

DEPARTMENT OF DEFENSE AUTHORIZATION  
REQUEST FOR APPROPRIATIONS FOR FISCAL  
YEAR 2024 AND THE FUTURE YEARS DEFENSE  
PROGRAM

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HEARINGS

BEFORE THE

COMMITTEE ON ARMED SERVICES  
UNITED STATES SENATE

ONE HUNDRED EIGHTEENTH CONGRESS

FIRST SESSION

ON

**S. 2226**

TO AUTHORIZE APPROPRIATIONS FOR FISCAL YEAR 2024 FOR MILITARY  
ACTIVITIES OF THE DEPARTMENT OF DEFENSE, FOR MILITARY CON-  
STRUCTION, AND FOR DEFENSE ACTIVITIES OF THE DEPARTMENT OF  
ENERGY, TO PRESCRIBE MILITARY PERSONNEL STRENGTHS FOR  
SUCH FISCAL YEAR, AND FOR OTHER PURPOSES

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**PART 4**  
**AIRLAND**

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APRIL 18, 26, 2023



DEPARTMENT OF DEFENSE AUTHORIZATION REQUEST FOR APPROPRIATIONS FOR FISCAL YEAR 2024 AND THE FUTURE YEARS DEFENSE PROGRAM—Part 4 AIRLAND

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**DEPARTMENT OF DEFENSE AUTHORIZATION  
REQUEST FOR APPROPRIATIONS FOR  
FISCAL YEAR 2024 AND THE FUTURE YEARS  
DEFENSE PROGRAM**

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**TUESDAY, APRIL 18, 2023**

UNITED STATES SENATE,  
SUBCOMMITTEE ON AIRLAND,  
COMMITTEE ON ARMED SERVICES,  
*Washington, DC.*

**ARMY MODERNIZATION**

The Subcommittee met, pursuant to notice, at 2:30 p.m., in room 232A, Russell Senate Office Building, Senator Mark Kelly (Chairman of the Subcommittee) presiding.

Subcommittee Members present: Senators Kelly, Peters, Duckworth, Cotton, Fischer, Ernst, and Scott.

**OPENING STATEMENT OF SENATOR MARK KELLY**

Senator KELLY. The Airland Subcommittee will come to order. First, I would like to say how honored I am to have the opportunity to chair this Subcommittee and its oversight responsibilities of our Nation's primary land and air forces.

Not sure how a Navy guy got this job, but don't worry, I am not going to start asking Army and Air Force pilots to land on a ship. Luckily, I have got an Army guy next to me to partner with.

Senator Cotton, I look forward to working with you and all of the Committee Members as we continue the Subcommittee's collaborative approach during this critical time. I know we can find broad agreement within the Subcommittee and work jointly to confront the issues facing our soldiers, our airmen, and their families.

I would like to welcome our witnesses to the hearing this afternoon, Mr. Douglas Bush, Assistant Secretary of the Army for Acquisition, Logistics and Technology, General James Rainey, Commanding General, Army Futures Command, and Major General Michelle Schmidt, the Director of Force Development or Army G8.

I welcome each of you and thank you for your service, and your willingness to appear before us today. As we meet to review the Department of the Army's Investment and Modernization Strategy as presented in the fiscal year 2024 budget request, I want to acknowledge the work soldiers are doing all across the globe and express our gratitude to them and their families for the vital role that they play.

Today's Army remains engaged in operations and training events worldwide that build confidence and interoperability with our allies and our partners, test and experiment with equipment to identify needs, capabilities, and present combat credible forces to deter our competitors.

Today, as Ukrainians battle to defend their homeland, thousands of United States soldiers remain deployed to the European continent to deter the expansion of Russian aggression. I had the occasion to meet many members of the 10th Mountain Division in Poland just last week. These missions underscore both the complexity of contested logistics and the importance of our pre-positioned stocks.

Operations in Ukraine also demonstrate how critical effective multi-domain operations are for a ground force, as well as the power that joint and coalition operations can have. They also provide a stark contrast to the complexities the Joint Force would face if compelled to conduct similar operations in a contested maritime theater.

This is why the Army's focus on long range fires, integrated air missile defense, deep sensing and contested logistics is critical to the current and the future force. We look forward to hearing about lessons learned over the past year. As we begin work on the 2024 National Defense Authorization Act, we recognize that the Army continues to operate with a largely flat budget.

At the same time, the Army is providing significant equipment and munitions in support of Ukraine. Mr. Bush, we have had occasion to discuss this work before, and today I would like to hear how the Army is using the replenishment of these items to build future modernization in concert with the organic industrial base modernization strategy, and your assessment of any additional risks the Army may be incurring in discussion of any additional resources or flexibilities that would further improve munitions development and production.

In this budget submission, the Army continues to prioritize its signature modernization efforts while slowing procurement of enduring capabilities. This supports the current National Defense Strategy that I think accurately ranks China as the most consequential strategic competitor and the pacing challenge for the Department.

As you all know, China has been investing heavily in its military and in emerging technologies, and the best way to deter them is not to just keep pace on the cutting edge, but also to continue modernizing our forces to make clear to our adversaries that they cannot beat us on the battlefield.

At the same time, Russia continues to demonstrate an aggressive posture, and operations in Europe remind us that enduring systems require modernization investments too. We would like to better understand how the Army is balancing risk between newer modernization priorities and supporting enduring programs.

We are interested in the specific investments and capabilities the Army included in the 2024 budget requests that continue the implementation of the current National Defense Strategy (NDS), including efforts across six modernization priorities, which are long range precision fires, next generation combat vehicles, future



vertical lift, the Army network, air and missile defense, soldier lethality, and its rapid capability—capabilities’ development efforts in hypersonics, directed energy, indirect fire protection, and mid-range capability.

We appreciate the Army’s employment of more flexible acquisition authorities and increased use of experimentation and soldier touch points to better defined capabilities and requirements. The Yuma Proving Ground in Arizona has been a proud host for signature efforts like Project Convergence, which continues to guide modernization activity.

These practices make more rapid fielding possible, and we applaud the Army’s progress in this area and are interested in the Army’s assessment of its current testing and training facilities, that capability and that capacity to support the modernization force.

The broader organic industrial base also remains critical to the Army’s overall modernization strategy. We would like to better understand how the Army is ensuring that it is identifying and maintaining critical industrial capacity. The Army is now faced with competing pressures on its structure, a significant shortfall in recruiting and a generational modernization effort.

For the purpose of this Subcommittee, we are deeply interested in how the Army is determining the structure, ops concepts, and posture it requires to field these new capabilities and best meet the threat environment. Additionally, we must understand the impact of these decisions on the modernization of the Army National Guard and Army Reserves, and critical components of the total Army.

The Army continues to make significant progress in these efforts, but difficult decisions lie ahead, and I have great confidence in all of you and look forward to a productive year here as we work to continue to field the world’s best Army.

On that, I now recognize our Ranking Member, Senator Cotton.

#### **STATEMENT OF SENATOR TOM COTTON**

Senator COTTON. Thank you, Mr. Chairman. Let me begin by saying congratulations on your new role as chairman of the Armed Services Subcommittee on Air and Land Power. I look forward to working with you.

I had a productive working relationship with your predecessor, Senator Duckworth. I know that we will have one as well, despite your suspect service in our Navy. I want to thank our witnesses for being here as well. The subcommittee meets to discuss the Army’s modernization efforts with a focus on the fiscal year 2024 budget submission from President Biden.

China is this Nation’s chief threat, even as we face continued threats from adversaries like Russia, Iran, North Korea, and others. Ensuring that we can prevail in any conflict with China will require a joint effort, and the U.S. Army will play a key role in any such conflict.

Beginning in 2014, China undertook a force reorganization and modernization plan that has resulted in key advantages, including strategically located forces, mass and magazine depth. If called upon to compete with this improved Chinese force, the United

States Army will need to be modernized and ready to provide key capabilities such as command and control, logistics, and long-range precision fires.

But I am still concerned that the plan for the Army of 2030, and now General Rainey's plan for the Army of 2040, may be insufficient to produce the Army we need now and in the near term to counter China. For instance, Russia's unprovoked war of aggression against Ukraine has exposed severe weaknesses in the Army's industrial base, as in the other services.

I want to commend Assistant Secretary Bush for his yeoman's work in executing drawdown authorities and contracting new equipment to support Ukraine. But the Army's World War II era plants and depots cannot fully support the Army's munitions and equipment needs, and the industrial base continues to be undermanned and under-resourced.

Mr. Bush notes in the Army ammunition plant modernization plan that "several projects could be moved to the left if additional resourcing becomes available." The Army's unfunded priority list and also includes funding for planning and design, as well as one project, the Radford Army Ammo Plant.

I look forward to hearing about these and other organic industrial base projects ready for funding in fiscal year 2024. For the past several years, the Army has focused its modernization efforts on six critical areas, long range precision fires, next generation combat vehicles, future vertical lift network, air and missile defense, and soldier lethality.

I am most encouraged by the progress made in long range precision fires, specifically the fiscal year 2024 budget support of the precision strike missile, mid-range capability, and long-range hypersonic weapon. All three will play direct roles in any future conflict in the Western Pacific. But as Mr. Bush noted in a recent interview, important trades had to be made in crafting this year's budget.

I believe the Biden administration did the Army a disservice by forcing it to make these trades. When adjusted for inflation, President Biden's budget proposes to cut the Army's funding by 2 percent compared to last year's enacted levels. As a result, the Army submitted almost \$2 billion worth of unfunded priorities, including air defense, tanks, helicopters, military construction, and training.

All of these priorities will help modernize the Army, and this Subcommittee will look to include many of them in this year's National Defense Authorization Act. Again, I thank the witnesses and look forward to their testimony.

Senator KELLY. Thank you, Senator Cotton. Testifying today are Hon. Doug Bush, Assistant Secretary of the Army for Acquisition, Logistics and Technology and Army Acquisitions Executive, General Rainey, the Commanding General of the United States Army Futures Command, and Major General Michelle Schmidt, Director of Force Development, or G-8.

I know the witnesses together submitted a single joint statement, but I want to start with Secretary Bush for an individual statement and then we will go in that order.

**STATEMENT OF THE HONORABLE DOUGLAS R. BUSH, ASSISTANT SECRETARY OF THE ARMY FOR ACQUISITION, LOGISTICS AND TECHNOLOGY**

Mr. BUSH. Sir, thank you. Chairman Kelly, Ranking Member Cotton, and distinguished Members of the Senate Armed Services Committee on Airland, good afternoon. Thank you for the invitation to appear before you to discuss the Army modernization program and the resources requested in the President's Budget for fiscal year 2024.

I am pleased to be joined by my teammates, General James Rainey, Army Futures Command, and Major General Michelle Schmidt, the Army Deputy Chief of Staff, G-8. We appreciate your making our written statement a part of the record for today's hearing.

With your support, the Army's fiscal year 2024 budget gives us the opportunity to maintain critical momentum across the board. The Army's budget request puts us on a sustainable path to equip today's soldiers with modern equipment while we invest in the technologies and systems necessary to build the Army of 2030.

It represents our sustained commitment to our key modernization portfolios that both the distinguished Chairman and Ranking Member outlined in their statements. It also continues modernization and procurement of our enduring platforms and equipment that will remain in the force for years to come.

However, no budget proposal can be built without balancing risks, and this one is no different. I believe that this budget request reflects a thoughtful and balanced approach between developing future capabilities and modernizing our enduring systems. But at the end of the day, Members of Congress will decide if we struck the appropriate balance, and I welcome that dialog.

In that spirit, I would like to address a few specific issues raised in the invitation for this hearing. First, the hearing invitation asked us to address how the Army's budget request supports requirements in the Indo-Pacific theater, including long range fires, area missile defense, and sensing capabilities.

I can say with confidence that this year's budget request fully recognizes and funds the Army's role in the Pacific in these areas. As you look at the Future Years Defense Program (FYDP) overall, you will see significant new investments and procurement dollars for the network, long range fires, air missile defense, and deep sensing. All vital to the Army's mission in the Indo-Pacific region.

Critically, to shift from doing just R&D [research and development] to actual procurement is a major step for the Army that gets us another step closer to fielding real capabilities to real soldiers, not just doing R&D. Second, the hearing invitation asked that we provide an update on the Army's efforts to expand critical munitions production, including opportunities to further expand production timelines—or reduce production timelines.

As part of the Army's role in the overall United States Government response to Ukraine, we are using the generous funding from Congress and every authority at our disposal, including those new ones we received in the Fiscal Year 2023 NDAA, while working closely with our industry partners to dramatically increase production rates across the board.

We have here a generational opportunity working with Congress to improve the quality and modernization of our organic industrial base, as well as making capital investments with our private sector industry partners to put the United States Army in a better place in the long term.

Through your support, production rates in key areas such as munitions replenishment are on the rise, and we are able to address obsolescence issues with the machinery in our precision munitions manufacturing as well, critical to deterring China.

Third, the hearing invitation requests an update on the Army's efforts to adapt experimentation and testing to support concept development and accelerate our modernization efforts.

As highlighted in our written statement, the Army is modernizing our business practices by embracing industry best practices. Such as the use of soldier-centered design and rigorous experimentation.

General Rainey will elaborate further on the great work Army Futures Command (AFC) is doing in this regard, specifically in the areas of Project Convergence and the Experimental Demonstration Gateway Event, otherwise known as EDGE, and other efforts.

Last, the hearing invitation asked how the army is managing risk in modernizing enduring capabilities while concurrently prioritizing future programs. As Members are aware, in order to protect the Army's highest priority modernization efforts, the Army did accept some risk in other areas, and specifically the pace of modernization of armored brigade combat teams.

However, in doing so, the Army sought to ensure that we didn't go so low on any system that we put the industrial base at risk to a degree that forecloses the ability of the Army to ramp back up if the Army's priorities change. In short, we sought to ensure we did not close off options for Army leaders or Congress to adjust our plans in the future, if they judge that is the right thing to do.

That is a careful balance to strike. I acknowledge we don't always get it exactly right. There are often differences of opinion with industry on the right balance between a production line being viable and fully productive, but I look forward to working with you and other Members on this issue of where you think the Army got it right and where you think we got it wrong.

A final issue I would mention is the Army is fully utilizing the new acquisition authorities provided by Congress. Such as the urgent need pathway, middle tier acquisition pathway, and software acquisition pathway to make the Army's acquisition system work much more quickly than in the past.

In closing, I want to say thank you for both the funding and authorities we need to support our modernization efforts. Thank you for your time today. I look forward to your questions.

Senator KELLY. Thank you, Secretary Bush. General Rainey.

**STATEMENT OF GENERAL JAMES E. RAINEY, COMMANDING  
GENERAL, UNITED STATES ARMY FUTURES COMMAND**

General RAINEY. Chairman Kelly, Ranking Member Cotton, distinguished Members of the Senate Armed Services Subcommittee on Airland, good afternoon. Thank you for the opportunity to testify about how the Army's fiscal year 2024 budget request supports the

Army's comprehensive approach to modernization, as we both deliver the Army of 2030 and design the Army of 2040.

Army Futures Command is accountable for transformation or transforming the Army, and modernization is obviously an essential part of that important mission. I am honored to be here with great teammates, the Honorable Mr. Bush and Major General Michelle Schmidt. I agree with Mr. Bush that Army modernization is on track.

I think there are four primary reasons for that, that I would offer. The first is very strong teamwork. AFC works very closely with Assistant Secretary of the Army (ASA) Acquisition, Logistics and Technology (ALT). I respect Mr. Bush. We have a very positive and professional working relationship, and I think that transcends both of our organizations and is critical to our success.

Putting new equipment and weapons into soldiers' hands to increase lethality is what both of us work hard on every day. Teamwork also includes integrating efforts across the whole army, so Training and Doctrine Command, Army Materiel Command, FORCECOM, our service component commanders.

Working closely with General Flynn and General Williams, who are out on the edge in Europe and INDOPACOM are critical partners in them because we don't fight as an Army, we fight as a Joint Force.

Our teamwork with the rest of the Joint Force has been very positive and is contributing to our success. The second thing is consistency. We have gone on 5 years now where the Army has stuck with the modernization priorities as previously discussed, and that consistency is translating into success.

The third one is organizational changes. Five years ago, to get after those six priorities, the Army came up with the idea of cross-functional teams (CFT) that have been one of the absolute success stories of the adjustments, not just of AFC, of the way the Army has adjusted, and sustaining those where we are capitalizing on that success by adding, as we announced recently, a new contested logistics, CFT, to get after what is absolutely one of the things we have to address as we modernize the Army. Fourth is our commitment to continuous learning.

As asked in the invitation, Project Convergence is the Army's campaign of persistent experimentation. So not a one-time event, but a campaign of persistent experimentation. Project Convergence includes linked learning events throughout the year that inform each other.

For example, Balikatan, an annual bilateral exercise is underway now in the Philippines. We have AFC teammates and analysts participating with General Flynn in that critical experiment. An Experimental Demonstration Gateway Event, also known as EDGE, is scheduled to take place next month, 1 through 19 May in Yuma Proving Grounds, and I would be glad to talk more about that.

All of these things work together to deliver the speed, range, and convergence our Army needs as part of the Joint Force to ensure overmatch against our adversaries. Material modernization is absolutely essential part of transforming our Army to ensure war winning future readiness.

Transforming turns material modernization into true warfighting capability and lethality to make sure that we are the dominant land force in the world now, in 2030, in 2040, and every point in between. Transformation means thinking in terms of formations, not just platforms.

We buy things, but we fight formations. It is absolutely essential that we modernize our equipment in a holistic way, but also address organizational changes, continue to develop our people and develop our leaders, create the training capacity for that equipment, make sure we have facilities that enable us to utilize that equipment.

Transforming means thinking further out into the future also, out to 2040 and beyond. We are reaching out to the best experts we can find to think with us about the future of warfare as we define the future operational environment, develop future concepts, and experiment aggressively.

We need to approach 2040 with a sense of urgency now, over the next 18 to 24 months. Transforming the Army to ensure we are winning future readiness and doing that persistently and urgently is the best guarantee that our successful material modernization efforts will produce lethal formations that can dominate the land domain.

Thank you for your support to the soldiers and civilians of our organizations in the Army. I look forward to your questions.

Senator KELLY. Thank you, General. Major General Schmitt.

**STATEMENT OF MAJOR GENERAL MICHELLE A. SCHMIDT,  
DIRECTOR, FORCE DEVELOPMENT, G-8, UNITED STATES ARMY**

Major General SCHMIDT. Good afternoon. Thank you, Chairman Kelly, Ranking Member Cotton, and the distinguished Members of the Senate Armed Services Subcommittee on Airland for the opportunity to appear and testify regarding the Army's fiscal year 2024 modernization efforts.

A special thank you to our Committee Members for your enduring support of our soldiers, civilians, and our families as they continue to play such a vital role in defense of our Nation.

I am honored to be here today with Hon. Bush and General Rainey, who are both incredible professionals and leaders. Our modernization budget request for fiscal year 2024 reflects our multiyear effort to accelerate focused modernization and place transformational capabilities into the hands of our soldiers.

Our single focus is to make our soldiers and units more lethal to fight and win our Nation's wars. These investments will assist with building enduring advantages over our Nation's adversaries, whether in the Indo-Pacific or European theaters, or wherever threats may arise, and the transformation you are assisting us with is being brought to bear.

We must modernize responsibly, maintaining readiness now, while transforming at a pace informed by available resources. Several years of difficult prioritization, eliminating, reducing, and deferring lower priority and less necessary modernization efforts, as well as divesting legacy capabilities, affords little flexibility in our budget top line, so every decision we make now is a difficult one.

These are hard choices, tough choices about the pace of modernization and the balance we must achieve in integrating new capabilities while maintaining our ability to deter and respond to crisis. As such, we ask for your continued support to maintain a sustainable modernization path for the Army.

In closing, I would like to thank your staffs and all those who professionally facilitate the engagement necessary to advance our shared commitment to the defense of our Nation. Thank you, and I look forward to your questions.

[The joint prepared statement of the Honorable Douglas R. Bush, General James E. Rainey, and Major General Michelle A. Schmidt follows:]

PREPARED STATEMENT BY THE HONORABLE DOUGLAS R. BUSH, GENERAL JAMES E. RAINEY, AND MAJOR GENERAL MICHELLE A. SCHMIDT

#### INTRODUCTION

Chairman Kelly, Ranking Member Cotton, distinguished Members of the Subcommittee, thank you for your continued support to our soldiers, civilians, and families. On behalf of the Secretary of the Army, Hon. Christine Wormuth, and the Army Chief of Staff, General James C. McConville, we thank you for the opportunity to appear before you today to discuss the Army's modernization program.

The Army's fiscal year 2024 budget reflects the Army's comprehensive approach to modernization, so the Army can adapt to the challenges of an unpredictable era marked by technological change and great power competition. The budget request sustains momentum in our modernization initiatives to build the Army of 2030, while simultaneously prioritizing our role in the Indo-Pacific, improving our Nation's industrial base, and continuing to support our allies. Most importantly, this request will provide our soldiers the materiel solutions needed to fight and win our Nation's wars as part of the Joint Force.

#### THE SECURITY ENVIRONMENT

As highlighted in the 2022 National Defense Strategy and National Security Strategy, the security environment is marked by efforts of the People's Republic of China (PRC) and Russia to reshape the post-cold war world and by rapid and disruptive technological change. The PRC is our most consequential strategic competitor and the pacing challenge, while Russia remains an acute threat. Both states are applying all instruments of national power, including military modernization, as they seek to challenge America, our allies, and our partners.

The PRC seeks decisive overmatch in emerging areas such as artificial intelligence (AI), robotics, and cyber. The convergence of technologies such as quantum computing, AI, and robotics promises to expand the fields of competition and the race to find comparative advantage.

Russia's unprovoked invasion of Ukraine demonstrates how the character of war continues to change. The pace of technological innovation and Ukraine's ability to leverage the skills of its citizen-soldiers and integrate with its private sector are noteworthy, and we are studying their implications closely. What we are seeing in Ukraine validates our six modernization initiatives, particularly Long Range Precision Fires, Air and Missile Defense, Next Generation Combat Vehicle, and the Network.

#### MODERNIZING AND TRANSFORMING OUR ARMY

Materiel modernization is an essential part of the Army's broader transformation effort. Transforming our Army to ensure war-winning future readiness requires integrating materiel modernization with non-materiel efforts. These include Doctrine, Organization, Training, Leadership and Education, Personnel, Facilities, and Policy. Transforming our Army holistically, including modernizing it, puts the capability and lethality we need into our formations and ensures that our Army will continue to dominate the land domain.

#### MODERNIZING THE FORCE

The fiscal year 2024 budget request puts the Army on a sustainable path to equip today's soldiers with modern equipment while we invest in the technologies and sys-

tems necessary to build the Army of 2030. We have also ensured that our requested resources are synchronized with the Secretary of the Army's six operational imperatives around which we are building the Army of 2030:

- First, to sense deeper and more persistently than our enemies at all echelons.
- Second, to concentrate combat forces from dispersed locations to overwhelm our adversaries.
- Third, to deliver long range precision fires as part of the Joint Force.
- Fourth, to deliver air and missile defense at echelon to protect our forces.
- Fifth, to reliably communicate amongst ourselves and our joint and coalition partners and secure ourselves from enemy cyber and electronic attack.
- Last, to sustain the fight for whatever the duration.

Front and center in this effort is our sustained commitment to our key modernization portfolios—Long Range Precision Fires, Next Generation Combat Vehicle, Future Vertical Lift, Network, Air and Missile Defense, and Soldier Lethality—and we are grateful to Congress for the stable funding provided to advance these initiatives.

- *Long Range Fires Programs:*

- The Army demonstrated the Precision Strike Missile's (PrSM) capability to achieve ranges well beyond the legacy Army Tactical Missile System and will begin production qualification testing in 4th quarter fiscal year 2023.
- We successfully tested the Land Based Anti-Ship Missile seeker and the Extended Range Propulsion ramjet, setting conditions for subsequent increments of the PrSM program.
- The Extended Range Cannon Artillery (ERCA) program continues improvements compared to conventional artillery technology to deliver long-range cannon fires capability to the soldier. However, technical challenges emerged during a test event in 1st quarter fiscal year 2023, resulting in delay of our planned procurements in fiscal year 2024. The ERCA program will continue to move through system development and testing, and will execute extensive Soldier Touch Points and learning events in fiscal year 2024.
- The Army's Rapid Capabilities and Critical Technologies Office, in partnership with the Navy, is on track to deliver the first hypersonics battery in fiscal year 2023.
- We also delivered the Army's Mid-Range Capability (MRC) initial hardware in 1st quarter fiscal year 2023 and are on track to deliver the first operational prototype in 4th quarter fiscal year 2023. The MRC prototype effort leverages existing Service missiles, launchers, software, and hardware to fill a critical capability gap identified by the United States Indo-Pacific Command.

- *Next Generation Combat Vehicle Programs:*

- The Army remains fully committed to the Optionally Manned Fighting Vehicle program, executing a multi-phased acquisition approach to maximize competition. In 3rd quarter fiscal year 2023, the Army will award the competitive contract to up to three vendors for the Phase 3 (Detailed Design) and Phase 4 (Prototype and Test) portions of program.
- The Robotic Combat Vehicle (RCV) program continues to make progress, informed by extensive experimentation with the RCV-Light Full-System Prototype effort. By the end of fiscal year 2023, the Army intends to award multiple contracts for demonstrator vehicles.
- We are currently fielding Armored Multi-Purpose Vehicles to replace the 1960's-era M113 Family of Vehicles and completed First Unit Equipped in 2nd quarter fiscal year 2023.
- The Mobile Protected Firepower (MPF) program began low-rate initial production this year, with first fielding of MPF planned for fiscal year 2025.
- We are also supporting the Army's Climate Strategy and the administration's greenhouse gas policies with the Bradley Hybrid Electric Vehicle, Electric Light Reconnaissance Vehicle, High Mobility Multi-Purpose Hybrid Wheeled Vehicle, and Joint Light Tactical Vehicle Hybrid Electric Vehicle projects.

- *Future Vertical Lift Programs:*

- The Army is committed to both the Future Attack Reconnaissance Aircraft (FARA) and the Future Long Range Assault Aircraft (FLRAA). They remain the highest aviation modernization priorities.
- FARA will provide the Army and Joint Force with transformational battlefield reach, lethality, and survivability critical to operating in the expanded battlespace envisioned in future conflict.
- FLRAA will provide effective assault and MEDEVAC capabilities, with significantly increased speed, range, and endurance.
- The Future Tactical Unmanned Aerial System is leveraging a competitive rapid prototyping approach, informed by a year-long Soldier Touch Point "Buy, Try, Inform" effort to replace the RQ-7 Shadow in the Brigade Combat



Teams with a runway-independent, CH-47F-transportable, and weather-hardened system with a reduced acoustics signature.

- The Army continues development of Air Launched Effects, a low-cost aerial capability launched from crewed and uncrewed platforms to extend the tactical and operational reach, lethality, and protection of the host platform. This will include loitering munitions, additional sensors, and a vast array of small and large payloads of varying mission requirements.
- *Network Programs:*
  - The Army has delivered Capability Set 21 modernized tactical network equipment to eight Brigade Combat Teams, six Expeditionary Signal Battalions-Enhanced, and two Multi-Domain Task Force units.
  - The Army is now delivering Capability Set 23, which focuses on tactical edge communications for mounted formations and division headquarters, supporting the pivot from the Brigade Combat Team to the Division as the primary unit of action for large-scale combat operations.
  - We have also fielded modernized network technology, such as upgraded mission command and fires applications, mobile mission command upgrades, resilient satellite communications equipment and modernized cryptographic systems, while piloting expanded Low Earth Orbit (LEO) commercial satellite service options.
  - In fiscal year 2024 the Army will focus on designing Capability Set 25 to support the pivot from the Brigade Combat Team to the Division as the primary unit of action for large-scale combat operations.
  - The Army is leveraging Project Convergence and regionally aligned operational exercises and experimentation to advance technologies such as data fabric, zero trust security architecture, and unified network management tools to provide commanders with data at the point of need.
  - In total the Army anticipates fielding more than 300 Army, Army Reserve and Army National Guard units with modernized network capability in 2024.
- *Air and Missile Defense (AMD) Programs:*
  - The Army is fielding the Initial Operational Capability for the Integrated Air and Missile Defense Battle Command System (IBCS) in 3rd quarter fiscal year 2023 and recently completed the Full Rate Production decision for this critical Air and Missile Defense system that will link Army and Joint sensors to shooters.
  - The Army is improving the Maneuver-Short Range Air Defense capability, which was fielded to the first battalion, with the second battalion planned to be fielded in 4th quarter fiscal year 2023.
  - The Army continues to make progress on its Directed Energy Maneuver-Short Range Air Defense effort, a 50 kilowatt-class laser on a Stryker, including successful live-fire events at Yuma Proving Grounds, Arizona.
  - We are advancing directed energy efforts for Indirect Fire Protection Capability (IFPC) by pairing high-energy lasers (HEL) with high-power microwaves (HPM) for a layered defense of fixed and semi-fixed sites against an array of threats.
  - Six Lower Tier Air and Missile Defense Sensor (LTAMDS) prototypes have been manufactured and are in developmental testing, with initial operating capability anticipated to be delivered in 1st quarter fiscal year 2024.
  - We have accepted delivery of two batteries of Iron Dome Defense System-Army from the Israeli Government and are incorporating these systems into our exercises.
  - The Army received the first IFPC Increment 2 launcher in 2nd quarter fiscal year 2023, with an additional 15 launchers planned for delivery by 4th quarter fiscal year 2023.
- *Soldier Lethality Programs:*
  - Based on results from Integrated Visual Augmentation System (IVAS) fiscal year 2022 operational testing, the Army conducted a program re-plan to address areas of improvement. The Army and Microsoft have identified solutions to address these areas through refinements driven by soldier-centered design, and the Army is on pace to field IVAS 1.0 and 1.1 systems to selected training and doctrine units (IVAS 1.0) and operational units (IVAS 1.1) in fiscal year 2024. The Army intends to field IVAS 1.2, the full rate production goggle, to the Close Combat Force as early as 4th quarter fiscal year 2025.
  - The Army has procured the majority of its Enhanced Night Vision Goggle Binocular (ENVG-B) procurement objective. Additional procurement funding in fiscal year 2023, along with programmed funding in fiscal year 2024, facilitates the purchase of an additional 10K ENVG-B systems and maintains ENVG-B production through 4th quarter fiscal year 2025.

- Production of the Next Generation Squad Weapon (NGSW) Rifle, Automatic Rifle, Fire Control, and General Purpose Ammo began in fiscal year 2022, and First Unit Equipped is expected in 2nd quarter fiscal year 2024.
- *Synthetic Training Environment (STE) Programs:*
  - STE Information System (STE-IS) and Reconfigurable Virtual Collective Trainers (RVCT) will deliver initial prototype capability in Fiscal Year 202023. One World Terrain, a key component of STE-IS, is in the hands of soldiers now providing operational battlefield visualization.
  - We continue progress on the Squad Immersive Virtual Trainer which remains closely coupled with IVAS, with development focused on hardware productization, cybersecurity, and other enhancements.
  - The Army's Live Training System (LTS) to conduct force-on-force and force-on-target live training will deliver initial capability to the Joint Readiness Training Center in fiscal year 2024.
  - The Soldier Virtual Trainer (SVT) conducted its first Soldier Touch Point in 1st quarter fiscal year 2023, with a second STP scheduled for 3rd quarter fiscal year 2023. The program is on track to deliver initial capability in 1st quarter fiscal year 2025.
- *Assured Positioning Timing and Navigation (PNT) and Space Programs:*
  - The Army transitioned to M-Code Global Positioning System and alternative PNT beginning in fiscal year 2022, following the first fielding of Dismounted Assured PNT Generation I Quick Reaction Capability System, fulfilling the Directed Requirement.
  - The Mounted Assured PNT System Generation II Program of Record, an M-Code GPS capable system, will initiate fielding in fiscal year 2024.
  - The Army continues to invest in the ground segments of space-based technologies that close operational gaps in deep sensing and targeting activities. The Army prototyped and live-fire demonstrated the first-ever use of Low-Earth Orbit Satellite-based Alternative Navigation technology to guide a Precision Guided Munition in a totally GPS-denied environment and successfully engage a target at long range.

The Army's budget request also continues procurement and modernization of our key systems for our operational aviation platforms, Ground Combat Systems, Intelligence programs, Logistics, Armaments and Ammunition. We carefully balanced the overall Research, Development and Acquisition portfolio, including fine-tuning between Research, Development, Test and Evaluation funding and Procurement funding, as we transition from enduring systems to our new modernized systems.

Our Aviation portfolio strikes a balance between prudent investments to maintain the viability of current aircraft identified as part of the enduring fleet, while also investing in future aircraft and capabilities designed to provide reach, standoff, and overmatch against peer competitors in Multi Domain Operations. Beyond investments in Future Vertical Lift, we are making key investments in Apache and Black Hawk modernization, munitions, and aircraft survivability. Additionally, we are continuing to procure the MH-47G Block II Chinooks for our Special Operations units. The Army remains committed to Joint Air-to-Ground Missile production to replace the aging Hellfire missile and investing in Aircraft Survivability Equipment, a suite of systems that protect Army aircraft from threat infrared missiles, radar guided missiles, and lasers through detection and defeat systems.

Armored Brigade Combat Team modernization and combat vehicle protection remain a priority, as well. With this budget, the Army will procure 34 Abrams M1A2SEPV3s Tanks, 85 Strykers, 24 Self-Propelled Howitzer Paladin Integrated Management (PIM) vehicle sets, and 26 Joint Assault Bridges.

Our intelligence portfolio contains the resources required to provide intelligence and electronic warfare capabilities, support the Army's implementation of the National Defense Strategy, and enable "seeing and sensing farther." We continue to close capability gaps with the Tactical Intelligence Targeting Access Node, the Terrestrial Layer System, the Multi-Function Electronic Warfare-Air Large, Top Secret Communications, and investment in the Multi-Domain Sensing System-High Accuracy Detection and Exploitation System. The investments in the High Accuracy Detection and Exploitation System will modernize our Aerial Intelligence, Surveillance, and Reconnaissance platforms by providing the range, speed, and sensing required to meet our pacing threat challenges.

The Air and Missile Defense portfolio invests in integrated command and control, sensors, and shooters to provide 360-degree, tiered, layered defensive fires against a wide range of air and missile defense. It continues to invest in Counter-small Unmanned Aircraft Systems (C-sUAS), Lower Tier AMD Sensor prototypes, Patriot radar upgrades, and procurement of critical AMD munitions, such as the Patriot Missile Segment Enhanced. In fiscal year 2024, we will procure C-sUAS for one Di-

vision set and 15 fixed sites to cover globally prioritized critical sites. We will also work with Congress on options to consider additional multi-year procurement contracts for critical munitions, including the Guided Multiple Launch Rocket System rockets and Patriot PAC-3 missiles.

Our Command and Control portfolio is procuring Manpack and Leader Radios and related equipment to support Division type formations; a Low Cost Tactical Radio that will replace legacy Single Channel Ground and Airborne Radio System and meet National Security Agency cryptographic modernization requirements; and a Unified Network Operations prototype to enable common planning, configuration, monitoring, provisioning, management, and defense of the Network. It will also continue to procure and develop improvements for the Joint Battle Command-Platform.

Finally, the Logistics portfolio continues the procurement of Joint Light Tactical Vehicles, High Mobility Multipurpose Wheeled Vehicles (HMMWVs) and HMMWV antilock braking system/electronic stability control kits to improve our existing tactical wheeled vehicle fleet; invests in Army Watercraft, a significant combat multiplier in support of Army operational concepts and the Geographical Combatant Commander in large scale combat operations; invests in contested logistics capabilities to reduce demand and provide point of need production and sustainment; and realigns funding to support critical ammunition program lines and Army Training Strategies to ensure contractual requirements are met to maintain Industrial Base Minimum Sustainment Rate capacities.

#### MODERNIZING OUR BUSINESS PRACTICES

The Army has embraced industry best practices, such as the use of soldier-centered design and rigorous experimentation, to enable feedback from soldiers and commanders earlier in the development process. This is accomplished in phases—first by getting prototype equipment into the hands of soldiers from the operational force early, through Soldier Touch Points, to refine requirements before more investments are made. In subsequent phases of experimenting with prototypes in increasingly complex scenarios, we assess how we would organize and fight using this technology. This provides the Army not only valuable feedback on the technology itself, but we learn how we need to train and integrate across all facets, from Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, Facilities, to Policy.

The Army continues Project Convergence, a Joint and multi-national experimentation campaign of learning that culminates in a major field experiment. Working closely with our counterparts from the other services, we identify Joint warfighting problems to solve. Experimentation objectives, operational scenarios, and data collection plans are managed by the Project Convergence Board of Directors, which includes representatives from all the Services, the Joint Staff, and coalition partners.

Project Convergence seeks to enable and collect insights from exercises and experiments and apply them in future events. Project Convergence 21 (PC21) and Project Convergence Capstone 3 (PC22) incorporated Joint Partners to help inform the Army of 2030, the DoD Joint All-Domain Command and Control initiative, and the Joint Warfighting Concept. Project Convergence made it clear that we must adapt to a system-of-systems approach that moves from “interoperable systems” to “integration of systems.” Project Convergence has also made it clear that we need to integrate our offensive and defensive fires using a combined arms maneuver approach and develop data-centric capabilities as part of the Joint Force. Lessons from PC22 will inform persistent experimentation over the next year including the Joint Warfighting Assessment (JWA), events such as the annual Balikatan exercise with the Republic of the Philippines, and Capabilities Development and Integration Directorate (CDID) events. Lessons from those events will inform Capstone 4, currently scheduled for February and March 2024.

The Army continues to implement and employ the reform initiatives granted by Congress that were designed to streamline and gain efficiencies in the acquisition process. For example, the Army is judiciously using Middle Tier Acquisition (MTA) rapid prototyping authority to experiment with innovative, mature technologies to quickly demonstrate new capabilities. The Army is using MTA rapid fielding authority to quickly field production quantities of new or upgraded systems with minimal development, potentially resulting in faster capability delivery and lower costs. In all, the MTA pathway enables a “try before we buy” framework that reduces risk, reduces cost, and accelerates capability development and deployment. The Army currently has 30 programs executing MTA rapid prototyping or rapid fielding efforts and is using these authorities to accelerate select Army modernization priorities including LTAMDS, PrSM, NGSW, MPF and IFPC.

The Army also benefits from expanded use of Other Transaction Authority (OTA), which can include follow-on production awards. OTAs are simplified contractual mechanisms that lend themselves to working with small companies and non-traditional contractors, two known sources of technological innovation. The Army effectively uses OTAs to streamline the acquisition of basic and advanced research activities, prototype projects, and follow-on production efforts. In fiscal year 2022, the Army awarded more than 1,703 OTA agreements valued at \$6.3 billion. In November 2021, the Army updated its OTA Policy and we continue to review our procedures to promote consistency in practice and increase transparency.

The Army also benefits from two additional authorities provided by Congress. The Software Acquisition Pathway (SWP) is a new acquisition pathway used to facilitate rapid and iterative delivery of custom software capabilities to users, recognizing that technology development cycles are more rapid in software systems. Programs using the SWP will demonstrate the viability and effectiveness of the capability within 1 year. The Army currently has nine programs operating on the SWP. Congress also made permanent the authority for Commercial Solutions Opening (CSO). Since its establishment as a pilot program, the Army has leveraged the CSO authority to obtain innovative commercial products and solutions to fulfill requirements, close capability gaps, and provide technological advances. The streamlined nature of the CSO procedures also serves to lower barriers to entry and incentivize small and non-traditional vendors who have not previously worked with the Department. The Army used CSO authority extensively as part of its pandemic response efforts.

In addition, in the fiscal year 2016 National Defense Authorization Act, Congress encouraged delegation of Milestone Decision Authority (MDA) for most acquisition programs from the Office of the Secretary of Defense to the Military Departments. The Army further delegated MDA for some of these programs to the Program Executive Officer level, when appropriate. This delegation allows the Army to appropriately align program oversight with risk, resulting in reduced bureaucracy and increased efficiency.

All these initiatives, when used alone or in combination, allow for better and faster modernization decisions and faster requirements development.

#### CONCLUSION

The Army is modernizing rapidly, building a force capable of competing across the spectrum of competition and conflict to deter war and, failing that, prevail in war. These capabilities give the Army the speed, range, and convergence of actions that provide decision dominance which gives us overmatch over our adversaries. Thanks to stable funding, new authorities, and a rigorous experimentation regime, we are further down the modernization path than envisioned a year ago. Modernization is a central element of long-term Army transformation, which translates materiel modernization into capability and lethality for our soldiers. The nature of our adversaries' actions and intent, amid rapid and disruptive technological change, demands that the Army continue to modernize and transform, and, with your support, we are committed to doing that.

Thank you again for this opportunity to discuss Army Modernization and for your strong support of our soldiers, civilians, and their families.

Senator KELLY. Thank you, and I will start by recognizing myself here for 5 minutes. Let me start with General Rainey.

You mentioned cross-functional teams in your opening statement, and I understand that the maturity of efforts in the original Army's Futures Command cross-functional teams, you know, your focus, as you mentioned, is shifting to the Army of 2040 and you are considering adding, and you mentioned, new cross-functional teams to tackle additional challenges like contested logistics.

Can you please describe in more detail to the Committee how you are shifting AFC's focus, and what requirements you may be considering for our cross-functional team on this specific issue of contested logistics.

General RAINEY. Thank you very much, Chairman. I appreciate that question. If I may, when I talk about 2030 and 2040, so I don't want to create the impression that I am shifting away from 2030 to 2040. To be clear, Army modernization is going well.

We need to stay laser-focused on delivering on the modernization efforts we have going and start thinking about the opportunities to out think and get ahead of our adversaries as we start to think about what is going to change in this like second and third depths of that time period, but not at the expense of staying focused on delivering on our current efforts.

The contested logistics CFT, working in partnership with Army Materiel Command, who does the strategic and operational level. The CFT initial operating capability, our Chief and Secretary improved the stand up, so they have already started with the small team. They will be fully operational, I would say, by about October 1 of this year, and they are going to focus at the tactical level of contested logistics.

To specifically answer your question, predictive logistics, the technology absolutely exists today for us to do a better job of understanding what the logistics requirements, because one of the keyways to reduce our logistics burden is to be more precise. So, we can't afford to push stuff just to push it.

We need to know what the maintenance status, fuel status, and ammo status of our combat systems are. Autonomous and robotic distribution, so how can we leverage technology to minimize the amount of humans we are putting at risk to deliver logistics and sustainment. Demand reduction, hybrid electric, for example, that can start by lowering the amount of fuel we require forward. Tactical power generation.

As we become more and more technology focused and for all the great things that brings you, it also creates an increased demand in terms of battery, which especially at the most important level of the Army, the rifle squads, the soldiers who are walking and carrying everything they have, every pound matters, so I think there are opportunities there—

Senator KELLY. General, does that mean the ability to generate power forward or carry more dense batteries?

General RAINEY. Chairman, I think that the opportunity of the CFT, the way it has been successful, is to clearly identify a problem, put together the right talent from across the organizations, and let them develop those things.

I wouldn't want to rule out any possibilities, but to reduce the amount of energy consumed forward and reduce the weight on the soldier would be two of the things that they would start out pursuing.

Senator KELLY. Are you looking at any artificial intelligence decisionmaking in the logistics decisions?

General RAINEY. There are opportunities. We are employing AI and machine learning now to manage the massive amounts of data and analyze it. So predictive logistics has an opportunity—well, now it is an opportunity to use AI to analyze the amount of data. The opportunity to get into aided decisionmaking in terms of predictive logistics, I have not seen that yet, but I would not rule that out.

Senator KELLY. I had dinner with the V Corps Commander last Thursday night in Poland. This is an area where we do really well, logistics. He was stressing just how critical it is for any large-scale Army operation is we have got to get the logistics right.

I have got more questions about this for Secretary Bush, when it comes back to me. For now, let me recognize Senator Cotton.

Senator COTTON. Thank you. Mr. Bush, I want to return to what I said in my opening statement and commend you for your work to try to accelerate timelines for production of munitions.

I know you and a lot of others have really been rolling up your sleeves and working long hours, but I think you would agree that we are still not producing enough of what we need fast enough. That is both in our Army ammunition plants and the industrial base. I have dug into the tables behind the budget request.

It is a shocking timeline, really, in some of these cases. Basic munitions, not ones that are complicated or advanced, like artillery shells can take up to 2 to 3 years to produce. Can you give us a general sense of why that is? I mean, we built the Pentagon in less time than it takes to make basic artillery shells today. So, what is up with that?

Mr. BUSH. Senator, the actual time, I believe—the timeline is reflected in the formal budget documents are, I guess I would say those are the traditional timelines that assume a lengthy contracting process, followed by a staggered, sometimes slow on purpose to maintain a level workload at the factory, approach.

For conventional munitions, I can tell you that artillery shells, for example, it takes about a month to get the steel once it—now there is always a flow of steel, but about a month to get the steel. That steel is only at Scranton Army Ammunition Plant for about 3 days. Then it goes to Iowa Army Ammunition Plant for load, assemble, pack, which also only takes about a week. So, when we are going as fast as we can, like we are right now, those timelines can be faster. However, sir, right now, as you mentioned, the issue is capacity, not timeline. On precision munitions, your point is very well taken and still very much the case.

So advanced munitions, patriots, sometimes even GMLRS [Guided Multiple Launch Rocket System], things with seekers or advanced electronics, we are still, sir, in those, at times, 1- or 2-year timelines, but trying to go faster right now.

Senator COTTON. Thank you for that, and I probably want to continue that distinction. Another distinction I want to drill down on is what you said about contracting processes or timelines.

I view those as bureaucratic constraints. Those are Gordian knots. I think in my opinion, Gordian knots exist to be cut, in many cases a sword, or at least this Congress can be the sword. Then there is actual real-world constraints on the availability of certain inputs, whether it is steel, energetics, ships, what have you.

Let's focus on that area first. What are the single worst bottlenecks we face in the real-world constraints about these munitions? Because again, we are not talking about an aircraft carrier or stealth fighter.

We are talking about in what are most cases man portable munitions. But what are the concrete real-world bottlenecks that the Army is facing right now?

Mr. BUSH. Yes, sir. So, I think if we are talking about precision munitions, often it is the sensitive electronic components. Computer chips and everything behind that leads to some of those timelines.

If you trace back to the original sources, that is where some of that comes from. Also, of course, our systems, you have sophisticated systems to make them safer than what the Russians might produce or exportable. That also adds time.

But most often it is the electronic components that take the most time, probably followed by solid rocket motors for a lot of our munitions that are rockets or missiles. The other elements are the explosives and such, sir, really are the shorter holes in the tent.

Senator COTTON. Okay. What are the best ways this committee and this Congress can provide the Army with ways to reduce those timelines, to open up those bottlenecks?

Mr. BUSH. Yes, sir. First of all, the most economically efficient way to make a production line better is to buy more.

That way you let the market do its thing and downstream suppliers get better and it helps the whole system, so that is number one, and thank you for your support on all that. No. 2, and thank you for the support last year, is multi-year techniques like multiyear procurement and advanced procurement.

I think when we testified last year, we were exploring the ideas of doing those things for munitions. They hadn't been done before. We are doing them now, and making that normal, not an exception, will be vital, sir.

We have to get that right. One other leg in a store would be over time working on continued, for example, Defense Production Act investments. So that is the tool the Department has to go way down in the supply chain and directly invest in companies, often small ones, at the third and fourth tier. Congress provided very generous additional DPA, title 3 funding last year.

I think we are putting it to great work. I think we did it in the cold war on a much larger scale, and I think that is a model for how with the right authorities and the right money in the right place, we can be better prepared next time, sir.

Senator COTTON. To be clear on that, you are not talking about up here at the primes or assembling things, but at the subcontractor or maybe even the sub-subcontractor doing fairly kind of basic inputs, let's call them valves or gaskets or what have you, reaching down to that level with DPA authorities.

Mr. BUSH. Yes, sir, and it is a big difference with DPA. So really our normal input is at the top with the prime and you hope that funding flows down and goodness of the production line gets down to those suppliers.

DPA lets us go directly at some of those subs, which are often actually the most weak points. It is not the bigs, it is the sub-tier contractors.

Senator COTTON. Yes, and oftentimes those subcontractors, one or two levels down, are providing those inputs for multiple primes or multiple different weapon systems, so there is a bottleneck there as well, right?

Mr. BUSH. Yes, sir. In many cases, when—and we have got this now. I think we have got a much better handle on mapping our own supply chains—from the Government side. We see those overlaps, and industry might not see it because they are looking at their supply chain, not the national supply chains.

Senator COTTON. One final question about inputs drawing from a partner. Are you aware of Nammo's challenges and expanding in central Norway?

Mr. BUSH. Not specifically, sir.

Senator COTTON. Their CEO [Chief Executive Officer] said a couple of weeks ago that they would like to expand. Obviously, they are producing a lot of munitions that are in very high demand in Ukraine, but there is no electricity available in central Norway because all of the excess capacity is going to power servers for TikTok videos.

He said that they literally can't make more munition shells because of cat videos. Are you aware of any constraints on either our Army ammunition plants or in the defense industrial base because of electricity or other power inputs?

Mr. BUSH. I am not, sir. I believe we have other challenges. Some of I have mentioned and others, but I have definitely not heard that one—not in the United States.

Senator COTTON. The Nammo CEO said he wouldn't have even put it past TikTok and the Chinese to specifically have sited their cat videos next to Nammo's production facility in central Norway. All right, I have more specific questions I will save for a second round.

Senator KELLY. Senator Peters.

Senator PETERS. Thank you, Mr. Chairman. General Rainey, on several occasions this Committee has expressed concerns about how the Department of Defense is tasked and organized to support electronic warfare operations in support of the Joint Force or our newly established multi-domain task forces.

Although both cyber and electronic warfare personnel are attached to the Army's cyber branch, electronic warfare lacks a designated entity for cross-cutting electronic warfare attack, for sensing and protection across all Army formations and echelon.

My question for you, sir, is can you outline what entity will own the manning, training, equipping, budgeting, and capability deployment for electronic warfare operations in the Army?

General RAINEY. Thank you, Senator. Yes, I can. Major General Paul Stanton is the Commander of the Cyber Center of Excellence and is responsible for the force generation of electronic warfare forces.

General Barrett is the Army Cyber Command, who is the operational commander, who is the senior cyber and electronic warfare officer we have. If I may, because I share your interest. One, it is something we have been working on as part of the Army 2030. The importance of electronic warfare is blindingly obvious if you are an observer of what is going on in Ukraine right now.

It is going to become more and more important as we go forward. The Army modernization efforts address that, so, we are adding new capabilities at every echelon. Technology wise, the TLS, brigade combat team capability is an acknowledgment that we need to put the ability to sense and strike into our most forward formations and work in that at a higher echelon.

Also, organizationally, the Army is adding intelligence and electronic warfare battalions back into our divisions, or at least our



Army 2030 priority modernization efforts. Those are a couple examples.

Theater information advantage groups, the multi-domain task force have a dedicated electronic warfare capability both in humans and technology built into them, so absolutely critical. Something we need to keep working on. But I believe it is a matter of delivering and following through on our plans.

Senator PETERS. All right. Absolutely. Well, thank you. Thank you for that deeper dive. General Schmidt, outside of Joint Readiness Training Center (JRTC) and National Training Center (NTC), do you believe the Army would benefit from having training locations with standing approvals from the necessary DOD and non-DOD bodies to conduct electronic warfare operations during large scale combat operation training exercises?

Major General SCHMIDT. Senator, thank you. I think our Army is the best army in the world because we are committed to training as we fight. And so, we try to replicate an operational environment, a realistic operational environment wherever we can.

That said, I know there are some challenges in conducting electronic warfare operations in areas outside of the few designated areas, and I welcome your support in overcoming some of those challenges. If I may, you know, General Rainey, sir, would you have more to offer on that one?

General RAINEY. Well, thank you, Michelle. We absolutely need to continue to add the capability to train with multi-domain capabilities that keeps up with both the pace of war and the capabilities that we are adding.

It would be tragic if all our material modernization, Senator, resulted in real equipment showing up in formations that we couldn't then train with. There are some clear challenges. I would love the opportunity to followup and brief you in great detail on this, but some examples.

If you think about what the National Training Center did, standing that up and how that translated into the Army of Desert Storm timeframe, that same opportunity is presenting us. We are adding electronic warfare and multi-domain training capabilities to both Polk and Fort Irwin.

But there is other great opportunities—Fox training range at Fort Huachuca is uniquely postured to get in there and do things with authorities, populations, and we are probably going to need help from the entire Government because the Federal Communication Commission (FCC), FCA, there some authorities and challenges that will have to work their way up through the Joint Staff to OSD (Office of Secretary of Defense) obviously, but I think we should be pursuing expanded capabilities very aggressively.

Senator PETERS. Well, I appreciate that from both of you. We have some ideas about how to do that in some locations, so if we could followup with you offline and talk about that, because I agree this is absolutely essential.

There are a limited number of places where you can do it, and there are some places where we—I think in my home State, where we can expand some of this, we would love to have that conversation with you. Thank you, Mr. Chairman.

Senator KELLY. Senator Ernst.

Senator ERNST. Yes. Thank you, Mr. Chair, and thank you, Mr. Bush and General, General. Thank you for being here. So, we have witnessed the last year of the war in Ukraine, and it has just made it extremely clear that we need a responsive munitions industrial base.

Mr. Bush, we have talked this a number of times, and I do commend the Army's investment in the Iowa Army Ammunition Plant and other munitions enterprises. So, thank you very much for that. We know that this is a critical down payment for the future needs of our Army.

There is still an acute vulnerability, though, that exists out there in the munitions industrial base, and something that the Ranking Member addressed just a bit ago, and that is our energetics. These are the chemicals that are critical for our explosives and propellants, and yet our supply chain for energetics is decades old.

We have limited suppliers for energetics, and they have created some very vulnerable points in our industrial base. We all know that if we can't sustain this for our future fight, we are going to lose—we are going to lose.

General Rainey, would you agree that advanced energetics like CL-20 can provide improved munition range, lethality, and size? Will this help U.S. forces end long range salvo exchanges against our peer militaries? Or Mr. Bush. Whoever would like to take that.

General RAINEY. Well, Senator, yes, if I could, please. So, the CL-20 issue, I am aware of some recent thoughtful articles and some studies that have highlighted that potential of using that different formulation to get improved range, for example, out of the same size rockets and missiles.

When I asked my experts at Picatinny, they are doing research on that. I think the questions come down to safety standards and handling. We have very high standards for that, probably the highest in the world.

But I think my first contact with them on that issue, they said that where in the past it was kind of ruled out that there might be additional potential. So, ma'am, that could be an area of some additional R&D focus, could certainly potentially pay dividends from that or something else like that.

Senator ERNST. Okay. No, that is important, that we don't completely rule it out, but we continue to research that. I appreciate that, and then Mr. Bush as well, what is the State of energetics supply chain? Where are those risk? Where are the vulnerabilities, and how can we shore that up?

Mr. BUSH. Yes, Senator. I have seen that our first pass is the supply chains. What you often see is kind of what the most economical version of that supply chain is, so you often go to lowest price suppliers, which are often in countries, some of which we really don't want to be dependent on. I think we are taking a more fulsome look at that.

I think we are seeing that we need not just suppliers in the right countries, so friend-shoring, or if it is not in the United States, which is ideal, but if it is in like perhaps a neighboring country or a strong ally, and we need more than one for everything.

Critically, we have to spend the money in advance to qualify those sources so that when we need to ramp up, and this is ad-

vanced planning for a surge, you already have a qualified vendor. Meaning all the safety and other standards have been addressed to make sure that we get what we pay for. We are doing that now.

But one of my lessons learned from this—in munitions expansion is that that kind of work needs to be done in advance and coordinated with allies. We have a lot of the capability that we can also draw on, and so it is not just us doing it, but using the whole Western world to do this together.

Senator ERNST. Absolutely, and as we look toward the fight in Ukraine, obviously, what we do at the Iowa Army Ammunition Plant is very important. If we look at other fights that may occur around the globe, it may take different types of munitions.

As we are in the planning with that, we want to know how we can be very helpful there because we need to be able to sustain peacetime, but then also be able to surge for any future fight we might have.

So, thank you. Mr. Bush, would you agree that enterprise level coordination would reduce risk in the energetics industrial base?

Mr. BUSH. Senator, I want to say, yes. Enterprise between—

Senator ERNST. Different industries, yes—

Mr. BUSH. Well, I think definitely a Department of Defense (DOD) approach would be more efficient than the services doing it themselves because we wouldn't want to step on each other. For example, we often go back, you know, the Navy is buying missiles, we are buying missiles, we don't want to step on each other's toes.

Certainly there are avenues for cooperation through, for example, industry consortiums where you are able to get in the room and really share information with the Government and among the suppliers. That could pay benefits, yes, ma'am.

Senator ERNST. Yes. Appreciate that very much, and thanks for the great work. I really do appreciate it. I know with Ukraine and all the discussions that we have had, both in open and closed sessions, has been extremely helpful to identifying where some of our vulnerabilities are and where they exist. So, thanks. Really appreciate your input. Appreciate it. Thank you.

Senator KELLY. Thank you, Senator Ernst. I will now take another 5 minutes here. So back to the contested logistics, Secretary Bush.

The Secretary of the Army describes the Army's role in the Pacific, in part to sustain the Joint Force over vast distances by providing secure communications, establishing an inter-theater distribution network or networks, maintaining munitions stockpiles in theater, as well as forward arming and refueling points in the Western Pacific.

This all gets to the importance of contested logistics. I saw not the contested part, but I saw the great job in Chechlo, Poland that the Army is doing in getting the equipment needed for the fight in Ukraine to the border essentially.

Uncontested and contested, but contested is much more challenging—orders of magnitude more challenging situation. So how does the fiscal year 2024 budget invest in this Army contested logistic capabilities? Secretary Bush.

Mr. BUSH. Yes, Senator. So, I think we did start in 2024 for moving the dial on logistics investments. So, a couple of areas I would

mention, there is more funding than I think if you compared to 2023 for maintaining our watercraft fleet, at least keeping it viable, but also starting in 2024 production of one of our first new vessels, the maneuver support vessel light in many, many years that will replace some very old platforms. So that is one.

We also put more funding back into things like just trucks and wheeled vehicles. The Army has that title 10 role, as you mentioned. That logistics force is vast and requires up to date equipment, so we put more funding back there. Also ammunition stocks, conventional ammunition stockpiles, was a third area of investment.

Sir I think how that works though in a specific context is where you get into the transport legs, the communications networks, General Rainey mentioned having predictive logistics and more accurate logistics, and also just needing less, so demand reduction, be it ammunition or fuel.

The more efficient platforms we have, that is part of solving a contested logistics problem.

Senator KELLY. Mr. Secretary, even though it is obviously a different Army, different operations, different tactics, I mean, the needing less is not a scenario that has played out well in Ukraine.

Are there any lessons that were taken from operations in Europe right now? How does that affect our thought here on getting to the point where we could potentially need less ammo?

Because right now we are seeing in the first major land conflict in Europe that it is exactly the opposite.

Mr. BUSH. Senator, if I could start and ask General Rainey to provide his thoughts, if that is okay. First off, I think, you know, the U.S. Army, when we fight, we tend to fight with a lot of precision.

We also have our Joint Force providing a lot of fires from the air, again, with precision. Ukraine doesn't have that. For the large part, they are fighting differently than we would. Does not mean it is not a concern.

Sir, by needing less, I think I was speaking simply at the individual platform level, which would make us more efficient with the same logistics flow. You can sustain more forces if they were more efficient.

I didn't mean to suggest that—overall, wars tend to always, as you note, require vastly more resources than we think. Beyond that, if I could have General Rainey talk a little bit more about that.

General RAINEY. Thank you, Mr. Bush, and thank you, Senator. What we are observing is obviously horrific, what is going on in Ukraine right now. But from a military standpoint, we are observing attrition warfare.

Two armies frontally assaulting and using attrition as opposed to maneuver warfare, which is the strength of the United States Joint Force. You know, our really asymmetric superpower is our people.

A close second to that is the fact that we practice maneuver warfare, joint warfare that is underpinned by really disciplined and tough training. Which is why things like being able to train on these capabilities, like General Schmidt said, is just as important as having the capabilities.

In terms of contested logistics, the two biggest opportunities for our Army as we modernize is to increase the lethality and survivability of our light formations. We have very deployable formations. They just have a problem with things like protection from counter Unmanned Aircraft System (UAS) and the lethality.

We have tanks to kill tanks, but the technology absolutely exists, as we have seen, to kill tanks with Javelin missiles, for example. So, increase the lethality and survivability of our light formations and do things to drive down the weight and the logistics tail of our heavy formations.

Pursuing those, and those are—that can give you several examples of how our modernization efforts do that, if you are interested. Silent drive and silent watch, for example, is the hybrid technology that lets our tanks not become dependent on electricity, but it makes a better tank because it can be silent, and both when it is standing still and limited approach.

Those kind of requirements as we modernize our vehicles is an opportunity to reduce our long tail and improve the lethality of our formations.

Senator KELLY. Well, thank you. Senator Cotton.

Senator COTTON. Mr. Bush, I want to return to one more question about our opening conversation of the munitions issue at a high level. You stressed demand and how high demand can help keep lines going, you know, keep people employed in their high skilled, specialized functions. I assume that means demand not just from our military, but also allied and partner military as well, right?

Mr. BUSH. Yes, sir. Ideally, we don't have to provide all that demand. It is very encouraging in that light that many countries in Europe in particular are now committing to spending more and buying some of our equipment. That is enormously helpful to keeping healthy production lines.

Senator COTTON. So, it is good—it is not just good from a military standpoint that we have friends in Europe and the Middle East and the Western Pacific that are wanting to buy more ammunition, but it is also good for our workers and our companies here in the United States.

Mr. BUSH. Yes, sir. Absolutely.

Senator COTTON. Thank you. Now, I want to get a little more specific. The budget request includes investments to support prototyping for the long-range hypersonic missile, flight test for the mid-range capability missile, and initial fielding of the precision strike missile or PrSM.

As PrSM is one of the key long range fire capabilities necessary and will be vital in a Pacific conflict, I just want to dig a little bit deeper on this. The Army is requesting \$273 million to work on future increments of PrSM, and \$384 million or 110, Increment 1, missiles, but I suspect that is likely inadequate for the need.

What are the plans to expand production capacity of the PrSM Increment 1 beyond 110 missiles per year?

Mr. BUSH. Senator, I think that initial number reflects mostly the fact that it is a new missile. We are just ramping into production and transitioning away from Army Tactical Advanced Conventional Munitions System (ATACMS) production to PrSM. I think to

the degree we can, I know there was great support inside the Department for this capability.

I think there is an opportunity there for expanded production, assuming current initial testing goes well. On the R&D, for Increment 2 and Increment 4, improve future versions, production for those are still a few years out, but if we set conditions right with a healthy production line for Increment 1, that will put us in a better place.

Senator COTTON. Can you say a little more about your plan for both Increment 2, and especially Increment 4?

Mr. BUSH. Yes, sir. So, Increment 2, we hope to be able to give us an anti-ship capability that would provide anti-ship capability out of a High Mobility Artillery Rocket Systems (HIMARS) launcher at significant range. Increment 4, we hope, could more than double the range of Increment 1. That will require a new propulsion system, but the science, technology is underway on that.

Again, all launch out of HIMARS, which has proven highly successful in Ukraine. Very difficult to locate, easy to move around. This would be a dramatic increase in the Army's ability to create problems for a potential fight with China, for example, because we could station those everywhere.

Senator COTTON. Okay. What is the prospect for a multi-year procurement for PrSM, as you have done for PAC-3 and GMLRS?

Mr. BUSH. Senator, as soon as we have that production line up and running, and the cost is well understood on Increment 1, I think it could be a very good candidate for a multi-year approach.

Senator COTTON. Okay. I also understand from your testimony and statement that the operational evaluation of the extended range cannon has revealed some engineering problems. Would you please say a little bit more about those challenges and about the Army's progress on the cannon?

Mr. BUSH. Yes, sir. So, the Extended Range Cannon Program, I think we have been on a very aggressive timeline. We have built seven or eight prototypes, and we took them immediately into full testing. That testing has revealed challenges. I would say there are more engineering and mechanical challenges, but still, there they are.

While disappointing, I think it is good that we found them now before we went into a full production for this system, for example. We are still doing testing.

I believe we will know more over the summer about the degree of the challenge and the extent to which we need to adjust our budget request this year and in future years and look at the portfolio overall and see where that capability fits in terms of just overall improvement in Army range for cannon systems.

I would mention there is great R&D work going on, for example, on new munitions that can also provide very long range out of existing cannons. So, a mix of those two approaches might be warranted.

Senator COTTON. Okay.

Senator KELLY. Thank you. General, I want to move on to a little bit of a different topic here, which is testing critical capabilities.

General Rainey I am concerned that our ability to test certain capabilities ranging from things like electronic warfare to directed

energy, to hypersonics, are constrained by some current limitations that we have to conduct like open air as well as hardware in the loop and simulated test environments and experimentation, but also real world testing.

I come from a flight test background for a number of years. We have some facilities around the country. Some really good ones happen to be in Arizona. The electronic proving ground at Fort Huachuca, the Yuma Proving Ground.

I think both of these facilities are crucial to the Army's efforts. General Rainey, can you explain how the Army is ensuring that it has sufficient capacity and capability to proceed on its modernization requirements at the pace that our National Defense Strategy demands?

General RAINEY. Yes. Thank you, Senator, and to just acknowledge the point there. The ability to test is absolutely critical. That is not the pacing item. We currently aren't waiting for the ability to test on any modernization efforts. But as we continue to make progress, we have identified that as a potential.

That is why we are continuing to invest heavily in places like Yuma and Fort Huachuca and Camp Grayling and other places. What we can't afford to do, from the modernization and transformation standpoint, would be to continue to pay for test capability and pay for training capability as separate things.

So, one of the very positive initiatives Army has, is to bring those test and training capabilities together, so to make sure we don't ask for resources, use it in a test, and then let it go to waste. We need to use it for tests and then be able to train.

That is why a place like the Fox training complex that gives you the ability to both test effectively and train effectively is one of our priorities.

Senator KELLY. So, at the same facility. I think for Huachuca especially, when we look at issues we have that we are facing with electronic warfare, and it offers a very unique geography, let's say, to be able to transmit that relatively high-power level without disrupting populations.

I don't think we do a lot of training there yet. My understanding is I think we might do more in the Yuma area. But I agree with you that the more we can integrate those two facilities into one, it would certainly make sense to me. In the Navy and the Air Force, we traditionally haven't done that.

Maybe more recently we have, but like the Pax River, you know, Naval Air Station is really about, you know, developmental tests. Edwards Air Force Base, you know, the same for the Air Force. So, it is good to see the Army is doing this. Beyond that, like, how do you leverage the full capacity of an installation?

I have found, as I have traveled down to Fort Huachuca and down to Yuma proving ground they often have the range—well, what they tend to be missing is like an investment in the test infrastructure.

It might be theodolites, it might be other equipment to gather data. I think we often under invest in those systems. Is that your sense, General?

General RAINEY. On the specifics of our investment in that, I will defer to Hon. Bush. But to your point about how do you optimize

them? Another thing is using all the tools you have, so live, virtual, and constructed, and having the ability to link those capabilities.

So, linking someplace like Yuma to the National Training Center to Camp Pendleton, which is something that we do during Project Convergence and need to continue to do that to find efficiencies.

To your point about the joint, we need to not just be able to do that in the Army, but we need to be able to train together, experiment together as a Joint Force, and that is one of the main efforts of the persistent experimentation we have in Project Convergence.

You will see a lot of that, hopefully if you can come visit us, at EDGE, when we do the—it is the biggest annual aviation experiment we do out of Yuma next month.

Senator KELLY. If we have more time, I would like to talk about EDGE maybe at the end of the hearing, Senator Cotton.

Senator COTTON. Mr. Bush, again, I want to go back to the defense industrial base question. For the past few years, Congress has shown a willingness to fund and accelerate needed projects for the Army's organic industrial base.

To that end, what projects within the Army ammunition plant modernization plan could be accelerated if Congress provides you with the necessary funding? Could you also explain how these projects would prepare the army for conflict with China?

Mr. BUSH. Yes, sir. I think the great work done by my predecessor and General Daly at Army Materiel Command (AMC) was to develop a 15-year plan. And at the time, some questions, like why have a 15-year plan? Well, sure enough, all of a sudden there were more resources and we had a plan with shovel ready projects ready to go.

We still have that. Sir, you mentioned one, I think it is the unfunded priorities list (UPL) list that certainly would be a strong candidate for Radford. There are others, and we can provide a detailed list. One to and up to perhaps 10 or 15 projects as a followup, if I could. There is a limit of absorption at some places because we, of course, have to keep these plants running while we are modernizing them.

So, we can't just shut the whole place down and modernize it. We are bumping up against that in a couple of places, but there is—I think we found that there is always more work that can be done. There are two types of projects. Some are really directly tied to increasing production capacity or automating systems or modernizing with regard to safety. Those are the ones that usually get the most attention.

Others, though, that are equally as important is those long-term investments in the infrastructure of these places. Security, cyber investments, more resilient electricity, generation onsite, better roads. Those things matter too, sir.

I think we are open to a dialog and a detailed level of what projects could be accelerated where based on what members might have in mind.

Senator COTTON. Okay. We have been talking a lot about how to make these things. Let's talk about it now, where to put them and how we would use them. General Rainey, could you talk a little bit about how pre-positioned stocks could support the Army's role in



the Western Pacific to include the possibility to pre-position stocks afloat?

General RAINEY. Senator, thank you very much. It gets to both the priority of the Indo-Pacific, the long lines of communication and contested logistics. So absolutely, the pre-position has kind of like the deferred term.]

Whether you are talking about Army prepositioned stock (APS) traditionally, but absolutely, the ability to position supplies forward in theater and INDOPACOM. I fully agree that that is something we need to be doing. I know General Flynn is pursuing that aggressively as the Army Commander out in the Pacific.

If you look at one of the observations and lessons from Ukraine. I think is if you look at how fast we were able as a country to react and support Ukraine, it was underpinned by a lot of things. One of which was the amount of capability that we already had, forward position, the partnerships we had, the training capabilities that we had in Europe at 7th ATC, and the relationships we had with partners. Replicating that in the priority theater, I fully support and I agree with, sir.

Senator COTTON. What about the prospects specifically of floating pre-positioned stock?

General RAINEY. There is a business case and ships at sea with a lot of stuff on them, have some risks associated with it. But I would defer to Mr. Bush on that.

Mr. BUSH. Sir, we have our APS-3 set, which is our current one afloat set. We did have to add funding for it in 2024 just to maintain it due to some increased costs, for example, on ship leases.

But that is a vital capability and the Army is committed to maintaining it. Expansion of APS-4 beyond where it is today, heavily relies on really work of the State Department and others on getting access to these countries so we can build the locations. There is, anywhere in the Philippines, Australia, other Southeast Asian locations would be things that the Army I know has looked at and planned against.

I believe the Department is working through getting to good—so we can start that process. I can tell you in our current, of course we are working on fiscal year 2025 already, how to expand APS-4 is a critical issue the Army is still working through.

Senator COTTON. If they are not floating, they have to be on land somewhere, as you just alluded to. Just tell us in plain language, like what is the plan or the concept for preventing China from blowing all that stuff up in the early stages of a conflict?

General RAINEY. Yes, Senator. So, the ability to position anything gets to the one thing that is an even bigger problem than contested logistics, and that is the ability to protect anything you forward position. There is a kinetic aspect, so air and missile defense and integrated—that is never going to be the total solution.

So, utilizing concealment, deception. One of the advantages of land-based capabilities, whether it be sustainment or long-range fires, is they are more agile and able to move them. So good tactics and fighting.

We are not going to be able to put anything in range and assume it is going to stay safe unless we fight to keep it safe. So, it is a

balancing act. How much you go forward, you better be able to protect it. We are pursuing those efforts.

Senator COTTON. You just touch indirectly, so I will ask you directly about something—I sometimes hear from other Senators who are on the Committee or just normal Arkansans who wonder about it, it is like, if we are going to be fighting China one day, isn't it going to be all out in the sea and in the air?

The Army is fighting on the ground. So, what is the Army going to be up to out in the Western Pacific? Why does the Army need to worry about that? Could you just here in public, explain in plain language what the Army has to do with a fight that, if you just look at the map, appears to be all on water and in the air?

General RAINEY. Well, thank you, Senator, and I will try and do that. We fight as a Joint Force. There is not such a thing as an air maritime theater any more than there is such a thing as a land theater.

The strength of the Joint Force is everybody brings their capabilities to bear. More specifically, the Army, as our Secretary has said, has several responsibilities to enable the Joint Force. Command and control, our title 10 responsibilities for both protection and sustained logistics.

But we are absolutely going to be able and need to control land. Whether it is to position Air Force assets to support the Navy's operations, or they have to come and touch land, to secure ammunition sustainment.

There is absolutely a role. We are going to always need the ability, No. 1, to deter them first, because this is a war we don't want to have, and that is underpinned by them believing that they would lose in a ground war with us.

If we do transition to conflict, we are going to have to be able to take land away from the enemy. And if they defend it, that means taking it the old-fashioned way by killing them and secure it and protect the Joint Force. So, there is absolutely a role for our Army and every other service in what would be a horrific war.

Senator COTTON. Thank you.

Senator KELLY. Followup on something Senator Cotton said about China blowing the stuff up. If we forward position things, as we should, and have the munitions, the fuel, the equipment forward deployed, at some point in a conflict, we might need to be moving fuel, munitions, equipment across, say thousands of miles of ocean.

I want to see what your thought is about our ability to do that. I mean, it is not specifically the job of the United States Army, but it is your stuff. And right now, today, we have in our Merchant Marine about 85 oceangoing merchant vessels. This is beyond what Military Sealift Command has.

China has 5,500. Are you concerned about the ability, in a conflict, after it starts, about a logistics chain that goes across the Pacific Ocean, and our ability to sustain that?

General RAINEY. Yes, Senator. I think everybody in the Joint Forces is very concerned about that. I mean, you are talking the longest lines of communication that you can possibly imagine, and then fighting a really good enemy at the end of those.

General Flynn is doing a lot of work, I know, to shorten those lines of communications by improving the pre-positioning of assets like we just previously discussed. But no, we are going to have to fight for that, and there are challenges.

It will be contested at sea, and I am aware of the limitations of the Merchant Marine, but I am not an expert on it. But it is going to be a challenge, and we are going to have to fight for it, and we are going to have to protect it.

Senator KELLY. I want to turn back in the last 3 minutes here before I turn it back over to Senator Cotton, about back over to Europe.

I was in Poland, went to Kyiv, met with President Zelensky, spent over an hour with him, talking about a lot of the challenges he has faced. Some of the lessons learned. Met with his national security team.

There are a lot of lessons coming from this conflict, lessons that they are learning, lessons I think that we should be learning as well. So, General, from what you have been briefed on so far, what have the operations in Ukraine exposed, first about the value of heavy ground forces and how they are being deployed in Europe.

General RAINEY. Thank you. One, I am very proud of the Army and the Joint Force. We had our dedicated collection and lesson learned teams in place before the Russians even invaded—General Brito, the TRADOC Commander. And we have numerous efforts ongoing.

We take it very seriously. We have at my level, chief of staff at the level weekly conversations to pay attention to make sure we are learning everything we can from this tragedy. There are some things that haven't changed dramatically, if I may start there—the importance of humans.

The war is fundamentally still a contest of will between humans and you are seeing the value of people fighting for something they believe in and inspirational leadership, and the impacts of those.

So, some things don't change a lot about the nature of war, the importance of land. I think armored formations are absolutely relevant now and at any point in the future, but specifically now.

Both, we are providing the Ukrainians are asking for them, the Russians are trying to sustain them—the increasing lethality of the war, especially the high explosive (HE) artillery precision stuff matters and is really fascinating. But HE artillery is still the number one killer. You have to be able to protect your soldiers and that space would be another example.

Urban warfare, right? Everybody knows it is not what—you know, nobody wants to do it. It is the worst kind of attrition and it is the hardest thing, but it is unavoidable. When the people move to the cities, and urban areas sit astride your lines of communication.

We are going to have to fight in urban areas and it is impossible to do that without the ability to penetrate them, and you can't do that unless you have mobile protected firepower to do that. So those would be some observations.

Senator KELLY. One observation I had had to do with, and I hadn't seen this before, it is the way we are helping the maintenance and repair of systems, artillery systems, and others. It re-

minded me of telemedicine. The 10th Mountain Division Commander actually mentioned, and he used the word tele-maintenance, and that is what we are doing.

I think that is something we need to try to capture is the ability to repair things in the field in a way we never really had before, where you can put the company's technical representative for the piece of hardware. It might be BAE systems, it might be Lockheed Martin.

You essentially can virtually put them right there on the front lines when they need to repair something, not something I expected to see. Ukrainians are manufacturing parts. They can't make everything.

They can make parts out of titanium. Right now, that is a complicated machining process that they don't have the capability within the country to do. But there is a lot they can do.

I never really expected—and it is us, with the assistance the 10th Mountain Division is giving in trying to repair their equipment in a way that I don't think we have done before. I think that is a specific lesson that we need to capture and try to expand on.

Senator Duckworth.

Senator DUCKWORTH. Thank you, Mr. Chairman. And good afternoon to our witnesses. General Rainey, thanks for the discussion we had about Futures Command a few weeks ago. I thought it was very illuminating.

Last month, we learned about another delay with the improved turbine engine program, ITEP, and it won't be expected now until 2024. These delays not only affect the new Future Attack Reconnaissance Aircraft (FARA) aircraft, but also the already fielded 60s and 64s. Assistant Secretary Bush, in an interview with Defense News, you characterized the source of the delay as manufacturing challenges and not design challenges for GE Aerospace.

I know the Army is briefing me next month on the finer details of ITEP, and I look forward to getting to this issue in-depth then. But broadly, can you talk about the supply chain and component issues that are affecting ITEP? Is that what the manufacturing issue is, supply chain, or what is going on here?

Mr. BUSH. Senator, frankly, it is quality control further down the supply chain. Not—I mean GE is responsible for all of it, but of course, they have hundreds of subs that they deal with.

A few very important ones have had trouble building some of the new parts. For example, some of them are 3D printed. We are using some new techniques here, making them at the quality levels needed to get engines to go to test. The good news is we did just last we laid off the second test engine. We are on a path to a better situation, but that is my understanding of the challenge.

GE leadership is fully aware of it. I have had many conversations with myself. They know we are watching closely. They know how vital the program is. They are committed to getting it right. Right now, I am cautiously optimistic that our updated timelines will hold, but this will require constant attention, ma'am.

Senator DUCKWORTH. Yes. I have been very impressed with the Army and how they have developed the two new aircraft, and actually has always moved the timeline to the left, and now we are starting to slip right so, I am concerned about that.

Are these concerns something that would affect other Army modernization programs like combat vehicle, the next generation combat vehicles, the downstream supply chain manufacturing tolerances? Is this something that is going to spread to other areas?

Mr. BUSH. I don't expect so, ma'am. Not—I mean, of course, in aviation, we have the highest standards. It is the most difficult things to produce. We have not seen anything like that recently with any of our ground vehicle programs, either of the new ones like mobile protective firepower, or the older ones.

It is certainly a potential cause for concern. I would say right now I don't believe so, but it is definitely worth watching.

Senator DUCKWORTH. Okay, thank you. General Rainey, in our discussion last month, you described how Army Futures Command was reevaluating cross-functional teams, and how the Command is looking at the Army's new priorities and organizational changes.

As you emphasized, the purpose of modernization is to drive transformation across a Joint Force. I am interested in hearing more about the integration across the total force, and your 75th Innovation Command in particular.

How does Futures Command integrate the experience of its Reserve component members? Are there best practices for the Army at large to incorporate into other Active Reserve units?

General RAINEY. Thank you, Senator—

Senator DUCKWORTH. I know—like tee ball, I just put the ball right on top of the tee for you.

General RAINEY. The 75th Innovation Command is a great success story of the Total Army, right? It is not, you get this from COMPO 1 and something less in COMPO 2 or 3. That is absolutely not the case. When it comes to what I do, I am trying to innovate, trying to find tech expertise without paying a whole bunch of money or taking a lot of time.

The fact that the 75th Innovation Command and General Marty Klein, I can call him and say, "here is a problem" or "here is what we think is a solution," "we want somebody to troubleshoot."

His ability to reach out through his entire enterprise and find people that are not just experts but the best people in the military, a lot of them are the best people in the country in academia and industry, and being able to leverage that capability as we modernize the Army is kind of like a superpower.

So absolutely, we should continue to expand it. As far as integrating across the Joint Force, I would offer Project Convergence as an example of that. It is our persistent experimentation approach nested with exercises and then periodically having capstone events.

We believe that Project Convergence is an Army hosted joint experiment, and as for every year, as we do those capstone events, they become more and more joint. We add more and more partners, and that is another way that we are continuing to apply a sense of urgency into our integration efforts.

Senator DUCKWORTH. Thank you. I am over time, but if you could reply for the record. I would like to know what the Army's plans are to a program and integrate Gray Eagle into the National Guard and Reserve—or Active and Reserve components.

I want to make sure that the Army has a holistic view of concurrent and proportional fielding of weapon systems to achieve the total true force interoperability so that the National Guard is also getting the Gray Eagle in a way that they can actually also train up and operate them.

General RAINEY. Yes, Senator.

Senator DUCKWORTH. Thank you. Mr. Chairman.

Senator KELLY. You could take it. General, I am fine, if Senator Cotton is. If you want to take that and if you could talk about that briefly.

General RAINEY. I can talk about modernization of the Total Army and transformation of the Total Army. General McConville has been clear and adamant, as I know, because he was formerly his G-3.

There is no modernization effort we have that is COMPO 1 only. They are all spread and prioritized across, and I will followup with you on the specifics of the Gray Eagle.

Senator DUCKWORTH. Yes, probably General Schmidt would be better positioned to answer that. I am sorry. Should have asked her that.

Major General SCHMIDT. No, that is okay, ma'am. But I would also just like to followup with you on that one afterwards.

Senator DUCKWORTH. Thank you.

Mr. BUSH. Ma'am, I would add, if I could, Congress, we got the message. Congress was very clear about that capability in the Guard. We are in "make it work, make it happen mode." With the Guard really in the lead in determining how they are going to build units where what composition with the MQ1s that Congress directed.

Senator DUCKWORTH. Thank you.

Senator KELLY. Just make sure you hang the right stuff on it. Senator Cotton.

Senator COTTON. Mr. Bush, I want to talk about the integrated visual augmentation system, or IVAS. It began a new stage of development recently in December 2022. After several critical soldier touch points, the Army approved the purchase of 5,000 IVAS 1.1 systems.

At the same time, Microsoft agreed to develop the new IVAS 1.2 system, which will, if successful, change the design of the system and improve its performance.

Fiscal year 2022 appropriations included a \$394 million reduction in IVAS procurement, citing the original spending request as ahead of need. In March 2021, the Army awarded Microsoft a deal worth up to \$22 billion over the next 10 years to move the IVAS program from rapid prototyping to production.

Mr. Bush, why has the Army included some IVAS funding in the base budget while shifting some funds to two different projects on the Army's unfunded priority list?

Mr. BUSH. Senator, I think what you are seeing there is the Army trying to re-phase that program. We unfortunately we did a very difficult test with it and found all the problems.

While that is good that we found the problems, still disappointing and not the outcome we were looking for. One thing I would say is our ability to restructure that program on the fly here,

very quickly to try to get to 1.2, is because of the new authorities we are using. That would have been almost impossible under a traditional system.

To your specific question, we laid in funding we thought was sufficient to just get over the line to get 1.2 developed in 2024. The UFR items would let us go a little faster into actual production, if it proves successful this year, sir. I think we are taking a deliberate approach. Whereas the first time around was honestly very, very aggressive on timeline and production ramp up, this time we are being more cautious.

We want to make sure Microsoft, they have to deliver. This 1.2 system needs to be exactly what the Army needs or we are not going to produce it. I think, sir, that is one reason we scaled the funding back that way.

Senator COTTON. Okay. General Rainey, Mr. Bush hinted at my next question. How confident are you that the testing for 1.2 will be successful?

General RAINEY. I am very confident. It is not just the technical testing aspect. One of the successes of our modernization effort is using soldier touch points.

Because we have 5,000 of them, we are going to continue—not putting them into operational units where there would be a potential impact, but we are going to not just let them sit in a Conex somewhere.

We are moving them around to places like the Maneuver Center of Excellence, for example, where we have some of our experienced soldiers continue to do that. We are working with Microsoft, so we have the users working hand in hand as we develop the next thing. We are going to get it and we are going to test it with real warfighters and get that soldier feedback.

I am confident both, that we will test it effectively because we always do, the rigor that we put in the last one. But I am really kind of—what I am going to wait and hear from is the staff sergeants and the lieutenants and company commanders providing user feedback.

Senator COTTON. Okay. If that testing does not go as well as we had hoped, the Army is prepared to take a look at the program?

Mr. BUSH. Yes, sir. Institutionally for the Army, it is always a very hard decision to admit we can't succeed somewhere.

This is a potential area where, look, if the testing doesn't prove out very quickly that it is capable and going to get us what we need, the Army is absolutely prepared to end that arrangement and seek a new competition.

Senator COTTON. Okay. I want to turn in the time remaining to Abrams Tanks, Mr. Bush. The Army's fiscal year 2024 unfunded priority list includes \$533 million for Abrams set version 3 procurement to achieve a complete armored brigade combat team set. Those additional tanks would decrease the estimated costs per unit from \$17 million, that is 34 tanks at current funding, to \$12.3 million, 87 tanks.

In resourcing this, this requirement would accelerate the fielding of the M1A2 set version 3 tanks to one Active component BCT by year. So, the Army included \$533 million on its unfunded priority list for the Abrams Tank procurement, but that seems to have be-

come something of an annual occurrence, appearing on the unfunded priority list as opposed to the base request.

Can you tell me why this seems to continue year after year of this funding for tanks going on the unfunded list as opposed to the base request?

Mr. BUSH. So, Senator, of course, the Chief of Staff of the Army, it is his list in terms of why it appears there, but your question is a very fair one. I believe, as I mentioned, we have accepted some risk there in the base budget request.

We don't think it is too low, but that is less funding than as articulated in the UPL would be perhaps ideal. There is another mitigating factor, however, and that is recent increases in foreign military sales.

So, a very large order from Poland is going to end up being more than 300 tanks worth of work. A recent order from Romania will give us an excess of 50 or 60 or so additional tanks of work.

There is, of course, potential for additional tanks for Ukraine long term, so, we are always trying to balance between foreign military sales and our production to keep a healthy production line.

I think the Chief, as articulated in the UPL, believes that was an important one. It is a very large amount of money, so I think I would defer to him on his specific thoughts for why that was so high on his list.

Senator COTTON. Thank you.

Senator KELLY. Similar to tanks, I want to move to helicopters. Not something I have a ton of experience with, though I did get to fly the Apache last year out of Boeing in Phoenix, which was quite the experience.

The Army has placed a big focus and resources on its future vertical lift priorities, the future long range assault aircraft and the future attack reconnaissance aircraft. Neither of these systems are projected to field until 2030 or beyond. They are going to augment, not replace, the current Black Hawk and Apache fleet. The Chinook remains the Army's only heavy lift capability.

Yet in large part, the Army continues to defer investments in the stuff we have in order to fund these longer term two systems that are just going to augment what we have today. Does the Army still consider a manned reconnaissance aircraft the right solution here?

Can you just, in general, give me an update on the future long range assault aircraft and the reconnaissance aircraft?

General RAINEY. Thank you, Senator. The short answer is yes, there is absolutely going to be a requirement for the United States Army, as part of the Joint Force, to conduct vertical envelopment in the future, now or at any point. So, the ability to avoid that attrition warfare I was talking earlier by maneuvering, by ground, and by air to dislocate our enemies and envelop our enemies.

We absolutely need to maintain what is the strength of our current Army, and that is Army aviation. If you look at your specific question, there is always going to be a requirement for human reconnaissance. Reconnaissance and security is an essential of warfare. You have to not get surprised and you want to make contact on your own terms.

How much of that can go unmanned versus manned is very much at issue, and we should be paying attention to learning from that.



But the ability in an all-weather chaos, fighting the Chinese who are very good at not only disrupting our technical capabilities, but also injecting mis and disinformation, have the ability to talk to a human that you know and train who is looking at something and provide that back to the commander will always be a requirement.

Where that falls out on our other requirements will be a decision that we will make. But pursuing that capability, I agree, sir, I believe is the right thing.

Senator KELLY. You know, Blackhawks moving people, the Chinook, people and equipment, and the Apache putting ordinance on target. Those are missions that we can't take our eye off of.

General RAINEY. Absolutely.

Senator KELLY. They are going to be around with these platforms for a number of years. My concern is that we do have to focus on the future and beyond 2030.

At the same time, we have got to make sure that we continue to be able to support the warfighter with what he needs today, too, and I think that is those three platforms. Senator Cotton, you have any further questions?

Well, with that, General Rainey, Secretary Bush, General Schmidt, thank you very much for being here today, and the hearing is concluded.

[Whereupon, at 4:04 p.m., the Committee adjourned.]

[Questions for the record with answers supplied follow:]

#### QUESTIONS SUBMITTED BY SENATOR RICHARD BLUMENTHAL

##### BLACK HAWK MODERNIZATION

1. Senator BLUMENTHAL. Secretary Bush, the Army has stated that the Future Long-Range Assault Aircraft (FLRAA) is not a 1:1 replacement for the Black Hawk helicopter. Is this correct?

Secretary BUSH. Correct. The Future Long Range Assault Aircraft (FLRAA) is not projected as a 1:1 replacement for the Black Hawk. In the near term, FLRAA will supplement the Black Hawk fleet and provide transformational increases in capability. The Army is currently executing an analysis to determine the FLRAA procurement quantity and what the fleet mix of FLRAA and Black Hawk will be within the Aviation Force Structure.

2. Senator BLUMENTHAL. Secretary Bush, the committee understands that Black Hawk will remain in service in all Army divisions, in some number, well into the 2070's. We have been told that 800 to 900 such aircraft will remain in service. Is this accurate?

Secretary BUSH. The Black Hawk helicopter provides a very capable and necessary medium-lift capability which will continue to serve the Army for several decades. As we enhance our medium-lift capability through investment in the Future Long Range Assault Aircraft (FLRAA), which is designated to augment our current capability, the Army's continuous assessment and refinement of Force Structure requirements will ultimately define the right quantity and mix of Black Hawks necessary to support current and emerging long-term Department of Defense mission requirements.

3. Senator BLUMENTHAL. General Rainey, in addition to the Improved Turbine Engine Program engine and Modular Open Systems Approach, I would like to better understand the Army's plan to ensure the Black Hawk is viable and capable in the Joint All-Domain Operations (JADO) environment. What is the Army looking to do to recapture performance, enhance survivability, improve safety and increase operational readiness?

General RAINEY. The Army will continue to modernize, equip, and sustain the Army of 2030 to successfully conduct multi-domain operations as part of an integrated Joint Force. We have initiated a Modular Open Systems Approach on the

Black Hawk fleet to rapidly integrate new capabilities. We will continue to explore new technologies to be able to operate the Black Hawk as new threats and capability gaps arise.

4. Senator BLUMENTHAL. General Rainey, as the Army continues to operate and sustain the Black Hawk helicopter program well into the 2070's, what is the Army's plan to ensure that these aircraft remain relevant and interoperable with FLRAA in the JADO environment?

General RAINEY. The Black Hawk is definitively part of the enduring fleet and will continue to serve the Army for several decades. Our priority is to modernize the Army National Guard by replacing the aging UH-60L models with the UH-60V and UH-60M. Additionally, the Army will leverage targeted modernization efforts through a Modular Open Systems Approach and by integrating stronger, more fuel-efficient engines (Improved Turbine Engine), in order to sustain the Black Hawk's relevance and interoperability with modernized Future Vertical Lift Systems.

5. Senator BLUMENTHAL. Major General Schmidt, is an acquisition strategy currently being developed or at least planned modernize Black Hawk?

Major General SCHMIDT. As the Army continues to assess the structure of the utility helicopter fleet, we are considering contracting strategies to both modernize our fleet and support our allies. We believe it is vital to establish affordable contracts to achieve our long-term national security objectives.

#### FUTURE ATTACK RECONNAISSANCE AIRCRAFT (FARA)

6. Senator BLUMENTHAL. General Rainey, what transformational characteristics is the Army seeking to give them leap ahead capabilities in the JADO environment and U.S. Indo-Pacific Command (INDOPACOM) theater?

General RAINEY. The Future Attack Reconnaissance Aircraft (FARA) Ecosystem provides the Joint Force Commander multi-echelon effects and options across multiple domains simultaneously to present the enemy with multiple dilemmas and shorten the sensor to shooter and decision cycle timelines.

FARA will serve as the stand-in sensor for the Corps and Division, providing actionable target data through Deep Sensing at the tactical level to enable long range precision fires from safe stand-off distance. It will also provide the tactical commander options to delay, disrupt, or destroy/penetrate enemy Anti-Access/Area Denial (A2/AD) and integrated fires in order to create avenues of approach that will enable conduct of air assault operations (e.g. Future Long Range Assault Aircraft) and deployment of other Army modernization capabilities.

Utilizing masking and clutter of the air, maritime, and land domain, FARA will use simplistic and low workload Command and Control (C2) to employ a family of Launched Effects with broad capabilities spanning from detect / locate / identify / report, lethal and non-lethal effects, to communications relay and protection functionality enabling distributed C2 across vast distances in noncontiguous areas and outside normal supporting ranges and distances. Automation and Artificial Intelligence will enable collaborative behaviors across these extensions of FARA in an ecosystem to provide target recognition and enable precision fires at the time of need.

7. Senator BLUMENTHAL. Secretary Bush, can you confirm to the Committee that FARA is, indeed, the Army's No. 1 aviation modernization priority?

Secretary BUSH. The Future Attack Reconnaissance Aircraft (FARA) is among the Army's top modernization efforts and is Army Aviation's No. 1 modernization priority. The clean-sheet, next-generation design and Modular Open Systems Approach (MOSA) of FARA mitigates a critical armed aerial reconnaissance gap for the Army, enables operations in highly contested airspace, and set the conditions for mission success against peer/near-peer enemies engaged in Large Scale Combat Operations.

8. Senator BLUMENTHAL. General Rainey, why is FARA so important to the Army in the JADO environment? How is it instrumental in INDOPACOM?

General RAINEY. The projected Future Operational Environment of Joint All Domain Operations (JADO) and INDOPACOM is characterized by Anti-Access/Area Denial (A2/AD), including Integrated Air Defense Systems (IADS) and integrated mid-and long-range fires complexes that will limit military maneuver.

National, Strategic, and Army-level Intelligence, Surveillance, and Reconnaissance (ISR) assets will be contested and challenged in timely and sufficient quantity for targeting in the JADO/INDOPACOM operational environment.

This ecosystem approach—paired with speed and range in the manned platform and a Modular Open System Approach digital backbone—allows for enhancements at the speed of technology, provides a level of survivability that we have not seen within Army Aviation, and delivers deep reach within a non-permissive environment in an augmentation to 5th generation fighter aircraft to penetrate and disintegrate the strategic and theater strategic theater IADS.

Disintegration of this IADS allows freedom of maneuver and engagement from 4th generation fighter aircraft and AH-64s to disintegrate, isolate, dislocate, or destroy the enemy long-range fires and allowing the division and corps freedom of maneuver.

Without the employment of the FARA Ecosystem and the capabilities it will bring to bear, the Army will be unable to target deep to set the conditions and exploit the relative advantage necessary to employ many of the Army's key modernization programs that will expand opportunities for the joint force and create more dilemmas for the enemy.

9. Senator BLUMENTHAL. General Rainey, what is the current schedule and plan for development, test, and fielding for this program?

General RAINEY. The Army is on track to complete Future Attack Reconnaissance Aircraft (FARA) Competitive Prototype efforts prior to the end of fiscal year 2025, with the Weapon System Development program achieving Milestone B in 2d quarter, fiscal year 2026. The Army will continue to refine the remainder of the schedule as the program gets closer to Milestone B and transitions to a Major Capability Acquisition pathway.

#### QUESTIONS SUBMITTED BY SENATOR ANGUS S. KING, JR.

##### ACTIVE PROTECTION SYSTEMS FOR BRADLEY FIGHTING VEHICLES AND STRYKER COMBAT VEHICLES

10. Senator KING. General Rainey, it's evident that the Army is woefully behind our peers and allies in the development and fielding of Active Protection Systems (APS) for our combat vehicles; we attached an Israeli system to our tanks. While we seem to have a plan for the next-generation vehicles, what about the vehicles that would go to war today such as Bradley Fighting Vehicles and Stryker combat vehicles? What is your plan to rapidly field APS systems on those vehicles?

General RAINEY. There are many ways to protect combat vehicles, and APS systems are a likely element of a more comprehensive approach. However, The Army is not yet at a point where rapid fielding of APS solutions across the entire combat vehicle force is achievable for a variety of reasons. However, the Army continues to invest in the development and integration of platform protection enhancements for Bradley, Stryker and other combat vehicles within our Vehicle Protection Suite program (\$79.25 million (M) Research, Development, Test and Evaluation (RDTE) funding programmed in fiscal year 2024; total of \$400.9 million RTDE across the Future Years Defense Program).

11. Senator KING. Secretary Bush, why is there no funding in your new budget request to accommodate such plans?

Secretary BUSH. The Army continues to invest in the development and integration of platform protection enhancements for Bradley, Stryker and other combat vehicles within our Vehicle Protection Suite program (\$79.25 million (M) Research, Development, Test and Evaluation (RDTE) funding programmed in fiscal year 2024 (FY24); total of \$400.9 million RTDE across the Future Years Defense Program). However, given limited resources, at this time the Army is prioritizing other combat vehicle upgrade efforts rather than investing more funding to accelerate APS fielding.

##### SUPPLY CHAIN VULNERABILITY

12. Senator KING. Secretary Bush, over the last few years Maine producers of critical materials such as tungsten have seen a positive and appreciated increase in the focus, commitment, and funding around reducing United States industrial base supply chain vulnerabilities led by the Department of Defense's Industrial Base Analysis and Sustainment team with strong support from the Army Combat Capabilities Development Command Armaments Center. These efforts help reduce defense industrial base risks and reliance on foreign sources such as China. How is the DOD helping incent and train the large prime contractors to take a similarly proactive approach to strengthen the critical material industry base?

Secretary BUSH. As part of a proactive approach, the Army is currently developing a Supply Chain Risk Management (SCRM) Directive that will emphasize the Orig-

nal Equipment Manufacturers' role in system supply chain management and addressing risk. Additionally, the Army directive will highlight the government's role in helping manage supply chain risk and the SCRM guidebook will provide recommendations for incentivizing vendors as part of the contract process during source selection. The Army is also working closely with our Office of the Secretary of Defense partners to address strengthening our industrial base using the Defense Production Act (DPA). We have been using DPA Title I to help reduce schedule time to speed up delivery of equipment and DPA Title III to enable critical production nodes to accelerate and expand delivery.

#### LONG-RANGE HYPERSONIC WEAPONS

13. Senator KING. Secretary Bush, how does the reported cancellation of the Air Force's Air-Launched Rapid Response Weapon program impact the Army's commitment to boost-glide systems like Long-Range Hypersonic Weapon that uses Common Hypersonic Glide Body?

Secretary BUSH. The reported cancellation of the Air Force's Air-Launched Rapid Response Weapon (ARRW) program has no impact on the Army's continued commitment to the Long Range Hypersonic Weapon (LRHW). The ARRW program employs a boost glide system unique to the Air Force and its platform, while the Army and Navy share a Common Hypersonic Glide Body for their partnered hypersonic efforts (Army's LRHW and Navy's Conventional Prompt Strike). Though different, the lessons learned from ARRW's development benefit the overall hypersonic enterprise, including the Army's efforts. Army remains on track to deliver the first prototype LRHW system by the end of fiscal year 2023.

#### QUESTIONS SUBMITTED BY SENATOR GARY C. PETERS

##### ROBOTIC COMBAT VEHICLE

14. Senator PETERS. Secretary Bush, since the Army chose a software acquisition pathway approach successfully enabling the incorporation of innovative commercial technology into the Robotic Combat Vehicle (RCV) program, will it consider a similar acquisition strategy for other Programs of Record in the near future? If so, which programs?

Secretary BUSH. Lessons Learned from the Robotic Combat Vehicle (RCV) program and software baseline architecture will be applied for future RCV upgrades. While the Army has not formally started similar programs for other platforms at this time, we are considering this pathway for developing next generation platforms like the Optionally Manned Fighting Vehicle.

##### OPTIONALLY MANNED FIGHTING VEHICLE (OMFV)

15. Senator PETERS. Secretary Bush, the Next Generation Combat Vehicles (NGCV) cross functional team is working to advance combat vehicle technology to improve survivability and lethality on the battlefield. The OMFV is a centerpiece of NGCV's work. Your budget exhibits for the OMFV program took a significant reduction in fiscal year 2024 (nearly \$250 million less than forecasted last year). I understand this has driven the program team to reduce prototypes from 11 to 7 per bidder. Are 7 prototypes enough to accomplish all the test objectives for this phase of the program?

Secretary BUSH. Seven Prototypes per bidder is sufficient to accomplish the program's objectives while improving affordability. The Optionally Manned Fighting Vehicle program will be able to complete all the test objectives for this phase with some adjustments to the test schedule.

16. Senator PETERS. Secretary Bush, will the Army still be able to award three contracts to three competitors as you have expressed is your intent for this phase, or do you intend to reduce to two competitors?

Secretary BUSH. The Optionally Manned Fighting Vehicle program is currently in Source Selection, so we cannot comment on that issue at this time.

##### TACTICAL WHEELED VEHICLES (TWV)

17. Senator PETERS. Secretary Bush and General Rainey, tactical wheeled vehicles modernization programs—like Family of Heavy Tactical Vehicles, Family of Medium Tactical Vehicles, and Joint Light Tactical Vehicle (JLTV)—with the latest advancements in payload, safety, and mobility are essential to supplying combat vehicles with fuel, ammo, and spare parts to take and control ground. In other words, TWVs are a critical backbone of the logistics needed to sustain and win a fight. I also un-

derstand that the Army is developing a new Cross Functional Team (CFT) focused on contested logistics. Will TWVs be a focus area of this new CFT?

Secretary BUSH and General RAINEY. As we look toward the future, multi-modal distribution is essential as well as reduction in supply requirements within the tactical force. No single domain of transport will meet the distribution requirements of the Joint Force. Another key to this problem is human-machine integration that may allow for reduced manning in multi-modal transport systems, providing reduced risk and higher efficiency to meet the Army and Joint Force supply requirements.

The Contested Logistics (CL) Cross Functional Team (CFT) does not yet have an approved portfolio, but we expect to have the portfolio approved in the coming weeks. Army Futures Command will assign three to five modernization efforts to the CL CFT, focused on tactical level logistics. Multi-capable or multi-modal distribution platforms, which includes tactical wheeled vehicles, is one area that is being considered as an area of focus for the CL CFT.

18. Senator PETERS. Secretary Bush and General Rainey, will future Army budgets start to reflect TWVs role as critical and primary enabling warfighting capabilities?

Secretary BUSH and General RAINEY. The Army is updating the Tactical Wheeled Vehicle (TWV) Strategy with expected completion next year. In fiscal year 2024, the Army is investing \$1.31 billion in the TWV fleet including the Family of Medium Tactical Vehicles, Family of Heavy Tactical Vehicles, Joint Light Tactical Vehicle, High Mobility Multipurpose Wheeled Vehicle, Palletized Load System and the development of the Common Tactical Truck. The Army will continue to invest in a mix of vehicles within the TWV fleet in future budget submissions as we build the Army of 2030 and design the Army of 2040.

Future Army budgets will continue to take a fiscally responsible approach to procurement that minimizes risk while providing balanced modernization to our units. We recognize the challenges of a contested logistics environment, and we address that challenge in the fiscal year 2024 budget submission by continuing investment in Army watercraft, modernized fuel and water storage and distribution systems, and enhancing our aerial delivery capabilities.

#### HIGH-MOBILITY MULTIPURPOSE WHEELED VEHICLE (HMMWV)

19. Senator PETERS. Secretary Bush, based on current Army budget justification materials, the Army will retain an extensive HMMWV fleet of approximately 55,000 vehicles, even after fielding 49,099 JLTVs, all of which must continue to be modernized and sustained. Due to an increase in near-peer competition from Russia and China, the Army recently changed its operational focus and is currently studying ways to modernize its tactical wheeled vehicle fleet. To date, the Army has not shared a compelling light tactical wheeled vehicle strategy for continued modernization of the HMMWV family of vehicles to meet significant mobility needs over the remainder of the vehicle's planned life. How is the Army assessing and managing risk in the light tactical wheeled vehicle industrial base?

Secretary BUSH. The Army exercises frequent and deliberate engagements with Industry to identify and address risks and issues that affect the industrial base with a focus on minimum sustaining rates, potential production breaks and supply chain impacts. The Army is balancing Tactical Wheeled Vehicle (TWV) modernization by prioritizing among Light Tactical Vehicle investments, maintaining warm Heavy and Medium Tactical Vehicle production bases, and by increasing competition across the industrial base for programs such as Joint Light Tactical Vehicle, Common Tactical Truck and electric Light Reconnaissance Vehicle. A healthy and competitive TWV industrial base is key to controlling costs, enhancing innovation and improving quality.

20. Senator PETERS. Secretary Bush, what factors are you using to evaluate the defense light tactical wheeled vehicle fleet, specifically HMMWVs?

Secretary BUSH. The Army is currently updating the Tactical Wheeled Vehicle (TWV) Strategy, which we expect to complete late next year. We intend to develop a flexible strategy that will allow the Army to adjust the TWV fleet as requirements change. Essential to establishing TWV fleet requirements is the approval of an Army Force Structure designed to meet the twin challenges of Multi-Domain Operations and Contested Logistics, especially with regard to INDOPACOM. The Army appreciates congressional support for High Mobility Multipurpose Wheeled Vehicle procurement and understands it will be an enduring vehicle in the Army inventory.

The Army will continue to invest in a mix of vehicles within the TWV fleet in future budget submissions as we build the Army of 2030 and design the Army of 2040.

#### INFANTRY SQUAD VEHICLE (ISV)

21. Senator PETERS. Secretary Bush, the benefits of commercial off-the-shelf technology have proven to be undeniably important as we work to achieve full Army modernization. The Infantry Squad Vehicle, which just achieved full-rate production, is a new platform that clearly demonstrates how leveraging Commercial-Off-The-Shelf (COTS) products leads to efficiency in schedule, procurement and cost. As the Army looks to modernize several fleets of older and less agile vehicles, including the HMMWV, is the Army considering taking the best of this COTS platform and leveraging its different variants beyond the traditional ISV-9 to procure one vehicle that can answer the call to many missions?

Secretary BUSH. Yes, the Army is considering other potential configuration and mission options to leverage the commercial off-the-shelf capability presented by the ISV-9 platform. These efforts are currently in the development stages.

#### QUESTIONS SUBMITTED BY SENATOR TOM COTTON

##### MUNITIONS

22. Senator COTTON. Secretary Bush, the Army's fiscal year 2024 budget request includes funds for 110 Precision Strike Missile Increment 1 (PrSM). Can you expand on what factors led Army to this number (production capacity, funding concerns, program status etc.)?

Secretary BUSH. The Army's fiscal year 2024 budget request increases production capacity by purchasing rate tooling and procures 110 Precision Strike Missiles. The quantity is derived as an estimate based upon the Army Cost Position approved at Milestone B in fiscal year 2021 and the expected missile unit cost in this phase of the acquisition lifecycle.

23. Senator COTTON. Secretary Bush, what is the current status of PrSM Increment 1 testing?

Secretary BUSH. Precision Strike Missile Increment 1 has completed six system level flight tests and achieved Technology Readiness Level six (TRL-6). The program is currently conducting hardware, software qualification and safety testing. The program will start a series of production qualification flight tests in 4th quarter, fiscal year 2023.

24. Senator COTTON. Secretary Bush, what is the expected timeline for testing completion?

Secretary BUSH. Precision Strike Missile Increment 1 developmental testing and subsystem (component) qualification is ongoing. This testing was schedule to be completed in fiscal year 2022, but guidance set and solid rocket motor qualification failures have delayed the activity. Subsystem qualification is scheduled to be completed in 4th quarter, fiscal year 2023, where the program will begin production qualification flight tests thru 1st quarter, fiscal year 2025, followed by Initial Operational Test and Evaluation to conclude in 3d quarter, fiscal year 2025.

25. Senator COTTON. Secretary Bush, what is the assessed date for making initial and low rate as well as full rate production decisions?

Secretary BUSH. We are producing Early Operational Capability (EOC) Increment 1 missiles with delivery beginning in 4th quarter, fiscal year 2023 (not low-rate initial production). There will be three more EOC lots ending in fiscal year 2027. A Full Rate Production decision review will occur after Milestone C in fiscal year 2025.

26. Senator COTTON. Secretary Bush, what does DOD assess as the risk of moving those points forward, and what factors contribute to that assessment?

Secretary BUSH. Accelerating the program is high risk. The current program plan has accelerated production activities to deliver EOC missiles concurrent with Production Qualification Testing (PQT) flight testing. Results of PQT testing will inform design updates needed for full rate production and achieve full materiel release. Known design updates include fuze and guidance set obsolescence (M-Code compliance) and fully incorporates cybersecurity/program protection requirements.

27. Senator COTTON. Secretary Bush, what is the current status of PrSM Increment 2 testing?

Secretary BUSH. In 2021, the Precision Strike Missile (PrSM) Increment 2 program procured common long lead PrSM Increment 1 hardware to stand up software, hardware, and model and simulation test facilities. In 2022, the program awarded contracts to begin transition and refactoring activities for sharing of Interface Control Documentation between the Army and the prime contractor. In March 2023, U.S. Army Combat Capabilities Development Command Aviation and Missile Center completed its final Science and Technology flight test effort of the Land-Based Anti-Ship Missile (LBASM) seeker on a surrogate missile (Tail-Controlled Guided Multiple Launch Rocket System) to prove out seeker component technologies. The PrSM Increment 2 development effort transitions and integrates the LBASM seeker into the PrSM form factor creating the Increment 2 missile. Initial system-level prototype flight testing begins late fiscal year 2024/2025 to support Technology Readiness Level 6 (TRL-6) in fiscal year 2026.

28. Senator COTTON. Secretary Bush, what is the expected timeline for testing completion?

Secretary BUSH. Precision Strike Missile Increment 2 anticipates the Initial Operating Test and Evaluation to complete in fiscal year 2031.

29. Senator COTTON. Secretary Bush, what is the assessed date for making initial and low rate as well as full rate production decisions?

Secretary BUSH. System level prototype flight test results will inform an initial Early Operational Capability production decision to meet the Army's July 2022 directed requirement to deliver Precision Strike Missile Increment 2 missiles in fiscal year 2027. The Army projects a Full Rate Production decision after a successful milestone C and Initial Operational Test and Evaluation in the 2032 timeframe.

30. Senator COTTON. Secretary Bush, what does DOD assess as the risk of moving those points forward, and what factors contribute to that assessment?

Secretary BUSH. Seeker technology for Precision Strike Missile (PrSM) Increment 2 needs to be matured, tested and qualified to ensure components will survive the PrSM environment. Acceleration of schedule greatly impacts confidence in the missile performance and reliability to meet the warfighter's needs. Currently, the program is assuming risk in rapidly delivering Increment 2 capability early by awarding an Early Operational Capability production contract with less than three prototype flight tests in the PrSM form-factor.

31. Senator COTTON. Secretary Bush, you mentioned a ramp up of production for PrSM; what does the procurement plan look like over the FYDP and what is the expected maximum production rate in the future?

Secretary BUSH. The program is investing funds to increase production rates to 300 missiles per year by fiscal year 2027. The production facility shares floor space with the Army Tactical Missile System (ATACMS) at the Camden, AR facility. An opportunity exists to increase production to 400 missiles per year after sunseting ATACMS. Additional production beyond 400 missiles would require a new facility.

32. Senator COTTON. Secretary Bush, can industry produce more than 110 missiles in fiscal year 2024 if requested? If so, how many? If not, what is the limiting factor?

Secretary BUSH. Yes, production capacity is 120 missiles. The delivery of missiles begins 30 months after production contract award.

33. Senator COTTON. Secretary Bush, what if any tradeoffs does the Department assess there are in increasing fiscal year 2024 production and what is the Department's view on those tradeoffs?

Secretary BUSH. The Army would accept more Early Operational Capability missiles that do not meet all requirements. Production Qualification Tests, safety tests, and operational tests will not be completed prior to production award.

34. Senator COTTON. Secretary Bush, when considering future development of PrSM increments, what factors is Army considering to determine inventory requirements?

Secretary BUSH. As future increments are developed the Army will update the Total Munitions Requirement (TMR) dependent on the needs of the Army at that time. Modeling and future operational needs will drive the quantities needed. Currently, approval of the fiscal year 2029 TMR is pending.

35. Senator COTTON. Secretary Bush, I remain concerned that DOD wastes funds on duplicative research efforts that do not transition to programs of record. Can you explain any currently implemented processes and mechanisms to evaluate which research efforts get funded?

Secretary BUSH. The Army's Science & Technology (S&T) program funds priority research and development efforts guided by the Army's Modernization Priorities and, ultimately, the National Defense Strategy. We balance near-and mid-term efforts in support of the Modernization Priorities with investments in the foundational science which forms the backbones of the capabilities our soldiers will need in the long term. The office of the Assistant Secretary of the Army for Acquisition, Logistics, and Technology provides oversight of the Army S&T enterprise and through the budgeting process helps to ensure our research programs address the highest priority Army needs, while avoiding any duplication.

36. Senator COTTON. Secretary Bush, can you explain any currently implemented processes and mechanisms to coordinate research efforts to avoid duplicative or redundant efforts?

Secretary BUSH. The Army, along with our sister Services, coordinate research activities through a number of mechanisms. For instance, the Department of Defense (DoD) Communities of Interest bring together the Army Science and Technology executing commands, Army Senior Research Scientists and Subject Matter Experts with their colleagues in the other Services and the Office of the Secretary of Defense to ensure research in areas of interest across the department are non-duplicative. Coordination is also carried out through the DOD Innovation Steering Group.

37. Senator COTTON. Secretary Bush, can you explain any currently implemented processes and mechanisms to track the Department's success in transition of research and development efforts to fielded combat capability?

Secretary BUSH. We have developed and are using a number of strategies to improve transition success, including identifying transition pathways early in the Science and Technology (S&T) process. This includes establishing stage gate reviews for S&T efforts where acquisition Program Managers are involved and get a vote; and using signed Transition Agreements between the S&T labs and Program Executive Offices to help hold our leaders accountable for successful transitions.

38. Senator COTTON. Secretary Bush, is there currently any tracking and analytics of how many research project transition to fielded capability and why certain projects failed to transition?

Secretary BUSH. We have recently begun a new effort to categorize and track transitions across three broad areas—transition of a technology to programs of record; transition to industry or another government agency; and transition of technical information to help inform requirements or specifications. By looking at transitions in a more holistic way like this, we are able to better quantify the value our S&T community is providing to the soldier and gathering this data has and will continue to help us refine our strategies for more successful transition.

39. Senator COTTON. Secretary Bush, can you explain any currently implemented processes and mechanisms to expedite development, testing, and fielding timelines?

Secretary BUSH. The Army feels that the use of rapid acquisition authorities such as Urgent Capability Acquisition (UCA) and Middle Tier of Acquisition (MTA) do expedite capability delivery to the warfighter. The use of Other Transaction Authority (OTA) agreements is another process the Army uses to accelerate the purchase of products and services supporting capability delivery to the warfighter.

40. Senator COTTON. Secretary Bush, can you explain any currently implemented processes and mechanisms to assess Department wide sources of delays to capability development and fielding and any steps to address such sources?

Secretary BUSH. The Army has two primary tools to assess sources of delays: integrated master schedules (IMS) and audits. First, each program manages to an IMS that is a risk-informed schedule of events intended to describe the program's path through development, testing and fielding. A program's scheduler identifies current or future irregularities or deviations from the baseline schedule that must be investigated and addressed. Once understood, the impact of these deviations can be forecasted. Second, the Army Audit Agency (AAA) conducts numerous audits every year. Many of the AAA audits cover portions of the Acquisition process that includes requirement generation, acquisition, contracting, budget/finance, testing and



sustainment. AAA provides an independent assessment of Department processes and identifies opportunities for improvement in their reports. As process re-engineering opportunities arise, working groups are formed to identify courses of action.

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QUESTIONS SUBMITTED BY SENATOR JONI ERNST

ENERGETICS

41. Senator ERNST. Secretary Bush, what safety and handling regulations contribute most to extended timelines in development and deployment of energetics compounds?

Secretary BUSH. A significant hurdle to development is meeting Military Standard (MIL-STD) 882 System Safety Requirements and achieving an “Improbable” risk level of one in one million. Essentially, this means it can be assumed an occurrence of a mishap may not be experienced in the life of an item. The Energetic Material Qualification Board (EMQB) process is a long driver of developmental timelines as it can take upwards of 2 years to qualify a new propellant. Environmental regulations also impact the timelines for the development and deployment of energetics compounds.

42. Senator ERNST. Secretary Bush, what revisions to these regulations would reduce those timelines consistent with a level of prudent risk?

Secretary BUSH. We do not believe revisions to safety and handling regulations are currently needed. The Army has the ability to accept a higher risk. This has been leveraged as necessary, but the goal for release of end items to U.S. Warfighters is an Improbable risk of one in one million. Regarding safety regulations, we would recommend that the DOD Explosives Safety Board (DDESB) dedicate support to key modernization efforts in the Industrial Base to facilitate discussions on waivers to requirements that significantly drive costs and schedules.

43. Senator ERNST. Secretary Bush, how would the energetics enterprise benefit from Office of the Secretary of Defense coordination of prototyping, regulation, assessment, resourcing, and related responsibilities in developing energetics materials?

Secretary BUSH. OSD’s efforts are best focused on the advocacy for energetics research and development within the Services, development of policy that supports innovation in energetics research and production, and resourcing energetics efforts at an appropriate level to ensure that the U.S. has the appropriate capabilities to defend the Nation. Decentralized efforts to identify and develop novel materials are necessary to ensure the diversity of thought needed to identify the best ideas and ensure focus on Service needs. OSD-level forums to share work within the Services and National Laboratories would also serve to align the broader community and facilitate collaboration.

44. Senator ERNST. General Rainey, would you agree that advanced energetics like CL-20 can provide improved munition range, lethality, and size?

General RAINEY. It is true that the incorporation of advanced energetics such as CL-20 can provide improved range, lethality, and allow for Size, Weight, and Power (SWaP) tradeoffs advantageous to the design of more accurate and effective weapon systems. The weapon designer’s challenge is to optimize the system as a whole vice only addressing energetic ingredients and formulations. Consideration must be given to system redesign, qualification, and inherent insensitivity required for safety of handling, supply vulnerabilities, and manufacturing. CL-20 based formulations in warheads can help U.S. forces in long range fires by enabling compact warheads that maintain the performance of larger payloads, providing SWaP space for enhanced propulsion. Investment in additional propulsion and dual-use technologies is required to achieve true weapon system overmatch. It has been calculated that CL-20 contains about 10 percent more explosive power than High Melting Explosives, or HMX, which has been the state-of-the-art solid energetic fills. However, broad use of CL-20 has been significantly cost prohibitive to date and additional formulation work is required to make it more producible in large quantities. Joint efforts are ongoing to develop new synthesis routes for CL-20 that will reduce the cost. In the near term, however, CL-20 is likely better suited for integration into smaller sized weapon and munition system applications that can take full advantage of its properties.

45. Senator ERNST. General Rainey, would advanced energetics like CL-20 help United States forces in long-range salvo exchanges against peer militaries?

General RAINEY. Salvos against a near peer adversary requires the U.S. to have a deep magazine of weapon systems to sustain an offensive, which in turn, necessitates increases in production capacity at affordable costs. Investments in advanced energetics like CL-20 can provide improvement to the capabilities of U.S. Forces in terms of long-range fires, but there must be corresponding developments in energetics synthesis for production as well as for the weapons systems holistically. Plans for 'drop-in' replacement of existing energetic ingredients in current munitions may not provide sufficient performance improvement to justify the expected significant cost increases. Additionally, inclusion of more powerful energetics such as CL-20 will require modification of other formulations and overall system designs required to offset the increased sensitivity, which in turn will drive substantial changes to the handling, storage, and transportation of U.S. munitions. Determining utilization of highly advanced energetic materials will require upfront time and resources to develop models for performance and risk characterization, develop holistic formulations for production, and qualify material enhancements in order to inform munition configurations and Service acquisition decisions to support salvo capability assessments.

46. Senator ERNST. Secretary Bush, what weapon systems are most likely to receive enhanced performance and lethality from adoption of CL-20 energetics compound as the foundational energetics source?

Secretary BUSH. Despite the technical development and investment still required, opportunities for leveraging CL-20's high energy and sensitivity include small form factor weapon systems requiring higher performance warheads and some small minimum signature rocket motors. CL-20 based energetic formulations are effectively applied to weapons where Size, Weight & Power (SWaP) is a key consideration (i.e., precision munitions). The use of CL-20 enables equivalent range and lethality in smaller packages, enabling space for guidance, navigation, and control (GNC) technologies to increase delivery accuracy and precision. As demonstrated in Ukraine, the small form factor Switchblade drone system effectively utilizes a CL-20 explosive warhead where lethality vs weight constraint is critical.

The development and incorporation of explosive ink formulations that leverage CL-20 to sustain detonation in advanced precision initiation systems have been shown to dramatically improve warhead performance. In addition, these unique initiation systems can enable tailorable and selectable effects warheads for versatile multipurpose munitions. EDF-11 is DOD qualified explosive ink for fuze safe-and-arm devices. Another opportunity for leveraging CL-20 is in Combined Effects Explosives (CEX) which are a unique category of Army formulations that provide both blast and metal driving performance.

Current predictions for CL-20 are that it could provide roughly a 10 percent increase in CEX performance over the current HMX based formulations for enhanced multi-purpose warheads. This is an example of a nearer term application of CL-20 for which the high cost is less restrictive to integrate the material within the system warhead design, and the benefit to a smaller munition lethality is significant. Broad utilization of CL-20 across larger weapon systems is currently limited by costs required to synthesize and manufacture this material, as well as the need to manage its high energetic sensitivity. This sensitivity increases operational risks to soldiers, increases risk of sympathetic detonation, and will drive additional logistics and transportation related considerations. Critical safety measures will need to be implemented as risk mitigation in integrated weapon systems design.

The energetics research community needs increased support for improved predictive models to characterize new energetic materials and structures, without which the Department can experience higher test costs and risk acceptance for uncharacterized material conditions. Introduction of higher energy materials without improved characterization further increases this risk, while the potential performance benefits support the need for continued research in advanced energetics to overmatch competitor nations.

**DEPARTMENT OF DEFENSE AUTHORIZATION  
FOR APPROPRIATIONS FOR FISCAL YEAR  
2026 AND THE FUTURE YEARS DEFENSE  
PROGRAM**

**WEDNESDAY, APRIL 26, 2023**

UNITED STATES SENATE,  
SUBCOMMITTEE ON AIRLAND,  
COMMITTEE ON ARMED SERVICES,  
*Washington, DC.*

**AIR FORCE MODERNIZATION**

The Subcommittee met, pursuant to notice, at 2:26 p.m., in room 232A, Dirksen Senate Office Building, Senator Mark Kelly (Chairman of the Subcommittee) presiding.

Subcommittee Members present: Senators Kelly, Blumenthal, Peters, Duckworth, Cotton, Fischer, Ernst, Scott, and Mullin.

**OPENING STATEMENT OF SENATOR MARK KELLY**

Senator KELLY. The hearing will come. Our witnesses today are here to discuss Air Force modernization. They are Hon. Andrew Hunter, the Assistant Secretary of the Air Force for Acquisition, Technology and Logistics, Lieutenant General James Slife, Deputy Chief of Staff for Operations, Lieutenant General Clinton Hinote, Deputy Chief of Staff for Strategy, Integration and Requirements, and Lieutenant General Richard Moore, Deputy Chief of Staff for Plans and Programs.

I want to extend a warm welcome and thank each of our witnesses for coming before the Subcommittee today and look forward to hearing your testimony. Last week, this Subcommittee heard from Army witnesses about the challenges in the Army modernization portfolio.

Today, as we finish our scheduled hearings before we markup the DOD [Department of Defense] authorization request, I look forward to hearing from our Air Force leaders about the challenges and the opportunities that we face in modernizing the Air Force. All budgets require careful tradeoffs, and we see that across the Air Force budget request.

The question before us today is how well the Air Force strategy in this budget matches our national defense strategy and related modernization imperatives. I am especially interested in hearing from the witnesses how the Air Force plans to manage its multiple modernization programs in ways that deliver the capabilities that our warfighters need to defeat our most capable adversaries in a timely manner.

We must do this while protecting our taxpayers' dollars and avoiding too much risk to meeting our combatant commanders' requirements. These should include the F-35 fighter, the B-21 bomber, KC-46 tanker, also a new program to procure the so-called Wedgetail aircraft to replace some of the E-3 AWACS [Airborne Warning and Control Systems] aircraft, and also the Advanced Battle Management System, or ABMS, which seeks to replace the J-8, or the E-8 JSTARS [Joint Surveillance and Target Attack Radar System] capability, and is the Air Force contribution to the Defense Department's joint all domain command and control program, JADC2.

Prompt development and fielding of ABMS and JADC2 are all the more important as the Air Force plans to divest of the E-3 and the E-8 JSTARS capabilities before we are able to field replacement capability. Two other areas I want to draw particular attention to are electronic warfare and combat search and rescue capabilities.

The Air Force plans to replace the current fleet of 14 Compass Call electronic aircraft with ten newer and more capable EC-37s. According to Air Force's plans, however, we only need six of these aircraft delivered by the end of the Future Years Defense Program (FYDP), and the Air Force must expedite the delivery of these critical assets, which gives us the ability to suppress enemy air defense through electronic warfare (EW), among other roles.

We also need to fully understand the role that Compass Call and EW would play in a potential confrontation with near-peer competitors like Russia and China, and whether the ten planned aircraft will be sufficient, or is it going to be necessary to expand that fleet as we continue to see the PRC [People's Republic of China] investing in their own EW capabilities.

Also, I want to emphasize the importance of modernizing and ensuring a robust combat search and rescue (CSAR) fleet of aircraft. This is a capability that makes a difference, literally the difference between life and death for downed pilots, troops, and civilians in dire situations.

As the 563d Rescue Group at Davis-Monthan Air Force Base in Tucson says, they are in the business of making sure someone's worst day isn't their last day. The Air Force's plan to truncate the HH-60 Whiskey program after fiscal year 2023 would leave the Air Force roughly 25 percent short of its original plan to modernize the CSAR Fleet.

So, we need to hear how this reduction in the inventories, you know, for these forces are going to affect the Air Force's ability to conduct CSAR operations in future conflicts, including how it might be impacted by new airframes like Armed Overwatch. The Air Force has been particularly aggressive in implementing accelerated acquisition authorities, including for major defense acquisition programs.

Notably, the Air Force began the B-52 re-engineering program under accelerated authorities but has agreed to shift that program back to the normal acquisition process at the next acquisition milestone review.

Congress has given DOD these new authorities but will continue to oversee acquisition activities to ensure that the Defense Depart-

ment uses its authorities appropriately. We need to ensure that these investments yield the capabilities our Nation needs to compete in any future conflicts, such as with hypersonic missiles, the next generation air dominance program, and others.

We can't ignore needs to recapitalize other existing capabilities that give our forces a competitive edge, such as our tanker forces and the fighter squadrons in our Air Guard and Reserve components that represent more than a third of the Air Force's combat power.

We will also take into account lower visibility, but high importance capabilities like the investments we need to ensure we have adequate training ranges for our fifth-generation fighters and forthcoming next generation systems.

These issues are a personal priority and I look forward to working with the Air Force on the way forward. Our witnesses this afternoon face huge challenges as they strive to balance the need to support ongoing operations and sustain readiness with the need to modernize and keep the technological edge over our adversaries that is so critical to successful military operations.

Specifically, our Air Force will bear a large share of the burden of implementing the National Defense Strategy. Perhaps that is part of the reason behind the Air Force's request of a \$12.4 billion budget increase this year—in this year's budget. There is no ignoring the fact that strategic competition with increasingly capable adversaries is a primary U.S. national security concern.

We need to look no further than the war in Ukraine to see that the world remains a dangerous place with actors who do not always act rationally. While Russia may have showcased its limitations, we must ensure our readiness to meet challenges that a more capable force could present in the future.

There are a number of other issues that we need to discuss, but in the interest of time, I am going to stop here and followup during our discussion. Again, I thank our witnesses for their service and for appearing before the Subcommittee. I will now recognize our Ranking Member, Senator Cotton, for his opening comments.

#### **STATEMENT OF SENATOR TOM COTTON**

Senator COTTON. Thank you, Mr. Chairman, and gentlemen, welcome. Thank you for your appearance here this afternoon. I am pleased to see that the Air Force has requested 72 tactical fighter aircraft for fiscal year 2024 and each fiscal year for the next 5 years.

Despite repeated underfunding by the current administration, this is a good first step toward repairing and modernizing our hollowed-out Air Force. But I am afraid it is the bare minimum our military actually needs as we try to deter a potential conflict with China. Our Air force, unfortunately, has been characterized by shrinking inventories and an aging fleet since the end of the cold war.

We should be producing F-35s at full rate production, ramping up F-15EX production, and proceeding quickly to the development of the E-7 aircraft. This is a matter of life and death for many of our Nation's airmen and perhaps one day for our Nation itself.

I look forward to hearing your plans to get all of these essential programs to where we need them to be despite the fiscal constraints you face.

Second, I would also like to understand how you are maintaining the lethality of the Air Force while we wait to field F-35s with Block 4 upgrades, along with the Next Generation Air Dominance Aircraft, Advanced Battle Management System, and collaborative combat aircraft.

I am concerned that while we are developing capabilities for the far future, we are not making enough near-term upgrades to aircraft that are currently in service and that will be in service for decades to come, like the F-16 and our fielded bomber fleet.

We are dangerously neglecting the upgrades that we need to fight tonight, as the saying goes. I am also not confident that we are prioritizing munitions production for the near or the long-term fight.

Finally, the Air Force is already in danger of becoming over-extended in a period of peacetime. I would like to know how you are planning to overcome existing gaps in capacity, while preparing to deter China and Russia without exhausting personnel and equipment.

I look forward to hearing what you have to say on these topics and others. Thank you again for your appearance.

Senator KELLY. Thank you. Senator Cotton. I will now recognize our witnesses for some opening remarks. Secretary Hunter.

**STATEMENT OF THE HONORABLE ANDREW P. HUNTER, ASSISTANT SECRETARY OF THE AIR FORCE FOR ACQUISITION, TECHNOLOGY AND LOGISTICS**

Mr. HUNTER. Well, thank you very much, Chairman Kelly, and Ranking Member Cotton, and Members of the Subcommittee for having us here to provide testimony on our fiscal year 2024 budget request.

Our budget request very much reflects our attempt to align our programs and our resourcing and our decisionmaking with fulfilling the strategy, the national defense strategy. That was absolutely our cornerstone in the fiscal year 2024 budget process, and developing a threat informed future Air Force equipped to win high and fight.

Last year, Secretary Kendall and General Brown outlined their seven operational imperatives that we must meet to succeed, and those operational imperatives absolutely drove everything in our fiscal year 2024 POM [Program Objective Memorandum] process.

They were the combined work of the entire Air and Space Force teams, combining the best insights of our operators, our analysts, and operational analysis teams in our acquisition enterprise, working together to identify initiatives and priorities. As a result of this analysis and work, we have over \$25 billion requested in fiscal year 2024 for OI related investments.

So overall, our fiscal year 2024 request balances investment in critically needed new capability with the recapitalization and modernization of our existing platforms, as you both identified as a priority. I am going to highlight just a few key investments in my re-

marks, and my colleagues will touch on several of the other issues you have raised.

Certainly, bomber modernization is a core of our investment portfolio. It is a critical year in fiscal year 2024, in our request for production of the B-21. We do have a substantial investment in the largest modernization of the B-52 fleet in the history of the fleet since it was first constructed and built. We are focused on the parts of our bomber force that are part of our enduring force.

I do want to say on E-7, we are working to field E-7 as rapidly as possible, and we appreciate the support provided by this Committee as well as others with resources and with helping us with the reprogramming request that allowed us to get started early on that program in fiscal year 2023.

The ABMS program, part of our broader command Control Communications Battle Management, or C3BM Initiative, where we have established a new PEO [peace enforcement operation] to bring focus to that effort, is a huge priority and we have a substantial resource request for that in fiscal year 2024 budget. We ask for your support.

I think I will—if you would, be okay with you, sir, I will probably touch on C-37 perhaps as we get into Q&A [questions and answers]. In terms of our top modernization priorities, obviously the F-35 is a cornerstone of our future fighter fleet, and we fielded nearly 400 F-35As today. We are prioritizing fielding the Block 4 capabilities, as was mentioned, and affordability of sustainment is also critical.

We are continuing to make positive progress on our F135 engine module repairs with great work by the team at Tinker, and with support from the Congress with resources. We have significantly improved that item, which was degrading our mission capable rates quite a bit.

We are establishing more realistic affordability targets which will allow us to better prioritize where we focus our resources to improve F-35 sustainment. While crude fighters remain the core of our U.S. Air Force combat power, as well—along with bombers, a centerpiece of our fiscal year 2024 budget is the Uncrewed Collaborative Combat Aircraft, which will provide new combat capabilities and bring cost effective capacity or affordable mass to our force.

The CCA [Collaborative Combat Aircraft] is the single largest operational imperative investment in our budget request, and that is above where we were last year, with over \$6 billion requested across the FYDP. In fiscal year 2024, we are investing more than \$460 million to rapidly begin development of the first CCA platform, and to leverage our extensive work on autonomy that will underpin the CCA capability.

We are establishing an operational experimentation unit to work with existing platforms and capable partner nations to prove out the concept of operations for CCA. As we modernize the bulk of our F-22 fleet, and transition from F-22 to NGAD [Next Generation Air Dominance], funds guarded from the divestment of the F-22 Block 20's are being reinvested in NGAD development across the FYDP, and the transition timeline is dependent on the progress of NGAD development efforts.

The Air Force is ensuring cost control in NGAD by driving continuous competition for air vehicles, mission systems, software, and by mandating the use of a government-owned reference architecture.

We are also changing the way we execute highly complex acquisition programs by taking a hands-on approach to digital engineering that accelerates prototyping, drives efficiencies in manufacturing, and reduces cost in operations and sustainment through the use of integrated digital environments for the design and management and sustainment of our systems.

The Fiscal Year 2024 President's Budget Request funding for aircraft design, development, test, integration of advance mission systems, co-authored development of the government's Agile Mission System Suite, Open Architecture, and Rapid Software Development for the NGAD program.

Due to the updated threat environment that was highlighted in both of the Chairman and Ranking Members opening statements, we have made the decision this year to modify our approach to tanker recapitalization, setting aside the three-phase approach that was envisioned in the early 2000's, in favor of prioritizing and accelerating the right capabilities to deliver fuel to the joint force.

The next generation air refueling system, or NGAS, will be an accelerated advanced air refueling system that meets the future needs of the joint force and the anticipated future contested battlespace. We will actively consider clean sheet purpose-built designs for NGAS, potentially with aircraft delivered in increments as part of the family of systems that allows the Department of the Air Force to remain flexible and responsive to the ever-changing threat.

The program is being designed to leverage continuous competition, which is critical to our approach to the program. We have begun preliminary work toward an NGAS analysis of alternatives that will be completed in fiscal year 2024, and inform NGAS requirements and development timelines, and delivery is expected to begin into the mid to late 2030's.

That delivery timeline does mean that there will be a period beyond the current F—KC—46 contracted deliveries and the beginning of NGAS, and we are working through and have included funding to request a tanker recapitalization effort that will cover those years to ensure continuous delivery of modernized and new tanker capability. Our work with the operational imperatives as just begun.

As we begin to implement the recommendations borne out of this work, we are continuing to examine other areas that are cross-cutting operational enablers, such as mobility, and. Mr. Chairman, to your point, also electronic warfare and EMSO, electronic manning spectrum operations.

So, we want to remain in dialog with you on those requirements, those emerging requirements, as we continue that work. This work will leverage and complement our work on NGAS and the next generation air mobility study as well to identify priorities that enable our future operations.

More than ever, it is critical the Department avoid the delays driven by a continuing resolution. The OIs include multiple new



start programs that must begin as soon as possible. We cannot cede any more time on a critical moment in the Air Force's transition to the future fight, and we look forward to working with you on that.

I want to close by asking your support for a legislative proposal that was recently transmitted by OMB to Congress that creates a new authority for the military services to respond to emergent technology advances and threats.

This authority will accelerate our ability to respond rapidly to a changing security environment with effective congressional oversight, and I think is directly responsive to some of the concerns that the Committee has identified. I look forward to working with you and thank you again for your continued support.

Senator KELLY. Thank you, Secretary Hunter. General Slife.

**STATEMENT OF LIEUTENANT GENERAL JAMES C. SLIFE,  
USAF, DEPUTY CHIEF OF STAFF FOR OPERATIONS**

Lieutenant General SLIFE. Chairman Kelly, Ranking Member Cotton, Members of the Subcommittee, thank you for inviting us here today to provide testimony on Air Force modernization in light of the budget request being considered by the Subcommittee. Secretary Kendall and General Brown have emphasized the need to make hard choices to modernize our Air Force.

The Air Force's component of the Fiscal Year 2024 Presidential Budget Request reflects a delicate balance between the requirements of the present and the modernization needed to ensure our sustained comparative advantage vis-à-vis our pacing challenges.

Over the last half century, our Air Force has faced four strategic inflection points at which the strategic environment or the threat changed rapidly and we had to adapt from the Air Force we had to the Air Force we would need.

The first of these was in 1973, at the end of the Vietnam War, and the accompanying need for modernization to face down the Warsaw Pact in Eastern Europe. The second was at the end of the cold war in 1991 and the rapid drawdown of the U.S. Military in response to a diminished global threat environment.

The third was the attacks on our Homeland in 2001 and the need to adapt to the needs for sustained counter insurgency, counterterrorism, and counterviolence extremist operations. We are in 2023 at a fourth strategic inflection point, one which finds us facing unprecedented set of challenges.

These challenges include disruptive technologies which don't fit neatly into our traditional views of armed conflict, a landscape in which our pacing challengers employ irregular warfare to counter our traditional strengths, the theft of our most sensitive intellectual, personal—intellectual property and personal data to be weaponized against us, and emerging domains of warfare which require new doctrines and capabilities to effectively leverage.

Just like the prior three strategic inflection points of the past half century, the one at which we stand today requires disruptive and uncomfortable change. But as hard as change may be, losing would be substantially worse.

We must change. The budget request being considered by the Congress represents positive change to address the security envi-

ronment we now face. I look forward to collaborating with this Subcommittee as you work to discern a wise response to the budget request before you today.

Thank you for your continued support and I stand ready to answer your questions.

Senator KELLY. Thank you, General. General Hinote.

**STATEMENT OF LIEUTENANT GENERAL S. CLINTON HINOTE,  
USAF, DEPUTY CHIEF OF STAFF FOR STRATEGY, INTEGRA-  
TION, AND REQUIREMENTS**

Lieutenant General HINOTE. Chairman Kelly, Ranking Member Cotton, and distinguished Members of the Subcommittee, thank you for inviting us here today to provide testimony on the Air Force's modernization efforts.

I would also like to thank each of you for your continued leadership and dedication to our national security. I am not sure if the Subcommittee is aware, but I have five more duty days in a career that spanned 35 years.

As you can imagine, that comes with many emotions. I feel honored and proud to have served, but I also feel this sense of urgency to push the changes that we need. I am thankful for the opportunity to discuss those changes with you at this important and timely hearing.

So, I just returned from the Air Force Academy, where I met with the future leaders of our Air and Space Forces. I know each of you has sent the best from your states to the academies, and I could not be more impressed with the quality of the young leaders getting ready to enter our Force. As I spoke with them, I was reminded of why we do what we do.

Our mission at Air Force Futures is to be the voice of tomorrow's airmen, to advocate for the capabilities and concepts the next generation of leaders will need to be successful. To do that, our Force will have to change, and change is hard.

During my career, I have served in the Pentagon under three very different administrations. Despite their differences, I found it remarkable that they arrived at three common conclusions.

First, China is the primary challenge. Second, we want to deter, and you deter by being ready to fight and win. Third, for too long, we have privileged current risk at the expense of future risk. That last part is important. Sometimes we think of the future risk as some sort of theoretical concept.

What it really means is that we are not handing off an Air force that wins to the next generation. I am not okay with that, and I know you aren't either. This budget helps us get to the change that we need. It is not perfect. No budget is.

But due to the leadership of Secretary Kendall and General Brown, we are seeing real progress in our operational imperatives and Force Design. It is not just about increasing capacity and divesting platforms that won't survive if we have to fight.

There is real and transformational change in this budget. We are shifting major resources to the new capabilities that will be new used in new ways. For years, we have needed a change-oriented budget. This is it. Thank you for the invitation and I look forward to answering your questions.

Senator KELLY. Thank you, General, and General Moore.

**STATEMENT OF LIEUTENANT GENERAL RICHARD G. MOORE, JR., USAF, DEPUTY CHIEF OF STAFF FOR PLANS AND PROGRAMS**

Lieutenant General MOORE. Thank you, Mr. Chairman. Chairman Kelly, Ranking Member Cotton, and distinguished Members of the Subcommittee, I echo the thanks of my colleagues and appreciate the opportunity to testify on this year's Defense authorization request for fiscal year 2024, as well as the accompanying Future Years Defense Program.

For over 70 years, we have provided air superiority to American Joint Forces, and our allies and partners, and they have rightly come to depend on it. Together, we survived and won the cold war and we fought the war on terror. But times are changing. While our attention was focused elsewhere, China was watching and learning.

Today, we are in the midst of an important transition from a legacy force built for counterinsurgency warfare to one built to deter Chinese aggression and to win against any peer competitor. As you heard from my colleagues, there is still much to do as we continue to posture force for future conflict.

What they have described is possible, but time is not on our side and we need your help. Fiscal year 2024 presents another opportunity for the Department of the Air Force and the Congress to work together so that we can remain the world's preeminent power projection force.

Through the lens of the Department's seven operational imperatives, we aligned our funding request to build a force that will give our adversaries serious pause. The fiscal year 2024 budget request is a strong example of the significant progress we are making toward closing key capability gaps, but the hard choices are not behind us.

Today, and through this budget cycle, we ask for your continued support as we seek to move away from several legacy platforms. In the fiscal year 2024 budget, you will see that we are once again requesting to divest our oldest F-22s, the Block 20's, which are not combat representative and never will be.

We proposed divesting our aging T-1 fleet as we move toward new and advanced undergraduate pilot training programs, and thanks to the support from Congress, we continue to progress on our A-10 and F-15C divestment and transition plans.

Legacy platforms such as these have served us well, but we must be disciplined in our decisions and focus our investments on what we need most. Our most valuable resources, manpower, money, and time, remain limited.

We cannot afford to stop short of achieving the force our Nation needs. Looking critically at ways to reduce our excess infrastructure to free people and resources for higher priority mission remains a focus of the Air Force.

The resources, at least as importantly, manpower, freed in these endeavors will directly contribute to bringing—to helping us realize our operational imperatives and to deterring aggression.

This, however, will take time, and as I have said, time is not on our side. American lives and those of our allies and partners rely on our ability to deliver air superiority, and we cannot fail in this endeavor.

Finally, I cannot emphasize enough the importance of an on-time budget. This is critical to keep modernization efforts on track and further discouraging our adversaries. Time wasted during a CR costs us a modernized future force.

We must act now to modernize in advance our capabilities, and we look forward to once again working with Congress to shape a lethal force that efficiently and affordably provides the most capable air power for our Nation.

I am honored to sit here with Honorable Hunter, General Hinote, and General Slife, and together, we look forward to answering your questions.

[The joint prepared statement by The Honorable Andrew P. Hunter, Lieutenant General S. Clinton Hinote, Lieutenant General Richard G. Moore Jr., Lieutenant General James C. Slife, follows:]

JOINT PREPARED STATEMENT BY THE HONORABLE ANDREW P. HUNTER, LIEUTENANT GENERAL S. CLINTON HINOTE, USAF, LIEUTENANT GENERAL RICHARD G. MOORE JR., USAF, LIEUTENANT GENERAL JAMES C. SLIFE, USAF

#### INTRODUCTION

Chair Kelly, Ranking Member Cotton, and distinguished Members of the Subcommittee, thank you for having us here today to provide testimony on the Department of the Air Force's Fiscal Year 2024 President's Budget (PB) request for Air Force modernization.

The United States Air Force is critical to our national defense. Our capabilities underwrite the entirety of the Joint Force. This is particularly true of the capabilities that are the purview of this Subcommittee and that we will discuss today.

The Department of the Air Force's fiscal year 2024 President's Budget Request is guided by the seven operational imperatives we must meet to win in the future fight which Secretary Kendall and General Brown outlined last year. Our budget request reflects our commitment to developing a threat-informed, concept-driven future Air Force. We have made significant progress in identifying the capabilities the Air Force will need to develop and field to prevail against our adversaries.

The Air Force is grateful for congressional support in fiscal year 2023, which allowed us to continue our pursuit of the critical warfighting capabilities needed to deter our adversaries and, if needed, prevail in combat. As we continue to modernize or recapitalize our force, we are eager for continued collaboration with Congress, industry, and the communities that support our Air Bases to ensure our Nation's security.

#### AIR FORCE THE NATION NEEDS

##### *Global Force Management*

The shift from 20 years of counterinsurgency operations in a permissive environment to strategic competition in a contested environment requires a cultural shift in how the Air Force organizes, trains, and equips its forces. Years of low-intensity conflict resulted in expeditionary taskings that came at the expense of long-term preparedness for major combat operations. The shift to strategic competition requires the Air Force to restore long-term sustainable readiness, modernizing our force structure, and mature warfighting concepts to posture the Air Force as a combat-credible and ready force to meet the demands of great power competition.

As we transition to the force the Nation needs, continued operational demand for Air Force capabilities combined with the National Defense Strategy (NDS) modernization priorities are driving difficult resource tradeoffs. To be ready and relevant for the strategic environment, we will transform the force, train the force, and retain the force all with the goal of achieving a task-organized combat power to achieve the NDS demands. We will balance the risk and demands of the current environment with the need to arrive in the future with the capacity and capability we require. It is essential to modernize and eliminate costly and less-capable legacy

systems. These actions will lower operating costs, improve availability, and provide essential capabilities to present a combat-credible and ready force to meet the demands of great power competition.

#### *Readiness*

Our readiness posture has been flat for over 3 years, and indicators suggest it will trend lower in the future as we continue to invest in overdue modernization. This condition represents the confluence of over 30 years of compounding issues. Continuous contingency deployments, delayed modernization, and personnel cuts have left the Air Force at a readiness deficit. This deficit cannot be recovered overnight and must continue to be balanced against the priority to modernize the force for the pacing challenge.

Building back readiness will take time and requires continued congressional support to make tough choices, including divestment of less relevant systems to maximize our resources for the Nation's defense. Modernization efforts will yield greater capability, but will also require investment in manpower, the sustainment enterprise, training infrastructure, and a healthy flying hour program. These investments will enable a force that is ready and capable of employing and winning with the advanced capabilities we are acquiring.

Limitations in physical airspace, advances in blue capabilities and tactics, challenges in developing realistic threat replication, and live-fly OPSEC concerns drive high-end advanced training to a virtual environment. Supplemental synthetic training allows the warfighter to train to fight in a secure, multi-level security environment providing relevant and realistic integrated training interactions for all aviators. The Joint Simulation Environment (JSE), developed by the USN and USAF, is the synthetic backbone integrating into the Virtual Test & Training Center, shifting focus of electronic warfare and high-end training and test to the synthetic environment.

In the live domain, our range priority remains our two largest ranges: the Nevada Test and Training Range (NTTR) and the Joint Pacific-Alaska Range Complex (JPARC). We will modernize NTTR and JPARC to enable warfighters to train for the peer fight in an all-domain contested environment against relevant and realistic threats. These ranges will contain training assets that can be continually upgraded at the pace of our adversaries. With current and programmed funding, NTTR and JPARC are projected to complete this modernization by fiscal year 2030. Additionally, by fiscal year 2032, we will upgrade six additional Primary Training Ranges to replicate the environment of an adversary that uses legacy aircraft and threat systems.

The Air Force is procuring the US Navy's Tactical Combat Training System II (TCTS-II)/P6 Combat Training System (CTS) to modernize our current P5 CTS capability. The TCTSII/P6 provides an ability to share encrypted data for training, allowing 4th, 5th, and Next Generation platforms to integrate in a way not currently achievable. The Air Force's version, P6, will offer fighter pilots real-time, enhanced assessments of training exercises, which will allow instructors to focus on learning points and maximize time for debrief.

#### *Rated Force Management*

The Air Force remains focused on improving overall pilot inventory and is committed to meeting the needs of both its airmen and the Air Force through continuous improvements to production, absorption, and retention of our Total Force pilots. In fiscal year 2022, the Total Force manned pilot shortfall increased leaving the Total Force short ~1,900 manned pilots. Most critical pilot shortages are in the Fighter and Bomber communities. The fiscal year 2022 Undergraduate Pilot Training (UPT) production decreased from fiscal year 2021 production and remained below the required 1,500 pilots per year. T-38 engine shortages, T-6, and T-38 CAD/PAD (ejection seat) inspection, and low Civilian Simulator Instructor influenced the decreased production.

It will take 10 years of producing to the Company Grade Officers (CGO) requirement to right-size the force while retaining Field Grade Officers (FGO) to right-shape the force of the future. To close the gap, we need to improve CGO manning through increased production capacity and training innovation, coupled with increasing retention to address pending FGO shortfalls due to past year-group underproduction. To that end, efforts to close the gap include redesigning training programs, improving simulator instructor manning, and integrating technology, all with the goal of creating a healthy aircrew ecosystem.

The Air Force is employing a four-part strategy to improve the pilot inventory by increasing production plant capacity to align with requirements (size of the force), reducing risk within the production plant, maximizing retention to meet FGO re-

quirements and mitigate previous underproduction (shape of the force), ensuring production & retention efforts deliver right size/shape of the pilot force (closed system).

AETC has several pilot training transformation initiatives to improve the quantity and quality of pilots produced. Initiatives include Accelerated Path to Wings, Helicopter Next, Civil Path to Wings, Air Mobility Fundamentals-Sim, Fighter/Bomber Fundamentals, Remote Sim Instruction. UPT now incorporates a spectrum of training devices, leading to more productive time airborne. The Air Force offers several incentives to recruit and retain including Direct Hire Authority, Recruitment, Relocation and Retention incentives, Special Salary Rates, Student Loan Repayment, Permanent Change of Station (PCS) assistance, and Training and Development Programs.

#### *Air Force Force Generation*

In November 2019, the Air Force began efforts to revise the USAF force generation model to more effectively present and subsequently report readiness of forces and capabilities to support the National Defense and National Security Strategies. The Air Force Force Generation (AFFORGEN) model replaces the Air Expeditionary Force construct with four, 6-month phases of readiness. The cycle includes: “available to commit” (a unit is deployed or ready to deploy at a moment’s notice), “reset” (airmen focus on family and individual training), “prepare” (unit preparation for a possible future deployment), and certify (focus on high-end, more intense, multi-unit training).

AFFORGEN will provide more predictability enabling airmen to train and deploy as a team. AFFORGEN is the Air Force’s sustainable, capacity-driven model for presenting forces to the Joint Force. AFFORGEN allows the Air Force to clearly articulate the service’s finite capacity and sustainable force offering to our consumers. By focusing on a capabilities-based sustainable force offering, our service can better manage the balance between generating ready forces and their consumption in support of global operations. The Air Force will review and iteratively update the AFFORGEN model to facilitate better readiness and performance in the high-end fight.

#### *Agile Combat Employment*

Changes to the modern operational environment and rapid technological improvements require the Air Force to adjust its scheme of maneuver. Our response to these challenges is to continue to refine the Agile Combat Employment (ACE) concept. ACE is the ability to quickly disperse and cluster tailorable force packages to a cooperative security location and conduct operations across all domains, while maintaining operational flexibility and increasing resiliency. The operational unpredictability of ACE will present our adversaries with multiple dilemmas and targeting challenges during both day-to-day competition and potential future conflict. ACE requires a change in how the Air Force thinks about and conducts operations within the modern environment.

Agile Combat Employment (ACE) disperses operations from large bases to smaller networks of locations to create dilemmas for the adversary’s targeting process. We are working on establishing enterprise-level requirements for training and certifying ACE-capable force packages. We are making construction investments in the European and Pacific theaters to support this concept’s development. DAF efforts with resilient basing, sustainment, and communications set conditions to achieve the Joint Warfighting Concept scheme of maneuver. DAF must invest in additional capabilities and formalize training programs to field an agile force that sets the theater and establishes distributed command and control.

#### CURRENT CAPACITY AND CAPABILITY

In line with the 2022 National Defense Strategy (NDS) guidance on future force design, the Air Force seeks to invest in technologies and field systems that are both lethal and survivable against tomorrow’s threats. Our greatest weapon system is the more than 333,000 airmen and guardians who proudly wear our uniforms. A critical need in transitioning to the high-end fight is assigning experienced pilots, maintainers, munitions specialists and support personnel to receive and operate the new platforms as they arrive at our bases. Ultimately, this means transitioning away from many legacy capabilities to free up manpower and resources to modernize and field more capable systems. We must modernize to address the emerging threat, which requires pivoting resources from our legacy platforms and weapons systems that are decreasing in relevance. If deterrence fails, our airmen must have the training, tools, platforms, and operating systems required to win.

### *Bomber Force Structure*

Our budget request supports the NDS call for continued modernization of the nuclear triad, to ensure a safe, secure, and effective nuclear deterrent to backstop our integrated deterrence approach. Air Force bombers anchor the air leg of the Nation's Nuclear Triad. They are also the essential element of the Nation's capability for conventional long-range strike, as well as the only strategic bomber among all U.S. Allies and partners, a key national security priority. As a unique national security capability, the B-21 represents the future of this bomber force along both dimensions. As modernization continues, the Air Force will gradually transition the current three-bomber fleet to a two-bomber fleet of next-generation B-21s and modernized B-52s to provide nuclear and conventional global strike options for decades to come.

#### *B-21*

The B-21 Raider will form the backbone of our future bomber force and is the centerpiece of the Secretary of the Air Force's sixth Operational Imperative. The B-21 underscores our national security as the most flexible leg of the Nuclear Triad and supports Combatant Commanders across the range of military objectives as both a nuclear and conventional bomber. The Fiscal Year 2024 President's Budget Request includes \$2.985 billion in Research, Development, Test & Evaluation (RDT&E) funding that continues to fund Engineering and Manufacturing Development. Additionally, the Fiscal Year 2024 President's Budget Request includes modernization activities focused on nuclear certification, Long Range Standoff (LRSO) weapon integration and other activities. The Fiscal Year 2024 President's Budget Request also includes \$2.332 billion in procurement funding to continue support to the program's transition toward low rate initial production. All EMD test aircraft are in various stages of assembly on the production line, which uses the same tooling processes and technicians who will build the production aircraft. The first B-21, unveiled in December 2022, was successfully powered-on and initial system tests of the aircraft are being conducted in preparation for first flight. The Air Force, in partnership with industry, has invested heavily in software integration labs, a flying test bed, digital tools and other risk reduction efforts to shift discovery early on in the program and will accelerate issue resolution as the program enters the flight test phase. First flight will be informed by events and data, and we anticipate it will occur in 2023.

In parallel, beddown preparations at Ellsworth Air Force Base (AFB), South Dakota, remain on-track. The Fiscal Year 2024 President's Budget Requests \$395 million to support one follow-on increment and two new military construction projects at Ellsworth AFB, and initiate planning and design for MILCON projects at Dyess AFB, Texas and Whiteman AFB, Missouri in support of beddown activities. The first B-21s are projected to arrive at Ellsworth AFB in the mid-2020's with base infrastructure ready to support. A second Environmental Impact Study continues with an estimated completion in fiscal year 2024 to assess the final two basing locations.

The Air Force is committed and on track with respect to its key performance parameter of building B-21s with an average procurement unit cost of no more than \$550 million (Base Year 2010) / \$692 million (Base Year 2022), assuming a minimum fleet of 100 aircraft.

#### *B-52*

While the last B-52 Stratofortress entered service in the Air Force in 1962, we expect to continue operating the B-52 beyond 2050. We will continue to invest in modernization programs to keep the platform operationally relevant. Major modernization efforts include the Commercial Engine Replacement Program (CERP), the Radar Modernization Program (RMP), integration of LRSO nuclear air-launched cruise missile, and installation of Advanced Extremely High Frequency (AEHF) secured satellite communication capabilities.

The Air Force's number one priority for the B-52 is to ensure platform viability through 2050 and the CERP enables us to achieve this goal. CERP will replace legacy engines (TF33-PW-103) with new military-derivative commercial Rolls Royce F-130 engines. It is important to note that CERP is more complex than just a standard commercial engine refit. CERP includes new engines, flight systems, and cockpit throttles and displays. In September 2023, the CERP program will seek a Milestone B decision, which will authorize the program to enter the Engineering and Manufacturing Development phase and set the acquisition program baseline.

The RMP is also necessary to ensure viability through 2050 and modernize the current Strategic Radar (AN/APQ-166), which is based on 1960's technology modified in the 1980's. In 2024, the RMP will begin aircraft modifications to support development testing and a Milestone C decision. Overall, the RMP program will up-

grade all 76 B-52 aircraft with new radar systems to perform mission-essential navigation and weather avoidance functions.

Finally, integration of the LRSSO weapon and AEHF terminals will bolster the B-52's role in the airborne leg of the Nuclear Triad. AEHF integration is on-track for an early fiscal year 2024 Milestone B decision, which will establish the program's baseline supporting secure nuclear communications on the B-52 platform.

#### *B-1*

The Fiscal Year 2024 President's Budget Request focuses resources on sustaining and modernizing the remaining combat-coded B-1s, after retirement of 17 B-1s as authorized in fiscal year 2021. We will ensure the B-1s remain lethal and viable until B-21s are operational in sufficient numbers.

The B-1 is the Air Force's threshold platform for the Long Range Anti-Ship Missile (LRASM). Integration of this weapon, coupled with the B-1's long range, high speed, and large payload capacity, postures the B-1 for an important role in any conflict in the Indo-Pacific region.

Last, the B-1 will serve as a test platform for hypersonic weapons through additional congressional funding in fiscal year 2022 and fiscal year 2023.

#### *B-2*

In fiscal year 2024, the Air Force will continue work to ensure the B-2 remains effective until the B-21 is operational. The Air Force has de-scoped the Defensive Management System modernization program because delays in the effort would have limited the operational utility of the system by the time it would have fielded. Instead, we are replacing the B-2's unsustainable cathode ray tube displays with modern sustainable displays as part of the B-2 Displays Modernization program.

In fiscal year 2024, we are continuing B-2 modernization programs including Adaptive Communication Suite upgrades, enhancement of the Identification Friend or Foe (IFF) system, integration of hardware upgrades for employment of the B61-12 nuclear weapon, software upgrades to allow the B-2 to carry the extended range variant of the Joint Air-to-Surface Standoff Missile (JASSM-ER), and the Radar Aided Targeting System (RATS) software upgrade to improve the navigational hand-off to the B61-12 nuclear weapon in a GPS-degraded environment. Finally, the B-2 will continue sustainment efforts for the Low Observable Signature and Supportability Modification effort to improve aircraft maintainability and availability and ensure the aircrew and maintenance training systems remain aligned with the aircraft.

#### *Fighter Force Structure*

The Air Force must continue to evolve its fighter force to meet the pacing challenge posed by China and the acute threat posed by Russia and ensure the capability and capacity to meet worldwide demands today. Extensive wargaming and analysis show that TACAIR modernization is critical to provide the Joint Force with the capability and capacity needed to deter and prevail against future aggression. The threat will not allow the Air Force to pause in place. We have critical investments across the 4th, 5th, and 6th generation fleet to meet the pacing challenge.

In realistic budget projections, we must balance the need for high end technology with affordable capacity. To attain a fighter fleet that matches capability and capacity of platforms and weapons to mission requirements, the Air Force is transitioning our fighter fleet from seven platforms (F-35, F-22, F-16, F-15EX, F-15E, F-15C, A-10) to four platforms (NGAD, F-35, F-15EX, F-16). Next Generation Air Dominance (NGAD) & F-35 Block 4 are required to address the most challenging missions assigned to the fighter force.

On the path to achieving the desired future fighter fleet, the Fiscal Year 2024 President's Budget procures 72 fighter aircraft in fiscal year 2024, the largest single year fighter procurement since 1991. Divestment of legacy systems is critical to building a relevant future force capable of addressing the Department's pacing challenge. Resourcing those future capabilities and modernizing our remaining force demands both money and manpower currently tied up in our legacy systems and platforms. To transition fighter resources to a modernized, lethal force, the fiscal year 2024 budget proposes a net change of minus 89 fighter aircraft in fiscal year 2024, and a total FYDP net change of minus 425 fighter aircraft.

#### *Next Generation Air Dominance (NGAD)*

The NGAD Family of Systems is vital for securing air superiority for the U.S. Air Force. The NGAD Family of Systems will replace the F-22 in the Air Force Future Fighter Force Structure. Funds garnered from the divestment of F-22 Block-20's have been reinvested in NGAD development across the FYDP. The transition timeline from F-22 to NGAD is dependent on the progress of NGAD development



efforts. The NGAD Family of Systems consists of the NGAD crewed platform, uncrewed Collaborative Combat Aircraft, the Agile Mission Suite open architecture, and advanced mission systems. Analyses, development, and prototyping within the NGAD program leads to enhancements in survivability, lethality, persistence, and interoperability. The NGAD crewed fighter platform enables counter-air missions in highly contested environments, thwarting advances in enemy anti-access capabilities, and allowing the joint force to seize and exploit the initiative. This new fighter will field novel technologies that could change the way we fight but, more importantly, it will have the ability to rapidly adapt to emerging technologies and threats to keep pace with our adversaries. The Air Force ensures cost control on NGAD by driving continuous competition for air vehicles, mission systems, software, and by mandating the use of a government-owned reference architecture. We are also changing the way we execute highly complex acquisition programs by taking a hands-on approach to digital engineering that accelerates prototyping, drives efficiencies in manufacturing, and reduces costs in operations and sustainment. The Fiscal Year 2024 President's Budget requests \$1.93 billion in fiscal year 2024 to fund aircraft design, development, test, and integration of advanced mission systems, cooperative development of the government's Agile Mission Suite open architecture, and rapid software development to enable cutting-edge electronic warfare and communications techniques.

#### *Collaborative Combat Aircraft (CCA)*

While the NGAD crewed fighter will give us an exquisite edge, it will be unaffordable to purchase these in sufficient quantities to provide the necessary mass on a threat-relevant timeline. CCA provide affordable and capable mass by teaming with the NGAD crewed platform as well as numerous other current and future generation platforms across the joint force. CCA development unites the parallel disciplines of autonomy and low-cost air vehicle construction previously funded under Air Force Research Laboratory's (AFRL) Skyborg Vanguard program. We have learned a great deal through analysis and experimentation in the Skyborg program, and in our ongoing concept refinement studies. The Fiscal Year 2024 President's Budget requests \$392 million for competitive concept refinement, design, and development of a first-generation CCA. Additionally, we request \$119 million to fund supporting activities that will accelerate platform-agnostic autonomy development, and explore the optimal operations, maintenance, and sustainment concepts for these novel platforms. Our extensive analyses show that CCA are a force multiplier that will allow us to achieve air superiority affordably and at scale. Continued investment in the NGAD Family of Systems will ensure our ability to secure the air against proliferating threats to support future joint operations anytime, anywhere.

#### *F-35*

The F-35 is the cornerstone of our future fighter fleet and we have fielded nearly 400 F-35As to date. In the near-term, we must concentrate on achieving the F-35 capability needed for advanced threats. While the F-35 is a formidable platform today, the Air Force must confront key development, interoperability, sustainability, and affordability challenges to acquire, upgrade, and retrofit the F-35A fleet to obtain the minimum required capability and capacity as quickly as possible within projected resource constraints. First flight in a Technical Refresh-3 (TR-3) configuration occurred earlier this year and is the foundation for Block 4. Block 4 modernization with TR-3 hardware ensures F-35 relevance in the high-end fight against China or Russia in 2025 and beyond.

The Fiscal Year 2024 President's Budget requests 48 F-35A aircraft, an increase of five aircraft from the fiscal year 2023 enacted position. The Air Force is prioritizing investments in the F-35 fleet, seeking modernization, infrastructure, and advanced weapons in this budget request. Commitments include \$6.0 billion in procurement, \$1.3 billion in development and \$2.3 billion to fund necessary sustainment. This increased investment ensures maximum future viability of the fleet. Propulsion and cooling development investments contained in the Fiscal Year 2024 President's Budget request will help ensure capability enhancements will continue to be viable for the platform while also reducing lifetime sustainment costs. In addition, the fiscal year 2024 President's Budget funds progress toward on-time nuclear operational certification of the F-35, which will ensure the continued credibility of our extended deterrence commitments to our NATO and Indo-Pacific allies.

The Air Force continues to make progress in addressing readiness challenges with the F-35A and stand-up depot capacity to improve future sustainment. We are recovering from the F-135 MICAP issue with today only five aircraft awaiting engines, power modules, or fan modules. The two largest sustainment cost drivers the Air Force controls are the number of aircraft possessed and programmed flying

hours, and the major cost categories are parts, people, energy, and consumables. We are establishing more realistic affordability targets which will allow us to better prioritize Air Force resources. The Air Force is continuing work with the F-35 Joint Program Office, Navy, and industry to identify and evaluate opportunities to increase depot repair capacity and further reduce the cost of materiel and manpower.

The Air Force is committed to reducing F-35 costs for both production and sustainment as well as improving mission readiness. Additionally, the F-35 program is moving toward a supply chain, demand reduction Performance Based Logistics (PBL) contract at the end of 2023 to prioritize availability and affordability outcomes across the F-35 enterprise. In response to the Fiscal Year 2022 NDAA Section 142, the Air Force is working with OSD, the Department of Navy, and the F-35 Joint Program Office (JPO) to assume greater management, planning and execution roles of the F-35 sustainment functions to further reduce sustainment costs.

#### *Advanced Engine Development*

The Air Force is working with the JPO to implement the F-35 enterprise decision to move forward with the F135 Engine Core Upgrade and accompanying Power and Thermal Management System upgrade. While Operational Analysis determined that the AETP three stream adaptive cycle engines provide substantial F-35A operational performance advantages, the JPO-led BCA determined that the F135 Engine Core Upgrade will restore engine life and prevent degradation for all three F-35 variants and partner nations at the lowest cost. Data from testing of the AETP prototype adaptive cycle engines is informing design activities for the Next Generation Adaptive Propulsion (NGAP) program as are the validated advanced engine technologies. NGAP engines leverage the AETP technology suite and deliver capability enabling propulsion options for the most highly contested environments. Competitive NGAP prototyping, funded in this budget request, preserves key advanced engine design and manufacturing skills required to maintain U.S. strategic advantages in propulsion over competitors.

#### *F-15*

Our F-15C fleet is aging, with two-thirds of the fleet past its designed service life. The 179 F-15C/Ds in the Air Force inventory will reach the end of their design service life in the next five to 7 years, and our analysis shows additional service life extension programs are not cost effective. The Fiscal Year 2024 President's Budget Request divests 57 F-15C/Ds from the active fleet in fiscal year 2024. We have already started to replace this fleet with a modernized successor by purchasing the F-15EX. The Fiscal Year 2024 President's Budget Request procures 24 F-15EX aircraft and funds weapon system investment at \$2.9 billion. Notably, the Air Force remains fully committed to developing advanced 5th and next generation capabilities and the F-35. The F-15EX is a complementary step to both F-35 procurement and NGAD development and helps mitigate capacity risk while balancing near-term readiness concerns.

The Fiscal Year 2024 President's Budget requests \$406.5 million in fiscal year 2024 to continue modernization efforts to ensure the F-15E Strike Eagle remains viable to the 2030's. Modernizing the F-15E with Early Passive Active Warning Survivability System (EPAWSS), also used on the F-15EX, demonstrates our commitment to building a more lethal Air Force. EPAWSS will allow the F-15E/EX to survive to attack targets in high threat environments.

#### *F-16*

Our more than 600 post block F-16s will provide affordable capacity for the next 15 or more years, in both competition and more permissive combat environments. We are beginning to transition away from our oldest, early block F-16s, with a reduction of 49 planned through fiscal year 2025. We will continue to modernize the late block F-16s we keep as our "affordable capacity" fighter into the 2040's. The F-16 investment strategy funds modifications for the most capable, late block aircraft to ensure they can operate and survive in today's threat environment. The Fiscal Year 2024 President's Budget requests \$405.32 million in fiscal year 2024 to continue these modernization efforts. This includes continuing the Service Life Extension Program comprising 12 structural modifications, affecting 450 aircraft, as well as several avionics capability upgrades including the Active Electronically Scanned Array (AESA) Radar upgrade. The new radar replaces the current mechanically scanned radar, with greater ability to detect, track, and identify low-observable, low-flying, and slow-flying targets. This Joint Emerging Operational Need (JEON) of 72 radar systems is complete and fielded. The underway Phase 3 will install a total of 443 radar systems across the Combat Air Force (CAF), Air Force Reserve Command (AFRC), and Air National Guard (ANG), bringing critical capabilities to the F-16 platform to meet aerospace control alert mission requirements to properly de-

fend the Homeland against modern threats. These radars continue fielding in fiscal year 2024.

#### *F-22*

F-22 Block-20's are now in their third decade and have the highest operating costs of any Air Force fighter. They are not combat representative, meaning they do not possess the combat capabilities resident in the F-22 Block-30/35. Remaining committed to ensuring air superiority for the Joint Force in the highly contested environment against a peer adversary, it is imperative to modernize the F-22 to preserve its advantages while concurrently developing NGAD. To resource both F-22 modernization and NGAD, the Air Force maintains our fiscal year 2023 position to divest the oldest and least capable F-22s (32 F-22 Block-20's) in fiscal year 2024. In the near term, three heavily modified F-22 Block-20's will be kept for testing. Additionally, the Fiscal Year 2024 President's Budget request includes \$1.62 billion in fiscal year 2024 for modernization efforts essential to gain and maintain air superiority against evolving threats. The Rapid Prototyping and Rapid Fielding efforts follow an agile acquisition construct and combine former TacLink16 and Tactical Mandates (TACMAN), Low Drag Tanks & Pylons, Electronic Protection, and GPS M-code programs to deliver slices of each capability on an annual release cadence for capabilities as they mature. Future modernizations will continue to leverage the agile construct as a vehicle to rapidly prototype and iteratively field critical enhancements with capabilities delivered to the fleet in order to ensure "first look, first shot, first kill" capability in highly contested environments. Funds garnered from the divestment of F-22 Block-20's have been reinvested in NGAD development across the FYDP. The transition timeline from F-22 to NGAD is dependent on the progress of NGAD development efforts.

#### *A-10*

In the Fiscal Year 2024 President's Budget Request the Air Force seeks to continue the drawdown of the A-10 fleet by divesting a total of 42 A-10's in fiscal year 2024. Aircraft will come from Davis-Monthan AFB (-36) and Moody AFB (-6). A controlled drawdown will allow the Air Force to continue transitioning its fighter fleet and maintenance personnel to an advanced force capable of defeating the threats outlined in the National Defense Strategy and National Security Strategy. Failure to execute the A-10 divestment as planned will inject unacceptable risk to the Air Force's ability to deter or defeat a peer adversary.

#### *Trainers*

##### *T-7A*

The T-7A Advanced Pilot Trainer replaces AETC's existing fleet of 422 T-38C aircraft with 351 aircraft and associated simulators, ground equipment, spares, and support equipment. The T-7A will provide student pilots with the skills and competencies required to be better prepared to transition into 4th and 5th generation fighter and bomber aircraft. The T-7A program was designed for the Air Force using a digital engineering approach, which offers significant benefits particularly during the design and build phases. Digital engineering reduces development times, lowers production costs, and allows greater collaboration between the Air Force and industry in the development and production of the initial T-7 prototypes. Embracing modern digital engineering practices reduced design costs, reduced production support manpower, improved first time quality by 75 percent, and reduced assembly hours by 80 percent through task reduction. The Fiscal Year 2024 President's Budget request continues the program's Engineering and Manufacturing Development (EMD) and early aircraft flight test efforts, ensuring we meet the 2027 Initial Operational Capability and 2036 Full Operational Capability milestones. Rollout of the first EMD T-7A occurred in April 2022 and First Flight is anticipated in 2023. The Air Force is working with Boeing to enable the T-7A program to achieve Milestone C in the 2nd quarter of fiscal year 2025. While these dates are later than the initially proposed milestones for T-7, they represent realistic and achievable timelines which can sustain our training capability through the T-38 to the T-7 transition.

##### *T-1, T-6, and T-38*

The Air Force is continuing investment efforts in its trainer platforms, including critical modernization programs for the T-6 and T-38 fleets. The T-1A fleet is scheduled for divestment between fiscal year 2023 and fiscal year 2026. Training of future Mobility pilots, currently being conducted in the T-1A aircraft, will be accomplished in the T-1A simulators using procedures developed from the Pilot Training Next Innovation Cell at Air Education and Training Command (AETC). The T-6 continues mitigation efforts for the aircraft with the On-Board Oxygen Generation

System (OBOGS) to improve the safety of pilot training and address Unexplained Physiological Events (UPEs). To date, mitigation efforts have resulted in an 82 percent reduction in UPEs. Expected completion of Enhanced OBOGS mitigation efforts is mid-fiscal year 2024. In fiscal year 2023, the T-6 will start a major Avionics Replacement Program (ARP) to address Diminishing Manufacturing Sources and Material Shortages (DMSMS) for critical avionics issues. For the T-38, modifications are also required to sustain and upgrade the fleet until the T-7A delivers, including avionics, Pacer Classic III, Talon Repair, Inspections, Maintenance, and front canopy replacement programs. The fiscal year 2024 PB requests \$14.3 million, \$39.7 million, and \$129.8 million for the T-1, T-6, and T-38 fleets, respectively.

#### *Munitions*

Extensive wargaming and analysis demonstrate that the Air Force requires an affordable mix of both air-to-air and air-to-surface weapons that can deliver the capacity and capability needed to maintain a competitive advantage over the pacing challenge. The Fiscal Year 2024 President's Budget request modernizes munitions and directly supports and influences the DAF's seven Operational Imperatives.

The Air Force shaped its investments based on the optimal mix of munitions, aligned with current OSD and Joint Staff planning guidance. In fiscal year 2024, the Air Force is focused on critical high performance, standoff, and precision strike weapons to deliver munitions with increased range and precision effects in contested environments against high-value targets. The Air Force made investments to expand production capacity, procure munitions at favorable economic rates, and strengthen the industrial base. The munitions portfolio includes three new multi-year procurement programs, which aim to maximize weapon production efficiency with a buy-to-budget procurement approach. The Air Force will continue to collaborate with partner nations and the Navy to share cost and technology; this partnership is critical in countering naval air defense threats. The Fiscal Year 2024 President's Budget request for Norway's Joint Strike Missile represents such a partnership to procure an operational long range, air-to-surface, precision guided survivable system that enables the U.S. to hold maritime targets at risk in contested environments and increases our maritime strike capacity. The Air Force continues to respond to current operational demands and ensuring we are prepared to defend against more advanced threats. Doing so requires advanced weapons capabilities and the Fiscal Year 2024 President's Budget request reflects the Air Force's plan to continue investing in those areas, specifically with the Joint Air to Surface Stand-off Missiles (JASSM), Long Range Anti-Ship Missile (LRASM), and the Advanced Medium Range Air-to-Air Missile (AMRAAM). These weapons provide unique and necessary capabilities for the highly contested environment.

#### *JASSM*

JASSM is the premier air-to-ground, low observable missile for defeating threats in highly contested environments and is the weapon of choice for a future fight against peer adversaries. Through the use of multi-year procurement authority, the Air Force requests \$1.6 billion in fiscal year 2024 that includes an economic order quantity to increase inventory and ramp up to maximize production rates. Additionally, the President's Budget requests \$77 million in facilitization funding, which increases the JASSM production line from 550 to a capability to produce 810 missiles per year in fiscal year 2026.

#### *LRASM*

LRASM, produced in the same facility as JASSM, is a Navy developed purpose-built anti-ship missile particularly critical for the future fight in a maritime environment. The Fiscal Year 2024 President's Budget requests \$188 million to procure 27 missiles and increases LRASM procurement in the future years defense program by utilizing Multi-year procurement authority. Included in the Navy's Fiscal Year 2024 President's Budget request is a \$53 million facilitization request to increase LRASM production from 120 to a capability to produce 240 missiles per year in fiscal year 2026.

#### *AMRAAM*

The Air Force also leverages Multi-year procurement authority in its Fiscal Year 2024 President's Budget request for AMRAAM as we continue to invest in the next generation medium and long-range air-to-air missiles. AMRAAM continues to be the Air Force's premier beyond visual range, all weather, launch and leave medium range air-to-air missile. The Air Force is requesting \$701 million for 457 missiles, which includes an economic order quantity that supports the Multi-year procurement strategy to maximize production capacity through the future years defense program.

#### *Stand-In Attack Weapon (SiAW)*

The Air Force continues to invest in technology to counter future peer threats. Continued development of the Stand-in Attack Weapon (SiAW) delivers a strike capability to defeat rapidly relocatable targets, a hallmark of the highly contested environment. SiAW is the munition that gives the F-35 unique air-to-surface capabilities in the high-end fight for the Joint Force. The Fiscal Year 2024 President's Budget requests \$298 million for SiAW development and prototyping, along with \$42 million in procurement funding to field Advanced Anti-Radiation Guided Missile Extended Range (AARGM-ER) on the F-35 as an interim capability.

#### *Hypersonic Weapons*

Hypersonics are being designed to rapidly overcome the tyranny of distance in the Pacific and enable the U.S. to hold high value, time-sensitive targets at risk in contested environments from standoff distances within the region. When integrated with the broader munitions portfolio, their cost and complexity make hypersonic weapons a high-end, low volume capability, which, in concert with a wider weapon force mixture, are key to providing a war-winning force.

#### *HACM*

The Fiscal Year 2024 President's Budget Request of \$382 million for the Hypersonic Attack Cruise Missile (HACM) development allows the Air Force to mature HACM to critical design, continue model-based engineering activities, and mature the digital ecosystem to complete critical design analysis. It also allows for design verification testing, execution of initial qualification testing, procurement and building of initial flight test hardware and aircraft integration assets, and maturation of Weapon Open Systems Architecture (WOSA) compliance evaluations. All of this is in preparation for flight test in fiscal year 2025, which enables production article procurement by fiscal year 2027.

#### *ARRW (AGM-183A)*

The Fiscal Year 2024 President's Budget requests \$150.3 million of RDT&E funding to complete the Air-launched Rapid Response Weapon (ARRW) AGM-183A rapid prototyping program and flight testing. It is important that we continue to test in order demonstrate that the system can meet the requirements for which it was designed so we can consider procurement options, including our overall munitions mix, in the future.

#### *Tanker Fleet*

Near-peer competitors have made significant advancements that threaten today's tanker fleet and potentially forces them to operate farther away from their area of responsibility. The stacked demand of global operations requires a set number of air refueling tankers with specific connectivity, survivability, and agility capabilities, generating at mission capable rates to meet timelines and win the fight. The Fiscal Year 2024 President's Budget Request modifies the Air Force's tanker recapitalization approach from the three-phase approach envisioned in the early 2000's (i.e., KC-X, which later became KC-46A, KC-Y, and KC-Z) to a more agile, threat-informed approach prioritizing and accelerating the right capabilities to deliver fuel to the fight.

#### *Accelerating to Next Generation Air-refueling System (NGAS)*

The Air Force is establishing and accelerating the Next Generation Air-refueling System (NGAS) to meet the future needs of the joint force and continue uninterrupted tanker recapitalization during the gap period between the end of the KC-46A production contract and delivery of the first NGAS aircraft.

NGAS will be an accelerated, advanced air refueling system that meets the future needs of the joint force. It will deploy advanced technologies and permit air refueling in the anticipated future contested battlespace. We are considering clean sheet, purpose-built designs that address projected future threats and delivers upgraded capabilities in multiple tankers, delivered in increments. The program is being designed to leverage continuous competition.

The Fiscal Year 2024 President's Budget requests \$7.9 million for an NGAS Analysis of Alternatives (AoA), led by Air Mobility Command, which will shape requirements and determine the technology development timeline. This analysis will be informed by a wide array of industry capability providers. The results of the NGAS AoA may indicate a need for more than one type of aerial refueling platform, matching capabilities to scenarios and using a family of systems approach, which allows us to remain flexible and responsive to the ever-changing threat. We plan to build substantial vendor pools to assist us in developing a future aerial refueling family of systems leveraging competition throughout the effort.

Delivery of the first NGAS increment is expected in the mid-to-late 2030's. That will leave a gap period between the delivery of the final KC-46A under the current production contract and delivery of the first NGAS aircraft. During this gap period, we must continue to modernize our tanker fleet through continued recapitalization with a limited number of air refuelable, commercial derivative, limited development tankers. The tankers procured during this gap period will have capabilities similar to the KC-46A with Pegasus Advanced Communications Suite (PACS) also referred to as Block 1, plus potentially a digital backbone capable of Advanced Battle Management System (ABMS)/Joint All-Domain Command and Control (JADC2) integration, with minimal connectivity, survivability, and agility capabilities.

Continuous tanker recapitalization until NGAS delivers is critical to the warfighter because the KC-135 has inherent operational limitations. It is less survivable because it lacks the connectivity capability of the KC-46A. Further, it is not air refuelable and can only refuel either boom or drogue operations on a mission, lacking the flexibility of a KC-46A. It is not cost effective to add these capabilities to the aging KC-135 fleet in order to raise the mission capable rates required to compete in a contested environment. Under the previous tanker recapitalization strategy, the Air Force planned on procuring a fleet of 140–160 commercial-derivative aircraft following the completion of the KC-46A program. With NGAS accelerating from the 2050's to the mid/late 2030's, the Air Force will likely procure fewer recapitalization tankers before NGAS. Our goal is to use tanker recapitalization prior to NGAS to replace 15 KC-135s per year as they retire with tankers that have similar capabilities to the KC-46A.

The Fiscal Year 2024 President's Budget Requests \$4.97 billion over the Future Years Defense Program for tanker recapitalization. This includes \$526 million for RDT&E, \$136.2 million for initial spares, and \$4.3 billion for procurement of aircraft beyond the current KC-46A production contract, with deliveries in the fiscal year 2029 to fiscal year 2030 timeframe. It is estimated we will have final Joint Requirements Oversight Council (JROC) validated requirements in the 3rd quarter of fiscal year 2023. Upon final Business Case Analysis (BCA) completion based on the JROC validated requirements, the Air Force will determine its acquisition strategy for tanker recapitalization, which is likely later this year.

#### *KC-46A*

The KC-46A continues to deliver greater operational readiness, flexibility, connectivity, and survivability to the Global Reach mission. One hundred twenty-four production aircraft are on contract, with 15 more planned in fiscal year 2024.

Since January 2019, 68 KC-46As have been delivered among five Main Operating Bases (MOBs): McConnell AFB, Kansas, Altus AFB, Oklahoma (Formal Training Unit), Pease Air National Guard Base, New Hampshire, Seymour Johnson AFB, North Carolina, and Joint Base McGuire-Dix-Lakehurst, New Jersey. Travis AFB, California, is expecting its first delivery in 2023.

The Air Force continues to work with Boeing to correct deficiencies with the Remote Vision System (RVS) and stiff air refueling boom. We are committed to ensuring these deficiencies are properly addressed without undue burden on taxpayers or warfighters. The RVS 2.0 solution and start of fleet retrofit are now scheduled in the 1st quarter of fiscal year 2026. The design solution to resolve the stiff boom deficiency is expected to complete in the 2nd quarter of fiscal year 2025 with fielding start in mid-fiscal year 2026.

Despite its current deficiencies, the KC-46A is safe to operate (adhering to flight manual cautions provided to our operators). Since Summer of 2021, through its Interim Capability Release Process and associated rigorous assessment, AMC has made KC-46As available for training and worldwide operational employment and taskings to alleviate pressure on legacy tanker fleets and potentially allow legacy tanker retirements. AMC has cleared KC-46As to carry out operational refueling on nearly all required aircraft, except for the A-10 and any receiver aircraft without an approved technical compatibility assessment. Since January 2019, KC-46As have delivered over 95 million pounds of fuel through over 70,000 safe and effective aerial refueling contacts.

The Fiscal Year 2024 President's Budget Requests \$124.7 million in RDT&E to support the ongoing KC-46A Engineering and Manufacturing Development and post-production modification efforts, to include the boom telescope actuator redesign that resolves the stiff boom deficiency, continued test and receiver aircraft certifications, development for training system required updates, and increased effort on the KC-46A Block 1 program. Additionally, the budget requests \$3.1 billion to fund procurement of 15 aircraft in Production Lot 10 and the associated support costs, along with increased depot standup and transition to organic sustainment efforts.

*KC-10 and KC-135*

The Fiscal Year 2024 President's Budget request will continue KC-135 modernization efforts to extend its capability into the 2040's, including the Block 45 program, the Rudder Position Indicator program, the Aero-I Satellite Communications (SATCOM) program, Real-Time Information in the Cockpit program, Mobile User Objective System program, Comm 2 Crypto and Data program, High Frequency Modernization program, and the Center Console Refresh program.

This is the final year of operations for the KC-10 with all aircraft planned to retire at the end of fiscal year 2024. Service bulletin funding is necessary to ensure FAA certification.

The Fiscal Year 2024 President's Budget Request supports the Fiscal Year 2023 NDAA air refueling minimum inventory of 466 tanker aircraft. In fiscal year 2024, the Air Force is retiring the remaining 24 KC-10's as they are replaced by the KC-46A. These retirements are critical in providing the flexibility to free up resources and manpower to modernize and fund the Air Force's future tanker fleet.

*Executive Airlift**VC-25B*

The VC-25B program will replace the U.S. Air Force Presidential VC-25A fleet, which faces capability gaps, rising maintenance costs, and parts obsolescence as it ages beyond 30 years. Modifications to the 747-8 aircraft began in February 2020 in San Antonio, Texas, and include an electrical power upgrade, dual auxiliary power units that are usable in flight, a mission communication system, an executive interior, military avionics, a self-defense system, autonomous enplaning and deplaning, and autonomous baggage loading.

The Fiscal Year 2024 President's Budget requests \$490.7 million to continue Engineering and Manufacturing Development, aircraft modifications, developmental test and evaluation, and other product support activities.

*C-40*

The Fiscal Year 2024 President's Budget reflects \$8.9 million in procurement funding to address satellite communications system upgrades, cryptographic modernization, and low-cost modifications and service bulletins in order to provide secure and reliable government air transportation.

*Strategic and Tactical Airlift**C-5*

Current C-5 Super Galaxy investment programs focus on fleet obsolescence, maintainability, and safety of flight. The Fiscal Year 2024 President's Budget requests \$24.4 million in procurement funding, predominantly for communications, navigation, surveillance/air traffic management (CNS/ATM) and core mission computer/weather radar (CMC/WxR) system equipment. CNS/ATM upgrades include modifications to Automatic Dependent Surveillance-Broadcast (ADS-B) Out required for global airspace compliance. The CMC/WxR effort replaces an antiquated radar system and upgrades the core mission computer processor to meet the demands of future software modifications. Production funding also includes procurement of training systems.

Additionally, the Fiscal Year 2024 President's Budget requests \$26.5 million RDT&E funding to support replacement of the Multifunctional Controls and Displays (RMCD). This comprehensive sustainment modification mitigates the obsolescence of the current control and display units and increases capacity for future technology integration into the cockpit. There is an additional \$3.0 million to begin initial capability studies for a concept preliminarily termed the Next Generation Airlift (NGAL) that will determine requirements and technologies available to support a next generation airlift family of systems.

*C-17*

The C-17 is the only aircraft in the Air Force inventory that combines tactical capability with strategic range to operate from austere airfields. The fleet of 222 aircraft provides our Nation with unmatched flexibility to conduct theater and inter-theater direct delivery, airdrop, aeromedical, and special operations airlift missions. Agile and efficient software and hardware updates ensure timely readiness, safety, and capability improvements as this premier airlift platform contributes to our national security objectives.

The Fiscal Year 2024 President's Budget requests \$140.6 million in procurement funding to continue critical modifications to the C-17 fleet. The majority of this is allocated to procuring Beyond Line of Site (BLOS) communication equipment, but also includes a filter fire mitigation for the On-Board Inert Gas Generating System,

Large Aircraft Infrared Countermeasures defensive systems, and Replacement Heads-Up Display (RHUD). The BLOS program integrates aircraft avionics as well as back-end mission communications to utilize both military and commercial satellite systems, extend communication ranges, and ensure aircraft complies with air space mandates. The RHUD modification effort addresses obsolescence of the current C-17 heads-up display and improves the system's availability, reliability, and maintainability. Production funding also includes procurement of training systems.

Fiscal year 2024 RDT&E funding will finish testing of the BLOS program and begin the Flight Deck Replacement program. The Flight Deck Replacement program will develop, integrate, and retrofit the C-17 cockpit to replace four obsolete parts and provide an open systems architecture that enables future modular "plug and play" expansion of capability.

#### *C-130H/J Fleet*

The C-130 fleet consists of C-130H and newer C-130J aircraft, as well as special mission aircraft (AC/LC/EC/MC/HC/WC-130's). C-130Hs and C-130Js are medium-size transport aircraft capable of completing a variety of tactical airlift operations across a broad range of missions. The fleet delivers air logistics support for all theater forces, including those involved in combat operations.

#### *C-130H*

The Air Force continues to modernize the C-130H fleet to ensure aircraft safety, airspace compliance, and aircraft systems modernization. Our C-130H Center Wing Box replacement program breathes new life into some of our hardest flown aircraft, enabling them to continue to safely operate well into the future. The C-130H Avionics Modernization Program (AMP) Increment 2 improves the C-130H fleet maintainability and reliability by providing a new digital avionics suite and mitigating obsolescence and diminishing manufacturing source challenges. In addition, the Air Force plans to upgrade the C-130H fleets with a Mobile User Objective System. The Fiscal Year 2024 President's Budget requests \$5.4 million in RDT&E and \$71.9 million in procurement funding to support the C-130H fleet.

#### *C-130J*

The Air Force has partially recapitalized the C-130H fleet with C-130Js, which also support our Special Operations missions by providing Special Forces with extra weight carrying capacity, longer range, and better fuel efficiency. These special mission variants of the C-130J conduct weather reconnaissance (WC-130J), search and rescue (HC-130J), and special operations (MC-130J and AC-130J). The Air Force has multiple modification efforts for the C-130J, including Center Wing Box replacement, Large Aircraft Infrared Countermeasures, communications upgrades, and Block 8.1. The C-130J Block 8.1 modernization program, currently in production, delivers new communication and data link capabilities, a modern flight management system, and other key capabilities to the field. In addition, the Air Force plans to upgrade the C-130J fleets with a Mobile User Objective System and a Second-Generation Anti-Jam Tactical Ultra High Frequency Radio satellite communication system to ensure we maintain key communication links anywhere in the world.

The Fiscal Year 2024 President's Budget Requests \$19.1 million for C-130J RDT&E and \$156.2 million for C-130J procurement and modification efforts. The Fiscal Year 2024 President's Budget also requests funding for HC/MC-130J RDT&E and HC/MC-130J procurement and modification efforts.

#### *Rotorcraft*

##### *CV-22*

The CV-22 is the Air Force variant of the joint V-22 tilt-rotor aircraft. It allows for long-distance, terrain following, vertical lift operations with increased survivability and is the only high-speed vertical lift platform in the Air Force inventory. The Fiscal Year 2024 President's Budget requests \$175.1 million to continue modifications to increase CV-22 fleet reliability, capability, and survivability. Investments in these areas will ensure the CV-22 fleet remains ready, reliable, and relevant in the future.

##### *HH-60G and HH-60W (Combat Rescue Helicopter)*

The Air Force is the only Service with a dedicated force organized, trained, and equipped to execute theater-wide Personnel Recovery. The HH-60G fleet currently accomplishes this mission by conducting day, night, and marginal weather Combat Search and Rescue (CSAR) operations to recover isolated personnel in hostile or permissive environments. The HH-60W will replace the SH-60F in this role. To date, Congress has provided resources to procure 85 HH-60W, which is sufficient capacity for the missions envisioned for this force. No additional HH-60 aircraft were re-



quested in the Fiscal Year 2024 President's Budget. The Fiscal Year 2024 President's Budget requests \$4.2 million and \$330.8 million for the HH-60G and HH-60W programs, respectively.

#### *MH-139A*

The MH-139A program is a critical element of the Air Force nuclear enterprise reform initiative and also supports operational airlift within the National Capital Region. This program will deliver up to 80 replacement helicopters, training devices, and associated support equipment to replace the legacy UH-1Ns. The Fiscal Year 2024 President's Budget requests \$274.9 million for the MH-139 program, which will fund Low-Rate Initial Production for seven aircraft, training devices, and support equipment. It also funds the MH-139A Performance Enhancements and Product Improvements Program, which is the development of solutions to provide capability issues identified during the development and test of the MH-139A. This includes solving communication and weapon systems challenges, improving mission planning compatibility, resolving usability concerns, and other critical capabilities. The first six aircraft continue to be used to finalize test and development, while producing the first Low-Rate Initial Production lot of 13 aircraft procured in fiscal year 2023.

#### *Intelligence, Surveillance, and Reconnaissance*

The Air Force is focusing Intelligence, Surveillance, and Reconnaissance (ISR) resources on systems that provide high quality tracking and target coordinates, establish meaningful data nodes to give tactical direction, and optimize weapon systems with information that matters in the most useful formats, at speed and scale. To meet the challenges of a highly contested environment, the future ISR portfolio will consist of a multi-domain, multi-intelligence, collaborative sensing grid that uses advanced technology. The end goal is a ready Next Generation ISR Enterprise possessing a decisive advantage for the warfighter while remaining competent across the entire spectrum of conflict.

The ability to win future high-end conflicts requires accelerating investment to transition our ISR force structure into a connected, persistent, and survivable force. To achieve this, we must move away from expensive legacy systems that offer limited capability against future competitors. The Fiscal Year 2024 President's Budget request takes further steps toward repurposing, retooling, automating, and stabilizing the force to ensure the ISR Enterprise can achieve this vision within the next decade.

#### *MQ-9*

The Fiscal Year 2024 President's Budget request of \$178.7 million will continue MQ-9 fleet modernization efforts aimed at providing needed capabilities to the Combatant Commands. To date the MQ-9 fleet has flown over three million hours, with the vast majority of those hours supporting combat operations. This level of warfighter support is facilitated by an agile acquisition strategy, creating flexibility to quickly add new requirements.

The Air Force continues to right-size the fleet for current requirements, while focusing on future priorities. In fiscal year 2024, the remaining 48 MQ-9 Block 1 aircraft will be divested from the fleet and finalize transfer of 10 aircraft to the Marine Corps. The Air Force will begin to remove high time Block 5 aircraft toward the end of the FYDP; however, the remaining fleet will continue to meet the required force offering.

MQ-9 modernization efforts include the continued development of MQ-9 Multi-Domain Operations (M2DO) capability upgrades that will keep the fleet relevant. Upgrades in the M2DO configuration include Anti-jam GPS, Command and Control Resiliency, Enhanced Power, Link-16, and an effective and reliable open systems architecture.

#### *RQ-4*

The RQ-4 Global Hawk remotely piloted aircraft system provides high altitude, long endurance, all weather, wide area reconnaissance and surveillance. The Fiscal Year 2024 President's Budget request of \$1 million will maximize Block 40 utility through the remainder of the Global Hawk service life and maintain its ISR capabilities.

The Air Force plans to divest Block 40 in fiscal year 2027, as we continue to develop space-based Ground Moving Target Indicator (GMTI) to meet Combatant Commander's needs in accordance with the NDS. The reduced investment in the RQ-4 also enables the Department to better align resources with the NDS.

### *EC-37B COMPASS CALL*

COMPASS CALL is the Air Force's only wide-area, standoff, Airborne Electromagnetic Attack (AEA) Command and Control Warfare/Information Operations weapon system. The COMPASS CALL program is currently undergoing a re-host effort to transition the capability from the EC-130H to the EC-37B in order to maintain U.S. Electromagnetic Spectrum (EMS) Superiority in future conflicts. Ten EC-37B aircraft have been procured, to date, and are at various stages of modification, with limited fielding for training only in fiscal year 2025, and initial operational fielding in fiscal year 2026.

With the Fiscal Year 2024 President's Budget, the Air Force will be focused on continuing Developmental and Operational Test for the rehosted EC-37B capability, as well as continuing development of the mission system upgrade for the fielding of System Wide Open Reconfigurable Dynamic Architecture (SWORD-A) capabilities. The open and agile architecture of SWORD-A will enable a more rapid response capability against emerging threats and will be included on aircraft number six through ten initially and then to the first five aircraft as an upgrade modification.

#### *E-3 Airborne Warning and Control System*

Despite modernization efforts, the aging E-3 Airborne Warning and Control System (AWACS) offers limited operational utility in contested conflicts. The Fiscal Year 2024 President's Budget includes a resourced plan to replace the E-3 expeditiously to address this capability gap. Pursuant to the Fiscal Year 2023 NDAA, the Air Force begins divesting the first 13 E-3 AWACS aircraft in fiscal year 2023. This fleet reduction allows the Air Force to concentrate resources and improve E-3 aircraft availability rates, while efforts to procure E-7A are underway. Full fleet divestment is currently scheduled to occur by fiscal year 2029; therefore, most E-3 modernization programs are being terminated except mandated requirements for crypto and communication systems as well as safety of flight efforts. Keeping any number of the E-3s beyond the current DAF plan will not change the capability to address the "bathtub" because of the increasing sustainment and readiness challenges. The Fiscal Year 2024 President's Budget request divests two E-3s in fiscal year 2024 reducing the fleet from 18 E-3s in fiscal year 2023 to 16 E-3s by the end of fiscal year 2024. The Fiscal Year 2024 President's Budget request of \$849 million funds these efforts to maintain existing AWACS Battle Management and Command and Control capabilities.

#### *E-7A*

The E-7A program replaces the E-3 AWACS. It will enable the long range kill chain by delivering the ability to detect and track highly maneuverable, small radar cross-section airborne targets (modern and emerging threats); enabling greater airborne battlespace awareness with its precise, real-time air picture of sufficient quality to control and direct individual aircraft under a wide range of environmental and operational conditions. It will also mitigate reliability, operational availability, maintainability, and sustainability issues. These enhancements are made possible by state-of-the-art radar capabilities including beam steering, sector staring, and much faster target revisit rates that translate into better target detection and tracking of modern threats, as well as more robust Electronic Protection not possible with the mechanically scanned radar on the E-3 AWACS. The Fiscal Year 2024 President's Budget Requests funds to continue the rapid prototyping of the E-7A weapon system. Rapid prototyping includes development efforts to ensure compliance with U.S. cyber security and program protection standards; development efforts to ensure navigation and communication systems comply with GPS M-Code and Narrowband SATCOM mandates; design and build-out of contractor and government System Integration Laboratories supporting development, integration, and test activities, and provide analysis and products supporting future requirements and airworthiness certification. The Fiscal Year 2024 President's Budget request of \$681 million funds these continued efforts to develop the first two E-7A aircraft.

#### *Connecting the Joint Force*

The Air Force continues to work closely with the other services, the Joint Staff, and OSD to drive implementation of Joint All-Domain Command and Control (JADC2). The Department of the Air Force established a new PEO for Command, Control, Communications, and Battle Management (C3BM), which is leading the integration of command and control and battle management functions across the Department of the Air Force to ensure our planned capabilities deliver the C2 capabilities supporting the joint force. The cornerstone of this effort is the DAF Battle Network, including the Advanced Battle Management System (ABMS), which creates

decision advantage by delivering critical information and capabilities to warfighters and operators at multiple echelons.

Operationally optimized ABMS/JADC2 is one of the Secretary of the Air Force's operational imperatives and is foundational to many other operational imperatives. Within the ABMS portfolio, DAF PEO C3BM is pursuing multiple interconnected investments: digital infrastructure, aerial networking, software and applications, and architecture and systems engineering focusing on closing the right kill chains and delivering near-term operational capability. The Architecture and Systems Engineering (ASE) team within DAF PEO C3BM drives mission integration to enable warfighter capabilities for resilient decision advantage. Its primary product is engineering data to drive decisions on effective and efficient integration of the DAF Battle Network across the Joint Force. DAF PEO C3BM is working as the Integrating PEO to ensure Air Force and Space Force systems have seamless interoperability and compatibility to meet the JADC2 concept.

Driven by strategic requirements approved by the Chief of Staff of the United States Air Force and the Chief of Space Operations, DAF PEO C3BM has identified DAF Battle Network core and connected programs across the acquisition community, while also continuing to execute the ABMS portfolio. The Fiscal Year 2024 President's Budget request of \$500.6 million will enable ABMS to remain on track to deliver initial capabilities such as the Cloud-Based Command and Control (CBC2) tactical C2 software to multiple Air Defense Sectors, as well as multiple digital infrastructure efforts for software-defined wide area networking and deployable edge solutions for battle management teams at multiple echelons.

#### CONCLUSION

Thank you again for the opportunity to testify. We look forward to working with this Subcommittee to ensure the Department of the Air Force maintains the necessary military advantage to secure our vital national interests and support our allies and partners in fiscal year 2024 and beyond.

Senator KELLY. Thank you, General. I am going to turn it over to Ranking Member Senator Cotton for his questions first, and I will be back.

Senator COTTON. But I will be in charge until then—  
[Laughter.]

Senator COTTON. General Moore, with the Air Force being plagued by underfunding, shrinking inventories, and aging aircraft, can you explain a little bit how the situation has impacted your ability to focus on both modernization and also the current requirements to fight tonight?

Lieutenant General MOORE. Yes, Senator. As you rightly point out, there is certainly a balance between current risk and future risk. We have endeavored to balance what needs to be done to provide a modern force, as well as what it takes to remain ready today.

We have received over the last several budget cycles great support from this committee and others to move past the kinds of legacy force structure that aren't supporting our current operations needs.

It isn't just the dollars that are freed up by moving away from legacy platforms. One must divest an entire squadron of F-16s to buy a single F-35, or an entire squadron of KC-135s to buy a single KC-46. It isn't an issue of economics.

Every bit as important as the dollars, is the manpower that is involved in maintaining and flying legacy force structure. We need to transition that to, as you mentioned in your opening statement, the force structure that you see in procurement in this FYDP.

There will be some manageable risk to near-term ability for capacity, we will say. But there is no zero-risk solution. There is no way to make any kind of transition without taking risk. We have

to balance near-term risk and future risk, and we think we have done that in our budget submission.

Senator COTTON. General Hinote, would you like to speak to that question? I saw you nodding vigorously on a few occasions.

Lieutenant General HINOTE. Yes, sir. Ranking Member Cotton, thanks for the question. One of the things I think I can say about this budget that makes me feel more confident than ever is I think we have actually started to move the big money to the future.

I would have told you before, I felt like we had not had been able to do that for lots of different reasons. So, I think you are seeing quite a big change in the 1924 budget going toward the future capabilities, and that has me thinking we got that balanced much more correct.

Senator COTTON. Okay. General Slife, if I did not see you nodding vigorously, but I didn't see you rolling your eyes or expressing any other opinion. Would you like to express one verbally?

Lieutenant General SLIFE. Well, Senator, thank you. What I would offer—I spend the bulk of my days working these current operations issues, and the demand from the combatant commands is insatiable. They all want more Air Force.

But the problem is that unless we can articulate the risk and capacity of our Air Force to the joint force, we will always, as General Hinote said, privilege present risk at the expense of future risk.

I am excited about the progress we have made in our service force generation model, which is allowing us to articulate risk and capacity a little better, which in turn preserves the force's readiness, so that as we modernize, we have the force as ready as possible for today.

Senator COTTON. All right, and, Mr. Hunter, anything to add? Batting cleanup?

Mr. HUNTER. Yes, I would just I agree with my colleagues and I would say I think the key enabler for us in the Department of the Air Force in arriving at what I think was a balanced solution, a way to balance that risk was the fact that it was done as an enterprise.

That we had all of the various aspects, the operational community and the major Combatant Commands, with the Chief, and with the Secretary, and with the Secretariat, and with the acquisition, the expertise that all these elements bring, including my own acquisition organization, to bear on saying, how do—you know, what is the reasonable risk we can take in current ops?

What is a reasonable program we can put forward to buy down future risk that we can resource and that is realistic, and drive that a solution that everyone could sign up to.

Senator COTTON. All right. Thank you. I know that you have done the best you can under very difficult circumstances, but I think the Air Force requires close attention by the committee this year in the defense bill. I want to dig a little bit further now in my time left and in the next rounds on some of these programs.

The Air Force has stated that collaborative combat aircraft, also referred to as CCA, are a key component of future force designed to counterbalance the rising costs of new fighter aircraft, allowing the Department to procure a large fleet at a lower cost, unmanned wingmen to offset our adversaries' growing arsenals and increased

survivability of manned tactical fighter fleets. It has been explained that these unmanned systems will be controlled by manned aircraft.

I would like to know if the Department is coordinating the required mechanisms for that control across the manned aircraft fleet, and what is the status of that coordination? Mr. Hunter, would you like to start.

Mr. HUNTER. Yes, we are working very closely with Air Combat Command, the major command, as we formulate our acquisition strategy for the CCA, and of course the requirements that exist and sponsors that General Hinote validates for the Air Force. So, critical to that is looking at what aircraft it will interoperate with and how we achieve that interoperability, and that ability to share, you know, C2.

A lot of analysis has been done on that. We think we have a good process for how that should work. There is work to be done in making and demonstrating how it actually will work. So, we have this operational experimentation unit that has been established where we will work closely with the Australians who have a flyable platform that they are using today.

It is not quite exactly—would necessarily meet our requirements, but it is a very good proxy that we can use to develop the CONOPS for that. But General Hinote could probably speak more to exactly how that is going to work.

Senator COTTON. Yes.

Lieutenant General HINOTE. Yes, sir, and thanks for the question. Sir, you are right in that CCAs will allow us to do something that is fundamentally different. We are going to be able to manipulate risk and impose cost, especially in some sort of great power competition and conflict. What I can tell you is that a lot of analysis has been done, but we are still learning and will continue to learn.

So, where I think we are today is we have a good plan and we have a good opportunity for the operators and the acquisition professionals to be able to work together to figure out what it looks like when manned, unmanned teaming becomes real.

That is something that has not been totally figured out yet, and that is why I am really happy about this operational experimentation unit that can take what we have learned so far and push it into the future with our tacticians.

Senator COTTON. Thank you. Up next, Senator Peters.

Senator PETERS. Thank you, Senator Cotton. General Moore, the vast distances that our forces need to operate over the INDOPACOM AOR, I think certainly helped to highlight the importance of having a very robust and reliable refueling capability to go through those distances.

I remain concerned that the Air Force challenges with modernizing the refueling tanker fleet, as well as the lack of clarity concerning how that will progress, leaving our forces potentially vulnerable. So, my question for you is, can you speak to the importance of aerial refueling fleet and how the Air Force is working to recapitalize existing refueling squadrons?

Particularly you mentioned in somewhere in your opening comments the cost of the KC-46 versus the current aircraft, and par-

ticularly how that might be based in the Reserve or Air National Guard squadrons around the country, this recapitalization.

Lieutenant General MOORE. Yes, I can, Senator. Thank you. I started my career as a tanker pilot and enjoyed every minute of it. I remain concerned, as you do, about the future of that fleet. The youngest KC-135 we own was built in 1964, and in all likelihood, it will remain on the ramp in 2050.

So, the number one priority in this portfolio is to ensure continuous recapitalization of the KC-135. We have through 2029 for the last deliveries on the current KC-46 contract, and Mr. Hunter and his acquisition organization are working to ensure that we have the ability to continue procuring tankers until we are ready to get to the next gen aerial refueling system, or NGAS.

So, we are also, in addition to procuring new tankers, we are continuing to modernize the KC-135. The fuel panel and the associated navigation equipment in the center pedestal have reached end of life, and we will be replacing those over the next couple of years to ensure that the KC-135s remain viable. I have flown the KC-46.

It is a fantastic airplane. It has some things that need to be worked at. It has some deficiencies that Boeing is on contract to fix, and they are doing that and we are going to hold them to it.

So, we believe we have a viable plan going forward, but it will require continuous supervision and active management, because, as you say, the air refueling capability is one that we can't fight a war without.

Senator PETERS. The KC-46 is coming into reserve. You know, it is our National Guard where some of those legacy platforms are right now. What do you see a timeline for that?

Lieutenant General MOORE. So, they are coming in as we speak. There are both Guard and Reserve aircrews flying KC-46s today. There are still two basing decisions yet to be made in the KC-46 enterprise. Both of those are slated to go to the Air National Guard.

The percentage of Guard and Reserve forces in the tanker community will remain essentially unchanged. That actually in the Guard grows just a little bit across the future years' defense plan, but it essentially will remain unchanged.

Senator PETERS. Okay, General Slife, the Air Force recently stood up the 350th Spectrum Warfare Wing in Pensacola, Florida. Based on lessons learned in Ukraine and emerging requirements to support the joint force with cyber, as well as electronic warfare from increased distances that we are going to be facing, do you feel as though the Air Force has the appropriate budget and the strategy for employing next generation cyber and electronic warfare capabilities?

Lieutenant General SLIFE. Senator, I do. With investments in things like active, electronically scanned radars, investments in the E-7, the E-10.

These platforms are going to give us the spectrum dominance capability that our crews are going to need to be able to fight and win in the most contested environments.

The other thing that the 350th Spectrum Warfare Wing will allow us to do is make sure that we are updating and modernizing

the data files that underpin many of our electronic attack programs at the pace that our adversaries are changing.

As the threat environment becomes more lethal, our adversaries are changing the techniques that they use against us rapidly. We need the ability to stay one step ahead of them, and that is what the 350th will do for us, senator.

Senator PETERS. Thank you, and finally, Mr. Hunter, the fiscal year 2024 Air Force budget request includes funding for the procurement of 24 F-15EXs in fiscal year 2024, and advanced procurement funding for 24 F-15EXs in fiscal year 2025.

Given that the Air Force initially planned to purchase 144 of these aircraft but has since walked that back to 80 and is now seems to be adjusting to 104, how many F-15EXs does the Air Force actually intend to purchase, and what need is that aircraft filling?

As of today, it is our plan to complete the purchase of the F-15EX in fiscal year 2025. So, that would be the number, the analysis has been done to determine that that would be a sufficient force for the purpose for which the F-15EX is being acquired, which is largely to backfill and replace the F-15Cs that are rapidly divesting from the force.

So, I think we will have enough when we get to fiscal year 2025. The decision really was though, to accelerate that purchase, to acquire those aircraft as quickly as possible, and that is a case where a decision was made to do that in order to buy down, to the extent that we can, some of the current risk more rapidly.

Then we will transition resources once we complete F-15EX procurement into some of the more future focused modernization investments that we have in the portfolio.

Senator PETERS. Great. Thank you.

Senator KELLY. Senator Mullin.

Senator MULLIN. Thank you, sir. Secretary Hunter, having actually the honor to represent Tinker Air Force Base, you can imagine I am very much invested in the progress of the E-3 to the E-7, AWACS transition. Last year's NDAA included the Air Force \$300 million unfunded priority request to accelerate the transition. Can you kind of elaborate a little bit more on how that money was spent? I know you spoke about it earlier, but more specifically to this.

Mr. HUNTER. Yes, absolutely, and we very much appreciate the Committee's support.

So, we were able to, due to the committees approving our re-programming request, in fiscal year 2023, got the program office stood up and running, in 1923, in the same year in which we made the decision to purchase E-7, which was a huge benefit and allows us to avoid some of the delays that could have been caused by a CR last year.

Then we worked very rapidly to, once the program office was established, to get on contract with Boeing so that we could start to accelerate as much of the program activity, the engineering work, on the E-7 that we need to carry out as quickly as possible.

So, the resources that Congress provided really helped us to accelerate some of the engineering work. The kinds of things that we have, worked with Boeing to get underway as quickly as possible

is—we have begun from the very beginning and talked to them about the technical data that we will need to acquire for the U.S. Air Force to be able to not only sustain the platform but to upgrade and modernize it, to stay current with the threat, which is especially critical for the E-7, although it is critical for everything, but it is especially critical for the E-7.

We will have to work very closely with our colleagues at the FAA on certification of the E-7. We wanted to accelerate the work, the engineering work required to get after aircraft certification as early as possible. It has been certified previously by other countries that are flying the platform, but not for the U.S.

So, we wanted to get after that as quickly as possible, and we wanted to get after the software work that will put the E-7 aircraft that we are purchasing in a configuration that works in the U.S. Air Force context with our OMS approach to our software builds. We were able to accelerate that work thanks to the resources that Congress provided.

Senator MULLIN. Well, the concern that I have is the lag between when we phaseout the E-3s to the E-7s. The timeframe continues to be pushed, but yet we are still staying similar to the same phaseout period.

Now there seems to be about a 3-year lag between where the E-3s leave Tinker, to when the E-4s are supposed to start being delivered—or E-7s are supposed to be—start being delivered.

Are we concerned about that, especially about some of the emerging threats that are taking place today and that there is going to be such a lag between?

Mr. HUNTER. So, the balance that we are striking there is the E-3s that we are retiring are not in a good position to really engage in the most significant fight that we are posturing to be ready for, which is the INDOPACOM, the potential conflict—

Senator MULLIN. But do we have to take the place between that 4-year lag, because it seems to be—continue to grow. We haven't delivered. General, if you want to—

Mr. HUNTER. Well, let me just make one point, which is critical to fielding the E-7 as quickly as possible is having those E-3 crews engaged with us in the acquisition system as we work with Boeing to nail down the configuration.

But also, they are going to Australia and working with the E-7 community that is flying in Australia. I, myself had the opportunity to fly on the Australian E-7 and it is very impressive, and they have learned a lot in operating that platform. So, having those crews available is a huge accelerant to fielding the E-7.

Lieutenant General MOORE. Yes, Senator. We have held the E-3 divestiture schedule constant since we laid it in, so it has not changed. So far, the E-7 delivery schedule has stayed constant as well. So, that gap was programed in on purpose.

We have preserved enough capacity in the airborne battle managers, the ABMers in the back to see to the E-7 so that it is ready to go. As Mr. Hunter mentioned, we are even sending them to Australia for training. But there are capability gaps in the airborne early warning portfolio that the E-3 will never fill.

So, there is an issue of capacity, but really what we are getting at is capability, and we have to get to the E-7 to get that capability



gap filled, and the way to get there as quickly as possible was for us to draw down the E-3 fleet in the meantime.

Senator MULLIN. From when that plan first came through to where we are at today, the threat has obviously increased. Are we trying to really ramp up the delivery time to get the E-7s—you know, in operable conditions?

Lieutenant General MOORE. Yes, sir, we are, and you will notice on the Chief of Staff's unfunded priorities list, the number one item is further acceleration of the E-7.

Senator MULLIN. I saw that. Right.

Lieutenant General MOORE. What that does is buy a center fuselage section, which is where the radar sits. That is the long lead item for another aircraft as well as early acquisition or advance procurement for two of the radars.

So, we are—we believe that there is some acceleration possible. The first airplane can't come any sooner than fiscal year 2027, but they can come in greater quantity when they do start to come in, and that is what you see is the number one item on the Chief of Staff's.

Senator MULLIN. I know Tinker is getting ready for it, and they are prepping for it. They are getting hangars ready for it. You know, it is impressive, and so I appreciate the investment that is being made in Tinker and we want to be helpful. So, any way our office can be of assistance in this, please utilize us.

Lieutenant General MOORE. Sir, thank you.

Senator MULLIN. Thank you.

Senator KELLY. Senator Blumenthal.

Senator BLUMENTHAL. Thank you very much, Senator Kelly. Thanks for yielding to me. I am very concerned about the combat rescue helicopter.

We went back and forth about this platform for some time over the past few years, and I am particularly concerned that the additional ten combat rescue helicopters that we added last year have been put in backup inventory. I know you have difficult budget decisions.

You have decided to terminate the program. We only have 75 out of the 108 that are thought to be necessary. So, maybe you can tell me what your thinking is about terminating that program, when I think we all believe we have an obligation to leave nobody behind.

Mr. HUNTER. You know, let me just touch briefly on program status, but turn to my colleagues to speak through how we intend to CSAR with the fleet that we are fielding. But appreciate the resources Congress has provided for acquiring HH-60. We still have resources for 20 aircraft not yet on contract.

So, we are not terminating, you know—as a, you know, acquisition term of art matter, the program. We are working through getting those 20 that have been appropriated on contract with Sikorsky. So, that is a decision being made just, you know, imminently in the next several days. So, we will, you know, fully execute with the resources Congress has provided.

Senator BLUMENTHAL. Where will that bring us in terms of the number of aircraft?

Mr. HUNTER. So that will be at 85 total inventory, and I know—I don't know if you want to talk, Rick, to the inventory question.

Senator BLUMENTHAL. 85 out of 108?

Lieutenant General MOORE. Yes, sir, and we believe that is more than sufficient to do combat search and rescue. There is a big distinction in this portfolio between combat search and rescue and personnel recovery. There are literally thousands of platforms in the Department of Defense that can do personnel recovery.

This fleet is for something very specific. It was purchased for Iraq and Afghanistan. It is not particularly helpful in the Chinese AOR, and with that, I will pass to my colleague, General Slife.

Lieutenant General SLIFE. Senator, we recognize the moral imperative, as you describe it, to leave nobody behind. The challenges that much like the infamous attempted rescue of Bat 21 in Vietnam, no matter how dedicated you are, if you are not in a platform that is survivable to the threat environment, you end up losing more people trying to recover somebody than the person you lost to begin with.

So, the challenge we are facing is really how to address the question of how will we do personnel recovery in a contested environment. We are actively looking at nontraditional ways in order to fulfill that moral imperative of leaving nobody behind.

But until we can come to a definitive answer on that, I think the one thing we can say is that helicopters—and I have 3,000 hours as a helicopter pilot. Helicopters that fly 150 knots, refueled by C-130's with a pair of rescue men that ride a hoist up and down is probably not the answer in our most pressing scenarios.

So, I share your concern about this mission area, Senator, and we believe that the force that we have programed bridges the gap until we can develop a more suitable solution for a contested environment.

Senator BLUMENTHAL. Well, I assume the nontraditional or more suitable means would be unmanned?

Lieutenant General SLIFE. Senator, that is one of several options that we are looking at.

Senator BLUMENTHAL. Well, I would like to followup on what the other options would be, and whether they would be equally cost effective. Since my time is limited, I want to go on to F-35s.

You know, the numbers of F-35, I think are 48 per year over the next 5 years as compared to the full production rate, which would be 80 aircraft per year. We have been buying F-35s for 18 years now—18, will be the 18th year.

The production line is stable, but the Air Force is planning fewer than the 60 that would keep the production line stable. Maybe you could talk a little bit about that issue.

Mr. HUNTER. Yes. We have been working closely with Lockheed Martin, the prime, on production capacity. The most recent Block award is 3 lot block by contract with Lockheed Martin.

Essentially keeps them at a production rate of 156 aircraft per year. That is for the entire F-35 enterprise, including allies and partners, as well as Air Force and Department of the Navy, and right now, they would be very stressed to produce at a rate beyond that.

So, the Air Force purchases that we have planned today will fill—will largely fill the production capacity that Lockheed has. If we wanted to go to a higher production rate, we would probably have to tool, increase tooling, and one of the significant limiters there is the center body piece—the center——

Senator BLUMENTHAL. So, you are saying that the current rate of buy, it will keep the production line fully at work?

Mr. HUNTER. What we have in our budget request across the POM, combined with the Navy and the allied purchases——

Senator BLUMENTHAL. So, the allied purchases must be making up for some of the——

Mr. HUNTER. They are. They are a huge component of the program, and we see that, you know, since the conflict in Ukraine was initiated by Russia, we have had many additional partners and allies make the decision to purchase the F-35.

Senator BLUMENTHAL. Thank you. Thanks, Mr. Chairman.

Senator KELLY. Thank you, Senator. Secretary Hunter, I want to talk a little bit about the collaborative combat aircraft program that the Air Force is intended to begin.

You know, I understand that the Air Force intends that the CCA program would not replace any current capability or platforms but would be an additional capability. It is intended to provide, you know, the additional missile carrying capacity and firing capability for our fighter forces.

Essentially a wingman with no person in the aircraft. So, could you explain how the Air Force can afford to buy additional platforms to carry missiles and carry weapons when right now the budget doesn't really afford the ability to buy enough missiles to—and weapons to outfit the fighters that we currently own?

Mr. HUNTER. So, we do have substantial investments in our munitions portfolio and including multiyear production for AMRAAM and the JASSM, LRASM platform. So, we are at an increasing production rates of those munitions as well as JDAM, which by the time that we are fielding CCAs, will be entering our inventory.

So, we have looked hard at how do we ramp up production of munitions, recognizing that that will be critical to our ability to deter and to succeed. The CCA in particular, as you see, it brings affordable mass on the platform side. We are also looking hard at our mix of munitions investment and trying to understand how do we have affordable mass for our munitions.

So, some of our munitions will get cheaper as we ramp up production and we get more economies of scale in that production. Some of them are so high end that, you know, they probably won't ever be affordable mass. But we do have in our plan munitions that will be at a, you know, unit rate, unit cost that will allow us to scale up production of those weapons.

Senator KELLY. Well, Mr. Secretary, that is good to hear. What I also thought I might hear is it is not just about the number of missiles we have.

You did mention that this increases the number of platforms and the tactical advantage that you could gain from being able to, you know, put another platform in a strike package, doesn't have an individual in there that addresses the limited ability to recruit, retain experienced pilots.

So, it touches on that problem that we are—we have to address in recruiting in general. But to have additional capability, especially with someone like AMRAAM coming from a different angle, could be an advantage on the battlefield and help us get air superiority.

Can you also give just a quick update on how the development and testing, recognizing that this is not a classified setting, but the development and testing of this, what you are comfortable in saying, and how the warfighter perspectives are being considered and integrated into the program?

Mr. HUNTER. So, with CCA, we have the benefit that there has been ongoing work for some time with industry to understand what capabilities that they can provide and what timeframe in which they could provide those capabilities.

So, we feel like we have a very good understanding of the state of industry, lots of U.S. industry, but also understand there is capability available from partner nations as well. The CCA program is going to be a fully competitive program.

So, we will invite those that have been working with us in the concept definition phase of CCA to aggressively compete for our initial platform that we expect to field, and we will work to do some prototyping and do test of those aircraft.

So, I think you will see a program structure that is very—it is rapid. I think you will credit that it is rapid when you see the details and, but at the same time gives us that opportunity to really test out what industry is offering in a competitive environment.

The last thing I wanted to mention is we are also leveraging the Skyward program from the Air Force Research Lab, which really is focusing on the autonomy end of this, and that will be continuously worked throughout the lifecycle of the CCA from the initial platform, through every one of its iterations. I don't know if—

Senator KELLY. General.

Lieutenant General HINOTE. Chairman Kelly, as one of the warfighters who has been working with the acquirers in this program, one of the things that I think that Secretary Kendall and Secretary Hunter has done is we are working more closely with requirements programing and acquisition than I have ever seen.

What that allows us to do is iterate in ways that are, I think, very beneficial. This program is going to be an iterative program. We do not know everything we need to know about this, and I can't require what CCAs are going to look like in 10 years.

I think the technology is moving faster than we can keep up in certain areas. What I am very excited about is we have a plan to incorporate the tactics and the logistics concerns so that we can learn what an organization looks like to fly these, and I really want to complement our acquirers for that.

Senator KELLY. Were you iterating on the level 1 requirements for this platform, or is it just a—

Mr. HUNTER. So, we have—Sorry, that is your line—yes—

Lieutenant General HINOTE. We have set the first tranche requirements.

Senator KELLY. Okay, and—

Lieutenant General HINOTE. We do have a threshold and objective, and so, there is a gap between the threshold requirement and the objective requirement, but we have set those.

Senator KELLY. You know, it seems like one of these programs where we have got to invent, not just innovate, you know, invent things. You know, somebody recently mentioned the B-2 being in that category of aircraft whereas we developed it, a lot of the technologies weren't currently available.

Because of that, we wound up with significant delays, cost overruns. They get rather expensive. I hope in this case, you know, we are aware of it and still try to—and I see the benefit in this capability. But I also am concerned that some of these technologies might be a little bit big of a leap, and we have got to be—we just have to be aware of it.

Mr. HUNTER. Yes, and so, our strategy is very much, we are being very disciplined on our initial requirements set, really scoping based on our work with industry, what we believe is achievable on the timeframe on which we are proposing to field.

Then we will—there will be future increments and that is very much baked into our acquisition strategy, that—and that is true for the competitors, that those who may not be the lucky winners for initial increments are still very much in the game for later increments.

Senator KELLY. Thank you. Senator Duckworth.

Senator DUCKWORTH. Thank you, Mr. Chairman. I humped over here as quickly as I could from that vote. Good afternoon to our witnesses. General Hinote, thank you for your years of service, and obviously to your family as well. In this—gentlemen, in this Subcommittee's last hearing, we heard from the Army about its modernization efforts for weapons systems and organizations.

I believe that the purpose of DOD modernization is to drive transformation across the joint force. General Hinote, the Marine Corps Force Design 2030 provides a detailed roadmap and vision for what its future force will look like.

The document describes methodology for the study, identifies capability, identify capacity, and detail of the gaps, and details of the actual numbers of weapons systems and formations required to achieve the envisioned force design.

I know the Air Force just unveiled your future operating concept document last month, which does list key airpower fights. But does the Air Force have a force design 2030 comparable document to share with Congress?

If not, what is informing the service's RTD&E investments, or shaping its recruiting and retention goals? How does the service measure modernization success if it doesn't have an explicit modernization roadmap?

Lieutenant General HINOTE. Senator Duckworth, thank you for that question. It is a question that comes up all the time when we talk about force design. So, I will start with, we have unveiled the future operating concept. You might consider that to be a part of the future force design. We also have other things that we are doing.

I believe the operational imperatives that Secretary Kendall has us working on are very much a part of force design. They are clos-

ing gaps that we need. To get after your question, yes and no. So, we have a process—and force design is not a 2030 or 2032 one-time thing.

What we believe is we have a process, and ours goes out to beyond 2040, and we are constantly updating what the force should look like at any one point in time. Now, you absolutely can snap a chalk line and say in 2030 or 2032, this is what we think it is going to look like.

We have that, and we would be happy to share. We don't have it in a paper form right now. What it is, though, is it is a series of concepts that we can show you and show you the analysis behind them. Unfortunately, that tends to go at a pretty high classification level, and so we would need to be able to show you in a classified setting.

Mainly that is because these technologies that we are trying to incorporate into our force design are quite new and we don't want to give our playbook to China. So, and I actually do believe that they could derive some important insights if we were to publish something that—in an unclassified setting, but we would be more than happy to share what we have with you.

Senator DUCKWORTH. I am just concerned that the Air Force has some way of measuring modernization success, right, even if it is benchmarked as opposed to a timeline base. But there is got to be some way that you can measure that success and there is got to be some way that I can do my job here in Congress to make sure that we are keeping track of that.

What Air Force efforts are underway to redesign Air Force formations or manning? General Slife and General Hinote, I think you can both take this. How is new technology affecting how the service organizes its personnel, right?

This is followed on to that last question, is you have got to have some sort of a roadmap or plan, and we have got to be able to figure out how your successes are. But then how are you looking at your formation and person organization into the future?

Lieutenant General HINOTE. Senator Duckworth, you are exactly right. So, I will go very short and then hand off to General Slife. So, as we look and we see the pacing challenge is China, we know that we have to present a force that is different than the one that we have right now.

A key component of that is the infrastructure, and we have huge investments in this budget to get after a Pacific infrastructure that allows us to present that force in the way that we need to.

With that, I will hand over the General Slife, because the idea of a new way of presenting the force that is compatible with our pacing challenge and then a new way of generating the force is something that he is leading and making great progress in.

Senator DUCKWORTH. General Slife. Sorry I missed pronounce your name earlier.

Lieutenant General SLIFE. No problem. Well, thank you. Senator Duckworth. You have your finger on a question that I spend many hours every week working on. To General Hinote's point about force presentation, just to be plain about what we are talking about, it is what is the element that the Air Force provides, the

squadron, a group, a wing—what is the thing that the Air Force generates and provides.

You know, the model that we have used for force presentation over the last 20 plus years since 9/11 has been a very ad hoc model. We deploy portions of units and aggregate them in a large main operating base someplace in the Mid-East and project air power from a largely secure, largely fixed main operating base.

We have been able to get away with that because our adversary hasn't pressured us in the way that we think future adversaries can and will. So, as we look at the future operating environment, we recognize that we have to be much more agile.

We have to be much more focused on those—what the rest of the Joint Force would call combat support and combat service support elements and how those things are packaged and generated in order to provide the platform from which we can project air power.

So that—developing that force presentation model for the future is an enormous part of what I am working on right now. What I can tell you is that, and General Moore may be able to provide some of the programmatic detail underpinning this, is we have made significant investment in the budget before the Subcommittee today, significant investment in the capabilities we will need to support those agile combat employment type operations.

You know, we have unit equipped ourselves to operate out of main fixed operating bases. You know, we may not need the 1.21-gigawatt generator. We may need some, you know, 50 horsepower Honda generators that are much more mobile and enabled to be used in much smaller formations, and so, we are well ahead on that.

Senator DUCKWORTH. That leads to—I am over time but can—I have more questions here. Let me keep going till you cut me off. Thank you. General, did you want to add something to that?

Lieutenant General MOORE. Ma'am, I would just say in our operational imperative, in the U.S. Air Force's operational imperative portfolio, you will see that what General Slife was talking about is the number two investment.

Collaborative combat aircraft is number one, and there is over \$5 billion, of course, across the future years defense plan for pre-positioned equipment, repair of runways and fields that we haven't used since World War II, camouflage, concealment, and deception, and then the continuing sustainment tail that provides all of that into the future.

Senator DUCKWORTH. This is exactly what I am deeply concerned about, right, especially going into the Indo-Pacific. It is a very different way that we are going to be projecting our force into that region as opposed to EUCOM, you know, European command.

I mean, I understand the AFFORGEN is supposed to provide a balanced and predictable fourth generation model, especially if you are looking at the geographic combatant commands.

But does the fourth-generation model work for all Air Force units? Also, how do you balance the demands—the difference between what you need in Europe versus Indo-Pacific?

Lieutenant General SLIFE. Senator, the Air Force's force generation model conceptually is a good model for all of us to think about, but it applies unevenly across the Air Force. The reason for that

is because some forces have been assigned to combatant commanders, and the Air Force doesn't generate those forces. They are assigned on a day-to-day basis to the combatant commander.

So, you can imagine we have an F-16 squadron in Spangdahlem, in Germany, for example, and, you know, if General Cavoli, the EUCOM Commander, wants to employ that F-16 squadron, I don't have the ability to tell them, hey, sorry, they are in force generation right now, we will be back in 18 months when they are available. I mean, that is an unacceptable answer.

So those combatant command assigned forces are going to be employed by the combatant commander as they see fit. The F4 gen model that you are talking about is really for those forces that the institutional United States Air Force generates and deploys in support of those emergent requirements where combatant commanders ask for and need a fighter squadron over here—I need a tanker over here. Those are the forces that we generate.

Senator DUCKWORTH. Thank you. So, moving on to the equipment, right, as we are looking at INDOPACOM and some of the new challenges—Secretary Hunter and General Moore, I think this probably comes to you.

Secretary Kendall submitted a legislative proposal that provides a service rep acquisition funding authorities. I absolutely understand you need to be agile. We have new stuff coming out, and we need to be able get to it quickly. The funding authorities is to initiate new start development activities of emergent technological advancements up to \$300 million.

Both NGAD and the next gen air refueling system, NGAS, require significant technological advances in order to become successful. How does this proposal from Secretary Kendall reduce the risk for development of NGAD and NGAS? Are there other areas in which these proposed authorities would be helpful?

Mr. HUNTER. Yes, I think there are absolutely other areas where it would be helpful, and I think we could use, you know, NGAD or NGAS as an exemplar. As we sit today, those programs are underway, and they are at a—well, at least NGAD is at a stage beyond what our legislative proposal would apply.

So, I don't see us using it necessarily with NGAD because of the fact that it is already, you know, well on its way to—as a program. But in principle, right, a similar idea applies in that those programs came out of a recognition of a change in the threat environment.

In order to respond to that change in a threat environment, we understand that we have work to do, engineering work and technological work to find a solution and then field it as rapidly as possible.

So, what the legislative proposal is designed to do is allow us to engage in early stage engineering in the year of execution, with congressional oversight and approval, without having to wait for a full year appropriation bill, which may be months or even in some cases years away, that we would then have to wait until we receive those funds.

Senator KELLY. Secretary, I am going to ask you to pause there for a second. Senator Duckworth, I am going to turn it over to Senator Cotton, and then we will come back.



Senator COTTON. Mr. Hunter, I would like to talk about logistics. The only way we can help to deter aggression and win any potential conflict in the Western Pacific in particular is by ensuring our logistics are second to none.

That includes not just our munitions and fuel, but also the spare parts that are necessary to keep our aircraft flying. But reports from the GAO paint a pretty bleak picture of aircraft logistics, with the Air Force missing their mission capable rights for almost every aircraft every year, meaning that our aircraft aren't available to fly their required missions for a significant portion of time.

This includes the F-35, which only had a 38 percent for mission capable rate in 2021, and the C-5, which has, according to a report, exhibited increasingly low aircraft availability and mission capable rates over time.

A major contributor to this issue was identified as spare parts. If this is the state of our logistics in peacetime, I am troubled what it would look like in wartime when logistics are truly stressed by our own demands and by enemy action.

Do these logistics challenges delay our ability to rapidly modernize our fleet, Mr. Hunter, since we have aircraft unable to fly and test new systems? Also do the challenges impact pilot production and training?

Mr. HUNTER. Senator, they absolutely do impact pilot production and training. In fact, that our current challenge with pilot production is very much tied to the challenges with sustaining the T-38 platform, which is one of the linchpins of our pilot production approach.

A lot of that is driven by the age of our platform. A lot of it is driven by the engine which we are engaged in substantial work to help us manage through the current spare parts shortages, finding new sources of supply and second suppliers for those that may have shut down production in order to keep that engine operating until the T-7 is fielded, which will have a modern engine and we won't have quite the same challenge.

So, it is absolutely an impact on pilot production. Impact on fielding of capability is a little bit dependent on the platform. In some platforms, our test capacity is very constrained and is a constraint on how quickly we can move. In some cases, that is where we are doing our greatest degree of modernization.

So, for example, the B-52 is one where the extent of modernization on the B-52 is so large that it is, you know, it is a challenge to the capacity of the test fleet for that platform. When it comes to the F-35, it is a slightly different challenge. Right here, we don't have really old stuff. This is new stuff.

In fact, one of the things that challenges there is, we were slow to stand up depot capacity, initial depot capacity for the F-35. That meant that when a part broke, instead of going to depot and getting fixed and coming back, we had to buy a new part.

We can actually, you know, we can repair parts, generally speaking, faster than we can buy new unless—you know, unless they are off the shelf. So, that has been a big constraint and has driven a lot of our non-mission capable for supply dynamics on the F-35.

But starting about a year ago, the Department committed to stick to the plan on depot stand up, and instead of diverting re-

sources from depots into new aircraft production, we held the line, and with the help of Congress because you obviously provided funds for additional aircraft purchases, which made it easier to continue our depot stand up activities.

So, we are actually now starting to burn down some of that challenge on parts for the F-35, but it is going to take us time to get there.

Senator COTTON. Okay, General Slife.

Lieutenant General SLIFE. Senator, thanks. I would just point out, much of what you are describing as what we call weapon system sustainment funding, which funds many of our repairable depot activities.

A lot of the modernization, for example. This budget that is before you today is the highest in terms of the percentage of our WSS requirement that is funded since 2009. So, this issue that you have highlighted is absolutely an issue.

It absolutely affects pilot production. It affects the number of hours that crews are flying in our operational units. We recognize the need to get over it. So, I think you will see a stair step approach to improving our weapon system sustainment funding over time.

Senator COTTON. Yes, and the F-35 is moving to a so-called performance-based contract soon, is that correct?

Mr. HUNTER. So that is in work. Notionally, the current sustainment contract would finish around the end of this year, and we would put in place that next contract structure. We are working hard to have it be the case that that next contract structure is a performance-based logistics contract.

But as you probably know, there is a congressional mandate that says we have to be able to certify that that PBL approach would meet certain benchmarks in terms of cost and performance.

We obviously, we have to get there, working with the supplier. So, my hope and my expectation is we will get there. But if we can't get there, then we will not bring a PBL contract back that doesn't meet the requirement.

Senator COTTON. Would you expect to extend that approach to any other aircraft?

Mr. HUNTER. Well, we do have performance-based logistics contracts on several of our platforms. I would say across the Air Force, we are probably not the largest user across the Department of Defense compared to some of the other services, but it does work in certain cases.

You know, we obviously have to meet our statutory requirement for the organic industrial base, and most of our platforms that we are currently bringing on board, we are planning for organic sustainment.

So, KC-46, B-21. So, most of my focus, honestly, is on making sure that that we stand up the organic depots, and we haven't been going after a lot of new PBLs in the Air Force.

Senator COTTON. Thank you.

Senator KELLY. Right. Secretary Hunter, I want to talk a little bit about the Compass Call aircraft. We have been pursuing a program to replace these EC-130's with the new EC-37. This program is slated to replace 14 EC-130 aircraft with 10 brand new EC-37s.

In budget justification, Materiel indicates that we will only have 6 EC-37s from the program by the end of the future years defense program. This is only because that—I was able to push for fund procurement of four additional airplanes last year.

Secretary Hunter, what steps could we take to accelerate recapitalization of this important capability? Are there ways to shorten the timeline in a responsible manner on this? If there is, by how much could we shorten the timeline?

Mr. HUNTER. Well, Senator, I appreciate the support that Congress has provided on this. There is a little bit of an issue of where the window applies when it comes to future years defense program.

So, the four aircraft that Congress has appropriated dollars for that—in addition to the six that you saw that we will deliver within the FYDP, there is one that is right on the dividing line. So, the number seven is right on the dividing line of where the FYDP ends and the next FYDP begins.

Then the other three are just after that window. So, all ten will deliver. Some of them are coming, you know, some months after the kind of end date of the current FYDP. So, I didn't want you to think that those aircraft are not happening. They are absolutely happening and will deliver. Just so happens they are just outside the FYDP.

That is a long fuse from when you have appropriated the funding to us to when those aircraft will deliver.

So, I will have to look into why that timeline is that long. You know, this is one case where we are going and acquiring used aircraft because the production line had closed. That does add some time and complexity versus an aircraft that you can just buy off the line.

Senator KELLY. So, what is the risk—and maybe the General Hinate, or General Slife, or even General Moore could comment on what is the risk of conducting the mission with fewer aircraft?

Lieutenant General HINOTE. Chairman Kelly, right now, Secretary Kendall has us looking at the—what are we going to do about electronic warfare in the future. This is one of the questions that we are asking ourselves, is how many do you really need?

Where I think, we are going to go from a design point of view is we are going to use the EC-37 as a pathfinder for the open mission systems that we will proliferate throughout our platforms. That will include platforms we could talk about in here and some that we can't. Those will be distributed in the battle space.

The things that we are able to develop through the EC-37 and the Spectrum Warfare Wing that we talked about before, because we are going to be using software defined apertures, we are going to be able to distribute out the electronic attack capabilities, or not.

We will have to make some choices about where we will have to go. If that doesn't work, then I think we should go back and reassess where we are with the EC-37.

If it does work, it can be incredibly powerful by distributing all of those electronic attack capabilities in a way that I think would be very difficult for any adversary to counter. So, we have got some.

Senator KELLY. Is there a timeline to make that decision?

Lieutenant General HINOTE. Yes, sir. We need to get some EC-37s in the air and see how they are working. We also need to do a very solid threat analysis as we get them in the air versus the waveforms that we are going to field. That hasn't been done yet.

We are—in fact, we are working on those with the new group that is studying the holistic electronic attack across the Air Force.

Senator KELLY. When I joined the Armed Services committee, one of the big surprises that I experienced was when I found out the Air Force only had initially 14 EC-130's, you know, doing this mission.

When you look at the Navy and even the Marine Corps, you know, had—the Marine Corps had probably a squadron and or two and the Navy had one in every air wing. So, it seems like a more substantial capability. Obviously, the way we operate the Air Force and the Navy are different.

But this is a capability that I believe we all recognize that our main adversaries are—they do well and have been making some significant advancements in. So, I think it is important that we pay really close attention to this.

I find the distributed EW capability an interesting idea, but we are going to have to see if we can actually implement that. Senator Duckworth.

Senator DUCKWORTH. Thank you, Mr. Chairman. Gentlemen, I am going to continue on my joint—my joint force train of thought. I know that the ranking member earlier asked a question about the CCA, the collaborative combat aircraft and its operability across the Air Force.

At this month's Sea, Air, and Space Conference, the Navy actually highlighted its cooperation with Air Force in CCA development and even previewed the ability of the Navy to control Air Force CCAs and vice versa.

Secretary Hunter, how closely are you working with your counterparts in the Department of the Navy to build interoperable weapons systems while not creating a whole bunch of new requirements that result in program delays or cost overruns?

Also, how do you balance that interoperability with the speed necessary to field new technology? Importantly, how and when will you demonstrate to Congress to progress that—in these truly joint service CCAs? So, it is sort of a three-part question there.

Mr. HUNTER. Well, I would like to believe that we are demonstrating it today in terms of the work that we have done on the front end to plan the integration of our approaches. That is very much the case.

So, the reference architectures that are the foundation of the underpinning of all our programmatic efforts tied to CCA, the Navy has indicated in testimony to me directly, but in testimony to Congress, that they are adopting the same approach, the same reference architecture.

So that will dramatically improve our efforts, right. There is efficiency in it, but there is also power in it, particularly with industry, because it—for all of those capability providers out there who have innovative technology to bring, right, the market space has just doubled for them, so it becomes an even more attractive target for investment. I am seeing that response from industry.

Their engagement level has been exceptionally high because they see that we are working closely together and giving them common approaches. Maybe not exactly common requirements, but very common approaches to how they can leverage technology. So, we are doing that on the front end.

We are also leveraging each other. So, the Navy—it is not all. They are using our stuff, right. The Navy has quite a bit of work put in, particularly on things like comms and secure communications, that we can leverage and intend to leverage and are leveraging in our CCA approach.

Also because of their work on the MQ-25, you know, they are going to have some systems that could potentially, you know, contribute information about how do we operate some of these uncrewed systems in a reasonable way.

Then in other programs, I would say across the whole swath of our programs, we are trying, working hard to integrate our approach, and I think it is a very good news story.

Lieutenant General HINOTE. Senator Duckworth, can I add for the—

Senator DUCKWORTH. Please—

General HINOTE.—from the warfighter side. So, I have definitely been in contact with my counterparts throughout the Joint Force. One of the things that is quite different right now is that we have a joint warfighting concept that we can all reference, wargame together, learn from, and require to.

That is just fundamentally a different thing, and there is a real momentum behind this joint warfighting concept. So, one of the ways that we have been able to work together in this CCA environment is to agree upon whether it is we want to do with them, at least at first.

So, the Joint Staff sponsored a major war game last summer, I had the chance to participate, and one, I could say without giving too much away, one of the star players was the CCA, not only for the Joint Force, but also for the combined force, because the Australians participated in that war game as well, as well as the UK, and both of them brought their concepts for CCAs in.

I think the idea that they have to be interoperable, you mentioned that the Navy could control our CCAs and vice versa—we all agree on that, 100 percent. Because, and as the Secretary Hunter talked about, we were able to adopt communications standards between us, that is going to be so much easier to do.

But what—I don't know that I have seen a capability that converged as fast across the joint force as what the CCAs have under the joint warfighting concept. So, we feel very good about investing as much as we have, and we are investing quite a bit.

Senator DUCKWORTH. Is it slowing down the speed for fielding new technology? I just want to make sure that we are balancing things out.

I just think back to the days of the F-35, right, where we develop an aircraft that then actually couldn't land on a carrier, right, because the tailhook was not in the—was, you know, that the distance from the landing gear, the tail was not appropriate, right, so that slowed everything down.

I am all for interoperability. I think it is great. I just want to make sure that we are handling that balance, that we can still field the new technology as rapidly as possible, but also maintaining that interoperability part.

Mr. HUNTER. Yes, I would say it is central to our approach to CCA, both with partner services but also with partners and allies, that we are not envisioning this where we all have to buy the same thing, or all from the same manufacturer.

So, the power of these government reference architectures is they are, by design, able to integrate and interoperate, even if they come from different manufacturers, produced in different countries, bought by different services, and have slightly different mission roles.

But the integration of the architecture, reference architecture level, and in the standards that are, you know, that support that architecture will enable the kind of interoperability and the efficiency.

As I said, from the industry side, it creates a much bigger market space for them to compete for, which helps us drive that continuous competition, which is fundamental to our strategy to get there rapidly and to innovate over time.

Senator DUCKWORTH. Thank you. I just want to ask the ranking member, I know we are waiting—the chairman went off to vote and he is going to come back. I have another question, if you are—I don't know if you wanted to ask additional questions.

Okay, thank you. This is now, I am going to go up to a very macro level. How does the Secretary of the Air Force's operational imperatives support the joint force?

You know, can you comment on the efforts in your budgets where you can—where those efforts are supporting the joint force? Give some examples.

Lieutenant General HINOTE. Yes, Senator Duckworth. In fact, I believe the operational imperatives are truly imperative for supporting the joint force. I don't think the joint force wins if we don't close the gaps represented in the operational imperatives.

I will start with the first operational imperative, which is space. I have never seen a scenario where the joint force is able to win if we lose access to space. It is that important. It is a prerequisite for victory.

So, what you see is that we are investing in resilience in ways that we have not invested before, and we are able to proliferate the capability across different orbital structures as well as just across things like low-Earth orbit and the ability to use both commercial and military satellites as well.

But that is just one of many. So, when you look at operational imperatives two, three, and four, we are really talking about our kill chains and how our kill chains come together. I don't mean Air Force kill chains, I mean joint kill chains.

The core of the joint kill chains are represented in operational imperatives two, three, and four, as is the keys capability. It is, again, not an Air Force capability, a joint capability to establish air superiority, even just for windows of time. Because we know that China has invested well, they are worthy adversary, and we are going to have to fight very hard.

That being said, two, three, and four can really help us when it comes to bringing the joint force together, aggregating to do the job, and the job that we are preparing for is to stop aggression from China.

So operational imperative five gets after the infrastructure that we were talking about and the ability to operate off of these airfields. So, not only does it include things like refurbishing runways and proliferating the amount of bases that we can use, it also talks about pre-positioning and deception and other areas that help us in that.

So, for many, many years, we have been the source for the Joint Force for Deep Strike and operational Imperative six gets after a new way of doing Deep Strike around the B-21 but making the B-21 better. Unfortunately, that is about all I can say here, but happy to go into it in another forum.

Then operational imperative seven gets after the fact now that no matter where we are, we might be in your home State getting ready to deploy, or we might be on a Pacific Island somewhere, but anywhere in between, we are going to be resisted. Some of that resistance will be non-kinetic.

We will have cyber-attacks. There will be—they will use space in a way that will make it very hard for us to move our logistics, what we expect to do, and they will try to slow us down in communication, being able to talk to each other. But as we get closer, they will start using everything in their portfolio and that will include kinetics as well.

So, what operational imperative seven does is it examines our across the board ability to go to war and identifies the vulnerabilities. Now, the first step in closing of our ability is realizing they exist. We are finding a bunch, as you can imagine, but we are prioritizing them and knocking them out through operational imperative seven.

So, to go back, where I think the Joint Force benefits from the operational imperatives is that with the joint warfighting concept that I referred to earlier is doable. You can achieve it if we close those operational imperatives.

What I think that means is that even in the most difficult scenario, if you might think of a South China Sea scenario or a Taiwan defense scenario or helping Japan defend against China, those are tough scenarios.

You have to go a long way to win those scenarios. But even in those scenarios, if we can close the gaps in the operational imperatives, it allows the joint force to come together. It is almost like we are the glue of the joint force.

We bring it together to accomplish the mission, and one of the reasons why I am more optimistic than I have been in a long time is because we are actually investing in getting after these gaps.

Senator DUCKWORTH. Expand that to the combined force. You know, especially if you are looking at the Indo-Pacific region, right. You mentioned cyber, for example, and also space, where the disruptions are going to come from.

We need to be sure, I would think that our allies are able to maintain cyber, and not just allies and partners, but also commercial partners that we are going to be relying on, especially when

it comes to logistics in a contested environment. What are you doing there, and expand your discussion to the combined—

Lieutenant General HINOTE. Yes, ma'am. So, certainly, from the combined point of view, we see the ability for us to fight together, to be integrated as being the key. It is something we bring that China won't have.

We have great allies and partners, and one of the things that has been a real joy for me is working with my counterparts in places like Australia, the UK, Japan, coming together and figuring this out. I will tell you, one of the things I have noticed recently is how serious Japan is about its defense. I think there is a major change there. It is a positive change for us.

We have always had a very close relationship with the Japanese Self-Defense Forces, but now it is just going to that next level. Very happy about that. That allows us to plan together and it allows us to understand how they are going to fight and how we can communicate with them, command and control, in a way that is fully integrated, so we are truly a team.

To get after the commercial side, that is a tough challenge. As you know, a lot of the computer systems that we have in our industrial base are unclassified and they may or may not be updated with the best software and things like that.

So, as we look across that vulnerability, we see that there are key gaps we have to close and we are working with the companies to close those. But also, we know there is more to be done, and it is not just a military effort, it is a whole-of-nation effort, and we know that China is going to test us in this area.

I think we need to get ready for it, and I believe that people are waking up to the seriousness of that threat and they are asking for help.

Senator DUCKWORTH. I think the commercial side is where we have some real potential challenges. You know, I remember I was touring, when I was in Congress, a civilian contractor that had the contract to make lights more energy efficient on a major maneuver command in the Army, and I went to visit.

They were very proud because they got this contract, small company, engineers and everything, and they are like, look, let me show you how I can turn the lights on and off at this major maneuver command in Texas. They were showing me how they were lowering it on this laptop.

I said, is that a secure laptop? Because we just walked into this room and it was just left sitting there. They are like, oh, no, no, our chief engineer has a TS/SCI so it is okay. But the laptop is sitting there and they are very proudly showing me how they could, like, dim the lights and brighten the lights to save energy, but do you understand the implications of what you are talking—and they, you know, they were—they just cared about energy efficiency.

So, there are—I think, the commercial sector is where we are going to have some real challenges. I also think, on top of that, you could also address, you know, you talk about Japan and UK and Australia, but, you know, there are other nations we have to deal with that may not be quite there, Indonesia, Philippines, you know, Thailand. I think that part of cyber, it is equally important to bring both those friends and allies along.



Mr. HUNTER. Well, I am going to talk mostly to the commercial part of the question, and I will just say, you know, things are moving fast.

So, on the Philippines, I am now roughly 1 year in office, and that has been a huge shift in that—just in that 1 year of my current service. But on the commercial side, I would say we have forged very strong relationships that you might not have predicted three or 4 years ago with a lot of our commercial partners.

That is true in commercial space. It is very much true in commercial networking and advanced compute capabilities, including folks helping us substantially to field robust, secure, cloud-based networking capabilities, which will enable us to do the kinds of things you were talking about, but securely for those kinds of critical capabilities, of which we have many.

Senator DUCKWORTH. Mr. Hunter, do you want to speak to some of our other partners out there or some of the nations where perhaps they need a little help moving their cybersecurity along? You can always get back to me on it.

Mr. HUNTER. We can get back to you—

Senator DUCKWORTH. Okay, thank you. Senator Cotton.

Senator COTTON. General Moore, anything else in your purview that you would like to share with us today?

Lieutenant General MOORE. No, Senator. I think we touched on everything we wanted to make sure we talked about. Thank you.

Senator COTTON. General HINOTE, you have got 5 days left. What do you want to get off your chest?

Lieutenant General HINOTE. Well—

Senator COTTON. Unburdened by concerns about the future—

General HINOTE:—everybody in the Pentagon is excited to hear—in all honesty, I have watched—for whatever reason, I have been in the Pentagon for a while now and know many of you in the room. I have watched this narrative unfold, this story unfolds.

We have known we have needed change for many, many years, and it feels like we are finally maybe getting to a pivot point right now.

That is exciting, but it is also scary because it could come off the rails right away and we don't want that. So, I am cautiously optimistic and I will be cheering from the sidelines.

Senator COTTON. Mr. Hunter, General Slife, anything from you to close out?

Mr. HUNTER. I did want to mention. So, I think you raised it, sir, in your opening statement and I didn't touch on it as much as would have maybe been judicious on, the importance of our C3 battle management and ABMS related investments.

So, all of the OIs, you know, you think how the OIs operate, they are all fundamentally trying to solve the same problem, which is the operational problem, the pacing challenge. There are sort of different frameworks for understanding and decomposing that problem. They all recombine when you look at OI two and ABMS and C3BM.

To make progress on all of the different OI's, we have to be able to deliver that. We have got a pretty substantial investment resource increase in our budget for that and we very much ask your support for that.

I think we have worked very hard to, with the new PEO, to bring a lot of acquisition rigor and engineering insight, and a lot of a richer set of program activities that you can see when they will deliver results that will be meaningful. So, I think we have come a long way and we ask for your support for that request.

Senator COTTON. Thank you, Senator.

Lieutenant General SLIFE. Senator, we have talked a fair bit today about things like electronic attack, and apertures, and the need to be able to close long range kill chains at scale. One of the things that underpins all of that is the electromagnetic spectrum.

So, as I believe you are tracking, there are considerations about selling access to the electromagnetic spectrum. There is a study going on right now that should be finished, I believe, in September, that will kind of inform the Defense Department's position on this.

I don't know what that study is going to say, but I would just encourage the Subcommittee to remain witting to the potential national security impacts of the loss of spectrum for some of our key capabilities. Thank you, Senator.

Senator COTTON. Okay, all right, gentlemen. Thank you all for your appearance today. Thank you for your service to our Nation. The hearing is adjourned.

[Whereupon, at 4:07 p.m., the Committee adjourned.]

[Questions for the record with answers supplied follow:]

#### QUESTIONS SUBMITTED BY SENATOR TOM COTTON

##### COLLABORATIVE COMBAT AIRCRAFT (CCA)

1. Senator COTTON. Lieutenant General Moore, it was stated that the Department is leveraging things like Artificial Intelligence and Autonomy to underpin the development of Collaborative Combat Aircraft. Is Artificial Intelligence and/or Autonomy a requirement for Collaborative Combat Aircrafts?

Lieutenant General MOORE. The goal of Collaborative Combat Aircraft is to allow the Air Force to generate sufficient deployable combat power, credible and affordable mass, and enhanced forward force posture while minimizing human exposure to risk. To field this capability, initial variants will follow deterministic autonomy logic with more sophisticated AI-derived behaviors being integrated as technology matures. As CCAs will be required to meet mission objectives without direct command from human operators when operating in highly contested environments where communication may be difficult. The Air Force is exploring options to include an appropriate level of human involvement in kill chain decisions to use lethal force.

2. Senator COTTON. Lieutenant General Moore, is the Department of the Air Force committed to fielding these unmanned systems as expeditiously as possible without letting the development of Artificial Intelligence and Autonomy technologies slow things down?

Lieutenant General MOORE. Yes—the CCA acquisition strategy requires an incremental approach with an open architecture. This will allow the Department to field available, proven technologies quickly while investing in autonomy maturation to support future fielding. The incremental approach enables us to leverage a broader industry base and bring in small, software-first businesses that have niche capabilities in autonomy or AI. Parallel to this acquisition strategy, we will concurrently research and validate autonomy through Project VENOM and explore non-materiel aspects of autonomous capability with an Experimental Operations Unit.

3. Senator COTTON. Lieutenant General Moore, with one of the missions of Collaborative Combat Aircraft being electronic warfare—has there been any consideration to upgrading and more widely deploying low cost, currently available items like the miniature air launched decoy-jammer to meet this mission set in the near-term? Or putting jamming pods on aircraft already fielded?

Lieutenant General MOORE. The Air Force is focusing our initial Collaborative Combat Aircraft (CCA) efforts on augmenting our shooters by increasing our weap-

ons delivery capacity. We are currently procuring 10x EC-37B Compass Call aircraft to replace the EC-130H Compass Call, as our premier Airborne Electromagnetic Attack Offensive Counter Information weapon system; the first five aircraft are scheduled to deliver in fiscal year 2025. Our investment in the EC-37 System-Wide Open Reconfigurable Dynamic Architecture (SWORD-A) will deliver capability in a software-defined open architecture, enabling faster system updates and delivery of advanced applications needed to counter rapidly evolving threats. Additionally, our most modern platforms are equipped with integrated, highly survivable electromagnetic warfare capabilities.

#### LOGISTICS

4. Senator COTTON. Secretary Hunter, what steps are we taking now to train and evaluate our logistics systems for operations in a great power conflict where logistics will be heavily contested?

Mr. HUNTER. To achieve resilient basing, the DAF has developed a new concept, Agile Combat Employment (ACE), that uses a hub and spoke system of alternative bases that are resilient to attack. This concept is sound, but a cost-effective mix of investments is necessary to make ACE effective. The fiscal year 2024 budget request includes funding to mature Agile Combat Employment operations, which enables mission execution in a contested environment. The fiscal year 2024 budget request demonstrates our commitment to distributed, resilient basing by prepositioning key support equipment and providing training that will allow combat sorties to launch and recover at expeditionary airfields. These investments sustain support to the joint force, our hardware, and our most important asset—our airmen.

#### SYSTEM DEVELOPMENT

A Defense Advanced Research Projects Agency study on Capability Fielding showed that development times for new military aircraft have increased dramatically since the 1970's with recent systems like the F-35 taking over 20 years to go from project initiation to Initial Operational Capability. A significant component of that increase was test and evaluation which has increased 1000 percent since the 1970's. This increase in development time can obviously lead to having obsolete technology at fielding and aggravate a need to "gold-plate" requirements that drives up cost and risk to programs.

5. Senator COTTON. Secretary Hunter, with test and evaluation as a leading contributor of expanding acquisition times; what if any steps are being taken to safely accelerate test and evaluation execution?

Mr. HUNTER. Data has shown that delays to program timelines identified within the test phase are rarely attributable to problems in test execution. Most test delays are caused by problems with hardware or software. Modern challenges like robust cross-system integration and the cyber domain have drastically increased the complexity of Test. Faced with the need to reevaluate how we view and execute Test, the Air Force has begun an initiative termed "Accelerate Test or Lose." (ATOL). In close collaboration with the acquisition community, ATOL will leverage best practices in acquisition/test policy, digital engineering, modeling and simulation, and digital ranges to address and mitigate sources of delays with the goal to accelerate development and delivery of safe, reliable, and sustainable capabilities to the warfighter. While currently still in progress, ATOL has uncovered several potential changes with high impacts to fielding capabilities faster. The Air Force will begin implementation of easy change/high-impact options as early as late fiscal year 2023.

6. Senator COTTON. Secretary Hunter, what investments are you making into the test infrastructure, and what is the expected impacts of those investments?

Mr. HUNTER. The Air Force is actively working to sustain, renovate and modernize our test infrastructure in alignment with the strategic initiatives laid out by the Department of Defense. Test infrastructure within the Air Force, and DOD, is the foundation of the Nation's ability to develop, mature, and field our most critical defense systems. Our aging test infrastructure is highly specialized and must be modernized in both capability and throughput to confidently defeat near-peer adversaries. Key areas of our test infrastructure modernization efforts include electronic warfare (kill chains), hypersonics, and nuclear modernization with active investments including \$111 million in new facilities for the Joint Simulation Environment (JSE) at Nellis AFB (NV), Edwards AFB (CA), and the Eglin Cyberspace Facility (FL). These new facilities/capabilities enable the Air Force and DOD to conduct joint, multi-domain, high-fidelity virtual test and training events, in a secure, adaptable, and scalable environment which replicates robust open air test and training, increasing aircrew proficiency and lethality. Additionally, the Air Force is leveraging

hypersonic technology through various congressional adds and service investments to upgrade arc heater facilities, wind tunnels, and sled tracks, to bring hypersonic capabilities to the warfighter sooner. These updates, amongst others, are vital to the Nation's ability to fight and win wars of the 21st century.

7. Senator COTTON. What lessons from the F-35 are being applied to accelerate Next Generation Air D and Collaborative Combat Aircraft fielding?

Lessons learned from the F-35 program are an integral part of the strategy and planning for the NGAD Family of Systems (FoS) acquisition. NGAD FoS are structured to ensure a much higher degree of design maturity than F-35 before start of production. They are built on the foundation of a government reference architecture that both avoids vendor lock and ensures the adoption of mature mission systems early in the program's life cycle. NGAD will ensure continuous competition. Unlike the F-35 development, the NGAD FoS approach, which includes Collaborative Combat Aircraft and the NGAD Platform, will employ digital engineering, digital sustainment, agile software development, and government-owned open system architectures.

#### DATALINKS

8. Senator COTTON. Lieutenant General Hinote, Secretary Hunter mentioned previously that the ability for systems to work together is essential, and it is imperative to create data linkages between platforms in order to ensure those systems can work together. These linkages presumably, are also a pre-requisite for control of the Department's Collaborative Combat Aircraft. With platforms like the F-35, F-15EX, and F-22 all having different datalinks, are there steps being taken to coordinate common datalinks across weapon systems and across the military services? With the KC-46 stated to be a critical network node, are there any concerns with creating a single point of failure or that the KC-46 will be too far from forward systems to be effective?

Lieutenant General HINOTE. The Air Force, in conjunction with the Navy, is pursuing development and integration of next-generation line of sight (LOS) and beyond-line-of-sight (BLOS) data link capabilities. These new capabilities align with the Department of the Air Force Operational Imperatives and are informed by the future threat environment. Primary design objectives for these new capabilities include interoperability across all platforms required to enable long-range kill chains, as well as interconnectivity with future aerial and space-based network architectures. Although the KC-46 is envisioned as operating outside the contested environment and thus will not necessarily require the exquisite data link features of forward platforms, connectivity for command and control (C2) and general situational awareness is still needed. The Air Force is actively working to modernize current Link 16 capabilities to improve connectivity and survivability, ensuring communications resilience across key platforms such as the KC-46.

