanced Battle Management System] resources for investment in digital network environment and infrastructure. However, $150 million of the $203 million budget is for the Airborne Edge Node. How is devoting two-thirds of the Advanced Battle Management System budget to a single communications pod prioritizing network infrastructure?

General BROWN. As we do the Airborne Edge Node, that is the first major step of us putting an ABMS on our aircraft. And it goes onto the KC–46. It is not just the KC–46, but it actually starts the process for us to be able to continue to develop that capability, to put it on other airplanes and other communication nodes to really drive the aspect of ABMS to create a network of capability to be able to use and push information. Because ABMS is really about pushing information to drive decision-making for the joint force and the Air Force.

Mr. LANGEVIN. In the era of great power competition, where we are going to be playing the away game on a field that is tailored to deny our advantages, General, what are you doing to protect our systems, both from cyber and electronic warfare threats, but also ensuring and improving the survivability of assets like tankers and command-and-control platforms that are high-value and easy-to-shoot-down targets?

General BROWN. There is a combination of things, as you highlight. For cyber, in particular, as we work with Cyber Command on that capability, but also internal to the Air Force, the ability as we go forward and work our oncoming systems to ensure they have the appropriate cybersecurity to be able to execute the mission. At the same time, from a broader aspect, how we modernize our force to ensure their survival in the future will be important, based on the technologies that are available, as we continue to move forward.

And then, the last piece is our ability now to use Agile Combat Employment as one aspect, but also, with ABMS, to be able to connect to increase the situational awareness for our force helps improve their survivability and their decision-making, as we work as part of the Air Force, but also with the joint team on cyber and other areas to protect the force and execution.

Mr. LANGEVIN. Thank you.

The last question for General Raymond. Most of our efforts in directed energy have been focused on terrestrial assets, but directed-energy weapons are a significant threat and possible defensive tool for space assets. From your perspective, are we developing our di-

rected-energy portfolio appropriately to be an effective capability for space dominance?

General RAYMOND. Yes, sir, we are. And what I would offer to you is I would like to come back and get you in a closed hearing and be able to go into more details on exactly what it is that we are doing. But it is important. As you said, we have to be able to protect these capabilities that we rely so heavily on. The force design work that we are doing takes that into account and balances our ability to accomplish the mission, the ability to protect and defend that mission, and cost, and how fast you can get those capabilities on orbit. I would welcome the opportunity to go into much more details in a classified setting.

Mr. LANGEVIN. I would welcome that, too.

I yield back. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you.

Mr. Wilson is recognized for 5 minutes.

Mr. WILSON. Thank you very much, Chairman Smith.

I want to thank all of our witnesses for being here today, especially me, for the "me" is the son of a World War II Army Air Corps veteran of the Flying Tigers in China and India. As I mentioned to you, too, I am also the grateful uncle of a person serving in the Air Force right now. So, I know firsthand of your success and capabilities.

General Brown, I am grateful to support the men and women of the 169th Fighter Wing at McEntire Joint National Air Guard Base in South Carolina. McEntire has been successful in limiting their pilot manning gap, maintaining 95 percent of their fighter pilot requirement. This contrasts with the overall Air National Guard Component fighter pilot inventory of 76 percent, a gap that has persisted for several years.

What specific lessons can be learned by shared components to reduce the fighter pilot shortfall across the service, and how does the fiscal year 2022 request support your pilot shortfall mitigation strategy?

General BROWN. Thank you for the question. And having spent 4 years at Shaw, I am very familiar with Joint Base McEntire.

There are two aspects when we look at our pilot shortfall. It is production and retention. You highlighted retention, and that is an area that we are working on. We have had a little bump during COVID. But the key aspect for me is production, and not only for the Active Duty, but really for the total force as well.

And so, in the fiscal year 2022 budget, we are focused on production, with Pilot Training Next as one of the aspects. How we will probably work with our civilian sim [simulator] instructor for locality pay; Accelerated Path to Wings, as members or individuals come in that actually already have flying experience, and how we adapt our course to use that.

I will also share with you that during COVID we were able to maintain the same level of production that we did in a pre-COVID environment, which, to me, shows the real quality and dedication from our airmen to be able to deliver in a very different environment. Our goal is to get to 1,500 a year, and I think we are on that path.

Mr. WILSON. And thank you for raising your Shaw heritage. I am really grateful. I somewhat share that with Congressman Jim Clyburn and Congressman Ralph Norman, but I also appreciate the cooperation between McEntire and Shaw, how beneficial that is for both bases.

Also, General, as a former air component commander for the U.S. Indo-Pacific Command, you understand the increasingly complex security environment posed by China's peacetime military buildup better than most. In fact, this is the largest peacetime military buildup in the history of the world. Our reliance on well-developed airstrips at established bases is a vulnerability against China, where their missile arsenal is capable of neutralizing our major force protection platforms. How does this budget support efforts to build expeditionary air launch capabilities throughout the Pacific? How are you adapting these capabilities to accommodate the logistical requirements of the F–35 platform?

General BROWN. There is a combination of things. First of all, when you think about the air-launched weapons aspect, we are focused on—we have reached the inventory for some of our preferred weapons that we use in today's inventory. But it is also how we look at some of our more advanced weapons, like JASSM [Joint Air to Surface Standoff Missile] or hypersonic capability to provide us the additional capabilities against that increasing threat.

From the aspect of logistics and working across our force, Agile Combat Employment and our ability to look at how we deploy differently, and how we organize a bit differently, and how we support from a logistics standpoint, will be important.

And then, finally, on the F–35 and its logistics, over the past 2 years, we have actually had deployments of F–35s. We have learned quite a bit, particularly in the Middle East, in how we expand that capability to be able to deploy and understand the logistics aspects of supporting the F–35. We have made some progress and done fairly well in the Middle East. It is now time to expand that and look at how we do this in the Indo-Pacific as well.

Mr. WILSON. And, hey, as we conclude, in regard to F–35s, I would like to point out what a wonderful facility McEntire would be for F–35s. And we have already seen the success of F–35 deployment in South Carolina at the Beaufort Marine Corps Air Station, and they are, indeed, appreciated as the sound of freedom.

I yield back.

The CHAIRMAN. Thank you.

Mr. Larsen is recognized for 5 minutes.

Mr. LARSEN. Thank you, Mr. Chair.

General Brown, the KC–46A tanker question, the Air Force I believe has requested $73.5 million in RDT&E for the 46A. Is that funding going to help address the six Category I deficiencies in the 46? If not, what is the other use for that?

General BROWN. It is. Two key areas on the KC–46 that this will help address is the stiff boom, which is a challenge for some of our aircraft to get higher altitudes in heavy weapons loads, and then, the other is increased communications on the KC–46 to make it compliant with some of the DOD [U.S. Department of Defense] mandates, international mandates, to be able to operate in various

airspace. And that is where a good portion of that money is going to.

Mr. LARSEN. A large portion of that?

General BROWN. Yes, sir.

Mr. LARSEN. Yes, okay. Great.

The second question for you on a different issue, can you just outline the AFWERX budget in fiscal year 2022 and the areas where that can be streamlined or improved? And that might be for Mr. Roth as well. Maybe Mr. Roth could, or whichever.

Mr. ROTH. Okay. Well, first of all, I mean, we are very excited about AFWERX. I mean, AFWERX is exactly the kind of thing we think we need to be involved in going forward. I mean, one word or one phrase for the leader of AFWERX is he is our chief commercialization officer. And so, the whole point of AFWERX is to leverage our money with commercial money and to bring into the Defense Department, bring into the Air Force, the kinds of actors and players and contractors that don't normally do business with us.

And so, for example, for the last 2 years, in 2019 and 2020, AFWERX awarded something on the order of 1,400 contracts worth about $700 million. Seventy-five percent of those contracts were with new performers, people who had not done business with the Defense Department before.

And so, again, we are pretty excited about what they can do and how we can leverage them going forward. In fact, we think they were such a good idea, we are going to stand up a SpaceWERX as well to try to see if we can expand the kinds of initiatives that we have.

Mr. LARSEN. All right. That is fair enough.

Last year, Representative Don Young and I had a provision in the NDAA [National Defense Authorization Act] to submit a report on upgrading the DEW sites, the defense early warning sites, in Alaska. And we want to know what the status either of those upgrades are or the status of the report is for the record.

Mr. ROTH. I will have to follow up in terms of what the status of the report is. We do have money in the budget to look at, continue to look at emerging technologies for the North Warning System. So, we are continuing to get after that. We will have to follow up and get back to you on exactly where that report is.

[The information referred to can be found in the Appendix on page 101.]

Mr. LARSEN. I appreciate that. It was in the NDAA and did ask you to get back to us on that.

As well, General VanHerck testified at this committee on his concerns as the commander of NORTHCOM [U.S. Northern Command] on his inability to have really a full situational awareness when it comes to threats across the Pole. And perhaps in that future closed hearing, closed meeting we have with you, you can, from the Air Force and Space Force perspective, help us understand how you are working with NORTHCOM to address those known gaps for detecting threats. Can I get a commitment on that from you all? I see nodding heads, but can you say "yes," so the clerk can pick that up?

Mr. ROTH. Yes, sir.

General BROWN. Yes, sir.

General RAYMOND. Yes, sir.

Mr. LARSEN. Thank you very much.

And then, finally—and probably for, I don't know, for Secretary Roth and General Brown—this is a 5G question. It is not necessarily an ABMS question, just to be clear about it. But how are you planning to integrate the use of 5G as your backbone for communications in the structure in ABMS? And are any of the 12 DOD pilot projects on 5G throughout the bases in the CONUS [continental United States], any of those related to learning about how to apply 5G into ABMS?

Mr. ROTH. I can start and the general can fill in some blanks.

Mr. LARSEN. Thirty seconds.

Mr. ROTH. Yes. Okay. Moving data at speed and scale is the essence of the Joint All-Domain Operations. It is the essence of the Advanced Battle Management System. It is the essence of warfare in 2030. So, capabilities like AI [artificial intelligence], machine learning, and 5G are all important aspects of the connectivity that we need to seek for the future.

General BROWN. We are using it, particularly out at Nellis, to help us with ABMS and to learn more about how to use 5G.

Mr. LARSEN. You are talking about Nellis?

General BROWN. Right.

Mr. LARSEN. That is great. Thank you.

Thank you, Mr. Chair.

The CHAIRMAN. Thank you. The gentleman's time has expired.

Mr. Turner is recognized for 5 minutes.

Mr. TURNER. Thank you, Mr. Chairman.

Mr. Secretary, as I have told you personally, I am a big fan of yours. I appreciate your service and your appearing before the committee and your answers today. And I want to thank you for your career of service at DOD.

You come from a finance background. And so, I am going to ask you a question that relates to that. This year we received the budget in June, which means that there is no way, of course, we are going to be able to get any of our work done before the fiscal year. As you know, there is no real rational basis as to why we operate under the fiscal year that we do. It is legislative. We could fix it. We could move the fiscal year to the calendar year, which would save 3 months annually for the Department of Defense. Could you please give us some perspective in your experience as to the effects of continuing resolutions, both financially and capabilities-wise, for the Department of Defense? And would moving the fiscal year to the calendar year help?

Mr. ROTH. Well, in terms of managing on a continuing resolution, I think, for better or worse, unfortunately, we have a lot of experience managing under continuing resolutions. So, I would say short term—and I am talking about a matter of a couple of months—that we have adjusted our spending patterns in a way that we can probably accommodate a fairly short-term continuing resolution, 2 to 3 months, and that type of thing.

Anything beyond that, as you know, the restrictions against new starts or expanding any efforts start to hurt dramatically and start having both contractual and operational impacts as well. So, long-term continuing resolutions are very corrosive and will require a

lot of sort of alternative plan B kinds of things—breaking contracts into smaller pieces, which ends up costing you money in the long run.

Back to your reference to my many years in this building, unfortunately, I can actually remember when we shifted to 1 October. Okay? I was a young pup at the time, but I actually went through the transition. It was back in 1976 and 1977. And the idea there was to provide more time to get all the appropriations and authorization acts done in time, because at the time the fiscal year was 1 July through 30 June. And so, you can see how that worked out.

So, my only caution is—I don't know—work seems to expand to fill the vacuum, so to speak, and I am not sure that that is ultimately a solution. Closing out a fiscal year, in moving the beginning of a fiscal year to 1 January, you are also, then, closing out a fiscal year in December, and that gets to be problematic for the staff. You are talking about Christmas in December and trying to do all the accounting adjustments and contracting to end a fiscal year. So, it just becomes a bit of an administrative burden, but, you know, the track record of actually getting bills done by the beginning of a fiscal year, no matter which date you pick, has always been a challenge.

Mr. TURNER. Thank you, Mr. Secretary. I appreciate that.

General Raymond, thank you for your leadership. You are the first in the Nation to be our Chief of Staff for Space Force. You have made it a point to ensure that there is greater declassification of information as to what our adversaries are doing. That has had a great deal of effect on our ability to debate policy. Would you please talk a moment about that process and how important you believe that is?

General RAYMOND. I think it is absolutely critical. Our goal is not to get into a conflict that begins or extends into space; it is to deter it. And if you want to deter, you have to be able to message to your adversaries.

We have seen both China and Russia develop capabilities and test those capabilities in a very concerning way. This past year, I talked very publicly for the first time about a Russian anti-satellite weapon that was purpose-built to destroy U.S. satellites in low Earth orbit. And that satellite is like the Russian nesting doll; it is the doll inside of a doll inside of a doll. When the doll launches, it opens up, another satellite comes out; it opens up and sends out a projectile—not safe and responsible behavior, not professional behavior. We have called them out, and since that time, Russia has actually come to the table and we have had some strategic dialog talks with them.

So, it is extremely important that the average person understands just how reliant they are on space and understands just how vulnerable they are with the threat that we are seeing today.

Mr. TURNER. General Brown, we have the past three administrations who have supported nuclear modernization and the Ground Based Strategic Deterrent. Could you speak for a moment how important it is that we support and complete the nuclear modernization in light of what our adversaries are doing?

General BROWN. Sure. We need to have a safe, secure, reliable nuclear portfolio that still deters a threat. And so, we do have an

advancing threat, and it is important we keep the Ground Based Strategic Deterrent and other aspects of our nuclear portfolio on track.

The CHAIRMAN. Thank you.

Mr. Cooper is recognized for 5 minutes.

Mr. COOPER. Thank you, Mr. Chairman. You have already noted the stark nature of this hearing. To have General Raymond here as a coequal service chief is, indeed, a historic moment. I have the opportunity to speak with General Raymond with some frequency, so I would like to yield now to Elaine Luria for my questioning.

Mrs. LURIA. Well, thank you, Mr. Cooper.

So, General Brown, I was looking and, in 2009, there was a new, but actually an old concept that emerged called the air-sea battle. And this has the goal of countering what was then termed the A2/AD [anti-access/area denial] threat in the Western Pacific theater of operations. And I think it has already been stated through your remarks here today that you do consider China as our most immediate threat. Looking at this threat, would you consider a conflict with China primarily, if not exclusively, an air-sea battle?

General BROWN. I do think, based on where I see the threat going, it is not just air-sea, but I would also say that the first mover would probably be in cyber and space, which is why I am happy to have General Raymond here with me, and really part of the Department of the Air Force that we can work very closely.

But, just looking at the environment of how quick things could happen, air definitely plays a role. To me, that is an aspect of being able to understand our capabilities in the air as well as watching how the People's Republic of China has really advanced their capability in terms of their air force as well. To me, that is why I really do see both air and sea, but, really, across the joint team and across all domains is where I expect a conflict to occur.

Mrs. LURIA. But, going further with that, actually, they say that no good plan survives the enemy. Well, this plan of developing an air-sea battle, it didn't survive contact with the Joint Staff. So, in 2015, it was consumed in the name of jointness, and a spokesman said that "The missing part of the air-sea battle concept was the land portion." So, just think about that: the missing part of an air-sea battle concept was the land portion. So, I guess the spokesman both forgot about the Marine Corps and, also, the concept within the Western Pacific. Would you agree that it is not part of our plan or strategy or thought that we would actually conduct a large-scale land invasion in any conflict with China?

General BROWN. What I really believe, if you look into where we are today as a joint force, and you look at the joint fighting concept, you are going to have capabilities across all domains, across all services——

Mrs. LURIA. Okay. So, just in the interest of time, do you envision a large-scale land invasion in a conflict with China?

General BROWN. It is kind of hard to predict what would happen, but I want to make sure we have options in the future to ensure that we can use all——

Mrs. LURIA. Okay. So, since this is a budget hearing, I just wanted to shift to your budget submission. Yesterday, we talked to the Navy about their budget submission. One thing remains true, from

year to year, it seems that each service is getting a one-third share. So, in my opinion at least, it doesn't seem that the next large-scale conflict in the Western Pacific, if that were with China, would require a large standing Army, but that is exactly what we have and that is exactly what this defense budget submission calls for.

So, do you agree with that current apportionment within the Department of Defense, one-third, one-third, one third for each service, or do you believe that the Air Force and the Navy require more resources in order to deal with this current conflict?

General BROWN. Naturally, I would like to have more, but I also think it is the analysis that we have to do internal to the Air Force to make the case for the things that we need to support not only the Air Force, but also the joint force. But, as you look at the joint warfighting concept, how we look at the redundancies between the services, how we look at the gaps to ensure we have the right capabilities not only for the Air Force, for the joint force as well.

Mrs. LURIA. Okay. I wanted to point out an article that came out recently called, "The Budget (and Fleet) That Might Have Been"—and they include in their "fleet" Air Force as well—by Blake Herzinger. It suggested a small cut in the Army could yield huge returns for the Navy and the Air Force alike.

And I only have a little bit of time left, but, out of this air-sea battle came a focus on anti-ship weapons delivered from the air. So, several quick questions. How many bombers do you have in the Western Pacific today armed with the AGM–158 and how many AGM–158s did you request in this year's budget?

General BROWN. We don't have a continuous bomber presence in the Indo-Pacific today. And so, we have a bomber task force that goes in and out. And I'll have to get you the exact numbers of the munitions.

Mrs. LURIA. Okay. And how many Quickstrike mines do you have in today's inventory?

General BROWN. I would have to get back to you on that one as well.

[The information referred to can be found in the Appendix on page 102.]

Mrs. LURIA. Okay. And how many bombers will you remove from the Air Force's inventory this year?

General BROWN. It will be 17.

Mrs. LURIA. Okay.

General BROWN. That is in fiscal year 2021.

Mrs. LURIA. Okay. Well, thank you, and I appreciate your comments that you feel you need more resources, but the point of my line of questioning was to say that I really strongly believe that the Air Force and the Navy have a larger role to play in the Western Pacific, and was hoping that you would come here, just as Admiral Gilday yesterday, and advocate for that, because I think this is truly essential to the defense of our Nation and what we might face in the Western Pacific in the future.

And I yield back.

The CHAIRMAN. Thank you,

Mr. Lamborn is recognized for 5 minutes.

Mr. LAMBORN. Secretary Roth, now I agree almost all the time with my colleagues and friends from Alabama, but there is one

issue I have to raise where we do differ. Colorado Springs, although the home of Space Command currently, was rejected in favor of Huntsville for its future home. Now Huntsville has a great history in rocketry, missile defense, and civilian space, but military space is an entirely different world. Operating and defending satellites, both DOD and IC [intelligence community] satellites, is done almost exclusively now in Colorado Springs, where seven of the nine Space Deltas, or space wings, now reside, and one other is nearby in Colorado, and one other is in California. Ripping the command away from operations and moving it a thousand miles away makes no military sense. Our understanding is that this was a political decision made by the last administration, and the Air Force, while initially selecting Colorado Springs, had to go back and scramble to justify a different siting decision.

So, Mr. Roth, last month during testimony, General Dickinson told us that civilians were the bedrock of Space Command and he wants to incentivize as many as possible to move. He also admitted that Huntsville did not have a survivable communications network, which does exist in abundance at the current location in Colorado Springs, and that such a network would have to be built from scratch at great expense in Huntsville. Despite this, the Department of the Air Force said of their basing process that they did not consider the cost of moving civilians or attrition rates and they did not consider survivable communications as a requirement.

And lastly, when General Raymond commanded Space Command, he operated out of Peterson's Building 1. American taxpayers have recently invested millions to upgrade facilities at Peterson in order to enhance Space Command's capabilities. So, the command is even more entrenched there, and yet, the Air Force did not even consider keeping the headquarters in Building 1.

So, how seriously should we view a process that did not consider the cost and attrition rate of moving civilians, the survivable communications requirement, and using existing infrastructure, among many other significant flaws?

Mr. ROTH. The selection of Huntsville as the preferred location by my predecessor was the result of our strategic basing process. And that process is an analytically based process. It uses something on the order of, I think, 21 criteria. In both cases, in both Colorado Springs and in Huntsville, Alabama, both were going to require new buildings. Based on the requirement for something north of 1,400 people, we were going to have to build a building, whether it was in Colorado Springs or whether it was in Huntsville. And it turns out the basic construction cost and the maintenance costs, and the like, in Huntsville was significantly less than Colorado Springs.

I have personally no evidence that the decision was politically motivated. It was the result of our strategic basing process, and we have worked with all the stakeholders to try to do the analysis and we are now in the process of doing the environmental analysis.

As I think you are aware, the GAO [Government Accountability Office] and the DOD IG [Inspector General] are going and looking at it and analyzing it and investigating——

Mr. LAMBORN. Okay.

Mr. ROTH [continuing]. The basis of the decisions. So, I will yield to them and see what it is, in fact, they find. I think the results aren't going to be available until later this year.

Mr. LAMBORN. Okay. Let me interrupt you because time is running out.

So, you will commit to providing the committee with all of the background documents and internal communications of the Department of the Air Force's Space Command decision-making process, both the original one that was scuttled and the second one which was completed in January of this year?

Mr. ROTH. Yes. I think, to a large extent, we already have. We try to make the process as open and transparent as possible. If requested, we will send you the folks who were involved in that decision and we will walk you through the criteria and the math, and all of that. I am more than happy to——

Mr. LAMBORN. Okay. Thank you. Because there are some things still missing there.

And changing subjects, you mentioned the environment, an environmental assessment. Redstone Arsenal has been listed on the EPA's [Environmental Protection Agency's] National Priorities List as a Superfund site since 1994. Was its status as an EPA Superfund site considered during the basing decision process?

Mr. ROTH. Yes, I will have to get back to you. I am not aware of whether it was or was not. We will have to get back to you with that.

[The information referred to can be found in the Appendix on page 102.]

Mr. LAMBORN. Thank you.

Mr. Chairman, I yield back.

The CHAIRMAN. Thank you.

Mr. Courtney is recognized for 5 minutes.

Mr. COURTNEY. Thank you, Mr. Chairman.

And thank you to the witnesses for being here this morning.

I would like to spend a few minutes on airlift, which, again, at the Projection Forces Subcommittee, myself and my colleague, Mr. Wittman, have been very involved with the KC–46, the C–130s programs, as well as the B–1 bombers. So, I actually think the KC–46 path that is now set is somewhat of a good-news story. I think Dr. Roper from the Air Force did a good job in terms of forcing Boeing's hand to get a hardware solution to the RVS [Remote Vision System] problem. I would just note that Congress in the NDAA has kind of put some steel in his spine in terms of making sure that we were not going to accept a platform that was not adequate for the crew. And now, it is all about execution.

Our sort of guiding principle was to make sure that we were listening to TRANSCOM [U.S. Transportation Command] as well as the Air Force during this whole process. It does seem that now the two have come together in terms of a way to use KC–46s in a less sort of intensive, I guess, manner while we are transitioning the fix over the next few years.

General Brown, is that your sort of approach and do you support that? Again, we are careful here not to just sort of accept a half-baked result. We want to get what the taxpayer paid for, but, nonetheless, we have got to move forward.

General BROWN. I am. And the aspect right now with the KC–46—it does have capability to refuel a good portion of our fleet, not only the Air Force, but also part of the joint force, to move cargo, to do air medical evacuation. We are making that capability available to TRANSCOM. I have had several conversations with General Lyons, and we have come to an agreement on how best to do this. It is also helpful because the airmen that are actually operating our KC–10s and KC–135s today are the same airmen that are going to have to operate the KC–46, operate and maintain the KC–46, when it comes off the line. But we have got to make the transition to be able to train that manpower, those airmen, to ensure that we can, as the KC–46 continues to develop its capabilities, we have them available to be able to continue to execute as the KC–46 gains its capability.

Mr. COURTNEY. Well, it makes a lot of sense. Again, it was clear to all of us, though, who took a ride a few months ago—and there was about a dozen or so House Members and Senators—I mean, in a contested environment, though, it is still not ready for primetime until we get the hardware fixed. So, again, it sounds like you found sort of a happy medium in terms of utilization, but we are going to be tracking very closely, because, as I mentioned, we have been very involved in this.

Secondly, on the C–130s, we in the last NDAA put a floor in terms of the size of the fleet at 287 C–130s. Again, there was a little bit of heartburn, I know, from the Air Force when that was done. However, we wanted to see what the Mobility Capability Requirement Study, which has been ongoing, in terms of airlift was going to come back with. We have gotten sort of a—it is a late-breaking development, literally within the last 24 hours or so, but it does seem to validate that the OPLANs [operation plans] and all of the studies show that we do need to have a fleet at roughly that same number.

And we look forward to working with you and your staff as that report gets digested. And I know there was a discussion before this morning's hearing. And again, we will sort of leave it at that for now.

General BROWN. Sure.

Mr. COURTNEY. And lastly, on the B–1 bombers, General Nahom was over at the subcommittee on June 8th, and he testified that, quote, "Until these units"—in other words, the B–21s—"shake hands with the B–1s, we have no intention of going below 45," in terms of the fleet, "because the combatant commanders need that firepower in the next 5, 7, 10 years, until the B–21s start showing up in the numbers we need."

So, I just want to confirm his testimony that we are not going to be retiring B–1s and dip below that 45 sort of minimum requirement. And again, if you could just speak to that?

General BROWN. That is accurate. And that is my intent, not only in bombers, but other capabilities as well, is to make sure we have a good transition between the capabilities we have today and the capabilities we have for the future and minimize risk to our combatant commanders in today's requirements.

Mr. COURTNEY. Thank you. Again, as I said, this has been an area, also, where Congress has been very involved, and we have a

very compressed schedule, as has been said before, in terms of markups. So, we look forward to working with you and your staff.

And with that, I yield back, Chairman.

The CHAIRMAN. Thank you.

Mr. Wittman is recognized for 5 minutes.

Mr. WITTMAN. Thank you, Mr. Chairman.

And I would like to thank our witnesses for joining us today.

Secretary Roth, I would like to go to you. Listen, I am exacerbated. Here we are with an aircraft that should have been delivered as a working aircraft. That is the KC–46A. And we are paying $226 million a copy for a lemon. Every month we hear another Category I deficiency, and we are being told, "Oh, don't worry about it. It has some utility. It can fly." Well, you know, there is not much other than that that it has the utility for. And I am really, really frustrated because, early on, we said, "Why are you accepting aircraft that have these multiple deficiencies, that can't do the mission?" And now, you have an additional cost of keeping other aircraft that you wanted to retire in the fleet.

Listen, the platform is broken. I think the program is irreparable, and the underlying cause is a bad contract. Now we learn that an FMS [foreign military sales] partner is being upcharged up to 1,500 percent for spare parts. That is just unbelievable.

And I find myself asking these questions continually, and I have a question for you. This is a bad contract. Have you thought about recompeting this contract when this contract ends, the current contract ends? Or have you thought about recompeting it this year? Something has got to give on this. We have a number of aircraft that are sitting on the tarmac that aren't even being flown. And we talk about aircrews; we talk about, "Oh, gosh, we're going to get it there." I keep getting promises after promises after promises, and we have tarmacs full of aircraft. And I understand you have got to train airmen and move them onto the next platform, but this aircraft is not fully mission-capable. It is time that something changes.

Acting Secretary Roth, what are your thoughts?

Mr. ROTH. We need to work on the KC–46 and make it the air——

Mr. WITTMAN. No, you don't need to work on it. You need to get it——

Mr. ROTH. Okay.

Mr. WITTMAN. You need to get it to the point where it is functional——

Mr. ROTH. Yes.

Mr. WITTMAN [continuing]. Fully functional.

Mr. ROTH. Well, again, we agree and we have been working with the contractor, as was responded to before. We are going to work on the remote visual system. We are going to work on the boom. And hopefully, they will be ready by fiscal year 2023 or fiscal year 2024.

At this point, we don't see either the economic or business sense of recompeting the contract. We do think it is a good idea to keep accepting aircraft, such as they are. They can do a bit more than I think you give the credit for. And we are going to use the KC–

46 as a node, and as we work out some of the ABMS technology, and the like.

So, our sense is the best——

Mr. WITTMAN. Mr. Secretary——

Mr. ROTH. I am sorry. Okay.

Mr. WITTMAN. Listen, with all due respect, you say it can do a little bit more than we say it can do. We look at Category I deficiencies. It can't hold fuel. It is supposed to be a tanker. You have human waste onboard that it can't seem to hold. The aircraft is full of foreign object debris when it is being manufactured. Those seem like pretty significant things to me. The description of the aircraft as a tanker and it can't hold fuel? I am not sure where you see the utility in saying that this is an aircraft. Yes, it can fly; you can put people in it, but I would argue there are a lot of other aircraft out there that can do the same thing. At some point—at some point—I think you have to take decisive action for this.

Let me move on to another question while I still have some time left. I want to get to, also, what our FMS partners are being charged for spare parts, and potentially, what we are paying for spare parts. It seems as though this is becoming a check-writer for Boeing on a bad contract—1,500 percent upcharge on spare parts. Is this true, and if so, why, and what are we doing about that? That is another element of this that I think is highly problematic.

Mr. ROTH. I need to get back. I don't have all the details on that. So, I take your point for the time being. As I understand, the customer—in this case, Japan—wanted a contract very quickly. We provided it to them, and they are relatively satisfied. But, that said, let me go back and check the facts. Our folks in the acquisition community are taking a look at what actually played out, and we owe you an answer on what exactly happened.

[The information referred to can be found in the Appendix on page 102.]

Mr. WITTMAN. Going back to the contract, it just doesn't seem like to me that the contract in its current state is good for the Air Force, and I would argue Boeing should be looking at this and saying it is not good for Boeing. They have lost over $5 billion with this contract. It seems like, under those circumstances, it would make sense to look at recompeting the contract. It doesn't seem like anybody in this contract is getting what they need.

Mr. ROTH. I take your point. Right now, our business sense is that recompeting it would not, in fact, be a good move. But we will take your point under consideration and go forward. Right now, we think the best thing to do is to try to execute the program as best as possible and fix it. I take your point.

Mr. WITTMAN. I would strongly urge you to look at recompeting.

Thank you, Mr. Chairman, and with that, I yield back.

The CHAIRMAN. Thank you.

Mr. Garamendi is recognized for 5 minutes.

Mr. GARAMENDI. I was hoping that Mr. Turner was here, and why he has made an assault on Christmas, his opening comment at all these hearings—the war on Christmas, Mr. Turner, please.

Moving on, General Brown, you have requested $2.6 billion for the GBSD in fiscal year 2022. The Air Force estimates that we will spend well over $85 billion in the next decade on this system. I sus-

pect that that is probably low, given the history of all of these major platforms. With this price tag continuing to rise over the next decade, what tradeoffs is the Air Force making in the relatively flat budget environment that we have? Perhaps weapons sustainment systems, perhaps the F–35 can be more than 54 percent fully mission-capable. What tradeoffs are you making so that you can fund the GBSD?

General BROWN. As far as the tradeoffs, it is really across our budget we will have to make adjustments to ensure to fully fund the nuclear modernization because nuclear modernization and the triad is really the rock foundation of our deterrent. It supports every one of our OPLANs. It supports and allows us to be able to execute conventionally. And so, there will be a balance between not only our nuclear, but also some other conventional capabilities. I don't have specifics I can give to you to be able to tie one to the other, but as we look across the entire budget, that is where we have to look and how we balance.

Mr. GARAMENDI. Okay. So, the GBSD is your top priority, and the ability of F–35 to actually fly more than 54 percent of the time fully mission-capable is not a priority?

General BROWN. The mission capability of the F–35 is also a priority. You can try to connect the two together, but I think it is a fuller aspect across the entire United States Air Force that I look at. The F–35 is an important program to us as well, just like our nuclear portfolio is.

Mr. GARAMENDI. So, you are satisfied with the F–35 at 54 percent mission-capable and you are not going to put any more money into it? Instead, you are going to fund the GBSD?

General BROWN. I am not satisfied with 54 percent. In fact, I think it is a bit higher than 54 percent. And so, our balance here is to be able to put not only into our nuclear portfolio, but also I am focused on sustainment with the F–35. It increases mission capability. I have had direct engagements with the CEO [chief executive officer] of Lockheed Martin on several occasions, as well as worked with the Joint Program Office to increase its capability, but it is really the aspect of us working together not only internal to the Air Force, but with the Joint Program Office and with our industry partner.

Mr. GARAMENDI. Well, in 2020, which was just 5 months ago, that entire year full mission capability, 54 percent. If you are satisfied with that, then fund the GBSD. Don't take any money out of the GBSD to buy perhaps more engines. I will let that just hang there.

You have a new warhead for the GBSD, is that correct?

General BROWN. We do.

Mr. GARAMENDI. Could you describe the process of the development of that new warhead, which I believe is the 87–1? How is that going?

General BROWN. From everything I understand, it is going well, but it is not only internal to the Air Force, but it is also working with DOE [U.S. Department of Energy] on that warhead as well.

Mr. GARAMENDI. Well, indeed, you are correct, it is the DOE, but they said in testimony just this week that they will not be able to develop the W87–1 pits until well into the 2035 decade. So, it won't

be available as you develop the GBSD, as you intend to deploy the GBSD. So, what warhead are you putting on the GBSD, since the 87–1 will not be available at any time during your deployment period; that is, to 2036?

General BROWN. Well, I have not been privy or been told about the particular issues with the warhead. I will have to get back with you on the specifics——

[The information referred to can be found in the Appendix on page 103.]

Mr. GARAMENDI. Well, presumably, the GBSD was specifically designed for a new warhead. The new warhead will not be available during the implementation of the GBSD; that is, until 2036 and beyond. Are you aware of the additional cost that the NNSA [National Nuclear Security Administration] is planning for the development of the pits?

General BROWN. I am not aware of the cost.

Mr. GARAMENDI. Well——

The CHAIRMAN. Sadly, the gentleman's time has expired.

Mr. GARAMENDI. Thank you.

The CHAIRMAN. Sorry.

Mr. Scott is recognized for 5 minutes.

Mr. SCOTT. Thank you, Mr. Chairman.

Secretary Roth, General Brown, I want to, first, thank you again for your visit at Robins Air Force Base and your commitment to Robins Air Force Base, the home of ABMS. And I know that the President's budget just called for the drawdown of four JSTARS [Joint Surveillance Target Attack Radar System aircraft]. That is something that I am supportive of, based on the advancements in ABMS and the Air Force's commitment to the men and women at Robins and the Georgia Air National Guard.

Could you briefly discuss some of the advancements of the ABMS program? And the Department has called for, in the fiscal year 2022 budget request, $204 million in research and development for the ABMS program. Could you speak to that issue, please, sir?

General BROWN. So, the investment on ABMS, really, aspects of it bring about parts of the digital infrastructure to be able to connect and move information for ABMS. So, that is one part.

The other part that is specific to the capability with the JSTARS is the Ground Moving Target Indicator [GMTI], and that is an aspect we are working at space-based capability, working very closely with the Space Force on bringing that capability together to be able to help provide additional ISR capability from other means from what we do day to day traditionally. And so, it is also one key aspect of it is building out the digital infrastructure, so we can actually move the information that comes from our various platforms, and to include our ISR.

Mr. SCOTT. And so, General Raymond, do you feel, are you comfortable that, as they pull down the JSTARS, that the GMTI capability will be there from space, so that our combatant commanders have that capability?

General RAYMOND. Yes, sir, I am. That program, two things in that program. First, it has recently come over to the Space Force. Secondly, the very first thing that we did was reduce the classification of it, so we can talk about it, so we can integrate it better with

commercial industry and integrate it better with our intelligence partners. Our goal is to build a system and design a system that takes advantage of both of those partners, and I am comfortable, where I sit today, that we will be able to do that and deliver on time for the JSTARS replacement.

Mr. SCOTT. I am absolutely convinced that it has to happen and it has to work. Our enemies have systems that their weapons are significantly faster than they were when our current systems were developed and they are more powerful than they were, and they are also smaller. That makes them harder to pick up, and it means we have got to pick them up further away, if we are going to intercept them before they do damage to Americans at home or our interests abroad.

And so, I don't have any further questions, other than, Secretary Roth, I appreciate your service and your time at Robins Air Force Base. I enjoyed that with you.

And, gentlemen, I appreciate your service.

And with that, Mr. Chairman, I would yield the remainder of my time.

Mr. ROGERS [presiding]. Mr. Norcross is recognized.

Mr. NORCROSS. Thank you.

I appreciate you all being here today.

General Brown, much is being said about the four-plus-one, and one of the key components is the F–35. Yet, in the unfunded priority budget, you did not list any additional F–35As this year, which is a noted exception going past the last few years. Why not? Yet, you included in the unfunded list the power modules and additional parts. Would you explain why that decision was made?

General BROWN. Sure, Representative Norcross.

What I look at, and one of the things we have talked about with members of this committee and others, is the sustainment on the F–35.

Mr. NORCROSS. Uh-hum.

General BROWN. And the other aspect of this is, with the F–35 we have today, it is not necessarily the F–35 we want to have that goes into the future that will have Tech Refresh 3 and Block 4 against an advancing—particularly, advancing Chinese threat. And so, I am balancing between additional F–35s, driving down our average age of our fleet with F–15EXs, but also focus on sustainment. And so, it is a balance there between the F–35s that we already have in the budget, which, even with the unfunded priority list [UPL], the majority of the fighters that we are going to buy are going to be F–35s. But I wanted to put some focus on sustainment as well, because we have talked about that quite often. That is the rationale behind the F–15EXs on the budget, on the UPL, not F–35s, but F–35 sustainment.

Mr. NORCROSS. Thank you.

Continuing on the four-plus-one, and we are looking at NGAD, which there is a considerable amount of money going towards that. And in the past, the Air Force has said time and time again they want to get away from that single-role fighter. To the degree you can in this environment, can you tell us, are you looking at NGAD as a single- or multi-role platform?

General BROWN. I would like to have it be multi-role. But the primary aspect for NGAD is air superiority, and with air superiority, it is an increased weapons load; it is increased range, particularly when you look at operating in the Indo-Pacific and against the threat we expect to see in the Indo-Pacific. So, I look to the future, but what I really look at for all of our fighters is to have multi-role capability to be able to go from a high-end conflict all the way down to homeland defense, and that drives a combination capability. But, really, NGAD is really focused more so on a highly contested environment, to have the weapons load both air-to-air primarily, but some air-to-ground capability to ensure, one, that it can survive, but also provide options for our component commanders and for the joint force.

Mr. NORCROSS. Thank you.

Just to shift back to the KC–46, and much has been said over the course of several years on the contracting problem, but, on the KC–46 and the contract with Boeing now, the mistakes that are being made are on the dime of Boeing versus on us, as most other contracts, is that correct?

General BROWN. That is correct, particularly for the remote visual system. The Air Force has some responsibility for the stiff boom.

Mr. NORCROSS. And the one we agreed to, the remote visual system, is now, quite frankly, as everybody has talked about, is unmatched in the world in terms of its advanced stage of what it can do, correct?

General BROWN. That is correct, and we have done some outstanding work with not only our engineers, Air Force engineers, but also Boeing engineers and others that have provided us some advice on how best to move forward.

Mr. NORCROSS. It was not pleasant getting here, and we have now the newest and best system in the world. And I don't think anybody will talk about making up the time, but, to retrofit a KC–46 with a new visual system versus going out and trying to get a brand-new fighter, the time doesn't come close, does it?

General BROWN. It doesn't.

Mr. NORCROSS. Okay. So, here we are, we ran the race. We are right at the finish line. And somehow, to look at this again seems to me to be insane. And certainly, I have great respect for the folks on the other side of the aisle on this one, but I didn't hear about putting this out for a new contract in the last 4 years, and I am hearing it now. We are so close to the end that I think this would be a grave mistake to do this. Beyond the contract, that is something new. Especially if we held this high of a standard for all the other platforms just in here today, we would have nothing out on the road.

And with that, Chairman, I will yield back.

Mr. GARAMENDI [presiding]. Mr. Norcross, thank you.

Mr. Kelly, I believe you are up.

Excuse me, Mr. Kelly. Ms. Stefanik, Mr. DesJarlais, are they on the screen?

Okay. Mr. Kelly, you are up.

Mr. KELLY. Thank you, Mr. Chairman.

And thank you all for your service and for being here.

I am not a bean counter, but I do know how to count beans. And as a member of the Budget Committee also, I am deeply concerned in what, in my view, is deep cuts to our DOD budget this year. And we rely on your leadership and your advice to the administration to inform them of what our required needs are to be ready to fight tonight and, also, fight the fights of the future. I don't want to go back to planes falling out of the air, airmen dying, to ships crashing into each other, and to those things.

So, I just ask that you guys, if you need something, please stand up and ask. We cannot take these haircuts and 2 years from now pay for that in readiness, which means service members dying. And that is our obligation, to protect the men and women who serve in our uniforms at all costs, regardless of party or affiliation.

That being said, as you are aware, Columbus Air Force Base in my district trains a great many prospective Air Force pilots each year. The 48 T–1A aircraft at Columbus Air Force Base provide prospective pilots with real-world flying experience. While the T–1 has a service life to 2050, and $67.2 million has been spent on upgrades, we have heard the Air Force was considering retiring this fleet in 2023. I have been told this decision resided with the Secretary of the Air Force and today the final decision has not been made. However, upon reviewing the Air Force's fiscal year 2022 budget where funds are provided for more upgrades to the T–1A, it also states that retirements will begin in 2023. Can you please explain where the Air Force is exactly on the T–1A retirement decision?

Mr. ROTH. Yes, let me defer to General Brown because I am actually not up to speed on this.

General BROWN. So, we have actually had conversations back and forth about the T–1, where we need to go as far as whether we retire or not. And this is part of our discussion on some of the initiatives we have associated with the pilot training mix and others. And so, I would tell you, Mr. Kelly, that we have not made a final decision one way or another, and that is part of the analysis that is still ongoing.

Mr. KELLY. Thank you, General Brown. And it is my understanding that the Air Force believes new simulation technology will require less actual cockpit time in the future, but most of this technology has yet to be implemented. Do you believe it is wise to retire a training aircraft with over 25 years of service life left prior to confirming the simulation technology will be as good as real-world flying? And again, this comes to airmen's, our pilots' lives.

General BROWN. And that is part of the ongoing analysis and kind of balancing out between the capability and the technology we have to do today's simulation, at the same time balancing it off against the cost of modernization for the T–1 and some of the other aspects. But I am 100 percent with you that we want to make sure our pilots across our force are well-trained and we don't put them at risk.

Mr. KELLY. And I would appreciate it if the Air Force would provide me, this committee, their analysis and finding as it pertains to the retirement of the T–1. I am concerned with the speed at which we are moving on this.

And I go back just a little further. General Brown, right now, we have a real issue retaining pilots in the Air Force. And I am not a pilot, but I do know that most men and women who join the Air Force, they join to fly. And if we are putting them in simulators instead of aircraft, what that means is they are going to go fly an aircraft for a commercial airline, which we are already having a hard time competing with. So, I would just ask that you guys do that.

General Raymond, in short, I feel like we have left you out today, and I think you are one of the most important—well, I was a real proponent for creating you guys. What needs do you have to make sure that our Space Force gives us the great competitive advantage against our near-peer adversaries? What can we do in Congress budgetwise to help you with that, General Raymond?

General RAYMOND. I appreciate your support. I have appreciated it for years. Thank you.

As I mentioned, we are trying to balance four priorities. We have critical capabilities that fuel our American way of war and our American way of life that are not easily defendable. We have to make that shift. And so, as we come in with the analysis that shows how we plan to do that, we are going to need your support because it is critical to us. We have a design that is purpose-built for a domain that we don't operate in today, and we have got to make a shift and we have got to do it quick.

Mr. KELLY. Thank you.

And my final point, I am an Army guy and I do not think we need to divest in our Army platform, although I do think the Air Force needs more right now and, also, the Navy.

With that, I yield back.

Mr. GARAMENDI. Thank you.

I am going to lay out the gavel order. Members are coming and going for multiple reasons. On the Democratic side, Mr. Gallego, Mr. Moulton, you are up. And then, on the Republican side, we have Mr. DesJarlais, who has returned, followed by Mr. Gallagher.

Mr. Gallego.

Mr. GALLEGO. Thank you, Mr. Chair. I refer and yield to my good friend from Hawaii, who is going to let me stay at his place a couple of times, for a question.

Mr. KAHELE. Mahalo, Mr. Gallego.

And thank you so much for coming today to testify.

I am going to piggyback off of Mr. Kelly's question, as a proud graduate of Columbus Air Force Base, to General Brown in terms of the pilot shortage that you discuss in your testimony and the inability to properly address that. You talk about production and retention, and I want to focus on the production piece.

What has the Air Force done, or is looking at, to address that pilot shortage? We know for a fact the commercial airlines are heavily recruiting our military pilots. There is a pilot shortage in the commercial U.S. domestic airline fleet, and they are going to continue to pull Air National Guard and Reserves and Active Duty pilots from our forces. Are we looking at other ways to raise the age for UPT [undergraduate pilot training] candidates to increase more applicants to the United States Air Force Academy, to recruit more from our ROTC [Reserve Officers' Training Corps] campuses

throughout the country? What are we doing to address that pilot shortage, so we have pilots to fly these aircraft in the future?

General BROWN. Well, there are several initiatives that we have ongoing that are tied to introducing young people to aviation much earlier in high school, junior high school, through junior ROTC, Civil Air Patrol, and summer programs, to create that interest.

Once we have got their attention, part of that is also the techniques we use in different initiatives, different from the way I went to pilot training. And I recall when I went to pilot training, if you were doing well and you were going too fast, you sat down.

But, by being more individually focused and using some of our virtual reality and other techniques to increase our throughput, but at the same time looking to ensure we have the right level of quality, and that is the thing I am proud of, the quality of the young people that we are getting into our Air Force.

On the retention side, it is not only the flying aspect, but it is how we take care of our airmen and their families. Because, often, it is not just the member who loves flying, but, also, particularly, they have a family, to make sure their spouse and their children have those resources. So, it is a combination of things that we have to do as an Air Force, not only produce, but also to retain that talent, not only in the Air Force, but also in the total force.

Mr. KAHELE. Are we seeing at the UPT bases across the country, because of the pilot shortage, that we are not flying or we are not teaching enough students? We are not flying enough airplanes to sustain the four, five UPT bases that we have? That is the appropriate level that we have right now for training?

General BROWN. What I would tell you is that, as I kind of described, in fiscal year 2019, in the numbers we had in fiscal year 2020, particularly during the height of COVID, we were pretty much equal, and COVID actually had a slowdown a bit. And as we come into fiscal year 2021 and continue, we are starting to see our numbers increase.

I think we are on a good path, based on not only just the production initiative we have today, but the additional initiatives we have on Pilot Training Next, UPT 2.5. Also, with our civilian sim instructor locality pay, it allows more of our service members to actually get in the cockpit and fly a bit more. While we have more sim instructors, we are not having them doing the sim. So, we have several initiatives ongoing to help increase our throughput to get to the 1,500 a year, which is our goal.

Mr. KAHELE. Okay. Great.

The last question is for the Space Force. General Raymond, the Maui Space Situational Awareness Lab over on Maui, a critical facility, and they are looking at expanding the tech park there, building a new facility that will support test integration, prototyping for electrical optical sensors, and remote control of those telescopes on Haleakala. Can you share the status of the Maui Space Situational Awareness Lab?

General RAYMOND. Well, first of all, that is a very important lab and a very important capability. One of the great things, when we stood up the Space Force, we also have an operational squadron on top of that mountain.

Mr. KAHELE. Yes.

General RAYMOND. And they didn't talk to each other. And now that we have put everybody under the Space Force, we have consolidated and we are going to consolidate them in one unit. So, we will be able to develop the technology and hand it over to operators, and be able to generate capability much, much quicker.

That facility that you are talking about is going through a design review by the Army Corps of Engineers. I think they just completed last November a 35 percent design review. There's an environmental assessment going on as we speak that is supposed to finalize this November, and then, we will have to secure funding for it. It is currently unfunded.

Mr. KAHELE. Okay. Thank you so much.

And I yield back. Mahalo.

Mr. GARAMENDI. Thank you.

Mr. DesJarlais.

Dr. DESJARLAIS. Thank you, Mr. Chairman.

Secretary Roth, in your posture statement, you indicate that the Air Force is investing heavily in hypersonic weapon systems, and I would like to focus on the testing and evaluation of these systems and the infrastructure that supports this testing. In order to field these weapon systems, we need to test them and ensure that they actually work.

Mr. Chairman, I would like to submit for the record the Department of Air Force's 2021 assessment of the Air Force Test Center.

Mr. GARAMENDI. Without objection, so ordered.

[The information referred to was not available at the time of printing.]

Dr. DESJARLAIS. Mr. Roth, in this report you indicate that the current testing capability and capacity available is wholly inadequate to accomplish National Defense Strategy required hypersonic weapon testing to meet rapid acquisition timelines. What are we doing to address this testing shortfall?

Mr. ROTH. I will have to get back to you with a little more details. But we work with our OSD partners as best we can to try to keep up with the test and evaluation infrastructure. To be honest, it is my experience we always lag by some amount of money.

So, we need to get after it. In order to be able to test the hypersonics, we need the capabilities to exercise them to their maximum extent possible. So, we will look into that and I will get you a more fulsome answer for the record.

[The information referred to can be found in the Appendix on page 101.]

Dr. DESJARLAIS. Well, as you may know, my district is home to the Arnold Engineering Development Complex, where most of the testing takes place. I have seen the poor condition of these facilities firsthand. And as I understand it, if some of these facilities like 16S, 16T, or Tunnel 9 were to go offline due to mechanical failure, we would see many of our most important emerging weapon systems delayed, including the B–21, NGI [Next Generation Interceptor], GBSD, and our hypersonic systems. Are you personally concerned about the condition of our aging and rundown testing infrastructure?

Mr. ROTH. The short answer is yes.

Dr. DESJARLAIS. Okay. Can you just put a fine point on how important it is that we modernize these facilities in the context of meeting the goals laid out in the National Defense Strategy?

Mr. ROTH. Again, I mean, if we are going to go to high-tech capabilities, we are going to go to fifth-generation, sixth-generation aircraft, hypersonics and the like, we need to be able to test them.

Dr. DESJARLAIS. And, yes, I share your concern, obviously, and the folks at Arnold have been sounding the alarms on this issue for years now and are making best of an awful situation, where they are understaffed and underresourced. I think they are being failed.

A lot of people pay lip service to importance of fielding hypersonic weapon systems as our top priority, and if that is truly the case, then we need to invest in our testing infrastructure to resolve this bottleneck and fortify our critical testing facilities. I believe the Department of Defense needs to be doing more and we on this committee need to be doing more as well. I hope that we can continue this dialog and that you can provide this committee with a path forward to address these issues.

I will also be submitting some questions for the record on FSRM [facilities sustainment, restoration, and modernization] funding at Arnold and look forward to your responses on that.

And for anyone who hasn't visited there, it is a gem. There is really nothing like it in the United States, maybe a similar facility in Europe, but it is almost a one-of-a-kind in this country. And some of the architecture and facilities have been working the same for 50–60 years. It is impressive to see how almost archaic some of it looks in terms of the machinery and how the wind tunnels work, but I think it is really essential that we get these upgraded, because, again, everybody talks hypersonic, hypersonic, but it all starts on the ground. If it doesn't work on the ground, it isn't going to work in the air.

So, thanks for your attention to this matter, and I yield back.

Mr. ROTH. Thank you.

Mr. GARAMENDI. Thank you.

The gavel order on the Democratic side is Moulton, Carbajal, Brown; on the Republican side, Gallagher, Bacon, Cheney.

We now turn to Mr. Moulton. He is not here. Mr. Carbajal, you are here.

Mr. CARBAJAL. Thank you, Mr. Chair.

Acting Secretary Roth and General Raymond, this committee has engaged with the Department many times regarding the development of a Space National Guard and Reserve Component. Hundreds of guardsmen in California operate space missions for the Air Force and the Army. In my district at Vandenberg Space Force Base, there are two critical Cal [California] Guard squadrons with space missions. From my understanding, Air Force and Space Force leadership are in agreement on the path forward on establishing a Space National Guard, but yet, no proposal has been submitted to Congress yet. When do you intend to submit the report required in the fiscal year 2021 NDAA and send over the necessary legislative changes for the fiscal year 2022 NDAA?

Mr. ROTH. I will start the answer, and General Raymond can fill in some blanks as well. We are still working it with our leadership

and the Office of the Secretary of Defense, and ultimately, with the Office of Management and Budget as well.

So, it has been an active topic. We concur with you. We are working it as best we can, and it is just a matter of trying to get people's time focused on it. And as soon as we get some clearance, if we get the clearance from the Office of the Secretary of Defense, we would be forwarding it.

I don't know if, General Raymond, you want to——

General RAYMOND. We have been operating with the Guard for 25 years. It provides critical capability, both people-wise and equipment-wise. We can't do our job without them today and we can't do our job in the future without them.

So, what the law said when we stood up the Space Force was, might you do it a better way that could even increase our ability to use those capabilities? We have done the report. It is complete. It is all through coordination. It is waiting for a final briefing. Once approved, it will get submitted to OMB [Office of Management and Budget] to get submitted to Congress. I think we are very close to getting that submitted.

Mr. CARBAJAL. Thank you.

General Raymond, I appreciate your leadership in developing the "range of the future" plan to invest in our launch capabilities. Can you provide additional insight into how the fiscal year 2022 Space Force budget is supporting the "range of the future" concept? What aspects of your plan will be the most difficult to accomplish?

General RAYMOND. The range of the future is vital to us to increase the transaction rates and get more things launched into space. We are launching almost on a weekly basis, not quite that, but the launch rates that we are seeing across our Nation are high.

We have got to reduce the bureaucracy of the range. We have to flatten the range. We have to make it more digital, and we have got that funded and we have got the architecture agreed to. And you are seeing that in throughput through the ranges that is pretty remarkable. We are leading the world in launch, and it is vital to us as we move forward.

Mr. CARBAJAL. Thank you. I appreciated your and Secretary Roth's insight that you provided us up on our visit to Cape Canaveral a few weeks ago. So, thank you very much for that.

General Raymond, to conclude, one of the major focuses of the Space Force was ensuring that space systems can be developed and acquired at the speed of innovation. What are your perspectives on how to fix the space systems' unique acquisition challenges?

General RAYMOND. Yes, we are working that really hard. We have to go faster. We have to go faster, and that has been our focus. With the help of this committee, we stood up a Space Rapid Capabilities Office. They are just 2 years old, and they are already delivering at speed.

In fact, the Space and Missile System Center has been rearchitected. I gave them a challenge less than a year ago to build a space domain awareness capability and develop it in tactical timelines and be responsive in its launch. In less than a year, they have built the satellite. We have put it on a shelf. We gave them a 21-day call-up, and they just launched it successfully yesterday.

We have to drive unity of effort across the Department. We have to reduce duplication. We have to reduce cost, and we have to push authority down to the lower level to be able to move at speed.

Mr. CARBAJAL. Thank you, General.

I yield back.

The CHAIRMAN [presiding]. Thank you.

Mr. Gallagher is recognized.

Mr. GALLAGHER. Thank you.

General Brown, do you share the assessment recently expressed by Admiral Davidson about a potential PRC [People's Republic of China] action against Taiwan within the next 6 years?

General BROWN. I don't know if I would characterize it the same way Admiral Davidson would. But I do believe that we are at risk in the next 6 years, into the next decade, you know, that PRC may have the capability. One of my goals, as the Air Force Chief and as one of the Joint Chiefs, is to ensure we have the capability to deter any type of action like that in the next 6 years, and really for the long term as well.

Mr. GALLAGHER. Deterrence I think is the keyword there. So, if you were to make the case in simple terms that this budget advances us down the field in the direction of a deterrence-by-denial posture, not by-punishment posture, in the Indo-Pacific, what would you highlight as far as what we are doing in order to deter by denial on a 5-year timeframe, not a two-decade timeframe?

General BROWN. One of the areas that particularly the PRC looks at is how they use information, and for us, how we use information as well. And this is the importance of an advanced Federal management system to be able to move data, to drive decision-making, so we can stay one step ahead of our adversary. It is not normally what we do from a Department of Defense aspect, but it is what we do as a nation to understand the environment, the dynamics, and how we are able to use our military capability to sow a bit of doubt into our adversaries. So, the day they decide to do something, it is not going to be that day, based on the capabilities we present and the information we understand, and how we move and react, and really more to be proactive in our approach.

Mr. GALLAGHER. In terms of, I mean, aircraft and sort of physical kinetic things, I would be curious to—expand upon that a little bit.

General BROWN. Sure. Well, really, on the kinetic things, for our weapons aspect, instead of investing in the preferred weapons that we have been using for the past 5, 10, 15 years, it is shifting that investment into different weapons capability, hypersonics, JASSM [Joint Air to Surface Standoff Missile], LRASM [Long Range Anti-Ship Missile], LRSO [Long Range Stand Off Weapon] on the nuclear side; moving forward and putting more RDT&E into those type of capabilities versus the capabilities that we use today that will not be as effective in the future.

Mr. GALLAGHER. I think LRASM is critical. Just quickly on that, when do you anticipate the B–52 will be LRASM-capable?

General BROWN. I don't have those specifics here in front of me, but I will get those back to you.

Mr. GALLAGHER. So, how has the end of continuous bomber presence in Guam impacted Air Force bomber presence in the Indo-

Pacific theater more broadly? Has it stayed flat? Has it gone up? Has it gone down?

General BROWN. It has provided options. And I will tell you, I was the INDOPACOM [U.S. Indo-Pacific Command] air component commander when that decision was made. And we now have more flexibility with our bomber task force and our CONUS-to-CONUS missions. And so, what we end up doing is about three times a quarter we will do a bomber task force for anywhere from 1 to 3 weeks at different locations across the Indo-Pacific as well as three to four CONUS-to-CONUS missions internal to INDOPACOM. That also provides flexibility for the other combatant commands.

It also provides an opportunity to go to locations we don't traditionally go to. For example, we had a bomber in India just this year, the first time we have got a bomber in India since World War II. It is aspects like that that provide us a bit more flexibility as an Air Force. It also helps to increase our readiness as an Air Force as well.

Mr. GALLAGHER. So, has bomber presence increased in other combatant commands now that the assets are no longer tied to Guam?

General BROWN. It gives us more flexibility to be able to—the way I would describe it is we have more flexibility to not have all of our capability in just one location. Our adversaries have to be thinking about the aspects that we can move our capability anytime anywhere very quickly. And that is one aspect that I am very proud of that the United States Air Force provides.

Mr. GALLAGHER. Are there any basing and infrastructure needs in INDOPACOM that are going unaddressed in this year's budget?

General BROWN. Well, from a MILCON [military construction] perspective, there are some things that we—I would have to get you some more details. But, just based on the look at how we invest in infrastructure for weapons storage, for airfield improvements as well, these are key areas that we want to continue to work on to provide us options to be able to operate in the Indo-Pacific.

Mr. GALLAGHER. I would love to follow up with you on that and a couple of other questions. I remain preoccupied with what I am now calling the "Davidson window," and how we can plan on that narrower time horizon, on that shorter time horizon, rather than a two-decade time horizon. And so, I look forward to working with you on that.

General BROWN. Thank you.

Mr. GALLAGHER. Thank you. I yield back.

The CHAIRMAN. Thank you. Mr. Brown in recognized for 5 minutes.

Mr. BROWN. Thank you, Mr. Chairman. Thank you for hosting this important briefing. I wanted to thank Secretary Roth, General Raymond, and General Brown for being here today. There's been a lot of conversation around strategy and structure and platforms and programs, I want to focus my questions on the people, our airmen and guardians.

Secretary Roth, the fiscal year 2021 NDAA included many provisions that promote greater diversity, equity, and inclusion in the Department, in the services, and those provisions enjoyed broad bi-

partisan support. So, I just wanted to ask you the status of some of those provisions. One was that we directed each military service to ensure that its promotion boards represent the diversity of its force. So, can you share with us how the Air Force has implemented that requirement, and if it has not, what is the plan to do so?

Mr. ROTH. Well, we have, in fact, taken the guidance from both the authorization act and we actually had initiatives that were ongoing before that to address exactly the kinds of concerns that you are alluding to. So, first and foremost, let me begin by, we took a diversity-inclusion task force and have institutionalized it. Part of what the authorization act called for was a senior advisor. And so, we now have an Office of Diversity [and] Inclusion, and the head of that office is a direct report to me, to the Secretary, as well.

We have also increased the training for everybody who is involved in the process, everything from selection panels to promotion panels, and the like, to ensure that folks are taking a broader view in terms of how they address both promotions and performance reviews, and this type of thing.

We have a Barrier Analysis Working Group that looks at the kinds of things that might be barriers and any anomalies that might be holding us back.

And what we are doing is taking a very data-driven approach to these kinds of things. We are doing climate surveys. We have something called DEOCS, the Defense Equal Opportunity Climate Survey, and other like kinds of things, to give us some information on exactly how we are doing and where the kinds of issues and problems might be.

So, we are taking a hard look at climate. We are taking a hard look at promotions, as you allude to. We are taking a hard look at how we manage the force across the board.

Actually, in preparing for the hearing, there was the list of all NDAA requirements, and for each one of those, we have an initiative ongoing to implement them.

Mr. BROWN. Well, I appreciate that, and I also do want to commend the Air Force. I have not looked at the Space Force on this issue, although since it is at the service level, the Air Force is the service that covers both the Air Force and the Space Force.

I commend you for establishing that office and appointing the senior advisor.

The Air Force Inspector General found in its independent racial disparity review that black airmen are 72 percent more likely to receive Article 15 non-judicial punishment and are 57 percent more likely to be referred to court martial. And moreover, it found that young black airmen are twice as likely to be involuntarily discharged. It is not the inviting environment, I think, that reflects our values and what we should expect of the Air Force and Space Force, and I have said the same thing to the Army, Navy, and the Marines. What is the Air Force doing to address some of these racially disparate treatments that we are seeing under the UCMJ [Uniform Code of Military Justice] and administrative procedures?

Mr. ROTH. Well, it is a point well-taken. We are familiar with the data and the information that you outlined. We actually have a command justice climate tool that we are using to get after that,

again, as part of our overall effort to have a data-driven approach to this. So, it probably should have been one of the areas I highlighted when I went through my quick summary, but we are also taking a hard look at our judicial and legal processes as well and trying to incorporate to see where we need to change our approach to those.

Mr. BROWN. Well, I appreciate that. I am actually glad you didn't include it in the quick summary because, given what we are seeing under the Uniform Code of Military Justice and administrative procedures, I mean, black and brown airmen are not being treated the way that they ought to be. So, I do commend the Air Force for taking a look and certainly want to see the movement in the metrics, in the numbers, to support that you are committed to making some change.

Thank you, Mr. Chairman. I yield back.

The CHAIRMAN. Thank you.

Mr. Bacon is recognized for 5 minutes.

Mr. BACON. Thank you, Mr. Chairman.

And I want to thank Mr. Roth for being here, and it is great to see General Brown and General Raymond, who I served with in multiple assignments in various capacities. And you guys are doing a great job.

I want to make a statement about passthrough funding, which the Air Force is straddled with, and then, a couple of questions.

First, on the passthrough funding, both services here have vital missions. You have two to three legs of the nuclear triad, strategic warning, air and space mobility, ISR, and most importantly, the ability to hold any target on earth at risk within hours or minutes. And this is why you exist.

The reason why this committee exists is to ensure that the limited dollars the Nation invests in national defense are put to the best possible use. This necessarily involves tough decisions, relies on clear and transparent budget information on where this money is going.

So, Mr. Chairman, I just want to note for my colleagues that the fiscal year 2022 request states that the top-line request for the Department of Air Force is $212 billion. What DOD's budget does not reveal is that $39 billion of that, of the Air Force top line, 18 percent, in fact, is not actually controlled by the Department of the Air Force, which means it neither implements nor advances the force design and operational readiness needs of our Air and Space Forces. So, when you subtract that non-blue amount from the Air Force top line, the actual top line is closer to $173 billion.

So, I submit that this is a Cold War era passthrough budgeting practice, and I think it distorts the public's understanding of our defense investments in air, land, sea, and space. I would guess that most members of the committee aren't even aware of this budgeting practice. I just think it is wrong. Now, more than at any time in our history, every defense dollar must deliver maximum deterrent value, and for this reason, we need to have absolute clarity and transparency.

So, last year, this committee and our colleagues in the Senate both raised this passthrough budget processing as a concern, and we tasked the Department of Defense to find a better way. So the

Department of Defense still owes the committee an answer on how to clean this up, and we are still waiting to hear how they plan to do it.

So, with that, my first question here is for General Brown. The budget request seeks to retire the E–8 Joint STARS along with some of the RQ–4s. Can you tell us how the Air Force plans to ensure ISR requirements are met while retiring a significant portion of the ISR fleet?

General BROWN. I appreciate the question. And I would really characterize it as a small portion of the ISR fleet as we move forward, JSTARS and the RQ–4. What we require for the future, not only for what we see today, but also require for the future, is an ISR capability that is connected, persistent, and survivable. Right now, I have something that is very persistent, less connected, and less survivable. And so, for us as an Air Force it is to be able to transition to that greater capability we require in the future.

An important aspect of that is a dialog I have with the combatant commanders, and I have talked to every single one of the combatant commanders, before they testified, about where the Air Force is headed and how we will actually do our best to help mitigate an incredible demand signal for ISR from the combatant commands and the capabilities the United States Air Force provides, in concert really with the Space Force as well, because the Department does the lion's share of the ISR for the joint——

Mr. BACON. Right. Going to the MQ–9 and a related question, you are going to stop procurement on the MQ–9. With such a large number of MQ–9s retiring each year due to reaching their maximum flight hour limits, how does the Air Force plan to keep this high-demand fleet viable until they can bridge to a new capability?

General BROWN. So, one aspect with the MQ–9 is it is, again, a very popular platform, particularly in the uncontested environment. Based on the previous budget cycles, we will still have MQ–9s coming into our inventory into fiscal year 2025, fiscal year 2024. So, we are not doing so much retirement. We are really going to stop some level of procurement.

The other aspect is our transition to a future capability as well, at the same time modernizing the remaining of the MQ–9 fleet with a multi-domain operation capability that will have the MQ–9s well into the next decade, really to about 2035, or so.

Mr. BACON. Thank you.

I want to segue to electronic warfare for a moment, but I only have about 40 seconds left. I appreciate General Brown's comments that the Air Force has been asleep at the wheel for about three or four decades in this area. For both the air and the space side, do you plan on submitting an electromagnetic spectrum operations strategy or implementation plan?

General BROWN. Really, under the Department of the Air Force, we actually have a strategy that was published in April, and our implementation plan for both services will be published here in the fall.

Mr. BACON. Thank you. I think it is important we catch back up with where the Chinese are at.

And I will just close with a comment, since we don't have time for a question. I know how important Block 4 on the F–35 is. I

hope you keep pressure on the JPO [Joint Program Office] and the other committees to get this fielded on time, and how much we need it.

Thank you.

The CHAIRMAN. The gentleman's time has expired.

Ms. Houlahan is recognized for 5 minutes.

Ms. HOULAHAN. Thank you, Mr. Chair. I am assuming that I can be heard.

And thank you, gentlemen, for joining us today.

I serve on the Military Personnel Subcommittee, where we have been closely examining the allegations surrounding substandard housing conditions in the privatized housing, including infestations of rodents and exposure to mold, and the impact that that consequence has to morale and readiness. So, this is really personal to me because I was a military brat myself. I moved constantly as a child and frequently lived in military housing.

So, my question for Secretary Roth is, in your budget material there are 12,000 units that are assessed to be in good or fair condition, according to the Facility Condition Index. And I would like to know what fair living conditions consist of on a military installation. Are these housing units for the enlisted or for officers, do you know? And have you done an evaluation of who is experiencing more maintenance and more poor housing conditions? So, how are you addressing this sort of discrepancy?

Mr. ROTH. Well, based on the findings and the discussions we have had in the last couple of years, what we have done is increased our focus on the quality of the housing that we have. And so, in each base now, we, essentially, have a housing, you know, a resident advocate or a housing advocate who reports to the base commander in terms of the issues that would come up with the members who live on base, and these kinds of things.

So, we are working on that. We have tried to increase our focus on it. And working with the contractors, we have implemented the Housing Bill of Rights. Out of the 18, I think, elements, we have got 14 out of the 18 that are in effect, and we are still working on negotiating with the contractors on the last 3 or 4.

So, it has become a priority. The Air Force Materiel Command, we are working with the major commands and the bases, and have put renewed focus on that. And the short answer to your question is we plan to get after it as best we can.

Ms. HOULAHAN. And, sir, there are more than 3,500 units that are considered to be poor or failing in their assessment of their condition. And so, my question is, do you know, are there tenants who are asked to live in those poor or failing conditions, or have they been moved? And if they have been moved, where have they been relocated to?

Mr. ROTH. Yes, I would have to get back to you on exactly how many moved and all. I am not familiar with how many have moved. So, we owe you that and we will get back to you with more——

Ms. HOULAHAN. If it is okay, sir, I would love for you to get back to us on that. And I will ask my next question, and maybe we could have that information provided for the record for the last one.

[The information referred to can be found in the Appendix on page 101.]

Ms. HOULAHAN. My next question, sir, is also for you, and it has to do with STEM [science, technology, engineering, and math] talent. Recruitment and retention of people is, of course, one of your priorities, and finding ways to encourage talent to remain in the Air Force is a high priority. During my time in Congress, I have been advocating for investment in STEM education and programming for children and young adults in my community to make sure that we are meeting the demands of the future workforce.

Secretary Roth, as the needs of the Air Force and Space Force adapt to demand to new technical skills for recruits and airmen and guardians, how does the budget reflect meeting the needs for STEM recruitment from our high schools and colleges? Have you been looking, as an example, into the ROTC applicants from minority-serving institutions to address the lack of diversity within STEM fields?

Mr. ROTH. The short answer is yes. And in both services, both Air and Space Force, we value the STEM. We want a digital-savvy workforce in both areas. So, as an example, in the fiscal year 2022 budget, we have $175 million for additional advanced degree programs to try to encourage STEM graduates who might have an interest in the Air Force. We have what we call a Premier College Intern Program as well, where we also are trying to frame a population that will serve us well. We have intern programs like PALACE Acquire and COPPER CAP as well that cross 20 career fields.

So, we are taking a focus on it. At the end of the day, we want a digital-savvy workforce, both civilian and military. And so, it is, in fact, a focus for us.

Ms. HOULAHAN. And that brings us to last year's NDAA, where we were able, my office was able to get in the Armed Forces Digital Advantage Act, which was included and established a policy to recruit, retain, and promote tech talent. Can you share what steps the Air Force and the Space Force have taken since to develop policy on tech talent management that allows us to recruit the right people for our workforce within the Department?

Mr. ROTH. Again, in general, I will have to give you more details. But, in general, it has been an emphasis. It is something that we value going forward. And so, we are taking a hard look at all alternatives and all options we would have along those lines.

Ms. HOULAHAN. I look forward to getting that in more detail from you for the record. And I appreciate it.

And I yield back. Thank you.

[The information referred to can be found in the Appendix on page 101.]

Mrs. LURIA [presiding]. Thank you.

Ms. Cheney, you are recognized for 5 minutes.

Ms. CHENEY. Thank you very much.

Thank you to our witnesses.

First, I just wanted to clarify something I believe Mr. Garamendi was concerned about or discussing, and that was the timing of the pit production for the GBSD warheads. Dr. Vernon has actually briefed the committee that the first pits for these warheads are going to come out of Los Alamos. So, the delays at Savannah River

should, in fact, have no impact on the production of warheads for the GBSD.

Further on the GBSD, I think this is probably one of the most bipartisan systems that we have in the United States Air Force today, approved by President Obama at the time when I think, Secretary Roth, you were in the comptroller's office. It was, then, fully funded by President Trump. Now President Biden has requested $2.6 billion for this program in fiscal year 2022. So, it is a crucial program. Nice to see such bipartisan support for it and for the funding, which I think will be important for us to continue.

As we look at the alternative of some of the life extension programs, when General Dawkins testified before the Strategic Forces Subcommittee last week, he had a figure of $38 billion; that basically, doing an additional life extension program on the Minuteman III would cost the taxpayers $38 billion additional dollars beyond the GBSD cost and, actually, produce a much less capable system. So, I would like to ask both Secretary Roth and General Brown if you have had a chance to look at those figures and if you could comment on the extent to which we are facing, in fact, the ability at much less cost to the taxpayers, if we move forward on the development of the GBSD.

Mr. ROTH. Well, going all the way back to when the analysis of alternatives was done back in 2014, every time we have looked at the numbers and done the analysis coming forward, the conclusion we have drawn is trying to do any kind of service life extension program for the Minuteman III will be more costly, will result in a missile that is not as capable, and with a missile that would be more expensive to maintain.

To date, the GBSD has hit all its significant milestones. It is using the most modern digital engineering processes and procedures in order to go forward. It will have first flight, if the program continues on its current trajectory, it will have first flight around fiscal year 2024, and we will hit initial operating capability in fiscal year 2029. It will be a more capable, a more dependable, a safer, and more secure missile.

So, our inclination is to continue with the GBSD program. If we have to do a SLEP [service life extension program] for the Minuteman III, we have to go back to square one. The industrial base doesn't support that missile yet. It will involve an enormous amount of redesign. And our sense is you will get a less capable missile likely later than you would the GBSD.

Ms. CHENEY. Thank you.

General Brown, do you concur with those views?

General BROWN. I do. I do. Secretary Roth hit all the key points. I have nothing else to add.

Ms. CHENEY. Thank you.

Can you advise, if we were to find ourselves in the position where we had to go back and look at a SLEP, what do you see on the horizon that would be the most likely factor to cause us to have to do that? Would it be Congress refusing to appropriate necessary funds at this point?

Mr. ROTH. I don't know what the circumstances would be, but, again, we think what that result—our responsibility—we own two-thirds of the nuclear triad—our responsibility as a force provider,

and as to organize, train, and equip, is to provide a safe, secure, and reliable nuclear deterrent. And that is the path we are on. If others want to adjust that, then we will have to have that discussion going forward. But our sense is GBSD in this particular area is the best way forward.

Ms. CHENEY. Thank you very much.

And I would just add, I think it is critically important for us in Congress to make sure that we are fulfilling our responsibilities and obligations, not to set us back, and make sure that we continue to provide the funding necessary to move forward in this timely fashion.

And I thank very much all the witnesses, and I yield back.

Mrs. LURIA. Thank you.

And I will now recognize myself for 5 minutes.

And, General Brown, I wanted to continue on our previous conversation. I can understand why you would not want to just come out and say that we need a smaller Army. But if we look at the role of Congress and the Constitution, it is to raise and support armies, and we currently have a very large All-Volunteer Army which is a standing army. And so, in the current situation we are in, and the constraints on the budget, with the current split within the departments, it seems as though we can only work around the edges as far as force structure is concerned.

But I was referencing earlier the air-sea battle, and basically, a plan for that. But no one had any objections to an air-land battle, which we have used over the course of time in preparing for the Cold War and the ground conflicts that we have had over the last several decades.

It seems that that construct is just blind to the current threat and the current environment we have today. And I would say that I continue to feel that both the Air Force and the Navy cannot be funded for the force structure they need and the mission using that construct.

And so, I wanted to go back a little bit to the things you mentioned before. You said that we do not have a continuous bomber presence in the Pacific. Notably, we, obviously, have ships present continuously in the Pacific. And I know that you were the PACAF [Pacific Air Forces] commander before coming to your current role.

I was wondering if you could comment a little bit on how we got to not having that presence in the AOR [area of responsibility].

General BROWN. There were a combination of things that drove that, and part of it was the readiness impacts we were having on the bomber requirements, not only in the Indo-Pacific, but also, particularly, in the United States Central Command. In thinking about our bombers, it is not the conventional capability we have, but it is also their nuclear responsibility as well. And it was a balance between those that drove the discussion on not having too much bomber presence.

Mrs. LURIA. And so, this year, further reducing the bomber fleet is going to further exacerbate that, I would gather?

General BROWN. Not necessarily. And part of it, as we looked at the B–1 fleet, in particular, there is an aspect of having a number of bombers that have a mission-capable rate that is much lower or having a smaller fleet of bombers, where we put our energy and ef-

fort in our manpower against those to make sure they are at a higher mission-capable rate.

Mrs. LURIA. Okay.

General BROWN. And we have seen improvements based on the approaches we have taken.

Mrs. LURIA. Well, thank you, and I would love to gather more information in a different forum about that.

So, some things that I think of, when we think about the Pacific, and we think about what strategy do we need if there is a conflict in the Pacific, some things that are game-changing are a standoff anti-ship cruise missile, like the LRASM, and the ability for minelaying from a distance, both capabilities that we touched on earlier. So, it seems as though those were not things that you highlighted in this year's budget when I asked about them earlier. You did mention LRASM. But, you know, those are game-changers in the Pacific. And we say China is the focus of this budget and the efforts of the service.

So, I just wanted to close out by saying that, you know, not having a bomber presence there, not really leaning in on these capabilities that will be game-changing in the Pacific, I think that our adversaries, potential adversaries, need to know that they are continuously targeted; that we have the resources there and we have actual not only platforms, but weapons to do that and put them at risk. I don't find that present in this budget submission. It is not just that we can be there, that we can send a bomber from CONUS and will be there soon, but they need to know that there is a persistent threat and a persistent presence. Can you comment on the ability of this budget to meet that?

General BROWN. There is a combination of things that are in the budget that will provide us the capability beyond just LRASM, and Quickstrike mining is focused on maritime. I am also focused on the ability to provide advanced weapons like JASSM and JASSM–ER [Joint Air-to-Surface Standoff Missile-Extended Range]. ARRW [Air-Launched Rapid Response Weapon], which is our hypersonic munition, and the Air Force is, I would say, leading the way on hypersonic development. The other aspect is the B——

Mrs. LURIA. Development? It is not a fielded weapon?

General BROWN. It is not fielded yet. But we are leading the way. And I will tell you, and when you look in competition, our adversaries are actually doing hypersonic capability at a faster rate than we are, which is why we have got to pick up the pace in that.

The other is our B–21, not only from a nuclear aspect, but also from a conventional aspect. So, it is a combination of those capabilities that provide us, not just in the maritime, but, as you talked about the air-sea battle, the combination of the capabilities between the Air Force and the Navy to be able to hold targets at risk, both in the maritime environment and in other areas as well.

Mrs. LURIA. So, just to clarify, these are not capabilities that we currently have on hand or will have at full operational capability within the next 5 to 6 years?

General BROWN. For ARRW, I suspect here—I would have to get you the exact, but, based on the testimony, I do see that within the next 5 to 6 years we will have hypersonic capability.

Mrs. LURIA. Okay. Thank you. My time has expired, and I yield back.

And I will call on Mr. Waltz for 5 minutes.

Mr. WALTZ. Thank you, Madam Chair, and General Brown, everyone, for coming today.

General Brown, I certainly appreciate your expertise as the commander of Air Force Pacific, and understanding the geography and the requirements there is critical. I think it is also important that we continue to recognize, this committee continues to recognize, that we have a need for close air support for our special operations community that will remain in 60 to 70 countries on any given day, that are there right now as we speak. So, I appreciate your continuing the work of your predecessor in General Goldfein and supporting the Armed Overwatch Program and supporting Special Operations Command's procurement of that program; the need for a platform that is light, cheap, particularly as we are having a budget conversation; rugged, and able to be colocated with those special operators. And I think, credibly, it is useful to point how much it helps you continue that shift of your fourth- and fifth-gen fleet to where it rightly belongs, in great power competition, by having this platform continue for special operators.

I also want our colleagues to be aware that we just had a third-party study. Thank you for your staff's support of the RAND study that showed the A–10 to be 1,000 percent more costly than an Armed Overwatch Program, the MQ–9 to be 200 percent more costly. I just want to confirm for the record that you still support SOCOM's procurement, which is in the President's budget, of the Armed Overwatch Program.

General BROWN. I do. As a matter of fact, I met with General Clarke, the commander of the United States Special Operations Command, just last week where we had a conversation on Overwatch and where I also talked to him my commitment to continue to support his development of——

Mr. WALTZ. That is great. We still seem to be running into some doubts in Congress, but we now have two Air Force Chiefs, and the Special Operations Command commander named it as his number one priority, and a third-party independent validation of that program. So, hopefully, we can overcome that resistance and get those special operators the armed overwatch that they need.

Switching to ISR, has the Air Force, or have you, discussed your ISR modernization plan with the combatant commanders? And what was their feedback? What effect do you think your proposals in divesting ISR capability will have on the geographic combatant commanders?

General BROWN. I have. As a matter of fact, I have taken the opportunity to speak to each of the combatant commanders, particularly those that are probably the most affected or have the most interest in the IRS capabilities provided by the United States Air Force. What I have articulated to them is exactly what I have articulated to this committee, is we have to make a transition to the future. And I understand that they have requirements, but I will tell you their requirements well outstrip the capacity of the United States Air Force and the joint force as well. And so, what I have talked to them about is how we together make a transition from

where we are today to make sure their successors, the combatant commanders that will be here 5, 10, 15 years from now, have the capability that they will require.

Mr. WALTZ. I would just encourage you to keep a close eye on it. We are the next terrorist attack, and I think, with the withdrawal from Afghanistan, that could increasingly be likely from that spotlight and those demands shifting right back in that direction. Right now, we are preparing for, and hopefully deterring, a future conflict, but that conflict we are still in. I don't think Afghanistan is done with us, even though we are pretending to be done with it.

And just in the interest of time, General Raymond, I just want to talk to you very quickly about Tactically Responsive Launch had a successful launch. I think it is incredibly important that we have backup capabilities to Cape Canaveral, to Vandenberg. I love Cape Canaveral; it is on the edge of my district, but between hurricanes or some type of conflict, if we lose that platform, we need alternatives.

My question, though, is it doesn't seem to be supported in the budget. So, you are affirming that it is a need, but I am looking at where the request is, and would certainly support you in that request, but where is the disconnect?

General RAYMOND. It is very important to us. We have got money and contract mechanisms with eight different small launch providers. We used—we utilized one of those just a couple of days ago for that responsive launch. We have money to modernize our ranges, both at Vandenberg and at the Cape, the range of the future. That is funded; that architecture is funded. We are working on policies with the FAA [Federal Aviation Administration] to reduce duplication of bureaucracy, which we have done. And so, there is a whole litmus test or a whole laundry list of things that we are doing. They didn't require big budget items. It was just making it happen.

Mr. WALTZ. Madam Chair, if I could just——

General Raymond, if you could give me a more fulsome answer——

General RAYMOND. I will.

Mr. WALTZ [continuing]. For the record of when we are going to get—you know, the importance of it, but, then, when you plan to push for funding.

General RAYMOND. Yes, sir.

[The information referred to can be found in the Appendix on page 102.]

Mr. WALTZ. Thank you. I yield, Madam Chair.

Mrs. LURIA. Thank you.

And I now recognize Mr. Moulton for 5 minutes.

Mr. MOULTON. Thank you very much, Madam Chair.

Let me start by just thanking my colleague and Future of Defense Task Force member, Representative Waltz, for his comments on making sure we are making smart investments in the future. And when the study comes out and says that one platform costs 1,000 times more than another, it certainly should raise some eyebrows, but it should also provoke some different decisions.

I think one of the best things, most important things, that members of this committee—indeed, Members of Congress—can do to

support our national security and the future of our defense is to be willing to make tough sacrifices when it comes to the equities that we have in our parochial interests in our districts. I will tell you that the largest employer in the largest and toughest city I represent makes the new engines for the A–10, but I am not afraid to sit here and say that we need to get rid of Cold War era aircraft to make room for new ones. Now just last week, we saw a Senator attack the Department's request to retire 42 A–10s.

General Brown, tell me what can you do with this money? What will you do with the dollars that you can save if you retire these old aircraft?

General BROWN. I appreciate the question. And as you described, what we will be able, then, is be able to put that money into future capability and really drive down all sorts of standing costs. As was just mentioned, when it costs 1,000 or 200 percent more to operate, we are able to take that money and that savings and put it into modernization; we put it into sustainment, and will be able to put into manpower, to be able to operate the new capability.

Mr. MOULTON. And do the alternative systems that can replace the A–10 have the same capabilities?

General BROWN. By and large, they do. And I'll tell you from my experience—not only as the INDOPACOM commander, but I was also the air component commander for the second year of the Defeat ISIS [Islamic State of Iraq and Syria] campaign—when a JDAM [Joint Direct Attack Munition] comes off an airplane, it doesn't matter whether it is an A–10, a B–1, or a B–52; it is still going to have the same impact. And it is those things that we are able to do a bit differently and use all of our capability, and to be able to be multi-roled, which is important to me, not only as an Air Force officer and an air component commander, but I also think for the joint force as well.

Mr. MOULTON. What is the risk of not retiring old legacy systems to be willing to invest in new capabilities?

General BROWN. I put it in really four categories, which I have kind of already highlighted. It would be in modernization, manpower, maintenance, and operational risk.

We need to be able to modernize to make sure we have the capabilities against the future threats that we already foresee that are coming our way, particularly with the People's Republic of China.

From a manpower standpoint, many of those airmen that are operating and maintaining the equipment we have today are the same airmen that we are going to need to put on that modernized equipment. And we have got to make a transition because they don't get trained overnight to be able to bring on that capability.

From a maintenance and sustainment piece, the longer we hold onto older aircraft—and what we have seen is our aircraft break more often; they take longer to fix, and it takes more money to maintain them—that is also costing us.

And then, last, but not least, is operationally. It impacts our readiness. It impacts and puts airmen and other joint teammates and our allies and partners at risk when we have substandard equipment, or substandard to the threat, their capability. And then, most importantly, it puts some of our national security objectives at risk as well.

Mr. MOULTON. Well, yesterday, we heard from numerous colleagues of mine on this committee how shameful it is that our Navy fleet is so much older than the Chinese fleet. Well, here we have an opportunity to modernize our aircraft, and I think we should take it.

General Brown, hearing this from the Navy and the Marine Corps as well, General Berger called for a hearing on modernization, where we can discuss the risks and benefits of freeing up resources from less relevant systems for future modernization. Do you agree that such a hearing would be useful, and if it is scheduled, would you agree to participate?

General BROWN. I welcome the opportunity and I would be very happy to fully participate in that.

Mr. MOULTON. Thank you.

Someone is not muted, but I shall continue.

In your joint statement, you highlighted suicide prevention as one of your top priorities for the airmen and guardians within your service. I am personally very passionate about mental health/suicide prevention in the military, and later today, I am formally introducing the Brandon Act, which would create a mechanism for service members to seek help about suicidal ideation outside of their chain of command. I am under no delusion that the Brandon Act will solve all the military's problems regarding suicide, but it is a step in the right direction and has a signoff from organizations like TAPS [Tragedy Assistance Program for Survivors], American Foundation for Suicide Prevention, and others. We have received pushback from DOD about the Brandon Act, but no alternative suggestions have been put forward.

Will you give your support to measures like the Brandon Act that provide a release valve in the worst-case scenarios?

General BROWN. I will.

Mr. MOULTON. Thank you, General Brown.

I yield back.

Mrs. LURIA. Thank you.

And, Mr. Johnson, you are now recognized for 5 minutes.

Mr. JOHNSON. Thank you, Madam Chair.

Secretary Roth, it was great having you at Barksdale recently to see firsthand the great work our airmen are doing in northwest Louisiana. And as you are aware, the work done on base is critically important to maintaining our national security, especially as we continue our ongoing nuclear modernization efforts.

As you know, one issue I am particularly interested in is the ongoing struggle to construct the new entrance gate and the access road at Barksdale. The State and local governments have invested considerable amounts to construct the interchange that will allow traffic to flow to the new gate from the interstates. The point is that the State and local governments have held strong to their end of the bargain and committed millions of dollars to the project, based on assurances that the Air Force will see the project through. To be frank, the Air Force has fumbled the ball on this critical project.

First, the project was severely underbid, and then there was an unwillingness to reprogram funds to solve that shortfall. So, I certainly appreciate that the new gate was listed on the Air Force's

unfunded priority list for this fiscal year; I am grateful for that. And I am going to work with all my colleagues to make sure we get this squared away once and for all.

But my question is, Mr. Roth, will the Air Force commit to seeing this project through and to reaffirming to stakeholders that they can trust, when the Air Force says it is going to do something, that that promise will actually be kept?

Mr. ROTH. Yes. I mean, we are committed to working with our partners here to make sure that the project happens.

Mr. JOHNSON. Thank you for that.

And on a different note, I was very pleased to see the line item in the fiscal year 2022 budget request to construct our Weapons Generation Facility at Barksdale. That has been a big focus of mine and many in the Louisiana delegation for some time now. Can you or General Brown comment on the strategic value that a WGF at Barksdale will bring to our country and the versatility that it will provide to the Air Force in ensuring that we have a strong strategic deterrent?

General BROWN. Sure. The Weapons Generation Facility will actually make it much easier for our airmen to be responsive in how we actually generate combat power, particularly from our bomber bases and from our nuclear bases that support ICBM [intercontinental ballistic missile] fields. And so, not only for Barksdale, but for the other locations where we actually build out Weapons Generation Facilities and modernize our capability to match up with not only the technology and platforms we are providing, but also to make sure it actually works well to support us against whatever threats might come our way.

Mr. JOHNSON. Thank you for that, General.

On the strategic importance of the aircraft itself, in the past year we have seen B–52s from Barksdale and elsewhere deployed all over the world, from Europe and the Middle East over to the Indo-Pacific. And according to the Air Force, the current B–52 engines will become unsustainable by 2030. Secretary Roth, what is the Air Force doing to ensure the B–52s' engines are replaced before that looming deadline?

Mr. ROTH. We have an ongoing acquisition program to replace the engines, and not only that, but we have actually put that program on the new, modern, accelerated acquisition kind of a process. We are using some of the authorities that we have gotten over the last couple of years. And so, our estimate is, using some of the so-called mid-tier acquisition authorities, that we will be able to shave about 3 years off the acquisition lead time in order to make that happen.

Mr. JOHNSON. We are very grateful for that prioritization. And as you and I were walking beneath those big birds, the B–52s, not long ago, I remarked about the engineering marvel. That that will be a 100-year aircraft it is projected, that is really amazing.

General Brown, in the limited time I have left, with the limited availability of the B–1 and the B–2 bombers right now—and the B–21 is still in development—what would be the impact of a significant delay to the B–52 re-engining effort from an operational perspective?

General BROWN. It will actually decrease our operational availability. And that is why going down the path of the modernization in the engine as well, as you described, nearing 100 years old, it is important that we make the right efforts to continue the modernization, so we have that operational availability and the flexibility to provide air power anytime anywhere in support of our combatant commanders.

Mr. JOHNSON. Well, I am out of time. I will yield back.

But I just thank you all for your service very much, and thanks for your time today.

I yield back.

Mrs. LURIA. Thank you.

Mr. Horsford, you are now recognized for 5 minutes.

Mr. Horsford, appears frozen. Do you want to test your audio, Mr. Horsford?

Mr. HORSFORD. Thank you, Madam Chair. Can you hear me okay?

Mrs. LURIA. Yes. Mr. Horsford, you are recognized for 5 minutes.

Mr. HORSFORD. Thank you very much.

And thank you to our witnesses for testifying. General Brown, thank you for being here today; General Roth, as well.

I wanted to start, first, regarding the MQ–9 Reaper. I was disappointed to see that, for a second year in a row, the Air Force is trying to end procurement of the MQ–9 in the fiscal year 2022 Presidential budget request. As I am sure you know, the MQ–9 plays a critical role in my district. Creech Air Force Base is the central hub for global intelligence, surveillance, and reconnaissance operations, as well as hunter-killer operations. The airmen of the 432nd Wing play an irreplaceable role as the eyes and ears of our deployed commanders, protecting our troops and interests 24/7 365 days.

Last year, despite the Air Force's attempt to, first attempt, to end production, MQ–9 combat lines were the number one unfunded priority for the U.S. Central Command. So, it is with good reason that in the last NDAA Congress prevented the Department from ending MQ–9 production, and instead procured an additional 16 aircraft. This procurement was a positive step towards meeting the needs of the joint force, but the demand for MQ–9s by combatant commanders still far outweighs what the Air Force can currently resource. Many of our combatant commands have very little persistent surveillance capability and are leasing contractor-owned, contractor-operated MQ–9A combat lines to mitigate their ISR collection gap.

So, I am concerned that shutdown of the MQ–9A production line or a reduction of the MQ–9 combat lines, with no fully funded followup capability at scale, leaves the Nation's warfighters to make do with an already insufficient number of MQ–9As and poses a risk to the combatant command's ability to conduct operations.

So, General Brown, is there currently a program of record to replace the MQ–9?

General BROWN. There are several programs of record that actually, as we look at our ISR portfolio, that will not only—I wouldn't say "replace" the MQ–9 because the MQ–9 will actually be in the force into the middle of the next decade, but it is the force mix of

capability that is required that includes the MQ–9, but other platforms. What likely we will be able to do is come back to you in a classified briefing to provide you some details on those other programs.

Mr. HORSFORD. Thank you. And again, I understand the constraints the Air Force is grappling with in this year's budget. I further understand and support the bias the services must have towards modernizing to win in the future operating environment. And while I support any efforts the service may be making towards the next-generation capability, we cannot overlook the incredible value the MQ–9 platform provides to commanders today. The MQ–9 is the most cost-effective platform the Air Force owns. It flies 11 percent of the total Air Force flying hours at only 2.6 percent of the Air Force's total flying hour cost. So, no other aircraft provides this much capability at this cost point—none.

So, this leads me to my second question, General Brown. Would continued procurement of the MQ–9 at levels consistent with the fiscal year 2021 NDAA place potential development of next-generation unmanned capabilities at risk?

General BROWN. I appreciate the question, but I would say it would. And this is where, as the Air Force Chief of Staff, and as I look to the future, it is how we balance between our current capabilities to support today's requirements with the MQ–9 that will be here until the middle of the next decade, but also having capabilities so that we can actually still be able to operate into the future. It provides ISR capability that is not only persistent like the MQ–9, but it is connected, and also survivable in what I expect potentially to be a highly contested environment in the future.

Mr. HORSFORD. Thank you, General Brown. And I look forward to following up with you and working closely with the Air Force to protect this vital capability.

Thank you, Madam Chair, and I yield back.

Mrs. LURIA. Thank you, Mr. Horsford.

Mr. Carl, you are recognized for 5 minutes.

Mr. CARL. Thank you, Madam Chairman and Ranking Member Rogers.

Gentlemen, I would like to talk about the KC–46. Although I am a freshman to Congress here, I am not a freshman in the KC–46 program. I was actually part of the team that put together the package with Airbus to bring it into Mobile, Alabama, which we do have it there now, Airbus USA. So I am very familiar. We won the contract; we lost the contract; we won the contract; we lost the contract.

So, here we sit 10 years later, we are 7 years behind delivery on this project so far. Now we are being told it is going to 2024 before it is ever delivered—2024 before it is ever delivered. That is going to put it, roughly, another—it is going to put it 10 years behind, roughly, not to mention all the upcharges on the spare parts.

My question is to you, General Brown. Our fleet, our fighters that are in Europe, do I understand it correctly that we are refueling those in behind an Airbus tanker in Europe right now?

General BROWN. Actually, our fighters and aircraft all across the world operate with their allies and partners. The bulk of our air refueling is done by——

Mr. CARL. But we do have an Airbus that can refuel it?

General BROWN. We do.

Mr. CARL. Okay.

General BROWN. But we also have a number of other capabilities, mostly the United States Air Force using the KC–135 in Europe.

Mr. CARL. Okay, the KC–135. But we are paying right now for a KC–46 being delivered, and it has got practically no use for what it was actually being built for at this moment.

So, my next question is, Mr. Roth, knowing that we have got an aircraft that can be built in America, that could have been already delivered because we are up to about three a month coming out of Mobile right now—not this particular plane, but, basically, the same scale—why are we not bringing this back up for a bid? We are 4 years down the road today, or 3 years down the road today, according to Boeing's numbers, which could easily change to another 3 years.

Why are we not looking at splitting this contract up? Where is our sense of loyalty here? Are we more loyal to—and I don't mean to put you on the spot, talk down to you this way, but the taxpayers are paying for something we are not receiving. So, I show no loyalty to what Boeing is doing to us here. So, my question is, why are we not rebidding this and looking at it again?

Mr. ROTH. Again, as we discussed this morning, our sense from both an operational and from a business management perspective right now is to try to make the current contract work as best we can. I take your point in terms of the history of the contract, but we think we would be best served. We are concerned that, if we try to go into a new contractual vehicle, that that would put additional delays into the program that we simply don't think would be efficacious for us. We are in a mode of accepting the KC–46s. We are trying to rightsize the tanker fleet by retiring older tankers while we bring the KC–46 in. I will take your point. We will look at it. But, right now, our business sense is that we need to work with all our stakeholders to make the KC–46 program work as best we can.

Mr. CARL. In all due respect, sir, I have been in business for my entire life. If I had a contract with somebody and I was 4 years behind delivering or 10 years behind, I think they would have a right to even ask for a discount. I brought that up at one point, which everyone laughed at me on the discount idea. But we are dealing with—yes, that is okay. I have had several laugh at me about that.

But, please, let's take a look at this. It is not just building the aircraft in Mobile. It is not just building the aircraft with a company that is in my district. It is about building an aircraft. I am worried about our Air Force and our refueling possibilities of our aging aircraft. It is a huge issue that I think we really need to push to the front of profits of anybody—anybody.

And I respect you all's job. I respect you being here today and I appreciate your service to this country.

And, General Raymond, I am sorry we don't hit you with tough questions today. You get a free ride.

Okay. Well, thank you, and I return my time back. Thank you.

Mrs. LURIA. And thank you, Mr. Carl.

Mr. Franklin, you are recognized for 5 minutes.

Mr. FRANKLIN. Thank you, Madam Chair.

A number of my previous questions have been asked. So, I have got one that may be a little unfair for you, but I want to ask it anyway, just because it is something that I am curious about as we get all these posture hearings.

But a lot of talk in both written and oral testimony about the threat of China. We all know that. That is not just what we are hearing here today. It has come from all the other services as well. But I notice in the written testimony, and as we have seen in all the other services, the talk of climate change. I am curious, Secretary Roth, is there money allocated within this current year budget for climate change programs or anything that the Department of the Air Force or the Space Command have any purview over?

Mr. ROTH. There is money in our budget. For example, we budgeted $68 million to, essentially, improve our installation resilience, taking a look, for example, at power sources and water sources, and see if there is some targeted investments we can make to improve our resilience in that area. We also have, as part of that $68 million, we will look at where our cybersecurity vulnerabilities are on bases, and we also look to see where we can make some improvements in our emergency management procedures, and when something does happen, what are some improved procedures and processes that we can put in place. So, that is the only money I am aware of that is explicitly targeted for climate change installation resilience.

I would also say, in terms of our operational requirements, operational resilience is very important to us as well, and particularly, aircraft engines. In the total DOD enterprise, we, the Air Force, use about two-thirds of the fuel that is spent by the entire DOD enterprise, largely driven, obviously, by our airplanes. And so, to the extent that we can invest in new technologies as we re-engine, for example, the B–52, or as we look to the next-generation aircraft, if we can reduce the fuel consumption by some significant percentage, that would be an enormous readiness improvement because it would reduce our logistics footprint, as we try to do agile basing and moving people around as well. So, we also have some targeted investments that predate some of this to look in terms of, can we reduce our fuel usage and reduce our logistics footprint as well?

Mr. FRANKLIN. All right. Thank you.

It is just a concern to me that our Commander in Chief says that the number one threat to the United States national security is climate change, and yet, I am not hearing that coming from the services. I am just glad to know that, even though the top-line budget isn't what most of the services would like, that you are not specifically feeling the haircut on that with climate change initiatives. But thank you.

And I yield back, Madam Chair.

Mrs. LURIA. Thank you, Mr. Franklin.

Mr. Green has rejoined us. Mr. Green, you are recognized for 5 minutes.

Dr. GREEN. Thank you very much. I thank the chairman and, of course, ranking member.

And I want to thank our witnesses for being here today.

The United States Air Force is clearly the best air force in the world, and I think it is a combination of Congress making sure that you have the resources that you need and great predecessors and your work. To the generals who are here for us today, General Brown, your work, your predecessors' work in leading the institution of the United States Air Force to greatness—I have deployed many times as an Army physician and infantry officer with the support of the Air Force. And I must tell you, when you talk about cutting A–10s, we Army guys get really scared about that, but I understand.

I also want to thank you. I have listened in and out today, because I have had to go back and forth between HASC [House Armed Services Committee] and Foreign Affairs, to the comments about China and the pacing threat, and I really appreciate the recognition of that.

My first question is really about their increased activity in Taiwanese airspace, you know, the invasions of Taiwan's airspace. We built our military to deter first, and then, when they can't deter, then fight and win the wars. Do you feel as if this increase in Taiwan shows that perhaps our deterrent effect with China has deteriorated or isn't where we need it to be?

General BROWN. What I would tell you is there is probably a combination of the two, in the fact that, as you see, the People's Liberation Army Air Force continue to increase its capability and its operational tempo, which I saw as the PACAF commander in watching how they were, actually, in some cases based on world events or regional events, will increase their tempo to put pressure on our partners in the region. We see that with Taiwan. We saw that recently with Malaysia. And it is a technique that has been used by the Chinese to put pressure on us.

At the same time, though, I think the ability of the United States Air Force with our joint partners, particularly being able to operate in international areas to fly, sail, and operate whenever international law allows, is an important aspect to discredit the activity by the Chinese.

Dr. GREEN. Yes, the question is deterrence, of course, and we want to make sure that that mission of deterrence is—that you guys are excelling at that. So, I just want to make sure you are properly resourced to do that, so that these kinds of escalations don't occur, because that is where the danger is.

A quick question, and I know the point has been made earlier, but, you know, if a cut in inflation-adjusted dollars, you know, if you have a spending increase and it is less than inflation, you have a real dollar decrease. And it looks like, according to our analysis, you are going to wind up with, at DOD at least, a $4 billion cut. I know that President Biden is not a fiscal conservative. They are increasing the non-DOD non-discretionary spending by 16 percent, significantly above inflation. Yes, I have a real—you know, going back to that question of deterrence, going back to this pacing threat, I mean, are these cuts going to cause you an inability to do that deterrence mission, and that, if deterrence fails?

General BROWN. I will tell you it makes it more challenging. And the aspect of not having adequate funding or having an Air Force

the size that is required to execute what has been asked of us, does create additional challenges. And this is why it is important for us to really do the right analysis, wargaming, to lay out the best capability for the best force mix for the United States Air Force in support of our joint teammates and working, also, with the rest of the other services, to ensure we have the capabilities to be able to deter, as you describe.

Dr. GREEN. If I could get to that sensitive topic of the A–10s, and I really just would love to hear assurance that, as we downsize that force to make it more cost-effective from a maintenance standpoint, we are still able—that close-air support mission that we rely so much on the Air Force for and the Army, I want to know that it is on your radar screen and what your plans are to make sure that that mission is still excelled.

General BROWN. It is definitely still on our radar screen. This is why the A–10s that we will have remaining—and they are really the bulk of the A–10s that we will have remaining because we are only reducing a small percentage—will still be modernized. And that mission set for close air support is not only with the A–10, but it is other capability that the United States Air Force provides to do close air support as well. So, it is definitely on our radar.

Dr. GREEN. Understand.

Thank you. Chairman, I yield.

Mrs. LURIA. Thank you, Mr. Green.

Mr. Jackson, you are recognized for 5 minutes.

Dr. JACKSON. Thank you, Madam Chair and Ranking Member Rogers, for holding the hearing today.

I also want to thank Secretary Roth, General Brown, and General Raymond for being here today. Thank you, sir. During my brief tenure in Congress, I have met many people, more people than I can count, from DOD. However, the Department of the Air Force, including all three of you, have been phenomenal in working with my team. And I want to tell you, thank you.

General Brown, you were the very first DOD senior leader to reach out to me and introduce yourself, once I was elected, and I really appreciate that. Thank you, sir. Your leadership has set an example for the rest of the Air Force, as has the team at Sheppard Air Force Base. They directly welcomed me with open arms from the base, from base leadership all the way down to the young airmen that I got to speak to when I was there just a few weeks after being sworn in. So, thank you, sir, for that, and the leadership there.

General Brown, I greatly appreciate your offer to come visit Sheppard Air Force Base with me, I think to see the NATO [North Atlantic Treaty Organization] jet pilot training program on the base later this year. I look forward to seeing that happen. My staff is going to work with your staff, and hopefully, we can find a time and get that scheduled. Thank you, sir.

My first question, the current child development center [CDC] at Sheppard Air Force Base was constructed in 1973 as a military detainment facility initially. Earlier this year, Secretary Roth sent me a letter stating that Sheppard CDC was going to be the number one priority for CDC MILCON [military construction], and the Air Force. I have the letter here. Madam Chair, I ask unanimous con-

sent that this letter received from Secretary Roth be entered into the record.

Mrs. LURIA. Without objection, so ordered.

[The information referred to can be found in the Appendix on page 97.]

Dr. JACKSON. Thank you, Mr. Roth. I greatly appreciate your engagement. Thank you, sir.

I also appreciate the follow-through, as I was glad to see full funding for the Sheppard CDC military construction project in this year's budget request.

Mr. Roth, I just wanted to confirm that this is still a top CDC MILCON project for the Air Force.

Mr. ROTH. Yes, sir, the fact that it is in the budget I think answers your question.

Dr. JACKSON. Yes, sir. Thank you.

My second question, I want to shift to the CV–22 nacelle improvement modifications. This work will increase overall aircraft readiness and availability. It will reduce platform operating lifecycle costs and mitigate the impacts to the aircraft performance and survivability. These all sound like critical improvements to me. So, we need to bring as much of this work forward as we can.

Mr. Roth, could you explain to the committee exactly what the CV–22 nacelle improvement program hopes to accomplish, and does the Air Force support accelerating the CV–22 nacelle improvement program?

Mr. ROTH. Yes, to the best of my understanding. I had to learn a little bit about this, but, yes, for this hearing, but it is, in fact, a critical area for the CV–22, providing the unique ability to fly vertically and horizontally. So, the improvement effort, which is occurring at Bell's Amarillo Assembly Center, will improve our readiness and it will reduce our repair time associated with the nacelle. So, we structured a contract to accommodate and accelerate its purchase, and if additional funding becomes available, we will accelerate it perhaps even further.

Dr. JACKSON. Thank you, sir. The workforce at Bell in Amarillo stands ready to complete that work.

The last thing I would like to talk about real quickly is the Advanced Pilot Training Program and the new T–7A Red Hawk, which will be replacing the aging T–38 fleet. Some of these T–38s have been flown in my district over 50 years, and we have seen too many of these aircraft with serious safety issues. When I was reviewing the budget request for this year, I noticed that funding for the Advanced Pilot Training Program was decreased relative to what last year's Future Years Defense Program had laid out.

General Brown, is this program that has seen a cut because of the proposed overall budget decrease that is not in line with the National Defense Strategy? And can you tell us what has changed regarding the new request or requirement, and what are the potential consequences of this decrease in funding?

General BROWN. Well, the decrease in funding, particularly on the T–7, was based on milestone C and some technical issues that had that slide a bit to the right. Our focus and commitment to the T–7 has not waned. We just want to make sure the money aligns with where the program is.

Dr. JACKSON. Yes, sir, well, I appreciate that. And I will do my part on the committee here to try to make sure that we meet our commitment there.

Thank you all for your responses. I am in favor of finding ways to save money where we can, but investments in our Air Force and our people are going to be critical to ensuring we are able to compete and win on the global stage. I look forward to working with each of you and my colleagues here on the committee to address the pacing threats and the accelerating threat that we face, and to provide our young men and women the training and the resources they need to accomplish their mission.

With that, Madam Chair, I yield back.

Mrs. LURIA. Thank you, Mr. Jackson.

And I will now recognize our last member to ask questions. Mr. Moore, thank you for your patience. And our witnesses as well, thank you for staying to answer all of the members' questions. Mr. Moore, you are recognized for 5 minutes.

Mr. MOORE. Thank you, Madam Chair. I am last on the list, but number one in our hearts, I think, right?

[Laughter.]

I am going to echo what Representative Jackson said. In my 6 months, the three of you stand out as being extremely available and willing to be collaborative, as we solve problems, as we work to celebrate wins, and interact. I view our role as that from Congress with the Department of Defense. And you three exemplify that. So, thank you for that time that you have spent with our team.

I will be very plain here. The budget is inadequate. That has been discussed. One thing that I was excited to see was that the GBSD program is funded, fully funded, through fiscal year 2022. As I have dug into this issue, I also keep it very simple, in that nuclear deterrence has saved lives on this globe; it has reduced conflict; it is a part, and should be a part, of our strategy going forward. And if that is the case, we must invest in it. It is very simple and very clear to me. I get that there is a lot of complexity with it, and we are willing to dig into those details, again, in that collaborative way, but the data are clear and we have seen too much success to let that go by the wayside. So, it is an area that we are focused on. I will ask a couple of questions on that to Secretary Roth.

Can you just share with us anything, in particular, as we wrap up today's hearing? What is being done to ensure that that stays on track?

Mr. ROTH. Well, again, you and I had the opportunity to visit the program offices on both the government side and on the contractor's side. And what I walked away very impressed with is on both sides they are using the most modern techniques, the most modern digital engineering, the digital trinity in terms of using open systems architecture, agile software, using the digital engineering, and the like. So, so far that has been working out extraordinarily well, and both sides claim that they are committed to going forward. So, they've hit every significant milestone to date, and that is a good sign, early in the program to be sure, but they are hitting every milestone so far.

And to your point, we take very seriously our piece of the nuclear triad. We own two-thirds of the nuclear triad. This is the ground portion of that. And so, it is in all of our interest.

We have lost margin in terms of delaying this as long as we have delayed it. So, we need to get on with it. If there is any significant delay in the program, it increases risks dramatically, and that is not what we want to do.

Mr. MOORE. Okay.

Mr. ROTH. So, it is incumbent now on the program managers to keep the program on track, and I am very confident that we have excellent leadership on both sides.

Mr. MOORE. Excellent. And that was the next question: are there any additional consequences by delaying it—some members have suggested doing that—to allow for less pressure on the Air Force budget? What would you see as any particular consequences in delaying it?

Mr. ROTH. Well, again, in a sense, you are where you are. We have delayed making a decision on the Minuteman III and its follow-on for a decade or more. And so, we have lost margin, period. And so, if we want a safe, secure, and reliable nuclear deterrent that is an ICBM, GBSD is it.

Mr. MOORE. Excellent. Thank you.

And, General Brown, every time I visit the Ogden Air Logistics Complex, the depot work that is being done in my district, I learn something new. There is a lot of discussion, also, around the F–35, but I find it worth highlighting that the F–35 has the best mission-capable rate of fighters in the Air Force, and that has improved from 61 percent to 76 percent between fiscal year 2019 and fiscal year 2020, an important thing to note.

And my question, in a more broad sense, is I am proud of the resiliency and the patriotism displayed through the pandemic, and the fact that depots suffered little to no delay in aircraft maintenance and contributed to the success, building off of the great work from our air logistics complexes. Can you provide an update on the Air Force organic industrial base plan and what the Air Force is doing to invest and improve in our depot facilities?

General BROWN. Sure. It is part of the organic industrial base masterplan. It is how we take a look at how we reduce cost. And so, it is really a 20-year look to not only look at how we keep up with what the capacities are required today, catch up where we are behind and really leap forward.

Over the course of the past four budget cycles, we have put about $2 billion into our three depots around the Air Force. But the key part is now, how do we look to the future and kind of lead up? And some of this is actually how we restructure some of our depots, how we do robotic aspects of our depots, to include like, for example, laser paint removal for some of our fighters, and it is using the technology to help work that process. At the same time, we have got an outstanding workforce and they have done great work throughout the pandemic as well to keep us on track.

Mr. MOORE. Excellent. Thank you.

And my time is up, but I would just like to also comment, General Raymond, no one would care more about their guardians and that workforce than you, and I see that exemplified. We would love

another chance to dig into some of the issues and the developments that you would like to see there. So, sorry we ran out of time.

General RAYMOND. No worries. Thank you.

Mrs. LURIA. Well, thank you, Mr. Moore.

Thank you to all of our witnesses for your thoughtful testimony and taking the time to present the budget to the committee.

Just a few closing words as we wrap up. I just wanted to say that I agree with Mr. Moore and his comments. I think that the nuclear deterrent remains the cornerstone of our national defense and appreciate the Air Force's role in maintaining that critical deterrent for our Nation.

And secondly, just pivoting back to the comments that Admiral Davidson made to the Senate earlier this year, I think you heard many members reflect on the fact that we think there is a sense of urgency and immediacy to making sure that we can counter any threats in the Pacific today.

So, I will close there and the hearing is adjourned.

[Whereupon, at 2:01 p.m., the committee was adjourned.]

A P P E N D I X

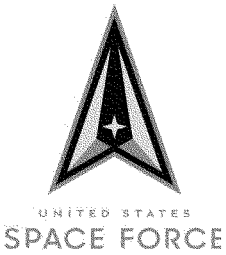
JUNE 16, 2021

PREPARED STATEMENTS SUBMITTED FOR THE RECORD

JUNE 16, 2021

Department of the Air Force Posture Statement
Fiscal Year 2022

Department of the Air Force
Presentation to the Committees
And Subcommittees of the
United States Senate
And the House of Representatives
1st Session, 117th Congress



Statement of:
The Honorable John P. Roth
Acting Secretary of the Air Force

General Charles Q. Brown, Jr.
Chief of Staff, United States Air Force

General John W. Raymond
Chief of Space Operations, United States Space Force

THE DEPARTMENT OF THE AIR FORCE

The Air and Space Forces unite under the Department of the Air Force and are inextricably linked in defense of the crucial high ground, integral to the stability of the global security landscape. Under civilian leadership, the Department's nearly 700,000 Airmen and Guardians provide independent and integrated options to national leaders while defending democracy, an ideal that President Biden said, "holds the key to freedom, prosperity, peace, and dignity." The Department of the Air Force enhances the peaceful instruments of diplomacy, sustains instruments of deterrence that check the spread of conflict, and ensures credible consequences for aggression.

Today more than ever, we and our national security partners must be bold. The challenges are many: the People's Republic of China, the Russian Federation, contested domains old and new, the vulnerabilities of proliferated technology and weapons, climate change, a global pandemic and its aftermath, the accumulated results of past budget priorities and decisions, and corrosive, difficult human issues like extremism, sexual assault/harassment, suicide, and disparate treatment of others. We must think and act differently. We no longer have the luxury of time to evolve into what we need to be…we must harness this unique moment together taking action to change. We simply cannot maintain status quo.

Given China's exponential pace of weapons development and extensive marshalling of government and industry, we do not have the leeway to simply maintain our current approach. China is on track to exceed our capacity, so it is our obligation to act with a sense of urgency. China poses challenges unlike any other in our Nation's history. We must be clear-eyed about these threats and our response to them. We recognize the need for change AND must create the capacity for that change. We must substantially improve our understanding of China and the Indo-Pacific region and prioritize the threats accordingly. We cannot afford to keep prioritizing near-term operational posture and today's force structure at the expense of modernization and investment.

This Department is particularly suited for these challenges. We own the high ground with air and space today, but it becomes more contested every day. We cannot allow the erosion of our advantages in this crucial high ground in competition now or in a future conflict. The speed, reach, and responsiveness of the U.S. Air Force and U.S. Space Force reinforce all instruments of national power and norms of responsible behavior. We can see, sense, and strike targets near and far, and provide global warning, networks, and independent options in space. We provide global strike and effects that can hold any target at risk within 24 hours—this is not conceptual or theoretical, it is reality. Global strike requires a unique fusion of intelligence, surveillance, reconnaissance, logistics, access, and speed that only the Air and Space Forces provide at a moment's notice. Our ability to rapidly eliminate threats anywhere in the world is a consequence of our inherent global persistence and reach, not necessarily dependent upon pre-positioning or forward basing. We have been exceptional at this, and **until now *we have also been unmatched.***

The Department of the Air Force requires a modernized force that is relevant today and long into the future. We are hard at work designing our future force. We must invest in the cutting-edge technologies and capabilities that are critical to securing our military advantage in the future—this includes updating our two legs of the Nation's nuclear triad, and our nuclear command, control, and communications systems. Enabling our military advantage in the long term means we need to shift away from legacy platforms and weapons systems that are decreasing in relevance today and will be irrelevant in the future—our aircraft fleet is 30 years old on average, and 44% are beyond their designed service life. Maintaining our aging weapon systems is costly now and, without change, will mortgage our future. We

must also create decision superiority by delivering information and capabilities to decision makers at all echelons through a "military internet ofthings." A critical step includes accelerating command and control infrastructure by investing in the Advanced Battle Management System (ABMS)—a vital contribution by the Department of the Air Forceto Joint All-Domain Command and Control. We must methodically and immediately move out on toughdecisions in order to compete.

Similarly, we must revise the Space Force's force design to be resilient against a significantly increasing threat. We must continue to innovate, adapt and diversify capabilities to meet the threats that challenge America's access and maneuverability in space and that of our allies and partners. As we advance space defense, we must simultaneously work with stakeholders across the Department of Defense, the whole-of-government, our allies and partners, and commercial industry to integrate and streamline spacepower efforts. Only then will America be able to fully leverage what we have built overthe last year.

The Air Force and Space Force have been on the leading edge of technology since their inception. By embracing novel authorities such as middle-tier of acquisition authorities, and innovative approaches such as agile software development, modular open systems approach, and digital engineering, we will stay on the cutting edge. We intend to capitalize on future investments in modeling and synthetic simulation environments to ensure both joint warfighters and operational platforms are ready.

As outlined in the Interim National Security Strategic Guidance, we are "committed to realizing and defending the democratic values at the heart of the American way of life." Outpacing threats in tomorrow's complex global security landscape requires innovative thinking and modern investments. We recognize the need for change in order to protect the American way of life. This budget lays out a plan to modernize our military capabilities, and will allow U.S. diplomats to negotiate from a position of strength.

EMPOWERED AIRMEN & GUARDIANS

America's Airmen and Guardians conduct combat operations, channel innovation, and conquer adversity around the globe all day, every day. We know that Airmen and Guardians are our greatest andmost precious resource. While weapons systems and tactics inevitably change, our Airmen and Guardians remain the core of our ability to deter and, if necessary, defeat our competitors. We need multi-capable professionals who bring diverse ideas, leverage digital tools, and outmaneuver and out think our adversaries. Our Airmen and Guardians have committed to service and taken oaths pledging their lives to the protection of our Constitution. And while we are working to provide the best environment possible as we recruit, train, retain, and leverage our strategic advantage—our people.

As a Department, we are working to increase diversity and inclusion, build and fortify resiliency, support our families, and develop empowered Airmen and Guardians. We must ensure a culture of dignity and respect. We must ensure our people have both high quality of service and high quality of life. This starts with ensuring Air Force and Space Force leaders represent the Nation and our Core Values. Our Nation's defenders must be empowered, resilient, agile, innovative, well-led and clear on how much they are valued.

Diversity

A diverse and inclusive force is a warfighting imperative. The Department of the Air Force must attract, recruit, and retain talented Americans from all backgrounds to leverage diverse ideas and experiences. By harnessing Airmen's and Guardians' diverse experiences, geographic and socioeconomic backgrounds, cultural knowledge, and language abilities, we possess an asymmetric advantage over ourcompetitors.

To sustain our lethality and credibility, our force must be truly inclusive and reflect the best of the diverse society we serve. This includes removing barriers to service—from reviewing our accession andassessment tools and career development, to expanding outreach to underrepresented minorities through diversity recruiting and increasing scholarships at minority-serving institutions. It will also include modernizing how we develop Airmen and Guardians, transforming our personnel and talent management systems, and championing a culture of support and inclusion for all Airmen, Guardians, and their families.

Sexual Assault Prevention and Response

Sexual assault is a crime that undermines force lethality, readiness, and mission success. The Department of the Air Force is committed to eradicating sexual assault using effective, research-based prevention. These efforts utilize assessment tools to identify those at high risk for unethical behavior, equip all leaders with information and goals to reduce assault risk factors, educate the force on intervention skills, and promote positive unit culture to eradicate sexual assault. When sexual assault does occur, the Department is dedicated to supporting victims and prosecuting those who would harm others through the chain of command and Uniform Code of Military Justice.

Suicide and Personal Violence Prevention

The prevention of suicide and interpersonal violence remains a difficult challenge. To reduce the incidence of suicide, the Department of the Air Force is undertaking a leadership-driven public-health approach informed by data and analysis while partnering with academia, industry, and our sister Services to include diverse ideas and perspectives.

The Department of the Air Force is also committed to eliminating interpersonal violence in any form. Domestic violence, child maltreatment, workplace violence, and sexual assault negatively impact victims, families, units, mission effectiveness, and the Department as a whole. We are dedicated to a strategy that leverages the latest science, implements best practices, and incorporates feedback from our members. Should these acts of violence occur despite our prevention efforts, we are committed to providing victims the necessary care and holding perpetrators accountable.

Quality of Life

We owe our Airmen and Guardians the best quality of life possible. We must continue work to improve all the professional and personal aspects of life for each of our Airmen and Guardians, and their families. It includes professional development, housing, child care programs, healthcare, education, and spousal employment, among many others. We are integrating the availability of quality housing, health care, occupational licensing reciprocity, and school caliber into our strategic basing criteria—ensuring our families have the best support possible. The Department is committed to continuing these worthy efforts. Our Airmen and Guardians deserve nothing less.

A DEPARTMENT OF THE AIR FORCE FOR 2030

As the Department of Air Force prepares to celebrate 75 years of service to our great Nation, the Air Force is transforming itself to address the challenges of near-peer adversaries while the newest branch of the U.S. Armed Forces—the Space Force—is creating and integrating a Service purposely built to compete, deter, and win in the space domain. Both Services, and the entire Department of the Air Force, are dedicated to protecting the Homeland and democracy around the globe. We must modernize and integrate to meet the challenges posed by great power competition, climate change, cybersecurity, fiscal constraints, and worldwide pandemics. With Congress's support, we will maintain our dominance of the high ground, and we will ensure the American way of life for generations to come.

UNITED STATES AIR FORCE

VISION FOR CHANGE—AMERICA'S AIR FORCE FOR 2030

America fights as a joint team, and the U.S. Air Force is the only Service that can meet our Nation's adversaries with mass, speed, agility and survivability on near-immediate timelines. The Air Force sees, senses, and communicates globally. The Air Force monitors our adversaries' movements, deploys forces en masse, deters competitors, and strikes enemies without warning. No one else can do it. Without theAir Force, the joint force loses. Only with a modernized and ready Air Force is the joint team—and our Nation—secure.

The American homeland is no longer a sanctuary. Our citizens face threats from a variety of actors in both the physical and digital arenas. Competitors, especially the China and Russia, continue aggressive efforts to negate our long-standing warfighting advantages while challenging America's interests and geopolitical position. While the Nation was focused on countering violent extremist organizations, greatpower competitors focused on the American way of war. They studied, resourced, and introduced systems specifically designed to defeat Air Force capabilities that have strengthened the joint force for a generation. That is why the Air Force must accelerate change now, so we can protect the American way of life in 2030 and for decades to come. Simply put, if we do not change, we risk losing. We risk losing in great power competition, we risk losing in a high-end fight, and we risk losing quality Airmen and families.

The President clearly stated that diplomacy is our primary means of engaging with the world: it must be our first tool of choice. The President likewise recognizes that our decisions and actions must come from a position of strength. The Air Force offers safe, secure, and effective nuclear deterrence, which strengthens national policies. It is also important to recognize that air dominance is not an American birthright. The Air Force is pivotal to deterring these aggressors and bolstering our allies and partners. America remains committed to freedom of the commons to support maintaining the rules-based international order around the globe. Control of the air and enabling domains ensures that the jointforce has full freedom of maneuver.

The diversity of our Airmen is both a tactical and strategic advantage. We are committed to recruiting and retaining the best of America. While the COVID-19 pandemic provided new challenges to our force, we remain devoted to caring for Airmen. Suicide and sexual assault persist as challenges that we are tackling head-on. Likewise family support programs are vital to our resiliency as a Service. A diverse and inclusive Air Force helps us out-innovate adversaries today and overcome challenges tomorrow. And, we know that each Airman—active duty, Guard, Reserve, and civilian, no matter their background—took an oath to defend the Nation for all Americans.

Airmen in the near future are more likely to fight in highly-contested environments. These complex, all-domain conflicts will result in combat attrition rates and risks to the Homeland that are more akin to World War II than the uncontested environments to which we have become accustomed. Given our ability to project power from afar, independent of forward access or lengthy prepositioning timelines, Airmen will be the first to respond to many emerging crises. In any scenario, the Air Force plays a unique and integral role to our collective deterrence and joint warfighting credibility. We must accelerate change to meet the challenges our Nation faces. This requires a relevant, modern force based on cutting-edge capabilities that will survive in future conflicts and shifting away from legacy platforms thatare increasingly irrelevant.

The Air Force is expected to provide enduring airpower capabilities irrespective of the threat encountered, the technology utilized, or the budget provided. The core missions of airpower—air superiority; global strike; rapid global mobility; command and control; and intelligence, surveillance, and reconnaissance—provide unequivocal advantage to the joint force. Only the Air Force provides air superiority, global strike, and rapid global mobility for the Nation. Without these missions, the Homeland is unprotected and America cannot project power around the globe. We are innovating and advancing our competencies with innovative capabilities such as the Advanced Battle Management System, which will increase commanders' decision advantage. Moreover, new approaches to our core missions enhance the joint force and answer the challenges posed by great power competitors.

The Air Force's future force design recognizes the need for change and the range of threats to the Nation, our allies, and partners. In 2021, we identified three key capability development areas for investment: connect the joint force, generate combat power, and conduct logistics under attack. Moving forward we will prioritize the resources that will allow us to continue to make investments in these areas, with more to come. Additionally, the Air Force will prioritize within its resources, affordable, analytically defensible, force structure and system capability proposals. Through partnership with Congress, the Air Force will prioritize resources to guard the foundations of national freedom and independence for America and our allies.

AIR SUPERIORITY

Combat power, regardless of Service, often depends on the Air Force's ability to deliver air superiority. Our competitors have fielded air forces, radar systems, and missiles that can attack our territory, bases, forces, and allies and partners, or defend against our military actions. Our job is to stop them through control of the air. To do this, we build understanding of the air situation and then use the right mix of capability and capacity to control the air while creating windows of air superiority—no matter the threat. As we stay ahead of our competitors, the Air Force needs flexible systems and agile design processes to field new capabilities at speed.

Current platforms will not fully support tomorrow's demands. Airmen are deliberately balancing today's readiness risk with capability modernization. Remaining ahead of adversaries who are committed to negating our technological edge requires investment in advanced capabilities. Likewise, access to domestic airspace allows us to train in realistic environments, which is essential to developing and maintaining these advanced capabilities. Near-peer competitors are challenging our capability to command the air. We must take action now to ensure the joint force's success tomorrow.

Future Air Superiority Capability

The F-35 Joint Strike Fighter is the cornerstone of our future fighter force and air superiority. Achieving air superiority in a future fight is strongly dependent on full-spectrum dominance. The F-35 and its 5th-generation capabilities are part of our fighter force design that outpaces key competitors. The Air Force is fully committed to the F-35 and needs it to be capable, available, and affordable. As we continue to receive the F-35 into the Air Force and increase our capability, it is important to manage our F-35 fleet in an intelligent and deliberate way to ensure we remain ready to deter adversaries, support our international allies and partners, and meet our Nation's security commitments worldwide.

The Air Force cannot successfully fight tomorrow's conflicts with yesterday's weapons. Our adversaries recognize that full-spectrum dominance is a national strength. As a direct result, competitors are investing to overtake our current warfighting advantage in the air. Next Generation Air Dominance (NGAD) ensures

we maintain air superiority in the future by introducing game-changing technology thatincludes digital engineering, open mission systems architecture, and agile software. NGAD is not a singleplatform—it is a capability focused on fielding capabilities to mitigate identified capability gaps, not on creating a "next-generation" aircraft. The capabilities NGAD provides will ensure survivability, lethality, and persistence while seamlessly integrating with the Advanced Battle Management System via a mix of manned, unmanned, and even optionally-manned aircraft along with advanced stand-off weapons.

We will complement NGAD and currently fielded 5th-generation fighters such as the F-22 and F-35 with the F-15EX. Acquiring this re-designed aircraft allows us to shore up our fighter force while driving down sustainment costs, our fleet's average age, and inherent risk. By leveraging our partners' investments in the F-15 platform, the Air Force is efficiently fielding a familiar aircraft with proven tactics. It also boasts an open mission software system, which allows us to easily update the computer and avionics software.

GLOBAL STRIKE

Global strike is critical to our national power and an enduring airpower capability. Regardless of the aircraft, weapon, or system employed, we must maintain the capability to attack at a time and place of our choosing. As China and Russia develop new weapons and defenses, we must modernize and develop capabilities to maintain a competitive advantage. Both nuclear and conventional strike must be integrated to compete against these near-peer adversaries. Air Force strike operations are precise, and these effects are delivered through standoff capabilities as well as penetrating platforms.

Nuclear deterrence allows the Nation to negotiate from a position of power. A credible, capable, and safe nuclear deterrent provides the United States and our allies with an umbrella of protection while discouraging the use of nuclear weapons by all nations. Likewise, a strong nuclear strike capability deters conflict.

For precise, conventional attack capabilities to succeed, they must be capable of penetrating highly-contested environments. To maintain our advantage, the Air Force requires capabilities that incorporate domain awareness, full-spectrum survivability, extended range, and sufficient payload. It is vital that our capabilities keep pace as threats evolve. By leveraging human-machine learning, the right mix of manned and unmanned systems, and agile design processes, our global strike capabilities will provide responsiveness, precision, flexibility, connectedness, and integration across the joint force.

The United States Air Force has the unique ability to sense, see, and strike any target, anywhere, at any time, nearly instantaneously, from anywhere in the world. On a daily basis, one aspect of these capabilities is on full display as our bomber task forces execute training scenarios with our allies and partners. It is no secret that potential adversaries closely monitor global activity—these maneuvers make adversaries think twice about conducting malign activities while reassuring our allies and partners.

The Air Force's global strike capabilities have the range, speed, and flexibility required in a conflict and are far less as dependent on pre-positioning or forward-basing. A continued investment in modernization efforts to our bomber and tanker fleets will ensure our long-range capability for the future. Additionally, a renewed emphasis into air base defense, along with Agile Combat Employment and Joint All-Domain Command and Control concepts will ensure the United States maintains the worlds' greatest military asymmetric advantage well into the future.

Ground Based Strategic Deterrent (GBSD)
The Nation requires a fully modernized nuclear triad and supporting infrastructure to maintain our nuclear deterrence capability. Deterrence operates in peacetime, through the gray zone, worldwide, across all domains, and into conflict. And, deterrence requires all three legs for a responsive nuclear triad. By not maintaining a reliable U.S. Intercontinental Ballistic Missile (ICBM) force, we risk deterrence erosion against not one, but two strategic nuclear adversaries. This is too high of a risk to our Nation's security. Our ICBMs have provided a highly reliable and secure deterrent capability since 1959. Delaying their modernization for the last two decades necessitates a comprehensive weapon replacement.

The Ground Based Strategic Deterrent (GBSD), the ICBM replacement, capitalizes on the strengths of a land-based triad component that is survivable, efficient, and geographically dispersed, while replacing aging components and addressing asset attrition along with the ICBM force's declining infrastructure.

B-21 Raider
Our bomber force constitutes the second critical leg of our Nation's nuclear triad and the B-21 Raider aircraft will be the backbone of our future bomber force. The B-21 will possess the range, access, and payload to penetrate the most highly-contested threat environments and hold any target around the globe at risk. This new bomber will provide the capabilities to deter and, if needed, win in high-end, near-peer conflicts. And with bombers as the most flexible leg of the nuclear triad, the B-21 underscore our national security. This aircraft will support combatant commanders across the range of military operations as both a nuclear and conventional bomber.

Over the past three years, the B-21 program accelerated from design to physical manufacturing of aircraft. While building test aircraft, the program is scaling manufacturing infrastructure and capacity across the industrial supply base. In parallel, B-21 beddown preparations continue on-track to support the Nation's newest bomber aircraft projected arrival in the mid-2020s.

Long-Range Standoff Weapon (LRSO)
The Air Launched Cruise Missile is nearly 30 years beyond its intended design life and faces evolving threats and availability challenges. Recapitalization of these missiles via the Long-Range Standoff Weapon (LRSO) is vital to our nuclear deterrence capability.

As our competitors improve their air defense systems, our stand-off delivery capability diminishes. In order to maximize our capabilities, the Nation requires a modernized bomber fleet and the LRSO. This weapon's ability to penetrate contested airspace and survive adversaries' defenses holds targets at risk and is a cost-effective way to modernize the nuclear triad. Additionally, bombers armed with LRSO provide a recallable and re-targetable capability which can hold any target at risk—it is both a visible and tailorable deterrent.

Hypersonics
The Air Force is also investing heavily in hypersonic weapons. This cutting-edge technology increases the Nation's rapid strike capabilities. By leveraging hypersonic weapons' improved maneuverability, America will have additional response options to deter adversaries and reassure allies. An operational hypersonic air-launched weapon enables the United States to hold fixed, high-value, and time-sensitive targets at risk in contested environments from stand-off distances. To that end, the Air Force is developing the Air Launched Rapid Response Weapon (ARRW) using the middle tier of acquisition rapid prototyping authority. ARRW is on track to be the Nation's first operational hypersonic weapon. Hypersonics—and global strike as a whole—enable diplomacy by strengthening the negotiating position of the United States.

RAPID GLOBAL MOBILITY

The Air Force capability that most directly, and physically, supports both the Air Force and our joint teammates is rapid global mobility. Airmen conduct Rapid Global Mobility operations to project and sustain combat power by moving personnel, material, fuel, and supplies across the globe, in and through permissive and contested threat environments on short timelines. The combination of speed, range, flexibility, and responsiveness is what differentiates air mobility operations from other forms of transport and is critical to multi-modal operations contributing to a higher pace for Joint All-Domain Operations. As threats evolve and the United States can no longer operate from well-established fixed bases, rapid global mobility is the lynchpin to persistent logistics, and we are examining unique ways to utilize mobility aircraft.

Air Refueling

Air refueling, one segment of rapid global mobility, is foundational to worldwide power projection. The ability to extend the range and persistence of air platforms provides a decisive advantage and deterrent against adversaries. To maintain our air refueling edge, the Air Force must continue investment in the KC-46 while moving beyond legacy KC-10 and KC-135 aircraft. The inability to phase the divesture of the legacy tanker fleet shackles funding and manpower resources and hampers the fielding of the more capable KC-46 at the rate required to support combatant commanders. This negatively impacts air refueling capacity and tanker advancement. Offsets from legacy tanker divestment in both funding and manpower are critical to the success of the KC-46 and air refueling as a whole.

Emerging Logistics

Every 4.2 minutes a mobility aircraft takes off from an airfield somewhere in the world. This is a unique opportunity as mobility aircraft are envisioned as critical nodes in the Advanced Battle Management System framework. Mobility platforms of all types can act as sensor nodes, inputting information into the sensing grid and increasing a commander's decision advantage. At the same time, we are exploring novel approaches to logistics through Agility Prime, which is developing electric vertical takeoff-and-landing vehicles (eVTOL). This innovative program will help us rapidly move small numbers of personnel and equipment around a battlefield and quickly rise to respond to emerging challenges such as isolated Service members. We are also training Airmen and developing concepts and practices that allow for dispersed, defendable, and mobile logistics networks. We are establishing agreements with allies and partners that provide access, and the ability to expand access, to key aerial ports, seaports, storage nodes, and associated connections.

Command and Control (C2)

Inherent to outthinking adversaries is the ability to command and control (C2) the joint force. Combatant commanders require an agile military that operates seamlessly across domain boundaries at both speed and scale. The Air Force's current C2 structure is based on a Cold War-era design that is vulnerable and slow—a roadblock to the goal of rapid and agile decision making. The enemy can easily target our C2 structure's centralized nodes with both kinetic and non-kinetic means. C2 must be resilient to attack, responsive to rapid changes, integrated across all domains, and secure from exploitation. This core mission allows the joint force to create an advantage by converging units and capabilities at a time and place of our choosing.

Achieving decision advantage for combatant commanders requires both sensors to gather data and a C2 network to translate and share data across the joint force. Real-time dissemination of actionable information, aided by artificial intelligence and machine learning, allows joint warfighting across all domains at a pace faster than our competitors. This speed matters to the decision maker and the warfighter. And, with the proliferation of technology, future warfighters will have the ability to observe, orient, decide and act within minutes—as opposed to hours and days.

Advanced Battle Management System (ABMS)

A critical step towards accelerating command and control architecture is the Advanced Battle Management System (ABMS)—the Department of the Air Force's contribution to Joint All-Domain Command and Control. As a new approach towards information sharing and decision management, ABMS enables compressed decision making and converging effects without domain or geographic boundaries. As a family of capabilities—versus a single system—ABMS creates a digital environment capable of increasing awareness, creating greater understanding, and enabling superior decision making—all of which is critical to prevailing in future conflicts.

As a simple analogy, ABMS strengthens decisions by channeling necessary information and capabilities through a "military internet of things." This internet, designed with digital standards, is being purpose-built to deliver critical capabilities to the joint force including secure processing, connectivity, data management, applications, sensor integration, and effects integration. ABMS helps overcome the Cold War-roadblock of vulnerable command and control nodes. For instance, by transforming from a small number of air operations centers to a "military internet of things," ABMS allows for agile, distributed, and mobile capabilities able to execute mission command even when fractured by an enemy attack.

ABMS's infrastructure is critical to ensuring the joint force connects sensors to shooters with machine-to-machine precision and speed while increasing commanders' awareness. And just like the development of the internet, ABMS is being built across multiple fiscal years. FY20 and FY21 have focused on exploring how we can best connect sensors and shooters while building partnerships with our industry partners. Moving forward, the Air Force will prioritize resources to allow the continued building of ABMS's digital network environment and infrastructure. By prioritizing the resources to support ABMS investment, the Air Force will be able to initiate replacement of human-in-the-loop data transfer processes with machine-to-machine data exchanges allowing for delivery of multi-domain secure processing and data management, connectivity, and applications that synchronize sensors and networks. In turn, the joint force is enabled to make decisions faster than the adversary is able to respond.

Nuclear Command, Control, and Communications (NC3)

Nuclear Command, Control, and Communications (NC3) systems act as the central nervous system of our nuclear deterrent. They link the President and national leaders to the nuclear force—all day, every day, under all conditions, without fail. Without NC3, we cannot effectively command and control nuclear forces. And without effective command and control of nuclear forces, we cannot deter adversaries.

Previously, electromagnetic pulses posed the greatest challenge to our NC3 networks. Now, electronic warfare, cyber-attack, and threats from space all provide challenges to key nodes and systems. Russia, while embracing a doctrine of nuclear escalation in conventional conflict, is nearly complete with its recent full range of nuclear modernization efforts. Equally concerning is China's pursuit of new nuclear capabilities tailored to achieve its national security objectives while also modernizing its conventional military.

As we modernize our portion of the nuclear triad, we must also modernize our NC3. The Air Force is pursuing communication capability enhancements with respect to our bomber force and Ground Based Strategic Deterrent so they will be fully integrated into our current NC3 systems and has flexibility to adapt as NC3 systems are modernized. Moreover, we understand that the strategic environment evolves and is increasingly dynamic. Our NC3 architectures and modernization plans will be adaptable, look beyond the near-term, and integrate with the Advanced Battle Management System (ABMS). While ABMS will enable conventional forces, it will also enable nuclear forces with rapid, multi-path transmissions that will transform NC3 from a Cold War-era relic into a C2 network operating at speeds our adversaries cannot match.

Successfully executing command and control across the joint force requires information. A major avenue for that information is the Air Force's intelligence, surveillance, and reconnaissance capabilities.

INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE (ISR)

The Air Force conducts intelligence, surveillance, and reconnaissance (ISR) missions to analyze, inform, and provide joint force commanders with the knowledge needed to achieve decision advantage. This ISR sensing grid consists of a robust multi-layered network of sensors, platforms, people, devices, and services with the goal of delivering a holistic, accurate, predictive, and timely characterization of the operating environment. This network is interoperable with the joint force, the intelligence community, allies, and partners. Domain awareness is underpinned by automation, connectivity and analysis; is rooted in intelligence; and is critical to the future of warfare. In that future, ISR underpins the Advanced Battle Management System (ABMS) architecture and allows joint force commanders to achieve an accurate, real-time understanding of the environment. This understanding accelerates decision making, effectively conducts command and control, and achieves decision advantage ahead of competitors.

Future ISR capabilities must be survivable against high-end threats while leveraging forward-looking investments in command and control capabilities—including emerging technology like artificial intelligence—to present decision-ready information faster than our adversaries' capabilities. The Air Force's current ISR systems are viable in a counter-insurgency war, but may not effectively contribute in tomorrow's competitive environment. Without investment in additional capabilities necessary for the high-endfight, we will be reliant on ISR platforms that will be ineffective in highly-contested and denied environments. As a result, we risk fighting blind.

Survivable, Relevant Platforms

ISR platforms play a critical and continuous role in supporting a range of military operations. The most important role of intelligence in military operations is to provide analysis of key aspects of the operating environment to facilitate timely military decisions. Current ISR platforms have been able to accomplish this task with relative ease because they operated in uncontested and low-threat environments where the United States enjoys superiority across all domains of warfare. Such freedom of action will not be the case in the future. Future threats will challenge the ability of legacy ISR platforms to successfully execute their missions.

In the near future, ISR platforms will feed critical data through the Advanced Battle Management System (ABMS), which in turn will present near real-time information to joint force decision makers. Future airborne ISR platforms will need to survive and operate in a more challenging environment. Ongoing modernization efforts will focus on a family of platforms that are effective, resilient, and survivable against technologically-advanced threats, and able to pass data to necessary networks at machine speed. In our

discussions going forward, we will steer away from platform-centric conversations and focus instead on the capabilities needed to inform joint force operations.

Our adversaries are already fielding technologies that will hold our legacy platforms at risk to support the range of military operations in a future high-end fight, and the technological evolution will continue to accelerate. In order to keep pace ahead of emerging threats, we must work with the combatant commands to assess the demand signal on current fleets and where acceptable risk can be taken so the Air Force can accelerate modernization. Legacy ISR platforms, once considered irreplaceable to operations, are often unable to survive or deliver needed capabilities on competition-relevant timelines. These legacy platforms must be phased out, with resources used to invest in modern and relevant systems. Working together, we must take calculated risk now in order to reduce the greater future risk.

For instance, the RQ-4 Block 30 Global Hawk was crucial to the ISR requirements of yesterday and today. However, this platform cannot compete in a contested environment. And tomorrow's conflicts will be contested. Moving beyond this platform allows us to bring the ISR enterprise into the digital-age by using sensing grids and fielding advanced technology thatincludes penetrating ISR platforms. The Air Force will continue to pursue the FY21 NDAA RQ-4 Block 30 divestment waiver in order to repurpose the RQ-4 Block 30 funds for penetrating ISR capability. Overall,intelligence collection will transition to a family of systems that includes non-traditional assets, sensors in all domains, commercial platforms, and a hybrid force of 5th- and 6th-generation capabilities.

A comprehensive investment strategy that the Air Force is bringing forward synchronizes divestment of legacy platforms, takes calculated risk in upgrading existing platforms, and introduces the next- generation ISR family of systems that will feed into ABMS.

NEW APPROACHES

The Air Force's core missions encompass both enduring capabilities unique to our Service and some capabilities shared with the joint force. Airmen are rapidly iterating and innovating improvements to all core missions. These new approaches to airpower overcome today's roadblocks and focus on tomorrow's great power challenges. Both technology and operational concepts benefit from our Airmen's perspectives. Every day, Airmen increase the agility, speed, resilience, and lethality of our contributions to the joint force.

Force Generation Model

The Air Force is also re-examining how we present forces to combatant commanders. The core missions of the Air Force continue to be in constant demand around the world. And because many of the capabilities we provide are exclusive to our Service, our forces have been under strain for two decades. This strain negatively impacts readiness and our ability to modernize.

Preparing for near-peer adversaries, the Air Force is implementing a new force generation model focused on building and sustaining long-term, high-end readiness. Our goal is to more effectively articulate readiness impacts and capacity limits, and instill discipline into the system. Our new, simplified model, realigns the Air Force with the Joint Staff's three phase model, is easily understood by combatant commanders, builds towards sustainable readiness, and balances current operations with the training necessary for future full-spectrum combat operations.

Agile Combat Employment (ACE)

The Advanced Battle Management System (ABMS) not only connects sensors and shooters but also enhances persistent logistics by sensing the threat landscape and material environment. Persistent logistics, with the inherent ability to posture, sense, and respond, is the warfighting answer to the key operational problem of logistics under attack and enables Agile Combat Employment (ACE). ACE is the ability to quickly disperse & cluster forces to a cooperative security location and conduct operations across all domains with minimal disruption, while maintaining operational flexibility. This new method of operating will allow the United States to confuse the enemy and strike at a time and place of our choosing with minimal risk. The ability of ACE to sustain combat operations through persistent logistics has already been validated through multiple exercises across both the Pacific and European theaters.

ACE requires technological advances like ABMS, novel equipment, and innovative Airmen. Our Airmen are tackling ACE, and the larger challenge of persistent logistics, by adapting techniques previously associated with special operators. Our commanders support these efforts by encouraging critical thinking skills and driving decision making to the lowest levels—in many cases our youngest frontline supervisors. These empowered Airmen are innovating new approaches to projecting combat power across the globe.

Base and Critical Infrastructure Defense

The Department's infrastructure defense efforts are currently focused on directed energy research, development, test and evaluation; counter-small UAS; and investments in cruise missile defense. In the coming years, we will steadily increase investment of critical infrastructure defense measures to meet the challenges of the future fight, ACE, and logistics under attack.

As China and Russia develop weapons that challenge our superiority in the air, they are also making strides that hold our bases at risk. While the Air Force will mitigate some risk through persistent logistics, the security of our air bases is essential to conducting combat operations. Like other aspects of combat operations, base defense is inherently joint. And just as the joint force is dependent on the Air Force to execute our core missions, the Air Force must leverage our sister Services for base defense.

If future expeditionary and permanent air bases are not protected from attack, the Air Force will be challenged to conduct combat operations. Without the Air Force's air superiority, the joint force is at risk of attack from the air for the first time since the Korean War. The Air Force acknowledges that this is a joint problem that requires a joint solution, which is why we have allocated experimental funding to explore and develop directed energy and kinetic and non-kinetic base defense options. Looking forward, the Air Force will prioritize resources that will allow it to continue prototyping the ability to detect, track, identify, and mitigate small unmanned aircraft system threats. Proper base defense encompasses significant decisions with far-reaching impacts—we must get this right.

Infrastructure

We project power, generate readiness, test new platforms, train to support joint operations, and provide safe and healthy communities for our families at our bases. As the joint force becomes increasingly dependent on an integrated battle network, installations also serve as key nodes in enabling mission success around the world. The readiness and resiliency of installations is a matter of strategic importance to ensure the Air Force can always provide combat capability. Changing climate and severe weather events are a continual threat to our installations, and we have seen first-hand the impacts climate and severe weather have on our installations.

The Air Force views installation resilience as the capability of a base to project combat power by protecting against, responding to, and recovering from deliberate, accidental, or naturally occurring events that impede operations. We are taking a deliberate, holistic approach to installation resilience through Department of the Air Force's Installation Energy Strategic Plan. This includes improving the resiliency of our energy, cyber, infrastructure, and response options.

AMERICA'S AIR FORCE FOR 2030

This year we celebrate America's 245th birthday and next year the Air Force celebrates its 75th anniversary. Throughout our history, the Nation prospered because of our willingness to adapt and evolve, to adjust course when the situation dictates. Democracy is not a birthright, and neither is air dominance. And although airpower is our great comparative advantage, tomorrow's competitive environment requires that we accelerate change or lose.

Tomorrow's battlespace will be shaped by human talent, climate change, constricting budgetary resources, and challenges posed by great powers. The Air Force and its core missions stand ready to exploit the air domain, provide nuclear deterrence, and underwrite the national security America expects and requires. By working with Congress, we will protect the Homeland and defend democratic ideals. Moving forward, the Air Force will prioritize its resources so it is able to adapt our equipment, support our Airmen, and bolster our core missions. We must continue to adjust course and overcome situational challenges so America maintainsits airpower advantage.

America cannot wait to modernize the Air Force any longer, not one year, one month, or one week. To deter and defeat today's competitors and tomorrow's adversaries, we must re-capitalize our Air Force and we must do it now… the call to accelerate change or lose is not hyperbole—it is a requirement.

UNITED STATES SPACE FORCE

SECURING AN ENDURING ADVANTAGE

The United States is a space-faring nation. We have long understood that our nation is strongest economically, militarily, and diplomatically when we have access to, and freedom to operate in, space. Unfortunately, potential adversaries have taken note of the United States' reliance on space, and this vital national interest can no longer be taken for granted; it must be secured. The rapid advancements of potential adversaries to threaten U.S. freedom of operation in space must be countered with immediate improvements to our space defense architecture and capabilities.

Competitors like China and Russia are challenging America's advantage in space by aggressively developing weapons to deny or destroy U.S. space capabilities in conflict. Both China and Russia have mobile ground-based laser and electronic warfare systems capable of jamming and blinding our satellite systems. China has invested in satellite grappling technologies, like the Shijian-17 satellite's robotic arm, which could be used in future conflicts. Russia has tested an on-orbit system that has released a projectile designed to destroy U.S. satellites in low-Earth orbit.

The United States would prefer that conflict not begin in or extend to space. Our goal is to deter conflictin space from happening and from spilling over into other domains, and the best way to do so is from a position of strength. We are prepared to protect U.S. interests today and we are moving fast to ensure we can deter in the future, but our ability to deter conflict hinges on demonstrating both capability and resolve. Over-classification of existing systems threatens this ability, and we are developing a reveal and conceal strategy to ensure we can compete, deter, and win in this contested domain.

The Space Force was established to protect U.S. investments and freedom of operation in space, provide space capabilities to the Nation, the joint force, sister Services, the intelligence community, and our allies and partners. The Space Force is designed to be lean, agile, and innovative in order to move at speed and compete in the vast domain of space. Our small size also makes us the ideal pathfinder to validate new structures and approaches that can provide benefit across the joint force. While our budget is roughly two percent of the Department of Defense's request, the capabilities we deliver underwrite the force design of the entire joint force. Space capabilities have become a cornerstone of deterrence, not just in space, but in every domain. Without space, our forces abroad, security at home,and allies everywhere are at much greater risk. If we lose in space, America loses.

We spent the first year inventing the Space Force, with an organizational design that reflects the character of our operating environment and the nature of conflict that is likely to manifest. A headquarters and Field Command structure aligns complementary functions and streamlines command authority in the deliberate pursuit of speed and agility. Our first field command, Space Operations Command, stood up in October 2020 as the primary space forces provider to the combatant commands. We will establish the remaining two field commands before the end of 2021: Space Systems Command will develop, acquire, and field operationally relevant and resilient space capabilities in resilient and defendable architectures, and Space Training and Readiness Command will develop tactics, a testing enterprise, doctrine, advanced warfare training, and a dedicated cadre of warfighting professionals. We have already transferred space missions, billets, and monetary resources from 23 Air Force units to the Space Force, and we are preparing to merge operations, acquisition, and sustainment for some space

systems currently distributed across the Army, Navy, and the Office of the Secretary of Defense, including the Space Development Agency beginning next year.

In our second year, we are aggressively integrating the Service into the fabric of national and international security by collaborating across the Department of Defense, interagency, commercial industry, and our allies and partners. As the Space Force creates independent military options for decision makers, we are preparing a force presentation model to optimize integration and delivery of space capability to the joint force. We are working to streamline acquisition processes to increase decision speed and expedite capability development, creating an integrated test enterprise, and doing the analytical and developmental work to create the most effective and efficient force design for the domain to bring unity of effort across the department. Lastly, we have initiated planning for a National Space Intelligence Center to provide scientific and technical intelligence as well as foundational space intelligence to the Service and the intelligence community. These initiatives make us more resilient and competitive, and they will put us in a better position to sustain continuing advantage.

DEVELOPING AND CARING FOR GUARDIANS

The character of operations and aspects of potential conflict in space are fundamentally different from the military art of terrestrial domains. Vast distances and speeds, potential for first-mover advantage, and unique operating environment demand experts that are familiar with these physical characteristics. As in all other domains, Guardians must stay ahead of adversaries to give joint commanders and national civilian leadership new space-based security options. This requires a dramatic change in how we attract, recruit, develop, train, and retain talent.

We are committed to ensuring that the Guardians reflect the diverse character of the United States—it is a national security imperative. Diversity gives us the perspective and skills to meet the challenges of our security environment and ensures we can bring our nation's best talent to bear on the hardest problems. In order to meet these goals, we must work hard to address tough issues like sexual assault, extremism, and discrimination within the force; solving these problems is essential to building a Service that ensures talented people of all genders, orientations, races, ethnicities, and beliefs are included and empowered to reach their full potential.

Guardian Strategy

To win the battle for talent, we have created a Human Capital Office to develop a new strategy for unified talent management for all Guardians, in pursuit of an inclusive and team-centric culture. Our small size creates the opportunity and the mandate for a tailored approach to caring for and developing our Guardians from accessions to retirement and beyond.

This "Guardian Strategy" will lead digital enablement by creating a digital cadre, an optimized data infrastructure, increased process automation, and new digital platforms. Using interviews and other assessment tools as well as focusing our Reserve Officer Training Corps presence at select universities will support both diversity efforts and needs for space related research and technical grounding. We look to develop and employ talent by taking a competency-based development approach, mandating more robust feedback systems, and creating potential-based promotion assessments with sequenced talent management boards. In our first year, professional development opportunities and promotion rates have increased significantly; we must reinforce systemic change to make this an enduring effect.

The Space Force is developing its own officer and enlisted professional military education (PME) programs to fit within the broader concepts of the Guardian Strategy to ensure that all members are career-long learners, and that learning directly relates to the success of their current and future duties. Space Force PME will focus on the development of space-minded warfighters who are credible and effective in multi-domain warfare and the joint environment. We have already expanded space curricula at Airman Leadership School; stood up a Space Force Non-Commissioned Officer Leadership Academy; expanded the Schriever Space Scholars Program at Air University; and created the West Fellowship for Senior Developmental Education. Finally, we are taking a proactive approach featuring teams at the unit level to strengthen social, physical, and mental attributes to energize personal and organizational resiliency. As the Space Force takes care of Guardians and their families, it must prepare them to defend our Nation. Space Force talent must be deliberately managed by well-positioned human resources mission partners in the field commands and headquarters office to support both military and civilian Guardians.

Training and Doctrine

We have completely redesigned our space training and doctrine across all space operations competencies, beginning with publication last year of a foundational doctrine document. Our training has elevated from basic operation of space systems to threat- and target-based advanced space warfare training. Guardian training and doctrine focuses on seven core competency areas, through advanced training and education: orbital warfare, space electromagnetic warfare, space battle management, space access and sustainment, military intelligence, cyber operations, and engineering and acquisition. Our shift in training and doctrine must be complementary to our capabilities and reflect the reality of our current and future missions. Additionally, Space Training and Readiness Command is bringing together training and doctrine to support our tactics, strategies, and theories of victory.

VALUE OF PARTNERSHIPS

An independent Service focused on space has already provided greatly expanded opportunities for partnerships with civil and commercial space organizations within the United States and with allies and partners around the world. Working through the Department of Defense, close cooperation with the National Aeronautics and Space Administration and the Department of State has ensured a unified U.S. voice in discussions about responsible behavior in space with foreign governments. Similarly, through the Department of Defense, we continue to work hand in hand with the Department of Commerce on shared interests including space traffic management, positioning, navigation, and timing programs, applications, and efforts to maintain the space industrial base. We are working to expand cooperation with commercial partners using both traditional and innovative development pathways; seeking means for tighter fusion to take advantage of the enthusiasm and energy in the commercial space sector.

Internationally, our partnerships have historically been built around one-way data sharing agreements with a small number of countries. As the proliferation and importance of space capabilities increases around the world, we are fostering greater cooperation with international partners across the board. For example, a hosted payload agreement with the government of Norway will save us more than $900 million and helped us get capability on orbit two years faster. We are also working with NATO to further integrate space capabilities and knowledge in that alliance, including the stand-up of the first NATO Space Operations Center within NATO Air Command. Cooperation with allies and partners, on both capability development and operations, continues to provide opportunities to decrease cost and increase speed and innovation.

CREATING A DIGITAL SERVICE

Founded in the Information Age, the Space Force was "born digital." We are harnessing modern era advancements and tools to accelerate innovation and ensure our military advantages in, to, and from space. Under the leadership of the newly established Technology and Innovation Office, the Space Force focuses on partnering with U.S. government, science and technology industries, and academia to build a digital Service to support Space Force missions and business operations.

Digital Headquarters
Leaders at every echelon of the force require access to data and analytics in order to make informed decisions with speed and precision. A new data analytic environment and automation tools will streamline headquarter processes, enable seamless data sharing, increase decision space, and accelerate warfighting outcomes. Digital transformation is occurring in operational readiness, talent management (recruiting and onboarding), programming and budgeting, and capability development. In capability development, digital models will enhance analyses of alternatives, iterate requirements decomposition, improve cost estimation fidelity, and ultimately accelerate the planning, coordination, and development of optimum solutions to meet critical warfighter needs.

Digital Operations
Commanders and unit-level Guardians are empowered to innovate inside their mission operations, explore novel concepts for space domain awareness, Joint All-Domain Command and Control, collaborate with small business innovators, and align innovation efforts for transition into operations. This effort includes partnerships with the Joint Artificial Intelligence Center, industry, and academia to advance use of artificial intelligence applications and research.

Digital Workforce
Continuous transformation requires digitally-fluent military and civilian Guardians. Therefore, we are funding software-coding training for military and civilian personnel and leveraging Department-wide digital training efforts to improve digital literacy using industry-leading commercial courseware. To achieve the goal of a digital workforce we must cultivate our collective digital acumen, develop an expert cadre of "Supra Coders," and equip and empower them to apply agile software practices, use artificial intelligence, and data science. Finally, we must place them strategically across the force to unleash their talent and energy toward inventive, innovative solutions in operations and acquisition.

ACCELERATING CAPABILITY DESIGN, DECISION, & DELIVERY

The Space Force must modernize its architecture to survive and execute spacepower missions in a contested domain and do so at speed. To this end, the Space Force is engaged in an end-to-end transformation of organizations and processes to accelerate delivery of operationally-relevant capabilities. Consistent with our effort to become a "Digital Service," we will exploit our digital engineering systems as a backbone to connect multiple processes and accelerate capability development activities from analysis to integration, decision, and acquisition.

Integrated Analysis for Optimal Design
The Space Warfighting Analysis Center (SWAC), currently aligned under the Space Operations Command, is leading analysis, modeling, wargaming, and experimentation to generate new operational concepts and force design options for the Department of Defense. The SWAC integrates domain expertise with unique

analytic tools, datasets, and intelligence todevelop operational architecture options to fulfill space missions. By driving unity of effort, we reduce cost, duplication of effort, and increase our speed of decision and action

Digital Engineering to Better Inform Requirements
Rather than static reports, the SWAC's design options are digital models, which enable testing of proposed capabilities through simulation in an environment that accurately reflects fast evolving threats and the space domain. The Space Force Strategy and Resources Office (SRO) integrates SWAC's design options with the appropriate processes to develop Service capability and programmatic options for presentation to the Joint Requirements Oversight Council and Deputy's Management Action Group. The SRO also ensures digital models generate required data artifacts to inform oversight; Planning, Programming, Budgeting, and Execution; and acquisition actions.

Streamlined Governance for Timely Decisions
In order to support the Assistant Secretary of the Air Force for Space Acquisition and Integration, who will eventually have Service Acquisition Executive (SAE) authority and chair the Space Force Acquisition Council (SAC), the Space Force has established a supporting Program Integration Council (PIC). As a collaborative interagency leadership council, the PIC facilitates cooperation and deconfliction between National Security Space Enterprise stakeholders and ensures planning, alignment, execution, delivery, and optimization of capabilities across all space mission areas. Streamlined coordination across the enterprise via the PIC and SAC improves collaboration and better enables timely decisions by the SAE. The Assistant Secretary of the Air Force for Space Acquisition and Integration is an essential element of this approach and we look forward to implementing this congressionally-directed change as quickly as permitted by law.

Consolidated Space Acquisition Enterprise for Agility
Finally, in the summer of 2021 the Space Force will stand up the Space Systems Command (SSC) to provide for cooperation across space acquisition within the Department of the Air Force. Initially comprised of the former Space and Missile Systems Center (SMC) and the Service's launch enterprise, SSC will also have a limited administrative support relationship with the Space Rapid Capabilities Office(SpRCO) and—as of the beginning of FY23, per statute—the Space Development Agency (SDA). By aligning three organizations with a pedigree in traditional acquisition, disruptive acquisition, and commercial acquisition, the Department of the Air Force can access best-of-breed solutions. Because SSC acquirers will receive digital models with traceable requirements, Program Managers and Program Executive Officers will be equipped to make faster, more agile decisions and trades. In addition, the space acquisition enterprise will continue to improve both commercial and allied integration.

MISSILE WARNING AND MISSILE TRACKING

Strategic and theater missile warning and missile tracking capabilities provide indications and warning to protect the homeland, joint forces and allies abroad. The evolution of threats to on-orbit systems force us to re-think both how we protect and defend our strategic assets, and how future strategic capabilities should be designed to mitigate threats. The Space Force is partnering with combatant commands, the Missile Defense Agency, National Reconnaissance Office, and the Space Development Agency to design and build a resilient missile warning architecture for the collective defense of our nation, joint force, and allies.

Next-Generation Overhead Persistent Infrared (OPIR)
We are designing and developing the future architecture for missile warning and missile tracking. Next-

Generation Overhead Persistent Infrared (OPIR) will succeed the current Space Based Infrared System (SBIRS) and will provide increased missile warning, missile defense, battlespace awareness, and technical intelligence capabilities with resiliency and defensive features to counter emerging threats.

The ground system for Next-Gen OPIR, also known as Future Operationally Resilient Ground Evolution (FORGE), migrates satellite command and control to the Space Force's Enterprise Ground Services, modernizes Mission Data Processing to implement an open framework, and upgrades Relay Ground Stations to meet United States Space Command's operational requirements. We are using Middle Tier Acquisition authorities to rapidly prototype solutions. This pathfinder approach delivers the first resilient geosynchronous satellite and associated ground system in FY25 and the first polar satellitein FY28.

POSITIONING, NAVIGATION, AND TIMING

The Global Positioning System (GPS) remains the "gold standard" for positioning, navigation, and timing for the United States and the world. GPS underpins the global economy and our way of war. Adversaries have long recognized our dependence on GPS and have proliferated technologies to degrade, deny, and spoof GPS signals for civil and military users. We are pursuing modernization efforts across the entire GPS architecture to include upgrades in space, ground, and user segments. The Space Force's future GPS architecture provides more robust positioning, navigation, and timing to the joint force, ensuring at least one technical generation advantage over any adversary.

GPS Space Segment

The Space Force is pursuing significant satellite enhancements to our GPS constellation, including higher-power military signals, new civilian signals, upgraded nuclear detection system payloads, and hosted search-and-rescue payloads. GPS Block III features improved signal strength and accuracy, increased anti-jam power, and a longer expected design life. The next block of GPS, GPS Block IIIF— available for launch in FY26—will deliver regional military-code protection, a higher power signal in a given geographic area of operation to boost anti-jam capabilities for contested environments.

GPS Operational Control Segment Next (OCX)

Operational Control Segment Next (OCX) will develop and field a modernized ground system required for the command and control of GPS satellites. The OCX program is on track to meet current Acquisition Program Baseline cost and schedule milestones. OCX provides expandable, robust information assurance architecture to significantly improve cyber resiliency, enabling the latest military and civilian GPS signals, improving cyber protection, and allowing the system to evolve to combat emerging threats. We have completed product test, are currently progressing through segment integration, and will transition to operations in FY22.

Military Global Positioning System User Equipment (MGUE)

Military GPS User Equipment (MGUE) will modernize user equipment to enable precision fires, safe navigation, and time coordination across multiple platforms in GPS-degraded environments. Military-code receiver cards embedded in weapon systems enable cyber-secure, anti-jam, and anti-spoof precision, navigation, and timing for the joint force and our partners. MGUE Increment one (1) completed developmental testing of the Army and Marine Corps lead platforms in FY20. MGUE efforts support finalization of card design, testing, and integration with Navy and Air Force lead platforms. MGUE Increment two (2) leverages the MGUE Increment one (1) technology to the maximum extent while addressing the production of M-Code integrated circuits far into the future.

COMMAND AND CONTROL (C2)

Our top priority is to develop a Joint All-Domain Command and Control System to ensure United States Space Command and their joint and coalition warfighting partners have the capability they require to command and control in a contested domain. We have made considerable gains this year, fully integrated in, and helping lead, the Advanced Battle Management System (ABMS) effort. In recognition that legacy space command and control capabilities are insufficient for us to prevail in future conflict, we have prioritized the delivery of space command and control capabilities using a development, security, and operations (DevSecOps) approach to acquisitions. Leveraging the agile approaches of commercial software developers, we are rapidly developing cyber-resilient capabilities that enhance U.S., allied, and partner nation operational-level space warfighting capabilities against the adversary.

The initiatives below build and sustain the infrastructure required to connect sensors to shooters using machine-to-machine planning and tasking of warfighting capabilities.

Unified Data Library (UDL)

The Space Force built and delivered the Unified Data Library (UDL), a cloud-based, cyber-accredited, multi-classification data store that facilitates universal data access and serves as the foundational element of the ABMS data architecture in partnership with the Air Force. UDL provides all-domain secure Space Domain Awareness (SDA) data sharing from all Services and sensors to support space-focused Battle Management and Command and Control; it is also extensible to fit the needs of Joint All-Domain Command and Control. This effort adds long-term access to a wide variety of space domain awareness data sources including commercial, allies, and academia. The UDL creates unified, agile procurement of commercial products to bolster Combined Space Operations Center and National SpaceDefense Center operations. Additionally, it protects satellite tracking data by seamlessly integrating defensive cyber operations.

Space C2 Open Architecture Operational Prototype (SCOOP)

The Space Force has also delivered the Space C2 Open Architecture Operational Prototype (SCOOP) program, a modern cloud architecture that is connected to 40 sites nationwide. Leveraging the Department of the Air Force's prior work on open architecture standards, SCOOP delivers a command and control capability for our most pressing needs, with the ability to connect into other domains, and serves as the foundation of our next generation C2 capability.

Space Domain Awareness (SDA)

Space Domain Awareness (SDA) is the cornerstone of our ability to command and control warfighting capabilities. The Space Force budget invests in new terrestrial radars, optical sensors, and space-based capabilities and commercial partnerships to increase the quantity and quality of space observations. A robust SDA architecture improves our indications and warnings, ensures freedom of action in space, and enables joint and coalition options to defend critical space capabilities. Additionally, investments in secure connectivity and data sharing tools improve our collective understanding of our adversaries' capabilities and intent.

Nuclear Command, Control, and Communications

As part of Department of Defense's efforts to modernize the nuclear triad, the Space Force will provide and modernize the space and mission control segments for worldwide, secure, jam-resistant, and survivable communications. We are pursuing digital development efforts for the future disaggregated strategic and tactical satellite communications systems to meet emerging threats in the 2030-timeframe. Evolved Strategic SATCOM will continue the strategic mission of the Advanced Extremely High Frequency (AEHF) satellite program with improved on-board resilience features, upgraded satellite capabilities, and

cybersecurity features. We are leveraging rapid prototyping demonstrations to speed the delivery of the space segment to meet the warfighter need date in 2032.

Space System Prototype Transition (SSPT)
Space System Prototype Transition (SSPT) is a portfolio of programs that rapidly advance next-generation space capabilities to the warfighter at the speed of relevance. The portfolio leverages the commercial industrial base and demonstrates common defense through partnerships to enhance resiliency. One example is the development and integration of space domain awareness payloads on two Japanese Quasi-Zenith Satellite System spacecraft. The hosted payloads will increase sensor diversityand enable space surveillance and event detection over USINDOPACOM in the geosynchronous orbit regime.

Transition to Enterprise Ground System (EGS)
Enterprise Ground System (EGS) will enable the transition from a family of legacy stovepiped satellite C2 systems to an improved, open, resilient, and common platform. The effort funds modernized system interfaces, virtualization, and the translation of mission applications to ensure rapid response to emerging threats and integration of new capabilities. We continue to develop a Minimum Viable Product for foundational services and infrastructure to provide an initial Enterprise Capability. EGS will integrate multiple new mission partners within the Space Warfighting Construct & Missile Warning mission threads, scale multiple services for existing mission partners, and integrate them at one or more of three EGS locations. Continued investment provides foundational services and infrastructure to deliver enterprise-wide command and control services to all Space Force satellite programs. We are on track to deliver a fully integrated system by 2028.

ASSURED ACCESS TO SPACE

National Security Space Launch (NSSL) provides assured access to space for the nation's most critical warfighting and intelligence capabilities. To meet the full set of National Security Space requirements, we must continue to competitively invest in domestic launch providers' development of new launch systems. The Space Force, National Reconnaissance Office (NRO), and the National Aeronautics and Space Administration have a coordinated strategy to certify new entrants to launch payloads, and continue to work with different launch providers to reliably meet our national requirements. The Space Force recently completed a five-year strategy to bolster a commercially competitive market and transition to domestic launch systems by awarding the NSSL Phase Two procurement contract.

Leveraging this strategy, we are pursuing five National Security Space Launches to deliver warfighting capabilities on time. Following the outcomes of our Phase Two launch procurement strategy, we will continue to engage with industry partners regarding emerging launch requirementsand technologies to invest in continued assured access to space.

National Security Space Launch (NSSL) Enabling Investments
We are investing in multiple public-private partnerships to develop enabling technologies for future space access, mobility, and logistics. Targeted investments in orbital transfer, on-orbit servicing, digital engineering, and novel on-orbit propulsion technologies will increase U.S. access and freedom to operate in space. We will continue to invest in providers of domestic launch services enabling our transition from non-allied space launch engines to domestic rocket propulsion systems. We will also continue technical maturation, risk reduction, and public-private partnership investment to expand domestic and cost-effective solutions for assured access to space. Additionally, the Space Force's research and development standards must reflect both the mission areas and the threat environment. The Space Force is building a

more defensible and resilient space defense architecture by disaggregatingon-orbit capabilities. We are building agile and threat responsive systems to complicate targeting. Additionally, we are building redundancy and resiliency countermeasures into the spacecraft and payload designs of our systems.

WAY FORWARD

Congress established the Space Force to ensure freedom of action for the United States in, from, and to space. This Department of the Air Force Posture Statement builds on FY21 efforts in strengthening our ability to deliver flexible capabilities and strategic options at operationally relevant speeds to outpace emerging and dynamic threats. The Service's streamlined and integrated organizational design also creates new military options with the joint force, inter-agencies, industry, and our partners and allies. We are eager to work with Congress to build a common understanding of both the strategy and the investments needed to secure our Nation's vital interests.

John P. Roth
Acting Secretary of the Air Force

Mr. John P. Roth is the Acting Secretary of the Air Force. In this role, Mr. Roth leads the Department of the Air Force, comprised of the U.S. Air Force and U.S. Space Force. He is responsible for organizing, training, and equipping Air and Space Forces and for the welfare of 697,000 active duty, Guard, Reserve, and civilian Airmen, Guardians, and their families. As the Department's senior leader overseeing an annual budget of more than $205 billion, Mr. Roth directs strategy, policy, acquisitions, technology, personnel, and risk management. He implements decisions of the President and Congress and fulfills Combatant Commanders' operational requirements.

Mr. Roth served as the Assistant Secretary of the Air Force for Financial Management and Comptroller from January 2018 to May 2020. As the Department's comptroller and chief financial officer, he was the principal advisor on all financial matters to ensure the effective and efficient utilization of the Department's financial resources. Mr. Roth oversaw the budgeting, auditing, cost estimating and financial operations that support Air Force priorities, in accordance with Congressional, Secretary of Defense and Secretary of the Air Force Direction.

From June to October 2019 and May to December 2020, Mr. Roth performed the duties of the Under Secretary of the Air Force.

Mr. Roth entered the Senior Executive Service in 1990 and has held several key leadership positions within the Office of the Under Secretary of Defense (Comptroller). Most recently, he served as the Deputy Comptroller (Program and Budget), the most senior career financial manager in the Department of Defense, responsible for the development and execution of a $550 billion annual budget. In addition, from January 2017 through May 2017, Mr. Roth performed the duties of the Under Secretary of Defense (Comptroller) and Chief Financial Officer. He is a past President of the American Society of Military Comptrollers.

EDUCATION
1974 Bachelor of Arts, University of Virginia, Charlottesville
1977 Master of Science, Administration, the George Washington University, Washington, D.C.
1987 Executive Excellence Program, Federal Executive Institute, Charlottesville, Va.
1991 Senior Managers in Government, Harvard University, Cambridge, Mass.
2000 National Security Leadership, Syracuse University, Syracuse, N.Y.

CAREER CHRONOLOGY
July 1974–September 1977, Budget Analyst, Norfolk Naval Supply Center, Norfolk, Va.
October 1977–February 1984, Budget Officer, Naval Data Automation Command, Washington, D.C.
February 1984–July 1990, Budget Analyst, Office of the Under Secretary of Defense (Comptroller), the Pentagon, Arlington, Va.
July 1990–February 1994, Associate Director for Investment, Office of the Under Secretary of Defense (Comptroller), the Pentagon, Arlington, Va.
February 1994–November 2001, Deputy Director for Investment, Office of the Under Secretary of Defense (Comptroller), the Pentagon, Arlington, Va.
November 2001–December 2017, Deputy Comptroller (Program and Budget); Office of the Under Secretary of Defense (Comptroller), the Pentagon, Arlington, Va.
June 2014–November 2015, Acting Principal Deputy Comptroller, Office of the Under Secretary of Defense (Comptroller), the Pentagon, Arlington, Va.
January 2017–May 2017, performed the duties of the Under Secretary of Defense (Comptroller) and Chief Financial Officer (CFO), Office of the Under Secretary of Defense (Comptroller), the Pentagon, Arlington, Va.
January 2018–May 2019, Assistant Secretary of the Air Force for Financial Management and Comptroller, Headquarters U.S. Air Force, the Pentagon, Arlington, Va.
June 2019–October 2019, performed the duties of the Under Secretary of the Air Force, Headquarters

U.S. Air Force, the Pentagon, Arlington, Va.
October 2019–May 2020, Assistant Secretary of the Air Force for Financial Management and Comptroller, Headquarters U.S. Air Force, the Pentagon, Arlington, Va.
May 2020–December 2020, performed the duties of the Under Secretary of the Air Force, Headquarters U.S. Air Force, the Pentagon, Arlington, Va.
January 2021–present, Acting Secretary of the Air Force, Department of the Air Force, the Pentagon, Arlington, Va.

AWARDS AND HONORS
2000 Distinguished Civilian Service Medal
2005 Meritorious Executive Presidential Rank Award
2012 Distinguished Executive Presidential Rank Award
2017 Distinguished Civilian Service Medal
2019 Defense Exceptional Civilian Service Medal

General Charles Q. Brown, Jr.
Chief of Staff of the Air Force

Gen. Charles Q. Brown, Jr. is the Chief of Staff of the Air Force. As Chief, he serves as the senior uniformed Air Force officer responsible for the organization, training and equipping of 689,000 active-duty, Guard, Reserve and civilian forces serving in the United States and overseas. As a member of the Joint Chiefs of Staff, the general and other service chiefs function as military advisers to the Secretary of Defense, National Security Council and the President.

Gen. Brown was commissioned in 1984 as a distinguished graduate of the ROTC program at Texas Tech University. He has served in a variety of positions at the squadron and wing levels, including an assignment to the U.S. Air Force Weapons School as an F-16 Fighting Falcon Instructor. His notable staff tours include Aide-de-Camp to the Chief of Staff of the Air Force; Director, Secretary of the Air Force and Chief of Staff Executive Action Group; and Deputy Commander, U.S. Central Command. He also served as a National Defense Fellow at the Institute for Defense Analyses, Alexandria, Virginia.

Gen. Brown has commanded a fighter squadron, the U.S. Air Force Weapons School, two fighter wings and U.S. Air Forces Central Command. Prior to serving as the Air Force Chief of Staff, Gen. Brown was the commander of Pacific Air Forces, Air Component Commander for U.S. Indo-Pacific Command.

Gen. Brown is a command pilot with more than 2,900 flying hours, including 130 combat hours.

EDUCATION
1984 Bachelor of Science, Civil Engineering, Texas Tech University, Lubbock
1991 U.S. Air Force Fighter Weapons School, Nellis Air Force Base, Nev.
1992 Squadron Officer School, Maxwell AFB, Ala.
1994 Master of Aeronautical Science, Embry-Riddle Aeronautical University, Daytona Beach, Fla.
1997 Distinguished graduate, Air Command and Staff College, Maxwell AFB, Ala.
2000 Air War College, Maxwell AFB, Ala.
2004 National Defense Fellow, Institute for Defense Analyses, Alexandria, Va.
2008 Air Force Senior Leadership Course, Center for Creative Leadership, Greensboro, N.C.
2012 Joint Force Air Component Commander Course, Maxwell AFB, Ala.
2014 Joint Flag Officer Warfighting Course, Maxwell AFB, Ala.
2015 Pinnacle Course, National Defense University, Fort Lesley J. McNair, Washington, D.C.
2017 Leadership at the Peak, Center for Creative Leadership, Colorado Springs, Colo.

ASSIGNMENTS
May 1985 - April 1986, Student, undergraduate Pilot training, 82nd Student Squadron, Williams Air Force Base, Ariz.
May 1986 - July 1986, Student, lead-in fighter training, 434th Tactical Fighter Training Squadron, Holloman AFB, N.M.
August 1986 - March 1987, Student, F-16 training, 62nd Tactical Fighter Training Squadron, MacDill AFB, Fla.
April 1987 - October 1988, F-16 Pilot, 35th Tactical Fighter Squadron, Kunsan Air Base, South Korea
November 1988 - April 1991, F-16 Instructor Pilot, wing electronic combat officer, and wing standardization and evaluation flight examiner, 307th and 308th Tactical Fighter Squadrons, Homestead AFB, Fla.
April 1991 - August 1991, Student, U.S. Air Force Fighter Weapons Instructor Course, Nellis AFB, Nev.
August 1991 - August 1992, F-16 Squadron Weapons Officer and Flight Commander, 307th Fighter Squadron, Homestead AFB, Fla.
September 1992 - October 1994, Weapons School Instructor, and standardization and evaluation flight examiner, F-16 Division, U.S. Air Force Weapons School, Nellis AFB, Nev.
October 1994 - July 1996, Aide-de-Camp to the Chief of Staff, Headquarters U.S. Air Force, Arlington, Va.

August 1996 - June 1997, Student, Air Command and Staff College, Maxwell AFB, Ala.
June 1997 - September 1997, Student, Armed Forces Staff College, National Defense University, Norfolk, Va.
September 1997 - November 1999, Air Operations Officer, Current Operations Division, Operations Directorate, U.S. Central Command, MacDill AFB, Fla.
November 1999 - June 2003, F-16CJ Instructor Pilot and assistant operations officer, 79th Fighter Squadron; Weapons and Training Flight Commander, 20th Operations Support Squadron; Operations Officer, 55th Fighter Squadron; and Commander, 78th Fighter Squadron, Shaw AFB, S.C.
July 2003 - June 2004, National Defense Fellow, Institute for Defense Analyses, Alexandria, Va.
June 2004 - June 2005, Deputy Chief, Program Integration Division, Directorate of Programs, Headquarters U.S. Air Force, Arlington, Va.
July 2005 - May 2007, Commandant, U.S. Air Force Weapons School, 57th Wing, Nellis AFB, Nev.
May 2007 - May 2008, Commander, 8th Fighter Wing, Kunsan AB, South Korea
June 2008 - May 2009, Director, Secretary of the Air Force and Chief of Staff Executive Action Group, Headquarters U.S. Air Force, Arlington, Va.
June 2009 - April 2011, Commander, 31st Fighter Wing, Aviano AB, Italy
May 2011 - May 2013, Deputy Director, Operations Directorate, U.S. Central Command, MacDill AFB, Fla.
May 2013 - February 2014, Deputy Commander, U.S. Air Forces Central Command; Deputy, Combined Force Air Component Commander, U.S. Central Command, Southwest Asia
March 2014 - June 2015, Director, Operations, Strategic Deterrence, and Nuclear Integration, Headquarters U.S. Air Forces in Europe - Air Forces Africa, Ramstein AB, Germany
June 2015 - July 2016, Commander, U.S. Air Forces Central Command, Air Combat Command, Southwest Asia
July 2016 - July 2018, Deputy Commander, U.S. Central Command, MacDill AFB, Fla.
July 2018 - July 2020, Commander, Pacific Air Forces; Air Component Commander for U.S. Indo-Pacific Command; and Executive Director, Pacific Air Combat Operations Staff, Joint Base Pearl Harbor-Hickam, Hawaii
August 2020 - present, Chief of Staff of the U.S. Air Force, the Pentagon, Arlington, Va.

SUMMARY OF JOINT ASSIGNMENTS
September 1997 - November 1999, Air Operations Officer, Current Operations Division, Operations Directorate, U.S. Central Command, MacDill AFB, Fla., as a major
May 2011 - May 2013, Deputy Director, Operations Directorate, U.S. Central Command, MacDill AFB, Fla., as a brigadier general
July 2016 - July 2018, Deputy Commander, U.S. Central Command, MacDill AFB, Fla., as a lieutenant general

FLIGHT INFORMATION
Rating: command pilot
Flight hours: more than 2,900, including 130 combat hours
Aircraft flown: F-16A/B/C/D and 15 additional fixed and rotary-wing aircraft

MAJOR AWARDS AND DECORATIONS
Defense Distinguished Service Medal with one oak leaf cluster
Distinguished Service Medal
Defense Superior Service Medal
Legion of Merit with three oak leaf clusters
Bronze Star Medal
Defense Meritorious Service Medal
Meritorious Service Medal with two oak leaf clusters
Aerial Achievement Medal
Joint Service Commendation Medal
Air Force Commendation Medal with two oak leaf clusters
Combat Readiness Medal
National Defense Service Medal with bronze star
Armed Forces Expeditionary Medal
Global War on Terrorism Expeditionary Medal

Global War on Terrorism Service Medal
Korea Defense Service Medal
Nuclear Deterrence Operations Service Medal
NATO Medal
Republic of Korea Order of National Security Merit (Samil Medal)

PUBLICATIONS
"Developing Doctrine for the Future Joint Force: Creating Synergy and Minimizing Seams," Air University Press, September 2005
"No Longer the Outlier: Updating the Air Component Structure" Air University Press, Spring 2016

EFFECTIVE DATES OF PROMOTION
Second Lieutenant Feb. 28, 1985
First Lieutenant Feb. 28, 1987
Captain Feb. 28, 1989
Major Aug. 1, 1996
Lieutenant Colonel July 1, 1999
Colonel June 1, 2005
Brigadier General Nov. 20, 2009
Major General July 3, 2013
Lieutenant General June 29, 2015
General July 26, 2018

General John W. "Jay" Raymond
Chief of Space Operations

Gen. John W. "Jay" Raymond is the Chief of Space Operations, United States Space Force. As Chief, he serves as the senior uniformed Space Force officer responsible for the organization, training and equipping of all organic and assigned space forces serving in the United States and overseas.

Gen. Raymond was commissioned through the ROTC program at Clemson University in 1984. He has commanded at squadron, group, wing, numbered air force, major command and combatant command levels. Notable staff assignments include serving in the Office of Force Transformation, Office of the Secretary of Defense; the Director of Plans, Programs and Analyses at Air Force Space Command; the Director of Plans and Policy (J5), U.S. Strategic Command; and the Deputy Chief of Staff for Operations, Headquarters U.S. Air Force.

Gen. Raymond deployed to Southwest Asia as Director of Space Forces in support of operations Enduring Freedom and Iraqi Freedom. Prior to leading establishment of the U.S. Space Force and serving as the first Chief of Space Operations, Gen. Raymond led the re-establishment of U.S. Space Command as the eleventh
U.S. combatant command.

EDUCATION
1984 Bachelor of Science, Administrative Management, Clemson University, Clemson, S.C.
1990 Squadron Officer School, Maxwell Air Force Base, Ala.
1990 Master of Science, Administrative Management, Central Michigan University, Mount Pleasant
1997 Air Command and Staff College, Maxwell AFB, Ala.
2003 Master of Arts, National Security and Strategic Studies, Naval War College, Newport, R.I.
2007 Joint Forces Staff College, Norfolk, Va.
2011 Combined Force Air Component Commander Course, Maxwell AFB, Ala.
2012 Joint Flag Officer Warfighting Course, Maxwell AFB, Ala.

ASSIGNMENTS
August 1985–October 1989, Minuteman Intercontinental Ballistic Missile Crew Commander; Alternate Command Post; Flight Commander and Instructor Crew Commander; and Missile Procedures Trainer Operator, 321st Strategic Missile Wing, Grand Forks Air Force Base, N.D.
October 1989–August 1993, Operations Center Officer Controller, 1st Strategic Aerospace Division, and Executive Officer, 30th Space Wing, Vandenberg AFB, Calif.
August 1993–February 1996, Chief, Commercial Space Lift Operations, Assistant Chief, Current Operations Branch, Headquarters Air Force Space Command, Peterson AFB, Colo.
February 1996–August 1996, Deputy Director, Commander in Chief's Action Group, Headquarters AFSPC, Peterson AFB, Colo.
August 1996–June 1997, Student, Air Command and Staff College, Maxwell AFB, Ala.
June 1997–August 1998, Space and Missile Force Programmer, Headquarters U.S. Air Force, the Pentagon, Arlington, Va.
September 1998–April 2000, Chief, Expeditionary Aerospace Force Space and Program Integration, Expeditionary Aerospace Force Implementation Division, Headquarters U.S. Air Force, the Pentagon, Arlington, Va.
April 2000–June 2001, Commander, 5th Space Surveillance Squadron, RAF Feltwell, United Kingdom
June 2001–July 2002, Deputy Commander, 21st Operations Group, Peterson AFB, Colo.
July 2002–June 2003, Student, Naval War College, Newport, R.I.
June 2003–June 2005, Transformation Strategist, Office of Force Transformation, Office of the Secretary of Defense, the Pentagon, Arlington, Va.
June 2005–June 2007, Commander, 30th Operations Group, Vandenberg AFB, Calif. (September 2006–January 2007, Director of Space Forces, Combined Air Operations Center, Southwest Asia)
June 2007–August 2009, Commander, 21st Space Wing, Peterson AFB, Colo.
August 2009–December 2010, Director of Plans, Programs and Analyses, Headquarters AFSPC, Peterson

AFB, Colo.
December 2010–July 2012, Vice Commander, Fifth Air Force, and Deputy Commander, 13th Air Force, Yokota Air Base, Japan
July 2012–January 2014, Director of Plans and Policy (J5), U.S. Strategic Command, Offutt AFB, Neb.
January 2014–August 2015, Commander, Fourteenth Air Force (Air Forces Strategic), AFSPC, and Commander, Joint Functional Component Command for Space, U.S. Strategic Command, Vandenberg AFB, Calif.
August 2015–October 2016, Deputy Chief of Staff, Operations, Headquarters U.S. Air Force, the Pentagon, Arlington, Va.
October 2016–December 2019, Commander, AFSPC, Peterson AFB, Colo.
December 2017–August 2019, Commander, Joint Force Space Component Command, Peterson AFB, Colo.
August 2019–August 2020, Commander, U.S. Space Command, Peterson AFB, Colo.
December 2019–present, Chief of Space Operations, U.S. Space Force, Peterson AFB, Colo.

SUMMARY OF JOINT ASSIGNMENTS
June 2003–June 2005, Transformation Strategist, Office of Force Transformation, Office of the Secretary of Defense, Arlington, Va., as a colonel
July 2012–January 2014, Director of Plans and Policy (J5), U.S. Strategic Command, Offutt Air Force Base, Neb., as a major general
December 2017–August 2019, Commander, Joint Force Space Component Command, Peterson AFB, Colo., as a general
August 2019–August 2020, Commander, U.S. Space Command, Peterson AFB, Colo., as a general

MAJOR AWARDS AND DECORATIONS
Distinguished Service Medal with oak leaf cluster
Defense Superior Service Medal with oak leaf cluster
Legion of Merit with oak leaf cluster
Meritorious Service Medal with four oak leaf clusters
Air Force Commendation Medal
French Order of Merit

OTHER ACHIEVEMENTS
2007 General Jerome F. O'Malley Distinguished Space Leadership Award, Air Force Association
2015 Thomas D. White Space Award, Air Force Association
2016 Peter B. Teets Government Award, National Defense Industrial Association
2017 James V. Hartinger Award, National Defense Industrial Association

EFFECTIVE DATES OF PROMOTION
Lieutenant July 20, 1984
First Lieutenant July 20, 1986
Captain July 20, 1988
Major July 1, 1996
Lieutenant Colonel July 1, 1999
Colonel July 1, 2004
Brigadier General Aug. 1, 2009
Major General May 4, 2012
Lieutenant General Jan. 31, 2014
General Oct. 25, 2016

DOCUMENTS SUBMITTED FOR THE RECORD

JUNE 16, 2021

SECRETARY OF THE AIR FORCE
WASHINGTON

MAR 2 9 2021

The Honorable Ronny Jackson
U.S. House of Representatives
Washington, DC 20515

Dear Representative Jackson:

Thank you for your March 2, 2021 letter about the Child Development Center (CDC) at Sheppard Air Force Base.

While our robust platforms and systems are the best in the world, our most valuable assets are our people. Mission success depends on supporting our Airmen and Guardians, and providing their family members with the skills and resources to thrive. Available, affordable, quality child care serves as a readiness enabler. Our Airmen and Guardians can remain mission-focused if they know their families are well cared for.

The Department of the Air Force shares your concern for the Sheppard CDC and has made it our number one priority for CDC Military Construction. The construction contract Request for Proposal, managed by the United States Army Corps of Engineers, is currently at 95% review. To date, $949,000 in appropriated Planning and Design funding has been invested in the project. After completion of required environmental analysis, we expect the project to be ready to award in fiscal year 2022, should funds become available. The estimated construction cost is currently $20,000,000.

We appreciate your recognition of this vital project at Sheppard Air Force Base. The Department of the Air Force remains committed to working with Congress to complete recapitalization of our CDCs in a timely, efficient, and cost-effective manner.

Thank you for your support for our Airmen, Guardians, and their families.

Sincerely,

John P. Roth
Acting

WITNESS RESPONSES TO QUESTIONS ASKED DURING THE HEARING

JUNE 16, 2021

RESPONSE TO QUESTION SUBMITTED BY MR. LARSEN

Mr. ROTH. The Department of the Air Force has programmed $42 million for environmental studies and surveys at potential sites for modern, 6th-generation Over-The-Horizon Radars (OTHR) in Fiscal Year 2021 (FY21) and Fiscal Year 2022 (FY22). These environmental and site surveys will further define the requirements and future for the Alaska NWS radar sites. The Department of Defense (DOD) also recently contracted for a feasibility study of communications architecture improvements for these NWS radar sites, to include terrestrial linkages. Currently, the site surveys are on-going. [See page 16.]

RESPONSE TO QUESTION SUBMITTED BY DR. DesJARLAIS

Mr. ROTH. Due to cost and the desire to prevent Service duplication of efforts, the Department's OSD/Test Resource Management Center (TRMC) is the lead for all hypersonic test infrastructure investment. Using its hypersonic investment roadmap, OSD/TRMC is funding in FY22 a new high temperature aeroshell materials test facility at Arnold Engineering Development Complex (AEDC). This facility will address the test capacity issue as cited in the 2021 AF Assessment of the Air Force Flight Test Center. [See page 33.]

RESPONSES TO QUESTIONS SUBMITTED BY MS. HOULAHAN

Mr. ROTH. No families are living in poor or failing Department of the Air Force housing units. Any units that are unfit for occupancy for various reasons (pending demolition, pending renovation, pending remediation, being used as model units, being used as storage facilities) are offline and families are not assigned to these units. [See page 42.]

Mr. ROTH. We appreciate your support in helping us remain competitive in recruiting and retaining tech talent. The recent expanded direct hiring authorities in the FY21 NDAA have been very helpful in improving our efforts. The DAF is investing in robust talent management and dynamic modern, scalable training to attract, develop, motivate, and retain qualified personnel to build a modern, innovative, and agile cyber warfare workforce. Of note is the former SECAF's Premier College Intern Program. This initiative focuses on hiring and recruitment of summer interns with possible follow on employment and supplemental training into a DAF formal developmental program. The DAF hires 500 PCIP positions each fiscal year in science, technology, engineering, and mathematics (STEM), Cyber, Acquisition, Intelligence, and other mission critical specialties. Additionally, the DAF has established a Talent Acquisition Division to fill mission critical, hard to fill positions. This division is successfully filling a large variety of critical positions via virtual recruiting fairs. A recent virtual event for the Air Force Life Cycle Center resulted in filling all 77 vacancies targeted for hire. The Office of the Under Secretary of Defense, Acquisition and Sustainment with support from the Defense Digital Services recently submitted to Congress the "Fiscal Year 2020 National Defense Authorization Act (NDAA) Section 230 (Policy on the Talent Management of Digital Expertise and Software Professionals) Strategy & Implementation Plan". The DAF is currently waiting on further policy guidance from DCPAS. A kick-off of the Section 230 Digital Talent Management Forum is planned in late July and members from across DOD including the services have been invited. The United States Space Force (USSF) is leveraging existing personnel hiring authorities to tap directly into the digital labor workforce for technical talent that can be strategically infused into our force structure. To maximize our ability to attract digital talent USSF will work to offer compensation and/or incentives tied to a person's experience and/or technical competency, for both the military and civilian workforce. [See page 42.]

RESPONSE TO QUESTION SUBMITTED BY MR. WALTZ

General RAYMOND. Regarding Tactically Responsive Launch, the US launch industry is the envy of the world and the Department of Defense is in step with our industry. The US Space Force has a dedicated office for enhanced coordination with emerging launch providers, and we are actively pairing research and development satellite requirements with cutting edge domestic launch technology—some of which may utilize responsive launch opportunities. The USSF currently has eight small launch providers on contract through our existing contracts (Small Rocket Program-Orbital and Orbital Services Program-4), and the plan is to on-ramp new qualified vendors every year to continue to leverage industry innovation. This procurement line (PE RSPL00—PSF—P–18) has historically budgeted for launch services every other year and the USSF intends to increase this cadence to annual launch services. Regarding ranges, the Department of Defense continues to evaluate the space architectures and their supporting capabilities to meet warfighting requirements. A 2019 RAND study, Assessing U.S. Space Launch Locations to Support the National Security Space Launch Program, found there are sufficient capacities at the Eastern and Western Ranges, as measured by the annual launch rates supported by the ranges, to meet current and forecasted demand by National Security Space, civil, and commercial customers. RAND also found risks from natural hazards are manageable, and a limited proliferation of spaceports is unlikely to enhance resilience to man-made threats. Their recommendation, which we support, is to ensure adequate funding for Eastern and Western Ranges (see PE 1203182SF—RDT&E, SF—R–41 and Budget Line SPRNGE—Procurement, SF—P–21) and to leverage the capabilities of commercial and state-owned spaceports for DOD and NRO missions where launch requirements match the Spaceports' capabilities. [See page 47.]

RESPONSE TO QUESTION SUBMITTED BY MRS. LURIA

General BROWN. In FY22 the Air Force plans to procure 525 JASSM (Joint Air-to-Surface Standoff Missile), which includes 280x AGM–158B, 210x AGM–158B2, and 35x AGM–158D. While I cannot talk to numbers of bombers in the Western Pacific and their load-outs in an unclassified setting, I would like to offer you a classified briefing as a follow up. We can cover USAF capabilities supporting USINDOPACOM in further detail. NAVSEA would be the most appropriate source to answer questions on quickstrike mines, and that conversation may require higher classification levels. [See page 20.]

RESPONSE TO QUESTION SUBMITTED BY MR. LAMBORN

Mr. ROTH. The Department of the Air Force is aware that Redstone Arsenal is on the EPA's National Priorities List as a Superfund site. Initial analysis indicates that the Superfund site does not impact the site chosen as the preferred location for the U.S. Space Command Headquarters (USSPACECOM HQ). The Department is currently in the process of conducting an analysis in compliance with the National Environmental Policy Act (NEPA), and the final decision for the USSPACECOM HQ will be informed by the NEPA-compliant analysis and documentation. [See page 22.]

RESPONSE TO QUESTION SUBMITTED BY MR. WITTMAN

Mr. ROTH. Yes. Boeing proposed the Honeywell Navigational Light (HNL) for the KC–46 Japan Spares contract at a unit price more than 1500% above the previous unit price. Boeing's specific price information is proprietary information protected from release. The Air Force could not make a fair and reasonable price determination on approximately 12% of Boeing's total proposed contract price due to the lack of information from Boeing to support cost or price analysis related to commercial spares. However, Boeing's total proposed price did not exceed the Letter of Offer and Acceptance amount agreed to by Japan for this requirement. After nearly 18 months of requests for information to support negotiations, all Government actions failed to elicit the requested information from Boeing. Therefore, Major General Cameron Holt, Deputy Assistant Secretary for Contracting within the Office of the Assistant Secretary of the Air Force (Acquisition, Technology & Logistics) and the Air Force Head of the Contracting Activity determined, in accordance with 10 U.S.C Section 2306a(d)(2)(A), that award of the contract was in the best interest of the Government given the unsuccessful efforts made to secure adequate pricing information,

the Government of Japan's need for the spares, and the increased costs and harm to the United States Government if the award was not made. The KC–46 program is planning to procure spare parts through competitive contract. [See page 25.]

RESPONSE TO QUESTION SUBMITTED BY MR. GARAMENDI

General BROWN. There is no impact to GBSD fielding based on the current W87–1 development and fielding plan. The W87–0, currently deployed on Minuteman III, will be the initial warhead deployed on GBSD. The W87–1, which the Department of Energy's National Nuclear Security Administration (DOE/NNSA) is scheduled to deliver its first production unit warhead in 2030, will be the second warhead deployed on GBSD. Program management for GBSD and W87–1 is tightly coupled to ensure these two systems meet their own individual program requirements as well as U.S. national security goals and objectives. A key element supporting warhead development is the DOE/NNSA pit production strategy. Production of new pits to support the W87–1 will come from Los Alamos National Laboratory. The first W87–1 pit will be produced in 2023, seven years ahead of the W87–1 first production unit date. NNSA is on track to achieve a 30 plutonium pit per year production capacity at Los Alamos National Laboratory by 2026. [See page 27.]

QUESTIONS SUBMITTED BY MEMBERS POST HEARING

JUNE 16, 2021

QUESTIONS SUBMITTED BY MR. TURNER

Mr. TURNER. Research and development of offensive and defensive hypersonic weapons systems has skyrocketed over the last several years, with the service aiming at delivery to the warfighter in early 2020s. Ongoing development of these systems is critical if we are going to maintain parity with China and Russia. Recently, there has been increasing interest in reusable hypersonic flight as the next step of development. These are traditional, though very fast, aircraft with both military and commercial applications. Can you describe the current direction of reusable high Mach and hypersonic flight development and some of the lines of effort you plan to pursue over the next few years? At current resourcing levels, when might we see first flight of a reusable hypersonic flight system? How might an increase in budget accelerate this timeline? And are there any particular lines of effort where additional resources would be most impactful?

Mr. ROTH. Reusable high-Mach systems are in early development for commercial transportation by several aerospace companies. The Department of Defense and NASA are conducting long-term science and technology activities that are complementary with the industrial developments. Reusable high-Mach systems have the potential to provide the military with flexible on-demand strike, surveillance, and targeting in highly contested environments, feeding the joint force with critically needed information and promptly accessing targets in defended areas and responsive space launch to rapidly reconstitute critical space-based assets.

The Department of the Air Force (DAF) is working with the Office of the Under Secretary of Defense for Research and Engineering and NASA to develop a national strategy for High Mach and Hypersonic Aircraft. The strategy will leverage previous and ongoing investments in expendable hypersonic weapons to develop the future technologies required for reusable hypersonic flight. The DAF also plans to pursue technology development in aerodynamics, propulsion, structures and power generation that enable future expendable and reusable hypersonic multi-mission platforms. For example, DAF is collaborating with DARPA and NASA to develop turbine-based combined-cycle propulsion technologies for hypersonic aircraft. The Department of Defense does not currently have a program to field reusable hypersonic aircraft. Reusable hypersonic aircraft could one day enable military ISR/strike, commercial point-to-point transportation, and dual-use responsive space launch. The Department of the Air Force is working with DOD and NASA partners to develop a national strategy to determine the cost, schedule, programs, and test and evaluation infrastructure to develop and field a reusable hypersonic aircraft. Additional resources are required for advanced technology development to mature technologies for propulsion; materials and structures; advanced fuels, thermal management, and power generation; and mission systems for ISR and strike payloads. Additional prototyping resources would permit system development, manufacturing, and flight tests. Additional test and evaluation resources would modify existing test and evaluation facilities or build new facilities to conduct large-scale aerodynamic, propulsion and structures ground testing.

Mr. TURNER. What is the state of our hypersonic testing infrastructure? What additional investments are needed to ensure that we can accommodate the testing needed across the spectrum—from expendable weapons systems to reusable hypersonic aircraft? Many of the technologies developed for expendable hypersonic weapons, like materials and hypersonic test facilities, have crossover applicability to reusable hypersonic flight. Others, like propulsion, require unique development activities. In the near-term, what steps are being taken to transfer expendable weapons program gains into reusable high Mach flight programs? And what can this committee do to better support continued research and testing progress on technologies unique to reusable high Mach flight? Hypersonic Space Launch—Service leaders have been discussing responsive space access for many years, looking to rapidly reconstitute critical space based assets degraded by an adversary in a conflict. Yet the primary challenge remains—we have a limited number of rockets to launch from a limited number of sites. Recently there has been increasing conversation in the public and private sector about the utility of reusable hypersonic aircraft to act as the first stage of a launch to low earth orbit. Can you discuss the potential of

reusable hypersonic aircraft based space launch and steps you are taking to ensure research efforts are appropriately funded and policy and regulatory issues are being addressed?

Mr. ROTH. As reflected in the March 2021 Air Force's Assessment of the Air Force Test Center, the hypersonic test capabilities are at max capacity as well as in need of investment to meet emerging DOD requirements. The most notable test capacity shortfall is the aeroshell material testing area. The current hypersonic thermal test facility was originally designed for limited capacity use. As the DOD's investment lead for hypersonic test capabilities, OSD/Test Resource Management Center (TRMC) will fund in FY22 a new aeroshell material test facility at Arnold Engineering Development Complex (AEDC). The AF has provided additional funding for facility sustainment, repair and modernization for hypersonic test facilities at AEDC starting in FY22. The most critical areas of hypersonic test infrastructure in need of modernization or development are aeroshell material test capacity, improved flight test capabilities, air breathing propulsion ground test capability, hypersonic ground testing via the high speed test track, end game lethality testing, seeker and sensor test capabilities when exposed to hypersonic flow, and weather effects on hypersonic weapons while flying through snow/rain/ice at hypersonic speeds. The OSD Test Resource Management Center is the Department's hypersonic test infrastructure investment lead and will be able to provide more detailed responses on the aforementioned test capabilities needs. The Department of the Air Force (DAF) is working with our DOD and NASA partners to develop a national strategy for high Mach and hypersonic aircraft. The strategy will leverage today's investments in expendable weapons design, aerodynamics, gas turbine propulsion, scramjet propulsion, endothermic fuels, high temperature materials, and high temperature structures required for reusable hypersonic flight. DAF also collaborates with DARPA and NASA in developing hypersonic combined-cycle propulsion technologies for hypersonic flight that are benefiting from past technology advancements in expendable, supersonic turbine engines and hydrocarbon-fueled scramjets. The Committee can enable continued research and testing progress on technologies unique to reusable high Mach flight by supporting the President's Budget for science and technology in key areas such as hypersonic propulsion; high temperature materials and structures; advanced fuels, thermal management, and power generation; and high speed mission systems. Hypersonic aircraft can serve as the first stage of a two-stage-to-orbit launch system to rapidly reconstitute critical space-based assets by delivering up to 20,000 pounds of payload to low earth orbit.

The benefits of aircraft-based space launch systems include more flexible basing, fail-safe launch abort capability, and improved airspace integration. The Department of the Air Force is presently working with OUSD(R&E) and NASA to develop a national strategy to determine the cost, schedule, and test infrastructure to develop Hypersonic Aircraft that provides aircraft-based, responsive space launch capability by 2040. The Department of the Air Force currently does not have a program for an aircraft-based responsive space launch system, but will continue to assess the need and alternatives for responsive space launch and will consider additional resources for reusable hypersonic aircraft technology and system development in future program reviews as appropriate.

Mr. TURNER. Research and development of offensive and defensive hypersonic weapons systems has skyrocketed over the last several years, with the service aiming at delivery to the warfighter in early 2020s. Ongoing development of these systems is critical if we are going to maintain parity with China and Russia. Recently, there has been increasing interest in reusable hypersonic flight as the next step of development. These are traditional, though very fast, aircraft with both military and commercial applications. Can you describe the current direction of reusable high Mach and hypersonic flight development and some of the lines of effort you plan to pursue over the next few years? At current resourcing levels, when might we see first flight of a reusable hypersonic flight system? How might an increase in budget accelerate this timeline? And are there any particular lines of effort where additional resources would be most impactful?

General BROWN. Reusable high-Mach systems are in early development for commercial transportation by several aerospace companies. The Department of Defense and NASA are conducting long-term science and technology activities that are complementary with the industrial developments. Reusable high-Mach systems have the potential to provide the military with flexible on-demand strike, surveillance, and targeting in highly contested environments, feeding the joint force with critically needed information and promptly accessing targets in defended areas and responsive space launch to rapidly reconstitute critical space-based assets.

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Mr. TURNER. What is the state of our hypersonic testing infrastructure? What additional investments are needed to ensure that we can accommodate the testing needed across the spectrum—from expendable weapons systems to reusable hypersonic aircraft? Many of the technologies developed for expendable hypersonic weapons, like materials and hypersonic test facilities, have crossover applicability to reusable hypersonic flight. Others, like propulsion, require unique development activities. In the near-term, what steps are being taken to transfer expendable weapons program gains into reusable high Mach flight programs? And what can this committee do to better support continued research and testing progress on technologies unique to reusable high Mach flight? Hypersonic Space Launch—Service leaders have been discussing responsive space access for many years, looking to rapidly reconstitute critical space based assets degraded by an adversary in a conflict. Yet the primary challenge remains—we have a limited number of rockets to launch from a limited number of sites. Recently there has been increasing conversation in the public and private sector about the utility of reusable hypersonic aircraft to act as the first stage of a launch to low earth orbit. Can you discuss the potential of reusable hypersonic aircraft based space launch and steps you are taking to ensure research efforts are appropriately funded and policy and regulatory issues are being addressed?

General BROWN. As reflected in the March 2021 Air Force's Assessment of the Air Force Test Center, the hypersonic test capabilities are at max capacity as well as in need of investment to meet emerging DOD requirements. The most notable test capacity shortfall is the aeroshell material testing area. The current hypersonic thermal test facility was originally designed for limited capacity use. As the DOD's investment lead for hypersonic test capabilities, OSD/Test Resource Management Center (TRMC) will fund in FY22 a new aeroshell material test facility at Arnold Engineering Development Complex (AEDC). The AF has provided additional funding for facility sustainment, repair and modernization for hypersonic test facilities at AEDC starting in FY22. The most critical areas of hypersonic test infrastructure in need of modernization or development are aeroshell material test capacity, improved flight test capabilities, air breathing propulsion ground test capability, hypersonic ground testing via the high speed test track, end game lethality testing, seeker and sensor test capabilities when exposed to hypersonic flow, and weather effects on hypersonic weapons while flying through snow/rain/ice at hypersonic speeds. The OSD Test Resource Management Center is the Department's hypersonic test infrastructure investment lead and will be able to provide more detailed responses on the aforementioned test capabilities needs. The Department of the Air Force (DAF) is working with our DOD and NASA partners to develop a national strategy for high Mach and hypersonic aircraft. The strategy will leverage today's investments in expendable weapons design, aerodynamics, gas turbine propulsion, scramjet propulsion, endothermic fuels, high temperature materials, and high temperature structures required for reusable hypersonic flight. DAF also collaborates with DARPA and NASA in developing hypersonic combined-cycle propulsion technologies for hypersonic flight that are benefiting from past technology advancements in expendable, supersonic turbine engines and hydrocarbon-fueled scramjets. The Committee can enable continued research and testing progress on technologies unique to reusable high Mach flight by supporting the President's Budget for science and technology in key areas such as hypersonic propulsion; high temperature materials and structures; advanced fuels, thermal management, and power generation;

and high speed mission systems. Hypersonic aircraft can serve as the first stage of a two-stage-to-orbit launch system to rapidly reconstitute critical space-based assets by delivering up to 20,000 pounds of payload to low earth orbit.

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Mr. TURNER. Research and development of offensive and defensive hypersonic weapons systems has skyrocketed over the last several years, with the service aiming at delivery to the warfighter in early 2020s. Ongoing development of these systems is critical if we are going to maintain parity with China and Russia. Recently, there has been increasing interest in reusable hypersonic flight as the next step of development. These are traditional, though very fast, aircraft with both military and commercial applications. Can you describe the current direction of reusable high Mach and hypersonic flight development and some of the lines of effort you plan to pursue over the next few years? At current resourcing levels, when might we see first flight of a reusable hypersonic flight system? How might an increase in budget accelerate this timeline? And are there any particular lines of effort where additional resources would be most impactful?

General RAYMOND. While the Department of Defense does not currently have a requirement for reusable hypersonic aircraft, the Department of the Air Force is doing early work with our DOD and NASA partners to determine the projects, programs, and test and evaluation infrastructure needed to develop and field a reusable hypersonic aircraft. The resultant strategy will leverage today's investments in expendable weapons design, aerodynamics, gas turbine propulsion, scramjet propulsion, endothermic fuels, high temperature materials, and high temperature structures required for reusable hypersonic flight. Additionally, organizations such as AFWERX are pursuing advancements in supersonic or hypersonic aircraft through the SBIR/STTR program. Further, AFWERX and partner organizations are investigating teaming with industry on supersonic or hypersonic transport technologies with the resurgence in commercial interest, investment, and development. The Department of Defense does not currently have a program to field a reusable hypersonic aircraft. With our planning work just beginning, it is too soon to reasonably predict a first flight date or how additional funding might accelerate that date. Additional resources would be impactful for advanced technology development to mature technologies for propulsion; materials and structures; advanced fuels, thermal management, and power generation; and mission systems for ISR and strike payloads. Additional prototyping resources would permit system development, manufacturing, and flight tests. Additional test and evaluation resources would modify existing test and evaluation facilities or build new facilities to conduct large-scale aerodynamic, propulsion, and structures ground testing.

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QUESTIONS SUBMITTED BY MR. LAMBORN

Mr. LAMBORN. China and Russia have publicly announced that they've entered into a MoU on establishing a lunar International Research Station.

Although this was publicized as a scientific effort, some perceive this as a thin veil for military corporation on the moon. What is the Space Force doing to look ahead at potential military needs and capabilities beyond our traditional orbits and near the lunar region?

General RAYMOND. The United States Space Force's (USSF) mission is organizing, training, and equipping the forces needed to support the combatant commands and ensure unfettered access to, and use of, space by the United States and its allies and partners. We are in discussions with NASA, NRO and industry to determine the necessary communication, Position Navigation and Timing, Space Domain Awareness, and logistics required to support routine cis-lunar operations. We also continue to uphold and support existing international treaties that encourage the peaceful use of space for all nations. Further, we will continue to collaborate with allies and partners to develop, uphold, and encourage other nations to uphold commonly accepted standards of responsible behavior in space, to improve safety and transparency for all space activities.

Mr. LAMBORN. In the Space Force's Unfunded Priority List, you submitted a set of requests for an additional $431M to get after 'Developing a Warfighting Punch'.

If Congress does not fund this set of requirements, how will it impact the service's ability to stay ahead of China and Russia's advancements in Space?

General RAYMOND. The 21st century space domain is, and will be a more complex and dynamic environment than anything we've experienced before. As China and Russia attempt to gain an advantage in space, we need to invest in order to maintain our national advantage in space.

- We need to model and simulate the enemy's scheme of maneuver and emulate the possible effects those systems may have against our force.
- The Space Force needs an advanced technology infrastructure that allows live and virtual training spanning vast geographic distances that serve as a catalyst allowing our innovative space professionals to develop cutting-edge tactics and validate tactical procedures.
- We also recognize we have a need to test and refine our warfighting practices. A major space range expansion is needed to transition the Space Test and Training Range from its Space Electronic Warfare roots into a National Space Test and Training Range that incorporates testing and training of advanced threat simulation environments and delivers all-domain integration training for all warfighters.
- Additionally, the Space Force is investing in our human capital by providing expanded educational opportunities for our Guardians at all ranks to sharpen their technical acumen and also broaden their strategic and operational apertures making them invaluable assets throughout the Joint force. The combination of advanced technical training, exercising, and education with our Joint partners under realistic conditions preserves freedom of action, intensifies joint lethality, and enhances our decision advantage during a conflict.

Failure to provide the funds necessary to transform our force would result in a 20th century force fighting a 21st century battle. We will be ill-prepared to operate with the speed, agility, and ability to integrate with the broader Joint force—all areas our enemies will exploit by operating inside our decision space and outpacing our ability to seize the initiative in a future fight. I have only skimmed the surface of the exact nature of the specific technological investments we seek and I am happy to come back and discuss those efforts in a classified forum.

Mr. LAMBORN. In your opening statement, you mentioned that the Space Force is driving "unity of effort" across the department in capability development. Can you tell us a little about how you're doing that and how it's going, especially as it pertains to the force design work the SWAC is doing?

General RAYMOND. The Space Force is driving unity of effort across the department in capability force design by performing integrated analysis, integrating DOD space requirements, streamlining governance, and consolidating across the space acquisitions enterprise for agility. The Space Warfighting Analysis Center (SWAC) plays a foundational role in leading analysis, modeling, wargaming, and experimentation across the DOD to generate new concepts and force design options for the Department. SWAC's coordination across the national security space enterprise is key to achieving governmental unity of effort in building a more resilient architecture. The JROC recently identified the Space Force as the lead integrator for space requirements across the DOD. The Space Force has established a Program Integration Council to facilitate cooperation and deconfliction between National Security Space enterprise stakeholders and ensure planning, alignment, execution, delivery, and optimization of capabilities that inform the Space Acquisition Executive and Council. In the summer of 2021, the Space Force will establish the Space Systems Command to align the former Space and Missile Systems Center, Space Rapid Capabilities Office, and Space Development Agency (as of FY23), combining traditional acquisition with disruptive approaches and non-traditional vendors.

QUESTIONS SUBMITTED BY MS. SPEIER

Ms. SPEIER. Please provide details about the Department's initiatives to counter extremism in the force and how these initiatives are supported by the FY22 budget request.

Mr. ROTH. The Department of the Air Force is taking a comprehensive approach to addressing extremist behavior and ideology within the force. We utilized the SecDef directed "stand-down" day to create a dialogue with our members, not only making them aware of the threat posed by extremist behavior and ideology, but also reinforcing our values and principles as a military service. Subsequently, we incorporated feedback from our personnel in developing future initiatives. We are also conducting a thorough review in conjunction with OSD and the other Services across multiple lines of effort to include fostering greater transparency and accountability through military justice and personnel policy, expanding screening capabilities to better vet potential recruits for previous participation in extremist activities, coun-

tering potential insider threats, and education and training for the force as a whole. Further, we are implementing focused training for our separating and retiring members during our Transition Assistance Program to assist these members in guarding against recruitment efforts by extremist organizations upon their departure from the military. Thus far, all initiatives have been executed within existing budget authority, as further initiatives are developed and scoped, cost assessments will need to be factored into the equation.

Ms. SPEIER. Despite having more than 70 Department of the Air Force Child Development Centers (CDCs) listed as being in "poor" or "failing" condition as of June 2020, the Air Force's FY22 budget request only included one CDC Military Construction project, while another 4 were on the unfunded priorities list.

1. Given that the Air Force has, by far, the largest number of CDCs in poor or worse condition, why has the Air Force not requested more CDC MILCON projects in the budget and unfunded priorities list?

2. What is the Department's, plan, including a time horizon, to improve all Child Development Centers to at least "fair" condition?

Mr. ROTH. The Air Force updated its assessment of Child Development Centers in the "FY21 Adequate Childcare for Military Families Report." This updated report used a far more accurate, commercially accepted tool called BUILDER™, which accounts for the actual condition of facility components (e.g., plumbing; heating, ventilation, and air conditioning; electrical; roofing; fire protection systems) versus an imprecise aggregate dollar value of deferred maintenance as contained in the FY20 report. The FY21 report categorized 74 CDCs as "Green" [Good condition with routine maintenance or minor repair], 144 CDCs as "Amber" [Acceptable condition, requiring small system repair or replacement] and one CDC as "Red" [Poor condition, requiring major rehabilitation]. The single "Red" facility at Joint Base McGuire Dix Lakehurst will be repaired in FY22 at $3.9M. As mentioned, the FY22 Budget Request does include our most pressing CDC MILCON project at Sheppard AFB, TX. While several installations nominated CDCs for the Air Force's MILCON program, projects were prioritized against numerous other critical mission and quality of life requirements and did not rise above the cut line for funding in this year. First and foremost, all facilities being used by our children are safe for their use—installations are empowered to handle any immediate life-threatening, safety, or health-related repairs. The DAF utilizes the Childcare Capacity Working Group to identify priority projects for advocacy and inclusion in future MILCON or Facility, Sustainment, Restoration, and Modernization (FSRM) programs to address issues with conditions and capacity of our child care facilities. Currently the Department has 15 Child Development Center (CDC) MILCON projects in planning with five (totaling $126M) that will be ready to award in Fiscal Year 2022. Of the five FY22 projects, one (1) was included with the FY22 Presidents Budget and four (4) are included in the FY22 Unfunded Priority List (UPL). Additionally, the Department has 22 CDC FSRM projects at $93M ready to execute in Fiscal Year 2022. The Air Force updated its assessment of Child Development Centers in the "FY21 Adequate Childcare for Military Families Report." This updated report used a far more accurate, commercially accepted tool called BUILDER™, which accounts for the actual condition of facility components (e.g., plumbing; heating, ventilation, and air conditioning; electrical; roofing; fire protection systems) versus an imprecise aggregate dollar value of deferred maintenance as contained in the FY20 report. The FY21 report categorized 74 CDCs as "Green" [Good condition with routine maintenance or minor repair], 144 CDCs as "Amber" [Acceptable condition, requiring small system repair or replacement] and one CDC as "Red" [Poor condition, requiring major rehabilitation]. The single "Red" facility at Joint Base McGuire Dix Lakehurst will be repaired in FY22 at $3.7M. This action will bring all CDCs to at least an "Amber" condition. We are committed to never expose children or CDC workers to unsafe facilities.

Ms. SPEIER. How much of the Air Force's requested $7.7 million increase to fight "corrosives" including sexual assault will be directed to new initiatives, and what are the new initiatives?

Mr. ROTH. The DAF requested approximately $7.7M to address areas of greatest concern with sexual assault. We plan to use this funding to modernize prevention education and skill building for Airmen, Guardians, and DAF leaders at all levels. We intend to focus on community-level prevention strategies unique to servicemembers' environments using virtual platforms. This funding will allow us to expand our Sexual Communication and Consent program, an innovative, evidence-informed sexual assault prevention training that includes both universal and tailored content to servicemembers outside of accessions training. The DAF will also direct funds to strengthen the evaluation methods of the effectiveness of our various sexual assault prevention and victim assistance programs. We intend to identify and

enhance effective programs while eliminating programs with limited utility. Finally, the DAF will use funds to improve access to advocacy services and reduce lingering stigma around seeking help. We intend to boost resiliency by building a "No Wrong Door" environment where all helping agencies will work cohesively together to assist and direct care for all Airmen and Guardians. The Air Force is actively pursuing implementation of many of the recommendations of the Independent Review Commission on Sexual Assault in the Military, including those related to improved victim care and assistance.

Ms. SPEIER. How much of the Air Force's requested $7.7 million increase to fight "corrosives" including sexual assault will be directed to new initiatives, and what are the new initiatives?

General BROWN. The Department of the Air Force (DAF) requested approximately $7.7M to address areas of greatest concern with sexual assault. We plan to use this funding to modernize prevention education and skill building for Airmen, Guardians, and DAF leaders at all levels. We intend to focus on community-level prevention strategies unique to servicemembers' environments using virtual platforms. This funding will allow us to expand our Sexual Communication and Consent program, an innovative, evidence-informed sexual assault prevention training that includes both universal and tailored content to servicemembers outside of accessions training. The DAF will also direct funds to strengthen the evaluation methods of the effectiveness of our various sexual assault prevention and victim assistance programs. We intend to identify and enhance effective programs while eliminating programs with limited utility. Finally, the DAF will use funds to improve access to advocacy services and reduce lingering stigma around seeking help. We intend to boost resiliency by building a "No Wrong Door" environment where all helping agencies will work cohesively together to assist and direct care for all Airmen and Guardians. The Air Force is actively pursuing implementation of many of the recommendations of the Independent Review Commission on Sexual Assault in the Military, including those related to improved victim care and assistance.

Ms. SPEIER. When will the Air Force release the results of the second racial disparity report that was announced in February?

Will the report be released in sufficient time to inform the use of the $68 million increase for diversity programs requested in the FY22 budget?

General BROWN. The second disparity review focused on race, ethnic, and gender disparities was released on September 9th and the results are in the process of being shared. The report is available to inform the FY22 budget.

Ms. SPEIER. The Air Force is requesting to cut 77,000 flight hours in the FY22 budget. How will this impact the experience and readiness of pilots, and what is the Air Force doing to mitigate this risk?

General BROWN. The Air Force has been forced to make difficult tradeoffs in its FY22 budget request. These tradeoffs include the necessity of taking measured risk in readiness to fight tonight as we modernize the force to ensure preparedness for any future conflict with our pacing threats. The reduction in flying hours in the FY22 budget will impact our ability to train our pilots and there will be a consequential impact to near-term readiness. One mitigation mechanism we will pursue is the enhancement of both the live and synthetic flight training environments through heavy investment in training infrastructure. These improvements won't happen overnight but do require FY22 investment and beyond to realize relevant capabilities and offset recognized risk. The Air Force requires your assistance to retire legacy aircraft that will no longer be relevant in a highly contested future conflict. The increasing cost to maintain these aircraft drains resources which not only impacts the sustainment of the remaining fleet, but also significantly curtails our investment in the development of a more capable future force.

Ms. SPEIER. Have there been any formal reviews by the Space Force studying the use of the personnel flexibilities, such as direct officer accession authorities, provided by Congress? What is the status of these efforts?

General RAYMOND. The Space Force appreciates the personnel flexibilities afforded by Congress, such as direct accession authority and it is the Space Force's intent to maximize the use of those existing authorities. We have reviewed the existing authorities and are working with personnel experts across DOD to draft policy that capitalizes on niche talent integral to building the Space Force and maintaining superiority in Space. We conducted a review of our existing civilian personnel hiring authorities and established a plan to maximize their use. These flexible authorities help develop, retain and reward our civilian workforce while enabling a more streamlined and simplified civilian personnel system. This system will be agile enough to build and sustain a Space Force that can successfully maintain America's advantage in space.

QUESTIONS SUBMITTED BY MR. KELLY

Mr. KELLY. The Air Force can choose to replace the MFDs with a modern, in production alternative which brings additional capabilities to bear such as the large area display currently in the Air Force inventory on the KC–46. Or, the Air Force can choose to pursue a custom form fit function replacement that would only address reliability concerns without providing additional capabilities or offer developmental synergies with other in-inventory displays. Given that the MFDs have been out of production for decades and there is no off the shelf direct replacement available, it seems that both of these paths would require fairly similar development efforts while only the large area display would bring new capabilities for the warfighter. Has the Air Force modelled the impact to readiness (mission capable rates) that MFD obsolescence and MFD stockpile shortages will have over the next 10 years? If so please share that data with the committee.

General BROWN. The Air Force has not conducted studies, analyses or assessments (to include modeling) on MFDs.

Mr. KELLY. When does the Air Force intend to begin a replacement program for the Multifunction Displays and when would the USAF fleet be fully retrofitted?

When does the Air Force intend to request funding from Congress to begin this program? Is this included in the future years defense program (FYDP)?

General BROWN. The FY22 PB did not request funding for the replacement Multifunction Displays (MFD). Any MFD funding requests will have to be addressed in future budget submissions.

Mr. KELLY. Given that the Air Force intends to keep the C–17 in service into the 2070s, I believe that it is absolutely critical to take a long term, full lifecycle cost view of modernization efforts for this aircraft. o Does the Air Force intend to consider the lifecycle cost when deciding which MFD replacement path to pursue?

General BROWN. The C–17 program office will consider lifecycle costs when evaluating courses of action to address MFD obsolescence.

QUESTION SUBMITTED BY MS. HOULAHAN

Ms. HOULAHAN. The Air Force has sought an increase in recruitment funding which will support the Air Force in improving the tools they use to effectively recruit, train and equip Airmen and attain accession goals and diversity targets. Looking at your January 2021 numbers though I am still dismayed at the current recruitment levels which remain remarkably low for underrepresented minorities and women. Can you please provide an update on your recent efforts to recruit and retain a diverse force?

General BROWN. The Department of the Air Force continues to align our recruiting efforts to synergize and maximize diversity recruiting effectiveness. The increased resources will be used as we continue to develop and publish a data-informed outreach and recruiting campaign plan and integrate our total force resources. Our efforts will lead to an increase in under-represented students in the "Qualified Candidate Pool" vice just increasing the diversity of the "Applicant Pool."

QUESTIONS SUBMITTED BY MR. MORELLE

Mr. MORELLE. Secretary Roth, how does this budget request seek to provide greater economic stability and predictability for the defense industrial base and its suppliers? Are there further steps the Air Force can take to tailor its strategy to maintain this network of critical infrastructure?

Mr. ROTH. The Department of the Air Force relies on a dynamic, multi-layered, and complex global industrial base to reliably acquire and support weapon systems. Our budget provides ability to keep production lines running, and enables us to enter into long-term contracts, ensuring stability and predictability for our industrial base. We are mindful of the importance to sustain and grow competition in our industrial base in partnership with the Cybersecurity & Infrastructure Security Agency under the Defense Industrial Base Sector. Through digital design and engineering approaches, there is a chance to broaden the vendor base, and provide new industry entrants an opportunity to deliver innovation and war winning capability. As you may know, the AFWERX challenge aims to accelerate inventive solutions from individuals, startups, small business, large enterprises, academia, and research labs in the most collaborative way. We look forward to staying in sync with the Committee as we adapt to access this larger, innovation base.

Mr. MORELLE. General Raymond, how does this budget request seek to provide greater economic stability and predictability for the defense industrial base and its

suppliers? Are there further steps the Space Force can take to tailor its strategy to maintain this network of critical infrastructure?

General RAYMOND. Outpacing our adversaries requires a new level of partnership between Congress, the industrial base, and the DOD to preserve the strategic advantages our space capabilities afford while still maintaining accountability and transparency to the American public, and this budget request is a step in that direction. The Department has taken steps to build the launch industrial base, providing stability in National Security Space Launch procurement over the next five years, and is increasingly working with smaller and non-traditional companies through the use of Other Transaction Authorities, such as the Space Enterprise Consortium (SpEC). SpEC is designed to address the challenges associated with the increasing collaboration with non-traditional suppliers—growing the defense industrial base and achieving award timelines 40 percent faster than traditional contracting methods.

QUESTIONS SUBMITTED BY MR. MOORE

Mr. MOORE. Since the efficacy of attritable aircraft depends on the ability to produce them in affordably in high volumes, minimizing cost for these systems is critical to creating a viable program of record. How critical is it that we develop low-cost propulsion solutions optimized for attritable vehicles? And can you describe the impact to risk of operations 5th gen fighters in a future theater, such as the Pacific, if we failed to field attritable sytsems due to affordability issues?

Mr. ROTH. Propulsion is a key cost driver for attritable aircraft. The Department of the Air Force is working on limited-life engine technologies, prioritizing cost optimization over performance. Overall, the Department of the Air Force is pursuing digital designs, low-cost manufacturing techniques, and modular open system architectures to ensure these aircraft are produced at a price point that enables sufficient mass to deter, and if necessary, defeat peer adversaries. The Air Force is pursuing programs such as the manned-unmanned teaming of attritable systems with fighter aircraft to provide an operational benefit to the warfighter at a lower cost. While we do not have specific analysis that compares risk to 5th Gen Fighter Operations operating with or without attritable systems, our wargaming and analysis indicates that attritable aircraft can be a force multiplier in some of the most difficult scenarios we anticipate the Joint Force may confront in a future operating environment that is highly contested.

Mr. MOORE. How does the Air Force plan to mitigate F–35 cost and aircraft availability challenges if it continues down the path of procuring less F–35As per year than originally planned for Full Rate Production?

Mr. ROTH. F–35 operating costs (as currently projected) and long-term sustainment costs still require continued focus to maximize affordability. Any approved Air Force reductions in annual F–35A procurement rates are designed specifically to utilize offsets from within the program to address cost, aircraft availability, and other challenges to realize the fighter force design that the Air Force requires.

Mr. MOORE. Composites, especially carbon-fiber, have demonstrated the capability of creating lighter, stronger and more cost-effective solutions to USAF materials and manufacturing programs. Are there research opportunities within AFRL Aerospace Vehicle Technologies to create new warfare and sustainability solutions using advanced materials? Are there constraints in funding opportunities?

Mr. ROTH. AFRL is actively engaged in advanced materials discovery, development, manufacturing, and sustainability technologies, including composites, for air and space systems. AFRL efforts include demonstration of advanced manufacturing techniques, such as braided structures for aircraft fuselages, to reduce cost and improve performance. The Department of the Air Force resources a robust materials and manufacturing program, which is augmented by additional congressional funding.

Mr. MOORE. Are there composites entities that could execute a composites research program which works with USAF and brings together the industrial base, advanced manufacturers, universities and government entities?

Mr. ROTH. The Department of the Air Force actively engages universities, commercial and defense industry, manufacturers, and other government entities to further composite research and technology.

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Mr. MOORE. The Air Force has been procuring F–35s at a rate nearing Full Rate Production for the past several years. Recently publicized data showed F–35 as having the best "Mission Capable" rate out of all Air Force fighter fleets in 2020. Despite these significant achievements, the Air Force's FY22 budget proposes reducing F–35 annual procurement below last year's appropriated level, while purchasing additional 4th generation fighters that have not been produced at rates for the Air Force in roughly 20-plus years. As the Air Force tries to mitigate a fighter shortfall, how does this revised acquisition plan not add additional risk? How does the Air Force plan to mitigate this risk?

General BROWN. The AF is committed to the F–35, particularly the Block 4 version and beyond. This version of the F–35 will be the cornerstone of our fighter fleet for decades, and we are anxious to get the Block 4 into the fight. At the same time, the AF must also pursue a mix of fighter capabilities (F–35, NGAD, F–15EX, and F–16) with affordability, sustainability and availability in mind, in order to support the joint force to fight and win across the range of military operations.

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QUESTIONS SUBMITTED BY MR. FALLON

Mr. FALLON. 1. General Brown, do you believe there is systemic racism in the United States Air Force? (a) General Brown in your opinion, is the United States Air Force a meritocracy?

2. Please provide the number of Article 15s, court martials and disciplinary separations for the last fiscal year that data is available?

a. What was the reason for each Article 15, court martial or disciplinary separation? b. What was the race of each individual in question? c. What was the disciplinary history, if any, of the individual(s) in question? d. How many Airmen/Guardians were separated, in the last fiscal year data is available, due to extremist activity?

3. What is the racial makeup of the United States Air Force (enlisted/officer/total) for the most recent fiscal year?

General BROWN. No. However, there are individual acts of racism and disparities in military discipline processes, personnel development, and career opportunity that were highlighted in our Racial Disparity Review conducted by the Air Force Inspector General and released in December 2020. 123,000 Airmen and Guardians responded to the survey and provided an additional 27,000 pages of free text responses. Later this summer, the Inspector General will release a second review looking at the experiences of women and other minorities in the Air Force. I understand over 100,000 Airmen responded to this survey as well. The number of responses by

Airmen and Guardians on both surveys is remarkable, but also instructive and indicates we still have work to do. The Air Force is committed to creating and maintaining an environment where all of our Airmen and Guardians can reach their full potential. Key steps in doing so are the two Reviews that took the hard look at ourselves and hearing the voices of our Airmen and Guardians followed by taking action. With this in mind, we've put in place several initiatives to ensure our Airmen and fellow Guardians have a continued voice to highlight behaviors and barriers that run counter to the diverse and inclusive organization we are charged to uphold. These include, but are not limited to, the establishment of a Diversity & Inclusion Office, Barrier Analysis at multiple levels, reviewing of our talent management processes, and ongoing senior leader discussions focused solely on progress in this realm.

I believe the Air Force promotes members based on talent, effort, achievement, and potential. All of our Airmen, no matter their background, want to have an opportunity to demonstrate their talent, effort, achievement, and potential so they can be considered for advancement in their respective careers. As we found in our Air Force Inspector General led review, we have some disparities in personnel development and career opportunity that require improvement. We are continually evaluating processes that affect the development and career opportunities for our Airmen, including our Recruiting/Outreach, Accessions, Retention, Force Development/Promotions, and Organizational Climate.

In fiscal year 2020, Air Force commanders imposed nonjudicial punishment in 4,278 cases. In fiscal year 2020, the Air Force separated 1,929 Airmen for a "misconduct" basis (e.g., drug abuse, sexual assault, minor disciplinary infractions, commission of a serious offense, civilian conviction, etc.). Each court-martial and Article 15 stems from an alleged violation of one or more punitive articles of the Uniform Code of Military Justice. Each involuntary separation can stem from a number of different bases detailed in DAF instructions, to include minor disciplinary infractions, a pattern of misconduct, discreditable involvement with military or civilian authorities, or commission of a serious civilian or military criminal offense. Commanders have a duty to ensure good order and discipline and justice within their units. As the Air Force implements the recommendations of the Independent Review Commission on Sexual Assault in the Military and the potential changes to the military justice system as required by this year's NDAA, the Commander's duty for accountability in their units is unchanged. The ultimate disposition of an allegation of misconduct will continue to be based on a number of factors, to include the seriousness of the alleged offense or offenses, the accused's criminal history or lack thereof, the wishes of the victim, and the probable consequences to the accused of a court-martial conviction, among others considerations.

For Fiscal Year 2020, of the 351 airmen court-martialed, 204 identify as White, 88 identify as Black or African-American, 10 identify as Asian, 8 identify as Native Hawaiian or Pacific Islander, and 6 identify as American Indian or Alaskan Native. The 35 remaining Airmen either declined to identify their race or listed as unknown. Of the total, 165 Airmen identified their race as "Other" in addition to one of the races already mentioned. For Fiscal Year 2020, of the 4,278 Airmen who received nonjudicial punishment, 2,564 identify as White, 1,245 identify as Black, 117 identify as Asian, 56 identify as Native Hawaiian or Pacific Islander, and 51 identify as American Indian or Alaskan Native. The 193 remaining Airmen either declined to identify their race or listed their race as unknown. Of the total, 227 Airmen identified as two or more races. Commanders, with the counsel and advice of servicing Staff Judge Advocates, make decisions regarding appropriate discipline based on a number of considerations, to include prior disciplinary history of the member in question, and the need for progressive discipline of past offenders. Some forms of discipline, such as nonjudicial punishment under Article 15, UCMJ, and court-martial convictions, are maintained permanently in a member's personnel record. Other lesser forms of discipline, such as administrative reprimands or counseling, may be filed only temporarily in a member's personnel record, or, depending on the nature of the discipline, not included in the member's personnel record. Thus, the Air Force does not maintain comprehensive disciplinary histories for each member apart from records of court-martial, nonjudicial punishment and administrative separation.

QUESTIONS SUBMITTED BY MR. HORSFORD

Mr. HORSFORD. I would like to better understand the Air Force's sustainment and modernization plans for the A–10. Some of the A–10's stationed at Nellis Air Force Base, in my district, are in need to new wings. In FY21, the Air Force requested and Congress fully authorized and appropriated $100M for the purchase of an addi-

tional 24 wing sets. I understand the Air Force has so far only purchased 2 wing sets with this funding and may be seeking a reprogramming for the balance. When does the Air Force need to place additional wing set replacement orders so that they can be bundled with the 2 wing sets purchased in December 2020 and thus achieve a lower cost to the taxpayer? Please also provide a proposed basing structure for fleets of 239 and 218 aircraft.

General BROWN. As of today, two wing sets have been purchased with the $100M appropriated in FY21. An additional four wing sets will be purchased in August 2021. These four wing sets will be used as spares. With these purchases, the Air Force will have enough wings sets to re-wing to the FY23 force structure Total Aircraft Inventory (TAI) of 218. The remaining FY21 funds will cover wing install costs which begin in 3QFY22. At this time, the Air Force does not intend to reprogram money out of this program. There are no other wing set purchases planned beyond the four spares being procured in August 2021. If bundling of additional wing purchases were to become a necessity, it would have to be done in August of this year in order to potentially see a lower cost. As proposed in the FY22 PB, the A–10 fleet will be reduced to 239 in FY22 and to 218 by FY23. The following outlines the planned basing structure, assuming the Air Force's request is approved.

FY22—239 Total A–10s: Moody, GA (52); Davis-Monthan, AZ (49); Osan, ROK (26); Tucson, AZ (2); Whiteman, MO (26); Fort Wayne, IN (21); Gowen Field, ID (21); Selfridge, MI (21); Warfield, MD (21).

FY23—218 Total A–10s: Moody, GA (52); Davis-Monthan, AZ (49); Osan, ROK (26); Tucson, AZ (2); Whiteman, MO (26); Gowen Field, ID (21); Selfridge, MI (21); Warfield, MD (21).

QUESTIONS SUBMITTED BY MS. SHERRILL

Ms. SHERRILL. Currently about 86% of pilots are white males and 6.5% are women. Has the Air Force done any studies on whether there is a culture or bias problem undermining pilot retention, and if so, what are the results of these studies?

Mr. ROTH. The Air Force has not commissioned any studies specifically addressing bias and culture factors in pilot retention decisions. However, pilot retention, to include potential culture or bias problems impacting under-represented groups, is a focus area for the Air Force. The Air Force has leveraged a body of work that includes studies, advanced data analytics, and surveys to better understand all the factors impacting the Quality of Life and Quality of Service for our pilots. The most recent studies (e.g., RAND 2018) have focused on Understanding Demographic Differences in Pilot Training Attrition. This study coupled with additional advanced analysis has resulted in re-assessing the Pilot Candidate Selection Model (PCSM). While it is difficult to isolate specific factors impacting retention, the Air Force is committed to improving retention and has implemented a number of initiatives. Many of these initiatives stem from the Women's Initiative Team, including addressing pilot height restrictions, uniform limitations, and restrictions on flying during pregnancy that had the potential to impact career progression.

Ms. SHERRILL. Currently about 86% of pilots are white males and 6.5% are women, compared to 20% of the larger Air Force. This prompts the question—if demographics of the pilot cadre matched that of the broader USAF, do you believe there would still be a pilot shortage? Given the history of aircraft design that favored male pilots, what is the USAF doing to ensure that current and future investments in new aircraft are designed from the ground and airframe up to include women pilots from the outset?

General BROWN. We assess the current shortfalls would exist regardless of demographics. Current pilot manning levels are driven by historic rates of underproduction of new pilots and low retention of our current pilots. Underproduction is driven by unrealized divestiture of weapon systems and low retention rates. These two factors taken together determine our overall personnel health. We continue to have strong interest from the nation's youth across demographics in becoming an Air Force pilot. While it is a priority to increase awareness and interest in aviation across all communities, doing so would not necessarily address the current shortfalls. The USAF implemented design guidance for pilot and air crew stations in 2020 that now requires acquisition programs to use the body measurements and proportions of the central 95% of male and female U.S. recruiting population as a design basis. The USAF will conduct new studies on the U.S. recruiting population beginning in late 2021 to refine this initial guidance and incorporate the findings in new USAF instructions.

Ms. SHERRILL. During an 8 June hearing of the Subcommittee on Seapower and Projection Forces, Lt. Gen. Hinote emphasized the need for novel logistical aircraft with vertical take-off and landing (VTOL) capabilities. Do you similarly foresee a need to include VTOL capabilities in fighter or bomber aircraft, particularly in light of needing to disperse forces in a possible future conflict with China? If so, how does this change your F–35 acquisition calculus?

General BROWN. The Air Force will continue to evaluate the need for VTOL capabilities as we develop the future force for peer competition and conflict. The Agile Combat Employment concept of generating combat power from multiple and dispersed locations may lead to requirements for short-field and VTOL capabilities, but this analysis is on-going. We will assess any impacts to other procurement priorities, including the F–35, once that analysis is complete.

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