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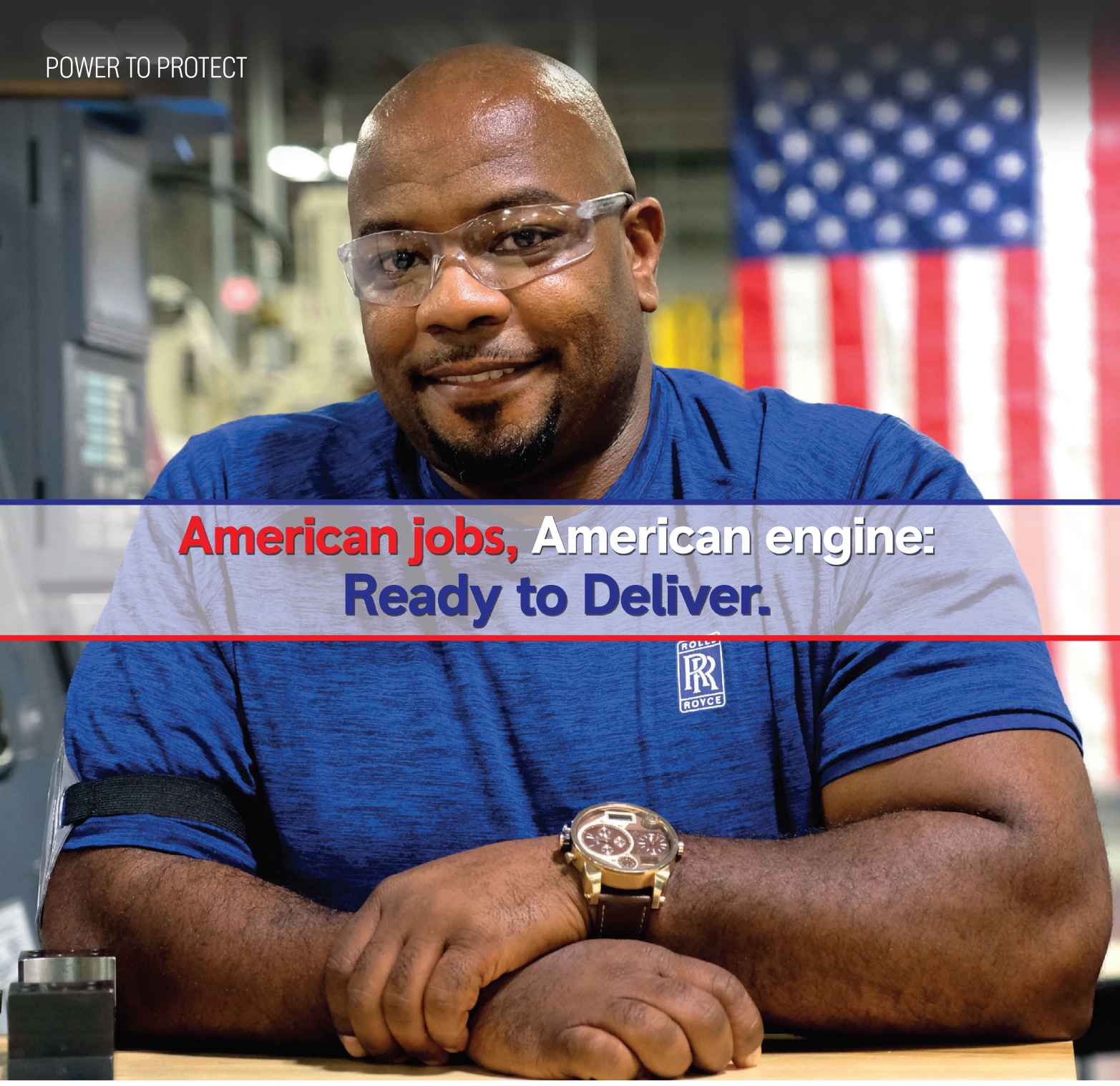
0 74470 29757 4

Published by the Air Force Association



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AIR FORCE

November 2021, Vol. 104, No. 11

Mike Tsukamoto/staff; Senior Airman Bryan Myhr/ANG

DEPARTMENTS

FEATURES

Three recent reviews performed by the Air Force found glaring gaps in diversity among both officer and enlisted ranks. See "More Uncomfortable Conversations," p. 35.

ON THE COVER

Alex R. Lloyd

A Lightning II Demonstration Team pilot pulls the nose up into a climb during practice at Hill Air Force Base, Utah. See "Next Generation Power for Air Force Fighters," p. 30.

STAFF

Air Force Magazine (ISSN 0730-6784) November 2021 (Vol. 104, No. 11) is published monthly, except for two double issues in January/February and June/July, by the Air Force Association, 1501 Lee Highway, Arlington, VA 22209-1198. Phone (703) 247-5800. Periodical postage paid at Arlington, Va., and additional mailing offices. **Membership Rate:** $50 per year; $35 e-Membership; $125 for three-year membership. **Subscription Rate:** $50 per year; $29 per year additional for postage to foreign addresses (except Canada and Mexico, which are $10 per year additional). Regular issues $8 each. USAF Almanac issue $18 each. **Change of address** requires four weeks' notice. Please include mailing label. **POSTMASTER:** Send changes of address to Air Force Association, 1501 Lee Highway, Arlington, VA 22209-1198. Publisher assumes no responsibility for unsolicited material.

By Tobias Naegele

The Bill Comes Due

Congress and the President failed to pass a budget for the fiscal year that began on Oct. 1, and the Pentagon is operating once again on continuing resolutions. Instead of doing the work that must be done, they're wrestling over wish-list social spending and how to tax wealthy individuals and corporations to pay for it all.

Congress and the President failed to pass a budget for the fiscal year that began on Oct. 1, and the Pentagon is operating once again on continuing resolutions. Instead of doing the work that must be done, they're wrestling over wish-list social spending and how to tax wealthy individuals and corporations to pay for it all.

Meanwhile, they fail to secure the nation and our allies from growing threats on the other side of the world.

China tested a missile this summer that circled the globe and glided to Earth at hypersonic speed. There is no defense against such a weapon.

"I don't know if it's quite a Sputnik moment. But I think it's very close to that," said Gen. Mark A. Milley, Chairman of the Joint Chiefs of Staff.

Sputnik was a wake-up call to an America tired of war and eager to invest in other things. That's not so different from today. China's rapid military evolution spans the spectrum of warfare and poses challenges not just to its smaller neighbors, but to American power, prestige, and influence.

Left unchecked, China will only grow more belligerent. Xi Jinping and his party claim they are interested only in their own defense, but their aggressive military buildup and expanding capabilities belie that assertion. Their behavior is indicative of a nation striving to intimidate and impose its views on others, not one interested in deterrence to avoid conflict.

Modernization has never been more essential, nor the funds more elusive.

Unconstrained by nuclear arms treaties, China is constructing at least 250 missile silos spread among three sites in Northwest China and Mongolia—hard-to-reach locations deep in the Asian landmass. Its air defenses and long-range, hypersonic missiles were built to counter U.S. strengths like aircraft carriers and bomber aircraft.

China already has more planes than anyone else in the region. A new variant of its most advanced fighter, the J-20, the product of stolen U.S. intellectual property, includes a backseat, perhaps indicating plans to fly it in tandem with companion drones.

American forces expect air supremacy. They may not have it in the very near future.

Over a four-day period in early October, China flew 149 aircraft into Taiwan's Air Defense Identification Zone. Though this was more stunt than intimidation, China demonstrated strength, resolve, and its growing willingness to test the bounds of good neighborly behavior. China made clear it will do as it pleases, international norms be damned.

China has never ceased believing Taiwan is part of China proper. "The complete reunification of our country will be and can be realized," said Senior Col. Tan Kefei, spokesperson for its Ministry of National Defense. A nation cannot be more plain about its intent.

The United States is committed to protecting Taiwan, but it's becoming doubtful we have the wherewithal to deter China from making a move. That depends on whether China thinks the U.S. can stop it from a successful land grab across the Taiwan Strait.

The risk of military conflict, whether sparked on purpose with an attempted fait-accompli invasion by China or accidentally as a result of one side misinterpreting a "strategic competition" maneuver for military aggression. Either way, the U.S. Air and Space Forces are ill-prepared for such a conflict.

China watched as the U.S. waged war over the past 30 years, growing and modernizing while USAF was depleting its resources and deprived of the funds needed to replenish. Planned purchases of F-22 fighters were cut in half; B-1 bombers and F-15s were flown beyond their usable life spans. New-build F-35s are coming, but far too slowly. Satellite systems deployed when space was benign, are indefensible from cyber and physical attack.

Modernization has never been more essential, and yet the funds have never been more elusive.

The Air Force finds itself like a family that put off buying new cars and maintaining the homestead for years while the kids grew, only to have all those bills come due at once.

USAF needs new ICBMs, new bombers, new fighters, new trainers, and new tankers. The ICBMs alone will cost $6 billion a year for a decade, according to the Congressional Budget Office. Half a century old and reliant on obsolete technology, they cannot be sustained any longer.

The bomber story is similar. The Air Force's newest bombers average 26 years of age, and there are only 20 of them; the entire bomber fleet averages 60 years old. To acquire 220 B-21 Raiders, at $550 million each, is another $110 billion.

And then there are the fighters. To right size and modernize, the Air Force needs at least 80 new fighters per year, mostly F-35s. Buy fewer and the fleet continues to age and wither. But the Air Force can't afford that many today. It needs another $1.6 billion a year over and above the billions it's already committing to reach that level.

Add those up and there's no money left for tankers, trainers, missile detection satellites, and advanced air defenses, let alone hypersonic and space-based weapons.

Were this a family, the only answer would be to get a second job to generate more income. For the Air Force and Space Force, the only answer is to find new revenue.

One option is the pass-through. While Secretary of the Air Force Frank Kendall sees this as a budget trick, the fact remains that holding on to an anachronistic and ineffective attempt to hide funding for other agencies distorts the public's understanding of what it's getting for its money. A second option is to cut Army force structure and related spending to pay the bill for Air Force, Space Force, and Navy modernization. In the wake of 9/11, the Army spent nearly a trillion dollars more than the Department of the Air Force to fight in Afghanistan and Iraq. Now it's time to invest on a similar scale in the Air and Space Forces.

This is a bill lawmakers cannot ignore. Air and space power are indispensable to the American way of war. Ponying up $20 billion a year for the next decade to right the imbalance between requirements and budget might not solve the problem altogether. But it comes close.

Congress is tied up in knots trying to pass legislation for trillions in new entitlement spending. Let's invest a tiny fraction of that to deter war with China and guarantee the safety of all our citizens. American air and space power must be ready and capable of defeating any threat that arises from the so-called People's Republic of China. ✪

LETTERS

It's Electric

I totally endorse electricity survivability in an age of severe weather incidents, cyber attacks, and other potential attacks ["Let There Be Light," September, p. 58]. I'm not sure that solar panels are the most cost-effective or reliable back-up source. Solar panels don't work at night. My father always used to say, "utilize your resources." What resources could be used at a USAF base to match the 28 megawatt solar array at Vandenberg Air Force Base, [Calif.]?

First, let me convert the power of the solar array from 28 megawatts to 28,000 kilowatts. Let me also note that 1 horsepower is approximately 0.75 kw. Let me illustrate with three different types of engines how many of these engines would be required to match the solar array. The three engines for illustration: 84 horsepower (60 kw) Chevy Volt engine, the 4,300 horsepower of one C-130 engine, and the 40,000 lbs of thrust for one C-17 engine. The 84 horsepower (64 kw) Chevy Volt engine is designed to drive a 55 kw generator. Thus it would take 28,000/55 = 509 such engines to be the equivalent of the 28 megawatt solar array. A single C-130 engine is 4,300 horsepower or about 3,200 kw.

Assuming a connection could be made to a generator which was as efficient as the Chevy Volt, this would be equivalent to a generator of 2,900 kw or 28,000/2,900 = 10 such engines would be the equivalent of the solar array. A single C-17 engine of 40,000 lbs thrust is not a straightforward conversion, but let me assume that it is the equivalent of 40,000 horsepower or 30,000 kw.

Thus, a single C-17 engine would be the equivalent of a 28,000 kw solar array. The Chevy Volt was designed for a engine-to-generator connection. There is no design for a C-130 engine to be connected to a generator, but this shouldn't be a difficult design task. The same type of design to connect a C-17 engine to a generator would be more challenging, but all natural gas power plants are simply turbines supplied with natural gas.

The Air Force should consider solar power, wind power, and also the power of its many engines at its bases as a source of emergency power. What's missing at the present are designs to harness these engines to generators to produce emergency electricity. How much fuel is stored at each Air Force base? I think there would be plenty to keep 10 C-130 engines running for many weeks or a C-17 running for many weeks. In fact, a few Air Force engines combined with appropriately designed generators and trained Air Force personnel could aid U.S. communities in the event of a power outage.

William Thayer
San Diego

The End in Afghanistan

Surely the generals did not advise [President Joe] Biden to hand over (secretly from our allies, in the middle of the night) a secure, defendable, two-runway base in favor of a single runway civilian airport overrun with people (including our enemy) in an urban area and surrounded by hills ["World: Afghanistan's Saigon Moment," September, p. 26].

At Bagram, you would have moved the perimeter out past a "no-go zone" and had the screening done by two troops each at checkpoints—well covered by firepower—rather than bunched in with the crowd as easy targets as mass bomb casualties. We heard a lot of talk about moving the perimeter out at the airport but it was impossible at a civilian airport in a city.

No platoon leader or above would have recommended this to Biden, but he now accuses the generals of doing just that. A more likely scenario is that

WRITE TO US

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AFA's Mission

Our mission is to promote dominant U.S. Air and Space Forces as the foundation of a strong National Defense; to honor and support our Airmen, Guardians, and their Families; and to remember and respect our enduring Heritage.

To accomplish this, we:

- **Educate** the public on the critical need for unrivaled aerospace power and a technically superior workforce to ensure national security.
- **Advocate** for aerospace power, and promote aerospace and STEM education and professional development.
- **Support** readiness for the Total Air and Space Forces, including Active Duty, National Guard, Reserve, civilians, families and members of the Civil Air Patrol.

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Biden ordered them to bring the troops down to, lets say, 600 and protect the embassy as a priority. That choice was an order by Biden to abandon Bagram—indeed, to surrender. If so, the generals should retire and go public.

If they somehow DID advise this, they should resign in shame, with no retirement, or worse. It's back to the dereliction of duty of the Vietnam days.

David Skilling
Marietta, Ga.

I was stunned by the wording on the September cover. Stunned because of how quickly the page had turned, with Americans left behind, friends left behind, and military equipped left behind.

Perhaps another title which wasn't so callous would have been in order.

Col. John Hill,
USAF (Ret.)
St. Paul, Minn.

I was totally amazed to watch American civilian noncombatants, Afghani refugees, and other evacuees allowed to board U.S. Air Force aircraft during the recent mass evacuation from Afghanistan. I did not see the complete evacuation process on the ground so I am writing in relative ignorance. Regardless, I was pleasantly surprised that nothing was reported which drastically could have happened in the air or on the ground.

As a former majcom intelligence representative for antiterrorism/force protection (AT/FP) plans and policy development during the 1990s and 2000s, I was aware of lessons learned from other similar evacuations. Most importantly, I did not see on videos of the Afghanistan evacuation where any processing and inspection of evacuees and their personal belongings were done.

Most critical in the Middle East are the vast differences in religions, sects, and beliefs which have been the cause of hundreds of years of strife and war among clans, tribes, and political entities. Mixing such people in a single aircraft is dangerous enough to cause physical disruptions. However, by not inspecting baggage, personal armaments, weapons and even explosives could have been carried onto aircraft and could have caused some catastrophic events.

Besides guns and other weapons, other contrabands could have been carried on and off the U.S. aircraft. Evacuation operations of unvetted people should always include screening of baggage and personnel to ensure passenger, aircraft, and crew safety. Time may be of [the] essence in such operations; therefore, in such cases uninspected baggage could just be left behind. In the future, videos should also cover such inspections to possibly deter potential weapon carry-ons and assure safe and successful execution of noncombatant evacuation and AT/FP operations.

Lt. Col. Russel A. Noguchi,
USAF (Ret.)
Pearl City, Hawaii

At the risk of being accused of piling on, I'd like to share thoughts on Gen. Mark A. Milley's recent performance as a senior military officer and Chairman of the Joint Chiefs of Staff.

My taste began to sour in the aftermath of his memorable walk in the park with the then CINC. I was shocked to hear him one morning being interviewed on liberal-leaning National Public Radio. This was just a day or so after the controversial Lafayette Square event.

It definitely wasn't a "stand by your man" moment. Clearly, he was not on the same page with the very CINC that had appointed him. Milley chose victimhood, rather unbecoming for a senior military officer. He was all about apologizing for his participation and in general (no pun intended) whining about it. Milley felt America needed to know.

More recently, his congressional testimony over our failed Afghanistan exodus only reinforced my view. During testimony Milley stated that he does his best to appear apolitical as he sat on the hot seat as a starring actor in political theater. During testimony he confirmed that he'd been interviewed for the recently released Bob Woodward-Robert Costa book covering the end of the Trump presidency and had made the disappointing statements attributed to him. Additionally, he shared that he'd been interviewed for other books of the like that have yet to be released.

Gen. Douglas MacArthur said, "Old generals never die, they just fade away." In Milley's case, don't expect a fade away any time soon. A lucrative book deal could be on his bucket list, leveraging his recent mainstream media fame. Perhaps a post-retirement plum job, a la Fox News' Gen. Jack Keane, as senior strategic analyst? What liberal cable news channel will make him a generous offer?

So much for apolitical. Sadly, somewhere along the way Milley seems to have forgotten that he's a Soldier first and not a media personality.

Col. Bill Malec,
USAF (Ret.)
O'Fallon, Ill.

Ask the Ground Troops

I was appalled at the ignorance of the A-10 and its missions exhibited by Gen. Mark D. Kelly, commander, Air Combat Command. ["World: Kelly: Downed Airmen Will Have Few Rescue Options in the Pacific," September, p. 32]. The A-10 is not a "single-mission, 210-knot airplane(s)" as he expressed in the Air Force Life Cycle Management Center, Life Cycle Industry Days streaming seminar on Aug. 3. Although the A-10 is getting long in the tooth, this mischaracterization of the aircraft and its missions is beyond belief for a major command commander.

The A-10 has performed yeoman duties in numerous conflicts. It is not a 210-knot aircraft, but uses mission profile around 300 knots. It performs missions of close air support, combat search and rescue, armed airborne escort (C-130 paratrooper drop), battlefield interdiction, and has been the Swiss Army knife of the Air Force for 40 years. It is the only Air Force fighter aircraft that can perform its missions from unprepared airfields.

The A-10 needs to be retired, there is no question about that. Unless the Air Force is willing to abrogate their responsibility to provide air support for our troops in contact with an enemy, the Air Force needs to begin the process of replacing the A-10 with an aircraft that can adequately fulfill its various missions.

The Air Force has touted the F-35 as a replacement for the A-10. I seriously doubt that mission planners will dedicate an expensive and fragile aircraft

such as the F-35 into the knife-fight that is endemic to the A-10s missions. The F-35 may fit the dream of the Air Staff of sterile combat where expensive precision weapons are used against our foes in contact with our troops. But experience has shown that the opposite is true. [Precision-guided munitions] are not a panacea for eyes on the target. Drones are not infallible. The psychological effect of an armed and capable air support aircraft in the weeds facing an enemy cannot be accomplished from 15,000 feet and 10 miles away. Ask any Soldier or Marine on the ground their preference for air support. No aircraft brings fear into the enemy as the A-10 does. It's replacement need to be as formidable.

General Kelly's statement is disingenuous and is insulting to the men and women who have placed themselves on the leading edge of combating our foes. The missions of the A-10 are not going to magically disappear in the face of technology. The mission knowledge and training must be preserved, or we are doomed to repeat the errors of Vietnam where we sent our under-trained Airmen into battle in inappropriate aircraft. We don't need to haul A-10s out of storage like we did with A-1s to fight a battle for which we are ill-equipped. Someone needs to brief General Kelly to get his facts straight before he places his foot in his mouth.

Maj. Tim Roth, USAF (Ret.)
Cobbs Creek, Va.

I am impressed by the clairvoyance of General Kelly. He obviously knows there won't be a need for such a platform against enemies such as ISIS, the Taliban, al-Qaeda, or any other so-called "low-intensity conflicts."

Nearly 10 years ago it was reported in this magazine that generals concluded the A-10 was not necessary, as fast movers such as the F-16 and F-15 could perform the close air support role better.

I wondered then, as now, did anyone bother the ask the Soldiers, Sailors, Airmen, on the ground doing the fighting?

MSgt. William J. Lee, USAF (Ret.)
Elkton, Mich.

China, China, China

The Taiwanese have invested most of their offshore capital into mainland China and, hence, shifted the balance of power in favor of China vis-à-vis the United States. Enriched by Taiwanese investment, Beijing can more easily afford the development of weapons that will cripple American forces in the Pacific [See "World: China, China, China," October, p. 18].

If the Taiwanese had, instead, invested its capital into Vietnam, then they would have shifted the balance of power in favor of the United States. Enriched by Taiwanese investment, Hanoi could more easily afford to project its military power into the South China Sea, thus reducing the need for American forces to counter the Chinese military in that region. (Vietnam and the United States are implicit allies.)

The Taiwanese investors opted for China over Vietnam in order to maximize their profits. Beijing gave, to the Taiwanese, economic incentives (like reduced taxes and accelerated approval of business projects) that Hanoi would not give.

Simultaneously, the Taiwanese claim that China terrifies them and, hence, that they need military protection from the United States. In other words, the Taiwanese are playing us Americans for a bunch of fools. We must not sacrifice a drop of American blood or treasure on protecting Taiwanese opportunists. They should pay the full cost of their profit-maximizing strategy in China.

Dwight Sunada, Ph.D.
Stanford, Calif.

VERBATIM

Aging in Place

Staff Sgt. Ryan Crane

"Having 80 percent of our current fighter inventory from the Reagan Administration is an issue. But it's the assets from the Johnson, Nixon, Ford, Carter administrations [that should most] concern us."

—**Gen. Mark. D. Kelly,** head of Air Combat Command, speaking at a virtual event hosted by AFA's Mitchell Institute for Aerospace Studies, Oct. 25.

Family Reunion

Mike Tsukamoto/staff; Pixabay

"The complete reunification of our country will be and can be realized."

—**Senior Col. Tan Kefei,** spokesperson, China Ministry of National Defense, responding to Pentagon comments on China's increased military activities in the Taiwan Strait, Oct. 17.

Air Force Space Command

LIVING OFF THE LAND

"Nothing else works unless our satellites work, and the fear that I have of a Pearl Harbor in space is growing every day. Because we could be blind, deaf and dumb; and spastic and incontinent and impotent, if our near peer adversaries were to launch such a surprise attack. For decades, our Air Force launched satellites without any protection whatsoever. That was a mistake. We're realizing that mistake too late."

—**Rep. Jim Cooper** (D-Tenn.) Oct. 7.

Temperature (and Costs) Rising

"Back in 2008, the [U.S.] put out an Intelligence Community assessment that climate change was a national security risk. The Intelligence Community and the Department of Defense, including on the uniform side, has never wavered from that viewpoint. ... You can look at wildfires, you can look at drought, you can look at sea-level rise—all of these affect our readiness, and then there's the fact that military forces, especially our National Guard forces, get called up more and more frequently to deal with climate-related adverse weather. ... All of these are ways that climate change is manifesting increased demand on and requirements for dollars from DOD."

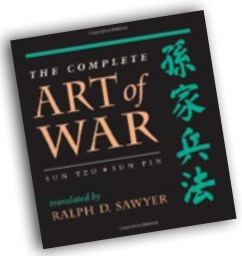
—Deputy Defense Secretary **Kathleen Hicks,** in an interview with the Center for Strategic and International Studies, Oct. 1.

Worthwhile Investment

"It is disappointing that year after year DOD continues to flat-line F-35 production investments, defer needed readiness funding, and underfund advanced capabilities for this critical fleet. ... Mr. President, the F-35 is both affordable and more capable than any other aircraft proposed in the budget; it is a technological marvel that represents the best of American manufacturing. Additionally, there is capacity to deliver additional aircraft which will provide greater capability to our men and women in uniform. ... We urge you to direct the DOD to ensure that it is making smart investments in the F-35 program as you prepare your FY23 budget request and Future Years Defense Plan (FYDP)."

—Oct. 19 letter to President Joe Biden from a **bipartisan group of 89 members of the House of Representatives.**

Lost in Translation



"Collectively, we Americans lack an adequate understanding of Chinese culture. We run a significant risk of misinterpretation and missed signals when we project our own perspectives upon Chinese actions and communications."

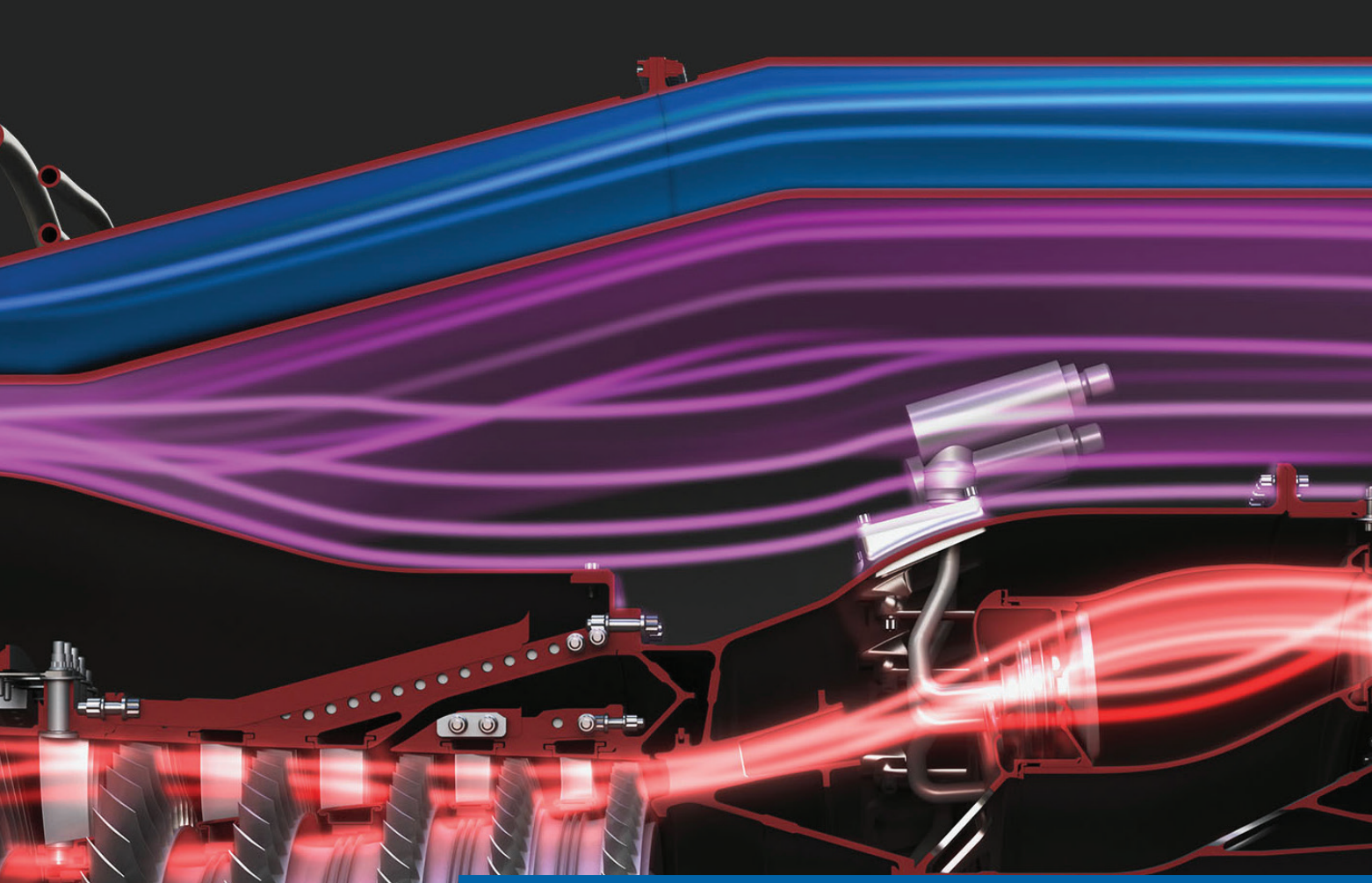
—Secretary of the Air Force **Frank Kendall,** addressing the Air Force Culture and Language Center and Air University Symposium, Oct. 1

No Shots, No Service

ClipArts

"You are hereby reprimanded! ... You failed to follow a direct order...and by doing so have placed yourself and your fellow Airmen in danger. ... You have shown you are not committed to maintaining readiness for the Department of the Air Force."

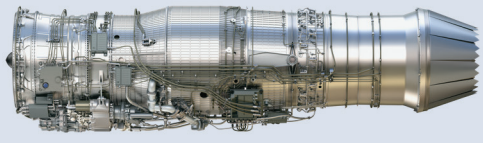
—**Letter of reprimand** sent to an Airman in the 319th Reconnaissance Wing, referencing the Airman's refusal to take the COVID-19 vaccine. Obtained by DefenseOne.com, Oct. 14.



A new era of combat propulsion

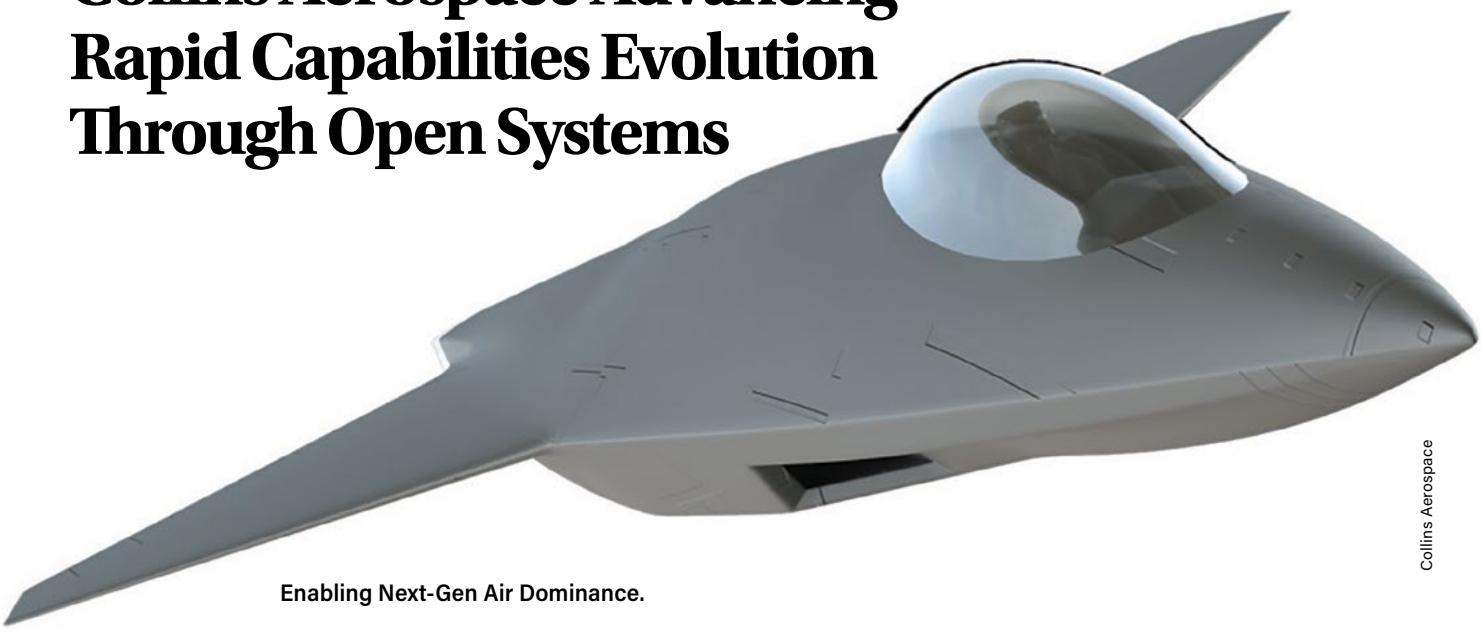
Designed, built and tested with the U.S. Air Force, GE's XA100 is the world's first flight-weight, three-stream adaptive cycle engine. The XA100 transforms mission capability by enabling in-flight transitions between a high-thrust mode for maximum combat power and a high-efficiency mode to extend mission range.

The engine's three-stream architecture provides a step change in thermal management capability to accommodate next-generation mission systems. Add in advanced materials and components to enable world-class efficiency and durability, and the XA100 is ready to deliver a generational change in performance.



geaviation.com/XA100

Collins Aerospace Advancing Rapid Capabilities Evolution Through Open Systems



Collins Aerospace

Enabling Next-Gen Air Dominance.

At Collins Aerospace, we understand the need for a more agile, connected battlespace. We achieve this through open systems. Our customers consistently mention these recurring challenges:

- Breaking vendor lock
- Leveraging new and commercial technologies more quickly
- Speeding the development and deployment of new capabilities to the warfighter, while minimizing impacts to airworthiness certifications.

With vitally important generational efforts such as the Next-Generation Air Dominance program and Advanced Battle Management System ramping up, maximum flexibility and openness is increasingly important. At this month's Air, Space & Cyber Conference we are exhibiting several capabilities aimed at helping the Air Force tackle its biggest challenges.

A Open Systems Leader

Developing open systems for three decades, Collins is uniquely positioned to provide solutions that allow our warfighters to continually adapt and overcome a threat environment that seemingly changes daily. Through our open and modular avionics, mission and connectivity solutions, we offer a cost-effective approach that allows customers to protect their previous investments while also upgrading and fielding new technologies more frequently.

Software Open Standards

The DOD favors more open and readily upgradable systems. For example, the Future Airborne Capability Environment or FACE™ focuses on developing reusable, portable software components, providing many benefits to end customers considering 'from scratch' software development, which can be a large cost driver for military programs.

Through our active involvement in the open standards community, we realize this new environment requires a new way of thinking. As a founding member of the FACE Consortium, Collins has been closely involved in advancing and maturing this critical multi-service open standard. Additionally, we have taken the lessons learned over the past 10 years and applied them to our product development efforts.

We remain committed to developing FACE-certified products. Many of our products completed the official FACE Conformance Certification process and are listed within the FACE Registry. Examples include:

- MFMS-1000, which provides civil-certifiable RNP RNAV navigation, flight plan management, and guidance capabilities
- LVPC-1000 Localizer Performance with Vertical Guidance Calculator
- Auto Avoidance Re-router (ARR-7000), to name a few.

Raytheon Technologies, our parent company, has the most FACE-conformant software components outside operating systems than any other company.

Collins is also a founding member of the Open Mission Systems (OMS) program Collaborative Working Group (CWG). We have remained actively involved in the development of the OMS and Universal Command and Control Interface (UCI) standards as well as the tools used to support development of Open Architecture Management (OAM) compliant systems. In addition, Collins remains an active participant in various experimentation and industry events. Collins' sensors, including its SYERS-2C and MS-177A, have been used in multiple demonstration and flight test events integrating OMS and Common Mission Control Center (CMCC), which required significant involvement with the CMCC consortium.

Hardware Open Standards

On the hardware side, Collins has been active in developing Hardware Open Systems (HOST) compliant capabilities

for many DOD programs, including the KC-135 and KC-46. Leveraging HOST standardized framework, our product lines use 3U components including: single board computers, avionics I/O, networking video mixing, power supplies, and backplanes to build up more complete systems. A number of our cards and components are also designed to align to the Sensor Open Systems Architecture™ (SOSA™).

Our product line approach uses common and standardized hardware and software building blocks that can be reused across numerous products and platforms. This includes our mission computer product line, which conforms to the 3U form factor and OpenVPX standards. This approach results in increased modularity, interchangeability of new technology and the reuse of hardware design across legacy and future platforms. This supports our customers' need for affordability, rapid upgrades and long-term sustainability.

Third-Party Integration

By building to common open interfaces and standards, Collins enables government customers or third parties to independently integrate new applications on our systems. Another way Collins is an industry leader in third party integration is our involvement with ARINC-661, a widely used 2D graphics industry standard for both civil and military aircraft. We self-invested to develop a toolkit used by dozens of companies, ranging from small businesses to OEMs, to integrate their equipment into Collins and third-party systems. Benefits of this toolkit approach include minimizing the cost of adding new display functions to the cockpit, better managing obsolescence in a rapidly evolving environment and allowing OEMs or end users the ability to standardize their Human Machine Interface (HMI) in the cockpit.

Digital Backbone

Our enterprise-wide open systems approach also supports ongoing efforts around developing a "digital backbone." This approach provides technologies that are focused on providing basic infrastructure to place digitally enabled components in an aircraft and effectively maintain them over an aircraft's lifecycle. Collins' digital backbone also enables customers to more rapidly and frequently upgrade and integrate new products and technologies. Doing this successfully requires systems designed in such a way that third parties and other customers can readily be integrated into the environment without Collins involvement.

Another key aspect of our digital backbone efforts is ensuring that simple changes don't impact numerous aircraft systems. To help with this, Collins has developed and demonstrated a method of securely separating safety-of-flight critical systems from other mission systems. This separation significantly shortens integration and deployment times, as certification efforts are minimized for those critical systems that are partitioned, resulting in faster airworthiness recertification. As a result, customers can more frequently upgrade, providing not only benefits to cost and schedule, but, as importantly, having aircraft systems that can evolve more rapidly than the 'block upgrade' cycle.

Conclusion

Collins Aerospace takes an enterprise approach to developing solutions architected around open systems to provide customers more control over their platforms, allow for greater mission flexibility and enable easier and faster advancements over time as new capabilities are tailored and integrated into their programs to meet evolving mission needs.

For additional information, visit CollinsAerospace.com/What-We-Do/Military-And-Defense/Open-Systems-Architecture-Solutions or to schedule demonstrations, contact J.R. Skola, jr.skola@collins.com.

About Collins Aerospace

Collins Aerospace, a unit of Raytheon Technologies Corp. (NYSE: RTX), is a leader in technologically advanced and intelligent solutions for the global aerospace and defense industry. Collins Aerospace has the extensive capabilities, comprehensive portfolio and broad expertise to solve customers' toughest challenges and to meet the demands of a rapidly evolving global market. For more information, visit CollinsAerospace.com.

By John A. Tirpak

North Korea's Game Plan and Capability

North Korea's approach to deterring an attack from the U.S. and South Korea is asymmetric: leaning heavily on strategic missiles and a nascent nuclear program to compensate for a large but obsolescent conventional force. So said the Defense Intelligence Agency (DIA), in its first-ever "North Korea Military Power" report.

Patterned on the "Soviet Military Power" series of the 1980s, and signed by DIA director Army Lt. Gen. Scott D. Berrier, the report assesses North Korea's military capabilities, ranging from force structure and organization to strategy and qualitative assessments of weapon systems.

North Korea is "one of the most militarized countries in the world and … a critical security challenge for the United States," Berrier wrote. The Pyongyang regime believes that it's "free to take destabilizing actions to advance its political goals," including attacking South Korea, developing ballistic missiles and nuclear weapons in defiance of United Nations edicts, conducting cyber attacks and committing cybercrime worldwide. The "closed nature" of the regime also makes gathering information about it all "extremely difficult," he said.

Although "on the brink of collapse" 30 years ago, the Hermit Kingdom has bounced back from a 1990s famine that killed 3 million of its citizens. Under Kim Jong Un, "it has become a growing menace" to the U.S. and its Indo-Pacific allies, the DIA assessed.

Kim's plan is to have long-range missiles with nuclear warheads, such that he can "directly hold the United States at risk, … deter Washington," and compel it to make policy decisions that benefit Pyongyang. This vision is "plainly articulated" in national rhetoric, Berrier wrote.

Engagement with North Korea by President Donald J. Trump a few years ago merely bought the regime time to advance its missile and nuclear programs, the DIA said. Though Kim and Trump agreed in principle in 2018 to a "denuclearization" of the Korean peninsula, pledged to reduce tensions and aim for a "lasting peace," Kim has since stepped up the pace of missile development, has "displayed a new, potentially more capable ICBM and new weapons for its conventional force," and "there continues to be activity at North Korea's nuclear sites."

The DIA noted that North Korea tested its Hwasong-14 and -15 long-range missiles in 2017, and these are capable of reaching the U.S. An unnamed new ICBM was also shown in a 2020 military parade. The DIA did not estimate how many of these missiles Pyongyang has, and emphasized that they are still in development. Coincidentally, North Korea tested a new submarine-launched ballistic missile in October, just days after the DIA report said it would soon resume such tests.

Pyongyang understands that "the character of war has changed" since it last openly fought the U.S. in 1953, and that its military is "largely unprepared to engage in modern warfare." It appreciates that the U.S. has "overwhelming advantages in power projection, strategic air superiority, and precision-guided standoff strike capability." It also judges itself at a "qualitative disadvantage" versus South Korea.

Still, the DIA views North Korea's conventional forces as highly dangerous, due to their size. The Democratic People's Republic of Korea (DPRK) army can "launch a high-intensity, short-duration attack on the south" with thousands of artillery and rocket systems, causing thousands of casualties and severely disrupting a "regional economic hub." Pyongyang realizes most of its armed forces field obsolescent weapons and can't hope to compete with the U.S. or South Korea in advanced systems such as combat aircraft. North Korea lacks much of a military industrial base, and either has to import major weapons or struggle to modernize the old hardware.

Explore DPRK

North Korean leader Kim Jong Un, center, speaks to military leaders in front of an ICBM display at the Defense Development Exhibition Oct. 12.

Though the national economy is ostensibly one of Kim's priorities, he's shown a willingness "to endure financial losses in order to advance other goals." Nuclear and missile tests trigger U.N. sanctions; one of which, the closing of the dual-nation Kaesong Industrial Complex, cost the North about $100 million a year.

North Korea wants Washington to believe that "the cost of … intervention" in a peninsula conflict "would be unacceptably high" to the U.S., even if North Korea lost the engagement. If deterrence fails, the DPRK military would fall back on its defensive advantages, such as "inhospitable terrain, widespread use of underground facilities, and a population conditioned from birth to resist foreign invaders," all to raise the cost of taking and holding North Korean territory.

With "the fourth-largest" military in the world, North Korea has 1.3 million people under arms out of the population of 25 million.

Although the military has historically been better off than the general population, "this trend has declined precipitously since the 1990s," according to the DIA. Troops are now subject "to the same deprivation as the general population outside of Pyongyang." Military defectors to the South have reported "malnutrition and harsh service conditions." Troops are frequently diverted to farming activities.

While Pyongyang says little about the COVID-19 pandemic's effect on its citizenry, "border closures, quarantines, lockdowns and steep reductions in trade to prevent the spread of the virus" have "exacerbated North Korea's already-weak economy."

North Korea has both a biological and chemical weapons capability. The DIA assesses that it might use either in a conflict: It used the VX nerve agent to assassinate Kim's half-brother in Malaysia. The DIA assesses that North Korea "may consider the

use of biological weapons during wartime or as a clandestine attack option," and could employ chemical agents using artillery and ballistic missiles.

Pyongyang excels in special operations forces, the DIA determined, and they are designed for "rapid offensive operations, infiltration, and limited attack" on South Korean targets. Their primary mission would be to attack government facilities and leadership at the outbreak of war, or as a preemptive move.

The DIA noted that North Korea has "the largest and most fortified" complex of hardened and deeply buried facilities and tunnels in the world, which are specifically designed "to withstand U.S. bunker-buster bombs." The facilities would be used in wartime to conceal regime leaders, hide ballistic missiles and weapons of mass destruction, war materiel and other high-value assets. These facilities range from small, narrow tunnels to huge complexes. Within them is a concealed road network to move senior leaders around during wartime. They are so formidable the DIA worries Kim may "take more belligerent action if he perceives he is safe from counterattack."

North Korea's air force and air defense system is, in large part, out of date, the DIA said. The most advanced fighters it has are 1980s-vintage, Russian-made MiG-29s, but the bulk of the air force is "much older," and North Korea is "one of the only air forces in the world that still operates MiG-21s, MiG-19s, MiG-17s, and MiG-15s," the latter of which date back to the Korean War.

The DPRK air force would "struggle to penetrate South Korean air defenses in an attack role," the DIA said. North Korean pilots only get about 15 to 25 flying hours a year, so they have only basic proficiency.

Though Pyongyang's industry was capable of assembling combat aircraft from kits supplied by Russia and China in the 1980s and 1990s, "that capability has waned," the DIA judged. To maintain "its dated force," North Korea must rely on "cannibalization and the purchase of spare parts from overseas markets."

Pyongyang has a very basic capability to build "small to medium" unmanned aerial vehicles, mostly based on Chinese designs, and is importing others. Some of these have been used for "reconnaissance missions over South Korea and which could be equipped with rudimentary armaments." Models that crashed on South Korean territory have been studied, showing no advanced capabilities.

The sole exception is one based on the American MQM-107D Streaker, "that probably was acquired from Middle Eastern sources." Pyongyang is expected to graduate to larger UAVs in the near future.

Ground-based air defenses in North Korea tend to be clustered around Pyongyang. "The capital has one of the most dense concentrations of (anti-aircraft artillery) in the world," the report noted. They are "primarily fixed, but transportable" air defense missile batteries, capable of "basic air defense operations."

The bulk of air defense missile systems are Soviet-era SA-2s, SA-3s, SA-5s, and SA-13s. The latter, though a "double-digit" surface-to-air missile system, is a vehicle-based system designed to hit aircraft at "medium to low altitudes," the DIA said. The rest are systems the U.S. overcame 30 years ago in the 1991 Gulf War.

Some new systems are being introduced in very small numbers; "During a 2020 military parade, North Korea first displayed a new mobile SAM launcher and accompanying radar that externally resembled the Russian S-300 and Chinese HQ-9," the DIA noted. It added that North Korea has "a large number of aging early warning and intercept radars that provide basic detection of large aircraft at long distances to support the defense of its airspace."

The DPRK military puts high value on electronic warfare, the DIA said. It is viewed as "an essential tool" in countering western advanced systems and precision-guided munitions, as well as defeating or disrupting enemy command and control and intelligence-gathering. The North has operated GPS jammers near the demilitarized zone on a number of occasions, and this has interfered with "navigation systems onboard commercial aircraft flying in the area."

Likewise, Pyongyang openly says it will try to defeat U.S. space capabilities with jamming of GPS and others satellites; these capabilities "have been tested on multiple occasions in the last decade," the DIA cited. Having ballistic missiles also "theoretically suggests" that Pyongyang could have a kinetic anti-satellite capability. North Korea's indigenous space capabilities have allowed it to put two satellites in orbit by 2016, but not in recent years.

Cyber is viewed as one of North Korea's key fighting domains. Pyongyang sees cyber capabilities as "a low-cost and deniable tool" that can disrupt enemy operations and even attack adversary domestic infrastructure in peacetime "with little risk of reprisal," the DIA said. The cyber enterprise also allows Pyongyang to gather intelligence and "generate currency that circumvents international controls."

The DIA, citing its own sources and the FBI, attributes several well-known cyber attacks to North Korea. One was the 2014 attack on the Sony Pictures Entertainment network after Sony refused to accede to Pyongyang's demands to cancel the release of a movie depicting the assassination of Kim Jong Il. The attack deleted data and blocked employee access. The 2017 "WannaCry " computer worm attack, which hit "over 250,000 computers in over 150 countries" was also the work of Pyongyang, and disrupted networks worldwide, including Britain's National Health Service.

Some of the regime's operating funds also stem from cyber crime. The DIA said North Korea was behind the 2016 theft of $80 million from the Bank of Bangladesh, and that "more than 100 banks" worldwide have been robbed "using a combination of malware tools and harvested user credentials." Using the internet, North Korea does business that evades economic sanctions using both domestic and foreign-based cyber entities.

"Theft, fraud, blackmail, online gambling, and other cyberactivities" have raised revenue of about $860 million annually for the Kim regime, the DIA reported.

Given increasing sanctions as Pyongyang ignores bans on ballistic missile and nuclear tests, the regime is likely to "continue turning to cybercrime as a means to generate currency to fund its weapon programs while sidestepping international efforts to freeze [its] funding."

While DPRK doctrine calls for maintaining a six-month of supply of food, ammunition and other war materiel, it may only have "sufficient supplies for … two to three months," the DIA determined. "Subsistence supplies could last up to three months, and ammunition could last slightly longer." Inadequate fuel and transportation capability, poor maintenance of ground lines of communication, and insufficient training "all constrain North Korea's large-scale conventional offensive operations." North Korea's roads, in particular, are all "in poor condition," and many are little more than "unpaved gravel or dirt surfaces." While this helps in defense, it hampers the North Korean army "in the offense."

North Korea's military problems stem mainly from "the loss of direct Soviet and Chinese military-to-military support in the early 1990s," and an attendant "major economic decline" in that decade, the DIA recalls. But Pyongyang is making the best of the capabilities it has and continues on a path "to a nuclear breakout," making it a continuing "critical security challenge" to the U.S. and its allies for "years to come." ✪

Pararescuemen departed their C-130J Super Hercules for a high altitude, low opening (HALO) jump over East Africa in September 2021. Members of the 82nd Expeditionary Rescue Squadron, they specialize in combat search and rescue and personnel recovery and can rapidly deploy to virtually anyplace on Earth. Air Force PJs are among the most highly trained emergency trauma specialists in the U.S. military.

Tech. Sgt. Michael Cassaboom

The Crow Creek Challenge at F.E. Warren Air Force Base, Wyo., pits teams in an intense series of obstacle challenges and agility drills, including swimming, fireman and litter carries, calisthenics with gas masks, a Humvee push, mock explosive searches, and more. These Airmen from the 90th Security Forces Squadron teamed up to win the 2021 event in October.

Airman 1st Class Charles Munoz

A U.S. Air Force CV-22 from the 8th Expeditionary Special Operations Squadron soars over Dubai and the hazy silhouette of the Burj Khalifa, the world's tallest building, during a training operation in September.r. The CV-22 flies long-range infiltration, exfiltration, and resupply missions for special operations forces, which benefit from the tilt-rotor aircraft's unique ability to take off and land vertically, hover, and fly long-range missions like a conventional turboprop.

Master Sgt. Wolfram Stumpf

John Parker/Boeing

The Air Force already planned to buy more than 350 T-7A advanced trainers. A new RFI may double that number.

Air Force Wants Up to 400 Advanced Fighter Trainers

Red air operations and training are priorities for USAF in the coming decade.

By John A. Tirpak

The Air Force is seeking "at least 100" and as many as 400 Advanced Tactical Trainer aircraft to train fighter pilots and to serve as adversary aircraft in training, a role now filled by the AT-38.

While the Air Force seems likely to expand the role of the T-7A, the service did not mention either that airplane or its maker, Boeing, in its request for information (RFI), which was published Oct. 12.

The RFI is "very similar" to one issued by the Navy for jet trainer to replace the T-45. To "reduce the burden of crafting a response," contractors can submit the same information as provided to the Navy, the service said. The Air Force is conducting market research to determine what options now available might match the requirement, but an Air Combat Command (ACC) spokesperson said it is open to "any and all vendors that can meet the desired design."

Responses are due by Nov. 23.

Air Force leaders have for several years suggested the T-7 Advanced Jet Trainer could be the basis of a companion trainer/aggressor aircraft in the mold of the T-38/AT-38, but the new jet must first pass muster as an advanced jet trainer before they'll invest in adapting it to other roles. Former Air Combat Command Commander and retired Gen. James M. Holmes said he could envision the T-7 as the basis for a lower-cost, lightweight export fighter or a homeland defense platform. But for now, at least, the T-7 lacks external hardpoints for weapons and its aerial refueling system is optional.

The Air Force plans to buy 351 T-7A advanced trainers. The additional work could double that figure. Boeing has

suggested a market opportunity for the T-7A and variants of at least 1,500 airplanes. The company partnered with Saab of Sweden to develop the aircraft, which it describes on its website as designed with "provisions for growth."

The runner-up in the T-X competition, the Lockheed Martin and Korean Aerospace Industries T-50A, is another potential option. The companies jointly developed the T-50A as a derivative of their combat-capable F-50, which has been sold to the Philippines, Indonesia, Iraq, and Thailand.

Air Combat Command in the past discussed buying or leasing T-50As or similar aircraft for its "Reforge" basic fighter trainer program, which remains in its infancy, in advance of the T-7As planned 2024 arrival in service; the T-7A isn't expected to reach full operational capability until 2034, so the Air Force will continue to operate the T-38 in the interim.

"The platform desired is one that will meet the Initial Tactical Training platform requirements within the Reforge [concept of operations]," an ACC spokesperson said. The Advanced Tactical Trainer could also potentially be used as "an Adversary Air platform and [have] potential for growth/adaptation as a tactical surrogate."

Air Force officials said a "tactical surrogate" could teach switchology and procedures to F-16 or F-35 pilots, for example, providing a less-costly aircraft in which the displays and possibly the controls and performance could be modified to simulate the actual combat fighters. The ACC spokesperson said timing for acquiring the new aircraft will depend on the responses to the request for information.

The RFI said the new trainer aircraft will be used for initial tactical training, "adversary air support," and as a "tactical fighter surrogate of existing and future" Air Force front-line fighters. The Air Force wants "feasibility, estimated cost, and schedule for at least 100," plus up to 200 more, in lots of 50. The service wants a two-seat airplane, with the option for a single-seat variant in which the rear seat area would house other mission gear.

Requirements call for an airplane that can fly at Mach 0.9 and be able to "replicate current and future fighter aircraft systems" by providing an embedded training environment to build "transferable skills, systems management skills, and decision-making skills" for weapons employment. The jet is to have a large cockpit display and one hardpoint on each wing to carry at least one Air Combat Maneuvering Instrumentation pod or a Combat Air Training Missile. The hardpoints also have to be able to carry an external fuel tank or an electronic attack or countermeasures pod or "other future pods." Endurance is to be 90 minutes, of which 30 minutes would be "tactical maneuvering." The jet is to have a ceiling of at least 45,000 feet and have a structural instantaneous G of 7.5, plus a sustained 6G maneuver.

The controls must have a "universal stick and throttle connection" in order to be reconfigurable and "mimic Hands on Throttle and Stick of front-line" fighters. The jet is to have a "secure open architecture," according to the RFI.

The Air Force is "interested" in having the new jet support a helmet-mounted display system and in onboard power sufficient to power wing stations, electronic countermeasures pods, and an infrared sensor. It has a preference for an airplane with an automatic ground collision avoidance system (GCAS) and a zero-zero ejection seat, as well as an "engineering analysis or option" for aerial refueling and an infrared search and track system (IRST).

To go with the jet, the Air Force wants a "smart chair" simulation-like device that can provide ground-based virtual reality flight practice.

ACC put forward Reforge—short for "Rebuilding the Forge"—last year as the command's plan to update fighter pilot training. Reforge would consolidate some phases of pilot training and shift some instruction to the undergraduate pilot phase. The goal is to cut the time needed to grow a flight lead—a fighter pilot who is qualified to lead a two-ship formation—by up to 18 months and shift some front-line fighters from training to combat status.

One way Reforge saves time is it reduces the number of change-of-station moves fighter pilots must make en-route to becoming qualified. That reduces lost momentum and the amount of relearning that has to take place. Drafts of the concept suggested that transitioning from instruction in the T-7A to a fighter-like variant would accelerate training even further.

The T-7A's advanced capabilities helped inspire Reforge. The jet will be able to simulate many of the visuals and procedures a pilot would experience in a front-line fighter. Because it can do more than a T-38, Air Education and Training Command has said it does not plan to operate the T-7A just as it used the T-38. Neither ACC nor Air Education and Training Command have discussed whether they will develop a similar program for bomber pilots. ✪

Matthew Short/Lockheed Martin

Lockheed Martin's T-50A, the company's offering to the advanced pilot training competition, first flew in 2016.

1st Lt. Savanah Bray

The Air Force's continuing pilot shortage and historic lows in flying hours led Heritage to rate the Air Force as weak.

Heritage Rates Air Force and Space Force 'Weak'

By Abraham Mahshie

The Air and Space Forces rated "weak" ratings from the Heritage Foundation's 2022 Index of U.S. Military Strength, which cited insufficient pilot training, misaligned investment strategies, and insufficient space domain awareness, along with offensive and defensive space weapons as critical shortfalls.

Heritage rated the Air Force's warfighting capacity and capability as "marginal," but dropped the overall rating to "weak" based on its readiness assessment. That represented a decline from 2020's "marginal" ratings for the Air Force. By contrast, Heritage rated the Army and Navy "marginal" and the Marine Corps "strong."

The Space Force was rated weak across the board, for capacity, capability and readiness, primarily because of the age of its systems and the lack of offensive and defensive space weapons.

"The aging and shrinking of America's military forces, their reduced presence in key regions since the end of the Cold War, and various distractions created by America's domestic debates have created a perception of American weakness that contributes to destabilization in many parts of the world and prompts old friends to question their reliance on America's assurances," the report states. "For decades, the perception of American strength and resolve has helped to deter adventurous bad actors and tyrannical dictators. Regrettably, both that perception and, as a consequence, its deterrent effect are eroding."

Retired Lt. Gen. David Deptula, dean of AFA's Mitchell Institute for Aerospace Studies, said the declining ratings should come as no surprise. "To those who follow the travails of the armed services this slip in rating should come as no surprise as for every year since 1990—31 years—the Department of the Air Force (that includes the Space Force) has received less funding than either the Army or the Navy," he wrote in an opinion published on Forbes.com after the report's release. "As a result of this chronic and serious underfunding, the Air Force is currently the oldest, smallest, and least ready than it has ever been in its history. It has become a geriatric force with some combat aircraft having an average age of 59 years."

Space Force "capabilities on orbit are in major need of investment as well," Deptula wrote. "They reflect a previous generation's operational reality, one not aligned to handle the threats posed by China and Russia."

Two decades of war degraded the Air Force's air fleet, which now average 31 years old, and while research and development investment has grown, it now outpaces procurement, the report notes.

"USAF currently is at 86 percent of the capacity required" to fight two major regional contingency operations, the report said. But that actually overstates current capability because "the disposition of those assets limits the ability of the service to deploy them rapidly to a crisis region."

"While the active fighter and bomber assets that are available would likely prove adequate to fight and win a single regional conflict, … the global sourcing needed to field the required combat fighter force assets would leave the rest of the world uncovered."

Average Hours Line Fighter Pilots Received per Month in Combat-Coded Squadrons

	2019	2020	Percentage Change
F-22	11.0	7.6	–31%
F-35A	15.4	14.7	–5%
F-15C	11.9	8.9	–25%
F-16C	12.7	8.5	–33%
F-15E	21.7	16.6	–24%
A-10	16.9	14.1	–17%
All Jets	14.6	10.9	–25%
Average Hours per Year	174.7	131.0	–25%

Source: Headquarters U.S. Air Force, response to request for information, May 14, 2021.

heritage.org

Average Sorties Line Fighter Pilots Received per Month in Combat-Coded Squadrons

	2019	2020	Percentage Change
F-22	7.4	5.5	–26%
F-35A	6.7	6.8	1%
F-15C	6.8	5.0	–26%
F-16C	7.6	5.3	–30%
F-15E	8.0	7.2	–10%
A-10	7.7	6.5	–16%
All Jets	7.5	5.9	–21%
Average Hours per Year	89.9	71.0	–21%

Source: Headquarters U.S. Air Force, response to request for information, May 14, 2021.

heritage.org

Deptula said these facts are not well understood. "Many in the public believe that since the United States outpaces any other power in defense spending that should a conflict occur, it would be virtually impossible for the United States to lose," he said. "However, that conclusion is mistaken. Such comparisons are made wholly absent context regarding comparative national interests or basic economic buying power realities between countries. Both the possibility of war and the possibility that the United States might lose are very real and continue to grow more likely as the United States' military advantage continues to erode."

The Heritage report noted the Air Force's continuing pilot shortage, citing a shortfall of 1,925, as well as historic lows in sortie rates. USAF pilots averaged less than 1.5 sorties per week in the past year, and just 131 flying hours, well under "healthy fighter force thresholds" of three sorties per week and 200 flying hours per year per pilot.

COVID-19 had a severe effect on both flight hours and sorties, Heritage found, predicting it will take years to recover from the hours lost in 2020. Indeed, it argues the Air Force is making the problem worse, not better. "Unfortunately, the Air Force is not moving on that path and will cut 87,479 flying hours from its budget in FY22—a reduction of 7 percent," the report states.

Senior research fellow John "JV" Venable, a retired Air Force colonel, said the Air Force's decision to purchase fourth-generation F-15EX fighters to solve its near-term capacity shortfal rather than fifth-generation F-35s could put the U.S. at a disadvantage against peer rivals.

"The Chinese and the Russians do not fear fourth-generation platforms," he said. "But they do fear the F-35. That says a lot about what we should be buying right now."

The Air Force's fiscal 2022 budget request asked for 12 F-15EXs, and it included another dozen more in its 2022 unfunded priorities list. In fact, in a notable break from tradition, USAF did not include any new F-35s among its 2022 unfunded priorities.

"We could be applying that funding into the fifth-gen fighter force and actually moving the ball forward with regard to capability," Venable said.

Neither the Air Force nor Space Force responded to a request for comment.

SPACE FORCE GETS FAILING GRADE

The report praised the Space Force for maintaining its readiness throughout the transition from the Air Force to an independent Space Force. "The mission sets, space assets, and personnel that transitioned to the Space Force and those that have been assigned to support the USSF from the other services have not missed an operational beat since the Space Force stood up in 2019," the report says. "Throughout that period, the readiness levels have seamlessly sustained backbone and ISR support to the NCA, DOD, combatant commanders, and warfighters around the world. However, there is little evidence that the USSF has improved its readiness to provide nearly real-time support to the operational and tactical levels ("marginal") or that it is ready in any way to execute defensive and offensive counterspace operations to the degree envisioned by Congress when it formed the Space Force ("very weak")."

Aging and unprotected satellites, insufficient space domain awareness, and insufficient offensive and defensive capabilities combine to make a "weak" assessment necessary, Venable said.

"The Space Force is not capable of meeting current—much less future—on-demand, operational, and tactical-level warfighter requirements," the report states.

Venable said the Marshall Islands-based Lockheed Martin radar tracking system called Space Fence, which went online in 2020, only provides updates on the movement of some 26,000 objects every two hours.

"In between those two hours, what those platforms do, those satellites or missiles, … we wouldn't have known that because of the limitation on our spaceborne and our land-based surveillance platforms," he said, citing recent reports that China flew a nuclear-capable hypersonic glide vehicle through space in August.

Venable said the Space Force needs radars and satellites with optics to see spaceborne platforms and changes in the domain on a more regular basis.

Rep. Mike Rogers (R-Ala.), ranking member of the House Armed Services Committee, was an early advocate for the Space Force and agreed that space-based platforms are lacking.

"Space-based platforms, unmanned assets, and more distributed logistics capabilities are essential to deterring China," he said. "We're not in a good place."

But Rogers sounded optimistic about classified programs and capabilities now being developed. "What I'm telling you is that we've got some things going on that are going to put us in a great place," he added.

Rogers suggested advances in hypersonics are "really exciting" and that failures in testing are not a sign of worry, but of progress. "It's one of the things I keep trying to get members to get accustomed to," he said. "I want people to push the en-

velope and fail because every time you test and fail, you learn something. That's how Kim Jong Un finally developed a missile that could reach the United States."

The report cheered the Space Force's proposed $17.4 billion 2022 budget, with its 13 percent increase over fiscal 2021, and for the Space Force successfully assimilating 60 disparate offices related to space from across DOD in its first two years. But it expressed concern that more of the 21,200 space professionals still in the Army and Navy must be incorporated into the Space Force to "remedy the dysfunctional oversight or command and control issues that the Space Force initiative was intended to resolve."

Venable said China is ahead of the U.S. in offensive space capabilities and said U.S. ground-based blinding assets can only temporarily impede a satellite's operations, while China has anti-satellite missiles on Earth and anti-satellite lasers on orbit that can inflict more lasting damage.

"We have no true —at least unclassified—systems that can take an offensive punch to the Chinese," he said.

But Rogers said those capabilities are coming. "We intentionally are moving or developing Space Force in a layered effort over a five- or six-year period," he said. "I expect us to, as it matures, to continue to put more and more money in what they're developing both offensively and defensively. So, I'm pretty pleased with where we are there. I would like to be pacing that well in other areas." ✪

Amy McCullough contributed to this report.

KC-46, F-35 Provide Lessons for Future Testing

By Greg Hadley and John A. Tirpak

Lessons from the KC-46 and F-35 will prove useful to the testing community in the years to come, according to Nickolas Guertin, nominated to become director of operational test and evaluation at the Pentagon.

The Air Force is dealing with six Category 1 deficiencies in the KC-46 tanker and seven in the F-35 fighter and both aircraft prompted concerns from lawmakers during a confirmation hearing at which Guertin was among a slate of nominees called before the Senate Armed Services Committee.

Senior Airman Alexi Bosarge

A KC-46A Pegasus takes off on a mission to refuel a B-1B Lancer May 17 at McConnell Air Force Base, Kan. The crews of both the aircraft performed in-flight refueling and conducted a full tactical training scenario.

For the tanker, the most prominent issue remains the troubled Remote Vision System's (RVS's) camera, which distorts and, in some light, obscures the boom operator's view. Boeing, the tanker's maker, is developing a new system, RVS 2.0, with the goal of putting it in planes starting in late 2023.

Asked by Sen. Jeanne Shaheen (D-N.H.) to pledge that he would keep testing and evaluation on schedule for RVS 2.0, Guertin said he would—and pointed to a key area where previous testing for the tanker had fallen short: "It's especially important that the systems are tested the way they will be operated operationally, and to have those things come out as a part of fielding them is not the time we want to discover those problems."

In October, Air Mobility Command (AMC) boss Gen. Mike Minihan cleared the KC-46 to refuel F-15s and F-16s, a major milestone. That means 62 percent of aircraft that "request air refueling support" from U.S. Transportation Command can now be refueled by the Pegasus tanker, AMC said.

Minihan's order was the third "interim capability release (ICR)" for the Pegasus since July, paving the way for increased refueling duties for a tanker that had been limited largely to transport duty until earlier this year.

The Air Force is still gauging whether refueling the F-22 and F-35 fighters and the B-2 bomber from the Pegasus is safe. Because of RVS problems, KC-46 booms have previously damaged the sensitive stealth skins of those aircraft during testing.

"There is no timeline associated with the overall ICR plan," AMC said in its statement, referring to the interim capability release. Rather, aircraft are being cleared to refuel from the KC-46 when it's deemed safe to do so.

USAF's plan "focuses on establishing incremental confidence measures" to "quantitatively and qualitatively" assess the aircraft's "achievements at ICR milestones," AMC said. Crews flying the KC-46 will continue to "fly training, exercise, and demonstration missions until all operational confidence measures are met."

The F-35, meanwhile, is also culling its list of critical deficiencies, having dropped the number to seven from 13 in 2019. The exact nature of the most have not been publicly

disclosed, but Guertin hinted Oct. 19 that the complexity of the stealth fighter's systems made it such that real-world testing is sometimes a challenge.

"One of the things we need to be thinking about as we move forward into the future is a tighter alignment between modeling complex systems like the F-35—it's got a lot going on under the hood," Guertin told Sen. Mark Kelly (D-Ariz.). "Some things you're not going to be able to test operationally all at the same time in a threat-representative environment. So we need to be thinking about how we combine modeling and simulation of those environments with applied physical testing."

The Air Force has used "digital twins" in the recent past to simulate tests and shorten the development and testing time needed to field a system. Acting Air Force acquisition boss Darlene Costello said in July that the goal is to require physical tests only for the things that most require it.

Guertin agreed, writing in response to Senate questions that "digital technology, including strategic use of modeling and simulation, should be used much more frequently."

However, there are limitations to digital modeling and simulation, Guertin wrote, noting that realistic simulation requires accurate and reliable real-life data. "The early costs of [modeling and simulation] may be high," he wrote, "but it produces significant dividends in testing of the follow-on iterations of a system or a similar system."

As the Air Force proceeds with development of the Next-Generation Air Dominance platform, officials have already used digital methods to design the planned sixth-generation fighter. And when it comes time for testing and evaluation, Guertin said that the F-35 has been a "great use case" to build upon.

"We need to be taking full advantage of the lessons, both good and bad, in how we position ourselves in the future for taking advantage of those kinds of technologies as we build up these more and more complex systems, as we move further forward into the future," he said. ✪

Senate Appropriators Release Their Plan for DOD in '22

By Greg Hadley

The Senate Appropriations Committee released its version of the 2022 Department of Defense Appropriations Act on Oct. 18, as lawmakers look to provide the Pentagon with its annual budget before the current continuing resolution funding the government expires Dec. 3.

The $725.8 billion bill would raise DOD spending some $25 billion above the total proposed by President Joe Biden's administration back in May, is $20.1 billion more than the House bill, and put it in line with similar increases included in the National Defense Authorization Act (NDAA) passed by the Senate Armed Services Committee and the full House.

While the NDAA authorizes the funds for the Defense Department, the Department of Defense Appropriations Act actually appropriates the money. The House appropriations defense subcommittee reported its version of the bill, which kept spending in line with the administration's request, back in July, but the entire chamber had not proceeded with a vote on it as of press time.

U.S. Congress

Sen. Jon Tester (D-Mont.)

The Senate panel's version, meanwhile, adds spending across four main priorities, according to a report issued by defense subcommittee chair Sen. Jon Tester (D-Mont.)—countering China and investing in the Indo-Pacific; artificial intelligence (AI), cyber, and microelectronics; space; and infrastructure and public shipyards.

In particular, the bill would increase the Space Force's total budget to $17.9 billion, an extra $500 million on top of what the young service requested for 2022, which was already $2 billion more than 2021. That would mark around a 2.9 percent increase over the service's request and more than 16 percent over 2021.

A healthy portion of the $500 million increase—some $120 million—is dedicated to weapons system sustainment, which was a key part of USSF's unfunded priorities list. Another $61 million would be dedicated "to accelerate a cislunar flight experiment." Cislunar space, the region between the Earth and the moon, has increasingly become an area of interest for the Space Force, along with commercial and civil space organizations. On top of that, an extra $75 million is dedicated to "increased basic research."

The bill does include a reduction of $433 million for the Space Force's Overhead Persistent Infrared satellites, which the report states "are being developed on fixed-price contracts, yet funding is requested in excess of the contracted value."

Across the entire department, the bill also proposes a $500 million program "to increase adoption of artificial intelligence capabilities at combatant commands" along with an extra $100 million to improve recruitment and talent development for those in AI-related fields.

The Defense Advanced Research Projects Agency would also receive a bump in funding under the bill, with $70 million to increase the agency's efforts on "AI, cyber, and data analytics," and $80 million for its Electronics Resurgence Initiative 2.0.

As for the Air Force, the bill would leave USAF's request for 48 new F-35s and 12 new F-15EXs untouched. The service had asked for no additional F-35s and 12 additional F-15EXs as part of its unfunded priority list, and the Senate Armed Services Committee proposed buying one extra F-35 and five more F-15EXs.

While the appropriations bill does not include those increases, it does include an extra $1.8 billion for procurement of 16 new C-130Js for the "modernization of two Air National Guard operational wings," the bill's report states. It also adds six more MH-139 helicopters, listed as "UH-1N replacement." ✪

Van Ovost Takes Charge of TRANSCOM, Minihan Succeeds Her at AMC

By Greg Hadley and Amy McCullough

Air Force Gen. Jacqueline D. Van Ovost assumed command of U.S. Transportation Command during a ceremony at Scott Air Force Base, Ill., on Oct. 15, becoming just the second woman to lead a combatant command.

Taking over for Army Gen. Stephen R. Lyons, Van Ovost will lead TRANSCOM as it comes off a string of high-profile logistical challenges.

"You had to keep the American military moving during a historic pandemic, and you delivered," Defense Secretary Lloyd J. Austin III told the troops of TRANSCOM during the Oct. 15 ceremony. "You had to execute a complex retrograde in Somalia, and you delivered. And you had to conduct the largest noncombatant evacuation airlift in American history in Afghanistan, and you delivered."

Van Ovost played a key role in these challenges, especially the Afghanistan evacuation, as head of Air Mobility Command, and she has spent much of her career dealing with logistics, previously leading an air refueling squadron, a flying training wing, and the Presidential Airlift Wing.

Those experiences, Chairman of the Joint Chiefs of Staff Gen. Mark A. Milley said, make her uniquely qualified to lead the more than 122,000 Active-duty, National Guard, Reserve, and civilian personnel who are part of TRANSCOM.

"The sky is the limit with Jackie Van Ovost," Milley said. "She will take TRANSCOM into the future. She will take you to your next rendezvous with destiny, as we say in the Army."

Both Austin and Milley emphasized the importance of TRANSCOM to the U.S. in a new phase of strategic competition with peer adversaries such as China and Russia.

"Our overmatch capability will continue to rely on the logistical prowess and the ability to project power by TRANSCOM at great distances," Milley said.

"Logistics remain at the core of our warfighting concept and our ability to project and sustain combat power," added Austin. "That's why this command is central to our operations in the 21st century and to our vision of truly integrated deterrence."

Van Ovost noted that TRANSCOM's mission is expansive and not always confined to combat operations.

"We understand our mission is critical for national defense to meet our national security objectives. I also know our role is not always to provide combat power, because we deliver hope on behalf of the American people," Van Ovost said. "I've seen our values reflected in the kindness and compassion demonstrated by our teammates executing humanitarian operations around the globe and right here at home."

At the same time, she said, as the U.S. shifts from wars in Iraq and Afghanistan to competition with countries such as China, the command's military demands will change.

"Know that TRANSCOM's No. 1 priority remains constant: Warfighting readiness is the surest way to prevent war. We expect that our freedom to maneuver will be challenged; our logistics lines will be contested at every level. But together with our coalition partners and our commercial teammates, we will flatten the globe and underpin the lethality of our nation's military arm," Van Ovost said.

Lisa Ferdinando/DOD

Air Force Gen. Jacqueline D. Van Ovost gives her first salute as commander of U.S. Transportation Command, Scott Air Force Base, Ill., Oct. 15.

Gen. Mike Minihan assumed command of Air Mobility Command from Van Ovost during a ceremony Oct. 5 at Scott Air Force Base, Ill.

Minihan, who last served as deputy commander of U.S. Indo-Pacific Command, pinned on his fourth star hours earlier.

Air Force Chief of Staff Gen. Charles Q. Brown Jr., who presided over the ceremony, said Minihan now leads about 110,000 Total Force Airmen and oversees a fleet of nearly 1,100 aircraft at a time when modern warfare is changing.

"There will be a contest among connected operational systems, not simply individual units or platforms," and "uncontested freedom of movement, provided by our mobility Airmen and enjoyed by the joint force, will be challenged by our strategic competitors," noted Brown.

Flanked by a C-32 in Air Force Two markings and a KC-135 tanker, Brown praised Van Ovost, who has led the command since August 2020. Under her leadership, Brown said AMC Airmen flew 12,000 combat airlift sorties and 7,000 combat air refueling sorties, offloaded more than 33 million pounds of fuel to more than 600 Bomber Task Force missions, flew nearly 700 presidential and senior leader airlift missions, and delivered hundreds of aeromedical patients and millions of COVID-19 vaccines and critical supplies across the globe.

During the ceremony, Van Ovost received the Distinguished Service Medal with her first Oak Leaf Cluster for distinguishing herself while in command.

According to the citation, which was read during the ceremony, Van Ovost "fundamentally redefined rapid global mobility culture, invigorating competition, innovation, experimentation,

and data-to-decision focus across the command; accelerating national defense strategy implementation; and energizing the Mobility Air Forces," or MAF, "as the indispensable maneuver force for the joint force."

She also helped negotiate incremental capability releases for the KC-46 Pegasus, helping to bring the Air Force's newest weapon system online faster and easing the burden on the service's legacy tankers.

Also under her leadership, "Air Mobility Command shouldered the nation's withdrawal from Afghanistan, flying over 2,000 missions, delivering over 66 million pounds of cargo, and closing six forward operating bases; and subsequently executed the largest noncombatant evacuation operation in United States history, facilitating the evacuation of over 124,000 American citizens and Afghan partners in 18 days," according to the citation.

The military needs "every Jackie Van Ovost that we can get," Austin said during the TRANSCOM ceremony, pointing to her trailblazing career as a test pilot who has flown more than 30 kinds of aircraft for the Air Force.

"Gen. Van Ovost, in the 21st century, careers like yours are a fighting imperative," Austin said. "And as she likes to say, as young women looking up, it's hard to be what you cannot see. So Gen. Van Ovost knows the importance of breaking barriers, of getting results in bringing teams together, and she's used to challenges that have never been tackled before."

Van Ovost is currently the only female four-star general in the Defense Department and just the fourth in Air Force history. She and retired Gen. Lori J. Robinson are now the only women to lead a unified combatant command—Robinson headed U.S. Northern Command and NORAD from 2016 to 2018.

Army Lt. Gen. Laura J. Richardson, however, was slated to receive her fourth star and take command of U.S. Southern Command in a ceremony Oct. 29.

Space Force Shakes Up Acquisition Again in Effort to Achieve Efficiencies

By Greg Hadley

The Space Force confirmed that it will reorganize space acquisition and space policy authorities starting Oct. 18 in an effort to streamline decision-making in line with Air Force Secretary Frank Kendall's plan announced in August.

As first reported by Breaking Defense on Oct. 15, the Department of the Air Force described a plan to break out space policy from the as-yet unnamed space acquisitions chief. The move would reduce the number of personnel required to sign off on policy decisions by transferring space policy to the Chief of Space Operations and the Secretary of the Air Force.

In August, Kendall described his plan to consolidate the Space Acquisition Directorate from the Office of the Assistant Secretary of the Air Force for Acquisition, Technology, and Logistics, or SAF/AQ, into a new organization, Space Acquisition and Integration, or SAF/SQ. Space acquisition policy remains within SAF/SQ, while broader space policy moves to Space Force and responsibility for international affairs shifts to the deputy undersecretary of the Air Force for international affairs, or SAF/IA.

Kendall in August named Brig. Gen. Steven P. Whitney to head the space acquisitions office until an assistant secretary for space acquisition and integration is named. Whitney has managed the reorganization pending the appointment of that new civilian leader.

Congress has for months railed against the slow pace of space acquisitions reform and the absence of a civilian chief. In a July report, the House Appropriations Committee claimed the Air Force was dragging its feet.

"The committee remains concerned that the Air Force has not taken more aggressive action in addressing long-standing space acquisition issues," the report read.

Lawmakers also said the Air Force had "made little progress in defining what the Space Force will be doing that is fundamentally different than when it was a component of the Air Force."

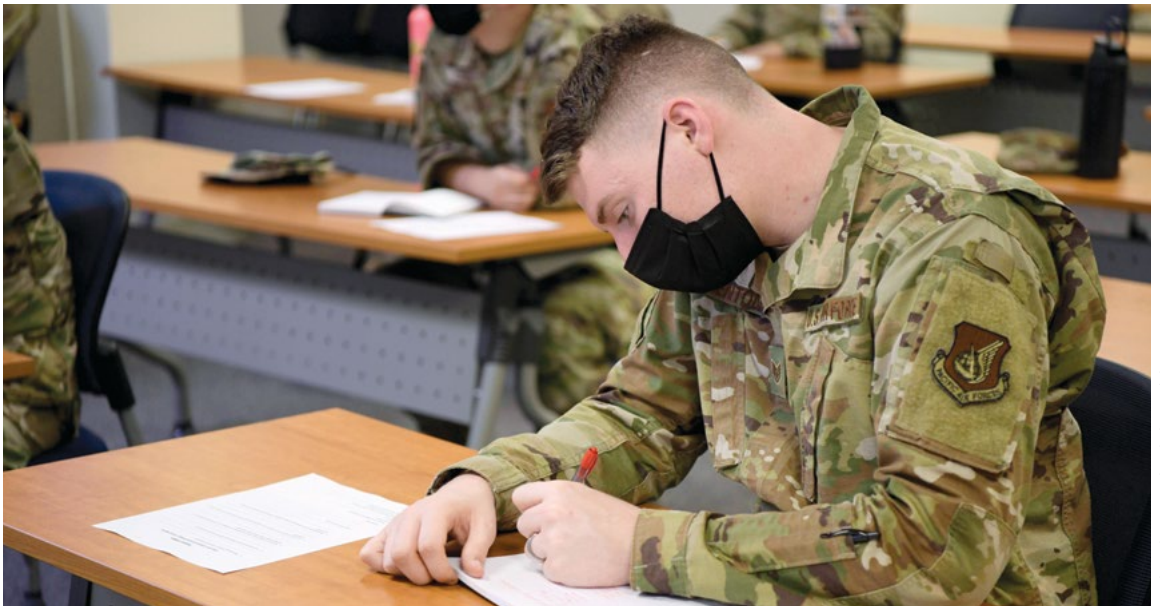
On Sept. 20 at the Air Force Association's Air, Space & Cyber (ASC) Conference, both Kendall and Chief of Space Operations Gen. John W. "Jay" Raymond expressed confidence in the reorganization of space acquisition, even though an assistant secretary had not yet been named.

Eric Dietrich/USAF

Brig. Gen. Steven Whitney will head the space acquisitions office until an assistant secretary for space acquisition and integration is named.

"We're actually interviewing people right now for the space acquisitions assistant secretary position," Kendall said at the ASC media briefing, foreshadowing the office reorganization and personnel movement. "So, it's moving forward. I'm reasonably happy with the pace."

USAF Changing Enlisted Promotion Recommendations to Favor Experience and Performance



A Staff Sgt. attending the "Bullet Writing 101" professional development seminar at Kadena Air Base, Japan.

Senior Airman Rebeckah Medeiros

By Greg Hadley

The Air Force is changing its enlisted performance system to better reward experience—as long as it's backed up by "sustained performance."

The changes principally affect how Enlisted Performance Reports (EPR) will be scored, with the introduction of the new Promotion Recommendation Score, the service announced in a news release.

"Our Air Force values the experience that our Airmen bring with them," Chief Master Sgt. of the Air Force JoAnne S. Bass said in the release. "The Promotion Recommendation Score is a step in the right direction to ensuring we recognize that experience, along with sustained superior performance."

The new system, like the current one, will continue to use a maximum of three EPRs in the Airman's current grade when calculating points. However, it will do away with the current system's practice of weighting point totals based on the number of EPRs evaluated.

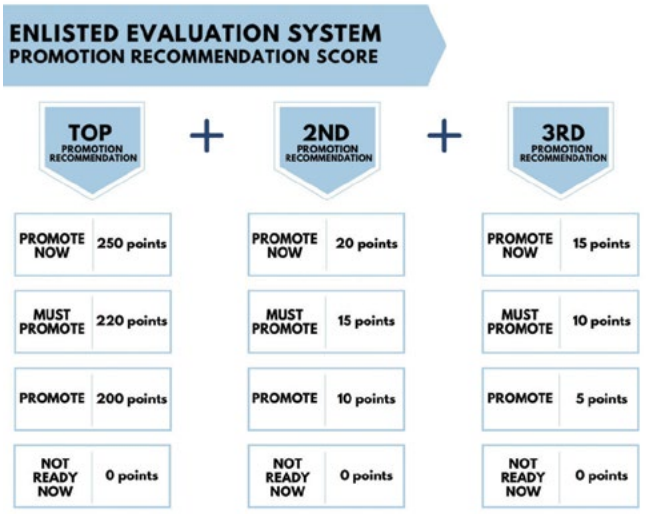
Under the current system, when an Airman has three years or more in the eligibility window, that Airman's most recent EPR is worth 50 percent of the Airman's score; the middle EPR is worth 30 percent; and the oldest of the three EPRs is worth 20 percent of the weighted EPR points. If only two EPRs are available, then the more recent one is worth 60 percent and the older one is worth 40 percent. And for Airmen with only one EPR, it is worth 100 percent of their weighted points.

That approach has meant Airmen with the same level of performance in a current year and with more experience could end up with fewer overall points.

In the new system, weighted points are gone. Instead, full point values are awarded for each year. The system is still designed to place the most emphasis on the most recent EPR.

For the most recent EPR, Airmen will receive 250 points for a "Promote Now" recommendation, 220 points for "Must Promote," and 200 points for "Promote." And for Airmen with only one eligible EPR, that will be the extent of their score.

But Airmen with a second EPR can receive anywhere from 10 to 20 points based off the promotion recommendation they received in that review, and Airmen with a third EPR can add an additional five to 15 points.



USAF

The new system also eliminates any point value for the "Not Ready Now" recommendation and does away with the "Do Not Promote" recommendation entirely.

These changes will impact senior Airmen and staff sergeants who are promotion-eligible beginning with the 22E6 promotion cycle.

"The transition to the new Promotion Recommendation Score is another integral step in shifting our culture and accelerating change to ensure we can develop and assess the enlisted force we need to win in the future," Chief of Staff Gen. Charles Q. Brown Jr. said in a statement. "We value our Airmen's experience, and we must show them that."

Bass previously pledged to reinstate the importance of experience when evaluating Airmen for promotion, according to Military Times, reversing a change to the system that started in 2014 that USAF leaders said at the time was focused on job performance. ✪

Lockheed Martin Delivers Laser Weapon for AC-130J Gunship

By Greg Hadley

Lockheed Martin has completed factory acceptance testing and delivered a new laser weapon to the Air Force, the defense contractor announced Oct. 6, with the goal of mounting it on the AC-130J gunship.

"Completion of this milestone is a tremendous accomplishment for our customer," said Rick Cordaro, vice president for Lockheed Martin Advanced Product Solutions, in a press release. "These mission success milestones are a testament of our partnership with the U.S. Air Force in rapidly achieving important advances in laser weapon system development. Our technology is ready for fielding today."

The Airborne High Energy Laser (AHEL) has been in development at Lockheed Martin since at least 2019, when the company received a contract for integration, testing, and demonstration of such a weapon on the AC-130J aircraft.

Master Sgt. Christopher Boitz

AC-130J Ghostriders may soon get a laser weapon—Lockheed Martin's AHEL—on board. A timeline has not been revealed.

Air Force leaders, however, have been talking about the possibility of a laser weapon onboard the AC-130J Ghostrider for much longer than that.

Back in 2015, then-Air Force Special Operations Command boss Lt. Gen. Bradley A. Heithold issued a challenge—to get a high-powered laser onboard the AC-130J by the end of the decade. That timeline was later pushed back to 2022 by Heithold's successor, Lt. Gen. Marshall B. "Brad" Webb.

What capabilities the AHEL will bring to the AC-130J remain to be seen. Lockheed Martin claims that its spectrally combined fiber laser weapon systems—of which AHEL is one—are "ready to defend against small rockets, artillery shells and mortars, small unmanned aerial vehicles, small attack boats, and lightweight ground vehicles that are approximately a mile away," according to the company's website, which also features an image of a hole smoldering in the hood of a pickup.

A Lockheed Martin spokesperson said "the specific capabilities of the AHEL laser cannot be discussed at this time" and deferred questions to the Naval Surface Warfare Center's Dahlgren Division, which gave Lockheed Martin a $12 million, five-year contract award in July 2021 for technical services, integration, testing, and demonstration of the AHEL. The Dahlgren Division subsequently deferred comment to Air Force Special Operations Command.

In 2015, Heithold described the laser weapon as primarily for protection from surface-to-air attacks, as modern threats reduced the windows in which the aircraft could operate.

Webb, however, envisioned it as an offensive capability, too, being used to disable enemies' communications, transportation, and power supply, according to National Defense Magazine.

In its press release, Lockheed Martin said it has delivered the AHEL for integration with other systems before ground testing and "ultimately flight testing aboard the AC-130J aircraft." The contractor added that it is on a "rapid schedule" to demonstrate the weapon on the AC-130J.

The AC-130J is used for close air support, air interdiction, and armed reconnaissance, and already features 30 mm and 105 mm cannons, precision-guided missiles, and small-diameter bombs. ✪

Air Force Activates First F-35 Squadron in Europe

By Greg Hadley

The Air Force activated its first squadron of Europe-based F-35As at RAF Lakenheath, U.K., on Oct. 1, as the service prepares to deliver the first fighters in the coming months.

The 495th Fighter Squadron was activated exactly 30 years after it was designated as a fighter squadron in 1991. Just a few months after that, though, the squadron was inactivated.

In 2015, the Air Force announced that Lakenheath would be the first base in Europe to get the new F-35 fighter, and in September 2020, U.S. Air Forces in Europe announced it was reactivating the 495th under the 48th Fighter Wing.

The 495th will consist of 27 F-35s and around 60 personnel, according to a 48th Fighter Wing release announcing the squadron's activation. The Air Force plans to eventually base a total of 48 F-35s at Lakenheath in two squadrons.

The first F-35s were originally slated to arrive in Europe in 2020, but construction delays bumped the activation to 2021.

Lt. Col. Ian D. McLaughlin assumed command of the 495th on Oct. 1. The squadron will be nicknamed the Valkyries, after the female figures in Norse mythology who choose who will live or die in battle.

The F-35s are set to start arriving in December.

With American F-35s arriving in Europe for the first time, the Air Force will be able to integrate and operate with its partners in the region, who also operate the F-35, like never before, USAFE commander Gen. Jeffrey L. Harrigian said at the Air Force Association's September conference.

"We've already got some pretty good plans as we start thinking about how we leverage that capability, particularly with many of our partners that already have F-35s in the theater. I really think it'll be a truly important step as we continue to demonstrate the importance that the F-35 has baked into it from an interoperability perspective," Harrigian said.

A number of American allies and partners have already received F-35s from Lockheed Martin, including the United Kingdom, Norway, Italy, the Netherlands, Denmark, and Israel. Switzerland announced in June that it would buy the stealth fighter as well.

NATO Supreme Allied Commander Air Force Gen. Tod D. Wolters, speaking at an event in June, predicted that between the U.S. and its allies and partners, there will be 450 F-35s in Europe by 2030. ✪

Gen. Colin Powell Dies at 84

By John A. Tirpak

Colin Luther Powell, U.S. Soldier, diplomat, and statesman, died Oct. 18 at the age of 84.

As Chairman of the Joint Chiefs of Staff, he advised President George H.W. Bush during America's response to Iraq's 1990 invasion of Kuwait and the ensuing swift victory in the 1991 Gulf War. He also presided over the invasion of Panama and a sharp reduction in the size of the U.S. military after the end of the Cold War. Powell faulted himself for not arguing more forcefully against a second war in Iraq while he was Secretary of State.

His death was attributed to complications from the COVID-19 virus; a breakthrough case, as Powell was fully vaccinated, but in recent years he had suffered from blood cancer that severely degraded his immune system.

Powell achieved a number of firsts for a Black man: the first to be Chairman of the Joint Chiefs of Staff, first to be Secretary of State—the only person to hold both positions other than George C. Marshall, who did so under President Harry S. Truman—and the first to be National Security Adviser. He was only the fourth Black man to be a four-star Army general. Powell was considered to be the least apolitical general since Dwight D. Eisenhower.

Powell attended New York City College and found his calling with the ROTC program there. He was commissioned in the Army and enjoyed a meteoric, 35-year career that included two tours in Vietnam. He rose to the rank of brigadier general by the age of 42, and was later tapped by President Ronald Reagan to be National Security Adviser.

At the White House, Powell, still on Active duty as a three-star general, advised Reagan on arms agreements and renewed détente with the Soviet Union, coming to national attention and establishing him in the inner circle of foreign policy experts. He left the White House in 1989 to become the four-star head of Army Forces Command. Just a few months later, however, Powell was appointed to be Chairman of the Joint Chiefs by President George H.W. Bush.

In August 1990, Iraqi strongman Saddam Hussein seized Kuwait. Powell advised that U.S. reaction be heavy and include internationally ironclad economic sanctions, but Bush decided, without consulting Powell, to reverse the invasion militarily.

Shortly after the buildup began, newly minted Air Force Chief of Staff Gen. Michael J. Dugan told reporters that if war came, a massive application of airpower would be required to whittle down the Iraqi Army, and that one goal would be to decapitate Iraq's leadership. Soon after publication, Dugan was fired by Defense Secretary Dick Cheney, who said Dugan had given away too much information about war plans, even though most of what he said had already been revealed in the defense press. Pentagon insiders said Powell urged Cheney to fire Dugan, as Powell believed Dugan was overpromising what airpower could accomplish.

In a November 2017 interview with the San Diego Union Tribune, former Chief of Staff Gen. Merrill A. McPeak, who replaced Dugan, said that after his own inspection tour of Desert Shield preparations, he told Bush that the Air Force and other service air arms were "ready to go" but that Powell "was trying—I thought—to delay operations until the Army got ready."

Senior Airman Rodney Kerns via National Archives

Gen. Colin Powell, Chairman of the Joint Chiefs of Staff, meets with U.S. Air Force personnel while visiting military facilities during Operation Desert Shield.

Powell eventually acquiesced to a war plan created by Army Gen. H. Norman Schwarzkopf, which closely followed what Dugan had laid out.

Powell in 1992 laid out ground rules for entering an armed conflict. "The Powell Doctrine" stipulated that the cause must be vital to U.S. security; the public be behind it; that overwhelming force should be applied to achieve rapid victory; and that an exit strategy must be set before the fighting starts.

After Desert Storm—and the self-dissolution of the Soviet Union—Powell implemented a reduction in the size of the U.S. military ordered by Bush. The "base force" concept saw about a 25 percent reduction in the force overall, though Air Force combat airpower and personnel saw as much as a 40 percent reduction.

He resisted President Bill Clinton's moves to allow LGBTQ Airmen to serve in the military, which eventually led to the "Don't Ask, Don't Tell" policy.

Powell was the first Cabinet appointee of President George W. Bush, serving as his first Secretary of State.

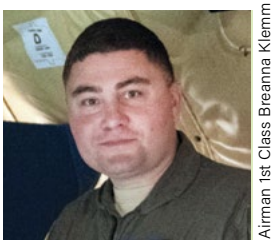
He argued against Bush's desire to engage in a second Iraq war, claiming that if the U.S. conquered Baghdad, it would assume the expensive responsibility for feeding and policing that nation until a new government could be installed. He later wrote that he did not argue forcefully enough against Operation Iraqi Freedom, feeling that Bush had already decided to attack and his counsel would be devalued if he continued to oppose the war.

In a February 2003 speech at the United Nations, Powell presented the case that Saddam Hussein had weapons of mass destruction that he might give to terrorists, and could not be left in power, citing U.S. intelligence. Powell's reputation swung world opinion, but the intelligence eventually proved faulty, and he later said in an ABC News interview that his U.N. speech would be a permanent "blot" on his reputation. ✪

FACES OF THE FORCE

Tristin English/USAF

Lt. Col. Richard "Dick" Cole was honored and posthumously promoted to the rank of colonel during a Sept. 7 ceremony at Joint Base San Antonio-Fort Sam Houston. Cole was the last surviving member of the Doolittle Raiders, a group of 80 Airmen led by Lt. Col. James "Jimmy" Doolittle. The Airmen flew 16 B-25 Mitchell bombers from the *USS Hornet* April 18, 1942, en route to an air raid to attack Tokyo in World War II, after the Japanese had bombed Pearl Harbor Dec. 7, 1941. While it only caused minor physical damage to mainland Japan, the mission boosted morale within the U.S. and signaled to Japan that the U.S. was not only ready to fight back, but willing to bring the fight to them if necessary, and strike the Japanese mainland.



Airman 1st Class Breanna Klemm

Senior Master Sgt. Bartek Bachleda created a boom operator instructor platform design that was installed in a KC-135 at Altus AFB, Okla., in November 2019. Now, it has made it past initial operational capability and been issued a Time Compliance Technical Order by Air Force A4 Logistics to fully integrate its installation in all KC-135 aircraft. The design provides a more ergonomically correct and stable workstation and is scheduled to replace all KC-135 instructor platforms USAF-wide.

Airman Elijah Van Zandt

Maj. Rashida Brown, 341st Medical Group group-practice manager, recently completed the Diversity and Inclusion Certificate Program at Cornell University, where she learned more about fostering an inclusive environment and diversity. She is sharing what she learned to foster inclusion on base, as well as in the community, with events highlighting Black History Month, Women's History Month, Asian American and Pacific Islander Heritage Month, and Pride Month.

ANG via Twitter

Master Sgt. Steve Brooks was one of 13 additional chaplains and religious affairs Airmen sent to care for AMC Airmen fulfilling the Operation Allies Refuge mission. In the photo above, he shields a three-day-old baby's eyes from the sun at Ramstein AB, Germany—the baby, born to Afghan evacuee parents at Landstuhl Regional Medical Center, received phototherapy for a case of jaundice at the 521st Air Mobility Operations Wing's Hangar 5 prior to boarding a flight.

Airman 1st Class Jose Miguel Tamondong

Growing up in Egypt as a woman, a religious minority, and poor, **Airman 1st Class Helbees Tawadrous** didn't see many options in life. But after moving near Ramstein Air Base in Germany, her Marine Corps veteran husband got a job with Stars and Stripes, and she was introduced to USAF. Seeing women in positions of authority and respect inspired her to enlist. Now, she's a contracting specialist at Eielson Air Force Base, Alaska, and hopes to become an officer.

Tech. Sgt. Frank Casciotta

Second Lt. Felix Zhang and **Senior Airman Emily Hosoya** are the only two members of the Air Force Reserve to be "Supra Coders," having graduated from an intensive three-month course that teaches students to become full stack developers, who can perform front and back-end coding for developing software. The course is followed by a three-month internship with one of the Air Force's innovation hubs. "All of our warfighting capabilities are reliant on software and communications," said Zhang.

Senior Airman David Busby

Master Sgt. Thomas Williams, 62nd Aircraft Maintenance Unit weapons loading noncommissioned officer in charge, received the Bronze Star Medal for meritorious achievement in a deployed location on Sept. 1, 2021. During a year-long deployment at Forward Operating Base Oqab in Kabul, Afghanistan, Williams conducted 187 outside-the-wire missions mentoring the Afghan air force munitions squadron commander on munitions safety and personnel management.

USAF

Capt. Amber Hansen, commander of Global Activities Squadron Detachment 4 at the National Air and Space Intelligence Center, and **Airman 1st Class Michael Mannozzi**, who works in Religious Affairs at the 88th AB Wing Chaplain's Office, were selected as the Air Force's 2020 Male and Female Athletes of the Year. Hansen is an internationally ranked powerlifter, having qualified for U.S. Powerlifting Association elite status, while Mannozzi competed in the U.S. Olympic team trials as part of the 20-kilometer race walk.

Courtesy

Nadia Cain, the 16 year old daughter of Brig. Gen. Scott Cain, started a letter-writing campaign to thank Eglin AFB, Fla., veterans who served in Afghanistan. Within two weeks she had some 100 letters from middle schoolers ready for delivery. Cain dropped off the letters and worked with Eglin to distribute them to Airmen. SMSgt. Jeremy Holcomb received one, and said, "It warmed my heart receiving letters from students in our local community." Cain said she hopes to get her own school involved in another letter-writing campaign.

Tell us who you think we should highlight here. Write to afmag@afa.org.

Next-Generation Power for Air Force Fighters

USAF bet billions on Adaptive Engines. Are they ready now?

By John A. Tirpak

After nearly 15 years in development and a $4 billion Air Force investment, two brand-new fighter engines are in test, promising game-changing improvement in range and thrust. Which airplane they will equip first—and when—is suddenly a hot debate in Washington.

At least one of the new engines will power the Next-Generation Air Dominance fighter now in development, but there is growing interest in Congress to field new engines in the Block 4 version of the F-35 as soon as 2027. Whether that's possible—or affordable, given all the bills the Air Force has to pay—is not yet clear. But the Block 4 F-35s, which go into production in 2023, will need a new or improved engine to make full use of its upgrades.

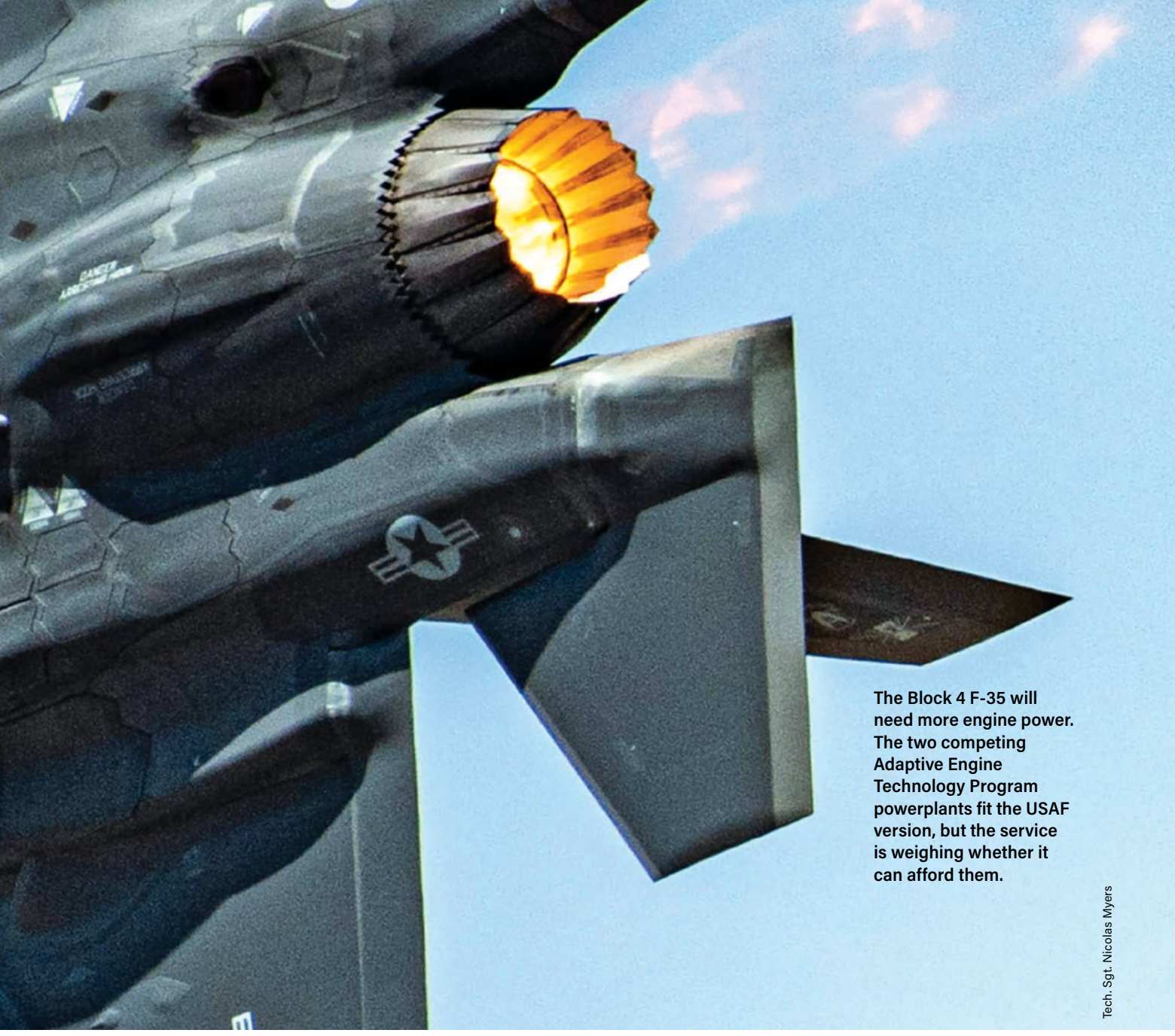
"We have the ability now, I think, to create engine competition."
—Adam Smith (D-Wash.), chairman House Armed Services Committee

The revolutionary new powerplants arise from the Adaptive Engine Transition Program, run initially by the Air Force Research Laboratory and now by the Air Force Life Cycle Management Center. Based on development efforts dating back to 2007, the AETP program generated the XA100 from GE Aviation and the XA101 from Pratt & Whitney.

Both say their engines yield 25 to 30 percent more range; up to 18 percent greater acceleration; and increased cooling capability for onboard electronics. Potential other benefits include more electricity to power emitting systems and directed-energy weapons, and a reduced heat signature to improve stealth.

"We know we can do that … we've achieved that," said Pratt's military engines division president Matthew Bromberg.

GE's David Tweedie, general manager for advanced combat systems, said his company's engine also meets the Air Force's goals and offers "a significant reduction in carbon emissions" as a byproduct. Tweedie said the transition from a successful technology effort to an engineering and manufacturing development program



The Block 4 F-35 will need more engine power. The two competing Adaptive Engine Technology Program powerplants fit the USAF version, but the service is weighing whether it can afford them.

Tech. Sgt. Nicolas Myers

aimed squarely at installing new engines in fighters should begin now. But "everything [in the budget] beyond fiscal '22 … is pre-decisional," he said.

NEXT-GENERATION PROPULSION

Fighter engine technology hit a wall in the early 2000s. Engineers struggled to squeeze even small improvements in thrust or range from fighter turbofan designs. Adaptive technology—which adds a third stream of airflow to the engine and the ability to adjust it—offered a way to break through that wall.

"There were three major technology efforts," according to Tweedie. The first was adaptive technology, "the ability to reconfigure, in flight, toward either a more fuel-efficient mode or a high-thrust mode," he said. Second was creating "the third-stream architecture for thermal management demands … unique to fifth- and sixth-generation combat aircraft." The third was "advanced … manufacturing techniques."

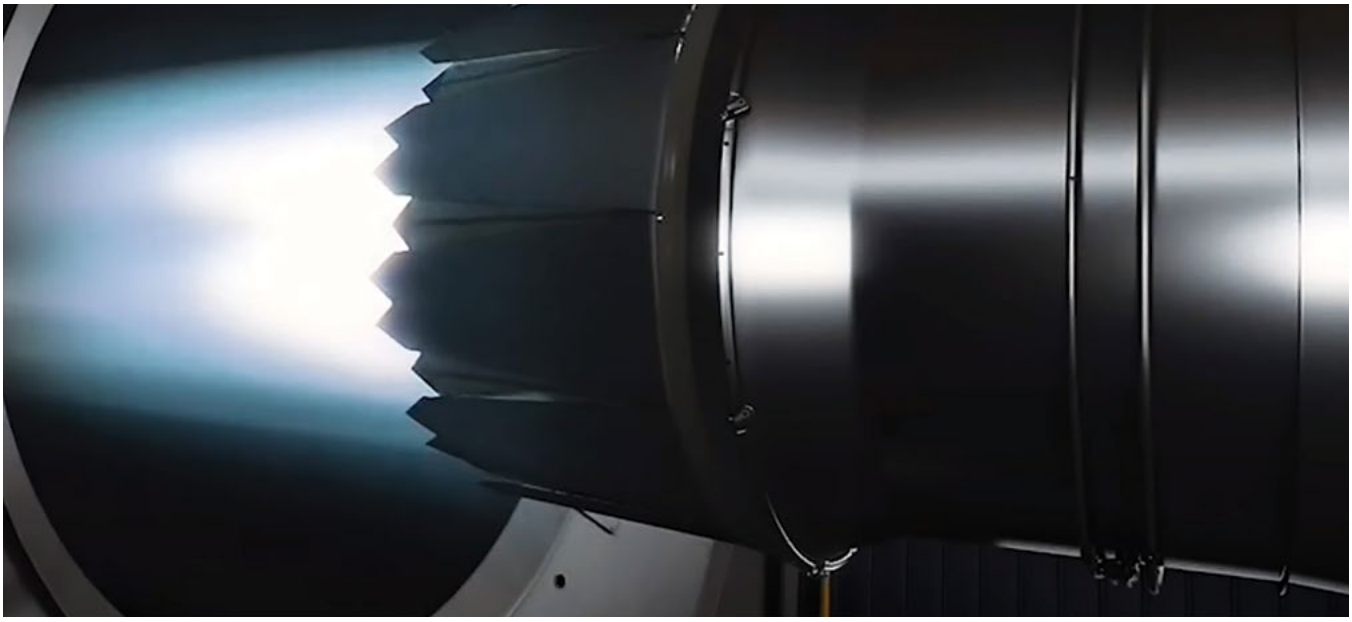
The third stream adds an extra air path to the engine, in addition to the central path that runs through the middle of the core and a second, bypass stream. Flowing around the outside of the engine case, the third stream can be used in several ways: diverted into the center stream for increased thrust; to improve propulsion efficiency; or to cool the engine and aircraft electronics.

New ceramic matrix composites (CMCs) replace metal alloys in some critical components, offering "lighter weight [and] higher temperature capability," Tweedie said. This enables the engines to run hotter and thus more efficiently, without sacrificing durability. Additive manufacturing—also called 3D printing—also"really helped engineers unlock the design space … to be able to answer questions like, 'How do you fit all this into a real airplane, like the F-35?'"

Bromberg said the XA1010 has "adaptive mechanical seals," which he said are unique to the Pratt design. These allow airflow to go "where you want it to go."

Now, Bromberg said, testing is focused on "how long will [an AETP engine] last?"

U.S. fighter engines are already "incredibly powerful," and Bromberg said the F135 is "invisible" to detection, but "we can make them so a pilot can use them again and again … and



GE Aviation

GE Aviation's AETP entrant is the XA100, seen here in an artist's concept. New technologies in both AETP engines include third-stream airflow, high-temperature ceramic matrix composites, digital design, and additive manufacturing techniques. A sure bet for the Next-Generation Air Dominance Fighter, the debate is on whether to put AETP engines in the F-35.

go years between a scheduled maintenance event." That's a "unique capability of the United States' propulsion industry, and we have to keep developing it. So, we test for that."

MORE RANGE, MORE POWER

The operational payoffs could be huge. Besides a 25 percent reduction in fuel consumption, Air Force officials said, fighters with the new engines could gain up to 30 percent more range or 40 percent more persistence, significantly offsetting the distance challenges in the Indo-Pacific theater. Put another way, adaptive engines could help fighters reach a third more targets, from a third more airfields, and reduce their dependence on aerial tankers by up to 75 percent.

"That range improvement gives me the same effect as more fighter squadrons," said a senior Air Force official.

Being able to run hotter would also allow the F-35 to fly low-altitude missions for longer than it can today, Tweedie said. GE's XA100 "can effectively double the thermal management capacity on the jet."

Both GE and Pratt said they've tested their AETP engines successfully throughout 2021 at their own facilities, and would soon turn them over to the Air Force for further tests and data collection at the Arnold Engineering Center in Tullahoma, Tenn.

Many in Congress are sold already. The House Armed Services Committee, in its version of the fiscal 2022 National Defense Authorization Act, directs the F-35 Joint Program Office and the Pentagon's acquisition and sustainment undersecretary to set a plan integrating AETP engines into the F-35 no later than 2027, a time frame that both contractors say they can meet.

HASC chair Adam Smith, in an Aug. 31 Brookings Institution event, said the F-35's current engine—Pratt & Whitney's F135—is "burning out faster and taking longer to fix than expected." Parts backups are creating a chronic shortage of F135 engines. Having a competing engine could stimulate improvements in cost and reliability, he said.

"We have the ability now, I think, to create engine competition going forward," Smith said. "We are going to push [it]."

LIGHTNING POWER

In 2011, however, after great debate about the price, technology, and industrial base advantages and disadvantages of maintaining two engine vendors for one fighter, Congress acceded to Defense Secretary Robert Gates's request to terminate the F136. He argued that it was an unnecessary expense, both to develop and because it would require a separate logistics train for the fighter. All three variants of the F-35 would use the F135.

Making a change now would be problematic, however. If the Air Force wants to use the AETP engines in its F-35s, it will have to bear the cost by itself, according to Joint Strike Fighter program executive officer Air Force Lt. Gen. Eric T. Fick.

The F-35 users agreed, since the program's inception, that "you have to pay to be different," Fick said in September. Neither the XA100 nor the XA101 will fit in the Marine Corps' F-35B model, which is the short-takeoff-and-landing version. The F-35B's exhaust swivels from horizontal to vertical to enable vertical fight, but Bromberg said an adaptive engine "can't articulate like that."

Fitting either the XA100 or XA101 into the Navy's F-35C carrier-based version is possible, but would also require major engineering; it would require shifting the carrier-landing variant's tailhook apparatus.

If the new engine is "a one-service … unique solution, the cost of that solution will be borne by that service," Fick said, adding, it would be "unfair" to ask partners who can't use the new engine to underwrite its development and integration. Indeed, any two-engine support train will impose costs on partners by reducing commonality among them: more different parts means higher unit costs for all.

Air Force Secretary Frank Kendall, speaking with reporters at AFA's Air, Space & Cyber 2021 Conference in September, said he favors AETP engines for the F-35, but doesn't know if that is affordable.

"We've had some pretty good success" with AETP, Kendall said. "We'd very much like to continue the program that advances engine technology," but it's "not clear" the Navy feels the same way. He said he's still discussing it with Navy Secretary Carlos Del Toro.

Karsten Moran

Pratt & Whitney's F135 engine, seen here on the production line at Middletown, Conn., powers the F-35 fighter today. Pratt is offering either an upgraded F135 or its new XA101 for the Air Force F-35A.

SOME KIND OF CHANGE

What is clear is that the F-35 needs some kind of engine improvement, Fick said. The "first three" increments of the fighter's Block 4 upgrade can function with the existing engine, he said, but "beyond that, we need to do something different." The jet can't fully exploit Block 4's capabilities without more power.

The JPO is working with Pratt & Whitney to develop "a family of options ... to give us the power and cooling we need" for Block 4 and beyond, Fick said.

As an alternative, Pratt has put together an Enhanced Engine Program (EEP), a package of F135 upgrades that can improve performance without changing out the F135's core.

Jennifer Latka, Pratt Vice President for the F135 program, told Air Force Magazine that the company submitted the EEP proposal in March: It could provide a 50 percent boost in thermal management and a 5 percent improvement in vertical lifting power.

She said the proposal "can be tuned" to "what the services most want," and that changes could be cut into production by 2028. The upgrade would still have "some margin" for additional capability growth.

"It is very well understood" that the F-35 needs more power and the engine will need to be modernized—"hopefully, one time over the life of the JSF program."

Pratt's proposed enhancements would cut 36 percent of the cost of the engine's first shop visit, "where the big bills come," she said. The EEP effort is separate from prime contractor Lockheed Martin's push to cut F-35 operating costs to $25,000 per hour by 2025 (in 2012 dollars).

Latka acknowledged that the existing F135 can run hotter to meet more of the Block 4 requirements, but that would mean "the engines come in for maintenance" with more frequency, and that will drive up operating costs, long a sore spot with the JSF program. But she estimated that adding a second engine to the F-35 program would be even more expensive, costing $40 billion more over the remaining 50-year life of the F-35.

The AETP engines were "always intended" to power sixth-generation fighters like the NGAD, she said.

Boosting the Air Force's Legacy Engines

Third-stream AETP technology can't be backfitted to previous engines such as the Pratt F119 that powers the F-22 fighter, or the Pratt F100 and GE F110 that power F-15s and F-16s. The engine space in existing fighters won't accommodate the larger-diameter powerplant.

However, "other mechanical systems" that went into creating the AETP can, said Matthew Bromberg, Pratt & Whitney military engines president. In fact, up to 70 percent of AETP technology "could be leveraged" into previous engines, he asserted, although those improvements would have to "buy their way in" by improving performance enough to justify the investment.

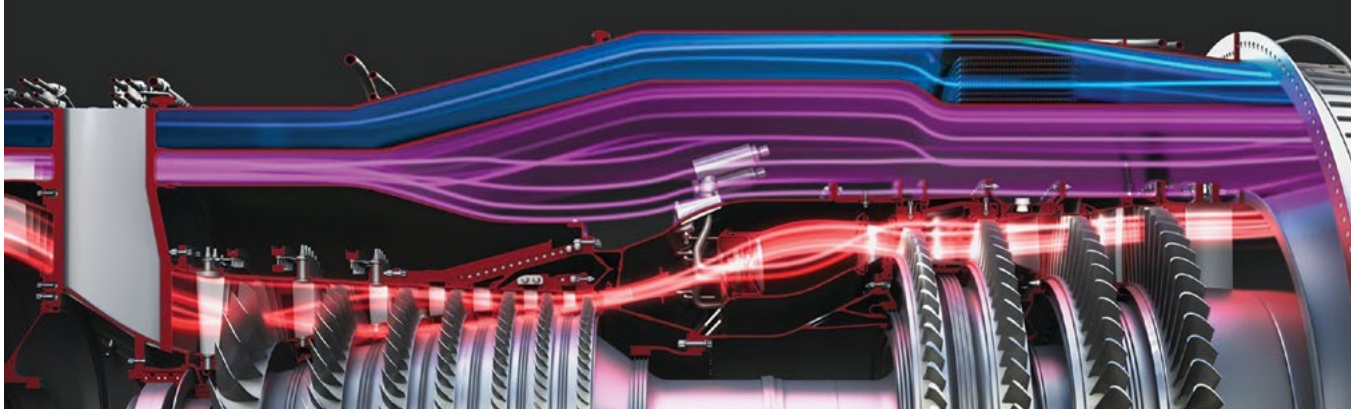
Still, "every future engine that we design will leverage that entire technology suite," Bromberg said.

The Air Force agrees. Gen. Arnold W. Bunch Jr., head of Air Force Materiel Command, told reporters in September that the service is excited to extract all the "goodness" it can from the AETP program for earlier engines.

While AETP technology writ large may not be portable to older engines, "if we can make an advance, even if it's a subcomponent or a manufacturing methodology ... we want to take all those things we can get to the max performance we can," Bunch said. He's got his engines directorate looking at whether "we can scale it" to larger or smaller airframes, and what trade-offs that might entail.

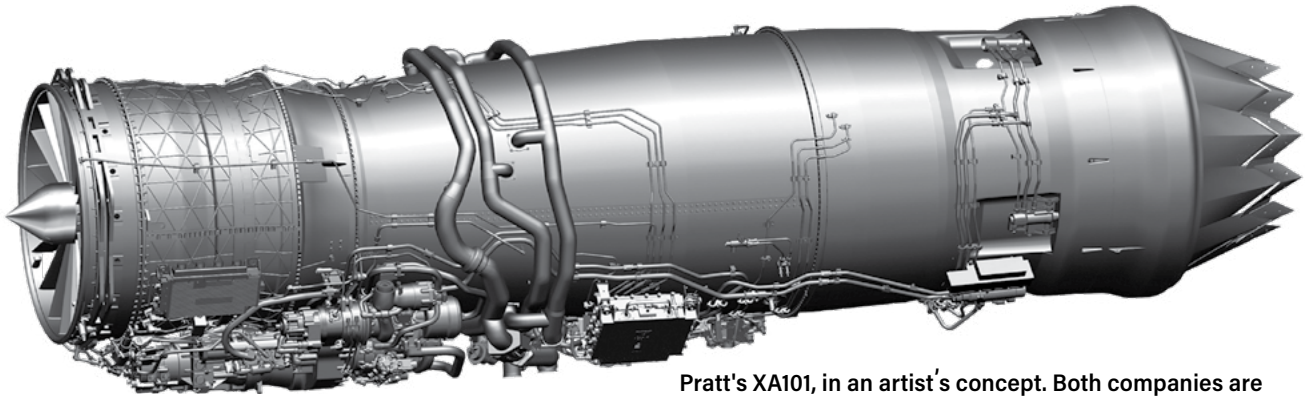
Whatever is decided about AETP applications, engine technology must move forward, Bunch said.

With his background in technology development, test and operations, "it's technology that I really believe we need to invest in, and continue to keep the industry up to the latest standards that we can capitalize on." The U.S. has a "decided advantage" in propulsion technology today, and the Air Force has determined that it must retain that edge, Bunch said.



GE Aviation

A GE Aviation diagram shows the three streams of airflow through and around the XA100 hot section. The third stream (in blue) can be put to work by diverting it, either by adding thrust or cooling the engine so it can run hotter, for longer.



Pratt & Whitney/courtesy

Pratt's XA101, in an artist's concept. Both companies are withholding competitive information on their version of the AETP engine.

"There's a significant amount of risk that comes with brand-new technology," she added. Before counting on the AETP to deliver the future of F-35 propulsion "a tremendous amount of validation" would have to be done. In her view, "The AETP is not the right fit for the F-35."

But Bromberg, Latka's boss at Pratt, said the company is "thrilled" about having two options to offer the Air Force and the F-35 Joint Program Office. "We'd love the opportunity to …obsolete ourselves," he said. "Now the debate is focusing on modernizing the Joint Strike Fighter. And we think it's a good time to have that debate." Each solution has its "advantages and disadvantages," he said.

Bromberg said he charged the F135 team to borrow what they could from AETP, such that the resulting EEP product "is suitable for all partner countries … [is] weight-neutral … [and] production cost-neutral." It also needed to offer sustainment cost advantages and be "cut into production" in a "very low-risk way."

Lockheed Martin, builder of the F-35, has worked with both GE and Pratt on their AETP research, according to company aeronautics executive vice president Greg Ulmer. Lockheed generates requirements for fighter power, but has no favorites among the propulsion options, he said. The Block 4 needs more power and cooling, but he's agnostic about how that's achieved.

Engine and airframe integration analysis is "always in work … it's recurring," Ulmer said. "We're constantly looking for ways to improve fuel efficiency on the platform."

Tweedie said Lockheed has been "an active participant" in AETP "since Day One." The companies have been working collaboratively—but not exclusively—"for the last eight years to ensure that our design integrates with their vehicle, not just where it was in 2011, when the F136 ended, as the [aircraft] has evolved."

Gen. Mark D. Kelly, head of Air Combat Command, told reporters the choice between an upgraded F135 and the AETP will have to be weighed in the context of "capability, capacity, and affordability. And we'll measure it across those three lines of effort and come up with the right solution."

Fick pointed out that even if the Air Force goes with an AETP solution, the enhanced F135 will still be needed to ensure that "we've got everybody covered."

With 700 F-35s now flying, and more than 100 more coming each year for the next five years, "that's 1,200 aircraft before I field an advanced engine," Fick said. Those aircraft will still need to be supported.

Whatever the Air Force and the F-35 partners decide about the F-35's engine, Air Force Chief of Staff Gen. Charles Q. Brown Jr. insists it's critical to continue propulsion research "so we do have options in the future."

The language from Congress about using the new engine technology in the F-35 is "really in line with what we're trying to get done" to make the F-35 "more affordable and make the sustainment costs more reasonable."

The Air Force significantly reduced AETP funding in its fiscal 2022 budget request, but included it among its "unfunded requirements." Congress appears poised to restore funding to the program.

Tweedie said GE is encouraged by Brown's comments and Congress's push. If the AETP is allowed to close out without advancing to an engineering and manufacturing development program right away, "there's a lot of cycle time that's lost if you bring it to a complete halt and then try to restart."

Having an edge in fighter propulsion is "not a birthright," Tweedie said. "We have to earn that."

The investment in AETP "burned down the risk" in making the next generational leap in propulsion technology, he asserted, and the industry is ready when the Air Force decides how to move forward. "It's our turn now to deliver that to this and future generations."

More Uncomfortable Conversations

Leaders welcome a wider reckoning with discrimination and harassment.

Mike Tsukamoto/staff; Senior Airman Bryan Myhr/ANG

Three recent reviews performed by the Air Force found glaring gaps in diversity among both officer and enlisted ranks. The Chiefs of both the Air Force and Space Force are committed to addressing the problems, which they believe affect readiness.

By Greg Hadley

In the 18 months since the killing of George Floyd sparked a national conversation on race and diversity, the Air Force has launched two major studies on the treatment of racial minorities and women, with more studies still to come.

The first review, released in December 2020 found clear differences between the way White and Black Airmen were treated in the judicial system; a follow-up report published in September 2021, detailed root-cause analysis and action plans for addressing those discrepancies. A third, also released in September, found disparities facing other racial and ethic groups, along with women. Still more reports are anticipated looking at the treatment of LGBTQ Airmen, women of color, and other minority groups. What started as a moment of reckoning has turned into a sustained reflection.

"We have problems in the United States Air Force. It's undeniable," Lt. Gen. Marshall B. "Brad" Webb, head of Air Education and Training Command (AETC), said in September at AFA's Air, Space & Cyber Conference. "It's right there in the data."

"We have problems in the United States Air Force. It's undeniable. It's right there in the data."

—Lt. Gen. Marshal B. "Brad" Webb, head of Air Eduction and Training Command

Correcting those problems will take time.

Webb began to foster "uncomfortable conversations" about race, gender, religion, and related topics in the summer of 2020 through a series of Facebook Live sessions called "Real Talk" that featured Airmen from many different backgrounds. After a few weeks, he wanted to move on from talk to action when a first sergeant intervened.

"Every one of us in the Air Force is a Type A personality that wants to get to action, right?" Webb said. "Like, OK, we've done a couple sessions, let's put it in gear and go. And her counsel to me was, 'Sir, you're not going to change 500 years of history over the summer.'"

REVIEWS AND RESULT

What started as a narrow review of disparities in discipline quickly expanded to include underrepresentation of ethnic and racial minorities in many

operational career fields, especially among pilots—the least diverse Air Force Speciality Code in the USAF officer corps.

Air Force Chief of Staff Gen. Charles Q. Brown Jr. said the diversity gap among pilots can get lost amid topline numbers, but it still has a significant impact.

"We've had increases in diversity across the Air Force in race, ethnicity, and gender," Brown said. "But it's not where we want it to be, and it's not in some of the career fields that we'd actually like to have." Because operational career fields typically see higher promotion rates, a lack of diversity there has a disproportionate impact across the rest of the service.

With 74 percent of current general officers growing up in operations jobs and 52 percent having been pilots, the lack of diversity in those specialities greatly reduces diversity at the very top, where 93 percent of general officers are White and 92 percent are male.

Similar trends are apparent among wing and group commanders during the second racial disparity review, which found racial and ethnic minorities were less likely to be selected for command positions than their peers.

"If the data tells you you're expecting to see a certain percentage in command given the base population of a minority, and you're not seeing it, and it's statistically significant, that is worth a careful look," stated Lt. Gen. Sami D. Said, Inspector General of the Air Force. "The data is telling us something that we're not expecting."

The second review also showed that for some racial and ethnic groups, the issue starts far earlier than leadership positions, going as far back as who and who doesn't join the Air Force in the first place.

STARTING OUT

"The problem starts with accessions," according to Said. "And that's where the ball starts rolling, where we start building disparity, because if you're not gaining a percentage of the population that's reflective of the wider population, you start with the problem."

Among the enlisted force, the biggest gap between the qualified population and the service was among Asian Americans, said Maj. Gen. Edward W. Thomas Jr., head of the Air Force Recruiting Service. "The Asian American qualified population in America is about 9-plus percent," he added, but only about 4.1 percent of the enlisted force is Asian American.

Hispanics, Native Americans, and women also join the Air Force and Space Force at rates lower than their population size would suggest. Among officers, similar discrepancies exist along with a shortage of African Americans.

For each particular racial and ethnic group, the overall trend points to differences that can't be explained away, leaders say.

Air Force Secretary Frank Kendall summed it up: "It basically points out very clearly, and I think very convincingly that there are a lot of disparities within the Air Force, in a number of facets of the Air Force experience," he said. "And this includes things like promotions, between their careers, how they're treated in assignments, how they're treated in the judicial system ... and also about perceptions that people have."

PERCEPTIONS MATTER

Both of the major disparity reviews solicited feedback from Airmen and Guardians, drawing an overwhelming response amounting to more than 230,000 survey answers and 44,000 pages of comments.

The results showed most White men did not see widespread disparities along racial, ethnic, or gender lines, while non-White men and women did.

Even that difference in perception is an issue worth review, Said noted. "If somebody believes something, it weighs on them, it affects their choices, their decisions, their stress level, how they react to things," Said pointed out. "So, we need to clear that up. Either they're correct and they're telling us there's a problem .. and we need to figure it out, or their perception is off and we need to better educate."

Webb said participating in "Real Talk" sessions made a big difference for him. "There hasn't been one session where I haven't walked away going, 'Didn't know that,' 'Never heard that before,' 'Didn't know that,'" Webb said. "And the point is, you're looking at a career Air Force officer that's done four decades of service. And yes, I've gone through [equal opportu-

Tech. Sgt. Jason Van Mourik/ANG

1st Lt. Joseph Asenuga, who was an F-15C student pilot in 2020, is breaking into a career field that is historically less diverse than others. Pilots and other rated officers tend to be promoted at higher rates than non-rated officers, leading to less diversity in the Air Forces' highest ranks.

1st Class Jose Miguel Tamondong

The second racial disparity report looked at minorities and women, but not female minorities such as Staff Sgt. Kyla McCaskill at Eielson AFB, Alaska. An addendum to the report to address that will be released shortly, according to Undersecretary of the Air Force Gina Ortiz-Jones.

nity] training, and the PowerPoint presentations, and all that stuff that's mandated for us. But we simply have never, before until recently, had the kind of discussions that are real, that really get down to the … topics that are just uncomfortable to talk about."

Retired Gen. Edward A. Rice Jr., former head of AETC, said what leaders are seeing now is coming about because they're asking questions that weren't asked in the same way before. Historically, "I don't think that we've done a good enough job of asking and listening to what our Airmen have to say about this issue," Rice said during a panel on diversity during AFA's Air, Space & Cyber Conference.

Had the Air Force asked for those comments years before, they would have gotten a similar response, Rice suggested.

Chief Master Sergeant of the Air Force JoAnne S. Bass said the positive takeaway to what's coming out now is that "our Airmen and Guardians, I think, trusted us enough to be able to share some of the experiences that they've had, whether they're small experiences or very impactful or hurtful experiences."

MORE TO COME

Changes are underway. Brown said the pilot selection process is being tweaked to reduce the value, for example, of prior flight training. That will reduce the advantage wielded by someone with the financial means to afford private flying lessons.

Other efforts include unconscious bias training, mentorship programs, and expanded recruiting efforts.

"Those are important steps," Rice said, but the measure of success is not in outputs but outcomes, he added. "Are we recruiting the diverse force that we want? Are we retaining the diverse force that we want? Are we promoting and advancing the diverse force that we want? And are we applying discipline equally across that diverse force in a way that makes us proud?

"Those ought to be the four big dials that we are watching and determining whether or not we're successful," Rice said. Measuring progress on those fronts will require regular updates for the foreseeable future, something Kendall pledged to do.

"I'm planning on one-year cycles in general, six-month updates to get some sense of whether we're making progress on actions or not," Kendall said. "And then every year, we'll take another look—like we did with the most recent study—to see if those benchmarks have moved, to see if we've improved or not."

On top of just data, Kendall also said there needs to be root-cause analysis for why these disparities exist. While the numbers show that racial and ethnic minorities are promoted at lower rates, for example, more study is needed to understand what exactly causes that result, from career opportunities afforded to the way performance evaluations are recorded to any number of factors

SEX-BASED DISCRIMINATION

The second diversity study found that more than a quarter of female Airmen and Guardians said they had experienced sex-based discrimination, and one in three said they had witnessed or experienced sexual harassment.

That's "just unacceptable," Kendall stated.

Undersecretary of the Air Force Gina Ortiz Jones said the second study missed an important nuance.

"When I read the racial disparity report, the second one, it talks about minorities, and it talks about women. It does not talk about female minorities," said Ortiz Jones. "And so I flagged that for the Secretary and the Secretary said, 'Yep, we've got to fix that.' And so in 30 days, we are going to have the addendum to that report."

Ortiz Jones said she is particularly concerned about discrimination of LGBTQ service members, noting that

Senior Airman Hanah Abercrombie

Space Launch Delta 30 members participate in a change of command ceremony on June 11 at Vandenberg Space Force Base, Calif. Diversity and inclusion is a readiness issue, says USSF's Gen. John "Jay" Raymond, Chief of Space Operations.

Pentagon policies make gathering data in that regard difficult.

"We just celebrated the 10-year anniversary of the repeal of [the Don't Ask, Don't Tell] policy," she said. "But now, what are some of the other policies that we can get after, that will make sure that we are demonstrating to those serving and those that want to serve that this is a place where they can serve to their full potential?"

IT TAKES TIME

Race and gender issues come up periodically, Rice said, but then tend to fade again.

"We have a study, we have a commission, we have someone look at it. They make recommendations, we say yes, the recommendations are good, we're going to implement them. We set up a process to implement the recommendations," Rice affirmed. "And then we move on to the next challenge that pops up above the noise level, not really fully … appreciating that this isn't the type of problem that you can launch a missile at and leave it. It's a problem, it's a challenge that takes persistence."

Lt. Gen. Brian T. Kelly, deputy chief of staff for manpower, personnel, and services, said what is different this time is that "we're better informed." Leadership has made it clear, "we have a commitment to do it across multiple years, and not just look at it for a few months."

That's essential because these things take time, he said. "We are not going to change tomorrow the demographics of the wing commander force that we have. That's not going to be something that changes overnight," he continued. "It takes the development, the recognition over many years for us putting other things in place to get us to the right spot."

Thomas agreed.

"We do believe that the long game here is, we expose our problems, we deal with them, and we move on, and we get better for it," Thomas said. "And then in the long game, our recruiting is going to benefit from the transparent approach."

PUSHBACK

Critics say they don't have a problem with more diversity as long as it doesn't reduce readiness and lethality, but USAF and USSF leaders push back.

"I think it absolutely is a readiness issue," said Chief of Space Operations Gen. John W. "Jay" Raymond. "And it's not just for the Space Force. I think any organization or any team… [is] more ready when you have a diverse makeup.

"I'm a football fan, just look at a football team. If you had a bunch of defensive linemen, you're not going to score a lot of touchdowns. You've got to have a diversity of talent. And so diverse teams give you the ability to bring people together that have diverse talents, diverse perspectives, [and] help you solve complex problems, and keeps you from getting into groupthink," Raymond said.

Brig. Gen. Shawn W. Campbell, the deputy human capital officer for the Space Force, said studies show consistently that "diverse teams outperform homogeneous ones."

Leaders need to hold to such convictions, but they also have to share that view and convince others to buy in, said Chief Master Sergeant of the Space Force Roger A. Towberman.

"I can't change hearts and minds if I don't first understand hearts and minds, and I can't understand anything if I'm not willing to listen," he said. "So, if it's thinking, and if it's conversation, I'd say in general terms it's healthy. It's moving us where we want to be. This is about having conversations about working together to get through it," Towberman said. "We can't do that if we shut anyone down."

Nor will USAF or USSF succeed if they only pursue one kind of Airman and Guardian, Thomas said. Any approach other than recruiting and training the best possible warfighters is "a losing proposition." ✪

Evacuating to Freedom

The Story of the Afghanistan Airlift.

Sgt. Samuel Ruiz/USMC

Families board a C-17 Globemaster III during an evacuation at Hamid Karzai International Airport, Kabul, Afghanistan, Aug. 23. The U.S. evacuated 124,000 people during the swift but tumultuous end days of the war in Afghanistan.

By Abraham Mahshie

Two days after orders came down to launch the largest noncombatant evacuation operation in U.S. Air Force history, the contingency response group Airmen circled Hamid Karzai International Airport in Kabul, unable to land.

"What we saw on the ground was throes of people," said Col. Colin McClaskey, who led the contingency response element (CRE) aboard a C-130. "Just people everywhere, lots of people. And while we were there, a C-17 that had just approached in front of us had seen all sorts of weapons."

The aircraft circled as long as it could, then diverted to Qatar and another try later. They wouldn't land until the wee hours of the morning when things had finally quieted down.

"Everybody on board that airplane, myself included, knew that the only way we're going to be able to get a lot of people out is if we can get the right people in," McClaskey recalled in a phone interview.

"If I had any fears, or anxieties or anything like that, I wasn't thinking about them because what I was thinking about was the conversation I had with the people on the ground," he said. They were telling him, "'We need you guys here now. And we need to get this going now.' And so, that was my drive and my focus, as it was for everyone else on the aircraft."

"Thank God we're in America. And just think about how much these people had to give up to get here." —Col. Colin McClasky, CRE leader during Operation Allies Refuge

MONTHS OF PLANNING

The 618th Air Operations Center (AOC) at Scott Air Force Base, Ill., handles an average of 250 missions and 500 sorties worldwide every day. It's a huge load. But on Aug. 13, 2021, with tens of thousands of Americans, Afghan Special Immigrant Visa (SIV) applicants, and third-country nationals seeking emergency evacuation following the fall of the Afghani government, the workload grew rapidly.

The closest American air bases were more than a thousand miles away, and while planners had been working on this contingency for months, the rapid collapse of the government accelerated the pace and urgency of operations.

Brig. Gen. Daniel A. DeVoe, commander of the 618th AOC, got the order and went to work.

In just 17 days, his command would coordinate the evacuation of more than 124,000 people on 85 aircraft,

‘Flying Hospitals’ Treated Sick Afghans and Prompt New Capabilities

Afghans fleeing the Taliban in August concealed medical conditions ranging from battlefield wounds to high-risk pregnancies out of fear that doing so might cause U.S. military members to bar them from escaping Kabul. In response, Air Mobility Command provided medics and nurses, turning transports into “flying hospitals” that delivered babies and developed new means of care on the fly.

“A vast majority of individuals coming out of Afghanistan did not disclose their medical needs,” Brig. Gen. Norman S. West, command surgeon for Air Mobility Command, said in a sideline interview during AFA’s Air, Space & Cyber Conference in National Harbor, Md. AMC assigned 30 technicians and 30 nurses from nine medical groups to rescue efforts.

“We knew that by having medics on the aircraft, we could provide that medical care should they need it,” West said.

Passenger Medical Augmentation Teams, pairing a nurse and medical technician, accompanied each evacuation flight. They treated partial amputations, festering wounds, dehydration, heat-related injuries, as well as pregnant women with diabetes, malnutrition, and high blood pressure.

“Of about 72,000 Afghans flowing out of Afghanistan, roughly 9,000 of them were pregnant,” West said.

“We’re talking about individuals who are in their last trimester, who shouldn't be flying,” West noted. “But when your life depends on it, you do whatever you have to do.”

Soon, AMC also began to fly Obstetrician-Gynecologists on the evacuation flights. “What we don't want to do is start moving our Afghan partners who have sacrificed everything for us, and have them give birth and not be able to do something about it,” West said.

When terrorists attacked a crowded airport gate, killing 13 U.S. service members and injuring 18 more, AMC was able to quickly evacuate the wounded, rerouting an aeromedical evacuation flight that was about to take off from Ramstein Air Force Base in Germany from another requirement and dispatching it to Kabul.

AMC spokesman Capt. Frederick M. Wallace said the jet was re-tasked on the runway. “This kind of flexibility is key to responding to dynamic situations around the globe,” he said.

USAF courtesy photo

Dr. (Maj.) Elaina Wild, 379th Expeditionary Medical Group chief medical officer, takes a picture with a resting mother and her newborn babies at Al Udeid Air Base, Qatar.

When troops are wounded and need a level of care unavailable where they are, AMC’s job is to “get there as quickly as possible.”

The Afghans were flown safely to onward locations in the Gulf and European countries where enhanced medical attention was available on site. Once out of Afghanistan, many of the women remained at base housing for the remainder of their pregnancy.

One woman gave birth aboard a C-17 evacuation flight from Afghanistan.

“This is something we've never done before,” West said of the new and varied ways the medics were employed during the evacuation effort. “We’ve always had a binary solution: aeromedical evacuation or critical-care air transportation, and there was never an in-between.”

AMC is now looking at how to provide specialty care on flights, including OB, burn, and extracorporeal membrane oxygenation, or ECMO heart-lung specialists.

“It literally is a flying ICU [that] you have, it is one of the most impressive things you'll see,” West stated. “And we are the only nation that has this robust kind of system.”

flying 2,600 sorties.

“AMC A3 [Air Mobility Command Air, Space, and Information Operations directorate] gave us the capacity and the aircraft that we needed,” he said in an interview. “Then we take that and go, ‘How do we apply the resources we’re given to pull as many people out of Afghanistan as we can?’ … So the adrenaline gets real high, and people get very motivated.”

Sustaining that adrenaline was the challenge. “Because I don't just need you for 24 hours, I don't just need you for 48—I need you for a few weeks.”

DeVoe said, “Delivering hope” made it easy.

“Going in and taking people and delivering them to a new future—when you're talking about helping people, it just gets crazy how motivated folks get.”

Whether the operation ultimately was to extract 10,000 individuals or 200,000, DeVoe said the actions that needed to be set in motion were the same.

“It was very easy to initiate those actions right out of the gate,” he said. “But you never know exactly what the actual conditions are going to be at the time of execution.”

McClaskey, the CRE lead, was in the Horn of Africa doing airfield assessments when he was summoned on Aug. 13.

“I got a secure phone call saying, ‘Hey, we're going to need you to go to Kabul. We're starting to move a lot of people out of there.’ ”

The phone call gave no specifics.

McClaskey caught a C-130 to Ramstein Air Base in Germany, and by Aug. 15 was on a C-17 bound for Kabul.

“Our job is to continuously be ready for whatever Air Mobility Command needs us to do,” he said of the Contingency Response Group. “That is just how our operations are.”

Landing in the dead of night, he added, “It didn't matter how tired we'd been. It doesn't matter how hungry you were. Grab MREs, put them in your backpack, you need to hit the ground ready to help out the people that are on ground.”

SETTING THE STAGE

Evacuation flights out of Afghanistan were mostly C-17s,

Master Sgt. Alexander Burnett, 82nd Airborne Public Affairs

Paratroopers from the U.S. Army's 82nd Airborne Division line up to board a USAF C-17 on Aug. 30 at the Hamid Karzai International Airport. Maj. Gen. Chris Donahue was the last American Soldier to leave Afghanistan, ending the U.S. mission in Kabul.

with some C-130s mixed in, along with commercial carriers. While C-17s are normally configured to carry 100 passengers, DeVoe knew that wouldn't work. "The nature of this operation, and the sheer magnitude and number of folks that we had to move, we made the decision to go to floor loading," he said.

DeVoe thought he could get up to 300 passengers on board but in actuality the numbers ran as high as a C-17 could handle.

"We ran all the math, we did all the calculations, we looked at aircraft performance given the atmospheric conditions, altitude and determined that it was safe," he explained. "They were flying 400 pax out a day, that was really pretty exciting."

A new record was set when one C-17 flight evacuated 823 passengers.

A loop of passenger flights was organized between Afghanistan and staging bases in the CENTCOM and EUCOM theaters, with 28 aircraft in the sky at any given time. Ten KC-10s were in theater for aerial refueling but were ultimately used to transport evacuees between staging bases instead.

The Department of State, EUCOM, and CENTCOM worked with allies and partners to secure landing rights and documentation necessary to move passengers, with two dozen countries helping with temporary basing, logistics, and aircraft. American commercial carriers who participate in the Civil Reserve Air Fleet were called up by Defense Secretary Lloyd J. Austin III to provide capacity for onward movement of evacuees from European and U.S. locations.

"There was never a rest," DeVoe stated. "We booked the crews to max duty days. We set those crews against max duty days, and then we extended their duty days."

Mandatory 12 hours of crew rest held, but mission times were pushed to the limit. Aircraft that were scheduled for 21-hour days at execution would push to 24-hour days with an augmented crew. Individual aircraft commanders had to determine if they needed rest or could keep going.

"Those are long days," DeVoe noted. The intensity extended to ground crews. "The maintainers were delivering, fixing the aircraft, and keeping them flying."

Airmen in Kabul would sleep in shifts a few hours at a time. Back stateside, DeVoe's team was pulling 17 and 18 hour days.

Rescuing Afghans who had helped the U.S. cause over the past two decades was moving, DeVoe said, reminding him of his own adopted daughter's transition from her birthplace to the United States.

"It's a very personal chord for me," he said. "For her coming to the United States meant an entire rewrite on her future. And so for me, I attribute the same to all of these folks. Leaving Afghanistan on one of those gray tail aircrafts was a complete rewrite of their future for the positive."

THE VIEW FROM KABUL

Unlike other contingency response operations he had been involved in, McClaskey didn't need to set up a landing zone on a dirt strip in the middle of a desert someplace. He had all the concrete and asphalt runways and taxi lighting he needed. But Hamid Karzai International's air traffic control systems were in shambles.

"The tower had been damaged heavily a few nights before, so all the contractors left," he said. Walking into the weather building on arrival, he found the door ajar, coffee, and a partially eaten sandwich abandoned by its owner.

"The computers are still logged in with Excel up and the ongoing weather reports," he said.

Turkish forces were controlling one part of the airfield, the Americans another, and a third portion was uncontrolled, he recalled. A dozen countries were involved in one or another aspect of the operation and a Marine Tactical Air Command Squadron had the tower until the CRE took over.

McClaskey leveraged the Turks' relationships with Pakistan, Ukraine, and Russia to streamline the flow of aircraft through the airport. The air traffic controllers coordinated the movement of European A400Ms and U.S. C-17s and C-130s.

Getting aircraft closer to the passenger terminal smoothed out operations. "You could get lots of people out a lot faster," he said, because "they're not walking in front of other aircraft that we're trying to taxi."

At its peak, the operation moved 26,000 people out of Kabul

within a scant 24 hours, the pace outstripping space availability at staging bases.

"It's an evacuation operation, you can't view it just as just leaving Afghanistan," DeVoe said. "Throughout the whole 17 days, there was a metering ... of the flow. Some days we took out more than others."

Around Aug. 20, with just over 10 days left, McClaskey took over the aircraft PPR, or prior permission required, process from the Turks and exposed that more clearly to all participants. That made it easier to coordinate rescue flights in and out. Ramp space was apportioned to NATO and non-NATO participants.

"We had to be dynamic and continue to flex the plan and how we were operating these mobility airframes," he said.

SECURING THE SCENE

Continuous communication between CRE operators, the Army's 82nd Airborne Division, and Marines protecting the airfield smoothed security.

Maj. Gen. Christopher Donahue, commander of the Army's 82nd, communicated with the Taliban as necessary, ensuring a unified front. Once the perimeter was secure, McClaskey said, aircraft security became a less urgent issue, enabling USAF Ravens to focus on securing access to cockpits.

Controlling civilians on the ground remained a challenge, and McClaskey reached out to Marine Corps Brig. Gen. Farrell J. Sullivan to keep them away from the planes, out of harm's way.

"I needed control of people, so that people aren't walking onto the ramp and walking out onto the runway," he said. "They posted a Marine like every six feet around the ramp." He recalled telling an anxious group of American college students, "Look, I can tell you right now, you're on the safest three kilometers anywhere in Afghanistan," he said. "'I don't think you can look anywhere and not see a United States Marine, you have one five feet away from you offering you water, and probably 30 right in front of you, and you have a cyclone fence. And on the other side of that, you have 82nd Airborne. You're in one of the safest places you can be right now."

The Aug. 26 ISIS-K attack that killed a dozen Marines and a Sailor shook people up, but the Marines remained professional, focused, and compassionate, according to McClaskey.

"Those people who came through the gate, they cared about them. They were compassionate about them," he said. "They very quickly identified who the bad actors were and got them away from the rest of the crowd."

GLOW STICKS AND WATER BOTTLES

Scavanging for creative solutions, the specialized contingency unit kept the airfield operational despite extraordinary circumstances.

Several countries wanted to fly wide-body 777s, DC-10s and A380s into Kabul, but were denied because the airport lacked capability to load and unload those supersized jets. McClaskey and a Turkish officer worked the issue, found some old damaged stairs, and got a team working on them to make them viable. Before long, they were in use helping to load 737s and A310s.

McClaskey employed Amp-2 lighting and glow sticks and water bottles to mark the beginning and the ending of the touchdown zone.

The group brought generators and fuel experts. They tested fuel, isolated fuel, and ensured that fuel was good for vehicles and aircraft.

"We never ran out of fuel for aircraft, and we gave a lot of fuel to other countries' aircraft, maybe they didn't have the capacity to carry enough," he said. "All of it was possible because we bring the experts that do that."

1st Lt. Samuel Swanson

Members of the 618th Air Operations Center at Scott Air Force Base, Ill., oversee U.S. military aircraft flying in and out of the Kabul airport during Operation Allies Refuge, the noncombatant evacuation operation.

'DESPERATE FOR FREEDOM'

McClaskey doesn't see the comparisons others cited with the fall of Saigon in 1975. "This was very deliberate," he said. "Very quickly, like within days, we had a very streamlined process, and it got increasingly safe and increasingly more efficient."

In his understanding, Vietnam was the antithesis. In Vietnam the last flight took off with desperate people still trying to get on board; by contrast, in Kabul, when it was time for McClaskey to depart, there was nothing more he could do.

"There was nobody else at the gates," he said. "We had a number of aircraft still standing by in case anybody came in or came up to a gate," but none materialized.

The interagency team had pulled off a successful operation under challenging circumstances, DeVoe said, crediting that success to their ability to work together as a team.

"[It] was really a big win," he said. "Over 120,000 people in a matter of weeks. Lives changed forever, for the good, brought out of Afghanistan, and then the cherry on top, extracting those forces ... in a safe manner, and closing out that operation."

For McClaskey, an enduring memory is the thousands of faces he saw passing through the north and south gates to the airport, civilians who had abandoned everything for a chance to get out of Afghanistan before the Taliban took over in full.

"They were desperate for freedom," McClaskey said. "They were desperate for the ability to live a new life somewhere. Every single one of them was overwhelmed with gratitude that America was there.

"I reflect on that," he added. "I tell my kids that every morning. I'm like, 'Thank God we're here in America. And just think about how much these people had to give up to get here.'" ✪

Wounding Warriors:

How Bad Policy Is Making Veterans Sicker and Poorer

MikeTsukamoto/staff; USAF; Pixabay; Ed Schipul/Flickr

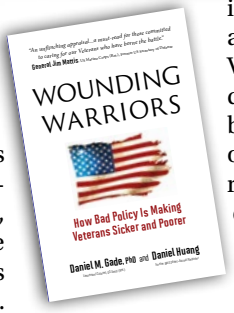
By Daniel M. Gade and Daniel Huang

Shamrock Reins, a nonprofit specializing in equine-assisted therapy for veterans, sits across more than 20 acres of land in Bucks County, Pa., just north of Philadelphia. Inside a dirt pen on a bright August morning, Andrew, a tall Iraq War vet in blue jeans and a loose white T-shirt, led his horse in small circles. The sun was already beating but the summer heat had not yet set in.

"That's it, Emerald," Andrew said in a loud, relaxed drawl. "Come, Emerald. Come. Good."

A Pennsylvania native, Andrew joined the Air Force Reserve after high school and trained as a flight medic. When his unit mobilized he deployed to Iraq. After separating from the military, he applied for disability benefits. "It took me almost four years of fighting to get my compensation," he said over lunch, gazing out at the fields from an outdoor picnic table. "I have big-time issues with the VA [Veterans Affairs]."

Public criticism of the Department of Veterans Affairs is common, but in the case of the VA's disability benefits system, the facts tell a more complex story. As a percentage of the total veteran population, more vets today are compensated for disabilities than ever before in the agency's history. VA spending on disability compensation has more than tripled since 2000 and is now the organization's largest expenditure. The VA is projected to spend more than $105 billion on disability benefits in 2021—more than six times the budget of the U.S. Space Force. It is spending more on veterans' disability today than it is spending on rehabilitation programs, on education and retraining, or on all veteran-related health care services.

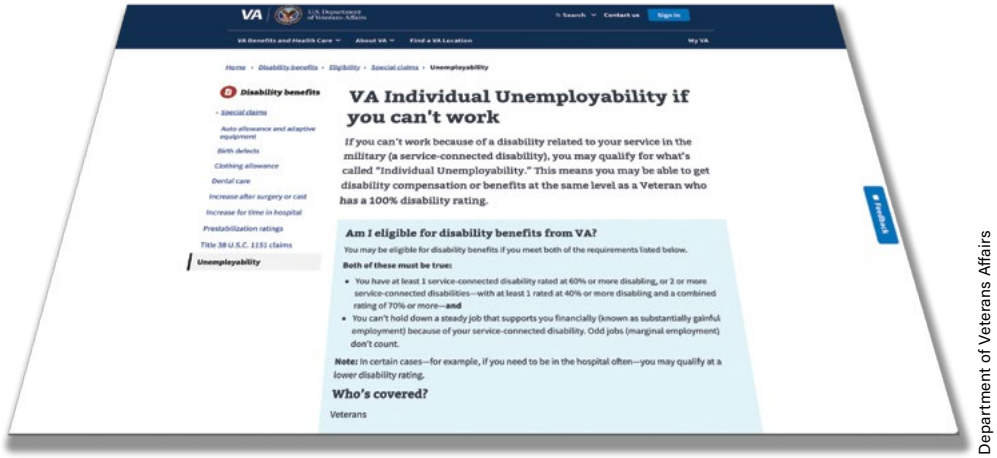


This article is excerpted from "Wounding Warriors: How Bad Policy is Making Veterans Sicker and Poorer," by retired Army Lt. Col. Daniel Gade and Daniel Huang. The book can be ordered at www.woundingwarriors.com.

WORKING THE SYSTEM

Andrew initially filed his claims through Disabled American Veterans [DAV], a national veterans service organization with more than a million members. The VA rejected his claim. He tried again, working with different DAV officers, getting the same unsuccessful result for two years. Then he met someone who took pity on him. "I'm not supposed to tell you this but contact this guy," the man said, sliding a business card across the table. "If anyone asks, I don't know who this person is. I didn't give you his name."

The card named a civilian therapist who had been assisting vets with VA benefits since the Vietnam War. "I hired him, and I paid him cash, and I didn't go to see him for therapy," said Andrew. "I went to see him to fight for me." The therapist reviewed Andrew's records and wrote a long letter detailing the afflictions Andrew sustained in service, including sinusitis ("I was



Department of Veterans Affairs

Individual Unemployability bumps a claimant's disability rating all the way to 100 percent if the veteran is deemed "unable to hold a job as a result of service-connected disabilities."

in sandstorms on the regular," Andrew said. "You breathe all that junk in and I lost my smell."); hearing loss ("not because of any traumatic event but you hear the vibration from the airplane floor and it damages those bones in your inner ear"); and PTSD from multiple deployments. In just three weeks, Andrew's claim was finally approved.

Some of the earliest pension programs for American veterans were beset by grifters and opportunists even in the early decades of the republic, notes George Mason University Professor James T. Bennett in his 2017 book, "Paid Patriotism? The Debate Over Veterans' Benefits." Performing private disability examinations is lucrative—several hundred dollars per evaluation—and not all do so ethically. One examiner in Puerto Rico charges $200 for a 10-minute phone consultation, before supplying veterans with the evidence they need to get their claims approved, a VA compensation and pension examiner told us via Google Groups in 2017. In some cases, the examiners or those who hire them on behalf of veterans take a commission on future benefits as payment. Other firms, such as militarydisabilitymadeasy.com and vaclaimsInsider.com market themselves as education providers, delivering online courses designed to help "you maximize the disability benefits you've earned" or to help vets "get the VA Disability Rating they DESERVE." These operations coach veterans on how to increase their disability rating.

Following the advice of the therapist he hired, Andrew continued to press for a ratings increase. "I contacted my senator and did a senatorial inquiry on [my VA examiners]," he said. Within two weeks, his disability rating was raised to 100 percent—retroactively. Andrew received three years of back pay.

According to the VA, veterans whose claims are turned down or reduced have three ways to appeal:

- File a supplemental claim to add new and relevant evidence;
- Ask for a senior reviewer to examine the case; and
- Appeal to a Veterans Law Judge. If his appeal is denied, the veteran can appeal further to the U.S. Court of Appeals for Veterans Claims.

The VA has no limit on the number of claims or appeals a veteran may file, nor a time span in which vets must file their claims, factors that contribute to the clogged and overworked VA disability system. Combat-wounded veterans must compete with opportunists for time and attention. For every new disability claimant, there are almost twice as many veterans seeking increased compensation.

Securing a 100 percent rating qualified Andrew for more than $3,000 in disability compensation each month. By then, he hadn't worked in more than two years, and soon, his veteran friends were advising him to apply for Social Security Disability as well. He contacted the civilian therapist again. "I paid him more money and said, 'Will you represent me for Social Security?' He said, 'Absolutely.'"

The additional benefits arrived so quickly they caught Andrew off guard. "I called my sister and I'm like, 'Did you make a large deposit in your account last night that was accidentally put in mine?' Because I'm loaded overnight. It was all the back pay. You don't know it's coming in. You turn around and there's $50,000 in your account."

Andrew found himself guarding his windfall like a secret, as if it would vanish if anyone found out. "Suddenly, I felt like I have to keep this to myself," he said. "I kept thinking I was going to wake up and this was all a bad dream. It didn't really happen."

His suspicions weren't entirely wrong. His increased benefits from the VA had come through a mechanism called Individual Unemployability, which bumps a claimant's disability rating all the way to 100 percent if he is deemed "unable to hold a job as a result of service-connected disabilities."

The bigger monthly checks gave Andrew an immediate thrill, but the long-term repercussions of his new designation began to sink in. "I went from being able to do everything—[to the VA] telling me I'm unemployable—that I should basically go home and sit around and lick my wounds," he said.

Andrew called the civilian therapist again. "I don't want to be unemployed for the rest of my life. What am I going to do?"

The therapist warned him not to rock the boat. "You can't challenge this because you'll lose everything that you fought for," Andrew recalls being told.

"I didn't like that but what was I to do?" he said. "It took me about a year to make peace with the decision." He lifted his shoulders, sitting a little taller. Lunch was over and he had decided to take a dip in the pool. "I realized I should count this as a blessing," he said. "I shouldn't feel bad about this."

PAID TO BE SICK

Andrew's story is not uncommon. Though he freely admits that he is "able to do everything," he fought to earn a 100 percent disability rating workforce. Once there, he is trapped. Yet reforming the VA's disability compensation system is crucial to ensuring that veterans lead lives of meaning, purpose, and value. The existing system too often treats veterans as victims rather than placing them in the driver's seat of their own transitions from Active service to civilian life. Among the challenges are the powerful, organized, and motivated interest groups that work to support veterans. Some of these veterans service organizations (VSOs) are explicitly chartered by the VA and have a quasi-official national role. The economist Randall G. Holcombe, quoted in "Paid Patriotism," calls veterans "the first organized interest group that was able to use the political process to systematically transfer large sums of money to themselves through the political system."

Daniel Gade/courtesy

Then-U.S. Army Capt. Daniel Gade at an undisclosed location. Gade became an amputee in 2005 while serving as a company commander in Ramadi, Iraq.

Mark Klosinski/Gade For Virginia Facebook

U.S. Senate candidate Daniel Gade addresses the crowd in Harrisonburg, Va., on Aug. 18, 2020.

The military is consistently one of the most respected sectors of American life, ranking just behind doctors, scientists, and firefighters in the public eye, and non-veterans view military service with deference.

Terminology is also a factor. The term "service-connected disabled veteran" describes both members seriously maimed in training or combat and those with minor conditions, like tinnitus or diabetes, that were diagnosed during or at the conclusion of service and thus attributed to service. Yet to the uninformed casual observer, the "disabled veteran" license plate signifies something greater than tinnitus or limited knee flexion. The political parties are also complicit in the beatification of veterans. The right ties veteran status to patriotism and rarely opposes veteran-related spending; the left views veterans as victims of the system.

After the Washington Post's exposé of conditions at Walter Reed Army Medical Center in 2007, the President's Commission on Care for Returning Wounded Warriors—co-chaired by former Sen. Bob Dole and former Secretary of Health and Human Services Donna Shalala, and called the Dole-Shalala Commission—proposed major reforms. First, it proposed that disability pay be separated into two parts: loss of earnings and quality-of-life. Given the agency's legal purpose to compensate for average loss of earnings, this proposal recognized the absurdity of parts of the disability "system." The Dole-Shalala recommendation would have given a substantial payment for the veteran whose sexual function was a casualty of war and returned the program to its legal foundation. Among the changes, only the quality-of-life payment would continue after the veteran began to receive Social Security, reducing double-dipping. (Some veterans even "triple dip" by getting Social Security disability, military retirement, and VA compensation.) Despite the bipartisan credibility and Washington clout of the co-chairs, however, the Dole-Shalala report went nowhere, except for one small recommendation to assign recovery coordinators to assist the most seriously injured.

Reforms since the late-2000s have been spotty and anemic. I [Daniel Gade] worked as a "Special Government Employee" on the VA's Advisory Committee on Disability Compensation (ACDC) from late-2008 to around 2013. The ACDC's mandate, springing out of federal law, is: "To provide advice to the Secretary of Veterans Affairs on establishing and supervising a schedule to conduct periodic reviews of the VA Schedule for Rating Disabilities (VASRD)."

In reality, it soon became clear, the ACDC was largely focused on supervising a revision of the disability rating system that would simply clear out a few obsolete diagnoses—diseases which no longer occur or have been folded into other diseases from a diagnostic perspective—while rubber-stamping increases in a variety of other disability diagnoses and ensuring that claims were processed accurately and quickly. In the backroom conversations to which I was personally privy, leaders acknowledged the disability system was a one-way ratchet: Only higher payments and increased ratings were to be recommended.

In this context, accuracy meant that the veteran was awarded compensation in accordance with the schedule, not that his condition was severe. The word "quickly" meant precisely that; the VA soon adopted an informal policy of approving claims with limited oversight. A former VA undersecretary for benefits told the advisory committee and staff that the "backlog" was the primary concern, not whether there were undeserving veterans in the queue. For that reason, claims processors were pressured to put as many claims through the system as they could.

The VA has made marginal changes, such as allowing vet-

Eric Draper /White House

President George W. Bush's (center) bi-partisan Presidential Commission on Care for America's Returning Wounded Warriors, co-chaired by Democrat Donna Shalala and Republican Bob Dole, recommended separating payments for loss of quality of life from payments for lost earnings. The proposal, like most of the commission's recommendations, was never adopted.

erans denied claims to choose their route of appeal, but the basics remain the same: Veterans are paid to be sick. This is a powerfully negative force in the lives of many veterans. The VA system robs veterans of vitality and then looks everywhere else for reasons to explain the veteran suicide crisis.

CONCLUSION

The durability of this system is a testament to its political viability and strength rather than to its moral value. In political science, such durability is attributed to so-called "iron triangles"—alliances between politicians, the bureaucracy, and interest groups. In the end, any reform that's implemented will be, like the current system, subject to political pressure. For that reason, we offer not concrete policy proposals, but instead a series of principles that should guide the resulting policy:

■ First, the goal of any system of veterans benefits and care should be to return the veteran as closely as possible to the life situation in which he would have found himself but for the service rendered. This requires an approach customized to the individual veteran. Since employment is a social good, we believe that employment should be the goal of any system of benefits—hopefully to a level that results in the veteran being weaned off whatever temporary assistance might be required. This is true even in cases of high-level spinal cord injury, multiple amputations, or devastating mental illness, as there are treatments that can result in a more positive life course than that which would be available in their absence. Our system must reject the idea that any veteran is unemployable or permanently and "totally" disabled. The only veterans for whom employment is not a reasonable goal are those few whose brain injuries are devastating and impossible to overcome. For them, virtually any amount of benefits is morally sustainable.

■ Second, the system should incentivize desired outcomes by linking treatment for an illness with the compensation associated with it. If you don't get treatment for your PTSD, then you have no right to taxpayer-funded support. This approach has a dual benefit: those who are faking symptoms to get paid would begin to drop out of the system, freeing up mental health providers to see those who are truly ill, and those who are being compensated and in treatment are more likely to eventually become better and graduate from treatment to a lower level of need. Critically, we must recognize that they will be better off with their health restored than if it were not.

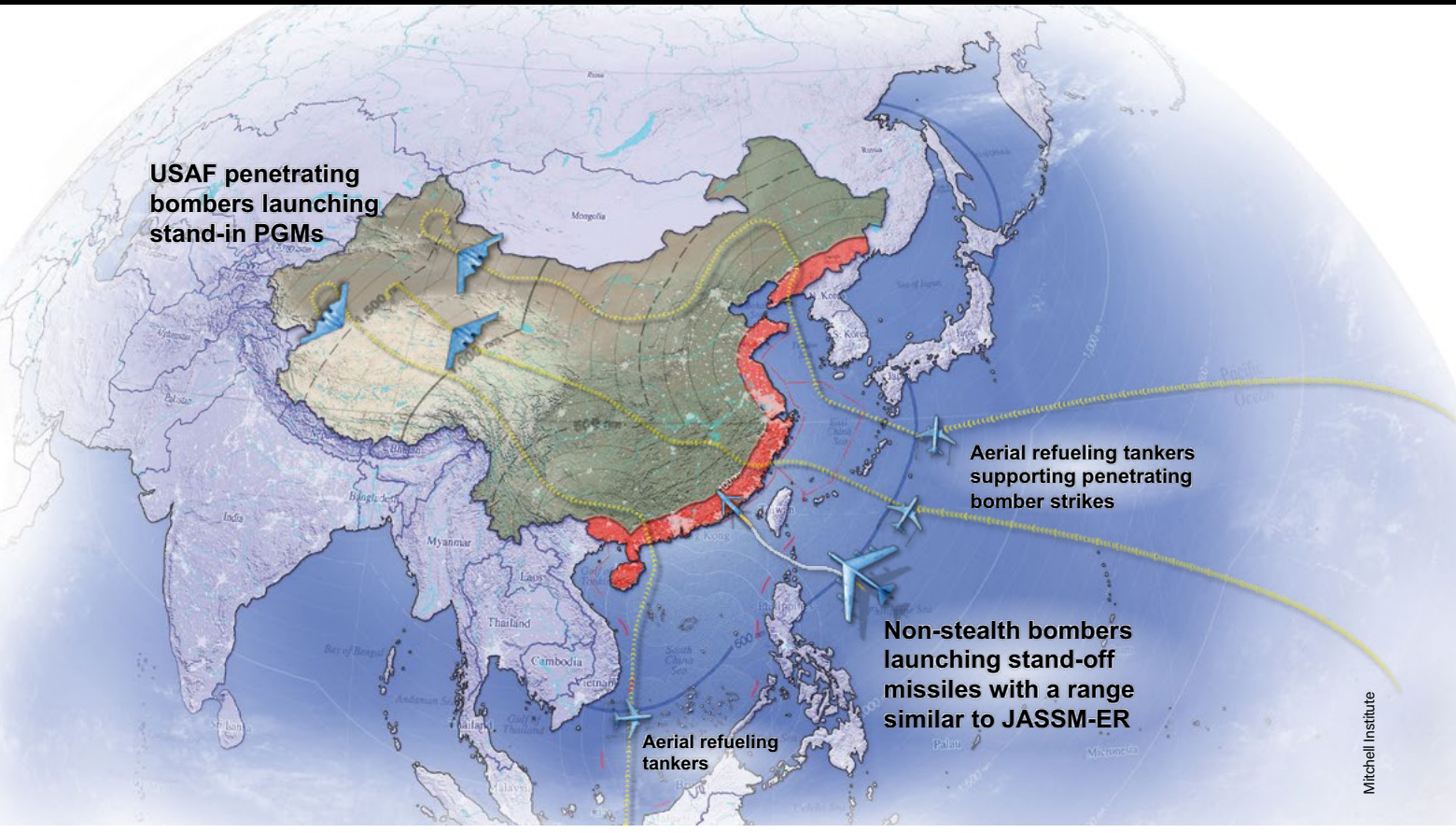
■ Third, the system needs total reform in the nature and types of disabilities compensated. Those injuries not directly caused by military service might be good targets for treatment rather than compensation. In the current regime, someone diagnosed with Parkinson's Disease or diabetes during military service will be compensated as if the disease resulted from military service. The veteran receives medical care, plus a disability payment. Instead, that person should be treated by the VA but not compensated—unless the cause of the illness can be tied directly to service. This would allow the VA to spend more on the veteran whose brain is damaged due to a gunshot wound and less on veterans with lifestyle or aging-related conditions. The entire disability rating system could be rewritten in a few dozen pages rather than thousands.

Our nation's 19 million veterans deserve to live lives they can be proud of, just as they are proud of their military service. They do not need or deserve to be trapped in a well-intentioned but demonstrably harmful system as they are today. ✪

*This article is excerpted from "*Wounding Warriors: How Bad Policy Is Making Veterans Sicker and Poorer*" by retired Army Lt. Col. Daniel Gade and Daniel Huang. Gade was twice wounded in combat in Iraq, where his wounds resulted in the amputation of one of his legs. He was a professor at West Point until his retirement from the Army in 2017 and now works as a consultant in Northern Virginia. Daniel Huang is a freelance journalist whose work has appeared in* The New Republic, Foreign Affairs*, and* The Wall Street Journal.

Affordable Mass

The Need for a Cost-Effective PGM Mix for Great Power Conflict



USAF's non-stealth B-52 bombers must rely on long-range standoff precision guided munitions to attack targets located in an anti-access/area-denial environment. The Joint Air-to-Surface Standoff Missile-Extended Range (JASSM-ER) has a range that exceeds 500 nautical miles.

By Mark Gunzinger

After decades of deferred and canceled modernization programs, the Air Force's lead over peer competitors is eroding and its forces are undersized for its operational tasks. At the same time, the Air Force's budget, which has long been less than the Army's and Navy's, is under stress. The Air Force must make smart choices if it is to maximize its future combat power. One of its most critical choices will be the strategy it adopts for developing a precision-guided munitions (PGM) inventory suitable for peer conflict. The Air Force must balance the range, size, speed, survivability, and capacity of its PGM inventory if it is to maintain a long-range strike advantage over China and Russia. This will require the Air Force to develop a family of affordable next-generation, mid-range—50 to 250 nautical miles—PGMs that can be delivered by its stealth aircraft to maximize the capacity and cost effectiveness of its future strike operations.

The Air Force needs to develop a next-generation family of affordable precision-guided munition with ranges of 50 to 250 nautical miles.

Most defense experts correctly point to the need for the Air Force to field new stealth aircraft to keep pace with China and Russia, yet forget that 5th-generation F-35 fighters and B-21 stealth bombers also give America's theater commanders another advantage—the ability to penetrate contested areas and conduct "stand-in" strikes that kill multiple targets per sortie. The ability to penetrate and release PGMs closer to targets allows stealth aircraft to carry large payloads of smaller munitions—smaller because the PGMs may not need powerplants and other capabilities required to fly long ranges after launch.

For instance, a penetrating bomber like the B-2 has the internal capacity to carry up to 48 notional

stand-in weapons that are sized to have a range of 50-150 nm in its two internal weapons bays, while non-stealth B-52s can carry up to 20 larger long-range JASSM-ER cruise missiles internally and externally. That's up to 48 targets per penetrating B-2 sortie compared to 20 targets for a non-stealth B-52, which must strike into contested areas from stand-off ranges of 500 nautical miles or more.

Standoff strikes require weapons that have more costly features like engines, fuel, guidance systems, and seekers. A powered subsonic JASSM-ER costs about $1.1 million—six times the cost of a mid-range weapon like the Small Diameter Bomb II (SDB II), a 250-pound unpowered guided bomb designed to glide to its target. Hypersonic (Mach 5-plus) weapons now in development are even more costly, like the Hypersonic Air-breathing Weapon Concept (HAWC) which could cost $3-4 million each. Cost is critical because DOD must buy enough PGMs to strike 100,000 or more aimpoints during a campaign against China or Russia. (For contrast, U.S. air forces attacked approximately 40,000 Iraqi aimpoints during Operation Desert Storm in 1991, a far smaller and less capable adversary).

The maxim "you go to war with the forces you have" applies to munitions as well as aircraft. Today's force packs legacy munitions that are vulnerable to enemy defenses, ineffective against some types of anticipated targets, or are simply too few in number to be effective. This will not produce victory in a peer conflict. Most air-to-surface munitions in DOD's current inventory were designed to attack militaries with weak air defenses, but conflicts with peer adversaries equipped with sophisticated integrated air defense systems (IADS) will require more advanced weapons. Addressing these shortfalls cannot wait because the time needed to develop new, advanced PGMs and to surge PGM production is too great to respond to a crisis.

In addition to acquiring 5th-generation F-35 fighters and B-21 stealth bombers that can penetrate advanced IADS, the Air Force needs a new generation of weapons to match. Gen. Mark D. Kelly, head of Air Combat Command, has said his service will not have a true fifth-generation force until its "fifth-gen fighters have fifth-gen weapons and fifth-gen sensing." Putting today's third-generation PGMs on the Air Force's stealth F-35s, F-22s, B-2s, and future B-21s will greatly limit their combat effectiveness.

Although DOD is now developing multiple new precision munitions, many of these efforts are focused on very long-range weapons to equip non-stealth aircraft for standoff attacks beyond the reach of an enemy's air and missile defenses. These very-long-range standoff munitions can cost millions of dollars each, however, and may not be effective against mobile targets like missile transporter-erector-launchers that can quickly change their locations or targets sheltered in hardened facilities. Designing weapons to fly long distances also increases their cost, since they must have engines, fuel, multiple guidance systems, and possibly seekers to precisely guide their warheads to designated aimpoints.

LOOKING BACK

Thirty years ago, U.S. air forces equipped with a new generation of guided weapons inflicted a stunning defeat on Iraqi forces that had invaded Kuwait. No other military could match the strike capabilities the Air Force brought to the fight during Operation Desert Storm. Today, however, those same air-to-surface PGMs are increasingly unsuitable for operations against peer militaries and even some more advanced regional adversaries. How did this occur?

By 1990, investments in precision guidance technologies, stealth aircraft, and new sensors were swinging the offensive-defensive pendulum in favor of U.S. strike forces. This came about because the Air Force developed both next-generation aircraft and munitions to gain the range, speed, survivability, and lethality it needed to overcome Cold War-era air defenses and attack targets with precision. After the Soviet Union collapsed, DOD shifted its focus to regional contingency operations instead of global conflict with a peer military. DOD's 1993 Bottom-Up Review determined aggression by lesser adversaries like Iraq and North Korea were the new primary threat to the United States' global security interests. Because these regional adversaries were largely equipped with antiquated air defenses and lacked the training needed to operate them effectively, DOD curtailed or ended programs intended to produce new stealth aircraft and munitions for contested environments. Over the next 15 years, DOD decided to buy only 21 of the Air Force's required 132 B-2 stealth bombers, 187 of the required 750 F-22 stealth fighters, and 460 of the originally planned 1,460 stealth Advanced Cruise Missiles. DOD also canceled SRAM II and TSSAM procurement and reduced its capacity to suppress enemy air defenses by retiring the USAF's F-4G and EF-111 fighters.

DOD's 1993 Bottom-Up Review also called for developing new "smart" precision-guided anti-armor munitions to defeat the mechanized forces of North Korea and Iraq, and "all-weather" PGMs like JDAMs following lessons from Desert Storm that showed weather, dust, and smoke could degrade the effectiveness of laser-guided air-to-ground weapons. Non-stealth JDAMs use the Global Positioning System to accurately strike targets in all weather conditions and can reach targets up to

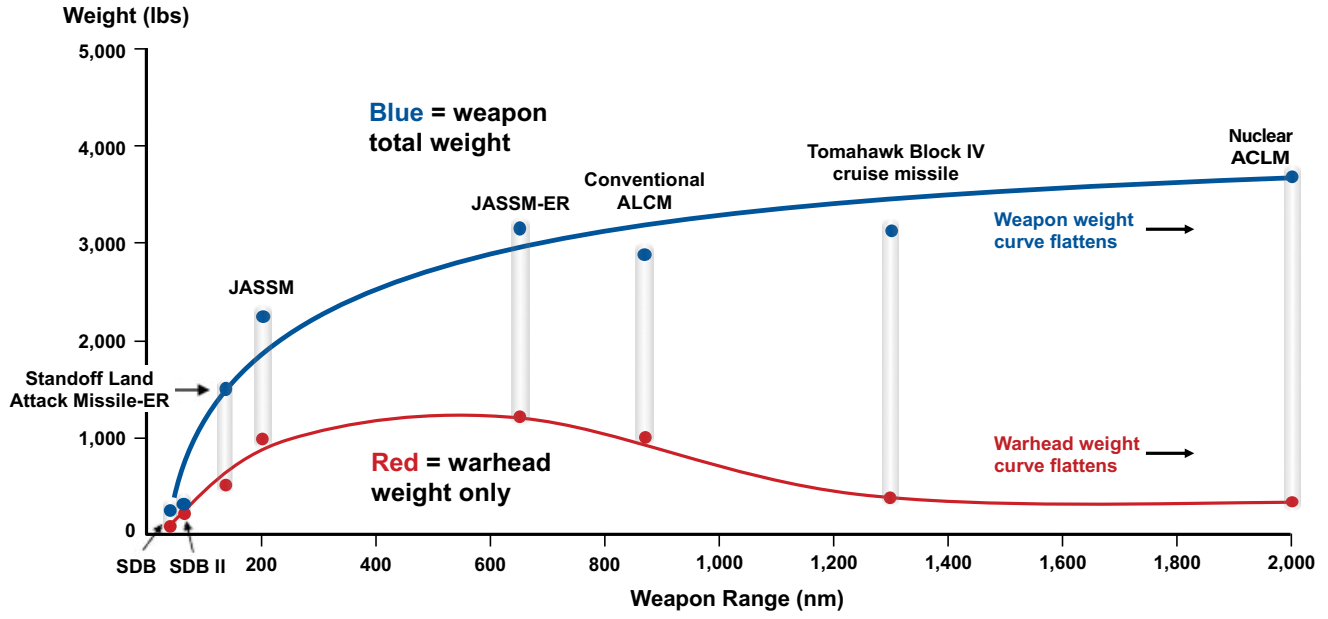
Cost Determines Volume

The more expensive a weapon, the fewer units the Pentagon buys. This table shows nine munitions and how they compare in terms of range, cost, and volume in the USAF and U.S. Navy's inventories.

	Range (nmi)	Average Procurement Unit Cost ($)	Number Bought or Ordered
Joint Direct Attack Munition (JDAM) variants	up to 15	25,000+	375,403
Small Diameter Bomb (SDB)	more than 40	36,000	50,769
Small Diameter Bomb II (SDB II)	more than 40	186,000	10,724
Joint Standoff Weapon (JSOW)	up to 70	357,000	5,168
Joint Air-to-Surface Standoff Missile (JASSM)	more than 200	698,150	2,034
Advanced Anti-Radiation Guided Missile (AARGM)	more than 60	970,000	2,475
JASSM Extended Range (JASSM-ER)	more than 500	1,048,000	5,166
AARGM Extended Range (AARGM-ER)	120	1,578,000	2,097
Long Range Anti-Ship Missile (LRASM), a JASSM derivative	more than 200	3,162,000	410

Bigger Weapons, Smaller Warheads

As PGM ranges increase so do their total size and weight. The opposite is true for the size and weight of their warheads, which can reduce their destructive power.



Source: Mitchell Institute

15 nautical miles from their release points. At a cost of $25,000 to $45,000 each, they became the signature air-to-surface PGM of the post-Cold War era.

PGM OF THE POST-COLD WAR ERA

Over the past three decades, DOD has demonstrated an enduring bias in favor of lower-cost direct attack munitions. For example, during Operation Allied Force in 1999, coalition forces launched 28,018 direct attack munitions, 743 HARMs, and 278 cruise missiles. Likewise, in the Operation Enduring Freedom and Operation Iraqi Freedom air campaigns, coalition forces expended 50,213 direct attack munitions, 1,012 cruise missiles, and 408 HARMs. Overall, 97% of the air-to-ground munitions in these air campaigns were direct attack munitions. From 2004 through 2019, U.S. and coalition partner aircraft delivered about 176,000 munitions on counterterror and counterinsurgency targets operations in Iraq, Afghanistan, and Syria—almost all of them JDAMs and direct attack Hellfire missiles.

Now, however, the precision strike offensive-defensive balance is once again shifting, making these legacy weapons far less suitable for the kinds of conflicts anticipated in the future.

THE NEED FOR A DIFFERENT PGM MIX

China and Russia's modernized militaries are far larger and more technologically capable than any the United States has faced in recent decades. Both have advanced weapon systems to deny freedom of action in the air, sea, space, cyberspace, and electromagnetic spectrum (EMS). Great geographic distances in the Indo-Pacific and other theaters add to the complexity of precision strike operations.

Overcoming these challenges requires strike aircraft with range to attack targets anywhere in China and Russia, 5th-generation stealth to survive in contested environments, and the capacity to carry large payloads of munitions, sensors, and other mission systems needed to find and attack mobile/relocatable targets.

In addition to acquiring F-35 fighters and B-21 bombers, the Air Force needs to create an inventory of air-to-surface PGMs that is designed and sized for peer conflict. Rebalancing the Air Force's PGM mix in favor of a family of next-generation, mid-range PGMs for stand-in strikes is the most achievable means for building up its capacity to take on peer competitors in a sustained fight. These weapons would complement the capabilities of the USAF's 5th-generation fighters and bombers, improve the Air Force's ability to defeat challenging mobile, hardened, and deeply buried targets, and will be affordable enough to procure at the scale required by theater commanders.

LONG-RANGE STRIKE

U.S. theater commanders must be able to strike tens of thousands of targets, including adversaries' airfields, ports, command and control complexes, ballistic missile fields, and critical military industrial facilities, whether they are located along the peripheries of those countries or deep in their interiors. The USAF's fighter force, however, largely consists of non-stealth aircraft that cannot survive in contested areas. The same is true of the small USAF bomber force, which now consists of 76 non-stealth B-52s, 44 non-stealth B-1s, and only 20 penetrating stealth B-2s. Most of the USAF's non-stealth fighters and bombers are therefore highly dependent on long-range standoff PGMs to remain survivable. This imposes significant operational limitations. For instance, cruise missiles launched by non-stealth bombers standing off at 500 to 800 nm from land based IADS will only be able can only reach a fraction of potential Chinese military targets, leaving anti-satellite weapons, ballistic missile units, and command and control facilities located deep in China's interior to be attacked by other means. And while 5th-generation fighters can penetrate contested areas, because they are range limited they too must use long-range weapons. However, stealth bombers carrying mid-range, stand-in weapons could accomplish this

mission, penetrating defenses and reaching targets anywhere in China; moreover, their ability to attack from unexpected directions would greatly complicate an adversary's air defense challenges..

PGMS MUST BE SURVIVABLE

Unlike the defenses U.S. air forces faced in the 1990s and 2000s, Russian and Chinese IADS can deny access to 4th-generation non-stealth aircraft and are increasingly effective against individual PGMs such as non-stealth, sub-sonic cruise missiles.

Russia's S-300V (SA-12), S-300PMU-1/2 (SA-20A/B) and S-400 (SA-21) all use self-propelled vehicles for their components, so they may deploy or stow within minutes. New phased-array radars are jam-resistant, and Russia's latest surface-to-air missiles include active electronically steered array (AESA) radars able to track multiple targets simultaneously. Some SAM system variants feature radars that operate in lower frequency bands to improve capability against stealth aircraft. China has also fielded Russian-made S-300 and S-400s and produced derivative systems like the long-range HQ-9. Networking allows radars to work collaboratively across a range of spectrums and enables long-range and short-range SAMs to receive target data from multiple sensors operating in all domains.

Another major difference between air defenses of the 1990s and IADS of today is the proliferation of systems capable of engaging incoming cruise missiles and other guided munitions. These defenses include Russia's SA-15 (Tor), SA-19 (Tunguska), and SA-22 (Pantsir) mobile SAMs that can target low-flying aircraft, cruise missiles, anti-radiation missiles, and bombs. China has developed its own variant of the Tor known as the HQ-17, and an FK-1000 short-range "point defense" system that resembles the Pantsir. These short-range weapons are fully integrated with electronic warfare systems and longer-range SAMs.

To counter these threats, the USAF might have to revert to a multiple sorties per target strike strategy, instead of striking multiple targets per sortie. The problem is that today's smaller Air Force is not sized to support that costly approach.

Another approach is to develop hypersonic weapons that are more difficult for air defenses to intercept. DOD is developing hypersonic weapons to strike time-sensitive targets over long ranges in contested areas, but the size of these weapons means fighters and bombers will carry fewer of them per sortie. Some might even be so large that they can only be carried externally by bomber aircraft, precluding their use by stealth fighters and bombers. Furthermore, very-long-range hypersonic weapons would still need to fly tens of minutes to reach their targets, which can give an enemy time to detect and counter attacks. Finally, hypersonic weapons that cost multiple millions of dollars each will constrain the number the Air Force can afford to buy.

A better approach would be to field a new generation of mid-range, stand-in weapons capable of penetrating advanced IADS. Next-generation stand-in weapons with ranges between 50 nm to 250 nm will increase USAF's lethality, reduce the number of sorties and weapons needed to kill targets in contested environments, and expand options for penetrating aircraft to launch high-capacity strikes in the face of high-risk defenses. Plus, with unit costs close to the SDB I and SDB II—less than $300,000 each—the Air Force could buy them at scale.

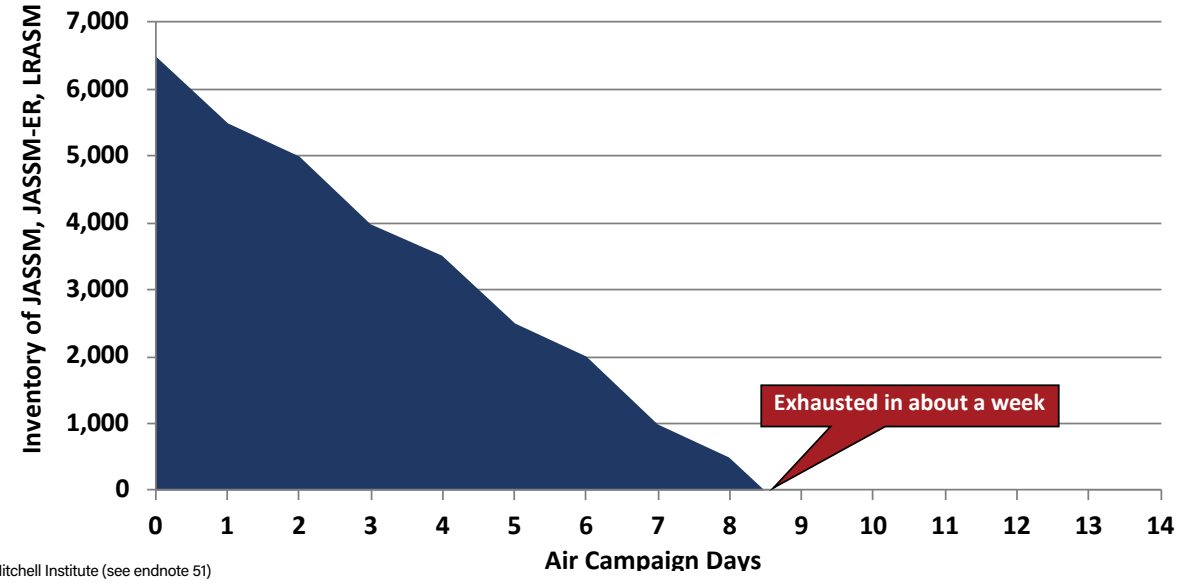
ATTACKING MOBILE OR HARDENED TARGETS

The increased mobility of China and Russia's high-value weapon systems complicates the U.S. military's ability to find, fix, track, target, and attack them at a distance. Deeply buried and otherwise hardened fixed targets are also challenging.

Although high-speed—even hypersonic—cruise missiles can help mitigate against a target's movements, their higher cost will limit the number the Air Force and other services will be able to afford. In many cases, stealth aircraft will present a more effective option, given their ability to penetrate contested areas to deliver a larger number of more affordable mid-range, stand-in weapons per sortie. Penetrating aircraft like F-35As and B-21s also have on-board mission systems

8 Days a Week

In a notional conflict with China or Russia, the U.S. would burn through its entire inventory of JASSM-ERs and LRASMs in just eight days. No other U.S. service or NATO ally can deliver similar capability.



Source: Mitchell Institute (see endnote 51)

to independently find and attack mobile/relocatable targets, which simplifies their kill chains and increases the cost effectiveness of their strikes. Their ability to launch shorter-range stand-in attacks also reduces the time available for an enemy to take countermeasures.

Destroying hardened or deeply buried targets presents a different problem. As missile ranges are extended, their size and weight also increase because of fuel and other capabilities they need to fly longer distances. At the same time, the size of warheads they carry is reduced. Larger conventional warheads are needed to attack underground facilities, such as leadership bunkers or hardened shelters protecting weapons of mass destruction. Only bombers have both the capacity to carry very large "bunker buster" direct attack weapons such as the 5,000-pound GBU-28 and the 30,000-pound GBU-57 and deliver them over long ranges. It may be feasible to design mid-range PGMs, however, with enhanced warheads to take on some hardened targets.

TENS OF THOUSANDS OF TARGETS

The Air Force currently lacks enough PGMs to engage in an extended campaign against China or Russia while still meeting operational needs in other theaters, as required by the National Defense Strategy. This shortfall is an artifact of post-Cold War planning assumptions that sized DOD's forces—including their munitions inventories—for short campaigns against lesser regional threats. Air campaigns against either China or Russia, however, could involve hundreds of sorties per day and last for many weeks. Absent sufficient PGMs, U.S. forces would not be able to sustain high-tempo strike operations regardless of how many combat aircraft it can bring to the fight.

The ability to quickly surge PGM production to meet theater commander requirements during a war with China or Russia could be decisive and should be part of the Air Force's plans to prepare for peer conflict. This could entail creating new capacity in existing facilities to surge wartime production, or to maintain munitions production capability in "layaway" status so industry can surge production in time of need. An inadequate PGM stockpile combined with an inability to surge production could convince an aggressor that it could continue to fight and achieve victory after U.S. forces exhausted their strike capacity.

MAXIMIZE COST-EFFECTIVENESS

Leaving aside the operational limitations of long-range standoff weapons against mobile, relocatable, and other challenging targets, their cost is another barrier to buying them at scale. Costs increase with PGM ranges and sophistication, meaning that the longest-range, most complex weapons are typically purchased in very small quantities. The Navy only acquires a few hundred Tomahawk cruise missiles per year, and the total acquired over the life of long-range standoff weapons programs is well under 10,000 weapons.

A better, more cost-effective choice is to invest in next-generation mid-range PGMs that can be carried in significant numbers by penetrating stealth bombers and fighters. Other PGM programs suggest new weapons should cost $300,000 or less if they are to be affordable enough to acquire in the large quantities needed for high-intensity peer conflict. New mid-range PGMs suitable for stand-in strikes by penetrating fighters and bombers would help achieve this objective and create a PGM inventory that has the capacity Air Force airmen will need in the future.

Finally, the Air Force must be cautious about its dependence on non-stealth aircraft that must launch weapons from standoff ranges. Because of the cost of those weapons, non-stealth aircraft like B-52 bombers and F-15EX fighters could quickly run out of JASSM-ER and other standoff weapons in a conflict with China or Russia. Procuring a future munitions mix that includes large numbers of more affordable mid-range stand-in munitions would help create a deeper magazine and convince adversaries that the Air Force is prepared to defeat any act of aggression that threatens the United States and its allies and friends.

Joshua Miller/USAF

The non-stealth B-1s in USAF's inventory are highly dependent on long-range standoff PGMs to remain survivable. Here, a weapons loader crew uploads a Joint Air-to-Surface Standoff Missile (JASSM) to an external pylon on a B-1B Lancer at Edwards Air Force Base, Calif.

CONCLUSION

The Air Force should adopt a strategy to transform its obsolescing PGM stockpile to a balanced mix that maximizes its capacity for a peer conflict, following these five steps:

1. Prioritize fielding "5th-generation weapons for 5th-generation aircraft" to take full advantage of the range, survivability, and capability of stealth aircraft to complete kill chains independently in contested environments.

2. Include a family of mid-range (50 nm to 250 nm) PGMs that can be delivered by penetrating aircraft on 100,000 or more discrete aimpoints.

3. Set an objective cost per weapon of $300,000 or less for these new mid-range, stand-in PGMs to maximize its "bang for the buck."

4. Establish baseline low observability and other capabilities for these new weapons so they can penetrate advanced IADS and survive to reach their designated targets.

5. Ensure the new mid-range PGMs are capable against mobile, relocatable, hardened, or deeply buried targets.

As the Air Force creates a future PGM mix that is suitable for great power conflict, it must not forget it has an advantage that is unmatched by any other U.S. or allied military: a growing force of advanced 5th-generation fighters and stealth bombers. Developing mid-range, stand-in PGMs suitable for operations in contested environments would help the Air Force take maximum advantage of its stealth forces. This is a "must do"—the best, most advanced combat aircraft in the world will be ineffective if they lack a PGM inventory that has the capacity, survivability, and effectiveness needed for great power conflicts. ✪

Col. Mark Gunzinger, USAF (Ret.) is the director of Future Concepts and Capability Assessments at The Mitchell Institute for Aerospace Studies.

AFA Helps Expose Youth to Flight

Virginia Wing Civil Air Patrol

The Legacy Flight Academy and Virginia Air Force Association held the Eyes Above the Horizon event in Chesterfield County. The single-day outreach program is aimed at fostering interest in aerospace careers by engaging youth in underserved communities.

By Scott King

The Legacy Flight Academy (LFA), in a first-time partnership with Virginia Air Force Association, on Sept. 25th held the Eyes Above the Horizon event in Chesterfield County. The single-day outreach program is aimed at fostering interest in aerospace careers by engaging youth in underserved communities. More than 40 students participated.

"All of our programs at LFA are bound to the heroic legacy of the Tuskegee Airman," Kenneth "KT" Thomas, President and co-founder of The Legacy Flight Academy, said. "Our Eyes Above the Horizon program enables students to get real experience in an airplane, see beyond their normal circumstances, and realize the opportunities around them."

The Eyes Above the Horizon program was first launched in 2015, but their most recent event in Richmond was the first time an Air Force Association State level organization was involved. Their budding partnership began late last year, when AFA President Lt. Gen. Bruce "Orville" Wright, USAF (Ret.) connected Linda McMahon, President of Virginia AFA, with the Legacy Flight Academy.

"At first, I thought this [event] could easily overwhelm a local chapter, but I figured the state organization can pull together all the State's chapters to really make this a show-class event," McMahon said.

"AFA is a well-known organization within the Air Force for connecting and helping people." Thomas, a major in the U.S. Air Force Reserve, said. "It only seemed right once the opportunity came for us to connect with AFA."

The program relies on both monetary donations and on organizations committing resources to support the program. In Richmond, Williamsburg Aviation Scholarship Program (WASP), GT Aviation, and Dominion Aviation Services provided planes and pilots. The Virginia Wing CAP, Virginia State Police Aviation Division, the Army National Guard, Hampton University Aviation Department, Virginia Space Grant Consortium, United Airlines, and other organizations provided hangars, static displays, speakers, booths and more.

"It's not easy to get pilots to want to come spend their own fuel, Thomas said. "But when you get people to really buy in on what we're trying to do, it made it an easy sell. … The volunteers end up having as much fun as the students and are just in awe of everything that goes on."

Team-building exercises and STEM education are built into the program as well.

"It's not just about flying airplanes, because for our future leaders of the Air and Space Force, it's about leading people, building a team, and having wingmen," Thomas said. "Then by introducing underserved communities, minorities, and females to fields that are heavy in STEM. … Now, they're wanting to learn about science and engineering, so that when it comes time to go to college and beyond, they're already prepared."

"Without diversity you would lose half of our nation's youth," McMahon said. "If it's not diverse, you're going to lose, because each one of us brings a different piece to the equation that's going to solve whatever tomorrow's problem is. China is already a big threat, so we need to start investing now in the STEM education of our nation's youth."

Additionally, students are able to envision greater possibilities for their future.

"When you take them flying in a plane at a young age, then flying a plane becomes very normal," Thomas said. "We are normalizing these extraordinary things ... that they don't look at it as some far-off and unreachable thing. Flying suddenly becomes an attainable goal for them."

"Students were smiling very nervously as they crawled into the cockpit, but as they came out, they had the biggest smile on their face," McMahon noted. "I don't think I saw anybody coming out of the cockpit that wasn't excited, and that's exactly what this was all about."

After hosting Eyes Above the Horizon in different locations across the country over the years, Thomas has learned to appreciate the different elements each locale brings to each event. In Richmond, retired Col. Alvin Drew, a former United States Air Force officer and NASA astronaut, spoke to the students.

"There's a uniqueness that every area brings and makes it different," Thomas said. "Colonel Drew was talking about moving through space and how we were going to travel to Mars, so

having an astronaut there helped them see that he's a normal person that has actually been to space, that makes it normal for them. It really makes them realize all of the things they can do."

With the success of the Eyes Above the Horizon event in Richmond, Thomas and McMahon believe they have created a foundation for a sustainable and working partnership to continue building the program in the Central East Region of AFA together.

"[Virginia AFA's involvement] was the most significant difference that made this event so successful," Thomas said. "This is the foundation of a long-term relationship that is going to continue to produce the outcomes we're looking for in at least one location of Virginia. But the biggest success that I see is that this is not just a one-off event, this is going to be a continuing event that's going to have huge impacts on the local community there."

Consequently, they believe the success of the Richmond event can also become a blueprint for other AFA chapters/States and the Legacy Flight Academy to work together toward their common mission.

"We're already planning our next partnership deal with our next iteration in Maryland," McMahon, who is also the Executive Vice President of the Central-East AFA Chapter, said. "By honing this craft a little bit more, we can make organizing the event slicker, smoother, better, faster and cheaper. Once we do that in a second iteration, I think we'll be ready to talk to the rest of AFA and say, 'Here's what you need to do. Here's the OP plan, create it in your own image, and base it on your locality.' I want to give them the benefit of what we've learned." ✪

AFA's National Teacher of the Year Megan Tucker

By Scott King

Megan Tucker earned the 2021 AFA National Teacher of the Year award, presented by Rolls-Royce, for her unflagging enthusiasm for for science, technology, engineering, and math (STEM). Now 17 years into her teaching career, Tucker is now a specialist in teaching STEM and the arts and an Instructional Facilitator of Technology at Hillsboro Charter Academy (Elementary School) in Virginia.

First, congratulations on being AFA's 2021 National Teacher of the Year! What was your experience like having the opportunity to be recognized at the Air, Space & Cyber Conference?

I wish I could bottle up that experience and send it to every teacher, because the appreciation that I felt was extremely humbling. I had four-star generals and all these high military officials thanking me everywhere I went. They were even yelling, 'To infinity and beyond!' at the conference, because I had said it in my speech. I really don't even have any words for the appreciation that I felt, and I wish other teachers could feel it too.

What did it mean to you to get this recognition?

When I first started my career, I had a mentor that got me really excited about using space and aviation in my curriculum and aerospace became my platform for teaching STEAM and STEM. Then being an Air Force spouse, it makes this award even more special.

But the most meaningful thing was that in the audience of over 2,000 people, there was a mom of a former student from my very first class who came over to thank me. Then at the reception, there was a dad who had a thank you note from his daughter, who I taught two years ago. When you find out that you've had that impact, it's a feeling like no other, and it's the reason that I teach.

You mentioned STEAM. Is that different from STEM?

Yes, so I'm a STEAM Specialist. The A stands for the Arts—not just visual arts, but also performing arts—because if you engineer something you need to have that visual sense to it and you've got to market your product. STEAM is really about a lot of the soft skills and having that creative flair built into STEM.

What makes the aerospace component so valuable as a backbone in your approach to STEM education?

It helps get kids starting to ask questions about things that you're bringing in: like airplanes or rockets. My kindergarteners know the Four Forces of Flight—thrust, gravity, drag, and lift—and then we can talk about why this happened or how we can make it go higher or farther, and it just opens the door to so many questions.

Courtesy photo

AFA's 2021 National Teacher of the Year is Megan Tucker of Lovettsville, Va. Nominated by the Gabriel Chapter, she is a specialist in teaching STEM, the arts, and is an Instructional Facilitator of Technology at Hillsboro Charter Academy in Virginia.

Why do you teach, as opposed to practice science?

With teaching, I felt I could impact more people and inspire and encourage them. I try to spread my coined phrase, "Aviation Fascination," to give kids the power to see that there are all these different careers in STEM.

What is it about science that engages and inspires youth?

I think it's the ability to question and to experiment to get the answers. It's a bigger purpose than just themselves. It's having the ability to ask questions like why things work, how they work, and then proving different science concepts to see the reason.

In 17 years of teaching, have any of your former students gone on to pursue STEM-related fields and studies?

A fourth-grader I had my first year of teaching in Florida got a job at the Daytona Police Department as a drone pilot. Recently, she was able to video chat into my Girls Club as a guest speaker—that was the highlight of my teaching career! To have somebody I had in fourth grade on the screen teaching my current fourth-graders about how important STEM and STEAM is, and having gone through what they're experiencing, was like a full circle moment. I have industrial engineers, electrical engineers—so many people that will come back and say, 'It's because you turned on that love, you turned on that passion, and I wanted more!' It's just amazing. ✪

AFA ALMANAC

By Chequita Wood

The Air Force Association's 12 Founders

John S. Allard
Bronxville, N.Y.

Everett R. Cook,
Memphis, Tenn.

Edward P. Curtis
Rochester, N.Y.

Jimmy Doolittle
Los Angeles

W. Deering Howe
New York

Rufus Rand
Sarasota, Fla.

Sol A. Rosenblatt
New York

Julian B. Rosenthal
New York

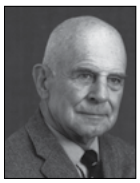
James M. Stewart
Beverly Hills, Calif.

Lowell P. Weicker
New York

Cornelius Vanderbilt Whitney
New York

John Hay Whitney
New York

AFA Chairmen of the Board and National Presidents



Jimmy Doolittle
President, 1946-47
Chairman, 1947-49

Edward P. Curtis
Chairman, 1946-47

Thomas G. Lanphier Jr.
President, 1947-48
Chairman, 1951-52

C. R. Smith
President, 1948-49
Chairman, 1949-50

Robert S. Johnson
President, 1949-51

Carl A. Spaatz
Chairman, 1950-51

Harold C. Stuart
President, 1951-52
Chairman, 1952-53

Arthur F. Kelly
President, 1952-53
Chairman, 1953-54

George C. Kenney
President, 1953-54
Chairman, 1954-55

John R. Alison
President, 1954-55
Chairman, 1955-56

Gill Robb Wilson
President, 1955-56
Chairman, 1956-57

John P. Henebry
President, 1956-57
Chairman, 1957-58

Peter J. Schenk
President, 1957-59

James M. Trail
Chairman, 1958-59

Howard T. Markey
President, 1959-60
Chairman, 1960-61

Julian B. Rosenthal
Chairman, 1959-60

Thos. F. Stack
President, 1960-61
Chairman, 1961-62

Joe Foss
President, 1961-62
Chairman, 1962-63

John B. Montgomery
President, 1962-63

W. Randolph Lovelace II
President, 1963-64
Chairman, 1964-65

Jack B. Gross
Chairman, 1963-64

Jess Larson
President, 1964-67
Chairman, 1967-71

Robert W. Smart
President, 1967-69

George D. Hardy
President, 1969-71
Chairman, 1966-67
Chairman, 1971-72

Martin M. Ostrow
President, 1971-73
Chairman, 1973-75

Joe L. Shosid
President, 1973-75
Chairman, 1972-73
Chairman, 1975-76

George M. Douglas
President, 1975-77
Chairman, 1977-79

Gerald V. Hasler
President, 1977-79
Chairman, 1976-77

Victor R. Kregel
President, 1979-81
Chairman, 1981-82

Daniel F. Callahan
Chairman, 1979-81

John G. Brosky
President, 1981-82
Chairman, 1982-84

David L. Blankenship
President, 1982-84
Chairman, 1984-85

Edward A. Stearn
Chairman, 1985-86

Martin H. Harris
President, 1984-86
Chairman, 1986-88

Sam E. Keith Jr.
President, 1986-88
Chairman, 1988-90

Jack C. Price
President, 1988-90
Chairman, 1990-92

Oliver R. Crawford
President, 1990-92
Chairman, 1992-94

James M. McCoy
President, 1992-94
Chairman, 1994-96

Gene Smith
President, 1994-96
Chairman, 1996-98

Doyle E. Larson
President, 1996-98
Chairman, 1998-2000

Thomas J. McKee
President, 1998-2000
Chairman, 2000-02

John J. Politi
President, 2000-02
Chairman, 2002-04

Stephen P. Condon
President, 2002-04
Chairman, 2004-06

Robert E. Largent
President, 2004-06[a]
Chairman, 2006-08

Joseph E. Sutter
Chairman, 2008-10

S. Sanford Schlitt
Chairman, 2010-12

George K. Muellner
Chairman, 2012-14

Scott P. Van Cleef
Chairman, 2014-16

F. Whitten Peters
Chairman, 2016-19

Gerald R. Murray
Chairman, 2019-

[a] The office of National President, an elected position, was disestablished in 2006.

AFA Executive Directors/Presidents

Willis S. Fitch
Executive Director
1946-47

James H. Straubel
Executive Director
1948-80

Russell E. Dougherty
Executive Director
1980-86

David L. Gray
Executive Director
1986-87

John O. Gray
Acting Executive Director
1987-88, 1989-90

Charles L. Donnelly Jr.
Executive Director
1988-89

Monroe W. Hatch Jr.
Executive Director
1990-95

John A. Shaud
Executive Director
1995-2002

Donald L. Peterson
Executive Director
2002-06[c]
President-CEO
2006-07

Michael M. Dunn
President-CEO
2007-12

Craig R. McKinley
President
2012-15

Mark A. Barrett
Acting President
2015

Larry O. Spencer
President
2015-19

Bruce A. Wright
President
2019-

Jim Simmons
Vice Chairman
for Field Operations
2020-

VICE CHAIRMEN FOR FIELD OPERATIONS

Joseph E. Sutter	2006-08
James R. Lauducci	2008-10
Justin M. Faiferlick	2010-12
Scott P. Van Cleef	2012-14
David A. Dietsch	2014-16
F. Gavin MacAloon	2016-20
Jim Simmons	2020-

Stephen K. Gourley
Vice Chairman for
Aerospace Education
2021-

VICE CHAIRMEN FOR AEROSPACE EDUCATION

L. Boyd Anderson	2006-07
S. Sanford Schlitt	2007-10
George K. Muellner	2010-12
Jerry E. White	2012-15
Richard B. Bundy	2015-18
James T. Hannam	2018-2021
Stephen K. Gourley	2021-

Michael J. Liquori
National Secretary
2021-

NATIONAL SECRETARIES

Sol A. Rosenblatt	1946-47
Julian B. Rosenthal	1947-59
George D. Hardy	1959-66
Joseph L. Hodges	1966-68
Glenn D. Mishler	1968-70
Nathan H. Mazer	1970-72
Martin H. Harris	1972-76
Jack C. Price	1976-79
Earl D. Clark Jr.	1979-82
Sherman W. Wilkins	1982-85
A. A. "Bud" West	1985-87
Thomas J. McKee	1987-90
Thomas W. Henderson	1990-91
Mary Ann Seibel	1991-94
Mary Anne Thompson	1994-97
William D. Croom Jr.	1997-2000
Daniel C. Hendrickson	2000-03
Thomas J. Kemp	2003-06
Judy K. Church	2006-09
Joan Sell	2009-11
Edward W. Garland	2011-14
Marvin L. Tooman	2014-15
John T. Brock	2015-17
Richard W. Hartle	2017-2021
Michael J. Liquori	2021-

Charles L. Martin Jr.
National Treasurer
2020-

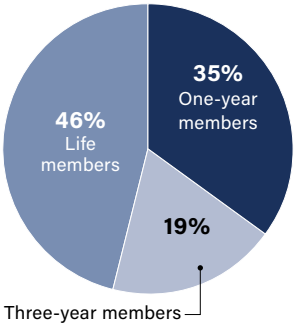
NATIONAL TREASURERS

W. Deering Howe	1946-47
G. Warfield Hobbs	1947-49
Benjamin Brinton	1949-52
George H. Haddock	1952-53
Samuel M. Hecht	1953-57
Jack B. Gross	1957-62
Paul S. Zuckerman	1962-66
Jack B. Gross	1966-81
George H. Chabbott	1981-87
William N. Webb	1987-95
Charles H. Church Jr.	1995-2000
Charles A. Nelson	2000-05
Steven R. Lundgren	2005-10
Leonard R. Vernamonti	2010-14
Nora Ruebrook	2014-16
Charles L. Martin Jr.	2016
Steven R. Lundgren	2016-2020
Charles L. Martin Jr.	2020-

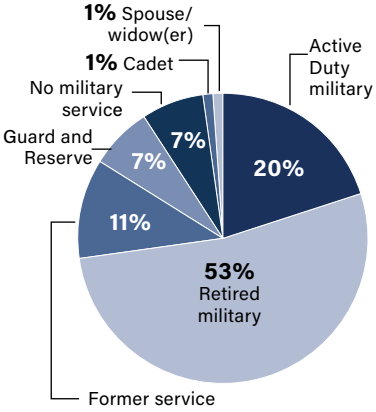
AFA Membership

As of September 2021. Total **100,175.** Numbers are rounded.

MEMBERSHIP CATEGORY



MILITARY STATUS



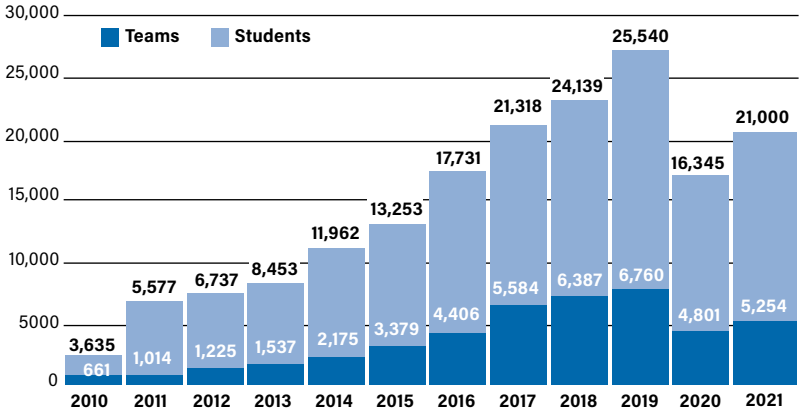
Year	Life Members	Total
1946	32	**51,243**
1947	55	**104,750**
1948	68	**56,464**
1949	70	**43,801**
1950	79	**38,948**
1951	81	**34,393**
1952	356	**30,716**
1953	431	**30,392**
1954	435	**34,486**
1955	442	**40,812**
1956	446	**46,250**
1957	453	**51,328**
1958	456	**48,026**
1959	458	**50,538**
1960	464	**54,923**
1961	466	**60,506**
1962	485	**64,336**
1963	488	**78,034**
1964	504	**80,295**
1965	514	**82,464**
1966	523	**85,013**
1967	548	**88,995**
1968	583	**97,959**
1969	604	**104,886**
1970	636	**104,878**
1971	674	**97,639**
1972	765	**109,776**
1973	804	**114,894**
1974	837	**128,995**
1975	898	**139,168**
1976	975	**148,202**
1977	1,281	**155,850**
1978	1,541	**148,711**
1979	1,869	**147,136**
1980	2,477	**156,394**
1981	3,515	**170,240**
1982	7,381	**179,149**
1983	13,763	**198,563**

Year	Life Members	Total
1984	18,012	**218,512**
1985	23,234	**228,621**
1986	27,985	**232,722**
1987	30,099	**237,279**
1988	32,234	**219,195**
1989	34,182	**204,309**
1990	35,952	**199,851**
1991	37,561	**194,312**
1992	37,869	**191,588**
1993	38,604	**181,624**
1994	39,593	**175,122**
1995	39,286	**170,881**
1996	39,896	**161,384**
1997	41,179	**157,862**
1998	41,673	**152,330**
1999	42,237	**148,534**
2000	42,434	**147,336**
2001	42,865	**143,407**
2002	43,389	**141,117**
2003	42,730	**137,035**
2004	42,767	**133,812**
2005	43,094	**131,481**
2006	43,266	**127,749**
2007	43,256	**125,076**
2008	43,557	**123,304**
2009	43,782	**120,507**
2010	43,954	**117,480**
2011	44,182	**111,479**
2012	43,686	**106,780**
2013	43,851	**102,540**
2014	43,720	**96,017**
2015	43,936	**92,829**
2016	44,074	**93,379**
2017	44,083	**90,970**
2018	44,068	**96,429**
2019	44,035	**97,181**
2020	44,031	**91,979**
2021	44,014	**100,175**

STEM Programs

AFA'S CYBERPATRIOT PROGRAM

CyberPatriot is the National Youth Cyber Education Program created by AFA to inspire K-12 students toward careers in cybersecurity or other science, technology, engineering, and mathematics (STEM) disciplines.



CyberPatriot Mentor of the Year

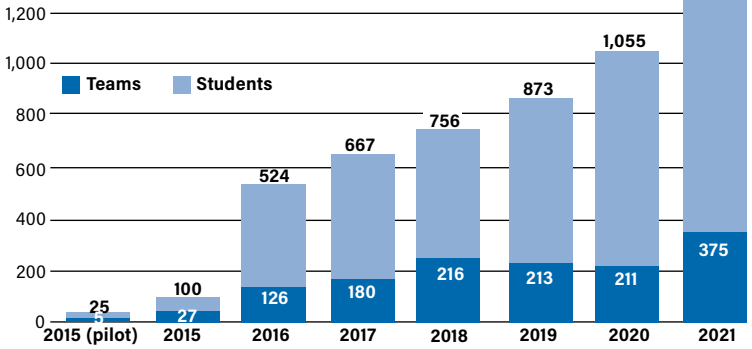
Jacques LaCour
Wheaton Warrenville South High School (Wheaton, Ill.)

CyberPatriot Coach of the Year

Steve Morrill
Loyola Blakefield College Prep School (Towson, Md.)

AFA'S STELLARXPLORERS PROGRAM

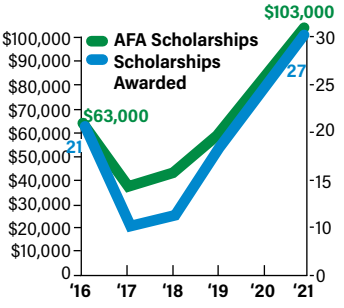
StellarXplorers is a challenging, space system design competition involving all aspects of system development and operation with a spacecraft and payload focus.



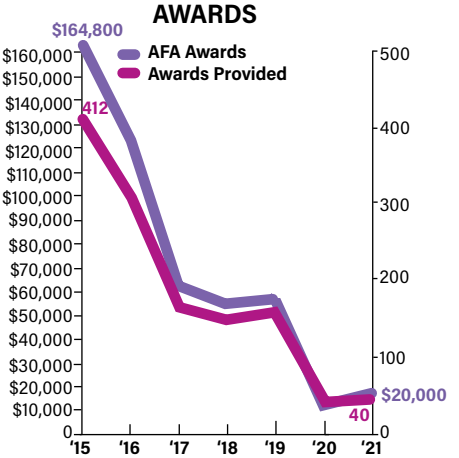
Scholarships

AFA awards **scholarships,** to aspiring college students backed by funds from generous organizations and individuals. AFA also funds **Pitsenbarger** awards for Airmen who complete their associate degree through the Community College of the Air Force and intend to pursue a bachelor's degree.

AFA SCHOLARSHIPS



PITSENBARGER AWARDS



National Aerospace Awards

H.H. ARNOLD AWARD

Named for the World War II leader of the Army Air Forces, the H.H. Arnold Award has been presented annually in recognition of the most outstanding contributions in the field of aerospace activity. Since 1986, it has been AFA's highest honor to a member of the armed forces in the field of national defense.

Year	Award Recipient(s)
1948	W. Stuart Symington, Secretary of the Air Force
1949	Maj. Gen. William H. Tunner and the men of the Berlin Airlift
1950	Airmen of the United Nations in the Far East
1951	Gen. Curtis E. LeMay and the personnel of Strategic Air Command
1952	Sen. Lyndon B. Johnson and Sen. Joseph C. O'Mahoney
1953	Gen. Hoyt S. Vandenberg, USAF (Ret.), former Air Force Chief of Staff
1954	John Foster Dulles, Secretary of State
1955	Gen. Nathan F. Twining, Chief of Staff, USAF
1956	Sen. W. Stuart Symington
1957	Edward P. Curtis, special assistant to the President
1958	Maj. Gen. Bernard A. Schriever, Cmdr., Ballistic Missile Div., ARDC
1959	Gen. Thomas S. Power, CINC, SAC
1960	Gen. Thomas D. White, Chief of Staff, USAF
1961	Lyle S. Garlock, Assistant SECAF
1962	A. C. Dickieson and John R. Pierce, Bell Telephone Laboratories
1963	The 363rd Tactical Recon. Wing and the 4080th Strategic Wing
1964	Gen. Curtis E. LeMay, Chief of Staff, USAF
1965	The 2nd Air Division, PACAF
1966	The 8th, 12th, 355th, 366th, and 388th Tactical Fighter Wings and the 432nd and 460th TRWs
1967	Gen. William W. Momyer, Cmdr., 7th Air Force, PACAF
1968	Col. Frank Borman, USAF; Capt. James Lovell, USN; and Lt. Col. William Anders, USAF, Apollo 8 crew
1969	(No presentation)
1970	Apollo 11 team (J. L. Atwood; Lt. Gen. S. C. Phillips, USAF; and astronauts Neil Armstrong and USAF Cols. Buzz Aldrin and Michael Collins)
1971	John S. Foster Jr., Dir. of Defense Research and Engineering
1972	Air units of the allied forces in Southeast Asia (Air Force, Navy, Army, Marine Corps, and the Vietnamese Air Force)
1973	Gen. John D. Ryan, USAF (Ret.), former Chief of Staff
1974	Gen. George S. Brown, USAF, Chm., Joint Chiefs of Staff
1975	James R. Schlesinger, Secretary of Defense
1976	Sen. Barry M. Goldwater
1977	Sen. Howard W. Cannon
1978	Gen. Alexander M. Haig Jr., USA, Supreme Allied Commander, Europe
1979	Sen. John C. Stennis
1980	Gen. Richard H. Ellis, USAF, CINC, SAC
1981	Gen. David C. Jones, USAF, Chm., Joint Chiefs of Staff
1982	Gen. Lew Allen Jr., USAF (Ret.), former Chief of Staff
1983	Ronald W. Reagan, President of the United States
1984	The President's Commission on Strategic Forces (Scowcroft Commission)
1985	Gen. Bernard W. Rogers, USA, SACEUR
1986	Gen. Charles A. Gabriel, USAF (Ret.), former Air Force Chief of Staff
1987	Adm. William J. Crowe Jr., USN, Chm., Joint Chiefs of Staff
1988	Men and women of the Ground-Launched Cruise Missile team
1989	Gen. Larry D. Welch, Chief of Staff, USAF
1990	Gen. John T. Chain, CINC, SAC
1991	Lt. Gen. Charles A. Horner, Cmdr., CENTCOM Air Forces and 9th Air Force
1992	Gen. Colin L. Powell, USA, Chm., Joint Chiefs of Staff
1993	Gen. Merrill A. McPeak, Chief of Staff, USAF
1994	Gen. John Michael Loh, Cmdr., Air Combat Command
1995	World War II Army Air Forces veterans
1996	Gen. Ronald R. Fogleman, Chief of Staff, USAF
1997	Men and women of the United States Air Force
1998	Gen. Richard E. Hawley, Cmdr., ACC
1999	Lt. Gen. Michael C. Short, Cmdr., Allied Air Forces Southern Europe
2000	Gen. Michael E. Ryan, Chief of Staff, USAF
2001	Gen. Joseph W. Ralston, CINC, EUCOM
2002	Gen. Richard B. Myers, USAF, Chm., Joint Chiefs of Staff
2003	Lt. Gen. T. Michael Moseley, Cmdr., air component, CENTCOM, and 9th Air Force
2004	Gen. John P. Jumper, Chief of Staff, USAF
2005	Gen. Gregory S. Martin, USAF (Ret.), former Cmdr., AFMC
2006	Gen. Lance W. Lord, USAF (Ret.), former Cmdr., AFSPC
2007	Gen. Ronald E. Keys, Cmdr., ACC
2008	Gen. Bruce Carlson, Cmdr., AFMC
2009	Gen. John D. W. Corley, Cmdr., ACC
2010	Lt. Gen. David A. Deptula, USAF Deputy Chief of Staff, ISR
2011	Gen. Duncan J. McNabb, Cmdr., TRANSCOM
2012	Gen. Norton A. Schwartz, USAF (Ret.), former Chief of Staff
2013	Gen. Douglas M. Fraser, USAF (Ret.), former Cmdr., SOUTHCOM
2014	Gen. C. Robert Kehler, USAF (Ret.), former Cmdr., STRATCOM
2015	Gen. Janet C. Wolfenbarger, USAF (Ret.), former Cmdr., AFMC
2016	Gen. Mark A. Welsh III, USAF (Ret.), former Chief of Staff
2017	Lt. Gen. Christopher C. Bogdan, USAF (Ret.), former PEO, F-35 Prgm
2018	Gen. Herbert J. Carlisle, USAF (Ret.), former Cmdr., AFMC
2019	Gen. Ellen M. Pawlikowski, USAF (Ret.), former Cmdr., AFMC
2020	Gen. David L. Goldfein, USAF (Ret.), former Chief of Staff, USAF
2021	Gen. John W. "Jay," Raymond, USSF, Chief of Space Operations

Mike Tsukamoto/staff

Gen. John Raymond, USSF Chief of Space Operations, accepts the 2021 H.H. Arnold Award from AFA Chairman of the Board Gerald Murray at AFA's 75th Anniversary & USAF Birthday Celebration.

W. STUART SYMINGTON AWARD

AFA's highest honor to a civilian in the field of national security, the award is named for the first Secretary of the Air Force.

Year	Award Recipient(s)
1986	Caspar W. Weinberger, Secretary of Defense
1987	Edward C. Aldridge Jr., Secretary of the Air Force
1988	George P. Schultz, Secretary of State
1989	Ronald W. Reagan, former President of the United States
1990	John J. Welch, Asst. SECAF (Acquisition)
1991	George Bush, President of the United States
1992	Donald B. Rice, SECAF
1993	Sen. John McCain (R-Ariz.)
1994	Rep. Ike Skelton (D-Mo.)
1995	Sheila E. Widnall, SECAF
1996	Sen. Ted Stevens (R-Alaska)
1997	William Perry, former SECDEF
1998	Rep. Saxby Chambliss (R-Ga.) and Rep. Norman D. Dicks (D-Wash.)
1999	F. Whitten Peters, SECAF
2000	Rep. Floyd Spence (R-S.C.)
2001	Sen. Michael Enzi (R-Wyo.) and Rep. Cliff Stearns (R-Fla.)
2002	Rep. James V. Hansen (R-Utah)
2003	James G. Roche, SECAF
2004	Peter B. Teets, Undersecretary of the Air Force
2005	Rep. Duncan Hunter (R-Calif.)
2007	Michael W. Wynne, SECAF
2008	Gen. Barry R. McCaffrey, USA (Ret.)
2009	Sen. Orrin G. Hatch (R-Utah)
2010	John J. Hamre, Center for Strategic & International Studies
2011	Rep. C. W. "Bill" Young (R-Fla.)
2012	Gen. James L. Jones, USMC (Ret.)
2013	Michael B. Donley, SECAF
2014	Ashton B. Carter, former Deputy SECDEF
2015	William A. LaPlante, Asst. SECAF (Acquisition)
2016	Jamie M. Morin, Director, Cost Assessment & Prgm Evaluation
2017	Lisa S. Disbrow, Undersecretary of the Air Force
2018	Deborah Lee James, former SECAF
2019	Heather Wilson, former SECAF
2020	Will Roper, Asst. SECAF (AT&L)
2021	Barbara Barrett, former SECAF

JOHN R. ALISON AWARD

AFA's highest honor for industrial leadership.

Year	Award Recipient(s)
1992	Norman R. Augustine, Chairman, Martin Marietta
1993	Daniel M. Tellep, Chm. and CEO, Lockheed
1994	Kent Kresa, CEO, Northrop Grumman
1995	C. Michael Armstrong, Chm. and CEO, Hughes Aircraft
1996	Harry Stonecipher, Pres. and CEO, McDonnell Douglas
1997	Dennis J. Picard, Chm. and CEO, Raytheon
1998	Philip M. Condit, Chm. and CEO, Boeing
1999	Sam B. Williams, Chm. and CEO, Williams International
2000	Simon Ramo and Dean E. Wooldridge, missile pioneers
2001	George David, Chm. and CEO, United Technologies
2002	Sydney Gillibrand, Chm., AMEC; and Jerry Morgensen, Pres. and CEO, Hensel Phelps Construction
2003	Joint Direct Attack Munition Industry Team, Boeing
2004	Thomas J. Cassidy Jr., Pres. and CEO, General Atomics Aeronautical Systems
2005	Richard Branson, Chm., Virgin Atlantic Airways and Virgin Galactic
2006	Ronald D. Sugar, Chm. and CEO, Northrop Grumman
2007	Boeing and Lockheed Martin
2008	Bell Boeing CV-22 Team, Bell Helicopter Textron, and Boeing
2009	General Atomics Aeronautical Systems Inc.
2010	Raytheon
2011	United Launch Alliance
2012	Boeing
2013	X-51A WaveRider Program, Boeing, Aerojet Rocketdyne, and Air Force Research Laboratory
2014	C-17 Globemaster III, Boeing
2015	F-22 Raptor, Lockheed Martin
2016	SpaceX
2017	Northrop Grumman
2018	Skunk Works, Lockheed Martin
2019	Draken International
2020	Marilyn Hewson
2021	Tory Bruno, CEO, United Launch Alliance

AFA LIFETIME ACHIEVEMENT AWARD

The award recognizes a lifetime of work in the advancement of aerospace.

Year	Award Recipient(s)
2003	Maj. Gen. John R. Alison, USAF (Ret.); Sen. John H. Glenn Jr.; Maj. Gen. Jeanne M. Holm, USAF (Ret.); Col. Charles E. McGee, USAF (Ret.); Gen. Bernard A. Schriever, USAF (Ret.)
2004	Gen. Russell E. Dougherty, USAF (Ret.); Florene Miller Watson
2005	Sen. Daniel K. Inouye; William J. Perry; Patty Wagstaff
2007	CMSAF Paul W. Airey, USAF (Ret.)
2008	Col. George E. Day, USAF (Ret.); Gen. David C. Jones, USAF (Ret.); Harold Brown
2009	Doolittle Raiders; Tuskegee Airmen; James R. Schlesinger
2010	Col. Walter J. Boyne, USAF (Ret.); Andrew W. Marshall; Gen. Lawrence A. Skantze, USAF (Ret.); Women Airforce Service Pilots
2011	Natalie W. Crawford; Lt. Gen. Thomas P. Stafford, USAF (Ret.); Gen. Larry D. Welch, USAF (Ret.); Heavy Bombardment Crews of WWII; Commando Sabre Operation-Call Sign Misty
2012	Gen. James P. McCarthy, USAF (Ret.); Vietnam War POWs; Berlin Airlift Aircrews; Korean War Airmen; Fighter Pilots of World War II
2013	Maj. Gen. Joe H. Engle, USAF (Ret.); US Rep. Sam Johnson; The Arlington Committee of the Air Force Officers' Wives' Club—"The Arlington Ladies"
2014	Brig. Gen. James A. McDivitt, USAF (Ret.); Civil Air Patrol—World War II veterans; American Fighter Aces
2015	R. A. "Bob" Hoover; Eugene F. "Gene" Kranz; Gen. Michael V. Hayden, USAF (Ret.)
2016	Maj. Gen. Claude M. Bolton Jr., USAF (Ret.); Lt. Col. John T. Correll, USAF (Ret.); Gen. Charles A. Horner, USAF (Ret.); Lt. Gen. James M. Keck, USAF (Ret.); Gen. Richard B. Myers, USAF (Ret.)
2017	Gen. Ronald R. Fogleman, USAF (Ret.); Col. Clarence E. "Bud" Anderson, USAF (Ret.); Elinor Otto; Lafayette Escadrille Memorial Foundation
2018	Maj. Gen. Alfred K. Flowers, USAF (Ret.); Dan Friedkin; Air Force Scientific Advisory Board; Air Force Enlisted Village; Air Force Aid Society
2019	Gen. John A. Shaud, USAF (Ret.); Gen. T. Michael Moseley, USAF (Ret.); Dr. Benjamin Lambeth
2020	Gen. Lloyd "Fig" Newton, USAF (Ret.); Gen. John M. Loh, USAF (Ret.); Maj. Gen. Michael Collins, USAF (Ret.)
2021	CMSAF James M. McCoy, USAF (Ret.)

AFA CHAIRMAN'S AEROSPACE EDUCATION ACHIEVEMENT AWARD

For long-term commitment to aerospace education, making a significant impact nationwide.

Year	Award Recipient(s)
2009	ExxonMobil Foundation
2010	*USA Today*
2011	The National Science Foundation
2012	The Military Channel
2013	The Civil Air Patrol Aerospace Education Program
2014	Department of Defense STARBASE Program
2015	Northrop Grumman Foundation
2016	Harry Talbot
2017	Analytical Graphics, Inc.
2018	Project Lead the Way
2019	Air Force Junior Reserve Officer Training Corps.
2020	Bernard K. "Bernie" Skoch
2021	The Mitchell Institute for Aerospace Studies

AFA Aerospace Awards

David C. Schilling Award
Most outstanding contribution in the field of flight
67th Special Operations Squadron, RAF Mildenhall, U.K.

Theodore von Karman Award
Most outstanding contribution in the field of science and engineering
Office of the Command Surgeon, HQ AMC, Scott AFB, Ill.

Gill Robb Wilson Award
Most outstanding contribution in the field of arts and letters
Dr. Benjamin Lambeth

Hoyt S. Vandenberg Award
Most outstanding contribution in the field of aerospace education
Brig. Gen. Bernard Skoch, USAF (Ret.)

Thomas P. Gerrity Award
Most outstanding contribution in the field of systems and logistics
Lt. Col. Jose Fiol, Spangdahlem AB, Germany

Lieutenant General Claire Lee Chennault Award
For outstanding aerial warfare tactician(s) from ACC, PACAF, USAFE, ANG, and AFRC
Maj. Matthew Zimmer, Shaw AFB, S.C.

General Larry D. Welch Award
- **Officer**

Most significant impact by an individual on the overall operations, safety, security, and effectiveness of the Air Force nuclear mission
Maj. Stephen Jiminez, Kirtland AFB, N.M.

- **Enlisted**

Most significant impact by an individual on the overall operations, safety, security, and effectiveness of the Air Force nuclear mission
MSgt. Willie Ware, Hill AFB, Utah

- **Civilian**

Most significant impact by an individual on the overall operations, safety, security, and effectiveness of the Air Force nuclear mission
Jacob Copley, Wright-Patterson AFB, Ohio

General George C. Kenney Award
Most significant contribution by an individual or team in the area of lessons learned
706th Surveillance and Analysis Team, Patrick AFB, Fla.

Joan Orr Spouse of the Year Award
For civilian spouses of military members for their significant contributions to the United States Air Force
Mary Foster, Kadena AB, Japan

Chief Master Sergeant of the Air Force Thomas N. Barnes Award
Most outstanding aircraft crew chief in the United States Air Force
SSgt. Juan Cervantes, RAF Mildenhall, U.K.

Crew and Team Awards

Lt. Gen. Howard W. Leaf Award
Best test team
F-22 Combined Test Force, Edwards AFB, Calif.

Lt. Gen. William H. Tunner Award
Best airlift crew
Crew of SHIVA 56, Cannon AFB, N.M.

Brig. Gen. Ross G. Hoyt Award
Best air refueling crew
Crew of TORA 41, Kadena AB, Japan

Gen. John P. Jumper Award
Best remotely piloted aircraft crew in USAF
Pilot: Capt. Nicholous Bank, Cannon AFB, N.M.
Sensor Operator: TSgt. Aaron Fagerwick, North Dakota National Guard
Mission Intelligence Coordinator: 1st Lt. Steven Collin, Creech AFB, Nev.

Gen. Curtis E. LeMay Award
Best bomber aircrew
HYPER 31 Flight, 37th Bomb Squadron, Ellsworth AFB, S.D.

Airborne Battle Management Crew of the Year Award
Outstanding aircrew's battle management contribution
Crew of PYTHON 91, Kadena AB, Japan

Gen. Thomas S. Power Award
Best missile combat crew
1st Lt. Christian Heath & 1st Lt. Juan Navarro, F.E. Warren AFB, Wyo.

Best Space Operations Crew
16th Expeditionary Space Control Flight, Al Udeid AB, Qatar

BAVA Humanitarian Mission of the Year Award
Most outstanding humanitarian mission
Crew of Reach 456, JB Charleston, S.C.

International Affairs Excellence Award
Officer - Maj. Anthony Bowman
Enlisted - TSgt. James Garcia Arvelo
Senior Civilian - Christal Ann Simanski
Junior Civilian - John Harrington

General Atomics RPA Trophy
89th Attack Squadron, Ellsworth AFB, S.D.

Citations of Honor

Recipients and achievements

11th Special Operations Intelligence Squadron
The 11th Special Operations Intelligence Squadron conducted 89,000 hours of ISR supporting multiple special operations task forces.

379th Expeditionary Maintenance Group
The 379th Expeditionary Maintenance Group utilized the talents of 4,827 Total Force Airmen to maintain the airworthiness of 107 combined aircraft and generate 6,216 combat sorties.

Hurricane Hunters
The 53rd Weather Reconnaissance Squadron flew 146 missions for a total of 1,364 flight hours, making 2020 the third-busiest season in squadron history.

Professional, Civilian, Education, Management, and Environmental Awards

AFROTC Cadet of the Year
Cadet Andrew Yang, Embry-Riddle Aeronautical University

CAP Aerospace Education Cadet of the Year
Cadet Rylee Schmuck, Riverside City Cadet Squadron, Ind.

Paul W. Myers Award for Physicians
Maj. Sarah Avila, Beale AFB, Calif.

Juanita Redmond Award for Nursing
Capt. Madalyn Owermohle, Spangdahlem AB, Germany

Stuart R. Reichart Award for Lawyers
Col. James Kennedy III, Ramstein AB, Germany

Verne Orr Award for Effective Utilization of Human Resources
460th Space Wing, Buckley SFB, Colo.

Civilian Senior Manager of the Year
Mary Lou Robinson, Kirtland AFB, N.M.

Civilian Program Manager of the Year*
Patrick Larson, Ramstein AB, Germany

Civilian Program Specialist of the Year*
Nicole Bundy, Nellis AFB, Nev.

Civilian Wage Employee of the Year*
Dr. James Steel, USAFA, Colo.

Lisa Disbrow Outstanding Civilian Award
Dr. James Steel, USAFA, Colo.

Gen. Edwin W. Rawlings Award
- **Management***
Michael Jago, Columbus AFB, Mo.

* Presented at recipient's location.

Air Reserve Component Awards

AIR NATIONAL GUARD AWARDS AND RECIPIENTS

Earl T. Ricks Award
Outstanding ANG airmanship
Jeremiah Brewer, JB Elmendorf-Richardson, Alaska

CMSgt. Dick Red Award
Best ANG maintainer
SMSgt. Gregory Walters, JB Elmendorf-Richardson, Alaska

Outstanding ANG Unit
Best ANG unit airmanship
108th Operations Group, New Jersey ANG

George Bush Award
Outstanding contributions to the Total Force mission
SSgt. Andrew McConnell, Pennsylvania ANG

AIR FORCE RESERVE COMMAND AWARD AND RECIPIENT

AFRC Unit Award
Best AFRC wing of the year
379th Space Range Squadron, Schriever AFB, Colo.

Mike Tsukamoto/staff

Gabrielle Kearney accepts the 2021 AFA Member of the Year Award from AFA Chairman of the Board Gerald Murray, right, and AFA Vice Chairman of the Board Jim Simmons during the AFA Field Awards Dinner.

AFA Field Awards

AFA MEMBER OF THE YEAR AWARD

State names refer to recipient's home state at the time of the award.

Year	Award Recipient(s)
1953	Julian B. Rosenthal (N.Y.)
1954	George A. Anderl (Ill.)
1955	Arthur C. Storz (Neb.)
1956	Thos. F. Stack (Calif.)
1957	George D. Hardy (Md.)
1958	Jack B. Gross (Pa.)
1959	Carl J. Long (Pa.)
1960	O. Donald Olson (Colo.)
1961	Robert P. Stewart (Utah)
1962	(No presentation)
1963	N. W. DeBerardinis (La.) and Joe L. Shosid (Texas)
1964	Maxwell A. Kriendler (N.Y.)
1965	Milton Caniff (N.Y.)
1966	William W. Spruance (Del.)
1967	Sam E. Keith Jr. (Texas)
1968	Marjorie O. Hunt (Mich.)
1969	(No presentation)
1970	Lester C. Curl (Fla.)
1971	Paul W. Gaillard (Neb.)
1972	J. Raymond Bell (N.Y.) and Martin H. Harris (Fla.)
1973	Joe Higgins (Calif.)
1974	Howard T. Markey (D.C.)
1975	Martin M. Ostrow (Calif.)
1976	Victor R. Kregel (Texas)
1977	Edward A. Stearn (Calif.)
1978	William J. Demas (N.J.)
1979	Alexander C. Field Jr. (Ill.)
1980	David C. Noerr (Calif.)
1981	Daniel F. Callahan (Fla.)
1982	Thomas W. Anthony (Md.)
1983	Richard H. Becker (Ill.)
1984	Earl D. Clark Jr. (Kan.)
1985	George H. Chabbott (Del.) and Hugh L. Enyart (Ill.)
1985	George H. Chabbott (Del.) and Hugh L. Enyart (Ill.)
1986	John P. E. Kruse (N.J.)
1987	Jack K. Westbrook (Tenn.)
1988	Charles G. Durazo (Va.)
1989	Oliver R. Crawford (Texas)
1990	Cecil H. Hopper (Ohio)
1991	George M. Douglas (Colo.)
1992	Jack C. Price (Utah)
1993	Lt. Col. James G. Clark (D.C.)
1994	William A. Lafferty (Ariz.)
1995	William N. Webb (Okla.)
1996	Tommy G. Harrison (Fla.)
1997	James M. McCoy (Neb.)
1998	Ivan L. McKinney (La.)
1999	Jack H. Steed (Ga.)
2000	Mary Anne Thompson (Va.)
2001	Charles H. Church Jr. (Kan.)
2002	Thomas J. Kemp (Texas)
2003	W. Ron Goerges (Ohio)
2004	Doyle E. Larson (Minn.)
2005	Charles A. Nelson (S.D.)
2006	Craig E. Allen (Utah)
2007	William D. Croom Jr. (Texas)
2008	John J. Politi (Texas)
2009	David R. Cummock (Fla.)
2010	L. Boyd Anderson (Utah)
2011	Steven R. Lundgren (Alaska)
2012	S. Sanford Schlitt (Fla.)
2013	Tim Brock (Fla.)
2014	James W. Simons (N.D.)
2015	James R. Lauducci (Va.)
2016	David T. Buckwalter (Texas)
2017	James T. Hannam (Va.)
2018	Russell V. Lewey (Ala.)
2019	Susan Broderick Mallett (Ala.)
2020	Mark Tarpley (Okla.)
2021	Gabrielle "Gabbe" Kearney (Alaska)

GOLD LIFE MEMBER CARD

Awarded to members whose AFA record, production, and accomplishments on a national level have been outstanding over a period of years.

Name	Year	Card No.
Gill Robb Wilson	1957	1
Jimmy Doolittle	1959	2
Arthur C. Storz Sr.	1961	3
Julian B. Rosenthal	1962	4
Jack B. Gross	1964	5
George D. Hardy	1965	6
Jess Larson	1967	7
Robert W. Smart	1968	8
Martin M. Ostrow	1973	9
James H. Straubel	1980	10
Martin H. Harris	1988	11
Sam E. Keith Jr.	1990	12
Edward A. Stearn	1992	13
Dorothy L. Flanagan	1994	14
John O. Gray	1996	15
Jack C. Price	1997	16
Nathan H. Mazer	2002	17
John R. Alison	2004	18
Donald J. Harlin	2009	19
James M. McCoy	2013	20
George M. Douglas	2014	21
John A. Shaud	2016	22
Mary Anne Thompson	2018	23

DONALD W. STEELE SR. MEMORIAL AWARD

Air Force Association Chapter of the year.

Year	Award Recipient(s)
1953	San Francisco Chapter
1954	Santa Monica Area Chapter (Calif.)
1955	San Fernando Valley Chapter (Calif.)
1956	Utah State AFA
1957	H. H. Arnold Chapter (N.Y.)
1958	San Diego Chapter
1959	Cleveland Chapter
1960	San Diego Chapter
1961	Chico Chapter (Calif.)
1962	Fort Worth Chapter (Texas)
1963	Colin P. Kelly Chapter (N.Y.)
1964	Utah State AFA
1965	Idaho State AFA
1966	New York State AFA
1967	Utah State AFA
1968	Utah State AFA
1969	(No presentation)
1970	Georgia State AFA
1971	Middle Georgia Chapter
1972	Utah State AFA
1973	Langley Chapter (Va.)
1974	Texas State AFA
1975	Alamo Chapter (Texas) and San Bernardino Area Chapter (Calif.)
1976	Scott Memorial Chapter (Ill.)
1977	Thomas B. McGuire Jr. Chapter (N.J.)
1978	Thomas B. McGuire Jr. Chapter (N.J.)
1979	Brig. Gen. Robert F. Travis Chapter (Calif.)
1980	Central Oklahoma (Gerrity) Chapter
1981	Alamo Chapter (Texas)
1982	Chicagoland-O'Hare Chapter (Ill.)
1983	Charles A. Lindbergh Chapter (Conn.)
1984	Scott Memorial Chapter (Ill.) and Colorado Springs/Lance Sijan P. Chapter (Colo.)
1985	Cape Canaveral Chapter (Fla.)
1986	Charles A. Lindbergh Chapter (Conn.)
1987	Carl Vinson Memorial Chapter (Ga.)
1988	Gen. David C. Jones Chapter (N.D.)
1989	Thomas B. McGuire Jr. Chapter (N.J.)
1990	Gen. E. W. Rawlings Chapter (Minn.)
1991	Paul Revere Chapter (Mass.)
1992	Central Florida Chapter and Langley Chapter (Va.)
1993	Green Valley Chapter (Ariz.)
1994	Langley Chapter (Va.)
1995	Baton Rouge Chapter (La.)
1996	Montgomery Chapter (Ala.)
1997	Central Florida Chapter
1998	Ark-La-Tex Chapter (La.)
1999	Hurlburt Chapter (Fla.)
2000	Wright Memorial Chapter (Ohio)
2001	Lance P. Sijan Chapter (Colo.)
2002	Eglin Chapter (Fla.)
2003	Hurlburt Chapter (Fla.)
2004	Carl Vinson Memorial Chapter (Ga.)
2005	Central Florida Chapter
2006	Enid Chapter (Okla.)
2007	Central Oklahoma (Gerrity) Chapter
2008	Lance P. Sijan Chapter (Colo.)
2009	Paul Revere Chapter (Mass.)
2010	C. Farinha Gold Rush Chapter (Calif.)
2011	Lance P. Sijan Chapter (Colo.)
2012	Hurlburt Chapter (Fla.)
2013	Paul Revere Chapter (Mass.)
2014	D. W. Steele Sr. Memorial Chapter (Va.)
2015	Lance P. Sijan Chapter (Colo.)
2016	Paul Revere Chapter (Mass.)
2017	Enid Chapter (Okla.)
2018	Langley Chapter (Va.)
2019	Wright Memorial Chapter (Ohio)
2020	Mile High Chapter (Colo.)
2021	Paul Revere Chapter (Mass.)

Aerospace Education Excellence Award

Presented for excellence in aerospace education programming. To qualify, a chapter must have received the Aerospace Education Achievement Award this year.

Medium Chapter
Savannah Chapter, Ga.
President Edwood Hood

Extra Large Chapter
Eglin Chapter, Fla.
President Marian McBryde

Aerospace Education Achievement Award

Presented to chapters for outstanding achievement in aerospace education programming.

Ak-Sar-Ben Chapter, Neb.
President Chris Canada

Albuquerque Chapter, N.M.
President Frederick J. Harsany

Central Oklahoma Gerrity Chapter, Okla.
President Janelle Stafford

Cheyenne Cowboy Chapter, Wyo.
President Scott Fox

Eglin Chapter, Fla.
President Marian McBryde

Lance P. Sijan Chapter, Colo.
President Angelo Bryant

Langley Chapter, Va.
President Richard Shook

Lincoln Chapter, Neb.
President Kenneth Brownell

Martin H. Harris Chapter, Fla.
President Sharon Branch

Mel Harmon Chapter, Colo.
President Michael Sumida

Mile High Chapter, Colo.
President Cliff Klein

Montgomery Chapter, Ala.
President James Harris

Mount Clemens Chapter, Mich.
President Randy Whitmire

Northern Utah Chapter, Utah
President Scott Warren

Paul Revere Chapter, Mass.
President David DeNofrio

Robert E. Huyser Chapter, Colo.
President Michael Peterson

Roanoke Chapter, Va.
President Dwight Holland

Savannah Chapter, Ga.
President Edward Hood

Seidel Chapter, Texas
President Paul Hendricks

Space Coast Chapter, Fla.
President Dwyer Dennis

Tucson Chapter, Ariz.
President Walter Saeger

Ute-Rocky Mountain Chapter, Colo.
President Catherine Barker

Distinguished Sustained Aerospace Education Award

Presented to an individual AFA member whose record overwhelmingly demonstrates distinguished sustained service in any support of the educational mission of the Air Force Association over a period of years.

Mike Tsukamoto/staff

Richard "Dick" Bundy, second from right, receives the Distinguished Sustained Aerospace Education Award from AFA Vice Chairman of the Board Jim Simons, left, AFA Chairman of the Board Gerald Murray, and AFA Vice Chairman for Aerospace Education James Hannam during the AFA Field Awards Dinner on Sept. 18, 2021, at the Gaylord Convention Center in Maryland.

Outstanding State Organization

VIRGINIA

President Linda McMahon

Outstanding Chapters by Size

Small Chapter
Mel Harmon Chapter, Colo.
President Michael Sumida

Large Chapter
Northeast Texas Chapter, Texas
President Sandra Gage

Medium Chapter
Savannah Chapter, Ga.
President Edward Hood

Extra Large Chapter
Langley Chapter, Va.
President Richard Shook

Chairman's Citation

Awarded to those individual AFA members whose distinguished contribution to AFA in a specific field has improved and elevated the effectiveness of the Association in a national sense.

Linda Aldrich
Stu Carter
Mark Chapman
Paul Hendricks
Jeffrey James
John "Dallas" Kennedy
StellarExplorers Team
Randolph Whitmire

Arthur C. Storz Sr. Membership Award

Presented to that AFA chapter which produces the highest number of new members during the 12-month period ending June 20, 2021, as a percentage of total chapter membership as of June 30, 2021.

Ramstein Chapter, Germany
President Lt. Marc Granville

Mike Tsukamoto/staff

AFA Ramstien Chapter President Lt. Marc Granville, center, accepts the Arthur C. Storz Award for Medium Chapters, from AFA Vice Chairman of the Board Jim Simons and AFA Chairman of the Board Gerald Murray during the AFA Field Awards Dinner on Sept. 18, 2021, at the Gaylord Convention Center in Maryland.

Unit Exceptional Service Awards

Airmen and Family Programs
Charles A. Gabriel Chapter, Va.
President Mike Winters

Best Single Program
Gen. Bernard A. Schriever Chapter, Calif.
President Arnold Streland

Communications
Seidel Chapter, Texas
President Paul Hendricks

Community Partners
Fairbanks Midnight Sun Chapter, Alaska
President Alexandra Sloat

Community Relations
Martin H. Harris Chapter, Fla.
President Sharon Branch

Overall Programming
Paul Revere Chapter, Mass.
President David DeNofrio

Veterans Affairs
Paul Revere Chapter, Mass.
President David DeNofrio

AAS/SW Integration
Paul Revere Chapter, Mass.
President David DeNofrio

Jack Gross Award

Presented to the chapter in each size category with the highest number of new members as a percentage of chapter size at the beginning of the membership year. A minimum of 10 is required.

Small Chapter
MiG Alley Chapter, South Korea
President Jeremy Nickel

Medium Chapter
Ramstein Chapter, Germany
President Christopher Parente

Large Chapter
David D. Terry Jr. Chapter, Ariz.
President Jerry Reichenbach

Extra Large Chapter
Seidel Chapter, Texas
President Paul Hendricks

Chapter Size Larger Than 1,100
Langley Chapter, Va.
President Richard Shook

Special Recognition Awards

STATE GROWTH

This state has realized a growth in total membership from June 2020 to June 2021:

Alaska
Arizona
Arkansas
Colorado
Delaware
Florida
Georgia
Hawaii
Idaho
Illinois
Indiana
Kansas
Kentucky
Louisiana
Maryland
Massachusetts
Michigan
Minnesota
Mississippi
Missouri
Montana
Nebraska
Nevada
New Jersey
New Mexico
New York
North Carolina
North Dakota
Ohio
Oklahoma
Pennsylvania
South Carolina
South Dakota
Tennessee
Texas
Utah
Vermont
Virginia
Washington
West Virginia
Wisconsin
Wyoming

REGION GROWTH

This region has realized a growth in total membership from June 2020 to June 2021:

European Region
Far West Region
Florida Region
Great Lakes Region
Midwest Region
New England Region
North Central Region
Northeast Region
Northwest Region
Pacific Region
Rocky Mount Region
South Central Region
Southeast Region
Southwest Region
Texoma Region

CHAPTER GROWTH

These chapters have realized a growth in total membership from June 2020 to June 2021:

Abilene Chapter, Texas
Aggieland Chapter, Texas
Ak-Sar-Ben Chapter, Neb.
Alamo Chapter, Texas
Albany-Hudson Valley Chapter, N.Y.
Albuquerque Chapter, N.M.
Altoona Chapter, Pa.
Altus Chapter, Okla.
Ark-La-Tex Chapter, La.
Austin Chapter, Texas
Baltimore Chapter, Md.
Battle Creek Chapter, Mich.
BG Frederick W. Castle Chapter, N.J.
Big Sky Chapter, Mont.
Billy Mitchell Chapter, Wis.
Birmingham Chapter, Ala.
Bob Hope Chapter, Calif.
Bob Newman Cape Fear Chapter, N.C.
Bozeman Chapter, Mont.
Brig. Gen. Bill Spruance Chapter, Del.
Capt. Eddie Rickenbacker Memorial Chapter, Ohio
Carl Vinson Memorial Chapter, Ga.
Central Maryland Chapter, Md.
Central Oklahoma Gerrity Chapter, Okla.
Charlemagne Chapter, Germany
Charleston Chapter, S.C.
Cheyenne Cowboy Chapter, W.Y.
Chicagoland-O-Hare Chapter, Ill.
Chuck Yeager Chapter, W.V.
Columbia Palmetto Chapter, S.C.
Concho Chapter, Texas
Dacotah Chapter, S.D.
David D. Terry Jr. Chapter, Ariz.
David J. Price/Beale Chapter, Calif.
Del Rio Chapter, Texas
Delaware Galaxy Chapter, Del.
Denton Chapter, Texas
Dobbins Chapter, Ga.
Dolomiti Chapter, Italy
Donald W. Steele Sr. Memorial Chapter, Va.
Edward J. Monaghan Chapter, Ark.
Falcon Chapter, Fla.
Finger Lakes Chapter, N.Y.
Florida Highlands Chapter, Fla.
Florida West Coast Chapter, Fla.
Fort Dodge Chapter, Iowa
Frank Luke Chapter, Ariz.
Frank P. Lahm Chapter, Ohio
Gen. James R. McCarthy Chapter, Fla.
Gen. Bernard A. Schriever LA Chapter, Calif.
Gen. Bruce K. Holloway Chapter, Tenn.
Gen. Carl A. Spaatz Chapter, N.Y.
Gen. Charles L. Donnelly Jr. Chapter, Texas
Gen. David C. Jones Chapter, N.D.
Gen. Doolittle LA Area Chapter, Calif.
Gen. E. W. Rawlings Chapter, Minn.
Gen. H. H. Arnold Memorial Chapter, Tenn.
Gen. Joseph W. Ralston, Ohio
Gen. Robert E. Huyser Chapter, Colo.
Gen. Robert F. Travis Chapter, Calif.
Gen. Russell E. Dougherty, Ky.
Genesee Valley Chapter, N.Y.
Gold Coast Chapter, Fla.
Golden Triangle Chapter, Miss.
Greater Seattle Chapter, Wash.
Green Mountain Chapter, Vt.
Hangar One Chapter, N.J.
Harry S. Truman Chapter, Mo.
Hawaii Chapter, Hawaii
High Desert Chapter, Calif.
Highpoint Chapter, N.J.
Hurlburt Chapter, Fla.
Inland Empire Chapter, Wash.
Iron Gate Chapter, N.Y.
Joe-Walker-Mon Valley Chapter, Pa.
John C. Stennis Chapter, Miss.
Keystone Chapter, Japan
Lake Superior Northland Chapter, Mich.
Lance P Sijan Chapter, Colo.
Langley Chapter, Va.
Lawrence D. Bell Museum Chapter, Ind.
Lehigh Valley Chapter, Pa.
Lewis E. Lyle Chapter, Ariz.
Lexington Chapter, Ky.
Lindbergh/Sikorsky Chapter, Ct.
Llano Estacado Chapter, N.M.
Lloyd R. Leavitt Jr. Chapter, Mich.
Long Island Chapter, N.Y.
Maj. Gen. Edward R. Fry Chapter, Kan.
Maj Gen. Oris B. Johnson Chapter, La.
McChord Field Chapter, Wash.
Mercer County Chapter, N.J.
Meridian Chapter, Miss.
Miami-Homestead Chapter, Fla.
Mifflin County Chapter, Pa.
MiG Alley Chapter, Korea
Mile High Chapter, Colo.
Minuteman Chapter, Mass.
Montgomery Chapter, Ala.
Mount Clemens Chapter, Mich.
North Coast Chapter, Ohio
Northern Utah Chapter, Utah
Olmstead Chapter, Pa.
Otis Chapter, Mass.
P-47 Memorial Chapter, Ind.
Paul Revere Chapter, Mass.
Pioneer Valley Chapter, Mass.
Pope Chapter, N.C.
Prescott/Goldwater Chapter, Ariz.
Ramstein Chapter, Germany
Red River Valley Chapter, N.D.
Richard I. Bong Chapter, Minn.
Richmond Chapter, Va.
Roanoke Chapter, Va.
Robert H. Goddard Chapter, Calif.
Rushmore Chapter, S.D.
Sal Capriglione Chapter, N.J.
Salt Lake City Chapter, Utah
San Jacinto Chapter, Texas
Savannah Chapter, Ga.
Scott Berkeley Chapter, N.C.
Scott Memorial Chapter, Ill.
Seidel Chapter, Texas
Shooting Star Chapter, N.J.
Snake River Valley Chapter, Idaho
South Alabama Chapter, Ala.
South Georgia Chapter, Ga.
Southern Indiana Chapter, Ind.
Space Coast Chapter, Fla.
Spangdahlem Chapter, Germany
Spirit of St. Louis Chapter, Mo.
Stan Hryn Monterey Bay Chapter, Calif.
Steel Valley Chapter, Ohio
Strom Thurmond Chapter, S.C.
Swamp Fox Chapter, S.C.
Tarheel Chapter, N.C.
Tennessee Ernie Ford Chapter, Calif.
The Red Tail Memorial Chapter, Fla.
Thomas B. McGuire Jr. Chapter, N.J.
Thomas W. Anthony Chapter, Md.
Thunderbird Chapter, Nev.
Tokyo Chapter, Japan
Total Force Chapter, Pa.
Tucson Chapter, Ariz.
Tulsa Chapter, Okla.
Tyndall Chapter, Fla.
United Kingdom Chapter, U.K.
Ute-Rocky Mountain Chapter, Utah
White Sands Chapter, N.M.
Whiteman Chapter, Mo.
William J. 'Pete' Knight Chapter, Calif.
Wright Memorial Chapter, Ohio
York-Lancaster Chapter, Pa.

AFA Northeast Texas Chapter 416 President Master Sgt. Sandra Gage, center, accepts the AFA Community Partner Gold Award.

Community Partner Membership Awards

GOLD AWARD

Presented to chapters whose Community Partners represent at least six percent of overall chapter membership, with a minimum number of Community Partners. The minimum number is determined by chapter size.

Cheyenne Cowboy Chapter, Wyo.
Fairbanks Midnight Sun Chapter, Alaska
Fort Wayne Chapter, Ind.
Lincoln Chapter, Neb.
Mel Harmon Chapter, Colo.
Meridian Chapter, Miss.
Northeast Texas Chapter, Texas
Swamp Fox Chapter, S.C.
Ute-Rocky Mountain Chapter, Utah

ACHIEVEMENT AWARD

Presented in the field to chapters whose Community Partners represent at least three percent of overall chapter membership, with a minimum number of Community Partners. The minimum number is determined by chapter size.

MiG Alley Chapter, Korea
Tennessee Valley Chapter, Ala.
Golden Triangle Chapter, Miss.
Gen. David C. Jones Chapter, N.D.
David D. Terry Chapter, Ariz.
Hurlburt Chapter, Fla.
United Kingdom Chapter, U.K.

Individual Awards by Region

Presented for outstanding service.

Medal of Merit

Awarded for exceptional services in local, regional, or national fields and shall denote great initiative on the part of the recipient for specific achievements.

Exceptional Service Award

Presented to those individual AFA members who have performed exceptional services for AFA in local, regional, or national fields.

Central East

Medal of Merit
Jazzema Griffin
Tim Tanbonliong
Stephen Yelbert

Exceptional Service Award
Sonora Vazquez
Sonya Yelbert

Far West

Exceptional Service Award
Sareta Gladson
Arnie Streland

Florida

Medal of Merit
Jordan Arcturus
Edward McAllister

Exceptional Service Award
Colleen Smith

Great Lakes

Medal of Merit
Jeff Addison
Dave Babcock
Christopher Campbell
Robert Shofner

Exceptional Service Award
Mark Roland

Midwest

Medal of Merit
David Skilton

New England

Medal of Merit
Peter Schnorr

Exceptional Service Award
Brandon McCarty

North Central

Medal of Merit
Jeff Johnson

Northeast

Medal of Merit
Tom Baker
James Cain
Howard Leach
Dave Ribb
Gerald Still

Exceptional Service Award
Patrick Kon
Maxine Rauch

Northwest

Medal of Merit
Richard Wendt

Rocky Mountain

Medal of Merit
Burnett Deyerle
Henry Eichman
Scott Warren

Exceptional Service Award
Mary Ann Blair
Carolyn Ritchard
Catharine "Caty" Rozema

South Central

Medal of Merit
Quentin Richardson
Lynn Robinson
Anthony Todd

Exceptional Service Award
Betty McCoy

Southeast

Medal of Merit
Tiwanda Griffin Greer

Exceptional Service Award
Sam Grizzle
John Lasley

Southwest

Medal of Merit
Eric Jameson
Anthony Juan
Mike Morgan

Exceptional Service Award
William Goodall
Vickie Jo Ryder

Texoma

Medal of Merit
Sandra Gage
Jennifer Florence
Marvin Kobza
Pat Nugent
Nicole Powell

Exceptional Service Award
Charles Meador
Fletcher Sharpe

AFA Chapter Members by Region, State, and Chapter

These figures indicate the number of affiliated members as of June 2021. Listed below the name of each region is the Region President.

CENTRAL EAST REGION 10,208
Linda McMahon

Delaware 366
Brig. Gen. Bill Spruance . . . 101
Delaware Galaxy . . . 265

District of Columbia 1,065
Nation's Capital . . . 1,065

Maryland 1,953
Baltimore* . . . 728
Central Maryland . . . 446
Thomas W. Anthony . . . 779

Virginia 6,611
Donald W. Steele Sr. Memorial . . . 3,128
Gen. Charles A. Gabriel . . . 1,281
Langley . . . 1,364
Richmond . . . 561
Roanoke . . . 277

West Virginia 213
Chuck Yeager . . . 213

FAR WEST REGION 6,846
Wayne R. Kauffman

California 6,197
Bob Hope . . . 415
Brig. Gen. Robert F. Travis . . . 416
C. Farinha Gold Rush . . . 753
David J. Price/Beale . . . 238
Fresno* . . . 371
Gen. B. A. Schriever Los Angeles . . . 565
General Doolittle Los Angeles Area* . . . 675
Golden Gate* . . . 359
High Desert . . . 107
Orange County/Gen. Curtis E. LeMay . . . 393
Palm Springs . . . 239
Robert H. Goddard . . . 314
San Diego . . . 534
Stan Hryn Monterey Bay . . . 132
Tennessee Ernie Ford . . . 363
William J. "Pete" Knight . . . 269

Hawaii 703
Hawaii* . . . 703

FLORIDA REGION 7,053
Todd Freece

Florida 7,036
Gen. James R. McCarthy . . . 249
Space Coast . . . 812
Col. H. M. "Bud" West . . . 166
Eglin . . . 895
Falcon . . . 430
Florida Highlands . . . 229
Florida West Coast . . . 269
Gold Coast . . . 477
Hurlburt . . . 690
Martin H. Harris . . . 848
Miami-Homestead . . . 305
Red Tail Memorial . . . 419
Tyndall . . . 302
Waterman-Twining . . . 962

GREAT LAKES REGION 6,074
Craig Spanberg

Indiana 1,025
Central Indiana . . . 303
Fort Wayne . . . 136
Grissom Memorial . . . 160
Lawrence D. Bell Museum . . . 190
P-47 Memorial Chapter . . . 113
Southern Indiana . . . 123

Kentucky 623
Gen. Russell E. Dougherty . . . 367
Lexington . . . 256

Michigan 1,284
Battle Creek . . . 9
Lake Superior Northland . . . 110
Lloyd R. Leavitt Jr. . . . 262
Mount Clemens . . . 903

Ohio 3,142
Capt. Eddie Rickenbacker Memorial* . . . 426
Frank P. Lahm . . . 325
Gen. Joseph W. Ralston . . . 434
North Coast* . . . 159
Steel Valley . . . 103
Wright Memorial* . . . 1,695

MIDWEST REGION 5,099
Chris Canada

Illinois 1,842
Chicagoland-O'Hare . . . 824
Scott Memorial . . . 1,018

Iowa 371
Fort Dodge . . . 26
Gen. Charles A. Horner . . . 146
Northeast Iowa . . . 159
Richard D. Kisling . . . 40

Kansas 491
Lt. Erwin R. Bleckley . . . 302
Maj. Gen. Edward R. Fry . . . 189

Missouri 1,320
Harry S. Truman . . . 452
Spirit of St. Louis . . . 491
Whiteman . . . 377

Nebraska 1,075
Ak-Sar-Ben . . . 881
Lincoln . . . 194

NEW ENGLAND REGION 2,650
Kevin M. Grady

Connecticut 492
Flying Yankees/Gen. George C. Kenney . . . 288
Lindbergh/Sikorsky . . . 204

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Minuteman . . . 258
Otis . . . 172
Paul Revere . . . 613
Pioneer Valley . . . 229

New Hampshire 540
Brig. Gen. Harrison R. Thyng . . . 540

Rhode Island 160
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Vermont 175
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NORTH CENTRAL REGION 2,419
Dan Murphy

Minnesota 789
Gen. E. W. Rawlings . . . 648
Richard I. Bong . . . 141

Montana 271
Big Sky . . . 198
Bozeman . . . 73

North Dakota 318
Gen. David C. Jones . . . 167
Happy Hooligan . . . 67
Red River Valley . . . 84

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Wisconsin 681
Billy Mitchell . . . 681

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Patrick Kon

New Jersey 1,068
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Mercer County . . . 86
Sal Capriglione . . . 221
Shooting Star . . . 147
Thomas B. McGuire Jr. . . . 263

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Albany-Hudson Valley* . . . 290
Finger Lakes . . . 240
Gen. Carl A. Spaatz . . . 118
Genesee Valley . . . 161
Iron Gate . . . 214
L. D. Bell-Niagara Frontier . . . 228
Long Island . . . 426
Pride of the Adirondacks . . . 91

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Joe Walker-Mon Valley . . . 174
Lehigh Valley . . . 145
Liberty Bell . . . 415
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Olmsted . . . 216
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Alaska 473
Edward J. Monaghan . . . 369
Fairbanks Midnight Sun . . . 104

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Snake River Valley . . . 395

Oregon 676
Bill Harris . . . 182
Columbia Gorge* . . . 494

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Greater Seattle . . . 678
Inland Empire . . . 589
McChord Field . . . 944

ROCKY MOUNTAIN REGION 4,597
Linda Aldrich

Colorado 3,372
Gen. Robert E. Huyser . . . 116
Lance P. Sijan . . . 1,835
Mel Harmon . . . 101
Mile High . . . 1,320

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Gen. Bruce K. Holloway . . . 601
H. H. Arnold Memorial . . . 117
Maj. Gen. Dan F. Callahan . . . 357

SOUTHEAST REGION 6,155
Mike Trotter

Georgia 2,600
Carl Vinson Memorial . . . 769
Dobbins . . . 1,319
Savannah . . . 311
South Georgia . . . 201

North Carolina 2,022
Blue Ridge . . . 356
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Kitty Hawk . . . 46
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Janelle Stafford

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Austin . . . 899
Concho . . . 188
Del Rio . . . 114
Denton . . . 295
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*These chapters were chartered before Dec. 31, 1948, and are considered original charter chapters. Ohio's North Coast Chapter was formerly the Cleveland Chapter; Oregon's Columbia Gorge Chapter was formerly the Portland Chapter.

By John T. Correll

SURVIVAL AT LIMA SITE 85

Etchberger's actions made it possible for his companions to get off the mountain top alive.

The mountain called Phou Phai Thi rises 5,600 feet out of the rugged terrain of northeastern Laos, 15 miles from the North Vietnam border. The drop to the valley below is nearly vertical on three sides.

In March 1968, the surrounding area was a stronghold for the Pathet Lao and the North Vietnamese, but there were 19 Americans in a rough encampment on the mountain top, which was relatively level.

Their mission was complicated, and their situation even more so. They operated a transmitter that aimed a line-of-sight radar beam straight into North Vietnam, enabling the all-weather bombing of targets around Hanoi by US aircraft. The radar guided the bombers to precise coordinates in the sky where ordnance was released with great accuracy.

The emplacement was known as Lima Site 85, after an adjacent airstrip built by the CIA's proprietary airline, Air America, and which was the only way of access for people and supplies. The eastern slope of the mountain was fortified and guarded by a force of about 1,000 troops, mostly Hmong irregulars.

The neutrality of Laos was a fiction, thinly disguised. The North Vietnamese operated in strength in the vicinity of Phou Phai Thi. US airpower dispersed troop concentrations if they got too close.

The radar operators at Lima Site 85 were volunteers with long experience in the U.S. Air Force. They deployed by teams on two-week rotational tours from Udorn Air Base in Thailand. To enable the Laotian government and the US ambassador to deny an Air Force presence, they had been "sheep-dipped," a clandestine procedure that converted them officially but temporarily to civilian employees of a private contractor. When the operation was over, they would be welcomed back into the Air Force.

In February, U.S. intelligence learned of an impending attack and warned that security was uncertain. The Air Force, regarding the radar bombing capability as essential, said the site "would not be evacuated until capture appeared imminent."

The U.S. ambassador agreed reluctantly to the issue of a limited number of M-16 rifles to the Airmen. They had no real training with the weapons, only a general familiarization. When the attack came on the night of March 10, among those on duty was CMSgt. Richard L. Etchberger, 35, crew chief of one of the radar crews.

The assault on Phou Phai Thi opened at 6 p.m. with a mortar, artillery, and rocket barrage, but the enemy did not seriously challenge the defended eastern slope. Instead, a North Vietnamese sapper team that had trained for months for the mission climbed the sheer western side of the mountain, a feat that U.S. officials assumed was impossible.

The sappers reached the summit undetected and moved on the radar site about 3 a.m. Several of the Americans were killed and others wounded in the small arms exchange that followed. Etchberger, untouched by enemy fire, led the defense. With bullets whizzing around his head, he drove the sappers back and single-handedly held them at bay until help arrived at daybreak.

USAF/Courtesy

Chief Master Sgt. Richard "Dick" Etchberger, an Air Force senior NCO who was killed after saving the lives of some of his crew during a fierce battle at a radar site in Laos.

Etchberger helped the wounded into the rescue helicopter but he was getting aboard himself, he was struck by an enemy round. He died a few minutes later. Twelve of the Americans on the mountain had been killed, but seven others were airlifted to safety. Thirty of the Hmong defenders were killed as well.

The losses were all the more tragic because three weeks after the attack, the White House declared a bombing halt above the 20th parallel, including the part of North Vietnam into which the radar site had been directing strikes.

Etchberger was nominated for the Medal of Honor, but it could not be given without attention from the national news media, and the existence of Lima Site 85 was still cloaked in secrecy. The Air Force Cross was awarded instead, presented to his family in a closed ceremony in the Pentagon in 1969.

U.S. involvement in the war in Laos was revealed in 1970. The story of Lima Site 85 emerged in bits and pieces between 1977 and 1995 as information from various documents and reports was declassified.

Etchberger's supporters and colleagues made a strong case for an upgrade from the Air Force Cross. At long last, award of the Medal of Honor was approved in 2008 and presented in 2010 at the White House, where Etchberger's three sons received it on his behalf. ✪

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