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AIR FORCE MAGAZINE

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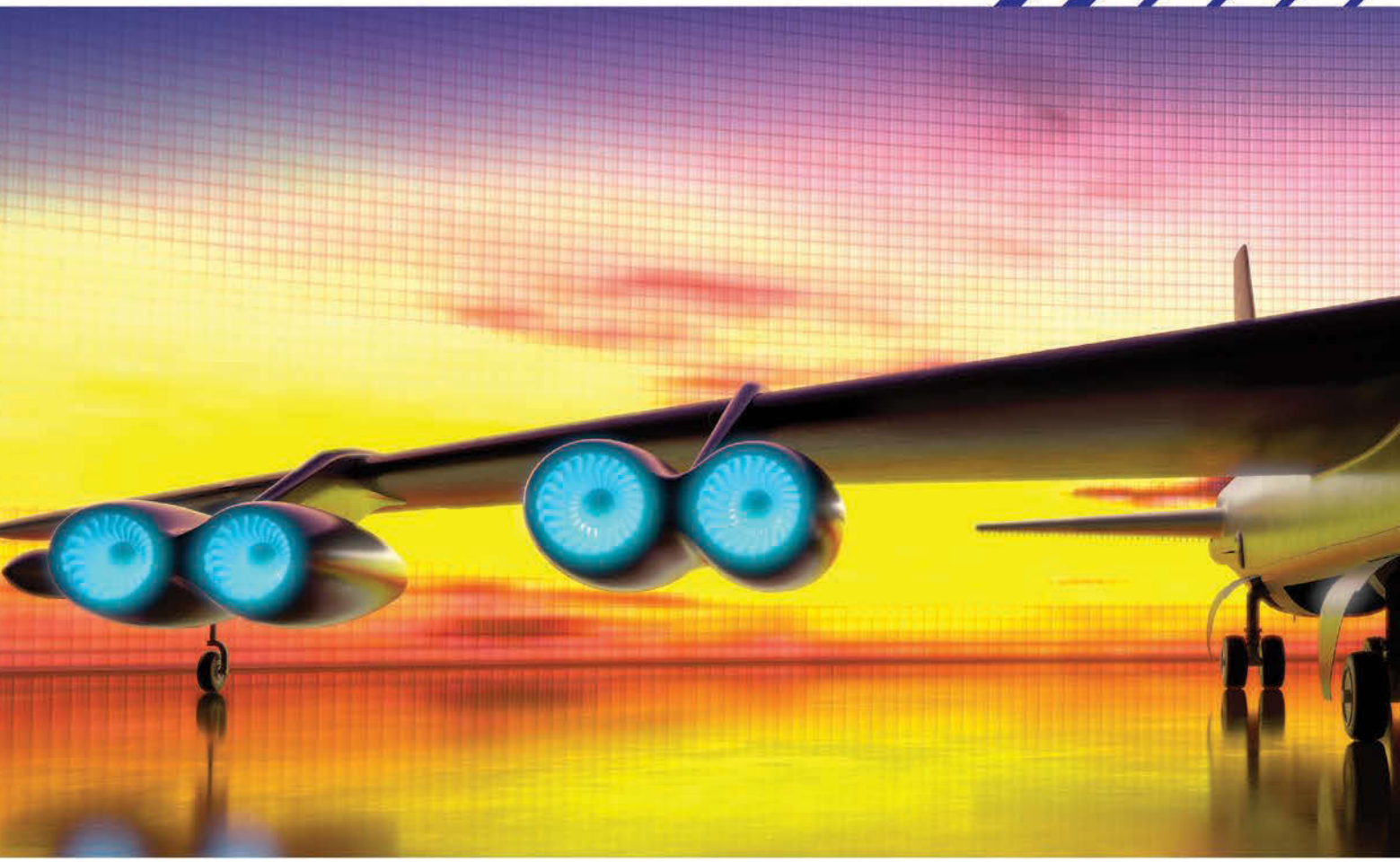

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May 2021 Vol. 104, No. 5

Pfc. Elijah Ingram/USA

A C-17 delivers Marines to Fort Bliss, Texas, as they complete their Advanced Battle Management Systems Training. Two M142 High Mobility Artillery Rocket Systems (HIMARS) and other support vehicles traveled as one package inside the Globemaster III.

DEPARTMENTS

FEATURES

ON THE COVER

Airman 1st Class Duncan Bevan

An F-35 Lightning II flies over the U.S. Central Command area of responsibility. See "Make-or-Break Time for the F-35," p. 40.

STAFF

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By Tobias Naegele

Rocking the Joint

The most important characteristics of those we entrust with our nation's most lethal weapons are trust and candor. Our military leaders must be willing to speak truth to power and to share their best military advice whether or not it is popular.

Air Force Gen. Timothy M. Ray, commander of Air Force Global Strike Command and the Air Force component commander at U.S. Strategic Command, made waves earlier this month when he called out the Army's drive to develop hypersonic land-based missiles as a wasteful, misguided investment.

"I completely struggle with the reality check that's required here," he said. "I kind of get it in Europe, I kind of get it in CENTCOM. But, I completely don't get it in the Pacific. I mean, I genuinely struggle with the credibility of that entire [Army] plan. ... Why in the world would we entertain a brutally expensive idea when we don't, as a Department [of Defense], have the money to go do that?"

If you're not quite where Ray stood, he left no room for doubt as he continued: "Honestly, I think it's stupid. I just think it's a stupid idea to go invest that kind of money to recreate something that this service [the Air Force] has mastered."

We might not hear a lot from General Ray in public forums in the weeks to come, but his point is made. Defense Department and congressional leadership take heed: One of our most capable, experienced, and seasoned military leaders just spoke truth to power.

Who is Tim Ray? A 1985 Air Force Academy grad, he flew B-52 and B-1 bombers and commanded the 7th Bomb Wing at Dyess Air Force Base, Texas. He's got two master of science degrees and 36 years of professional military experience, including time in combat zones. He's flown more than 4,000 hours on behalf of his country and endured a lifetime of the special scrutiny reserved for that small cadre of Americans entrusted with nuclear weapons.

Army Chief of Staff Gen. James C. McConville is pressing hard for a new Army role in "long-range fires," what the Air Force typically calls deep-strike missions. He argues that U.S. land forces occupying ground within 1,000 miles or so from an adversary can help clear the way for air and maritime forces, though it's hard to imagine that any nation would risk provoking an adversary by hosting such weapons.

Ray, by contrast, argues that aircraft flying high and without need for foreign permission are a more effective, less costly, and less provocative way to achieve the same effect. He's right.

The long-range strike mission is well in hand. Both the Air Force and the Navy have honed the skills and developed flexible weapons and platforms to strike deep into adversaries' territory. America need not reinvent that wheel. In a face-off with China in the Pacific, the Air Force and Navy, not the Army, will be the deep-strike forces of choice. No less an Army expert than the Chairman of the Joint Chiefs of Staff, Gen. Mark A. Milley, has made that point.

Yet the Army is persisting, standing up a "multi-domain task force" in Europe, two in the Pacific, one in the Arctic, and another for contingencies. It envisions having short-, medium-, and long-range hypersonic weapons. More striking still is the Army's plan to create a new headquarters element dubbed, "Theater Fires Command." Once again, the Army misses the joint picture: This is the role of a Joint Force Air Component Command, or JFACC. The Army need not replicate this capability; it should operate within the already established joint construct.

Congress passed the Goldwater-Nichols Act 35 years ago to capitalize on the strengths of each of the armed services, rather than leave them to compete with one another. During actual conflict, a joint force commander is designated to determine which elements of each of the services to use to best accomplish desired mission objectives. By exposing officers to joint operations, planning, and service throughout their careers, its architects reasoned, by the time they reached the top of their profession, officers would possess a solid understanding of how each military component complements the others.

Jointness is about making the hard choices on roles and missions—and then sticking with them.

Unfortunately, however, Goldwater-Nichols never fully delivered on its promise. Capabilities overlaps remain in every domain. Some missions, such as the Army's role in air base defense, are left unfulfilled. Others, like long-range strike, are coveted by those without a piece of the action. The Army justifies its mission creep by singing from the Marine Corps playbook, arguing for "organic" resources to ensure they can control those forces without interference by the joint force commander. The Army used that argument to justify acquiring its own fleet of Gray Eagle drones—replicating the Air Force MQ-9 Reaper capability. They got away with that move, so why not replicate Air Force deep strike, as well?

McConville claims the Army is "an all-domain force." Of course it is. So is the Navy, Marine Corps, Air Force, and Space Force. There is nothing unique in that assertion. No military force operates exclusively in one domain. All are involved in cyber, all are capable of flight. Yet each service is uniquely responsible for organizing, training, and equipping component forces to master their specific domain, be it air, land, sea, space, or cyber. Organizing "multi-domain forces" is the role of joint force and combatant commanders, not an individual service chief.

Jointness is not about ensuring every service gets a piece of every mission. That's a waste of money and resources.

Jointness is about using the right service component forces—at the right places at the right times. It's about making hard choices on roles and missions and then sticking to them, trusting the joint force commanders to combine the individual service components to best meet the needs of a particular contingency. The objective: To deter and dissuade rival forces such that no foe on Earth would risk challenging the combined power and prowess of the world's most effective armed forces.

There is power in jointness, but only if the services are capable of exploiting operations in their respective domains. Diluting those capabilities by seeking to assume the roles and missions of the other services undermines the entire joint concept. ✪

LETTERS

Long, Slow Wars

[Regarding] "Editorial: Go All In," in March, my sincere kudos to [Tobias] Naegele for a superbly written editorial. He states what I have been saying for years: "The failure to effectively use air power to rapidly achieve strategic effects" will result in long, slow wars against lesser foes.

Starting with the F-22 debacle, I was the program integrator in the F-22 SPO [System Program Office] at the time when Secretary [Robert M.] Gates canceled the program, because they were too "exquisite" (think expensive). He violated all the teachings learned in War College in that he planned the next conflict based on the current one. I have for many years referred to the re-emerging Soviet Union (and, there is also China). I bought Gates' book after I retired in 2014, thinking I might have missed something. After reading it thoroughly, I am convinced his was a very wrong decision.

War strategies: Many lessons were forgotten after World War II, where the chief aim was to win at all costs and force unconditional surrender on our opponents. Korea and Vietnam were never intended to be won, with the latter grossly so. I was there for Linebacker I and II, and I felt then that what we did during those two campaigns was what we should have been doing from the beginning. Politics got in the way again. We were told we couldn't take out SAM [surface-to-air missile] sites until their construction was complete, and destroying enemy aircraft on the ground was a no-no. How absurd could we be? But the real tragedy is in the cost in American blood, and for what?

The only properly conducted war since World War II was Desert Storm. We had a goal (get Saddam out of Kuwait), and Washington left the military to do what we do best. We properly applied air and ground power to achieve what asked of us, in only 43 days. Even during the Kosovo War, things started to go off the track when Washington started to tell us what our targets should be, but fortunately that interference subsided and we met our goals in minimum time.

Naegele is so correct in his assessment: Leaders, both military and political, need to ask the question: "How can we use air power to achieve greater results in less time?" The politicians must clearly tell the military what the goal is, and then let the military do their job to attain that goal. Don't tell us how to do it.

Naegele's [editorial] should be a must-read for all.

Col. Frank Alfter,
USAF (Ret.)
Beavercreek, Ohio

Killer Kilowatts

The first corollary to "Electric Aviation is the inevitable future of aviation" [See "Prime Investments," March, p. 41] is that charging stations are the inevitable requirement for electric transportation Charging requirements are not going to be limited to the flight line. The base/post commander, motor pool, hospital, and school buses are going to need chargers.

As battery technology increases energy density and decreases charging times, the electric current and total power required will skyrocket. Electric infrastructure is a long lead time issue.

A typical home requires 25 kilowatts per day, an economy-sized electric car with a 100 mile range requires a 25

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WRITE TO US

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kilowatt battery. A Class A semi-trailer requires 1 megawatt for 500 miles. Today, a single seat EVTOL [electric vertical takeoff and landing] requires 20 kilowatts to make a 12-mile round trip. Soldiers, we are talking about HUGE future electric requirements at military installations and also for our cities.

My recommendation to consider a plethora of small nuclear reactors is for a future letter.

Lt. Col. Rayford K. Brown,
USAF (Ret.)
Temple, Texas

No, *I* Object

I, too, have been a member of the Air Force Association for over 50 years, most of it as a life member. In response to Lt. Col. Peppers' ["Letters: I Object," January/February, p. 6]: *I object!*

As subsequent events conclusively proved to all but the most blinded, Wayne Grane's November letter was on time and definitely on target! [Letters: On Race, Unrest, and USAF" November 2020, p. 6].

Regardless of when, where, or who stands in its "bully pulpit," the sooner embedded, endemic, pervasive racism is reconfined to the pit of its origin, the better off humankind will be (in or out of uniform!)

Maj. J. Andrew Clark,
USAF (Ret.)
Murray, Utah

The More You Know ...

It is encouraging to read that [USAF Chief of Staff Gen. C.Q.] Brown "has a challenge for the force: Understand Your Enemy." ["Know Thy Enemy," March, p. 45]. During the mid-1970s, Gen. David Jones returned from USAFE to become USAF Chief of Staff. He directed my boss, Maj. Gen. George Keegan, to develop a program focusing on Soviet military capabilities. We assembled 35 civilian and military Soviet experts to tackle this challenge. Those people brought academic competence, Russian language fluency, and service in Moscow to our table.

The goal was to acquire, translate, and publish meaningful original Russian language military writings and distribute them widely. We subscribed to Krasnaya Zvezda (Red Star), Pravda, Civil Defense, books, monographs, and other materials to be the basis of what became the Air Force Soviet Awareness Program. We distributed our translations across the country, throughout the Air Force, to Congress, major universities, and friendly countries. We built a briefing team that traveled throughout the U.S., Europe, and Latin America. Chief Jones made the program a first stop in the annual brigadier general orientation course. The Soviet Awareness Program was influential to major media outlets and lasted until the Cold War ended. General Brown's current initiative, expanding the awareness baseline, is certainly welcome.

Maj. Gen. William L. Doyle Jr.,
USAF (Ret.)
Papillion, Neb.

Slim Pickens

The idea of putting air-to-air missiles on a B-52 was in the 1959 book "Red Alert," which was the prototype for the movie "Dr. Strangelove."

About 1982, I rode in a Las Vegas elevator with Slim Pickens. He did not yell "yahoo."

Capt. Larry Robinson
Greenville, SC.

Honor First

When my Officer Candidate School (OCS) roommate (Class 63-A, 1962) lied about coming late back to the barracks,

I never saw him again. The student Honor Committee convened, gave their findings to the commissioned staff, and Officer Cadet S_ was gone before the next lunch hour. We had an honor code that we proudly adhered to—an officer candidate will not lie, cheat, or steal, or tolerate those who do. Sound familiar? OCS produced top performing officers and the highest officer retention at the lowest of costs. USAF OCS closed a few years after USAFA opened at the highest cost and lowest retention rate of all commissioning sources. But it was expected to produce the highest caliber of professional military leadership.

The faculty, staff, and command of the Air Force Academy are all products themselves of that institution and all averred, "We will not lie, steal, or cheat, nor tolerate among us anyone who does." Apparently, they themselves lied, for they are now tolerating massive cheating among us. Instead of instilling honor and integrity in the very being of the cadets, the school sees the massive cheating as an opportunity to overhaul its honor code. It should be overhauling an institution that is worried more about impact on career than impact on professionalism.

Our service academy graduates are quite proud among themselves, but when their institution can't hold to its own standard of honor, but instead talks away the lying and cheating, the very worth of an Air Force Academy commission is severely diminished.

The graduating lieutenant who stood by his or her code is tarred by those brushed with remediation rather than expulsion, and their status in the eyes of those serving under and with them is ever diminished.

Lt. Col. John F. Piowaty,
USAF (Ret.)
Cape Canaveral, Fla.

Maintainer Mishaps

As a former USAF aircraft maintenance officer, 310th Bombardment Wing, Strategic Air Command, 1959-1962, I was encouraged to read that "Class A" mishaps—the serious catastrophic losses—decreased, but I am distressed to learn of the increase of "Class C" mishaps, (in our day they were called "incidents"). [See "World: Mishap Rise Due to Lack of Training, Shortage of Maintainers, Report Says," January/February, p. 25].

The lack of pilot training flying hours and reduction of instructors and increase of waivers to untrained pilots in flying units will only lead to more Class A accidents.

A more insidious trend is taking place within aircraft maintenance personnel. The report cites morale is a large problem within the maintainers and that training of maintenance personnel is seriously lacking. [Brian] Everstine reports that some new Airmen could not tell the difference between a ratchet and a socket (wrenches), and they are going into understaffed squadrons. Another distressing report says aircraft maintenance personnel are often required to perform security duties; it is no surprise many are tired and crying for help and that they leave the Air Force for civilian jobs. (Today's leaders should look back at the Strategic Air Command to see a well-run Air Force.)

Our aircraft are incredibly complex and require regular maintenance performed by well-trained and very competent technicians. Without this, we are certain to have more Class A mishaps. Please do not let this happen.

James O. Gundlach
New Orleans

It Takes All Kinds

Regarding the revamp of personnel evaluation in USAF [See "Air Force Unveils New Standards for Enlisted, Officers Evaluations," Daily Report, Feb. 3]:

Assessment of an individual's personality, leadership, and management style should be separated from organizational objectives, and evaluation of their attainment.

By their very nature, operational environments of military and civilian organizations are significantly different, and require personnel who can and will adapt to different demands.

Leadership is different from management—consequently, each requires different styles and skills. While management can be learned, leadership is primarily a function of innate personality.

Good leaders have strategic vision, are self-assured and persuasive, and focus on effectiveness. Outstanding leaders also inspire others to follow and emulate them. But leaders are neither outstanding, or even good, managers.

Good managers have a sound understanding of systematic procedures and processes for planning, implementing, monitoring, and controlling, but they focus on efficiency and economy and supervise others to do work delegated to them. Some do it by persuasion; others, by pushing—readily acknowledged and accepted as the modus operandi in the military environment, but all too often perceived as 'bullying' in the civilian working environment.

Teamwork is a common term with different connotations, which are diametrically opposed in civilian and military environments.

Military teamwork: The leader has all the power, and teamwork is essentially a top-down 'obey and follow the leader' chain of command relationship.

The military 'followership' mode requires that the leader knows best, and followers accept/assume their superiors know better, and unquestioningly comply with orders from ranking superiors with vested authority.

However, rather than autocratic leadership, the best practice is benevolent leadership—i.e., two-way, top-down with feedback—where the leader maintains an open door policy and is open to feedback; whether or not he/she chooses to accept it.

At the other extreme, the civilian primarily shares the power and—through teamwork—encourages every member to contribute their opinions until consensus is achieved, or at least is sufficient enough to move forward.

Civilian team members adhere to organizational structure and defer to their supervision if they accept his/her personal technical competence. However, strong personalities often question and challenge those in authority, and jockey for power and recognition within the team by asserting their own technical qualifications, competence, personal, familial, and political relations; and often unhesitatingly bypass the chain of command to undercut, usurp, and/or even supplant the nominal team leader.

Thus, from the military perspective, civilians are undisciplined and tend to be insubordinate. (That's the primary reason for military indoctrination via the service academies, ROTC and basic training.)

People are different! They are not interchangeable cookie cutter components in an organizational machine. So, when considering the capability of individuals for future leadership and/or management responsibilities and possible assignments, please seek to minimize—rather than maximize—the

myriad standardization aspects of your new personnel evaluation system.

Col. Kenneth F. Smith,
USAF (Ret.)
Honolulu

Agility is Primal

Focusing on the future is always challenging, but especially tough during the pandemic lockdown. Now that—fingers crossed—there is at least a light at the end of the tunnel with regard to returning to normal operating conditions, it's a good time for DOD, USAF (and other military service branches), and the contractors who support them to take a refreshed look at the role Agile software development can play in the deployment of weapons systems [See "Prime Investments," March, p. 41].

The last time the GAO [Government Accountability Office] weighed in on this subject, via last summer's Defense Acquisitions Annual Assessment, it depicted a fairly bleak assessment regarding the deployment of Agile software development across nearly two dozen major DOD weapons systems, finding that, too often, attempts to deploy Agile resulted in almost the exact opposite: i.e., slower deployments, reduced levels of system security, and higher—not lower—levels of expenditure.

If there was a lesson to be learned from the GAO's report, it was this: A program doesn't become "agile" merely by calling it Agile, or by adopting some of its protocols in the hope that the full benefits of Agile will occur as if by osmosis. They won't. Agile takes work, but if you put the work in, its benefits are manifest.

As just one example, take a look at USAF's success in shifting its Cyberspace Vulnerability Assessment/Hunter (CVA/H) Defensive Applications and Network Support (DANS) process from a traditional waterfall model to an Agile approach aligned with DevSecOps (i.e., the integration of development, operations, and security into DevSecOps.)

There's an old saying, "Anything worth doing, is worth doing right." In the case of Agile, that can be updated to "And if you don't do it right, don't bother doing it at all." But when it is done right, Agile software development can be a critical driver of mission success.

Gerry Morelli
Sterling, Va.

SERE Training

I read with great interest and experience your article "Cracking the Code," March, p. 34. When I was recalled for Active duty during Vietnam, I was one of only two USAF officers sent to the Navy-Marine SERE (Survival, Escape, Resistance, and Escape) training course North Island NAS, Coronado Island-San Diego, in August 1971 as the survival school at Fairchild Air Force Base, Wash., was full.

After a week of ground school at [North Island] where we learned how to survive in the jungle, we were loaded into trucks, clothed in old Navy gray canvas fatigues, and driven up into the mountains to Warner Springs above San Diego (where M*A*S*H was filmed). We were told to put on our rank insignia to simulate bailout conditions, so I put on my corroded major clusters and noticed I was the oldest and [highest] ranking officer among the Gold Bars of new Navy and Marine pilots.

The first part of the course involved evading, and had us running around a shell-pocked field made to look like a battlefield. I jumped into a hole almost on top of a young Navy ensign. As I dusted myself off, he looked at me and my rank and said, "No offense, sir, but what the hell are you doing here?"

I replied, "Didn't they tell you the war was going badly?"

He said, "Yes, but not this badly."

I was balding, chubby, and old enough to be his father. I replied, "Son, do you drink?"

He said, "Yes."

I said, "What do you drink?"

He said, "Scotch."

I said, "If you help me through this course, I'll buy you a 1/2 gallon of Chivas Regal."

He got his Scotch, and I got my diploma.

By the way, this part of the course involved three to four days in a simulated [North Vietnamese] POW camp, which included waterboarding, sleeping in a box in the ground, and being manhandled by guards dressed like the NVN and speaking Vietnamese.

After debriefing USAF POWs from Hanoi in February 1973, I was sent to advise the SERE school at Fairchild and recommended that they toughen up on the resistance as part of the training. I think they did.

Lt. Col. Richard L. Pinkerton,
USAF (Ret.)
Cleveland

History Counts

I stumbled across John T. Correll's article "Over the Hump to China," and am so grateful I did. I know it was written in [October] 2009, but I was compelled to share how important it was to me and my family.

My father was one of those pilots who flew many missions over the Hump. He would regale us with stories, that we assumed were exaggerated, as that was my father's superpower. He showed us the Blood Chit he had and explained the meaning of it. I had never read anything about it until today. As my father was quite a bit older than my mom, he passed when I was 24. I had not yet reached the stage of totally appreciating his contributions to life as we get to live today. Now I know that men and women who came back from World War I and World War II did not receive a fraction of the support that is available today. No one's fault—it just wasn't done.

One event my father told us about was flying over The Hump with radar equipment and some Chinese troops. They took some damage to a wing and he hollered for the Chinese officer in charge to lighten the load. When they landed, he walked into the back and there was the Chinese officer—no soldiers—and the radar equipment. When he asked the officer what happened, the officer looked at my father with tears running down his face and said, "This is all the radar equipment we will have, we have millions more soldiers. I weep for not being able to join them, as I know how to work the equipment." My father explained to us that different cultures have different values and ways of life and they gladly sacrificed themselves to save their country. It made a deep impression on me, as I was probably 7 or 8 at that time and am 64 now.

He also told us that he couldn't eat at the nice hotels when they went to cities, as it was too painful to see how many people were starving to death on the streets and sidewalks. I asked him why he didn't give them food and he said they were told not to, as it would only prolong the suffering.

Thank you for allowing me to share a tiny bit of the pride and memories that this article written in 2009 meant to me. I am sending it to all of my family members.

Kathy Dannel Vitcak
Clearbrook, Minn.

No Hero

[John T. Correll's "Lone Eagle, March, p. 56] states "he flew *The Spirit of St. Louis* on a tour of the nation, touching down in 49 states." Was the *Spirit* equipped with a time machine?

Despite the achievement, Lindbergh is no hero of mine. His flight was eclipsed within days. His support of Germany and particularly his display of his Nazi medal at the St. Louis Airport until after his death, where I passed it daily, was an affront. He never apologized and was unrepentant in his anti-Semitism.

Lt. Col. Allen J. Parmet,
USAF (Ret.)
Kansas City, Mo.

VERBATIM

Mike Tsukamoto/staff; Pixabay

Through the Looking Glass

"It's like the Pentagon is finding itself staring in the rearview mirror in the face of oncoming traffic."

—**Mackenzie Eaglen,** defense analyst, American Enterprise Institute, discussing slow development of new U.S. military technology versus near-peer competitors [Washington Post, April 1].

Feed the Families

"The problem of food insecurity among military families is an issue of mission readiness as well as troop retention and recruitment. ... We believe that as a country we must do more to assist these struggling families, and therefore ask the Department of Defense to outline concrete steps they intend to take to support these families."

—**Sens. Tammy Duckworth (D-Ill.)** and **Mark Warner (D-Va.),** in a letter to Secretary of Defense Lloyd J. Austin III, March 19.

Mike Tsukamoto/staff; Sgt. Dommnique Washington/USA; Pixabay

Connecting the Dots

"We can't see all of the dots. ... We have an inability to see everything. ... We as U.S. Cyber Command or the National Security Agency may see what is occurring outside of the United States, but when it comes into the United States, our adversaries are moving very quickly. They understand the laws and the policies that we have within our nation, and so they're utilizing our own infrastructure, our own internet service providers, to create these intrusions."

—**U.S. Army Gen. Paul M. Nakasone,** commander of U.S. Cyber Command on the challenges of preventing cyber attacks against outside adversaries and also from within the U.S., seeking better information-sharing from the private sector [Associated Press, March 26].

PO1 Carlos Vazquez II/USN

REDEFINING JOINTNESS

"If someone shows up to the battle and they don't have long-range fires and the adversary does, you can't effectively operate in that theatre. ... This means you want each service to bring those long-range fires; so, the joint warfighting concept succeeds if all of the force can apply fires wherever they happen to be, wherever the target is, whatever the lines of conflict, that is the joint warfighting concept."

—**USAF Gen. John E. Hyten,** Vice Chairman of the Joint Chiefs of Staff, in disagreement with Gen. Timothy Ray's assessment of the Army's long-range fire capabilities [Defense One, April 6].

Nothing Lasts Forever

"Undefeated in aerial combat, the F-15 Eagle epitomized air superiority in the minds of our adversaries, allies, and the American people for over 45 years. But it was not meant to fly forever. The F-15C and D fleets, in their current state, place us at great risk."

—**Lt. Gen. Duke Z. Richardson,** the military deputy in the Office of Air Force for Acquisition, on the need for the new F-15E-X due to structural issues and age of the current fleet, April 7.

Tech. Sgt. John McRell

So, ... What are We?

"It's sort of like we're exclusively dating. We agreed to not see other people right now, but we haven't committed to anything else yet."

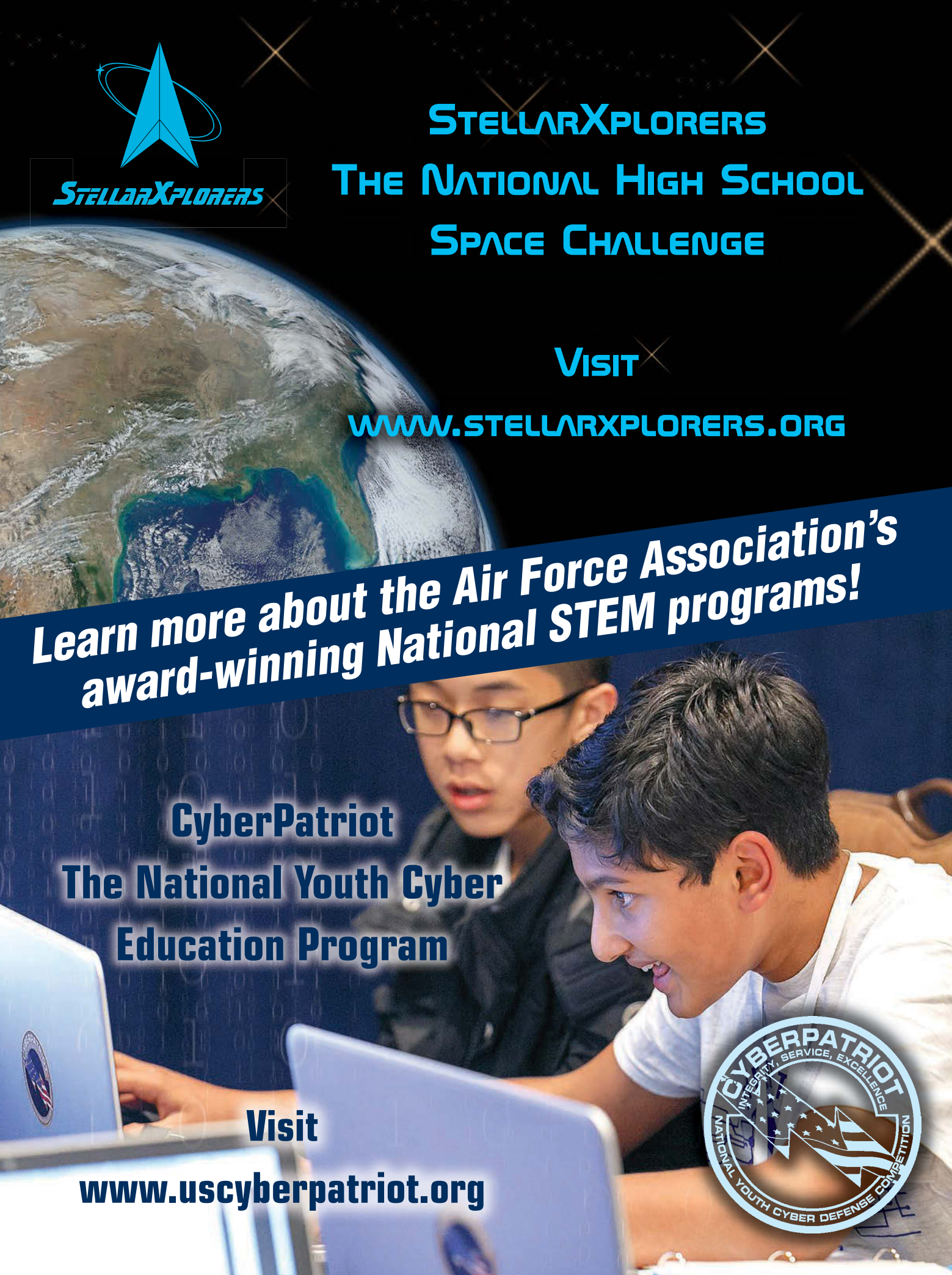
—**A Lockheed Martin official,** speaking about a bilateral agreement with startup Omnispace on future ventures dealing with direct-to-device 5G connectivity, alleviating the use of ground equipment that satellites must link to now [Breaking Defense, March 30].

Easy Targets

Tech. Sgt. Joshua Strang

"Today's air operation centers are static, easy targets to hit that are considered a huge ... liability. There's no resilience there."

—DAF Deputy Chief Technology Officer, **James "Rob" Beutel,** on why the AF is experimenting with 5G to provide mobile, distributed command and control [Armed Forces Communications & Electronics Association, April 7].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Bombs Away

Gen. Timothy M. Ray is commander of Air Force Global Strike Command and commander, Air Forces Strategic-Air, U.S. Strategic Command. Based at Barksdale Air Force Base, La., he is responsible for global strike and combat support to USSTRATCOM and the geographic combatant commands. The questions and answers here are adapted from an interview with retired Lt. Gen. David A. Deptula, dean of the Air Force Association's Mitchell Institute for Aerospace Studies, and Douglas A. Birkey, Mitchell's executive director for Mitchell's Aerospace Advantage podcast. To listen to the recorded interview, visit https://MitchellInstituteAerospaceAdvantage.podbean.com/

Q. From your perspective as the commander of global strike command, what unique value do bombers afford our nation?

A. First of all, [bombers are] flexible, right? So, when you watch what the Bomber Task Forces [BTFs] are doing today, the ability to be just about anywhere in a number of hours, and to do it very quickly—invisibly—is huge. ... It's not just the U.S. bomber force, it's the only bomber force on the western team. And it certainly becomes, both from a conventional and a nuclear standpoint … the version of extended deterrence that our partners and allies probably embraced first. … But what we can bring with range, speed, and payload, and flexibility … is probably one of the strongest things. ... It's classic air power.

Q. Requests for these aircraft from combatant commands is high. How has this demand signal grown in recent years and what's driving it?

A. Well, as we start looking away from the counterterrorism part of what we've been doing, to no kidding, the [National Defense Strategy] and great power competition, it becomes very clear the role that bombers play. When I get up every morning, I have my Intel read book. It's the INDOPACOM, it's the EUCOM read book, it's the NORTHCOM read book, the STRATCOM read book, the Joint Staff read book. I read all those Intel books, because I need to understand what's happening everywhere in the world. And then I'm routinely on the phone with my air component teammates to really understand what they're dealing with. And what the bomber task forces have really proven is you don't have to be static. In fact, if you're not, and you can come into and out of the theater, you're very effective. ... I get a lot of good feedback, particularly from the combatant commands and from their components. And part of their feedback is how deeply the partners and allies appreciate it. So, they're in very high demand. And I think you just talk to the crews, their morale is through the roof. I now have the highest bomber aircrew readiness in the history of the command, even in COVID. … That really allows us to be much more capable, much more ready for very high demand.

Q. How would you gauge our allies and our adversaries? How do they respond to this new concept?

A. You can make the case that imitation is the highest form of flattery, and we're watching now the Russians try to do the same thing—they're just not quite as good at it. … Our partners and allies get a lot out of this. The one that really comes to mind is when we went to Europe and we flew over every NATO country, you know, in a single day, with the B-52s. Gen. Tod D. Wolters [U.S. European Command boss] said, 'You have no idea the boost you guys gave this entire command, this entire alliance, by showing up and showing that commitment.' But it begins to teach and show how we can push back in areas and how fast we can move in and when we integrate our capabilities with fifth-generation [fighter] capabilities and other things like that. It's a huge deal.

Senior Airman Tessa Corrick

Gen. Timothy Ray, Air Force Global Strike Command commander, answers a question during an AFGSC town hall at Barksdale Air Force Base, La., in September. Ray believes it makes no sense for the Army to duplicate USAF's long-range strike capability.

Q. How about in the Pacific?

A. I had to go brief the Chief, the Secretary, I had to go brief the STRATCOM commander, I had to brief the Chairman, and the SECDEF, all in the single day. There was a little bit of a challenge by the Chairman and the SECDEF to deliver, ... and you know the message back was, 'Throw us in there because we're ready for this ... go ahead and test us.' Getting them to believe that we could do it at that level was the first step, and as we watched it unfold, you know the SECDEF—then Secretary [Mark] Esper—was pretty cognizant of what we were saying from a readiness standpoint, ... how it helped us in the nuclear mission, but later how the crews and the maintenance teams were really, really enthusiastic, so he saw the greater engagement and the greater presence around the globe. … What we really want to do now is just constantly take that bomber [agile combat employment concept of operation] and just drive the TTP—tactics, techniques, and procedures—and really refine the logistical, the communications, and the weaponeering, and integration, so … we are actually able to sit back and use our imaginations. Some of our teammates in the theater say, "Well, if you did that, can you do this? Have you thought about this place?" That's not just me to my teammates, but my teammates

to me. We're having fun ... we're actually having fun doing this, and that's at the four-star level and at the crew-dog level.

Q. What does that suggest for the B-21 buy? That is still several years into the future, but what are your thoughts in that regard?

A. The B-21 program is incredibly healthy. There's something I want to highlight that's unique. Randy Walden and the RCO [Rapid Capabilities Office] and Jason Voorhees—Col. Jason Voorhees is the program manager—that unique relationship with RCO and a major command to go do things is actually incredibly effective. And then we start thinking about Randy Walden, and [him] leading the Air Battle Management System [ABMS program] ... the connection with the B-21 to ABMS, is total. It's not an add-on or afterthought, It's part and parcel [of ABMS]. ... Since we have a modular design on the airplane, because it is very mature technology compared to what you might think—far more mature technology—it's open mission systems and we ... were able to be very, very steady on the requirements. ... We can very rapidly bring new radios, new emitters, new weapons—those kinds of things—very quickly to the airplane. It took me many years to get a [joint air-to-surface missile] onto a B-2; I'm going to be able to do that in a year. So, when I say it's the B-21, it's not the "B two point one." Right? It is a fundamentally different plane. We briefed Congress on the process, ... how we'll keep requirements stable, and how we'll keep adding really fresh tech and sustaining the plane in a way no one's thinking about. And when we start talking about, you know, how we're doing stuff with bombers around the globe, then the power of that becomes pretty obvious. ... So, I'm pretty optimistic about the future of the B-21.

Q. What are some of the attributes you're looking forward to seeing in the B-21, and what are the things on the table that are going to be most important?

A. We talked about my ability to design in a data-driven sustainment game plan that's not exquisite and unique like other programs, but that we can be really purposeful about monetizing. That's going to be one of the key pieces: the fact that you are data driven, and your digital [insight] is going to be a real key piece of how you can do ... developmental and operational tests—a synthetic training environment, right? So, we've started to work with some of the experts outside the Air Force who've been helpful to the Air Force on the Defense Science Board and the Scientific Advisory Board, on how best to create training systems of the future. ... We are bringing in some more folks from the outside who are great at the human-machine interface, ... we're going to build that from the beginning. We know that we're going to reduce the number of specialty codes inside the maintenance world. ... We have our maintenance guys right now embedded with the RCO to make sure we design in sustainability and simplicity and to really limit the number of things we have to do uniquely. You take an opportunity to be a different kind of team, with these kinds of capabilities, and it's really a match made in heaven, with us and RCO.

Q. We're now seeing a major surge by all the services to go after the long-range strike mission. Some of the other services are even moving out. Is it time for DOD to exert some leadership over what solutions are the most cost-effective and efficient?

A. In the end, I completely struggle with the reality check that's required here. I mean, ... I kind of get it in Europe, I kind of get it in CENTCOM. But I completely don't get it in the Pacific. I mean, I genuinely struggle with the credibility of that entire [Army] plan. I deeply struggle with the credibility of it. And we're doing it. I mean, if you like BTFs, then we're there. Imagine that with hypersonic weapons: the ability to be there in hours, not days, months, or weeks, ... the ability to keep up the operational pace. So why in the world would we entertain a brutally expensive idea, when we don't as a Department [of Defense], have the money to go do that? When we've already proven this?

You know, I've had a few congressmen ask me, and I just, you know—honestly, I think it's stupid. I just think it's a stupid idea to go invest that kind of money to recreate something that this service has mastered. And, and we're doing already, right now. Why? Why in the world would you try that? So I try to make sure that my language is not a little more colorful than it is. But, give me a break.

Q. What is the calculus when you're talking to people about this decision?

A. Look, you can measure in a lot of ways, but you know, just go ask your allies. "Hey, do you think the bombers can do this for us in 18 months?" Are we willing to wait five years for the Army to perhaps do this and have to stage it, you know, over a month or two period of time to get to the theater? Do you actually think that that has a return value? They'll probably give you the, 'I don't think so,' right? Because there's a lot of countries, who'd have to agree to this. I can see some of them probably agreeing in the European theater, maybe in the Central Asian theater. But I don't see it coming together with any credibility in the Pacific anytime real soon. So, that's one measure: ... What [do] your partners and allies really think? ... Proving the CONOPs [concept of operations]. ... I mean, I can, I can prove to you in a matter of months, with real capability [hypersonic missiles on bombers], versus a theoretical capability that's far more expensive. And [surface-to-surface missiles are] going to require a fundamentally different approach to basing. ... For some reason, we just skate right past that brutal reality check: Some of those countries are never going to let you put stuff like [hypersonic missiles] in their theater.

Q. People often ask, if we have ICBMs and ballistic missile submarines, why do we still need nuclear-equipped bombers? How do you answer that?

A. There are those out there who don't quite get all the complementary attributes of the triad—the flexibility, the survivability, the responsiveness. When you start thinking about, you know, the manned bombers role, if you're interested in counterproliferation, then you're a fascinated individual when it comes to extended deterrence. [Because] the subs and ICBMs are phenomenal. But our South Korean teammates aren't going to derive the same kind of physical reassurance that we've got their back—or the Japanese or the Australians—[compared to bombers, which] ... become an important part of that. But when you start talking about older systems, you need to be able to manage the risk either from a technical or strategic reality. If any one of those things starts to fall through, you need to pick it up another way. But it's also that very visible way to say to anybody, 'I'm getting ready to do something different. And I can very clearly message where you are on the escalation later.' And then the last part, of course, is there are things we can do with a bomber [that can't be done with the other legs]. ... When you launch an ICBM sortie, it's gone. There's no calling it back. ... [But a bomber,] while it may not be as fast, it does have the ability for you to do something that is reversible. ✪

Airman First Class Denalyn Rios employs a Bod Pod at the fitness center on Grand Forks Air Force Base, N.D., to track the effectiveness of her exercise and nutritional health regimes. The device measures body mass and body volume using air displacement technology to calculate body composition.

Airman 1st Class Ashley Richards

Pararescue jumpers and combat rescue officers practice retrieving astronauts from a SpaceX capsule mock-up during the Rescue Force Qualification Course at Cape Canaveral Space Force Station, Fla. The quarterly course gives trainees hands-on experience in astronaut recovery operations.

Staff Sgt. Christopher Muncy

USAF F-22 Raptors deployed to Marine Corps Air Station Iwakuni, Japan, operated with Japanese F-35A Lightning IIs and a U.S. KC-135 Stratotanker during training in April. The Raptors deployed to U.S. Indo-Pacific Command as part of a dynamic force employment demonstrating U.S. resolve and capability in a region where China and Russia have become increasingly assertive.

Staff Sgt. Matthew Kakaris

An F-16 Fighting Falcon from Holloman Air Force Base, N.M., fires an AIM-9M Sidewinder at Weapons System Evaluation Program East, Tyndall Air Force Base, Fla. Air Combat Command uses WSEPs to evaluate and test air-to-ground and air-to-air weapons systems, techniques, and procedures.

1st Lt. Savanah Bray

Claiming Itself an 'All-Domain' Force, Army Targets Long-Range Strike

Army Chief McConville stakes claim for mission in the Pacific theater.

U.S. Army Space and Missile Defense Command/Army Forces Strategic Command

The U.S. Army Space and Missile Defense Command/Army Forces Strategic Command conducted the first flight of the Advanced Hypersonic Weapon (AHW) concept in November 2011. A hypersonic, long-range missile could make the Army more relevant in the Pacific theater, where long-range Air Force and Navy weapons are more long-standing options.

By John A. Tirpak

The Army calls itself an "all-domain" force in a new vision paper that envisions "expanding ... into the maritime, air, space, and cyber domains" and a new role in long-range strike and suppressing enemy air defenses.

While acknowledging the need for joint operations, "Army Multi-Domain Transformation: Ready to Win in Competition and Conflict," claims a preeminent role for the Army that subordinates all of the other services. Released March 16, it argues that the Army, while part of the joint force, holds a preeminent role in combat by virtue of its size, suggesting the rest of the joint force adopt its methodologies and line up in support.

Calling for a "bold transformation" of Army organizations, weapons, and strategy, the new white paper charges the Army to "provide the joint force with the range, speed, and convergence of cutting-edge technologies that will be needed to provide future decision dominance and overmatch required to win the next fight." The Army's role, it adds, is to "set the conditions for the joint force to fight and win integrated campaigns necessary to defeat state actors."

Following the paper's release, Army Chief of Staff Gen. James C. McConville embarked on a sales mission, sharing his vision in a series of engagements, including one virtual event in which he appeared alongside Air Force Chief of Staff Gen. Charles Q. Brown Jr. McConville argued that the Army has a "need to penetrate" enemy airspace, and must therefore have its own long-range precision fires, such as hypersonic missiles, to deter enemy attack and respond when needed. In his vision, such missiles would enable the Army to counter "what some of our competitors have done with anti-access/area denial (A2/AD)" strategies, by holding rival air and missile defenses at risk.

CHANGE OF COURSE

The new Army concept turns on its head the conventional air-land arrangement, where air power clears the way for ground maneuver; as McConville sees it, land-based hypersonic missiles could enable the Army to "certainly suppress air defense, which could open up a gap if we needed to put aerial maneuver into place."

McConville has been moving in this direction for months, claiming more than once that Army Apache helicopters opened corridors for fixed-wing aircraft to attack Iraq at the outset of the 1991 Gulf War—an exaggeration that ignored the Air Force's stealth aircraft, which had already penetrated Iraqi airspace and were destroying its command and control apparatus when the Apaches flew.

"Long-range precision fires is very important," he said. "We feel we need to have that." He added the capability would give the Army "anti-ship capability, the capability to suppress air defense systems at very, very long range ...[and] the ability to do

strategic counter-fire, the ability to do anti-access/area denial."

McConville declined to address questions about the roles-and-missions implications of such a change, instead promising a fuller doctrine document next year. "We need speed in the future," McConville said. "We know we need range. … But it's really about convergence and how we bring all these systems together to get decision dominance."

AIR FORCE SPEED

CSAF Brown, meanwhile, is also making a case for speed. In addition to seeking to accelerate changes that have already been underway, he continues to make the case for the Air Force as a lynchpin in enabling joint all-domain command and control (JADC2). This new "revolution in military affairs" is the recognition that whoever controls the speed of information and decision-making will have the advantage in a future conflict.

"It's all about … decision advantage," Brown said during a virtual summit presented by The Hill, where he appeared together with McConville. "It is a revolution in military affairs, and not just from a technical standpoint, but it's a mindset, as well."

Reliable information must be the top priority in future fights, Brown said, a point frequently echoed by current and former defense officials. In future conflicts, the "fog of warfare" will become more acute, Brown said. "We'll either have information overload or information that is not necessarily clear … or we could be disconnected." There is also a risk that information flows can be compromised via cyber attack and that data may not be fully trusted. The services, he said, must work now to make information and networks more resilient and reliable, and to function without connectivity if necessary.

"We're really thinking differently about how we approach things," he said, noting a renewed emphasis on empowering Airmen by delegating decision-making authority "down to the lowest capable and competent level." The Air Force's calling card will remain "range, speed, and agility" to strike "any target on the face of the globe." It must be responsive to quickly evolving conditions.

The critical need for a speed advantage in decision-making is behind the Air Force's embrace of JADC2 and its vision for the future Advanced Battle Management System (ABMS), which would incorporate a variety of network and processing technologies to enable rapid handoffs from one platform to gain the upper hand on adversaries. It's the driving factor in the ABMS on-ramp exercises it's been conducting for more than a year.

But McConville asserts that the Army, not the Air Force, should develop these technologies, which he calls a Combined Joint All-Domain Command and Control system (CJADC2). "Combined" adds the element of coalition partners to the joint-warfighting concept. The Army should lead because the Army is bigger, he said.

"We've had this discussion with the Air Force," McConville said. "Bringing together thousands of airplanes that can talk to each other is a different task from what the Army has to do, with over a million systems on the ground that have to pass information."

What "works fine" for thousands of airplanes "may not work fine" for the Army, McConville pointed out, although he acknowledged that his forces "may not need as much information."

McConville's goal is to transform the Army by 2035, focusing on a six modernization priorities:

■ Long-Range Precision Fires to "penetrate and neutralize" enemy A2/AD capabilities and "ensuring overmatch at every echelon."

Lisa Ferdinando/DOD

"We need speed," says Army Chief of Staff Gen. James McConville. "We need range." Washington, D.C., March 26, 2020.

■ Next-Generation Combat Vehicles to increase firepower speed and survivability while allowing them to team with robotic vehicles.

■ Future Vertical Lift programs to enhance speed, range, and lethality.

■ Army Network Modernization to command and control forces "across vast terrain" and converge effects from multiple domains .

■ Air and Missile Defenses to defend the joint force, allies, and partners against manned and unmanned air and missile threats.

■ Soldier Lethality systems to help individual soldiers quickly understand and react to emerging situations while making them more precise, survivable, and lethal.

Events such as Russia's seizing of Crimea influence the Army's thinking. "Winning the first battle [to] prevent *a fait accompli* in crisis will be necessary to prevent prolonged conflict and escalation," the paper states. "Ground forces [must] decisively shape the first battle by leveraging positional and capability advantage," operating inside enemy air defense zones to create "corridors for air, maritime and all-domain forces to exploit." The Army would also establish "robust, resilient webs of communication, protection, and sustainment that enable the joint force to prosecute conflict."

Army long-range fires from the ground, the paper says, will "protect strategic deployments," provide rapid availability of the joint force, facilitate deployments "from the contested homeland to the point of employment," establish lines of communication, and maximize inter- and intra-theater transition capabilities.

MISSION ENCROACHMENT?

But that vision is duplicative, said retired Air Force Lt. Gen. David A. Deptula, dean of the Air Force Association's Mitchell Institute for Aerospace Studies. The Army, Deptula said, is "putting on a full-court press to duplicate long-range strike, air- and space-based intelligence, surveillance and reconnaissance (ISR), and command and control capabilities that already exist in the other services."

Rather than embrace jointness, which requires "each of the services to dominate in their respective domains," Deptula said, the Army is "encroaching on the domains of the other services."

There is nothing wrong, he argues, with the Army depending on the other services for their core competencies—long-range strike, space situational awareness, or maritime domination. There is not enough money available, Deptula said, to support a "rush to replicate what already exists."

If the Army believes more long-range strike capacity is needed, "then the additional investment should be made in the service with the most competency in that function," Deptula said. That would be the Air Force. If surface-to-surface missiles "are deemed appropriate to enhance air-delivered strikes," he went on, then why not assign that requirement to the Air Force? "It would be much more cost-effective, since the Air Force already

has the command and control and ISR architecture to operate weapon systems across an entire theater of operations, as well as globally," he said.

The new Army hypersonic missiles are, "unfortunately .... prohibitively expensive, non-reusable, and require extensive deployment logistics support," he asserted. "The bottom line is that our nation can ill afford to proceed with programs that replicate effective, proven weapon systems and C2ISR architectures, merely to bolster a single service's 'footprint' in the battlespace."

The new Army hypersonic missiles will cost millions of dollars per shot, versus thousands of dollars per shot for weapons released from stealth aircraft, which can be reused, Deptula said.

"The next few years will see hard choices in the defense budget," Deptula said. "Finite dollars must be directed toward programs that optimize combat options and capability across all the services. Not just one."

BIGGER PICTURE

During the same event sponsored by The Hill, where Brown and McConville spoke, former Undersecretary of Defense for Policy Michèle Flournoy took up Brown's press to accelerate change by pressing for more rapid modernization.

China's leaders, she said, "have convinced themselves that we are a nation in decline." That conclusion can only encourage China to become bolder; to deter China and "avoid miscalculation" on its part, the U.S. must deliver robust investments in defense, particularly in connectivity, while also demonstrating stronger ties with allies.

"We need to show them that we're recovering from COVID, that we're back on our feet, addressing key domestic challenges," she said. "The sooner they see us investing in key technology areas and really modernizing and transforming our military, optimized for deterrence in the Pacific, the more we're going to counter that narrative" that the U.S. is ceding world leadership.

Flournoy said "all of the wargames that have been done recently, if accurately reported," lead to the conclusion that "the currently programmed force is not going to keep our edge over the next decade. We will gradually lose our confidence in our ability to deter."

The U.S. military is "overinvested in legacy systems and underinvested ... in technologies" that ensure that Army units, fighter squadrons, and ships "are survivable and resilient and able to move, communicate, [and] strike ... in a much more contested environment, under constant attack, and disruption, she said.

Chinese doctrine calls for ending a fight "before we even engage, by taking down our command and control system, and our ability to move, and target, and communicate," Flournoy said. That demands the U.S. "build a resilient network of networks, which is what joint all-domain command and control is about. That needs to be one of the bets that the Pentagon places in the next four years if it's going to have what it needs to deter in the next 40." ✪

US to Leave Afghanistan by 20th Anniversary of 9/11

By Brian W. Everstine

U.S. forces will leave Afghanistan by Sept. 11—the 20th anniversary of the attacks on the World Trade Center and the Pentagon, Biden administration officials said.

President Joe Biden is expected to formally announce the plan, which is not "conditions based, unlike previous decisions on troop levels, on April 14. A senior administration official, who spoke with reporters on background, said sticking with the conditions-based approach is a "recipe" for U.S. forces to stay in the country forever.

However, Biden's hard deadline, is still more than four months after the May 1 deadline for American troops to leave the country, under the February 2020 deal with the Taliban. U.S. officials have long said the Taliban's level of violence remains too high to completely withdraw forces, although the U.S. already has drawn down to about 2,500 in Afghanistan, from a peak of more than 100,000 in 2011.

"We went to Afghanistan to deliver justice to those who attacked us on Sept. 11 and to disrupt terrorists seeking to use Afghanistan as a safe haven to attack the United States," a senior administration official said in a call with reporters, which was obtained by Air Force Magazine. "We believe we achieved that objective some years ago. We judge the threat against the homeland now emanating from Afghanistan to be at a level that we can address it without a persistent military footprint in the country and without remaining at war with the Taliban."

Extending the deadline will give commanders the "time and space" needed to safely withdraw from the country, the official said. The timeline is "what is required" in the judgement of military leaders, the official said.

"We have communicated with the Taliban in no uncertain terms that if they do conduct attacks against us or allied forces, as we carry out this drawdown, ... we will hit back hard and that we will hold them accountable for that," the official said.

There is no "military solution" to the problems in Afghanistan, and ongoing peace talks need to play out to end the war, the official said.

The administration has notified NATO of the plan, and "we remain in lockstep with them as we undergo this operation," the official said. Defense Secretary Lloyd J. Austin III is set to meet with NATO officials.

Withdrawing from Afghanistan will allow the U.S. military to focus more on global threats, and "we have to focus on those aspects of a dispersed and distributed terrorist threat even as we keep our eye on the ball to prevent the re-emergence of a significant terrorist threat from Afghanistan."

After Sept. 11, the remaining military presence will be focused on protecting the diplomatic presence in the country. The official did not say what size force would be needed for that mission.

Some on Capitol Hill quickly criticized the Biden administration for the plan. Senate Armed Services Committee Ranking Member Sen. Jim Inhofe (R-Okla.) said in a statement the hard deadline is a "reckless and dangerous decision," maintaining that withdrawal needs to be conditions based. ✪

USSF Unveils Structure of Space Systems Command

Space and Missile Systems Center will be SSC headquarters.

By Brian W. Everstine

The Space Force's new Space Systems Command (SSC) will oversee the new service's acquisition and launch services under one command, with the soon-to-be-former Space and Missile Systems Center (SMC) serving as its headquarters.

Space Systems Command, one of three commands within the Space Force, will officially stand up this summer after a commander is nominated and confirmed. SMC's current offices at Los Angeles Air Force Base, Calif., will be the headquarters, and launch operations at Patrick Space Force Base, Fla., and Vandenberg Air Force Base, Calif., will be realigned under the SSC.

The overall goal of the organization is to acquire and launch space systems more quickly. The SSC will work directly with the Air Force Research Laboratory and other groups like the Rapid Capabilities Office.

"We have to go fast," Chief of Space Operations Gen. John W. "Jay" Raymond said during an April 8 press conference. "It is a national imperative that we go fast."

Under the new design, SSC will be commanded by a three-star general with a two-star deputy who will serve as the "assured access to space leader" overseeing the launch enterprise. Once officially stood up, more units from the Air Force and personnel from other services will re-designate to part of the SSC. There will not be any geographic moves of units as part of the establishment, and current SMC boss Lt. Gen. John F. Thompson said the change is intended to be resource neutral.

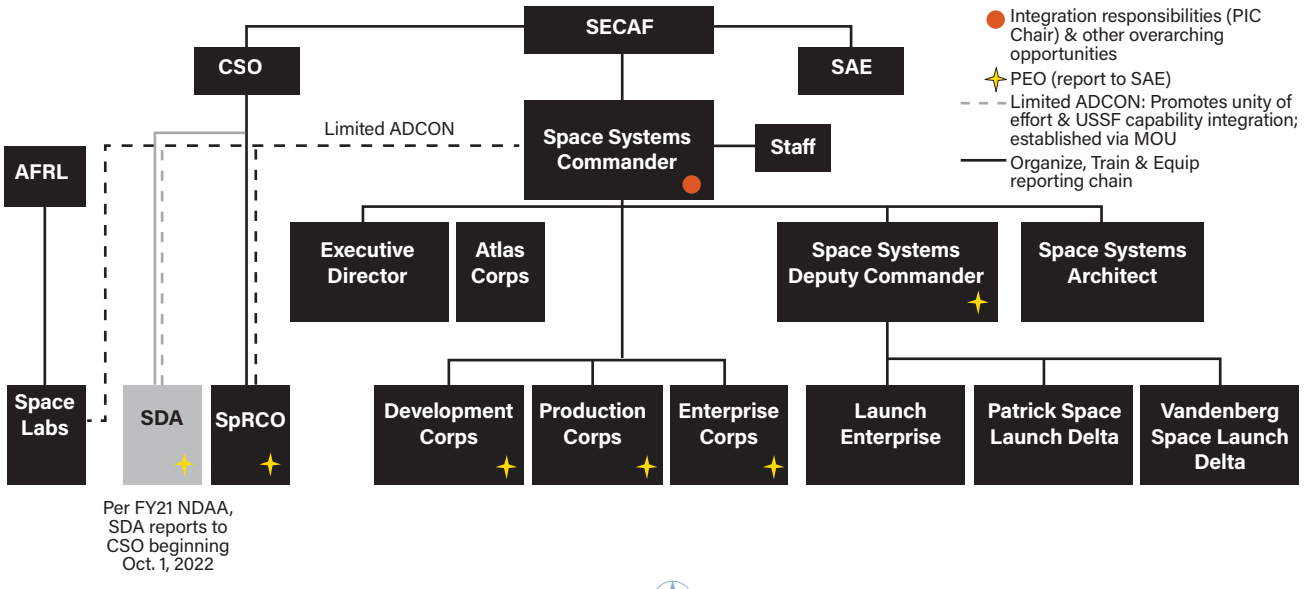
The announcement comes about a year and a half after SMC redesigned itself into SMC 2.0 with the goal of acquiring space systems faster. There are about 6,000 personnel in SMC now, and once the launch bases are realigned under SSC, the command will grow to between 10,000 to 11,000, Thompson said.

Additional changes include:

- The 61st Air Base Group at Los Angeles Air Force Base will be redesignated the Los Angeles Garrison.
- The 30th Space Wing at Vandenberg will become Space Launch Delta (SLD) 30, and the 45th Space Wing at Patrick will become Space Launch Delta 45.
- SLD 45's commander will be a one-star USSF general, director of the eastern range, SSC operations director, and acquisition lead for the "range of the future."
- Group-level organizations at the 30th and 45th Space Wing will inactivate, with subordinate units aligning under the Deltas.
- The 45th Range Squadron at Patrick will be redesignated the 1st Range Operations Squadron, and the airfield management and maintenance responsibilities will be transferred to the 45th Logistics Readiness Squadron.
- AFRL unit manpower and funding that perform space science and technology functions will be administratively controlled by SSC, but will stay aligned to AFRL.
- The Air Force Life Cycle Management Center's Strategic Warning and Surveillance Systems Division will move to SSC.
- SSC will provide select support to the Space Rapid Capabilities Office at Kirtland Air Force Base, N.M.
- SSC will provide administrative and integration support to the Space Development Agency when it transfers from the Defense Department to the Space Force in October 2022. ✪

The New Space Systems Command

Space Systems Command is one of the three principal commands in the Space Force and will be responsible for acquisition and launch services.



Russian Ministry of Defense

Russia's new rocket, the Angara-A5 heavy-lift vehicle, has performed well in tests and delivered a dummy payload into an orbit that's used by other military and commercial communications satellites.

Counterspace Capabilities

A new report tracks world military space capabilities.

By Amanda Miller

More of the world's militaries are reorganizing their command structures to prepare for future wars in space while coming up with ways to counter satellites directly or to interfere with satellite communications, according to a report out April 1.

In the 2021 edition of "Global Counterspace Capabilities: An Open Source Assessment," the nonprofit Secure World Foundation rounds up the publicly known or suspected activities, plans, and likely technological capabilities of eight spacefaring militaries in categories from weapons that target satellites in orbit, to jamming of satellite communications, to cyber attacks on satellite ground stations.

As satellite technologies such as GPS have become integral to military activities, more militaries have started figuring out ways to protect their equipment in orbit and on the ground. To elude outside interference, while also being able to disrupt others, is to achieve "space superiority," according to the report.

The U.S. military established its 11th unified combatant command, the U.S. Space Command, as well as the U.S. Space Force in 2019. More militaries had already reorganized their space entities in recent years, or have done so since.

"The challenge is that the access to space and freedom to maneuver in space can no longer be treated as a given."
—Gen. John Raymond, U.S. Space Force Chief of Space Operations

Countries outlined in the report along with their counterspace capabilities:

CHINA

China reorganized its space and counterspace forces in 2015 and placed them, along with electronic warfare (a.k.a. jamming) and cyber units, under the new Strategic Support Force.

Counterspace capabilities: China has tested rendezvous and proximity operations between satellites in low-Earth and geosynchronous orbits but apparently without "an actual destructive co-orbital intercept of a target," according to the report. Up to three development programs could lead to, or already have led to, a direct-ascent anti-satellite weapon to physically target satellites. China can likely interfere with some satellite communications but doesn't appear to actively do so.

Details of China's likely development of directed-energy weapons such as lasers are "scarce." It is building more ground-based radar stations and telescopes to track and characterize space objects for space situational awareness.

RUSSIA

Russia reorganized its "space forces" in 2015 under the Aerospace Forces responsible for space launches, ballistic missile warning, satellite control and space surveillance networks, and anti-air and anti-missile defense, the report states.

Counterspace capabilities: Russia has tested rendezvous-and-proximity operations including maneuvers, suggesting that a Russian satellite is observing a U.S. reconnaissance satellite. Russia is "almost certainly capable of some limited [direct-ascent, anti-satellite] operations" but isn't yet likely to pose a "critical threat" in this regard. It has upgraded its electronic warfare systems that jam GPS receivers in local areas. Russia likely can jam uplinks to communications satellites.

With likely international help, Russia tracks a catalog of space objects rivaling the U.S. It's system is "slightly more robust" in listing objects in high-Earth and geostationary orbits, according to the report. Russia's ground-based laser ranging system for tracking satellites could serve as a directed-energy weapon to dazzle satellite optics, while Russia is also developing such a weapon carried by airplane.

IRAN

Iran announced its Aerospace Force's new Space Command in April 2020 after the launch of an apparent cubesat.

Counterspace capabilities: Iran has demonstrated interference with commercial satellite signals. Its launch vehicle or ballistic missiles could form part of a direct-ascent anti-satellite weapon, but Iran isn't thought to be trying that. It may be able to track satellites in low-Earth orbit.

FRANCE

France reassigned control of its military satellites from its space agency to its military in 2019 while elevating a command within the country's air force and renaming that service the French Air and Space Force.

Counterspace capabilities: France wants to fill gaps in its space situational awareness by partnering with other countries in the European Union. Government officials have mentioned the idea of equipping French satellites with lasers to dazzle or blind unfriendly satellites that get too close.

INDIA

India created the Defence Space Agency and Defence Space Research Organisation in 2019 to respectively coordinate among the three branches of the armed forces and perform research and technical support.

Counterspace capabilities: India demonstrated in 2019 that its missile defense system could intercept a low-orbiting satellite. It is expanding its network of facilities for tracking space objects. It may be developing directed-energy weapons, but evidently not for counterspace purposes.

JAPAN

Japan established its military's Space Domain Mission Unit in 2020 to gather space situational awareness in the interest of tracking and protecting Japanese satellites. Expected to grow to 100 people by 2023, the unit will coordinate with U.S. Space Command.

Counterspace capabilities: Japan's ballistic missile defense system may be able to reach low-orbiting satellites but hasn't been tested in this capacity. The government is discussing whether to build a satellite to "intercept foreign threat satellites."

UNITED STATES

The United States gave U.S. Space Command responsibility for "space warfighting" and the Space Force responsibility for "operating, training, and equipping" forces in 2019.

Counterspace capabilities: The U.S. has demonstrated technologies that could form a co-orbital, anti-satellite weapon and has demonstrated its ship-based anti-ballistic missile interceptor against a satellite. Meanwhile, the U.S.'s ground-based interceptors "have the most potential capability" in the role, putting all satellites in low-Earth orbit within reach, according to the report.

The Space Force's Counter Communications System Block 10.2 for jamming geostationary satellite connections came online in 2020, the service's first offensive weapon system. While continuing to lead the world in space situational awareness, the U.S. is upgrading its network of ground-based radar stations and telescopes and adding new ones, while also agreeing to share data with other countries and "looking to leverage commercial capabilities." Like Russia's, the U.S.' laser ranging equipment for tracking satellites could dazzle or blind the optical sensors of Earth-imaging satellites.

The report cites North Korea's ability to jam civilian GPS "within a limited geographical area" and acknowledges that its ballistic missiles could conceivably be developed into a direct-ascent anti-satellite weapon.

Not mentioned is the United Kingdom Space Command announced in 2020.

"The United States has long known, long recognized that access to and freedom to maneuver in space is a vital national interest, as you said. It underpins our national security, it underpins our intelligence efforts, it underpins our treaty verification, it underpins our economy. … It underpins every instrument of national power," said Chief of Space Operations Gen. John W. "Jay" Raymond at the Air Force Association's virtual Aerospace Warfare Symposium in February.

"The challenge is that the access to space and freedom to maneuver in space can no longer be treated as a given. We have to be able to protect, because there are threats that exist today," he added. ✪

Navy, Air Force Team on Next-Gen Fighter

The Navy wants half its NGAD jets to be unmanned.

By John A. Tirpak

The Air Force and Navy are working together on the Next-Generation Air Dominance (NGAD) program, and the Navy version has a good chance of being unmanned, said Rear Adm. Gregory N. Harris, the Navy's director of air warfare, during a Navy League virtual event March 30.

NGAD will be a family of systems for both the Air Force and Navy, and the centerpiece of the Navy variant will be the F/A-XX, an aircraft that will succeed the F/A-18E/F Super Hornet, Harris said.

"We truly see NGAD as more than just a single aircraft," Harris said. "We believe that as manned-unmanned teaming comes online, we will integrate those aspects" into the air wing, which will see "adjunct," unmanned aircraft performing the roles of aerial tanking, electronic warfare, and possibly airborne early warning, succeeding the E-2D Hawkeye.

The Navy has just begun the "concept refinement phase" of NGAD, Harris said, and "we're working closely with our Air Force counterparts" on their version of the system.

"The two will likely be different as far as outer mold line, just based on different services' needs, but a lot of the internal mission systems will be similar," and will have open mission architecture, Harris said. This will enable competition in industry and "enable us to use best of breed." Open missions means that if a subsystem isn't performing as the Navy needs it to, or is too costly to maintain, "you have an ability to replace it without 'vendor lock,'" he noted, adding that's an issue that has "created problems for us before."

The Navy "firmly believes" that competition will "give us better reliability, better sustainment costs, lower overall costs," Harris said. He encourages industry to look beyond its usual teaming partners, "broaden their view," and maybe bring on smaller companies that could "work into the niche markets" of subsystems. Studies are underway about how to replace the EA-18G Growler electronic warfare platform, and that mission will likely be "half manned/half unmanned," Harris said.

The decision on whether the Navy's NGAD will be manned or unmanned will be informed by whether "autonomy and artificial intelligence [have] matured enough to put a system inside an unmanned platform that [can] … go execute air-to-air warfare."

Harris' guess is that the F/A-XX will be manned. He said last year's experiment in which an AI defeated a living pilot in an F-16 was not a pure test of skill, as the AI had full knowledge of the F-16's energy state. Air combat maneuvering is "the most complex" mission being contemplated for an AI, he said.

"In the real world," a pilot would be making judgments "as he watches the other aircraft maneuver; … did he go high or low, how many times did he go high or low, the rate at which the nose is turning, am I seeing differences in the nozzles. … All those things … [an] AI will have to learn to sense and react to."

Harris said it's not hard to imagine, in the near future, "an adjunct missile carrier … with missiles, flying defensive combat spread" missions. Such an application of an unmanned system is not a "stretch" by any means, he said.

Where it becomes a policy issue is when the AI is given the authority to shoot targets on its own, he said, suggesting that limits and rules such as Isaac Asimov's Three Laws of Robotics may come into play.

"In the next two to three years, we'll have a pretty good idea if the replacement for the F/A-18 E/F will be manned or unmanned," he predicted. "I would believe it most likely will be manned, but I'm open to the other aspects of it." Among the trades, he said, will be whether it's worth it to put the life support and escape systems into a jet, because that space and weight could be used for fuel, which translates to range or persistence.

Industry is also supplying the "art of the possible," Harris said. Ideally, the Navy likes an aircraft to be able to "call the ball" or declare itself on the right flight path from three-fourths of a mile away from the carrier, but if it can be done safely only a half a mile away, "that could change the angle of attack … and that difference … could change the outer mold line and could affect stealth capabilities, or range, or speed, or G." The current discussion "lets you find out what trade is worth what," he added.

The carrier air wing continues to shrink, even though the new Gerald R. Ford class is the largest yet, Harris said.

"In the '80s, … we typically had 90 aircraft up on the deck, now we're more like 66," Harris noted.

"Right now, notionally, we are driving toward an air wing that has a 40-to-60 unmanned/manned [aircraft] split, and over time, shift that to a 60-to-40 unmanned/manned split," Harris said. The aim is to "drive to an air wing that is at least 50 percent or more unmanned, over time."

Photo illustration by Mike Tsukamoto/staff; photo MC3 Siobhana McEwen/USN; Eric Shindelbower/Boeing

Boeing's unmanned MQ-25 Stingray is envisioned as a carrier-based aerial refueler, which could also perform intelligence, surveillance, and reconnaissance work. Carrier operations are still conceptual, however, at this stage in its development.

The speed with which that will happen depends on how easily the Navy absorbs the Boeing MQ-25 Stingray, Harris said. The unmanned aircraft will principally be used for aerial tanking—both on recovering aircraft coming back to the carrier, and to extend the range of jets at the edge of the carrier's operating zone. While all tests so far have shown the Stingray to work well, much is yet to be learned about operating it in and around the carrier environment, and in getting crews used to it. Sometimes, Harris noted, it will be the humans that make mistakes, and not the unmanned aircraft. The Stingray will also do some intelligence, surveillance and reconnaissance, and possibly some light strike, he said.

"I'm very confident in the unmanned plan," Harris said. "The challenge for all of us will be very similar, and it will come down to the networks: the reliability, sustainability, and resiliency of those networks" to support the new systems.

"The two will likely be different as far as outer mold line … but a lot of the internal mission systems will be similar."
—Adm. Gregory Harris, Navy director of air warfare

The Navy doesn't think that a larger number of smaller carriers—like the Marine Corps amphibious ships—will fit the bill in the future, despite the reduction of tails on a flattop. But it is considering the idea of a "light carrier," and has looked at 70 iterations so far, Harris reported, with a decision due in 2022.

"Over the long run, we don't find a compelling return on investment" for a small carrier, he said, due to the need to carry a lot of jet fuel and the ability to remain on station a long time. He touted the big ships as highly survivable and flexible.

The big carriers are seeing longer cruises, according to Harris, with some at sea for 10 months at a time. Though sailors want predictability, the changes have to do with global tasking and the flexibility demanded of by great power competition.

Harris said the F-35C will make its first operational cruise this summer, with 10 aircraft embarked aboard the Carl Vinson. The F-35C's longest time at sea so far was five weeks aboard the Vinson during the work-up phase. The jet has performed well, and "the performance of the most junior pilots … is really very encouraging," he said. ✪

A High-Tech Fix for the Air Force's Training Crisis?

By Shaun Waterman

The Air Force has long faced a silent crisis: It can't train and retain enough pilots. And now, challenged to confront peer adversaries, rather than the insurgents it's been engaging for the last 20 years, even the pilots the service can train aren't getting the quantity or quality of hours in mock combat they need to hone their skills, according to former USAF leaders.

A transformative new technology, which combines live training with virtual simulation, can help address that problem, its proponents say. Augmented reality (AR) training is "a game-changer," promised Will Roper, who previously served as the Air Force's assistant secretary for acquisition, technology, and logistics.

The pilot shortfall has been a persistent problem for the Air Force, despite a $1.7 billion annual training budget. But it's been highlighted anew as the U.S. military has pivoted from the "endless wars" of counterinsurgency to confront peer adversaries, especially China, which has its own fifth-generation fighters to match the U.S. F-22 and F-35.

"The gap between how we train our combat aviators and how they'll need to fight against modern adversaries has continued to grow wider," said retired Lt. Gen. David A. Deptula, dean of AFA's Mitchell Institute for Aerospace Studies. "We're essentially still training our pilots the same way we did 60 years ago."

Combat training for fighter pilots, with a red team playing the role of adversaries like China's fifth-generation J-20, is expensive and time-consuming. Above all, it's "limited by the availability of air and ground training assets that accurately replicate those peer threat systems," explained retired Gen. James M. Holmes, former head of Air Combat Command who now serves as Chairman of the Red 6 board. He added that the red teams at major Air Force exercises like Red Flag "resemble 1980s Warsaw Pact threats more than they resemble the capabilities of 2020's China and Russia."

Forty years ago, Holmes said, as a young lieutenant, he flew more than 225 training sorties a year, or about 350 hours a year. Now, his son Capt. Wade Holmes, who flies F-16s in the Air National Guard, is "lucky to fly 120 of those [training sorties] a year and almost half of those are flown as Red Air, providing training support for someone else."

The Air Force has used simulation technology to try to close that gap, and is investing heavily in its new approach to training: Live, virtual, and constructive. "LVC is widely recognized as the only way, the only cost-effective way, for us to train against fifth-generation adversaries," said longtime Senate Armed Services Committee staffer and USAF veteran Robert "Otis" Winkler. "We spent a ton of money and a ton of time developing the virtual and constructive portion of it."

He spoke alongside Holmes and Deptula at a Mitchell Institute virtual seminar March 16.

Simulators and other virtual training tools allow geographically dispersed forces—including foreign allies—to train together, Winkler noted. Simulators also let pilots push the envelope in ways that would be too risky in real-life training, noted Holmes. "You can practice things in a sim that aren't safe to practice in an aircraft."

Courtesy Red 6

Daniel Robinson, founder and CEO of Red 6, demonstrates the Airborne Tactical Augmented Reality Systems (ATARS) integrated into a Berkut 540 home-assembled propeller-driven aircraft, which he built himself.

But, Holmes added, "There's no substitute for live training."

That's because simulators can't accurately reproduce the physical and intellectual stress of actual flight, noted Dan Robinson, a retired Royal Air Force pilot who became a USAF flight training instructor and was the first foreigner to fly an F-22. "It's one thing to perform a maneuver in a sim, it's another thing to perform it when you're pulling 9Gs," Robinson told Air Force Magazine. "The physics matters. … The cognitive load is completely different when the pilot is actually in flight."

Robinson is the founder and CEO of Red 6, a tech start-up offering augmented and virtual reality solutions as a way to allow pilots to train live against virtual adversaries.

"It's the best of both worlds," Robinson said. Pilots can train in real flight—flying with a special helmet and heads-up display that allows them to see their virtual enemies. The enemies, being online creations, can be modeled to mimic the capabilities and profile of any adversary weapons platform—and can be powered by artificial intelligence. "You can create the adversary, define his capabilities, and train against weapons systems that would be too expensive for live training, such as hypersonic missiles," Robinson said.

But the technology is challenging, he explained. Virtual

reality (VR) creates an entirely synthetic environment, which is a relatively straightforward challenge. "In augmented reality we are introducing virtual entities, virtual objects into the real world, and making them interact dynamically with us, with our surroundings, as if they were really there and that's a much more complex set of technical problems to solve."

The key breakthrough technologies that enable Red 6's Airborne Tactical Augmented Reality System (ATARS), Robinson said, were in vision tracking—ascertaining where the pilot is looking and shifting the perspective of the virtual objects accordingly—and in the display. "Most VR doesn't work outside. … The environment is too dynamic and the display isn't visible enough. It's like trying to look at your cellphone screen in bright sunlight." VR technology is generally limited to a 60-degree field of vision, about a third of the 180-degree field of vision humans have in the real world. "We are at about 120 degrees right now, and we are working on expanding that," Robinson said.

AR is a transformational technology, with applications way beyond pilot training, Roper said. "This will disrupt not just Air Force training, but all-domain training. … Augmented reality provides a paradigm-shifting opportunity for the military to train at much lower costs and against threats and in environments that cannot be recreated in the real world," added Roper, who was appointed last month to the Red 6 Advisory Board. "AR technology has major commercial applications as well."

Red 6 has completed a SBIR II contract from AFWERX and is expecting a SBIR III soon. The Red 6 team is working to integrate its ATARS technology into a T-38 training aircraft at Holloman Air Force Base in New Mexico.

"That is the next step for us," Robinson said, "to demonstrate how this will work in an Air Force trainer jet." ✪

To Fly, Fight, and Win … Air Power Any Time, Anywhere: USAF Unveils New Mission Statement

The Air Force's new mission statement is familiar, all-encompassing, and joins two parallel aspects of the service's 74-year history: "To fly, fight, and win … Air power anytime, anywhere."

The new mission statement focuses on air alone, now that the Space Force is independent, and emerged from consultations with a spectrum of Airmen representing Active, Guard, and Reserve members in both the enlisted and officer ranks, said Air Force Chief of Staff Gen. Charles Q. Brown Jr. in a release.

Chief Master Sergeant of the Air Force JoAnne S. Bass said the mission statement will help join the entire force of more than 689,000 Airmen, regardless of whether their core mission is air superiority; global strike; rapid global mobility; intelligence, surveillance, and reconnaissance; or command and control.

"Every Airman, from every career field, is directly responsible for delivering, supporting, launching, and driving air power," Bass said in the release.

Air Force Association President and retired Lt. Gen. Bruce "Orville" Wright said the mission statement joins two central concepts and themes that have carried the Air Force forward throughout its history. "Flying, fighting and winning is the combat goal, it's what Airmen do," he said. "But that is underscored by the imperative of what our Air Force contributes to our nation's security: Delivering unparalleled air power, any place, any time, no matter the risk or obstacles before us. This is possible because of the commitment, readiness, and professionalism of our Airmen and the unwavering support of their families." ✪

Under Biden, Pentagon Again Allows Transgender Troops to Serve Openly

By Brian W. Everstine

The Pentagon on March 31 reversed its policy on transgender troops, formally opening the door to service for those who meet military standards.

The move effectively turns the clock back to 2016 when the Pentagon first reversed its policy barring transgender individuals from openly serving in the military or from being involuntarily separated, discharged, or denied reenlistment because of their gender identity. In 2017, President Donald J. Trump announced via Twitter a new ban on transgender service, catching military leaders by surprise. The Pentagon took the matter under advisement and offered a compromise ban in March 2018, sparking multiple lawsuits. Initial lower court rulings blocked the ban, until the Supreme Court cleared the way for the ban to take effect in April 2019. Under the policy, currently serving transgender service members were permitted to stay. President Joe Biden issued an executive order in January that removed all limits less than two years later.

"The Secretary of Defense strongly believes that the all-volunteer force thrives when it is composed of diverse Americans who can meet the high standards for military service, an inclusive force that strengthens our national security posture," Pentagon spokesman John Kirby said in a March 31 briefing.

Kirby said the policies are designed to prohibit discrimination, provide a means to accession into the military in one's self-identified gender as long as the standards are met, provide a path for those in service to seek medical care, and protect the privacy of those already in service.

Stephanie Miller, the Defense Department's director of accession policy, said during the March 31 briefing that there are about 2,200 troops in the military who are diagnosed with gender dysphoria. Under the new policies, the Pentagon will provide the "medically necessary care" to include either cross-sex hormone treatment or surgery.

Military officials expect the costs of those treatments to be in the "handful of millions" and will be covered by the "several billions" assigned to the military's defense health budget.

"We don't expect a significant impact. The cost was a main reason behind the ban, with Trump in his tweet announcing the change, saying allowing transgender individuals to serve caused "tremendous costs and disruption."

The new policies will go into effect in 30 days, giving the military services time to adjust their policies and protocols, Kirby said.

Defense Secretary Lloyd J. Austin III, in a March 31 memorandum commemorating International Transgender Day of Visibility, said "we will remain the best and most capable team because we avail ourselves of the best possible talent that America has to offer, regardless of gender identity."

The RAND Corp., in a 2016 study, estimates that there are between 1,320-6,630 transgender service members in Active duty, with the figure varying because of a lack of data and current policies. RAND also estimates that Active health costs would increase by between $2.4 million and $8.4 million if the military covered transition care. ✪

A high-altitude airdrop of simulated Joint Air-to-Surface Standoff Missiles on a pallet demonstrates how a C-17 Globemaster III airlifter could in the future be used to launch weapons using airdrop procedures.

Courtesy photo

Mobility Bombardiers: AMC Aims to Arm Transports

By Brian W. Everstine

Air Mobility Command (AMC) has big plans to overhaul its gray-tailed heavies for the high-end fight, turning airlifters into command and control assets and possibly putting air-to-air missiles on tankers.

The long-term planning is a shift away from the idea of keeping mobility assets away from a fight, using them instead just as delivery platforms for other combat forces.

AMC boss Gen. Jacqueline D. Van Ovost addressed concerns about the future of mobility and the idea of doing "something out of the box," during a March 31 Mitchell Institute for Aerospace Studies event, saying, "Why wouldn't we?"

"Why wouldn't we change the calculus by doing different things, moving away from the antiquated view that AMC just brings stuff when they're called … to be a maneuver force inside the threat ring," Van Ovost asked.

Several exercises and training events have shown that aircraft such as C-17s, KC-135s, and KC-46s have these capabilities. During an advanced battle management demonstration last year, a C-17 dropped Joint Air-to-Surface Standoff Missiles using a roll-on pallet. The idea is that instead of dropping weapons at a forward base to then be loaded on a bomber, the C-17 itself can drop the weapon in the air and Air Force Global Strike Command crews would then be in charge of command and control (C2) once it leaves the aircraft, Van Ovost said.

AMC will test having the C2 control on the airplane itself in an upcoming Advanced Battle Management System (ABMS) demonstration, she said.

"Instead of dropping them on a ramp somewhere at some island, we're just dropping them in the sky, and after they drop out of the sky, someone else lights them off and takes them to the target," she said.

AMC is looking forward to attritable systems, such as the Defense Advanced Research Projects Agency's Gremlins small unmanned aircraft, to show how C-5s and C-17s could launch these types of systems for both offensive and defensive counter air. The Gremlins can "actually be recaptured and rearmed on board," she added.

As part of the ABMS experiment last year, an AMC C-17 used its on-board antennas and other systems to direct a Marine Corps High Mobility Artillery Rocket System. In that scenario, the artillery system rolled off the C-17, received its target information from the aircraft's system, fired, and rolled back to "move before getting killed," she said.

The command's newest aircraft, the KC-46 tanker, has been selected to carry the first released system as part of the ABMS effort—a pod that can be strapped on to provide resilient command and control. The aircraft was picked because it "has the pipes, it's got antennas" that are ready for the system, she said, though the KC-135 could likely get a system like it in the future.

In a fight, the tankers will need to be flying near the action anyway, supporting fighters, so using them as a command and control system, either as the primary or a resilient backup, just makes sense, Van Ovost said.

"When I think about where our airplanes are, they are forward in the fight. So, why wouldn't we put a capability that's a pod that fits on the airplane, or that rolls on the airplane, because we have the size, weight, and power to do it and we're out there anyway," Van Ovost said.

In a high-end fight, mobility aircraft will be targets and will need improved defensive systems beyond the existing countermeasures. Aircraft such as the C-17 and KC-46 already have hardpoints on their wings, so it is "not a stretch to think that we could put one or two missiles on there for self defense for ourselves."

AMC is preparing for its largest exercise, Mobility Guardian 21, on May 15 to 26, which will further demonstrate some of the new capabilities and tactics. This year's version is scheduled to take place in multiple locations in the northern United States, with the focal point on the Alpena Combat Readiness Training Center in Michigan, where the main scenario will focus on humanitarian assistance and disaster relief in a contested environment. The 2021 event will be smaller than previous iterations, with about 1,500 personnel from five major commands and representatives from other services.

The exercise will include field artillery, defensive counter-air, cyber threats, and other scenarios. AMC crews will need to enter a contested area, provide humanitarian assistance, get out, and then transmit data forward, Van Ovost said.

"We're doing the pieces, we're not going to solve everything at once," she said. "But what we want to know is, in these experiments and in these future games where these are playing, do they make a difference? And so, we're going after that analytically, and some of the key problems we have to solve to get there, and from that we'll learn whether or not we want to proceed." ✪

Air Force Ground Accident Investigation report

An Airman lost control of this Polaris Ranger all-terrain utility vehicle when driving in the cargo yard at Ali Al Salem Air Base, Kuwait. The passenger was killed in the accident.

Airman Killed While "Joyriding" in an ATV, Investigators Find

By Amy McCullough

Two Airmen were "messing" around on a single all-terrain vehicle in the cargo yard at Ali Al Salem Air Base, Kuwait, last September when the driver lost control and the ATV rolled over, pinning the passenger to the ground and killing him instantly.

Staff Sgt. Ronald J. Ouellette, 23, of Merrimack, N.H., died in the Sept. 14, 2020, crash. An autopsy cited blunt force trauma to the head as the cause of death. The driver, also a staff sergeant, was treated for minor injuries and released. Neither Ouellette nor the driver—both assigned to the 386th Expeditionary Logistics Readiness Squadron—were wearing seatbelts or helmets.

Accident investigators said the Airmen were driving the Polaris Ranger all-terrain utility vehicle at about 15 mph, 10 mph over the posted speed limit in the cargo yard. The driver told security forces the two were "just out joy-riding" and "hit the turn too hard." He said he took his foot off the gas before turning the corner, but he did not remember hitting the breaks.

When the vehicle rose onto two wheels in the midst of the turn around 5 p.m. local time, the driver attempted to right the vehicle, but failed. He exited the passenger compartment through the protective roll cage, according to the ground accident investigation report, released April 13. Investigators believe Ouellette also attempted to jump from the ATV, but didn't make it.

The driver found Ouellette pinned under the protective roll cage, but was unable to lift it off of him. He called his supervisor for emergency support and security forces and first responders arrived on the scene at 5:02 p.m. Ouellette was declared dead on arrival.

Ouellette was an aerial porter in the Air Force Reserve. He joined the Air Force on Oct. 10, 2014, and was a member of the 42nd Aerial Port Squadron at Westover Air Reserve Base, Mass.

"Ronald was a valued member of the Patriot Wing and there are no words that can heal the pain his loss brings," said Air Force Col. Craig C. Peters, commander of the 439th Airlift Wing at the time, which includes Ouellette's unit, according to Stars and Stripes. "The loss of our own, or any service member, is never easy. During this difficult time, our priority is to do all we can to lift and support his family, friends, fellow Airmen in his squadron, and loved ones who are struggling."

The fatal accident occurred just two days after another deadly accident. Senior Airman Jason Khai Phan was killed while patrolling Ali Al Salem. Accident investigators concluded Airmen were not wearing seatbelts at the time of that crash and were inexperienced with the Mine-Resistant Ambush Protected All-Terrain Vehicle they were driving. Phan was assigned to the 66th Security Forces Squadron at Hanscom Air Force Base, Mass., and was deployed to the 386th Expeditionary Security Forces Squadron at the time.✪

Paul Wenzel/USAF

Chief of Staff Gen. Charles Q. Brown Jr., sat down with Faye Banks-Anderson, 78th Air Base Wing Public Affairs chief, to talk about diversity and Black history in February.

DAF Begins Work on Second Diversity Review

By Brian W. Everstine

The Department of the Air Force's kicked off the second Inspector General Independent Disparity Review on April 9, sending surveys to Airmen and Guardians, and conducting interviews that are focused on barriers to service that some faced based on gender and ethnicity.

This second review is focused on disparities Hispanics, Latinos, Asians, American Indians, Alaska Natives, Native Hawaiians, and other Pacific Islanders face, along with gender issues. It follows the first review, which focused on barriers to service and military justice inequalities that Black Airmen face.

"The review we conducted last year and the follow up efforts we've taken since have really opened the door to meaningful, enduring, and sustainable change in the areas of racial disparity," Air Force Chief of Staff Gen. Charles Q. Brown Jr. said in a release. "But we have a lot more work to do, and the overwhelming responses we had from our first review indicate that our Airmen and Guardians want to have a voice in the solution. I am 100 percent focused on ensuring we follow through with lasting results."

The review, which was announced in February, began with anonymous online surveys starting April 9. Additionally, USAF will use targeted interviews, targeted small-group surveys, and

a review of data, according to the release. The review focuses on both USAF and U.S. Space Force personnel. The Department of the Air Force Inspector General will release its findings this summer.

"Diversity and inclusion underpins the readiness of our Air and Space Forces," said Chief of Space Operations Gen. John W. "Jay" Raymond in the release. "This disparity review across gender, race, and ethnicity opens the aperture, allowing us to dig deeper into an issue that affects all of our Guardians and Airmen. We will continue to solicit and hear the experiences, perspectives, and concerns of those who serve. Together, we will create an environment where Guardians and Airmen can thrive, and where they are only defined by their excellence."

The first review produced a 150-page IG report, with 123,000 survey responses and 138 in-person sessions. Black Airmen reported a distrust of their chain of command, military justice inequalities, along with other administrative issues. ✪

Tech Sgt. William O'Brien

Aircraft maintainers recover an OC-135B Open Skies airplane at the Lincoln, Neb., Airport on Feb. 1. Both OC-135Bs will be sent to the boneyard at Davis-Monthan AFB, Ariz.

USAF Retiring its Two OC-135 Open Skies Aircraft

By Brian W. Everstine

The Air Force is sending its two OC-135B Open Skies aircraft to the boneyard after the U.S. withdrew from the treaty late last year, even though it's not clear whether the new Biden administration will rejoin the monitoring agreement with Russia.

Because there is no longer "a mission requirement for the OC-135B, the Department of the Air Force has moved to initiate standard equipment disposition actions in accordance with regulations," an Air Force spokesperson said in a statement. This includes sending the two aircraft from Offutt Air Force Base, Neb., to the 309th Aerospace Maintenance and Regeneration Group—also known as the boneyard—at Davis-Monthan Air Force Base, Ariz., "in the next couple of months."

The announcement comes the week after the Air Force sent Congress a report on the viability of the aircraft, as required by the 2021 defense policy bill. Neither the Air Force nor Capitol Hill officials would release the report on April 6.

The Air Force is considering what to do with the legacy wet-film cameras and the Digital Visual Imaging System off the aircraft. "This could include making the items available to allies and partners through the Foreign Military Sales program as appropriate," an Air Force spokesperson said in a statement.

The two aircraft, modified WC-135Bs, began flying in 1993 and include specialized mission equipment such as side-looking synthetic aperture radar, infrared line scanning devices, video camera, and framing and panoramic optical cameras. The Air Force in recent years worked to update the aircraft's cameras, and in 2020 canceled plans to recapitalize the fleet.

In 2018, the State Department declared Russia was in violation of the treaty for preventing access to Kaliningrad and the border with Georgia. The Air Force did not fly any sorties at the time, but resumed flights in 2019 and now continues to fly at a low pace.

Before the Trump administration formally withdrew from the treaty in November 2020, U.S. officials repeatedly complained that Moscow violated the agreement, claiming also that satellite systems could provide better surveillance than the aging aircraft. ✪

Hypersonic Setback: ARRW Booster Fails in Missile's First Test Flight

By Brian W. Everstine

The first booster flight-test of the Air Force's AGM-183A Air-launched Rapid Response Weapon (ARRW) failed April 5. In a release issued April 6, the service acknowledged the failure is a "setback" for hypersonic progress, but said the test still provided "valuable information" for the program's development.

The test, which was conducted at Point Mugu Sea Range, Calif., was supposed to be the first time the ARRW fired its booster vehicle and flew on its own, but the missile did not "complete its launch sequence" and remained on the B-52H Stratofortress. The bomber then returned to Edwards Air Force Base, Calif.

"The ARRW program has been pushing boundaries since its inception and taking calculated risks to move this important capability forward," said Brig. Gen. Heath A. Collins, Armament Directorate Program executive officer, in a release. "While not launching was disappointing, the recent test provided invaluable information to learn from and continue ahead. This is why we test."

The long-anticipated test would have been the eighth flight-test for the ARRW program, following seven captive-carry flights. During the mission, the Air Force intended to demonstrate a safe release from the bomber, assess booster performance, booster-shroud separation, and simulated glider separation, according to the release.

Because the vehicle was able to safely land, the 419th Flight Test Squadron at Global Power Bomber Combined Test Force at Edwards will "explore the defect and return the vehicle back to test," according to the Air Force. However, no timeline for this process was provided.

The ARRW arrived to Edwards via truck on March 1 and immediately went into ground test and checks. USAF officials originally said the booster flight-test would happen in December 2020, a date that was pushed to March 1 and then to early April.

The Air Force wants to deploy the ARRW as its first hypersonic weapon in early 2021. ✪

John T. Correll, 1939-2021

The USAF Almanac, Air Force Magazine's most popular annual issue, was re-imagined by John Correll while he was still on Active duty.

Courtesy

Correll and his wife Gina are congratulated on his Lifetime Achievement Award by Marc and Lana Schanz at AFA's Air, Space & Cyber Conference in 2017.

By John A. Tirpak

John T. Correll, editor in chief of Air Force Magazine from 1986 to 2002, a principal contributor for years afterward, and a recipient of the Air Force Association's Lifetime Achievement Award, died April 5 at age 81.

Correll used the bully pulpit of the Air Force Magazine to argue forcefully for Air Force issues and fair treatment of the service in modern and historical context. He was senior staff adviser to AFA's executive committee and board of directors on national defense issues, and wrote many of AFA's white papers, special reports, and the annual Statement of Policy. He was also an unofficial adviser to several Chiefs of Staff and senior USAF leaders.

His reporting in 1994-1995 about the Smithsonian's plans to display the newly restored B-29 "Enola Gay"—in a way that would paint the U.S. as a vengeful aggressor in WWII—rallied veteran's groups and Congress to oppose the exhibition. As a result, the Smithsonian dropped its plan and ultimately presented the aircraft without an editorial message. For this work and his other advocacy, AFA recognized Correll with its 1995 Gill Robb Wilson Award for arts and letters.

Correll served 20 years in the Air Force, retiring in 1982 as a lieutenant colonel. He served in Vietnam and Thailand, and was a distinguished graduate of Air Command and Staff College. Correll was the editor of Airman, the official magazine of the Air Force, and in his last assignment, was chief of editorial services for the American Forces Information Service in Washington.

During his Air Force career, he undertook a one-year "Education with Industry" tour with Air Force Magazine, during which he proposed overhauling the annual Almanac issue, implementing a plan very close to the format that has been used ever since.

He officially joined Air Force Magazine in 1984, rising in just two years from senior editor to editor in chief. He launched a popular department—"Valor"—which ran for nearly 20 years, highlighting the stories of heroic Airmen. In 2021, he helped launch a new series, Leaders and Heroes, modeled on the Valor articles from years before.

After his retirement from the Air Force Association in 2002, Correll continued to contribute historical features to Air Force Magazine, frequently debunking myths about the Air Force, its notable personalities, and milestone events. His byline appeared in the magazine for more than 35 years.

Correll also played a central role in the creation of AFA's Eaker Institute, forerunner of today's Mitchell Institute for Aerospace Studies, which he conceived as an intellectual advocacy arm of the Air Force Association.

He received AFA's Lifetime Achievement Award in 2016, for his contributions to "the advancement of aerospace power."

"John Correll was a terrific wingman, in more ways than he may have known," said retired Lt. Gen. Bruce Wright, president of the Air Force Association. He maintained "the highest standards of professional writing and mission-focused content," and "his words about airpower flew with me throughout my career." Correll's articles, and his advocacy on behalf of airpower "provide a lasting legacy to our Airmen and Guardians of their rich heritage."

Retired Gen. Michael Dugan, the 13th Chief of Staff of the Air Force, said, "The nation has lost a patriot today. John Correll was a writer, scholar, and historian. He was all things air and space; a meticulous researcher and a precise practitioner of English communications. He started and ended his long writing career as an Airman and was, at the close, still telling the remarkable story of American men and women serving and protecting their country at home and abroad in the air and space. He was my friend."

Born Dec. 14, 1939, in Conover, N.C., Correll was a reporter for the Hickory, N.C., Daily Record before entering the Air Force in 1962. He earned an M.A. in communications from Michigan State University and an A.B. in history from Lenoir Rhyne College.

He is survived by his wife of 49 years, Gina; a daughter, Donna, and a granddaughter, Rae. ✪

FACES OF THE FORCE

Senior Airman Kelly Willett/ANG

Alaska Air National Guardsmen from the **176th Wing** rescued an injured Iditarod musher March 9, some 136 miles north of Anchorage. Senior Master Sgt. Evan Budd, a rescue coordination center superintendent, said the musher was injured after falling near a checkpoint for the 900-mile dogsled race, which traverses remote Alaskan wilderness. An HH-60G Pave Hawk and a Guardian Angel rescue team were dispatched. Airmen stabilized the injuries and transported the musher to a hospital.

Senior Airman Alex Miller

Brothers **Master Sgt. Aaron Farris** and **Airman 1st Class Daniel Farris** were united at Spangdahlem Air Base, Germany, after 15 years apart. Aaron is 13 years older than his brother and left home to join the military when Daniel was six. Travel restrictions and lockdown measures to combat the spread of COVID-19 make it more difficult for troops to visit home, so "having family over here is especially beneficial to my mental health," Daniel said. "I see this as one of the most unique and rare opportunities two brothers can have," said Aaron.

Seven Airmen made history as the first "Accelerated Path to Wings" program graduates, and they transitioned from students to Air Force pilots during a ceremony March 12. Nicknamed the **'XPW'** program, the course is part of AETC's pilot training transformation efforts, and students completing an undergraduate pilot training (UPT) curriculum that only utilizes one airframe, the T-1 Jayhawk. "We had students from various backgrounds, including five who had completed their initial flight training and two who had earned their private pilot's license," said Lt. Col. Eric Peterson, 99th Flying Training Squadron commander. "This is a great program for students who want to go fly heavy aircraft in Air Mobility Command, or who want to go fly certain aircraft in special operations or in Air Combat Command." Traditional UPT is a three-phase program that produces pilots in 12 months. The XPW program is done in two phases and graduates students in about seven months. Once students make it through the required simulator training, they go on to fly in the T-1.

Sean Worrell

USTRANSCOM/courtesy

Doug Cook, deputy chief, Airlift Division, USTRANSCOM Acquisition Directorate, received the 2020 Pricing and Contracting Legends Award, which recognizes individual efforts within DOD acquisition and contracting, March 25. Cook's supervisor, Gina Lee, said, "Doug's intimate knowledge of our contracts and how the airlift system works allows him to craft unique solutions quickly." Cook thanked "a long list of supervisors who allowed me to fail a few times, and grow along the way."

Staff Sgt. Chandler Baker

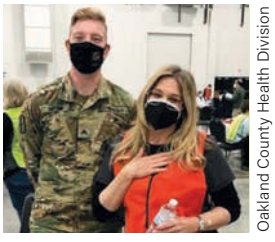
Capt. Haida **StarEagle** on March 12 became the first female Native American intelligence officer to join the United States Space Force. "Some people just have that 'it' factor, and I can tell you that the Space Force is gaining an absolutely phenomenal leader," said Lt. Col. Michael Hollingsworth, joint collection training division lead, United States Special Operations Command. "She is the most motivated person I've met in my 12 years of service," said Master Sgt. Ryan Ritchey, 36th IS chief of training. "Her commitment to her Airmen is at a level I've never seen before." From Brooklyn, N.Y., StarEagle is a member of the Matinecock Tribe. Her father, Chief Samuel Little Fox, is the Shaman for all 13 tribes on Long Island, and led the invocation during the induction ceremony. "When I was born, during my naming ceremony, the Shaman came back from his vision quest and told my father that I was destined for the stars," said StarEagle. "My entire life has been focused toward the stars, and joining the Space Force puts me one step closer to following that dream."

Senior Airman Alex Miller

Jens Fleer, 52nd Fighter Wing base falconer, demonstrated bird-of-prey handling at the 726th Air Mobility Squadron on Spangdahlem AB, Germany, March 5. Falconers train many types of birds of prey, multiple times per week. Jack, a male hawk, is trained to hunt on base to eliminate the chance of catastrophic bird strikes, which can damage aircraft. The Bird/wildlife Aircraft Strike Hazard (BASH) Team also employs dogs to clear the flight line of any wildlife before aircraft takeoff.

Machiko Arita/USAF

Chaplain (Capt.) Lance Brown, 374th Wing Staff Agency at Yokota AB, Japan, and his wife, Karen Brown have been performing home cleanses, or anointings, for the past eight years in homes where "odd things occur." Supernatural activity is reported so often at this base in western Tokyo that it inspired a Facebook group, Yokota Ghost Hunter Club. The Browns said their cleansings are sometimes about helping someone cope with anxiety, heartbreak, or a troubled past.



Oakland County Health Division

Michigan Army National Guard **Sgt. Christian Grow,** a combat medic, is credited with saving a nurse's life at a vaccination clinic during a lunch break. "I thought, 'She's actually choking,'" Grow said, describing the incident. He pulled the woman out of her chair and performed the Heimlich maneuver. "I seriously feel that had he not done that, I would have needed a tracheotomy to open my airway. It was very traumatic and very rapid," said Jacqueline Goldstein, the nurse. "I'm happy that we have the National Guard here."

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

Master of the Globe

As the Globemaster III racks up its 4 millionth flight hour, planners ready upgrades and begin to imagine what comes next.

The C-17 fleet surpassed 4 million flying hours on Jan. 15. USAF's 222 C-17s, and 53 others owned and flown by nine nations, are the go-to airframe for global airlift. A long series of planned upgrades looks to keep the Globemaster III relevant and flying into the 2060s.

Staff Sgt. Christian Sullivan

By Brian W. Everstine

On a chilly January morning, Airmen piled into C-17 tail No. 99205 at Joint Base Charleston, S.C., and took off for a rendezvous with history. Not long after takeoff, the jet joined up with a KC-46 Pegasus tanker and logged the 4 millionth flying hour for the unique airlift, a plane that began as a case study for acquisition failure and transformed, over nearly three decades, into the backbone of U.S. military airlift.

"This is a significant milestone for the program," said Col. Scott Ekstrom, Air Force Life Cycle Management Center C-17 System Program Manager. "It is truly a testament to the dedication and hard work that has gone into producing and keeping the C-17 fleet operational and effective over the years. It has been a team effort, everyone who has supported the C-17 fleet should take pride in this milestone."

The Air Force's 222 C-17s are the major portion of a global fleet of 275 aircraft flown by nine nations, including an international consortium. They are the go-to airframe to transfer personnel and materiel to combat zones and remote locales around the world, enduring conditions from dirt airstrips in the Syrian desert to ice and snow in Antarctica.

"We're optimistic on analysis, but this requires continuing study for what we would have to do to that airplane."—Gen. Jacqueline Van Ovost, AMC commander

Today, Air Mobility Command (AMC) anticipates keeping "the Moose" relevant out to around 2060, while it develops requirements for a "family of systems" that someday will replace it.

FROM FAILURES TO SUCCESS

The C-17 dates back to the initial award for a "C-X" airlifter to McDonnell Douglas in August 1981, with the company basing its projected new plane on its YV-15 demonstrator. McDonnell promised a low-risk design based on proven technology.

It wasn't long before turbulence struck. The requirement to land on short airstrips and to back up on a runway while also serving as a strategic airlifter carrying M-1 battle tanks and other equipment over vast distances complicated development. Flight control and wing design issues emerged.

Before long, Congress and the Pentagon threatened to cancel the program outright. Military and industry leaders were fired. Boeing, which would eventually buy McDonnell Douglas, offered an alternative: a militarized 747-400F, called the C-33. Lockheed Martin offered an updated version C-5 variant.

Gen. Jacqueline D. Van Ovost, now commander of Air Mobility Command, was a test pilot working on the C-17 demonstration in those early days. She became chief of the C-17 Acquisition Branch and C-17 Program Element Monitor. The program was "being battered around as a waste of money," she recalled recently. Deficiencies were rampant.

In 1994, USAF and McDonnell Douglas struck a deal to fix the problems. USAF spent more and altered requirements.

"Everybody put their nose to the grindstone," Van Ovost recalled in an interview with Air Force Magazine. "We were kind of given an ultimatum, and we produced. We saw real gains met, so we leveraged everything we could, and we turned that airplane around."

The USAF team focused on concurrently conducting initial operational test and evaluation and developmental test and engineering, with the aim of fixing problems quickly.

Flight-tests focused on aerial refueling, dirt operations, low-altitude operations, and combat-style airdrops, the major challenges. The unique capacity and rugged nature of the C-17 meant it soon became the backbone of mobility operations supporting operations in Iraq and Afghanistan and all around the globe. Those challenging capabilities demanded in the 1980s and '90s were right in tune with actual demands in the 2000s.

"To turn around and watch us use it in combat was very, very satisfying for me," Van Ovost said.

Today, she sees parallels with the challenges and struggles she endured with C-17 and today's poster child for troubled mobility aircraft, the KC-46. "When I got on the program, the C-17 was being battered around as a waste of money on the Hill. That was a time when we only had 40 airplanes on contract. And I stayed with that program for five or six years and in that period, we turned it from, you know, the joke, to we signed our first multiyear [contract] for the 120 airplanes because of the turnaround. ... Frankly, it had more "Category One"—or the worst kind of deficiencies—than this airplane does."

The last USAF C-17 was delivered in 2013; two years later, the fleet logged its 3 millionth hour, and Boeing, having long before acquired McDonnell Douglas, delivered its last C-17 and closed the Long Beach, Calif., production line.

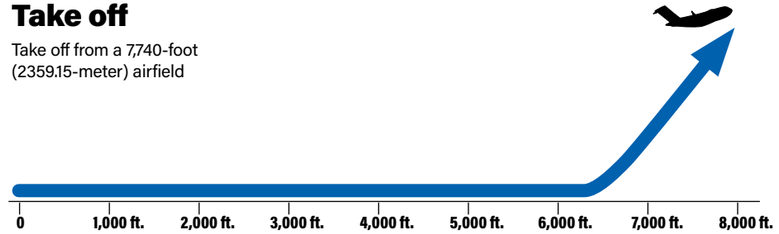
"The C-17 is a robust, solid platform that can get in and out of airstrips with significant cargo better than any airlifter out there," Ekstrom said. "We are seeing that the aircraft can fly longer than its initial design—but not without updates and modernization."

C-17 GLOBEMASTER III

The C-17 Globemaster III, sometimes called the "Moose," was not an out-of-the-gate success. Numerous problems plagued development and pushed up costs. But 30 years—and 4 million flight hours later—it's proven itself to be the flexible workhorse of the U.S. and allied airlift fleet, a long-haul heavy-lift jet that can take off and land on expeditionary airfields carrying tanks and other heavy gear and airdrop more than 100 paratroopers. The C-17 has participated in every major contingency operation since Operation Iraqi Freedom in 2003.

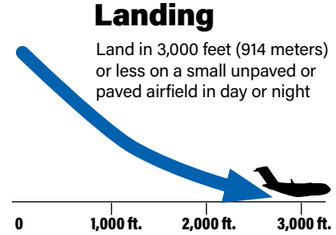
Take off

Take off from a 7,740-foot (2359.15-meter) airfield



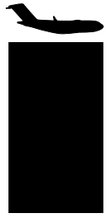
Landing

Land in 3,000 feet (914 meters) or less on a small unpaved or paved airfield in day or night



Ceiling

45,000 ft



Flight time

Fly 6,230 nautical miles with no payload

Range

2,760 miles

with 169,000 lbs of cargo, capable of in-air refueling

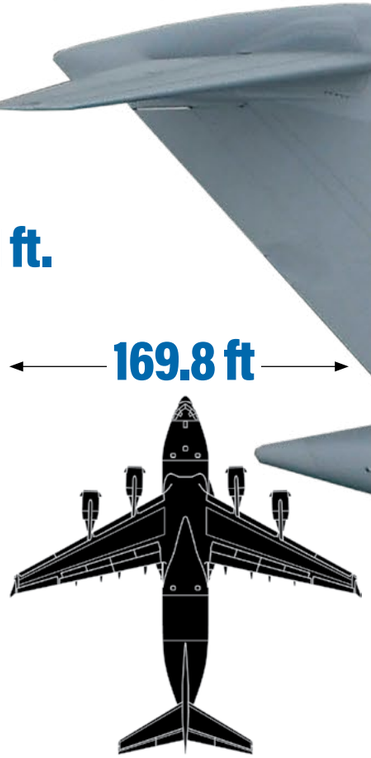
Speed

518 mph

at 25,000 ft

55.1 ft.

169.8 ft



Who Flies the Globemaster III?

Australia, Canada, India, Kuwait, Qatar, United Arab Emirates, United Kingdom, and the Strategic Airlift Capability coalition (Bulgaria, Estonia, Hungary, Lithuania, the Netherlands, Norway, Poland, Romania, Slovenia, the United States, Finland, and Sweden.)

Backup

Can back up a 2 percent slope

Cargo

Carry a cargo of wheeled U.S. Army vehicles in two side-by-side rows, including the U.S. Army's main battle tank, the M-1

174 ft

Contractor

McDonnell Douglas (now Boeing)

Production

257

Inventory

222

Power plant

4 Pratt & Whitney F117-PW-100 turbofans, each 40,440-lb thrust

Seating

54 on the sidewall

54 in the centerline

Max takeoff **Weight** **585,000 lb**

Payload

170,900 lb

Drop a single 60,000-lbs (27,216-kilogram) payload, with sequential load drops of 110,000 pounds (49,895 kilograms)

Carry Payload

Carry a payload of up to 164,900 lbs (74,797 kg)

Refueling

Refuel while in flight

Accomodation

Two pilots, loadmaster

3 Medical technicians (mission dependent)

2 Flight nurses

102 Troops/paratroopers

36 Litter patients

54 Ambulatory patients

18 Pallets

C-17 Timeline

Highlights of the C-17's 30-year history

1990

1991: First Flight: Sept. 15, 1991.

1993: Delivered: June 1993-September 2013.

1995: Jan. 17, 1995. IOC:

1995: May 1995. C-17 is recognized with the Collier Trophy for the top aeronautical achievement of 1994.

1999: February 1999. President Bill Clinton presents Boeing the Malcolm Baldrige National Quality Award for the C-17's quality achievements.

2000

2003: First strategic brigade airdrop and first airborne delivery of an Abrams tank: March 26, 2003, in northern Iraq.

2010: Dec. 20, 2010. Worldwide C-17 fleet surpasses 2 million flying hours during an airdrop mission over Afghanistan.

2010

2013: Boeing delivered the 223rd and final USAF aircraft on Sept. 12, 2013, and the final international aircraft on Nov. 29, 2015.

2015: Air Force awards the Long-Range Strike Bomber (LRS-B) contract to Northrop Grumman.

2020

2021: The C-17 fleet surpassed 4 million combined flying hours during a flight from Charleston, Jan. 15, 2021.

Graphic by Dash Parham, Mike Tsukamoto, and Zaur Eylanbekov/staff; Master Sgt. Keith Reed; Staff Sgt. Lance Valencia

Staff Sgt. Stephanie Serrano

As C-17s go into depot maintenance, crews will replace the legacy Head-Up Display with a new one that will increase field of view, among other near-term upgrades. Here, Maj. Adam Sugalski and 1st Lt. Matthew LoPresti fly a C-17 Globemaster III.

NEAR-TERM UPGRADES

All 275 C-17s, both USAF and international, completed the Block 21 upgrade in 2020. The update included the required Automatic Dependent Surveillance-Broadcast Out transponder system, required by both the Federal Aviation Administration and European authorities for aircraft in controlled airspace. Additional upgrades included an Identification/Friend or Foe capability, plus other communication and navigation software.

USAF teams worked to complete the update at five U.S. locations and deployed to five others internationally to complete the upgrades on schedule, said Jim Ross, primary Block 21 retrofit manager in the C-17 Program Office, according to a release. The entire process took about two years.

As C-17s rotate into depot maintenance, the C-17's legacy Head-Up Display system will be replaced, with the new system providing increased field of view, contrast ratio, and resolution, Air Mobility Command reports.

Beginning in 2023, legacy ARC-210 third-generation radios will be replaced with new sixth-generation radios including the Integrated Waveform, Mobile User Objective System voice, and second-generation anti-jam tactical UHF Radio for NATO (SATURN), which will replace the HAVE QUICK II system for all military services in October 2024. The new frequency-hopping radios are resistant to electronic counter measures, according to AMC.

Data link satellite systems also are being replaced as the Inmarsat I-3 communication satellites are reaching the end of their lives; AMC will do those upgrades at the same time to reduce cost and downtime.

"AMC will continue to research and prioritize modernization of our workhorse C-17 fleet as new requirements emerge," said AMC spokesman Capt. Christopher J. Herbert.

But AMC is also revolutionizing the C-17's ability to fight. An Air Force Advanced Battle Management System (ABMS) on-ramp demonstration in 2020 proved the C-17 can deploy weapons when a C-17 dropped a Joint-Air-to-Surface Standoff Missiles using a roll-on pallet.

"Why wouldn't we change the calculus by doing different things, moving away from the antiquated view that AMC just brings stuff when they're called?" Van Ovost said. C-17s can "be a maneuver force inside the threat ring," she added. "Instead of dropping them on a ramp somewhere at some island, we're just dropping them in the sky," Van Ovost said. "And after they drop out of the sky, someone else lights them off and takes them to the target."

AMC is planning in future demonstrations to launch attritable systems, like the Gremlin developed by the Defense Advanced Research Projects Agency. The small, unmanned aircraft could be useful in both offensive and defensive counter-air operations.

And with the C-17's wing-mounted hardpoints, Van Ovost said, it is "not a stretch to think that we could put one or two missiles on there for self defense."

In another 2020 ABMS demonstration, a C-17 helped a Marine Corps High Mobility Artillery Rocket System with targeting. The C-17 flew to its destination, the HIMARS was rolled off and fired, then was rolled back on so the C-17 could take off again in a "shoot-and-scoot" maneuver.

MAINTENANCE ON THE FLY

To keep the fleet healthy, AMC is applying conditions-based maintenance practices used for the C-5 and C-130 fleets to better predict parts failures with an eye toward increasing Globemaster readiness. The command has explored rotating airframes from high operations tempo units to lower op-tempo units to keep wear and tear even across the fleet, and likewise rotate units from high-moisture and high-salinity environments to more arid climates, in a bid to minimize structural corrosion.

"We're optimistic on analysis, but this requires continuing study for what we would have to do to that airplane," Van Ovost said. "So I'd say that we are cautiously optimistic about the life span of the airplane."

AIRLIFT DEMAND

The 2018 "Air Force We Need" called for 386 operational squadrons, including three more C-17 squadrons—or the equivalent—by 2030. But the option to buy or build more C-17s has long since passed. The cost to reconstitute the C-17 production line would be prohibitive.

But adding more is not be necessary, a 2018 Mobility Capabilities and Requirements study argued. It concluded existing strategic airlift is adequate to meet future needs. The Center for Strategic and Budgetary Assessments, in a congressionally mandated report released in 2019, recommended maintaining the C-17 fleet and ensuring readiness levels remain high as the best way forward.

A new Mobility Capabilities and Requirements Study could be released this year.

The C-17 fleet is about 20 years old on average, making it among the newest and healthiest airlifters in the USAF inventory. The mission capable rate was 82.23 in 2018 , according to USAF figures.

LONG-TERM PLANS

AMC is beginning to think about what a C-17 replacement might look like 20 to 40 years down the road. A "family of systems" are conceived as one way forward, with wargames starting to flesh out "what capabilities I'm asking for," Van Ovost said. "When I work with the Marine Corps and the Army, what is it they need to transport? What types of timelines? What kind of capabilities and where might they be positioned?"

The tactics tested in the ABMS events could help point to what those needs might be, as will exercises and wargames with the Army and Marine Corps to build out what a future force would require.

"I don't just think volume, I also think of the ability to do things inside of that contested zone," Van Ovost said. "How do you think small, as well? [Aircraft] that can fly off … and bring a capability forward to say [Air Force Special Operations] or to the Army when they need it? … That's how we're going to tweak the attributes necessary for the next … kind of a combined C-5, C-17."

Such an aircraft might employ stealth, or could be optionally manned; it could leverage capabilities developed for the B-21 Raider and the digital engineering and modelling attributes of the eT-7A Red Hawk, or even the highly secretive Next-Generation Air Dominance fighter platforms.

"It's hard to say what's going to happen," Van Ovost noted. The horizon is still far off, measured in decades, not months or years. "It's really pretty far out there to think about the full replacement of the C-17."

The Globemaster III will be a stalwart for years to come. ✪

Pfc. Elijah Ingram/USA

A Globemaster III delivers Marines assigned to Delta Battery, 2nd Battalion, 14th Marine Regiment, to Fort Bliss, Texas, in 2020. Two M142 High Mobility Artillery Rocket Systems (HIMARS) and other support vehicles traveled as one package inside the Boeing C-17 Globemaster III for the ABMS training.

Make-or-Break Time for the F-35

The Air Force's most important program faces increased scrutiny as high costs, low availability, and other problems continue.

Stealth and sophisticated sensor and data fusion make the F-35 the most advanced fighter aircraft in the world, and operators praised its performance on combat deployments for operations in Syria and Iraq. But high operational costs and shortages of parts and trained depot technicians continue to plague the program.

Airman 1st Class Duncan Bevan

By John A. Tirpak

Despite solid combat performance, the F-35's high maintenance costs and ongoing parts supply problems continue to be a drag on the fifth-generation fighter aircraft, giving critics ammunition as Congress readies to receive the Biden administration's first budget.

Lockheed Martin is delivering F-35s at rate of roughly 11 a month—about five of which go to the Air Force—and largely on schedule. Operators seem satisfied with its combat performance. But parts problems, engine support issues that will take years to correct, and an evolving performance-based logistics concept suggest a program overhaul may be coming, once the Biden Administration installs its new defense acquisition team.

In early March, House Armed Services Committee Chairman (HASC) Adam Smith (D-Wash.) wondered aloud at a Brookings Institution event if there was any way to "cut our losses" on the F-35. He called sustainment costs "brutal" and characterized the program as a "rathole." Mid-month, at a hearing of the HASC's Readiness subcommittee, Chairman Rep. John Garamendi complained "the entire F-35 system is of enormous concern."

"The more we buy, the worse overall performance has been. That is going to stop."
—Rep. John Garamendi, Chairman HASC readiness subcommitee

"We buy more planes," Garamendi said, but "we're not able to maintain the older ones. So the more we buy, the worse overall performance has been. That is going to stop."

He said Congress would direct the Air Force to provide an "integrated maintenance plan" in the next few months showing that it can smartly manage both new and classified systems, including the F-35. The service must prove that the maintenance needs of new systems are understood and will be properly funded, Garamendi stated. If it can't, it needs to identify which systems it can do without.

KELLY'S GET-WELL TOUR

Gen. Mark D. Kelly, head of Air Combat Command, toured F-35 manufacturing and support facilities in March, hoping to see evidence that F-35 availability is improving and that its $36,000 cost per flying hour is coming down. But Kelly said he's unconvinced.

"The takeaway is that the Air Force is committed to the F-35 and its capabilities to meet our national security requirements," Kelly said in an email response to questions. Echoing Chief of Staff Gen Charles Q. Brown Jr., he called the F-35 the "cornerstone" of the combat air forces.

"But like any cornerstone, it must be strong enough to hold up the rest of the Air Force's fighter house," Kelly added.

The question is whether the F-35 program can reach its stated goal of reducing its cost per flying hour by 2025 to $25,000, based on fiscal 2012 dollars. Adjusted for inflation, that's the equivalent of $28,867 in 2021 and, assuming 3 percent inflation, $32,233 in 2025.

"Rational parties can disagree without being disagreeable," Kelly said. "Lockheed Martin is still confident that $25K by 2025 is achievable, and I'm still not brimming with confidence." Assuming a 3 percent inflation rate on current costs, maintenance would have to come down more than 35 percent to meet that target.

The stakes couldn't be higher: The Air Force needs "a capable, available, and affordable F-35 as part of a deliberate fighter force design to outpace any competitors," he said.

The F-35 has performed well in deployments and proved its mettle, Kelly added.

"We operated the F-35 for 18 consecutive months in/around the Russian integrated air defense network in Syria, and the Marines and [U.K.] Royal Navy are operating the F-35B in global operations," he said. "To that end, I'd say it's been 'shaken out,' and it's performed very well in the contested environment."

During three six-month deployments from Hill AFB, Utah, from April 2019 to October 2020, 42 F-35s flew more than 1,300 sorties—averaging five hours each—dropping 350 weapons and firing 3,700 cannon rounds, all while maintaining an average mission capable rate of 70 percent. The jets were supported by 1,100 Airmen.

The Air Force wants to step it up, though, Kelly said, aiming to "progress from [performing] 'very well in contested environments' to 'outstanding in highly contested environments,'" and that requires the Technical Refresh 3 upgrade, which "unlocks" the jet's Block 4 improvements.

Tech Refresh 3—or TR3 for short—comprises a new core processor, a radar upgrade and a new cockpit display, as well as numerous software improvements, including enhanced electronic warfare capabilities. Block 4 is the Air Force's preferred model.

Brown suggested at the Air Force Association's Aerospace Warfare Symposium in February that accelerating F-35 purchases is one way to more rapidly modernize its fighter force, but Kelly said that's unlikely. "I'll defer to the [Headquarters, Air Force] for programmatics, but I don't see the current budget environment supporting robust 'accelerations' of many programs," he said. The Air Force's program of record remains unchanged at 1,763 F-35As. But at the current rate of 60 per year, it will be the early 2040s before that objective is attained.

WE'LL WAIT FOR THE NEXT ONE

Getting to the right version has been one factor slowing down the program. A Joint Program Office (JPO) spokeswoman said in March that some services have "had to rephase" their F-35 buying plans or "decided that they'd rather buy later and hold on for the Block 4 capability."

The next three F-35 production lots, now in negotiation, will collectively include 100 fewer aircraft than the prior three lots, according to Gregory M. Ulmer, Lockheed's long-time F-35 program manager who was recently promoted to executive vice president of aeronautics.

Kelly said the Air Force is keenly aware that it cannot afford the luxury of taking decades to develop new aircraft, and acknowledged the F-35 is taking too long. In the long war against violent extremism, the enemies were unable to "punish" USAF and its sister services for going to war with "an aging fleet, or for recapitalization and modernization efforts that either cost more than planned, delivered late, or delivered less than the full capability." But in a fight against peer adversaries, that will not be the case.

Time now is critical. Block 4 F-35s "can compete and win in a peer fight," he said. "So we need TR3 to show up on time."

A spokeswoman for the F-35 Joint Program Office said the TR3 upgrade "will deliver to Lot 15 in 2023, as required."

Kelly said the Air Force is "still on track to have over 20 combat-ready F-35 squadrons in our inventory by 2030," the capacity mandated by the National Defense Strategy. If USAF holds to 24 jet squadrons, 20 squadrons would account for only 480 aircraft, suggesting that the Air Force could reach that

Tech. Sgt. Charles Taylor

The F135 engine pipeline has a cushion of only about 12 percent spare engines and modules, rather than the 25 to 30 percent needed. Airmen wheeled an engine out of a C-17 Globemaster III at Al Dhafra Air Base, United Arab Emirates, to repair an F-35A deployed there in August 2020.

number by 2027. If the Air Force continued to acquire planes at the current 60-per-year pace, it would have another eight squadrons around 2030. What happens beyond that is unclear, but it could leave room for an early end to the program—if another option is available.

The Air Force is indeed looking at other options. Kelly took pains at the Aerospace Warfare Symposium to argue in favor of the Next-Generation Air Dominance (NGAD) program and developing that sixth-generation capability before China does.

"I don't know … if our nation will have the courage and the focus to field this capability before someone like the Chinese fields it and uses it against us," he said in a video press conference. The U.S. way of war assumes control of the air, he said, and "it's less designed to operate without it."

A new joint-service combat aircraft study now underway will assess the needs of the combat air force and what mix of aircraft it will need in the future. That mix will likely include NGAD, F-35, the F-15EX, and unmanned aircraft, which could be armed or provide electronic warfare escort. Also in the offing could be a lower-cost, manned aircraft for use in low-threat environments, and low-cost "attritable" unmanned aircraft designed for use in dozens of missions or more, but cheap enough that their loss in combat would be acceptable.

THE WAIT FOR FULL RATE

The Biden administration will have to declare the F-35's 20-year development program officially over at some point and push into full-rate production. That milestone was postponed for more than 18 months by President [Donald J.] Trump's Pentagon acquisition and sustainment czar, Ellen Lord, because of difficulties injecting the F-35 into the Joint Simulation Environment, a wargaming system used to model the number and types of weapons systems needed to prevail in various combat scenarios.

The JPO spokeswoman said that it will still be some months before the question can be taken up again, but the program office doesn't expect "full rate" to lead to a rapid increase in production. The real effect will be to allow the Pentagon to make multiyear purchases and benefit from cost savings as a result.

Ulmer said that the downward trend in F-35 unit costs will be hard to continue, given reduced quantities in Lots 15 to17, and the more advanced Block 4 configuration.

The F-35's sustainment problems tend to boil down to one general issue: early on, the program set optimistic predictions for the availability of parts, depots, and trained maintenance personnel. Shortages of all three have contributed to reducing mission availability for units in garrison, because parts and technicians must be prioritized for deployed units.

The Government Accountability Office (GAO) pegged low mission capable rates to parts shortages in April 2019 and progress continues to be slow. With suppliers producing multiple versions of parts—not just for the A, B and C models, but also for different configurations of each—it has proven difficult to get enough spares. Adding to the complexity, available parts must be shared among the 16 partner countries of the F-35. The GAO faulted the U.S. military services for not having a comprehensive tally of the F-35 parts they owned and where they were. It reported that parts taken along for Marine Corps F-35 deployments sometimes proved incompatible with the planes that deployed.

Faster parts turnaround at the depots could help, but so far gains in aircraft availability have come because jets increasingly come in a common configuration, program officials reported.

Lockheed F-35 sustainability Vice President Ken Merchant said in February that parts availability is improving. Parts that were at a "fill rate" of 47 percent are now at 97 percent, he said, and things should continue to improve, as this is now just two years into a five-year, get-well plan.

THE ENGINE'S SHARE

Problems with the F-35's Pratt & Whitney F135 engines are also a hindrance. Worst case, the Air Force risks having no working engines for 20 percent of its F-35As by 2025, the F-35 Joint Program Office acknowledged.

The problems are several: The government didn't order enough F135 engines and engine modules—self-contained sections of an engine—to achieve required availability. And F-35 engine depots are not yet up to speed, both because Pratt has been slow delivering tooling and equipment and because the depots haven't hired and trained enough people to do the work.

"It's a vicious circle," said an Air Force sustainment official.

"We couldn't hire all the folks we need until we have all the tools for them to use." Pratt is "mostly caught up, but it takes time to hire people … especially under pandemic conditions."

The international nature of the F-35 sustainment enterprise is also a challenge. "Technically, we don't 'own' the engines," the official said. "We get the next one generated. A particular engine can be used by any partner."

There are two versions of the engine: one for the USAF A and Navy C models, and another for the F-35B short takeoff/vertical landing model.

An industry official noted that as the development phase of the F-35 winds down, there should be more stability in the engine configuration, and that will allow suppliers to focus on a smaller pool of variant parts, increasing availability.

"Basically, the spares they predicted [were] for the mature phase of the program, and we are only getting there now," an industry official said. "But that means we go into this phase with … a backlog."

Industry officials also said that Pratt's suppliers are not keeping up with the pace the company is asking of them. Officials said the F135 pipeline has a cushion of about 12 percent spare engines and modules, when it really should have 25 to 30 percent. Because Pratt is ahead on delivering engines, a Pentagon official said, talks are underway about producing additional engines and modules.

"You can have fewer engines if your depot is quick in turning them around," an industry official said. "If the depot's not up to speed, then you'll have shortages."

Another problem with the F135 engine has to do with coatings on fan blades in the high pressure turbine section. When sand in the Middle East known as CMAS—calcium, magnesium, aluminum silicate—is ingested and heated in the HPT, it melts into a glass that damages the blade coatings. Pratt started applying a new coating a year ago, and so far that seems more durable, allowing the blades to last longer. How much longer is still not known.

Kelly said he has no plans to restrict F-35s from deploying to the Middle East, however, and that the potential engine shortage has been addressed for the near-term.

The desert environment is "just one factor" in limiting engine life, Kelly said, "along with total engine hours, engine age, foreign object damage, depot throughput capability, etc." To further mitigate engine shortages, ACC reduced the F-35 demo team's schedule, freeing up engines to "meet combat training and wartime requirements."

THE PBL DEAL

Lockheed Martin pitched a performance-based logistics (PBL) proposal to the F-35 partners in 2019, and company officials in February said they expect a sole-source request for proposals this summer. The plan has been "skinnied down," Merchant reported, but the company is confident it can reach the $25,000/flying hour cost by 2025, even so. The company is proposing a five-year deal with potential follow-on five-year arrangements.

Pentagon officials said the JPO declined the more far-reaching program out of reluctance to give Lockheed even more authority over the sustainment enterprise.

Savings would result from suppliers making more economic, large-quantity orders, Merchant said. Lockheed is already setting five-year deals with some of its vendors, even though it's on an annual contract with the government, eliciting "the right behavior" from previously problematic suppliers, Merchant said.

Lockheed and the JPO are midway through switching out the F-35's beleaguered Autonomic Logistics Information System, or ALIS, in favor of a rebranded and upgraded Operational Data Integrated Network, or ODIN. The old system was based on 20-year-old technology, Lockheed officials said, and needed a massive refresh. The new system is expected to be more secure, produce fewer errors, and easier to use.

ODIN will fully take over from ALIS in late 2022, providing improved insight into F-35 parts usage and service actions, and enabling improved predictive maintenance.

If the various efforts to improve F-35 sustainment bear fruit, the Air Force may actually get close to 1,763 Lightning IIs in its inventory. But at the current pace, and with other projects clamoring for funds and attention, the F-35 could turn out to be just a bridge to the future combat air force, rather than the destination once envisioned. ✪

Tech. Sgt. Jim Araos

Senior Airman Jazmine Brandon enters flight data into the F-35 maintenance system, known as ALIS—for Autonomic Logistics Information System—in 2019. Maligned for its faults and awkward user interface, ALIS will be replaced by the Operational Data Integrated Network, or ODIN, in 2022.

The German Luftwaffe had the air power advantage as the Battle of Britain began, but the British had a secret weapon: A network of radars, observers, and interpreters, plus the ability to distinguish friend from foe. In the end, the Royal Air Force overcame its aircraft shortfall with an investment in manpower and intelligence, including this radar station at RAF Bawdsey, Bawdsey Chain Home, Suffolk, U.K.

Flt. Lt. A. Goodchild/RAF via Imperial War Museum

The Battle for the Soul of JADC2

Lessons from the Battle of Britain loom large in how USAF constructs the Advanced Battle Management System.

By Douglas A. Birkey

In the summer of 1940, in the months after Nazi Germany had conquered France, Adolf Hitler was set on invading the United Kingdom. He began with an air offensive, and Germany had the clear advantage in numbers: Against the Royal Air Force's 446 fighters, Germany amassed 3,500 combat aircraft to send across the English Channel. In a war of attrition, the odds were clearly stacked against the RAF.

As the battle began, RAF losses mounted quickly. From Aug. 8 to Aug. 18, the RAF lost 154 pilots and even more airplanes; it had just 63 green pilots to backfill as further losses mounted. The Royal Air Force appeared to possess too few fighters and too few pilots to take on a superior German force.

But the Royal Air Force had a secret weapon to make up for its aviation shortfall. Radar stations along the southeastern British coastline detected German bomber formations as they crossed the English Channel. They alerted information fusion centers, which would interpret the data, combine it with additional reports from ground observers, and map the German formation positions on a plotting board before ordering specific Royal Air Force fighter units to take to the sky. Once aloft, British aircraft could readily distinguish friend from foe, thanks to on board transponders that enabled controllers to vector those aircraft with real-time positions for the German bombers. Thus, despite overwhelming odds, the RAF prevailed.

Three factors proved decisive for Britain in WWII: a robust sensor network, voice communications, and a highly integrated C2 enterprise.

Three factors proved essential: a robust sensor network of radar and observers; a voice communications network; and a highly integrated C2 [command and control] enterprise in which trained personnel gathered sensor inputs, fused the data, and communicated actionable information to fighter pilots. In short, information, connectivity, and C2 saved England when the chips were down.

Staff Sgt. Trevor McBride

The E-3 Sentry, Airborne Warning and Control System (AWACS), was a game-changer in its day, but USAF now needs newer technologies to accomplish their work faster, more directly, and with less human intervention.

Today, the United States Air Force finds itself in a similar position to the British 81 years ago. It has too few aircraft and faces burgeoning threats. As then-Secretary of the Air Force Barbara M. Barrett explained last year, "The Air Force, as currently constituted, is too small to do what the nation expects of it." Indeed, the U.S. Air Force fleet has never been so small—and so old. Today's force lacks the capacity and capabilities required in modern high-end conflict: Capable airframes with the stealth, payload capacity, and the information-technology attributes required to challenge peer competitors. Such systems are in incredibly short supply—USAF has just 20 B-2s, 186 F-22s, and about 300 F-35s presently fielded. The rest of the USAF's combat forces consist of several thousand nonstealthy, industrial-age airframes with outdated information technology.

These force structure shortfalls increase the need for the Air Force to create enterprise-scale information systems, connectivity, and C2 capabilities that maximize the combat potential of each of its weapon systems. History underscores that these are not mere nice-to-haves, they are essentials.

For the past 30 years, the Air Force has managed most of this challenge with two airborne systems: The E-8 Joint Surveillance Target Attack Radar System (JSTARS) and the E-3 Airborne Warning and Control System (AWACS). Each was remarkable and a game-changer in its day, yet now, newer technologies promise to accomplish their work faster, more directly, and with less human intervention. Air Force leaders are rightfully calling for a broad range of new systems to maximize the potential of emerging information technologies to give U.S. warfighters decision dominance in the future battlespace.

The practical implementation this effort will evolve through the Advanced Battle Management System (ABMS); Joint All-Domain Command and Control (JADC2) is the broader force management construct that ABMS will help to achieve. Yet the overarching intent and concept is not so different from what occurred 80 years ago in the Battle of Britain: Just as the RAF had its network of sensors, communications systems, and experts to direct fighter pilots to their targets, ABMS will provide the same, just at higher speed and greater range. The intent—information and decision superiority—remains the same. The ability for machines to share data automatically without human engagement is simply the next logical phase in development.

"ABMS will be able to perform the mission sets associated with both the JSTARS and AWACS platforms and possibly assume other roles of the Theater Air Control System," said former assistant secretary of the Air Force for acquisition, technology, and logistics, Will Roper, in 2020 congressional testimony.

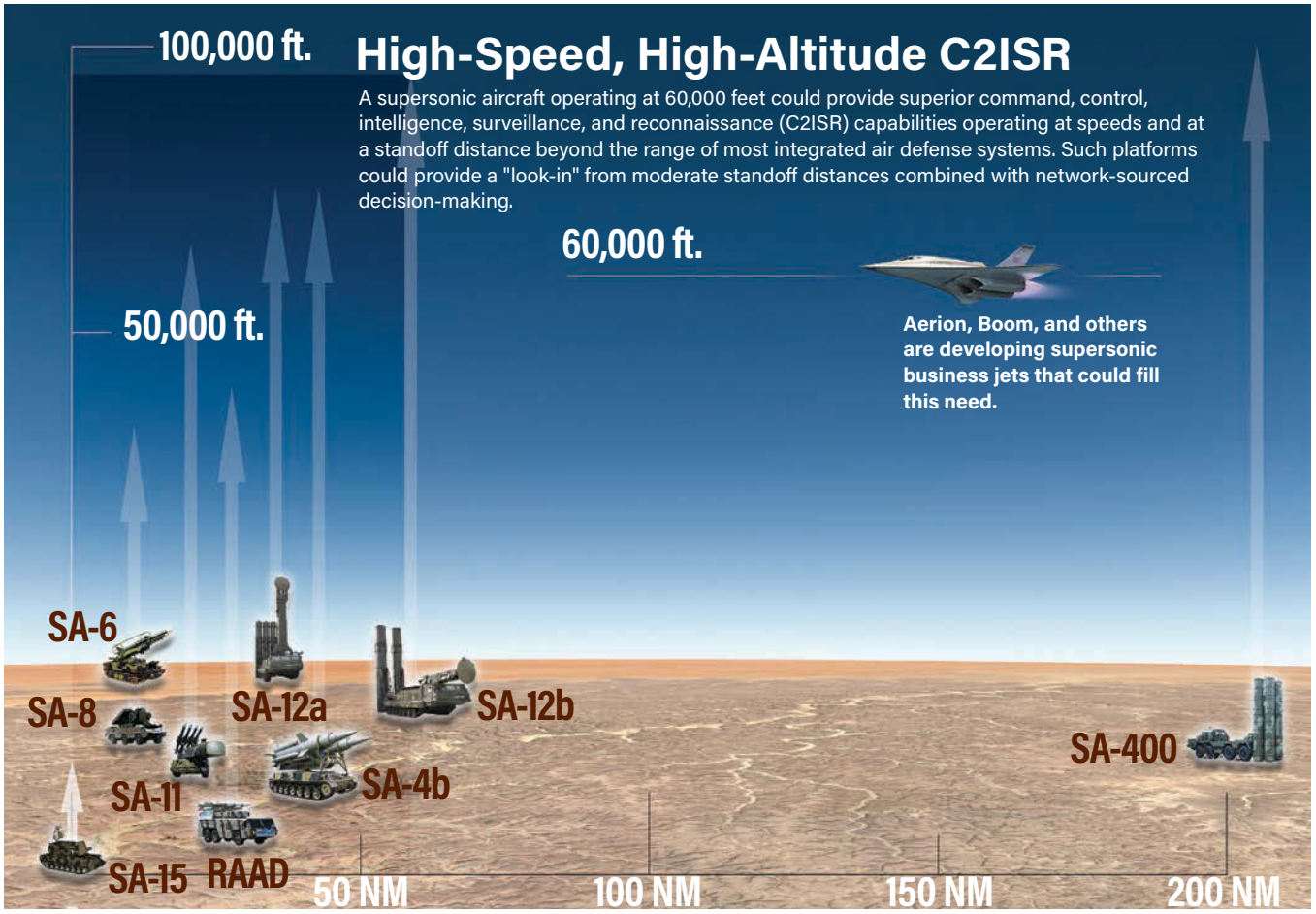
ABMS will be an ecosystem of sensors, fusion, and data-transfer networks aided by cloud-based processing power and artificial intelligence that will empower modern C2: a concept that DOD now calls Joint All-Domain Command and Control. The phrase "joint all-domain" refers to the notion of mission systems partnering in real time, and sharing data in a domain-agnostic manner. The composition of ABMS and JADC2 teams will be based on creating the best partnerships at given times and places to achieve desired effects better than what any single asset could do individually. Data gathered by systems in one domain could drive actions in another, which may be better positioned to net the desired goal. As one Air Force document explains, "Joint all-domain command and control connects distributed sensors, shooters, and data from and in all domains, to all forces, to enable distributed mis-

The Evolution of C2

Command and control for air operation evolved as networks, sensors, and communications systems became more sophisticated. The Advanced Battle Management System and Joint All-Domain Command and Control represent the future of C2ISR.

WWI	OPENING OF WWII	EARLY WWII	EARLY COLD WAR	MID-COLD WAR	EARLY 2000S TO PRESENT DAY	ABMS AND JADC2
Basic C2 measures	Early networked operations empowered by ground-based sensors, controllers, and radio communication	Aircraft-based sensors paired with ground-based sensors and associated C2 functions	Increasingly complex sensor networks, advanced control stations, and increasingly automated data transfer	The transition of the C2 controlling function to the sky	Distributed sensors, processing power, and connectivity creating sensor-shooter complexes	Represent the next step in this evolution

Zaur Eylanbekov/staff



sion command at the scale, tempo, and level to accomplish commanders' intent—agnostic to domains, platforms, and functional lanes."

In the rush to modernize, however, the Air Force risks focusing too much on technical aspects of its future networks and not enough on the fundamentals of command and control that underpin effective decision-making. Air Force leadership's overriding focus on network technology reflects this imbalance.

The Air Force must look beyond specific technologies and decide first where the C2 centers of gravity will reside within this new system, what they will look like, and how warfighters will employ them across the spectrum of conflict. Networks, while crucial, are not warfighting ends in and of themselves, nor will they magically manifest C2; they are merely the underlying, enabling technology. To meet the future threat environment, the Air Force must consider three overarching principles for ABMS and its JADC2 vision:

■ **The command and control design strategy must integrate technology and human intellect to ensure command intent is translated into desired action.** The rapid flow of raw data or the existence of potentially actionable information does not equate with mission accomplishment; to ensure the commander's intent is achieved, there must be an appropriately tiered decision-making network—working down from the strategic to the operational and tactical levels of operations.

■ **The command and control design must allow leaders to carefully manage the operational risks inherent to innovation as emerging technologies are assimilated.** Technological potential does not guarantee operational reliability in the near- or mid-term. Viable fallback capabilities must be available if innovative technology fails to meet schedule or functionality goals, or if adversaries are ever able to defeat it.

■ **The command and control design must be equally effective across the spectrum of operational environments and be both flexible and affordable.** While the peak demands of great power conflict must drive investment priorities and associated concepts of operation, design choices must also be sufficiently flexible and affordable to achieve mission results throughout the full range of operational environments.

These design principles have not been at the forefront of current public discussion. Instead, attention has been focused primarily on developing an information architecture and applying it to narrow operational scenarios. Form must follow function, however; failing to pursue a more balanced approach could result in suboptimal results.

THE CASE FOR SUPERSONIC C2ISR

C2 is a human endeavor that can be assisted by technology, but cannot yet be replaced by it. Technology can inform and assist with decision-making, funneling the most compelling data to the decision-makers, for example, but it is not yet at the point where it can be trusted to make operational decisions. Professionals will have to be positioned appropriately throughout the C2 decision structure. Additionally, redundancies and flexibility must be built in to enhance high-end operations and allow assets to be employed elsewhere in the threat spectrum when required.

Instead of centralizing air battle managers in JSTARS and AWACS aircraft, they will have to be distributed throughout the battlespace to connect and support defined forces so they can fight through attacks on communications links. But,

over-relying on extended network connections only introduces new points of vulnerability. This makes innovative concepts like supersonic C2ISR aircraft worthy of consideration, along with alternate airborne operating platforms, such as refueling aircraft, that will occupy relevant positions in the battlespace for extended periods of time. These notions support the argument for disaggregating C2 from ISR, without closing the door on integrated C2ISR should networked solutions find themselves immobilized due to enemy interference.

The advantages of a C2ISR aircraft capable of supersonic cruise at extended range are several: They could deploy rapidly; operate at speed to get to the destination quickly; and cover vast operational ranges, providing more time on station.

Operating from distant bases would also decrease demands on ramp space closer to the action. Because these jets would operate at very high altitudes, they would also cover greater distances and be harder to shoot down.

Building on commercial bones, these platforms could employ an open systems architecture to support a range of mission systems and modular mission payloads, enabling rapid updates and the ability to swap out sensors and mission systems for different missions or operating environments.

LAYERED EFFECT

To maximize C2ISR in high-threat scenarios, a layered, three-phased approach is needed:

1) Penetrating, highly survivable sensor nodes.

These are fifth-generation aircraft, such as the F-35 and B-21, paired with space-based systems, and linked to C2 operators providing real-time inputs.

2) High-speed, high-altitude manned C2ISR sensor platforms able to provide supplementary "look-in" and network-sourced decision-making insights, and to provide survivable C2ISR coverage over moderate risk regions.

Supersonic air transports under development by firms like Aerion, Boom, and others could provide unique value by ensuring C2 expertise at appropriate tiers of the battlespace.

3) Standoff C2 and ISR systems able to gather and process data into decision-quality outputs.

This construct could guide force employment decision-making in a timely, prioritized manner with built-in redundancy, capacity, and mission-based affordability. Most importantly, it relies on a balanced approach to information, connectivity, and C2. Each of these facets are represented proportionately.

In the years immediately following the Cold War, Les Aspin, the 18th Secretary of Defense, remarked, "We know how to orchestrate [technology] in a way that makes the sum bigger than all the parts." That statement holds true today more than ever. Technology can help ensure combat assets will be employed effectively, efficiently, and in alignment with commanders' intent.

To achieve that, the Pentagon must push significant advances in networks, processing, AI, machine learning, and aircraft design. The investment will be considerable. Some may balk at the cost. However, given what is at stake, the reverse must also be asked: What is the cost of not pursuing this approach?

Like the Royal Air Force at the start of World War II, the U.S. Air Force today is too small, too old, and too fragile to meet all its taskings through numerical superiority. Indeed, even if the Air Force managed to build back up to the 386 operational squadrons required by the National Defense Strategy, it still must be measured, effective, and efficient in employing its forces. The risks to do otherwise are too great.

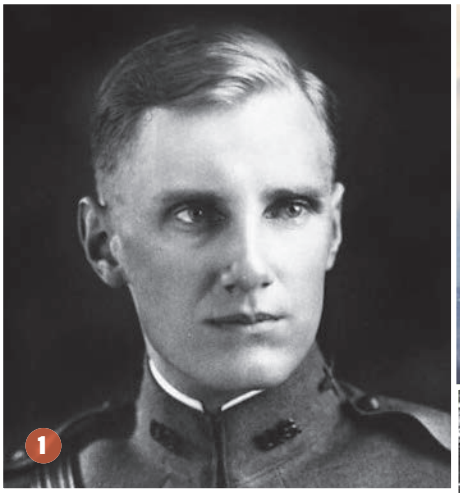
The Battle of Britain lends a cautionary note for today's force planners. With Britain facing one of the largest German attacks of the entire conflict, on Sept. 15, 1940, Prime Minister Winston Churchill visited an air defense command and control center responsible for directing RAF fighters against the attacking German forces. Watching the waves of incoming German attackers on the center's plotting boards, Churchill asked, "What other reserves have we?" Air Vice Marshal Keith Park replied, "There are none."

Decades later, this story is often romanticized as an example of stoic pilots defending the United Kingdom against all odds. In fact, it portrays a nation teetering on the brink of disaster. The difference between winning and losing was very narrow indeed. Britain won the battle thanks to superior information, connectivity, and C2. In a future conflict with China, will the United States be able to say the same? That depends on the success of the U.S. Air Force's planning and investment in a modern C2 enterprise. The future of the free world could depend on it. ✪

Douglas A. Birkey is the executive director of AFA's Mitchell Institute for Aerospace Studies.

Aerion Corporation

The Aerion AS2 now under development as a supersonic business jet could be adapted for military uses, including command and control.



JBER/Facebook,; Jamal Wilson/USAF; USAAF

1 Capt. Hugh Merle Elmendorf
2 An F-22 Raptor over Elmendorf
3 Construction of Elmendorf Field, 1941

ELMENDORF

The Natural

As a pilot, Hugh Elmendorf got a late start; he spent four years in the infantry before joining the Air Service. Then, when he got into a cockpit, he showed the world he belonged there.

His career zoomed upward. It ended 12 years later in the wreckage of an experimental aircraft.

Hugh Merle Elmendorf, after whom USAF named an Alaskan air base, came from a wealthy family in Ithaca, N.Y. His father had been mayor. He descended from the area's earliest Dutch settlers.

Hugh attended Cornell University, from which he took an engineering degree in May 1917—a month later, America entered World War I. He joined the Army, was commissioned, and served as an infantry instructor, but he never got to the war in Europe.

This may have rankled him; he transferred into the Air Service as soon as he could, in March 1921. Nine months later, he was rated as a pursuit pilot. Others began to refer to him as "a natural."

Soon, Elmendorf was moving up through important jobs—as commander of the 19th Pursuit Squadron in Hawaii in 1923-24, and as commander of the 94th Pursuit Squadron at Selfridge Field, Mich., in 1925-27. He was renowned as an exceptional sharpshooter; he won the service's aerial gunnery meet with the highest score ever recorded. Moreover, he wrote scientific papers on high-altitude flight.

In the slow-promotion days of the inter-war era, he never rose above captain's grade, but he seemed destined for bigger things.

Bad luck struck on July 14, 1927, at Selfridge. A transport pilot, wrongly given takeoff clearance, flew into the path of a P-1 flown by Elmendorf, who was landing. The two collided. Elmendorf suffered a broken back and damaged spinal cord.

After recovering, Elmendorf was given command of the 95th Pursuit Squadron, Rockwell Field, Calif. His work there focused on developing tactics for combat at extremely high altitudes.

On April 12, 1930, nineteen pilots led by Elmendorf set a record for high-altitude formation flying. The P-12 pilots reached 30,000 feet, shattering the old record of 17,000 feet.

Then came terrible luck. Elmendorf was the main test pilot for the Consolidated Y1P-25 fighter prototype at Wright Field, Ohio. On Jan. 13, 1933, he put the Y1P-25 into higher-G-level maneuvers. Then, he slumped over. His rear-seat observer could not revive him and bailed out. Elmendorf died in the crash, near Byron, Ohio.

What happened? Doctors speculated a flare-up of the old spinal cord injury somehow caused him to lose consciousness at higher Gs.

Elmendorf's peers thought he surely had been headed for an important service leadership role; for that reason, they pushed for an airfield to be named in his honor. Elmendorf never set foot in Alaska, but that's where his number came up. On Dec. 12, 1940, War Department General Order No. 9 made it official.

In 2010, Elmendorf was amalgamated with the Army's nearby Fort Richardson, producing JB Elmendorf-Richardson, Alaska. For all practical purposes, Elmendorf still functions as an Air Force major base. The main unit is the 3rd Wing, an outfit built around F-22s, F-15s, and air mobility systems. ✪

HUGH MERLE ELMENDORF

Born: Jan. 3, 1895, Ithaca, N.Y.
Died: Jan. 13, 1933, near Byron, Ohio
College: Cornell University
Occupation: US military officer
Services: US Army—Infantry; Air Service; Air Corps.
Main Eras: World War I, Inter-war period
Years Active: 1917-33
Combat: N/A
Final Grade: Captain
Awards/Honors: World War I Victory Medal
Interred: Arlington National Cemetery

ELMENDORF AIR FORCE BASE

Main Complex: JB Elmendorf-Richardson
State: Alaska
Nearest City: Anchorage
Area: 131.3 sq mi / 84,000 acres
Status: Open, operational
Base opened (unnamed): June 27, 1940
Base named Fort Richardson: Nov. 12, 1940
Aviation zone named Elmendorf Field: Dec. 12, 1940
Aviation zone renamed Elmendorf AAB: June 21, 1942
Base renamed Elmendorf AFB: March 26, 1948
Current owner: Pacific Air Forces
Former owners: Alaskan Defense Force; Alaskan Defense Command; Air Field Forces, Alaskan Defense Command; Alaskan Air Force; Eleventh Air Force; Alaskan Air Command.
Home of: 3rd Wing

Mission Arts

AFA's Wounded Airman Program hosts virtual art therapy events for total wellness support to Airmen, Guardians, and their families.

By Christine Brown

The year 2020 saw unprecedented challenges for many, and the wounded, ill, and injured community—some of the most vulnerable populations to the COVID-19 virus—were not excluded. Within the limitations of isolation and quarantine, wounded Airmen and Air Force caregivers faced difficulty, void of in-person rehabilitative events to support their recovery.

In quick response, AFA's Wounded Airman Program launched "Mission Arts" in partnership with Mission Warriors, an organization comprising of veteran wounded heroes who are healing arts instructors. Mission Arts events include paint pouring, meditation, writing, photography, and improvisational comedy.

Air Force Wounded Warrior and Mission Warriors Founder Dave Long was inspired to partner with AFA's Wounded Airman Program because of his personal passion for the healing arts. "I see the need for this [healing arts]. I think now, more than ever, healing arts are really taking off, and people are starting to realize there is power in them, and more than in just the "feel good" side," Long said. "Healing arts is often a personal journey with yourself. Creating just for yourself, just to create, sets you free to breathe without judgment."

Courtesy Mission Arts

AFA's Wounded Airman Program along with the Mission Warriors organization is providing a healing space for all Airmen and Guardians who need it.

The Wounded Airman Program (WAP) is the premier program for Airmen, Guardians, and families at the Air Force Association (AFA), providing life-changing and life-saving support. In addition to virtual healing arts events, AFA's Wounded Airman Program provides critical support to the more than 11,000 enrolled Airmen and Guardians in the Air Force Wounded Warrior Program. The WAP has provided over $750,000 to wounded Airmen and their families since its inception in 2011 and continues to support the growing needs of Air Force and Space Force families.

"AFA is proud to partner with Mission Warriors to offer creative activities for building resilience and improving the mental health of our Airmen and Guardians," said Kari Voliva, AFA's Vice President for Member and Field Relations. "In a world where challenges grow every day, we're excited to provide this opportunity to our Air and Space Forces family."

Mission Arts hosts monthly therapeutic art events by video teleconference to assist wounded Airmen, Guardians, their caregivers, and families on their road to recovery. The audience was expanded to include all Airmen and Guardians as a mental health and resiliency training opportunity. The highlights of the Mission Arts events are the interactions between the veteran art instructors and their fellow brothers and sisters in arms.

"There were times in my adversity that I did not want to move forward, and I was depressed and did not want to get out of bed. I was upset and angry with the world and the results of my medical evaluation board. I did not want to accept it. In the theory of improvisational comedy, we say, "Yes, and … ." I not only learned how to teach it, but also to apply it to my own psychological experience, said B.J. Lange, an Applied Improv Instructor.

Initially, it can be challenging for some wounded Airmen and caregivers to engage in group events. However, with the support of the program's art instructors who have been in their shoes, Airmen and caregivers leave the events happy that they took a chance and attended.

"I was nervous and even thought about not coming to the Mission Arts events at first, but I am glad I did," said, Air Force Wounded Warrior Sheila Propson.

During their sessions, the Mission Warriors art instructors demonstrate how healing arts have supported them on their own personal journeys. In turn, they empower and inspire the attendees to utilize the power of the arts for their mental stability.

"Healing arts, for me, wasn't something I thought would be part of my recovery. … I've always been artistic and creative, but I never thought it would be healing for me until I started teaching some journaling classes and began learning about how to express myself. Then I took a zin-tango class, the simple art of doodling that gives "in the moment" relief. You can be present, you can be mindful, but it is not taxing. When you are finished you have something that you never thought you could do," said Roann Leatz, a Mission Warriors Art Instructor.

AFA's Mission Arts program continues to grow in participation thanks to program partners such as Parker-Hannifin and Centene Corp.

AFA remains committed to caring for our wounded heroes and family members and providing total wellness support to the broader Air and Space Forces family.

For more information on AFA's Wounded Airman Program and how to get involved in Mission Arts events, visit www.AFA.org/wap. Mission Arts events are open and free for all of our Total Air and Space Forces. Priority is given to Air Force Wounded Warriors and Air Force Caregivers.

The George and Vicki Muellner Foundation Academic Scholarship

By Chequita Wood

The George and Vicki Muellner Foundation Scholarship, along with the Air Force Association (AFA), awards two $5,000 scholarships annually to eligible college students who are members of Arnold Air Society (AAS) and Silver Wings. This year's recipients are Cadet/1st. Lt. Ryan C. Casa, AAS, and Kylie Loman, AAS.

Retired Air Force Lt. Gen. George Muellner was a fighter pilot, test pilot, classified programs specialist, Boeing Technologist, senior member of numerous aerospace societies and associations, and served as AFA Chairman of the Board from 2012 to 2014.

Cadet/1st. Lt. Ryan Casa, a student at Embry-Riddle Aeronautical University (ERAU) in Daytona Beach, Fla., Woodward Squadron, is a computer science major who joined Air Force Reserve Officers' Training Corps to become a Combat Rescue Officer. He is active in ERAU's Red Rope organization and the special warfare preparation student program on campus.

AAS

Ryan Casa

The COVID-19 pandemic has placed financial roadblocks on his family, as well as many other families. Casa said, "I do not have to take out a loan this academic year" after receiving this scholarship. He appreciates the generosity and is on track to achieving his goals.

Kylie Loman is from the University of Utah, Schriever Squadron. She is working on a double major in psychology in criminology and French.

Starting in the AFROTC and recently joining AAS, Loman was tasked to command her squadron. She is working toward becoming either an Officer of Special Investigations or a Remotely Piloted Aircraft Pilot. The Muellner Foundation Scholarship will allow her to pay down some of her student loans. "Student loans are a huge and stressful burden on the majority of college students, and I am very fortunate to be able to ease a bit of that stress with this scholarship," Loman said.

AAS

Kylie Loman

Tom Gwaltney Air Force Association Fellowship

By Susan Mallett

AFA's Montgomery Chapter in Georgia established an AFA Jimmy Doolittle Memorial Fellowship in honor of Command Chief Master Sergeant USAF (Ret.) Tom Gwaltney. The chapter presented the plan for the fellowship to his widow, Helen, and their family at a Montgomery Chapter meeting on Zoom. COVID-19 protocols restricted attendance at both the chapter meeting and Gwaltney's burial at Arlington National Cemetery.

AFA Chairman of the Board, former Chief Master Sergeant of the Air Force Gerald Murray, made the formal presentation. Chapter, state, and national members and leaders joined the virtual event, including AFA Vice Chairmen Jim Hannam and Jim Simons.

The fellowship, endowed through donations from members of the chapter, the community, and across the nation, was designated to permanently fund 10 AFA Pitsenbarger awards—AFA's grants to selected USAF enlisted personnel graduating from the Community College of the Air Force who plan to pursue a baccalaureate degree.

Gwaltney served as president of the Montgomery Chapter, as Alabama State president, and the South Central Region president, and was a member of the national Field Council and worked on the IT and finance committees. As an AFA national director, Tom led the team to create the AFA's Wounded Airmen Program.

Murray reflected on his friendship with Tom, as well as his respect for his tireless work as a leader and volunteer. "The first president of AFA in 1947, Gen. Jimmy Doolittle [said], 'there is nothing stronger than the heart of a volunteer.' Tom was the epitome of the word volunteer. ... His legacy of honor, integrity, and service before self will live on in the organizations where he contributed so much time and talent," said Murray.

Courtesy

AFA Chairman of the Board Gerald Murray appears on screen during a memorial service for Tom Gwaltney as Mrs. Gwaltney holds up a plaque.

The chapter wishes to encourage others to donate to AFA by either honoring or memorializing someone with an AFA Aerospace Education Fellowship, at any amount from $100 to the $5,000 Doolittle level. (Visit: www.afa.org/education/fellowships)

AFA EMERGING LEADERS

By Gabbe Kearney

Capt. Jordan Arcturus

Home State: Florida
Chapter: Cape Canaveral Chapter #309 (Fla.)
Joined AFA: 2017
AFA Office: Chapter President
Occupation: Health Admin/Flight Commander
AFA Interests: Field Council, Development, Aerospace Education Council
Mentor: Mike Liquori

How did you first hear of AFA?
I first heard about AFA back at Vandenberg Air Force Base, Calif., when the long-time chapter president decided to step down. Some of the chapter members approached me to run for the position. So, after that I was elected and served as the chapter president for 3 ½ years.

What prompted you to join?
Becoming a chapter president was a pretty big motivator, but I decided to keep serving as I appreciated AFA's mission to work with our local communities and improve the lives of those that serve.

Courtesy photos

Capt. Jordan Arcturus

What do you enjoy most about your AFA membership?
There are numerous enjoyable aspects, but the main benefit would be the network of individuals that you are exposed to on a daily basis. Many of the individuals you interface with are pillars of the community and have served in some very important missions when they served. Being able to talk and learn from them is an invaluable asset to anyone's life and career.

What is your favorite AFA program, event, or project?
My favorite events and activities center around STEM education within the local community. I've had the chance to partner with school districts for various science fairs, and to be able to see our next generation get excited about a project is really inspiring to witness.

How has AFA helped you?
AFA keeps me informed of larger issues concerning our Airmen and has given me an outlet to contribute in a positive way to each community that I have lived, regardless of where my Air Force career takes me.

How do we build awareness about AFA?
Getting younger Airmen/Guardians to take an interest through unique volunteer and leadership positions within AFA is key. They have so many options when it comes to picking a private organization, and not a lot of time outside of work to volunteer. So, AFA must focus on being the premier choice for their time and career.

MSgt. Chris Gage

Home State: Mississippi
Chapter: Stennis Chapter #332 (Miss.)
Joined AFA: 2012
Occupation: Medical Equipment Tech/Superintendent, Keesler Air Force Base, Miss.
AFA Interests: Membership, Awards, and Development
Mentor: Molly Mae Potter

How did you first hear about AFA? A really good friend of mine was the president of the local chapter and invited me to a meeting. Afterward, I took the time to look up what AFA does at the national level and was very impressed with all they try to do for our nation's Airmen, and now, Guardians.

MSgt. Chris Gage

What prompted you to join AFA?
The opportunities. The idea of being an "Airman for Life," well beyond the time I put my uniform on for the last time is amazing to me. The networking, friendships, events, all of it in general. I have met so many people being a part of AFA.

What do you enjoy most about your AFA membership?
The people—whether you are a civilian, retiree, veteran, old, young, part of big business, or just starting a business—AFA draws and has so many different people that are connected to so many great things that happen each day in this nation.

What is your favorite AFA program, event, or project?
The [Aerospace Warfare] symposium, hands down. After my first one, I knew I wanted to be a part of this for life and that I wanted to come to each one. Meeting national board members, state and regional presidents, hearing the Chief Master Sergeant of the Air Force speak ... all of it was over-the-top impressive and such a massive experience for me.

How has AFA helped you?
It has opened my eyes to not only the importance of staying connected, but the people you stay connected with. If anything, it has helped me tell a better Air Force story to my fellow Airmen and those that support what we do every day.

How do we build awareness about AFA?
By taking small steps. From inviting a new friend to a meeting, taking five minutes to talk about it in our meetings and huddles, advertising it in the areas we live and work, to national things such as commercials, magazines, and events. There is no one way to build awareness about AFA, it is too huge and offers too much to just have one way to build awareness about it. The No. 1 recourse I use to build awareness is AFA.org. I would challenge anyone to go there, read about what AFA has to offer, and actively seek out ways they can serve through their local chapters.

MSgt. Sandra Gage

Home State: California
Chapter: Northeast Texas Chapter #416
Joined AFA: 2008
AFA Office: Chapter President
Military Service: 2005-Present, Active duty
Occupation: Logistics Operations Manager
Education: Bachelor of Science, Supply Chain and Logistics Operations, Bellevue University, Neb.
Mentor: Tom Kemp

MSgt. Sandra Gage

How did you first hear about AFA?
I first heard of AFA when I was a young staff sergeant at my first duty station in 2008. My supervisor at the time was a chapter member and convinced me to sign up. However, I only attended a few meetings, and then did not hear about it again until I PCS'd to my current squadron, 645th AESS Greenville, Texas in 2018.

What prompted you to join AFA?
To be honest, I initially joined Chapter 416 for EPR [enlisted performance report] volunteer bullets, but I have stayed because I love the support we provide to the community and what the organization stands for.

What do you enjoy most about your AFA membership?
Being a part of something bigger than myself and of course getting to meet wonderful people. As far as what the monetary cost of the membership provides, I enjoy receiving the Air Force Magazine so I can stay up to date with current events and to read about other members' successes.

What is your favorite AFA program, event, or project?
My favorite AFA events are the state and national meetings. It is because of meeting new people and the ability to network far beyond anything I have ever done. I get to be amongst a group of elite leaders and be mentored by individuals that have a breadth of knowledge. The meetings also highlight all the great things that the organization is doing. The funds raised go to great causes and have such a positive impact on our communities.

How has AFA helped you?
Personally, AFA has forced me out of my comfort zone and has shown me that I am capable of more than I thought. Professionally, it has provided me an opportunity to practice my leadership skills, since I am the lowest ranking member in my work section and do not supervise anyone.

How do we build awareness about AFA?
I feel the use of social media has been a great help in building awareness about AFA. Of course, the annual convention helps as well. Then, by word of mouth and sponsoring STEM events in our respective communities.

Lt. Marc Granville

Home State: Germany
Chapter: Ramstein Chapter #507 (Germany)
Joined AFA: 2015
AFA Office: Field Council
Occupation: Force Support Officer
AFA Interests: Field Council
Mentor: Joe Burke

Lt. Marc Granville

How did you first hear of AFA?
I was in the Air Force for almost four years before I knew what AFA was. I was a part of many other organizations and had seen some of the by-products of what AFA does, but never knew what AFA was. I was at Langley Air Force Base, Va., helping create the men's base basketball team. I went to a meeting to take a picture . . . because an organization was donating money to help our team. It happened to be the Langley AFA Chapter meeting. I was able to see that AFA was much different than any other professional organization that what I have been a part of. So, I decide to become a member and continue to learn more about the organization.

What prompted you to join?
Attending my first AFA chapter meeting at Langley, I realized that AFA provided personal development and learning opportunities that I have not seen anywhere else. I wanted to continue to learn and grow within my Air Force career and potentially become a commissioned officer. I came to find out that AFA was the perfect opportunity to make that possible.

What do you enjoy most about your AFA membership?
What I enjoy most about my AFA membership is the access to information that I have. I also enjoy the personal development, mentorship, connections, and friendships that I have gained from AFA as well.

What is your favorite AFA program, event, or project?
My favorite AFA program, event or project is the Air, Space & Cyberspace Conference held in September every year in Washington, D.C., at National Harbor. I call the event the "Grammy's of the Air Force" because all the top leaders are in attendance at the event. The event feels like a combination of an awards banquet, party, and family reunion ... the perfect opportunity to network, meet new people, or connect with old friends.

How has AFA helped you?
AFA changed my life forever! I attended the ASC conference as an Active-duty Enlisted Senior Airmen back in September 2016. At that event I was able to network and make a connection that afforded me the opportunity to join the Air Force ROTC program at the University of Maryland. Two years later I was able to commission as an officer. Without joining AFA and attending that event, I might not be in the position that I am today!

How do we build awareness about AFA?
By continuing to host events that add value and make a difference in the community. Also, we can help build awareness by sharing members stories about how AFA has impacted them and how it could potentially impact other people's lives as well. Then we can continue to use social media and other platforms to share and connect with more members.

SSgt. Edward Hood (ANG)

Home State: Florida
Chapter: Savannah Chapter #137 (Ga.)
Joined AFA: 2017
AFA Office: Chapter President
Occupation: IT Manager & Traditional ANG
AFA Interests: Membership and Development
Mentor: Mac MacAloon

SSgt. Edward Hood, ANG

How did you first hear of AFA?
When I was an Airman 1st Class at Holloman Air Force Base, N.M. I didn't join because I thought it was for officers.

What prompted you to join?
When I was in the Florida Air National Guard I had to go before a board to interview for a full-time position. One of the areas on the application was membership in a professional development organization. AFA was on the list. I contacted AFA to find out about our local chapter. I learned it was shut down. So, I convinced four other Airman to join my board, and we restarted/rebuilt the chapter. This chapter is now flourishing at Tyndall Air Force Base, Fla.

What do you enjoy most about your AFA membership?
AFA gives you the opportunity to continue serving your country in or out of uniform. AFA has been around since before the creation of the USAF. Every Airman would be a member if they knew what AFA has and continues to do for them every day. As an Emerging Leader, I get to present ideas which will help us reach the next generation.

What is your favorite AFA program, event, or project?
The Aerospace Warfare Symposium. If you want to see cutting-edge air, space, and cyberspace technology, you better be at AWS each year. One year they had Elon Musk as a guest speaker. It is the place to be every year for both Airman and Guardians.

How has AFA helped you?
AFA has put me into positions which challenged me and gave me plenty of room to grow both personally and professionally. I have gained a lot of experience leading people of different demographics. It has also given many a lot of great connections in the air, space, and cyberspace industry. If you want to grow your network, join AFA.

How do we build awareness about AFA?
Understand, the next generation is not reading this Air Force Magazine on a regular basis. They are on social media. We must deliver our message through social media. We must make the AFA Daily Report into a podcast and have that podcast delivered to ALL our social channels. The top social media platforms are Facebook and YouTube. Once Publer is fully integrated, we need to push that podcast out to all the Chapter Facebook pages every day. The ROI [return on investment] for this would be incredible.

Caroline Jok

Home State: Texas
Chapter: Thunderbird Chapter #189 (Nev.)
Joined AFA: 2015
Occupation: Intel Analyst
AFA Interests: Aerospace Education
Mentor: Mary Anne Thompson

Caroline Jok

How did you first hear of AFA?
I was a senior in high school interested in joining the Air Force and while I was researching, the Air Force Association popped up on Google.

What prompted you to join?
I figured, 'What better way to learn about the Air Force than to be in an association that is made to educate, advocate, and provide support for the Air Force?' It was a no-brainer. After that I reached out to my local chapter, and they were extremely welcoming.

What do you enjoy most about your AFA membership?
The mentorship and friendships. I joined AFA to learn more about the Air Force, but I stayed—and stayed active—because I was surrounded by amazing people from all walks of life that had so much to teach me and who were so eager and willing to share their knowledge and experience.

What is your favorite AFA program, event, or project?
I've worked with at least eight different chapters, and while every chapter is supporting AFA programs, they all have unique events that they hold in order to do so. That being said, my absolute favorite AFA event is the annual Air, Space & Cyber Conference. Not only are we there to discuss questions that are critical to the Air Force and have AFA meetings, but in between the business it's also like a giant family reunion—except the 'family' are people who are doing great things in the Air Force, industry, and their communities.

How has AFA helped you?
AFA has done so much for me. It introduced me to phenomenal people, provided me with a scholarship to earn my PPL [private pilot license], gave me an outlet to work in my community advocating for issues I believe are critically important, and kept me connected with the Air Force even when it became clear that pursuing a commission wasn't an immediate possibility. There's no question that I would not be where I am or who I am today without AFA.

How do we build awareness about AFA?
We need to first determine who our audience is in order to build a strategy that works—and 'everyone' is not the best answer in this case. If there are multiple audiences, then the messaging and outreach for each group is likely to be different. Ultimately, I think we need dig deeper into social media marketing and partnerships, and we need to strive to show meaningful impact. If I could choose the audience to target, I would pick people in their mid-20s to mid-30s, that's the age demographic that we could really use right now to challenge and adapt AFA. I would start with garnering membership from people who are somehow affiliated with the Air Force.

AFA began the **Emerging Leaders Program** in 2013 as an avenue to secure AFA's future. The purpose of the program is to identify, motivate, develop, and encourage emerging leaders to serve actively in AFA by providing hands-on experience and unique insights into how AFA operates and is governed. Emerging leaders volunteer for a year. With guidance from a mentor, they participate on a national-level council, attend national leader orientations, and serve as National Convention delegates.

Janelle Stafford

Home State: Oklahoma
Chapter: Gerrity Chapter #215 (Oklahoma)
Joined AFA: 2016
Occupation: Marketing & Leasing Director
AFA Interests: Strategic Planning
Mentor: Mark Tarpley

Courtesy photos

Janelle Stafford

When did you first hear of AFA?
Through work, as a Community Partner.

What prompted you to join?
As a part of the aerospace and defense community in and around Central Oklahoma and Tinker Air Force Base, we could see the benefits of being a Community Partner. I was not active, however, for a number of years. A certain meeting speaker/topic caught my attention, and I attended—and that was all it took. I immediately made the connection about how this would benefit not only my job, but it was a place where I wanted to invest my volunteer time and energy. Therefore, I also maintain a personal membership, just as a small way of providing additional support to the cause!

What do you enjoy most about your AFA membership?
The sense of community and camaraderie of us all working together with purposeful intent to support programs that I care about: STEM and workforce development, the advocacy aspect, and the ability to support those who are giving us or have given us their service. Some members touch one or two programs, and some work on multiple activities, but every member can (and does) find a good place to share his/her time and talent. Also, I believe that we do a lot of "building." We build teams and relationships, activities, programs, and are looked upon as a true resource for the military community, here. This is an organization with a huge, giving heart, and it is a joy to watch the ripple effects of our work amongst the various constituencies.

What is your favorite AFA program, event, or project?
That is really hard for me to answer, because I love everything we do (and I have a hard time saying no). I really enjoy the heritage projects like our annual Doolittle Raid anniversary remembrance. And our involvement in meaningful STEM programs like CyberPatriot, StellarXplorers, and STARBASE Oklahoma is also a favorite of mine.

How has AFA helped you?
Outside of the obvious benefits associated with my work it has provided me, personally, with a place for meaningful service. It is where I choose to spend my time—and where I feel rewarded in doing so. As a volunteer, we all want to feel that we can make a difference in some way. I get to see those "returns" of both short-term and longer-range program work and/or investments our chapter has made—every day! It means a lot to me to be a part of that.

How do we build awareness about AFA?
Nothing makes more of a difference than in-person connections with our partners and our local, state, and national leaders. The one-on-one communication is worth the investment in time—it puts a face on what we do. I would also say we need to continue to work hard pushing communication up AND down within our organization. Chapter activities can be excellent illustrations for the big AFA picture. Conversely —it is incumbent on our regional, state, and chapter leaders to bring the message to the local level and keep members well-informed.

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By John T. Correll

RED TAIL COMMANDER

From pilot training to fighter combat, Benjamin O. Davis was the mainspring of the Tuskegee Airmen.

When Benjamin O. Davis Jr., was commissioned at West Point in 1936, he became the second Black officer in the Army. The other was his father, Benjamin O. Davis Sr., promoted from the ranks in 1940 on sheer merit.

Racial segregation was deeply embedded. Davis had been appointed to the U.S. Military Academy by the only Black member of Congress, but the corps of cadets wanted nothing to do with him. He roomed alone, ate alone. Few classmates spoke to him outside the requirements of duty.

Davis applied for the Air Corps but it was not open to him. He served instead as an infantry officer. His opportunity came in 1941 when President Franklin D. Roosevelt ordered the War Department to create a "Negro pursuit squadron. Eventually, almost 1,100 Black airmen would train as fighter or bomber pilots at Tuskegee Army Airfield in central Alabama.

Schreick's Photo Service/Smithsonian

Col. Benjamin O. Davis Jr. in flying gear, including helmet, goggles, and oxygen mask, with parachute slung over his right shoulder by its straps.

The first class at Tuskegee began in July 1941. Its most prominent member was Davis, by then a captain, who was designated commandant of cadets as an additional duty. He completed pilot training in March 1942 and was named commander of the all-Black air unit, the 99th Pursuit Squadron, when it was formed.

Lt. Col. Davis, 31, and the 99th Squadron—flying the Curtiss P-40 Warhawk—deployed for combat in April 1943. Operating from Tunisia and Sicily, they attacked enemy installations and escorted U.S. bombers threatened with danger of intercept by German fighters.

Davis returned to the United States in October 1943 to take command of a larger unit, the 332nd Fighter Group, which consisted of three Tuskegee squadrons equipped with P-39 Airacobras. The 99th was later folded into the group's organizational structure. There was a Tuskegee-trained bomber unit as well, but it did not deploy to the war.

Meanwhile, the 99th came under criticism from opponents who said the Black pilots were ineffective and proposed an end to the Tuskegee "experiment." Their attack failed, in large part due to information provided by Davis to the War Department. The critics lost further credibility in January 1944 when Black Airmen shot down 12 enemy fighters in two days. According to Davis, there was "no significant general difference" between performance of the 99th and other P-40 squadrons in the Mediterranean.

The 332nd arrived in Italy in February 1944 and was based at Ramitelli Airfield on the Adriatic coast. Shortly thereafter, Davis was promoted to colonel. The group upgraded to P-47 Thunderbolts and again to the P-51 Mustang.

The popular name, "Tuskegee Airmen," first appeared in 1955. During the war, the Airmen were known as "Red Tails" from the markings and paint scheme of their aircraft, particularly the P-51.

The P-51s escorted heavy bombers on raids against targets deep in Germany, Austria, and other parts of central Europe. The total of wartime combat missions by Black pilots was 1,578. They shot down 112 enemy aircraft, including three Me-262 jet fighters, and destroyed another 150 airplanes on the ground.

A stubborn misbelief—originating in a Liberty Magazine article in 1945 and perpetuated for more than half a century by well-meaning supporters—was that the Tuskegee Airmen "never lost a bomber" to enemy fighters.

In fact, as analysis of daily mission records by Daniel H. Haulman of the Air Force Historical Research Agency has determined, 27 bombers were lost while under Tuskegee escort. That was still superior to other fighter groups in the theater, which lost an average of 46 bombers. The others, however, did better in some defensive categories, such as average number of enemy aircraft shot down.

The Tuskegee Airmen "were not worse, but they were also not better," Haulman said. "In the long run, they proved to be about equal." That was approximately what Davis said in 1943.

The Tuskegee experience was a factor in the Air Force announcement in April 1948 to "eliminate segregation," making USAF the first service to announce a policy of racial integration. This was well before President Harry S. Truman's executive order in July 1948 on equal opportunity in the armed forces.

Davis went on to command a fighter squadron in the Korean War and fly combat missions in the F-86 Sabre. During the Vietnam War, he was commander of 13th Air Force in the Philippines.

He retired from Active duty as a lieutenant general in 1970. He subsequently held several government posts, including assistant secretary of Transportation. He was promoted to four-star rank on the retired list in 1998.

John T. Correll died April 5 (see p. 32). This is among the last pieces he wrote for publication. The remainder will be published in the coming months.

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