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HOUSE ARMED SERVICES COMMITTEE
SUBCOMMITTEE SEAPOWER AND PROJECTION FORCES
UNITED STATES HOUSE OF REPRESENTATIVES

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STATEMENT OF:

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INTRODUCTION AND STRATEGIC ENVIRONMENT

Chairman Courtney, Ranking Member Wittman, and distinguished members of the subcommittee, thank you for having us here today to provide testimony on Department of the Air Force modernization. Additionally, thank you for your leadership and dedication to rebuilding the United States military. Together, in recent years, we have made clear gains in improving wartime readiness and setting the tone for modernization, but there remains work to be done.

As the nature and sources of conflict throughout the globe have become more diverse and less predictable, our Nation continues to face a complex set of current and future security challenges, including the resurgence of great power competition from China and Russia. It has become clear that supremacy in the air and space domains—a given for any U.S. military operation since the end of the Cold War—can no longer be assumed and, in some cases, is very much at risk. The National Defense Strategy shifted our prioritization to the high-end fight and reflected this changing nature of warfare.

Today, the Department of the Air Force has fully embraced Secretary of Defense Esper's goal of irreversible momentum toward National Defense Strategy implementation. The Department of the Air Force must be ready to compete, deter, and win in this rapidly changing and increasingly complex security environment; defend the homeland; provide a safe, secure, and effective nuclear deterrent; and be able to defeat a powerful conventional enemy while we deter opportunistic aggression in another theater; and continue to disrupt violent extremists. We must continue on the path to develop a future force that will prevail in each and every domain.

CURRENT CAPACITY AND CAPABILITY

The Department of the Air Force conducted an exhaustive review of our portfolios and made hard decisions to better align with the National Defense Strategy, which includes the

acceptance of calculated short-term risk. Some difficult choices require the divestiture of legacy platforms in exchange for capability needed for the future. Our decisions are supported by learning from multiple, complex wargames to assess alternative warfighting approaches against a peer adversary. Our modernization investments—focused on connecting the Joint force, dominating in space, generating combat power, and conducting logistics under attack—reflect the new strategic reality.

Bomber / ICBM Force Structure

The future of our bomber force relies on the B-21 and a heavily modified B-52. The Department of the Air Force will continue to invest and modernize the B-1 and B-2 fleets until the B-21 fleet is delivered in sufficient quantities. Our budget proposal supports the Defense Department's principal priority to maintain a safe, secure, and effective nuclear deterrent that safeguards the homeland, assures allies, and deters adversaries. As you know, nuclear deterrence is the highest priority mission of the Department of Defense – our deterrent underwrites every U.S. military operation around the world as is the foundation and backstop of our national defense.

B-21

The National Defense Strategy provided strategic direction to develop a new stealth bomber, and the B-21 Raider is the answer. The B-21 has a mature and stable design and has transitioned to development of the first test aircraft. The B-21 is driving an early focus and investment in DevSecOps and agile software processes to foster system flexibility as well as an affordable and smooth transition to an organic sustainment capability. The Air Force identified Dyess Air Force Base, Texas; Ellsworth Air Force Base, South Dakota; and Whiteman Air Force Base, Missouri as the preferred locations for the B-21 Raider. The final basing decision is

expected in 2021 following compliance with the National Environmental Policy Act (NEPA) and other regulatory and planning processes. The FY21 Budget requests $2.9 billion ($26.5 billion across the Fiscal Years Defense Plan (FYDP)) to continue Engineering Manufacturing and Development.

The B-21 will be a highly survivable asset with the ability to penetrate modern air defenses to accomplish mission objectives in an anti-access/area denial environment. We will need a minimum of 100 B-21s in our inventory. We are also pursuing legacy bomber fleet upgrades in order to keep those assets sustainable and viable, which is necessary until the B-21 becomes operational in sufficient numbers. The Department of the Air Force is committed to building a minimum of 100 B-21s with an average per unit cost of $550 million (BY10) / $639 million (BY19).

B-52

While the last B-52 Stratofortress entered service in the United States Air Force in 1962, we expect to continue operating the B-52 through 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), $2.0 billion across the FYDP; Radar Modernization Program, $1.2 billion across the FYDP; and Combat Network Communications Technology (CONECT), $51 million across the FYDP; and installation of Advanced Extremely High Frequency (AEHF) secured satellite communication capabilities, $215 million across the FYDP.

The Department of the Air Force's number one priority for the B-52 is to ensure platform viability through 2050 and the CERP is critical to achieving this goal. CERP will replace legacy engines (TF33-PW-103) with new commercial engines using Middle Tier Acquisition processes

to remove more than three years from the traditional program schedule. Additionally, CERP is more complex than just a standard commercial engine refit. CERP includes new engines, flight systems, and cockpit throttle and displays. The Radar Modernization Program is also necessary to ensure viability through 2050 and will modernize the current Strategic Radar (AN/APQ-166), which is based on 1960s technology modified in the 1980s.

B-52 Combat Network Communications Technology (CONECT) provides an integrated communication and mission management system, as well as a machine-to-machine interface for weapons retargeting. CONECT's digital infrastructure and architecture provides the backbone for the 1760 Internal Weapons Bay Upgrade, which allows for internal carriage of J-series weapons through modification of the Common Strategic Rotary Launchers. This significantly increases the B-52's capability to store and deliver the Joint Direct Attack Munition (JDAM), Laser-JDAM, Joint Air-to-Surface Standoff Missile (JASSM) and its extended range variant, and the Miniature Air Launched Decoy (MALD) along with its jamming variant. Finally, the integration of the long-range standoff (LRSO) nuclear air-launched cruise missile and AEHF will ensure the continuation of the B-52's role in the airborne leg of the Nuclear Triad. The Air Force remains committed to B-52 modernization to ensure the Nation's oldest and most versatile frontline long range bomber remains relevant through at least 2050.

B-1

The B-1 is a long-range, supersonic multirole bomber capable of flying intercontinental missions with the largest payload of guided and unguided weapons in the Air Force inventory. Our B-1 force has relentlessly delivered 18 years of continued combat airpower in support of global Combatant Command requirements. Now, we must rebuild our combat capacity in order to provide a lean and lethal B-1 force to combatant commanders. To do so, we will retire 17 B-1s

in FY21 to allow the Department of the Air Force to focus available resources on sustaining and modernizing the remaining combat-coded B-1s. The goal is to retire the most challenging aircraft to sustain in order to improve readiness of the remaining fleet. We will continue to invest in B-1 modernization and sustainment to ensure the platform remains lethal and viable until B-21s are operational in sufficient numbers. The Integrated Battle Station upgrade, $66 million across the FYDP, will enhance crew situational awareness and precision engagement capabilities and is the B-1's largest modernization effort ever. The first aircraft with this upgrade was delivered in January 2014. The last six aircraft will be completed in summer of 2020. Other efforts to update the B-1's communication systems are ongoing and ensures the B-1 remains the backbone of the Air Force's long-range bomber force.

Lastly, the B-1 is the Air Force 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.

B-2

The B-2 is the only long-range strike aircraft capable of penetrating and surviving advanced Integrated Air Defense Systems to deliver weapons against heavily defended targets. Its unique attributes of intercontinental range, precision strike, large conventional or nuclear payloads, ability to penetrate defenses, and low observable profile allow it to execute Nuclear Deterrence Operations, Nuclear Response, Global Strike, and Global Precision Attack missions. The Air Force will continue to modernize the B-2 to ensure it remains effective until the B-21 is operational.

Delays in the troubled Defensive Management System modernization effort have limited the operational utility of the system by the time it would be fielded. Therefore, the Air Force will abandon the full Defensive Management System modernization and instead pursue a reduced effort to upgrade the cockpit display system, required to replace unsustainable cathode ray tube displays.

The Air Force has completed development efforts to re-host the Stores Management Operational Flight Program software in the Flexible Strike program, enabling the B-2 to take advantage of advanced digital weapon interfaces, such as those used by the B61-12 nuclear weapon. The Flexible Strike capability will begin fielding this year as part of the B-2 P6.2 block effort, which includes Military GPS User Equipment and B-2 hardware to support carrying the B61-12 weapon. The Air Force began installing the Common Very-Low-Frequency / Low Frequency (VLF/LF) Receiver and will complete fielding the system in all 20 B-2 aircraft in FY20. This program provides the B-2 with a VLF/LF receiver for secure, survivable, strategic communications capability. Other on-going B-2 modernization programs include enhancement of the Identification Friend or Foe (IFF) system, replacement of the Crash Survivable Memory Unit, integration of hardware upgrades for employment of the B61-12 nuclear weapon, and software upgrades to allow the B-2 to carry the extended range variant of the Joint Air-to-Surface Standoff Missile (JASSM-ER). The Radar Aided Targeting System software upgrade began development in October 2018 and will provide improved navigational handoff to weapons in a GPS-denied environment. Finally, the B-2 will continue sustainment efforts, $132 million across the FYDP, for the on-going Low Observable Signature and Supportability Modification effort, to improve aircraft maintainability and availability.

Intercontinental Ballistic Missile Modernization

Intercontinental Ballistic Missiles (ICBMs) are the backbone of U.S. nuclear deterrence. The Department of the Air Force is in the initial stages of replacing this 1970s-era ICBM capability with the Ground-Based Strategic Deterrent (GBSD). The GBSD is the most cost-effective option for modernizing the ICBM leg of the Nuclear Triad and supports the National Defense Strategy to modernize the capability of nuclear forces. The GBSD will extend and improve the capabilities of the ground-based leg of the Nuclear Triad, providing a responsive deterrent capability against current and future adversaries through 2075. It also will provide more efficient operations, maintenance, and security by modernizing critical infrastructure and by decreasing lifecycle costs. Deployment is scheduled to begin in the mid-2020s in order to resolve capability, attrition, and age issues with the current Minuteman-III weapon system, as well as meet warfighter requirements. The Nation is investing $15.3 billion during this FYDP on these new missiles, infrastructure, and their accompanying re-entry systems.

Tanker Fleet

Tankers are the lifeblood of our Joint force's ability to respond to crises and contingencies quickly and are essential to keeping our Department of the Air Force fueled as a global force. At the end of FY20, the tanker fleet will be comprised of 398 KC-135s, 56 KC-10s, and 52 KC-46s that provide the backbone of rapid U.S. global operations. We have accepted 31 KC-46s and will receive a total of 179 KC-46 Pegasus aircraft while we continue to divest the aging KC-10 and KC-135 fleets and look towards the next generation for tanker recapitalization options.

KC-46

While we continue to sustain the current tanker capability, building the future tanker fleet remains one of the Air Force's top acquisition priorities. The KC-46 will deliver greater

operational readiness, flexibility, and survivability to the Global Reach mission. The Air Force awarded Lot 5 on 27 September 2019, increasing the number of production aircraft on contract to 67. The Lot 6 contract for 12 aircraft is projected to award in May 2020.

The first KC-46 aircraft was delivered to McConnell AFB, Kansas (Main Operating Base 1), on 25 January 2019. The Formal Training Unit at Altus AFB, Oklahoma, received its first KC-46 on 8 February 2019. The Department of the Air Force established Main Operating Base 2 at Pease Air National Guard Base, New Hampshire, on 8 August 2019. The Department of the Air Force will continue taking delivery of KC-46s at a rate of approximately three per month through FY20, at which point the delivery rate will reduce to approximately 1.25 per month. The Department of the Air Force began dedicated Operational Test and Evaluation on 14 May 2019, executed the first Operational Test flight on 4 June 2019, and formally transitioned into Initial Operational Test and Evaluation (IOT&E) on 23 October 2019.

Partnered with Air Mobility Command, we have worked hard to accept the KC-46 while ensuring its major deficiencies—the Remote Visual System (RVS) and stiff air refueling boom—are properly addressed without undue burden on taxpayers or warfighters. We established a subject matter expert team that derived critical performance parameters for both the RVS and boom and codified these parameters in legally-binding agreements with Boeing. Due to the extensive nature of the fixes, especially the RVS, design solutions to both issues will take three-to- four years to develop, and additional time to fully retrofit across our fleet.

The Department of the Air Force remains committed to holding Boeing accountable to fix deficiencies identified in both developmental and operational test and evaluation of the KC-46's effectiveness, suitability, and mission capability. We remain concerned with Boeing's slow progress resolving issues limiting the KC-46's ability to accomplish all missions and will

continue to work with Boeing to ensure the KC-46 meets all essential mission requirements. The Department of the Air Force is withholding up to $26.5 million per aircraft. If applied to all 67 aircraft on contract, withholds could be as high as $1.8 billion. The Department of the Air Force will not pay for capability not delivered.

Despite its current deficiencies, the KC-46 is safe to operate (adhering to flight manual cautions provided to our operators) and will be the Department of the Air Force's best tanker for contested environments due to enhanced situational awareness, battle management, and threat countermeasures. Accepting the KC-46 with known deficiencies permitted initiation of familiarization and operational test activities while the Department of the Air Force works with Boeing on long-term efforts to correct deficiencies. Accepting the KC-46, and fixing deficiencies in parallel with operational test and evaluation, is the fastest way to achieve full operational capability to meet warfighter requirements.

The FY21 Budget requests $106.3 million in RDT&E funding for the ongoing KC-46 Engineering and Manufacturing Development and post production modification efforts, to include the boom telescope actuator redesign effort resolving the stiff boom deficiency. Additionally, the FY21 Budget requests $3.1 billion in procurement funding to award Lot 7 (15 aircraft plus associated spares, engines, support equipment, and wing air refueling pods).

KC-10 and KC-135

The average age of our KC-135 and KC-10 tankers is 58 and 35 years old, respectively. Both fleets are challenged by aircraft parts obsolescence and diminishing manufacturing source issues. We are able to maintain these platforms as effective and safe weapon systems for the warfighter with the help of organic Department of the Air Force depots and industry. We are

executing several key modernization, safety, and compliance initiatives to ensure our KC-135 fleet remains viable through at least 2045.

The FY21 Budget requests $88.25 million to continue KC-135 modernization efforts. The Block 45 program addresses supportability, reliability, and maintainability issues with legacy flight and engine instruments by integrating a digital flight director, autopilot, radar altimeter, and electronic engine instrument display for our operators. Additionally, the Rudder Position Indicator program enhances safety of the KC-135 by providing the aircrew with situational awareness for the actual rudder position.

Furthermore, the FY21 Budget also requests $7.1 million through the FYDP to keep our KC-10 fleet operational through its planned retirement, and includes funding for service bulletins and low cost modifications to ensure Federal Aviation Administration certification.

The Department of the Air Force took measured risk in FY21 tanker capacity in order to resource the capability we need for the future fight. As we look to better align the Department of the Air Force with the National Defense Strategy, divestments were accelerated in both the KC-135 and the KC-10 fleets. Specifically in FY21, the Department of the Air Force is divesting 16 KC-10s and 13 KC-135s from the Active Duty fleets.

Presidential 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. The VC-25B program will deliver two new aircraft to meet the requirements for the President to execute the roles of Head of State, Chief Executive, and Commander-in-Chief. Two Boeing 747-8 aircraft will be uniquely modified to provide the President, staff, and guests with safe and reliable

air transportation with an equivalent level of communications capability and security available in the White House. The modifications to the 747-8 aircraft will 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 program successfully ferried both commercial 747-8 aircraft to the San Antonio modification facility in April 2019 and completed aircraft removals, jacking, and cribbing ahead of schedule. The program also completed the System Critical Design Review in January 2020.

The FY21 Budget requests $800.9 million to continue Engineering and Manufacturing Development, start aircraft modifications, and begin Product Support activities. The budget adds funding in FY21 to fix FY19 shortfalls and realigns out year funding to match program requirements.

Other Presidential Airlift Modernization

C-32

The Department of the Air Force and the Navy are engaged in a combined Analysis of Alternatives to recapitalize the National Military Command System fixed-wing airborne layer and large capacity Executive Airlift fleets. This study encompasses the E-4B National Airborne Operations Center, C-32A Executive Airlift, and E-6B Airborne Command Post/Take Charge and Move Out aircraft and missions. These platforms are aging and increasingly difficult to support. The study explores the realignment of missions among platforms and examines potential benefits of acquiring common airframes without sacrificing operational effectiveness or increasing overall costs. The Department of the Air Force and the Navy expect to complete the effort in the March 2020 timeframe. C-32 Recapitalization is currently in the Materiel Solutions

Analysis Phase and is not a formal acquisition program. The FY21 Budget requests $9.9 million for Materiel Solution Analysis activities, Technology Maturation, Risk Reduction, and to develop a Capability Development Document for the C-32 recapitalization program.

Strategic Airlift

C-5

The C-5 Super Galaxy provides all-weather worldwide strategic airlift for combat forces, equipment, and supplies, exemplifying Rapid Global Mobility outlined in the National Defense Strategy. Current investment programs focus on fleet obsolescence, maintainability, and safety of flight.

The FY21 Budget requests $71.8 million in procurement funding, predominately for communications, navigation, surveillance/air traffic management (CNS/ATM) and C-5 core mission computer/weather radar (CMC/WxR) system equipment. CNS/ATM upgrades include Automatic Dependent Surveillance-Broadcast (ADS-B) Out modifications required for global airspace compliance. The CMC/WxR effort replaces an antiquated radar system with diminishing manufacturing sources and upgrades the core mission computer processor to meet the demands of future software modifications.

Additionally, the FY21 Budget requests $32.6 million in RDT&E funding to support replacement of the Multifunctional Control 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.

C-17

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

The FY21 Budget requests $107.4 million in procurement funding to continue critical modifications to the C-17 fleet. This includes Identify Friend or Foe for the identification and control of military aircraft, and Large Aircraft Infrared Countermeasures defensive systems. The sustainment modification effort of a replacement heads-up display will address obsolescence of the current C-17 heads-up display and improve the system's availability, reliability, and maintainability. Additionally, $10 million of FY21 RDT&E funding will address obsolescence and flight safety issues. The Beyond Line-of-Sight communication system effort modernizes multi-channel voice and data communication subsystems to ensure the C-17 keeps pace with changes in Department of Defense communication infrastructure.

Tactical Airlift

The C-130 fleet consists of legacy C-130H and newer C-130J aircraft, as well as special mission aircraft (AC/LC/EC/MC/HC/WC-130s). 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 Department of the Air Force continues to modernize the C-130H legacy fleet through a four-pronged approach emphasizing aircraft safety, airspace compliance, modernization, and partial recapitalization. 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 1 ensures the legacy fleet is outfitted with modern communication equipment and complies with U.S. and international airspace transponder mandates and the Department of the Air Force is on track to complete these upgrades in FY21. The AMP Increment 2 program improves the C-130H fleet maintainability and reliability by providing a new digital avionics suite, and mitigating obsolescence and diminished manufacturing source challenges. The FY21 Budget requests $42 million in RDT&E and $5.9 million in procurement funding to support the legacy C-130H fleet.

As with other weapon systems, the Department of the Air Force is taking acceptable risk in the C-130 portfolio as it focuses resources toward the future force. Specifically, in FY21 the Department of the Air Force is divesting 13 C-130H from the Air National Guard (ANG) inventory. Also in FY21, aided by the decision to retain A-10s at the Maryland ANG base in Baltimore, the Department of the Air Force is able to execute the planned transfer of eight C-130Js from Active Duty to the ANG. Additionally, thanks to the support of Congress, the ANG will be receiving 11 new C-130Js from Lockheed Martin to recapitalize 11 C-130Hs.

C-130J

The Air Force is also partially recapitalizing the legacy C-130H fleet with C-130Js, which specifically supports 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 airborne psychological operations and offensive electronic

warfare (EC-130J), weather reconnaissance (WC-130J), search and rescue (HC-130J), and special operations (MC-130J and AC-130J). In addition to purchasing new aircraft, the Department of the Air Force has multiple modification efforts for the C-130J, including Center Wing Box replacement, Large Aircraft Infrared Countermeasures, and an accelerated avionics upgrade to meet 2020 Federal Aviation Administration and international airspace mandates. 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 Department of the Air Force plans to upgrade both our C-130H and C-130J fleets with a Mobile User Objective System satellite communication system to ensure we maintain key communication links anywhere in the world.

The FY21 Budget requests $10.7 million for C-130J RDT&E and $140 million for C-130J procurement and modification efforts. It also requests $24.7 million for HC/MC-130J RDT&E and $423.6 million for HC/MC-130J procurement and modification efforts.

FUTURE CAPABILITY

Competing against rising peer adversaries during this time of unprecedented technology change requires a competitive acquisition system: one that is faster and more agile than our rivals. Consequently, the Department of the Air Force is transforming what we buy, how we buy, and who we buy from to retain the battlefield dominance we presently enjoy.

Faster Acquisitions

Fielding systems faster is step one. Through rapid prototyping authorities granted by Congress, like Middle Tier Acquisition, we are trimming non-value-added steps that previously bogged down programs and slowed capability to warfighters. In May 2019, we achieved our goal of removing 100 years of excess time from program schedules. Since then, we have reached 125

years on our way to 150 this summer. Rapid prototyping—"flying before you buy"—is not just a faster acquisition approach; it allows risks to be tackled earlier, before systems are in production when there is still time to troubleshoot. The benefit is proving out in our 55 MTA programs, which maintain the same documentation and discipline as traditional programs. We thank Congress for this invaluable authority and will continue to report our status tri-annually.

Another accelerant is DevSecOps software development. With the establishment of our Program Executive Office for Digital, Chief Software Officer, and over 60 agile coding teams spanning both traditional programs (e.g., F-16, F-22, and B-21) and new development "factories" (e.g., Kessel Run, Kobayashi Maru, Space Camp, and LevelUp), the Department of the Air Force is scaling modern software practices where cycle times are now weeks, even days. To accelerate even further, we are fielding common infrastructure that all programs can leverage. "cloudONE," our enterprise cloud, and two coding platforms, "platformONE" and the Kessel Run platform, currently provide enterprise-wide coding environments employing leading commercial technologies, like containerization and Kubernetes, increasing the reliability and security of our code. Programs like F-16, F-22, B-21, and GBSD are leveraging this pre-accredited infrastructure to develop faster and more securely.

Another accelerant is digital engineering, which is revolutionizing the design and production agility of new programs like T-7A, GBSD, and Next Generation Air Dominance (NGAD). As future threats become increasingly difficult to predict, NGAD is employing digital engineering to replace once-in-a-generation, mass-produced fighters with smaller batches of iteratively-upgraded platforms. Dubbed the "Digital Century Series", the approach takes a cue from the digital transformation of the automotive industry, using high-fidelity models to troubleshoot design, assembly, maintenance, and cost before physical systems exist. The goal is

to end the learning curve cost of modernization so that future aircraft—as well as satellites and weapons—can rapidly adapt to changing threats in a way legacy Major Defense Acquisition Programs cannot. We are excited about our progress and look forward to sharing the details with Congress in a classified setting.

Smarter Acquisitions

Faster acquisitions go hand-in-hand with smarter ones. Leveraging new technologies and new industry practices that increase program quality and agility is essential to compete long-term. One area of smarter acquisition not often highlighted is sustainment innovation. The average aircraft flown by the Air Force is 23 years old, and systems like the C-5, KC-135, and B-52 are even older at 33, 58, and 58 respectively. These aging fleets face significant readiness challenges as approximately sixty percent of their supply chain is single-source or, increasingly, unsourced. To fill the gap, our Rapid Sustainment Office is developing, transitioning, and training Department of the Air Force maintainers to use technologies found in smart manufacturing. Artificial intelligence, robotics, and additive manufacturing (i.e., 3-D printing) are now being used at scale to lower costs and speed-up repairs for our warfighters. To date, the Department of the Air Force has certified over 2,000 additively manufactured parts, cold spray repairs at our depots, and predictive maintenance for 5 systems with 11 more joining this year—saving cost while increasing readiness. This summer we will host our first Advanced Manufacturing Olympics, a challenge-based competition showcasing current fleet readiness problems and awarding contracts to organizations who solve them. We are excited to take the next step in on-demand manufacturing with new industry and academia partnerships.

Another area of smarter acquisition is our work with startups, small businesses, and private investors. With over eighty percent of our nation’s research and development (R&D) now

commercial—and our Defense Industrial Base continuing to shrink through mergers and acquisitions—transforming the way we work with commercial companies is imperative. In 2018, we began energizing our Small Business Innovative Research/Small Business Technology Transfer Program (SBIR/STTR) to lower barriers for commercial tech companies, speed contracts, and bring private investment into the Defense market. In 2019 alone, we awarded over 1,000 contracts worth $240 million to 700 companies, with over half new to the government; conducted 15 "Pitch Days" that awarded $77 million in same-day contracts; and induced over $400 million of private investment matching for companies receiving Department of the Air Force awards. With more improvements coming this year, we will formally launch this new "Air Force Ventures" process at scale so that tech companies can depend on us as an early innovation partner of choice.

Another example of smarter acquisition is Agility Prime, a non-traditional program seeking to operationalize commercial electric vertical takeoff and landing (eVTOL) vehicles (i.e., "flying cars") for military missions and potentially accelerating the emerging commercial market. The Department of the Air Force has unique testing and safety resources—and revenue-generating military use cases—to help mitigate present commercial market and regulatory risks. Agility Prime will use these resources, vice significant R&D funding, to attract investors, build confidence, and hopefully expedite commercialization, all while providing warfighters with revolutionary flexibility for numerous missions. Transforming our acquisition system from a mere purchaser to an innovation partner is key for accelerating dual-use technology and countering the advantages of state-sponsored industrial bases. We appreciate the support of Congress on this effort, including the additional $25 million it appropriated in the FY20 Defense Bill.

Connecting the Joint Force

One effort that will stress how fast and smart our requirements, acquisition, and operations process can move is Joint All-Domain Command and Control (JADC2) powered by the Advanced Battle Management System (ABMS). Charged by the Secretary of Defense with leading the concept development for JADC2, the Department of the Air Force is building a militarized "internet of things (IoT)" to connect any sensor with any shooter—across all domains—with the required digital infrastructure for data analytics and artificial intelligence to fight at machine speeds.

Because of the complexity, risk must be retired more quickly and routinely than traditional programs to avoid "snowballing" and failure. Taking a cue from DevSecOps, which iteratively develops and deploys thin "slices" of minimally-viable code that stack into greater capabilities while providing user feedback each cycle, ABMS will develop and deploy military IoT-type connectivity—things like cloud, data management, and software-defined radios and networks—in hardware-software slices designed for upgradeability, vice point performance. Concepts and systems will be iterated in four-month cycles that culminate in live-fly experiments.

Our first experiment in December 2019 connected Air Force aircraft, Space Force sensors, Navy surface vessels and aircraft, Army air defense and fire units, and a Special Operations Team for the successful defeat of a simulated cruise missile. Led by U.S. Northern Command, 26 of 28 connectivity objectives were met, including the first connection of an F-35 with an F-22 via a translating gateway called "gatewayONE". However, the failures were more important than the successes: failing and fixing fast is the core acquisition principle.

Our Department of the Air Force FY21 Budget request includes additional resources for ABMS and its digital backbone, Enterprise Information Technology as a Service, comprising 28 development projects, like the aforementioned gatewayONE, and continued experimentation, the next of which is this April under U.S. Space Command, U.S. Northern Command, and U.S. Strategic Command sponsorship. We are committed to working with our Joint and Allied Partners so that existing systems can join easily. We ask Congress to support this capability so that future operators on the battlefield enjoy the same empowered connectivity they presently enjoy at home.

Thank you again for the opportunity to testify before this Subcommittee. The dialogue we have today will help us design, build, and operate a force capable of fighting and winning now and in the future.