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OPERATIONAL IMPERATIVES

An Update on Secretary Kendall's Top Priorities 30

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August 2023, Vol. 106, No. 8 airandspaceforces.com

Airman Mason Hargrove

DEPARTMENTS

FEATURES

Accelerating—and protecting—the kill chain by linking sensors, shooters, and commanders is crucial to ensuring success in future operations. See "Winning the Kill Chain Competition," p 44.

ON THE COVER

The seven Operational Imperatives defined by Air Force Secretary Frank Kendall represent the service's priorities for rapidly delivering meaningful new capabilities to Air and Space Force warfighters.

Dash Parham and Eric Lee/staff

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EDITORIAL

By Tobias Naegele

Build an Air Force

Viewed today, the 1950s casts a warm technicolor glow into America's collective imagination, as a mystical time of post-war tranquility, prosperity, and suburban peace. In truth, it wasn't so perfect. The nation was deeply divided over the Korean War, labor strife, fear of communism, and racial integration of schools.

In that light, our divisions today are trivial. Americans in the 1950s feared nuclear annihilation, and school children practiced duck-and-cover drills in their classrooms. Contrast that with the Chapman University Survey of American Fears which found that in 2019 American's greatest concerns were "corrupt government officials," followed by pollution of oceans and rivers, and "people I love becoming seriously ill."

Among the top 10 fears in that 2019 study, five were environmental, like pollution and climate change, and just one mentioned any kind of threat: Cyberterrorism, was No. 7 at 59 percent; war, nuclear weapons, and the like didn't crack the top 10. By 2022, "Russia using nuclear weapons" had grabbed the No. 2 spot behind corruption and just ahead of "people I love dying." The threat of the U.S. "becoming involved in another world war" came in fourth.

Notably absent: any mention of China, America's pacing threat, as stated by the U.S. National Security Strategy.

"The U.S. must be a more ready, capable, and credible threat of force."

Nevertheless, China does register as a threat among those in the know, and it's among the few unifying factors among congressional Democrats and Republicans. China is a concern in terms of our domestic supply chain, economic interests, political alignment with others, and military strength.

Still, the Chinese and Western economies are so intricately intertwined that many dismiss the risk of conflict. They see those ties as a security blanket: As long as China and the U.S. are mutually dependent economically, military conflict should be unlikely. But that only works if all parties remain rational.

Rationality depends on cold hard facts, not emotions.

The Chinese Communist Party was for a long time an opaque but predictably rational actor. Operating largely by committee, it subverted individual emotions to organizational groupthink. But as Xi Jinping concentrates his power—over the party, the military, and the government—what's left is one-man, not one-party rule.

Look how that's worked out in Russia: Vladimir Putin's decision to invade Ukraine last winter was an emotional choice imposed on the country by its leader. It also proved a massive miscalculation: Putin misjudged his military's prowess, Ukraine's will to fight, NATO's resolve, and even his own political strength.

In China, a party machine that once prioritized economic growth over everything else now is now less predictable under its one true master. Xi's zero-COVID policies, though briefly envied by some in the West, proved disastrous, and China's economic recovery after COVID has been weak. When, in 2021, Alibaba's Jack Ma pushed back against government interference with his digital empire, Xi crushed his most famous citizen, seized his company, and broke it up. Message to China's business class: Don't be too successful—and remember who's boss. Finally, China revised its anti-espionage laws in July, a move that will surely dampen foreign investment.

"Beijing views inadequate government control of information within China and its outbound flow as a national security risk," noted a bulletin from the U.S. National Counterintelligence and Security Center. That's indicative of one pulling back from international economic cooperation, not one going all-in.

Also in July, AFA's Mitchell Institute for Aerospace Studies held a wargame in which the U.S. and its allies sought to stop China from seizing Taiwan. This is a near-impossible task. The issue isn't *can* China seize Taiwan, but whether it is willing to pay the price such unilateral action would cost.

To ensure the answer to that question remains an emphatic NO, the United States needs to change its playbook. The U.S. must be a more ready, capable, and credible threat of force. Right now, China's military is larger than ours and increasingly capable—indeed, in some ways, more capable.

The slow-drip modernization foisted on the Air Force due to other service priorities is hurting U.S. defense. The Air Force has tried for years to modernize at its own expense, an effort that has yielded an older, smaller force.

What's needed is a large-scale infusion of cash to fund both sustainment of our most capable aerospace forces today and—concurrently—to add revolutionary new capability, at scale, tomorrow. To achieve that, Congress and the Pentagon must make a strategic shift in priorities, providing an additional redirecting of $10 billion to $20 billion annually to the Department of the Air Force. This is the only way to remain ready today while modernizing for tomorrow.

It's not hard to see where those funds can be found. Just as we reduced the size of the Air Force to fund the expansion and equipment needs of the Army during the 20 years of wars in Iraq and Afghanistan, the time is now to reverse that trend.

Cutting the Army by 20,000 troops—just 4.4 percent of today's Active-duty force—would free up $20 billion a year. That's enough to accelerate delivery of new F-35 Block IV fighters, B-21 bombers, Next-Generation Air Dominance Fighters, and uncrewed Collaborative Combat Aircraft, along with a new constellation of communications and targeting satellites, new E-7 Wedgetail early warning systems, new tankers, and new electronic warfare capabilities.

USAF's planes today average 30 years of age. Many fleets average over 60. The combat air forces amount to less than half the Air Force possessed in 1991, and that number is getting smaller, not larger. It's been five years since the Air Force last offered a plan to size the force to what it really needs. That plan—386 operational squadrons required to meet the needs of the defense strategy—identified that the Air Force is about 24 percent smaller than required. It's time to revive that kind of clear, strategy-driven force-sizing construct.

America can always raise a bigger Army, and it can do so in a relative hurry. But to build a bigger, better Air Force takes years, if not decades. We need to start growing ours today.

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LETTERS

Guardianship

I disagree with Richard Rief, who questioned the rationale for young junior officers and enlisted personnel to have security clearances for highly classified materials. ["Letters: Unclear Clearances," p. 6, June/July].

When I was a young captain with less than four years of Active duty and as a commander of a "geographically separated unit," my commander/supervisor was stationed thousands of miles away. My senior NCO was a tech sergeant and the rest of my unit were Airmen with less than four years of Active duty. Our mission was to maintain, update and distribute over a million classified materials for fighter units in the Asian Pacific area. There were two other units that were similarly manned in the Pacific that supported fighter units during the Vietnam War.

When I was a captain and chief of intelligence targets at a fighter unit, I can attest to the fact that lieutenants and Airmen did the bulk of the work to assemble, produce, update, and maintain the intelligence and targeting materials to brief, train, and assist young pilots (mostly lieutenants) to plan for and accomplish conventional and nuclear missions.

The chief of intelligence was the only field grader with two captains, four lieutenants, two or three NCOs and a dozen Airmen, most of whom were just a year out of Intel tech school. There were at least six fighter units in the Pacific and Asia that were similarly manned by such young personnel.

With these two examples, I am saying that if you take away clearances from young officers and Airmen, who will accomplish the war planning, warfighting and war supporting missions of the Air Force?

The key to the success of having young personnel with SECRET clearances is an effective security program at the unit level. That requires a monthly security briefing and testing of all personnel of all security regulations, procedures, and techniques. Additionally, the first priority of the IG is to check on the security knowledge and practices of all unit personnel.

In my humble opinion, in the Air Guard situation, it appears there was a failure of leadership—supervisory and security training and procedures.

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

I disagree with reader Richard Reif's comments about "junior" Airmen and their access to Top Secret material.

I was assigned to the former USAF Security Service from 1963 to 1967 as an R20250, Radio Intercept Analyst.

As the holder of a TS/SCI clearance, I handled Secret and Top Secret Code Word material on a daily basis.

Most of the intercept and analysis was done by E-3 and E-4s, supervised by E-5's. I know of only one case where CW material was compromised, and that was by an E-6 linguist. Sixty years later I have kept my silence.

Sgt. Paul Talbott,
USAF (Ret.)
Fayetteville, Ga.

WRITE TO US

Do you have a comment about a current article in the magazine? Write to "Letters," *Air & Space Forces Magazine*, 1501 Langston Blvd, Arlington, VA 22209-1198 or email us at letters@afa.org. Letters should be concise and timely. We cannot acknowledge receipt of letters. We reserve the right to condense letters. Letters without name and city/base and state are not acceptable. Photographs cannot be used or returned.

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

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Recruiting Crisis

In Tobias Naegele's Editorial ["Why Recruiting is in Crisis," April, p. 2] You mention important secular trends leading to lower recruiting numbers. However, I would share that more important ones were missed. I say this as someone who signed up during the Gulf War and joined the U.S. Army's Old Guard between 1991-1994. I now have a son who is an Air Force Officer, which is why I joined AFA.

Those who join the military tend to be [dedicated to] God, family, and country. It is my perception that our modern leaders are attacking all three of these by undermining our traditional faith and pushing acceptance of alternative lifestyles. In addition, forcing our troops to take known unsafe vaccinations with horrendous side effects is also a deal-breaker for many.

What are we fighting for anymore? Freedom? Can we say this in an age where our federal agencies are conspiring with big business to suppress our freedoms of speech, religion, and bear arms? It is also extremely discouraging to see an uneven system of justice and how our disabled veterans are treated upon release—better than illegal immigrants.

If we only fight just wars, promote traditional American values, uphold the rule of law, and inspire patriotism, while taking care of those who are injured in the line of duty, you will see the numbers skyrocket. Our youth want to do something inspiring! It will take men and woman of courage to talk about this rather than hide behind statistics and safe politically correct answers.

Pfc. Rick Scheeler,
USA (Ret.)
West Chester, Ohio

Not A Good Fit

I enjoyed reading David Roza's article ["Rescue in the High-End Fight," May, p. 28], but felt it overlooked some significant options.

SAR [Search and Rescue], and especially CSAR [Combat SAR], has always been one of those "red-headed stepchildren" that never found a stable place in the USAF force structure. While CSAR is an important force protection and morale-boosting element of combat air forces, it doesn't really belong under Air Combat Command, which primarily trains and equips combat aircrew, nor does it fit properly under Air Mobility Command, which primarily trains and equips airlift/refueler aircrews.

I think the answer to the CSAR problem is to return it to Air Force Special Operations Command, and buy additional CV-22Bs with some minor modifications for CSAR. Why? CSAR is very much like some aspects of Air Force Special Ops.

Given the value placed upon every Airman, CSAR is a high-risk, urgent, time-sensitive operation, the outcome of which will have significant political as well as military implications. CSAR, like [other] Air Force special operations, requires very intensive training for low-level, night/all-weather operations in contested airspace. CSAR aircraft need considerable unrefueled range/payload, good cruising speed, and VTOL/hover capability.

A variant of the CV-22 is considerably faster, longer-ranged, with higher payload, and generally more survivable than any H-60 variant, including the HH-60W.

Maj. Steven E. Daskal,
USAF (Ret.)
Virginia Beach, Va.

Top-Down Logic

In the May issue, the article about the B-52J ["World: It's Official: Re-Engined B-52 Will be the B-52J," p. 21] referred to the old radar as the "APG-166." It is APQ-166. I would hope that as part of the upgrade process, they include an air-to-air function for the new radar, and the necessary interfaces to fire AAMs from the midwing pylons or perhaps shoulder mounts on the inboards similar to the F-15's configuration.

Also valuable would be adding drogue refueling modules in the aft end of the external fuel tanks and an APU in the tail position formerly occupied by the gun. Perhaps a small AESA array (AN/APG-83?) and a 10-round launcher similar to the Navy's RIM-116 Mk 49 with flame ducts to the side could also be mounted in the tail, launching folding fin versions of the AIM-9X out the rear against enemy fighters or even SAMs, which would have high infrared signatures due to their speed.

This might also lead to a compressed carriage version of the AIM-9 that could fit three or four instead of just one in the side bays of the F-35 and F-22. This way, these pilots playing foolish games during intercepts might be a little more wary when it's a BUFF!

It may also be advantageous to adapt the AESA radar to take over the man-in-the-loop data link function of the AXQ-14 pod for certain EO GBUs or the AGM-84 SLAM. This would eliminate the necessity of carrying the reliability-challenged pod. Same goes for the AN/APG-82 upgrade in the F-15E.

I disagree with the removal of the EO sensor blisters, and I think mounting off-the-shelf sensor balls like the MX-15 or MX-20 would give better field of regard and also allow two-at-a-time laser designation along with better resolution optical performance from high altitude.

MSgt. Chris Dierkes,
106th RQW
Westhampton Beach, N.Y.

Sacrifice

Col. Phil Meilinger's reading list ["Readings on Vietnam," April, p. 54] is awesome and a worthy contribution to your magazine. He speaks as a preeminent military historian. However, one reader, Capt. Rollie Sterrett, (Letters, June/July) suggested one significant omission—any significant reading concerning the larger war that we fought in Southeast Asia, and in particular the mess that we had to deal with in Laos.

As a remedy, I suggest "The Key to Failure: Laos and the Vietnam War," by Norman Hannah. Published in 1987, with a foreword by Col. Harry Summers. It clearly and decisively explains our failure to recognize the central role that Laos played in the conflict and in fact, enabled the North Vietnamese to win the war. It raises the pungent question—did we fight the right war but in the wrong country?

Col. Darrel Whitcomb,
USAFR (Ret.)
Colorado Springs, Colo.

Correction:
Print editions of the June/July issue USAF & USSF Almanac incorrectly listed the rank of Gen. Duke Z. Richardson, the commander of Air Force Materiel Command. The digital edition has been corrected.

Integrating Everything

Brig. Gen. Luke C.G. Cropsey is the Department of the Air Force's first Integrating Program Executive Officer for Command, Control, Communications and Battle Management, tasked with modernizing the department. In announcing his appointment nearly a year ago, Air Force Secretary Frank Kendall described his role as "the hardest acquisition job I've ever given anybody." This interview is adapted from an AFA Warfighters in Action event in July. This condensed transcript has been edited for space.

Mike Tsukamoto/staff

Brig. Gen. Luke Cropsey is responsible for developing the overarching architecture that can turn Combined Joint All-Domain Command and Control (CJADC2) from a concept into an operational reality.

Q: Operationally focused ABMS is one of Secretary Kendall's seven Operational Imperatives. What does the ABMS structure look like today?

A: We've had about nine months now, working through the combined [Advanced Battle Management System, Rapid Capabilities Office, and Chief Architect of the Air & Space Forces] teams under one roof, getting, after a very singular focus: our ability to do Command, Control, and Communications across the Air and the Space Forces. … One of the things that we've learned is that you've got to be absolutely, intensely focused on the operational problem that you're trying to solve. If you're not … you'll end up in a boil-the-ocean scenario where you're trying to do everything all at once. And history is replete with the examples of great programmatic carcasses that have littered the side of the road on attempts to do just that. We're very diligent about staying focused on the operational problem. … [There is] lots of dialogue going on with Air Combat Command, Air Force Global Strike Command, USAFE, PACAF, you name it. That conversation is robust. And as you might imagine, everybody has some pretty strong opinions about what the need and the requirement look like.

Q: Doctrine used to be 'centralized command and decentralized execution.' Now it's 'centralized command, distributed control, and decentralized execution.' You're developing the Department of the Air Force Battle Network. What exactly is that?

A: One of the things that we talked through when we were standing up nine months ago was the scope and scale of the system-of-systems problem we are trying to get after: … We needed a label that was distinct from ABMS [which], depending on the time frame you're talking about, can be one of five different things. And making a six thing, also labeled ABMS, was going to be a challenge. So we [came up with] the label "DAF Battle Network" … as a way to better articulate the scope [of the challenge]. … The Battle Network, as we're defining it, is composed of everything from the right sensors that build situational awareness—what's going on in the battlespace, brings your data in, gives you that situational awareness, and allows you to start making operational decisions about where you need to go and when—and then it gives you the ability to direct the force, what needs to be in those particular places and locations and with what capability. There are lots of individual parts and pieces that make up that end-to-end chain. … If you don't have the perspective where the architecture requirements must allow you to rapidly integrate new capability quickly and at low switching costs, you will end up with an inability to pivot to [newer technology]. … You have to create a system at an architectural level that emphasizes the architecture's abilities over the individual performance specs of the things that are in that architecture. Because, however good you think you are today, somebody else is going to be better in another 12, 18, 24, 36 months. And if you can't rapidly pull that in and integrate it, you're going to lose.

Q: How does space play into all of this?

A: It's impossible to overstate how central a role space plays in this whole conversation, whether you're talking about the sensors, whether you're talking about comms, space is going to play an extended role. I am absolutely blessed to have a deputy who has decades of space experience and understands that business inside and out. … I can't do an air mission without space, I can't do a maritime mission without space, I can't do a land mission without space. So I have space embedded and integrated into everything that we're doing, and we have had absolutely phenomenal support from Lt. Gen. [Michael Guetlein] and the team out there [at Space Systems Command.]

Q: You're integrating this great system of systems, and trying to do it in a way that remains open. How are you doing that?

A: A lot of the technologies that we're talking about integrating are things that are being generated out of the commercial tech base, not internal department R&D—although there's certainly plenty of that going on as well. What we're trying to do is find ways to promote more competition, not less, as we're moving forward. And we're thinking very deliberately around how we create the conditions for deploying capability continuously. What does that look like? How do you do it? How do we get out of "Big Bang" acquisition, where I spend a decade or better trying to get it all just right before I push it out the door? We've got to move

to a different model where I am rapidly, iteratively, constantly moving capability forward at a rate that keeps up with how the technology is moving as a whole. … That model is something that we've got to go out and prove, quite frankly. We don't have a ton of experience, historically, making that work. But I think there's a lot of excellent evidence out there, both commercially and bright spots around the department, where they've taken that agile Product Manager perspective and have made it work.

Q: A distinct U.S. advantage is its close ties to allies and partners. How do they fit into what you're doing?

A: We're stronger in part because of our heterogeneity, but it also complicates our ability to actually get everybody moving in the same direction at the same time. So I'll offer a couple of thoughts: One, our current network-centric view of security is killing us. Our ability to push data to the places and the people that need to get it right now is confined by whether or not you're on a network that allows me to talk to you. My ability to scale, from an ABMS perspective, is significantly constrained by that fact. …. Until I get to a good identity management system that's coupled in with a good zero-trust capability that allows me to start to get to network-agnostic data flows, our ability to integrate across services and with partners is going to continue to be a challenge. ...

Our experience today is that if you bring that very focused operational problem into the bureaucracy side of this, and you tie what you're asking a bureaucracy to do back to the operational outcome, you can actually generate some pretty significant speed out of the bureaucracy—especially if you can articulate in a way that says, 'No, wait, you don't understand: if we don't get to this, the following operational outcomes aren't going to happen.' And then all of a sudden, it's not an esoteric conversation about a widget, it's, 'Hey, if this doesn't happen, these are the operational impacts.' ... I'm not waiting around for the silver bullet. We're strong advocates of the George Patton [theory that]: "A good plan today, violently executed is a better than a perfect one next week." So we have violent execution conversations on a regular basis.

Q: We're already seeing legacy platforms such as JSTARS retired. What are you looking at in terms of near-term operational capabilities to fill those gaps—or is your project more of a long-term, five-year, 10-year type of thing?

A: The Secretary hasn't give me the benefit of picking one or the other. He said we've got to do both. For those of you who have heard him talk about this, you've probably heard the example of the JADC2 Palace. So here's how it goes: There was a vision around how joint all-domain command and control would ultimately be able to provide a joint coalition capability from a C2 perspective. Its challenge is the fact that we didn't actually have a blueprint for what that JADC2 Palace would look like. So everybody got busy out there making bricks with regards to the programs that we're all trying to implement and make happen.

But because we didn't have that overarching blueprint, whether the brick actually fit into the building or not was an open question. So what we're actively pursuing right now is what he would call a modest house. We don't need a palace, but we need a house with a roof on it that will actually get the job done. And so the first job that he gave me was to build a blueprint for what that DAF house would look like when it comes to our C2 modernization. ... The second piece was, 'Hey, I need you to go bake the bricks around what goes into building that house.' So if a brick doesn't fit the design, you need to come back and tell me, 'Hey, we need to quit working on that, and shift the effort to something else that's actually going to get us where we need to go.'

Q: How do these initiatives fit in with what the other services are doing?

A: We're heavily engaged on multiple fronts, and with both sister services and with [the Office of the Secretary of Defense] and the Joint Staff. … We are engaged directly with the Navy, and their Project Overmatch. ... We're at a point now with the Navy, where we can seamlessly move apps that have been developed on the air and space side over to the Navy side of it, and vice versa. The rather rudimentary idea that we can actually share applications across services is a nut that we hadn't cracked until relatively recently. And that happened this past spring. So that's one example. We're also heavily engaged with the Navy on how we build the technical architecture that will allow Navy airplanes and Air Force airplanes, and space satellites to actually do the communications problem. ... On the OSD side, we are heavily engaged in conversations with the [Chief Data Officer] … around data, data fabric, if you're looking at it from a data-centric view. And we're also very much engaged with the acquisition and sustainment side of it under Dr. [William] LaPlante [undersecretary of defense for acquisition and sustainment] when it comes to programmatic integration between air, space, maritime, and army-related efforts and how those get converged programmatically.

Q: So it's all enormously complex and the scope is huge. How affordable is all of this?

A: Affordability is going to be a huge deal. Maybe the best way to think about it is the difference between what I'll call first-mover advantage architecture versus fast-following architecture. First-mover advantage architecture, think Soviet-era, where you have very large barriers to entry, it took a nation-state worth of investment in order to move a technology forward, and technology had a trajectory that you could predict pretty well to know where it was going to be in 10 years. We built our entire system around being able to do that problem. In a lot of ways, we're still doing that problem. With a fast-following architecture, you've given up on predicting where the technology is going, and you're building an architecture that allows you to very rapidly integrate that technology at low-switching costs. If you don't get the low switching cost piece, right, you'll bankrupt yourself trying to integrate new technology. The architecture actually has to be designed to do that problem. If it doesn't, or it doesn't do it well, we either get behind the competition with regards to their ability to do it, or we bankrupt ourselves.

Q: Large-scale integration problems have historically stumped the Pentagon. What's different this time?

A: One, phenomenal senior leadership support. I get to go see the Secretary every 90 days and give them an update on what's working and what isn't. And it's surprising how many things start working. Second, the people. I have an absolutely amazing team of people working with me, the best I've seen. From my perspective, we don't have a talent problem. I've got a bunch of unicorns in the stable. Do we need a few more? Yes, so if you know any, send them my way—I'm hiring. But between the senior leadership prioritization on this mission set, and the brain trust that we have operating … we're at a unique juncture in history. I've never seen as much alignment in the past 30 years that I've seen here [among the services]. So that gives me huge hope that we're actually going to figure this thing out. … When it comes to the size and the scope and the importance of the mission, the caliber of the people working for me, everybody's moving in a positive direction. And so if you're Red, you should not sleep well.

VERBATIM

Master Sgt. Cody H. Ramirez

ACE IN THE HOLE

"I really think the big indicator of a cultural change in the Air Force will be when they unambiguously embrace runway independence. ... As the Chinese deploy more and more ballistic and cruise missiles, all of which are very accurate, it's not possible, at least with currently available active defense systems, to comprehensively protect any single base or group of bases against large salvos. ... There's no silver bullet."

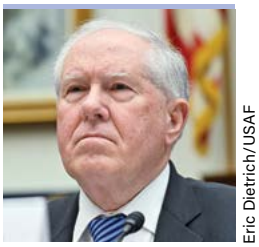
—David Ochmanek of the RAND Corporation, a former deputy assistant secretary of defense for force development and a former Air Force officer regarding the direction of future USAF resilient basing [July 5].

IF IT ISN'T BROKEN...

"If you turn engineers loose without supervision, they will absolutely, guaranteed find a solution for which you have no problem."

—Air Force Brig. Gen. Luke C.G. Cropsey, Integrating Program Executive Officer for Command, Control, Communications, and Battle Management, speaking at an AFA Warfighters in Action event [July 10].

Need for Speed



Eric Dietrich/USAF

"Over my career in national security and defense new product development, one drumbeat has been constant: the process is too slow. This proposal represents low-hanging fruit that would eliminate one to two years from critically needed programs without any risk. ... The United States needs a bigger toolkit to maintain our competitive advantages and strengthen stability and deterrence. When we discover innovative applications of technology that will give us a significant military advantage, we need to act."

—Secretary of the Air Force Frank Kendall stating that with help from Congress with regards to time when fielding new capabilities in "new start" programs, we can remain the most capable military in the world [Breaking Defense, June 26].

Two Sides to Every Story

Courtesy photo

"The bipartisan [NDAA] that was easily passed out of committee invested in the core of our national defense: service members and their families, innovation and technology, allies and partners, and our defense industrial base and military readiness. It ensured a 5.2 percent pay raise for service members, strengthened the DOD civilian workforce, and better supported military spouses and military families. It addressed the pacing challenge posed by the People's Republic of China (PRC), the acute threat posed by Russia, and the persistent threats posed by North Korea, Iran, and violent extremist organizations. The bill as amended, however, has allowed an extreme and narrow contingent to bring their culture war to what was a bipartisan process."

—Rep. Adam Smith (D-Wash.), pictured above, ranking member of the House Armed Services Committee, on the version of the NDAA passed by the House [July 14].

CSPAN image from video

"It is only because of the selflessness of the brave men and women who service in our armed forces that our nation remains free – the FY24 NDAA includes strong provisions that support our service members and their families. The threat we face from China is the most pressing national security threat we've faced in decades–the FY24 NDAA is laser-focused on countering China. The FY24 NDAA protects our homeland from threats by investing in a stronger missile defense and modernizing our nuclear deterrent. The legislation also boosts innovation and revitalizes the industrial base to ensure they can deliver the systems we need to prevail in any conflict."

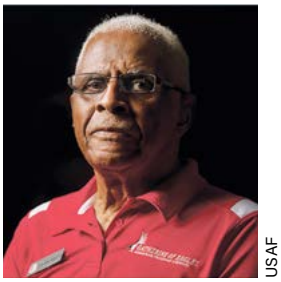
—**Rep. Mike Rogers (R-Ala.),** pictured above, chairman of the House Armed Services Committee, on the NDAA passed by the House [July 14].

Can We Have a Word

"He's jeopardizing U.S. security by what he's doing. It's just totally irresponsible in my view. ... I'd be willing to talk to him if I thought there was any possibility of changing his ridiculous position. The idea that we're injecting into fundamental foreign policy decisions what, in fact, is a domestic social debate on social issues is bizarre."

—President Joe Biden commenting on Sen. Tommy Tuberville (R-Ala.) blocking confirmations of military officers at a NATO press conference in Helsinki, Finland [AP News, July 13].

Attitude is Altitude



USAF

"Being old doesn't mean anything. It's just a number. It's your attitude: you have to keep a positive attitude about everything. If you do that, you're all right. And have a sense of humor. If you don't have a sense of humor, you're dead in the water."

—Retired Air Force Lt. Col. James Harvey III, an original Tuskegee Airman, on turning 100 years old [July 10].

FACES OF THE FORCE

Airman 1st Class Mary Bowers

The **40th Helicopter Squadron,** Malmstrom Air Force Base, Mont., received the 2022 Omaha Trophy in June as the best ICBM squadron. The award is the highest honor bestowed upon a nuclear enterprise by a civilian organization and is given to units across U.S. Strategic Command. The 40th distinguished itself by flying eight aircraft 4,060 hours and safeguarding 84 nuclear weapons movements, establishing a safe zone for a damaged payload transporter and rescuing an emergency patient. The 40th also led security training in the missile fields by identifying security shortfalls and developing improvements, and protected the wing's $2.2 billion arsenal.

1st Lt. Peyton Craven

Columbus Air Force Base, Miss., Airmen and Alabama nonprofit Legacy Flight Academy powered the first-ever Eyes Above the Horizon (EAH) outreach event for underrepresented youth in June. EAH provides local youth the opportunity to foster interests in aviation and STEM material. Students experienced Tuskegee Airmen-themed professional development, team building, a college and career fair, and aircraft simulator exercises. "No matter where we are, there are aspects of the community that just don't see things outside of their backyards," said Lt. Col. Aaron Jones, 49th Fighter Training Squadron Commander.

Dennis Santarimala/USAF

The 349th Force Support Squadron (FSS) at Travis Air Force Base, Calif., won the 2022 Air Force Reserve Command (AFRC) Force Support Wartime Readiness Legacy Award earlier this year—their second time receiving this honor. The award recognizes AFRC's best FSS in leadership, performance, and innovation in wartime readiness preparation. They led the command in readiness training, readiness activities, and utilizing innovative tactics, techniques, and procedures to advance readiness strategy. "What we have been doing is meeting several readiness factors," said Lt. Col. Faith Eudy, 349th FSS commander.

USAF

Retired Gen. Tod D. Wolters, former Commander of U.S. Air Forces in Europe–Air Forces Africa, will receive the next USAFE Order of the Sword at a formal ceremony in spring 2024. Established and bestowed by the enlisted force, the Order of the Sword recognizes an individual for remarkable contributions to enlisted personnel. Key initiatives Wolters championed included the USAFE-AFAFRICA Superintendent Course as well as the Inter-European Air Forces Academy, which trains company-grade officers and junior noncommissioned officers in a blended curriculum.

Staff Sgt. Sean Madden/ANG

New York Air National Guard **Tech. Sgt. Ryan Rutz (left)** 106th Rescue Wing, with Col. Shawn Fitzgerald 106th RQW commander, recently received the Staff Sgt. Henry E. "Red" Erwin Outstanding Enlisted Aircrew Member Airman of the Year Award, given to the Air Guard's top career enlisted aircrew member. Rutz serves as the loadmaster for an HC-130J Combat King II search and rescue aircraft flown by the wing's 102nd Rescue Squadron. Based at Gabreski ANGB, N.Y., 106th members are trained to rescue personnel behind enemy lines and conduct search and rescue operations worldwide.

Senior Airman Michael Olivares

Quick reaction from 195th Wing Security Forces **Senior Airman Ivan Sauer (left)** and **Staff Sgt. Alex Tranchina** likely saved the life of a civilian who collapsed outside the perimeter of Sepulveda Air National Guard Station, Calif., last August. Sauer witnessed a man falling backwards, then lying still on the ground. He and Tranchina sprinted to the unconscious man and discovered some diabetes paperwork. They stayed with the individual until rescue personnel arrived. After multiple doses of Naloxone HCl from paramedics, he responded.

CAP

Cadets from Virginia and Texas Civil Air Patrol (CAP) wings recently earned private pilot certificates through the Civil Air Patrol Youth Aviation Initiative's Cadet Wings program. **Cadet Col. Jacob Brown (above left)** of the Texas Wing's Redbird Composite Squadron plans to pursue an aviation career and attend the U.S. Coast Guard Academy. He also intends to become an adult CAP member. **Cadet Maj. Samuel Ten (inset)** of the Virginia Wing's Burke Composite Squadron plans to become an airline pilot. He will participate in Purdue University's professional flight program and obtain a Restricted Airline Transport Pilot License so he can begin flying for an airline at 1,000 hours.

Airman 1st Class Cody Friend/USSF

Peterson Space Force Base, Colo., is one of just six military installations across DOD to win the 2023 Commander in Chief's Annual Award for Installation Excellence. Established by the President in 1985, the award encourages commanders to foster innovative environments and enhance base-level services, facilities, and quality of life. The award recognizes excellence in several areas, including mission support, quality of life and unit morale, health and security, and public relations. Peterson Space Force Base has more than 100 specific accomplishments that contributed to its win.

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

A U.S. Air Force HC-130J Combat King II from the 81st Expeditionary Rescue Squadron lands on an unprepared landing zone in the Grand Bara, Djibouti, in July. Located on the Horn of Africa, Djibouti is about the size of New Jersey, but its strategic location has drawn the U.S., China, France, and Japan to establish bases there. The 81st is the Air Force's only fixed-wing personnel recovery platform, designed and equipped for low- and medium-altitude night flight operations without external lights and with minimal communications.

Tech. Sgt. Dhruv Gopinath

Two B-1B Lancer bombers operating as red, aggressor aircraft for Operation Noble Defender, are intercepted by U.S. and Canadian fighters dispatched by NORAD. The B-1s were simulating cruise missile threats in the operation and were intercepted as they entered the North American Air Defense Identification Zone off the east coast in June. After retiring 17 B-1Bs in 2021, Air Force Global Strike Command retains a fleet of 45 of the bombers, which it intends to keep into the early 2030s, when they are to be replaced by the new B-21 Raider.

Master Sgt. Bryan Hoover/ANG

A B-2 Spirit rises into position to take on fuel over Missouri in June, as seen from the boom operator's position on a KC-135 Stratotanker. The Air Force has 375 Stratotankers, with an average age of 61 years; yet it's likely the Stratotankers will outlast its small fleet of B-2s, which are expected to remain active for only about 10 more years. After a six-month layoff over concerns about the safety of its landing gear, the B-2s are back in the air. They're also adding upgrades, including new color cockpit displays, a new jam-resistant Link 16-based communications suite, new data recorders, and updated weapons integration.

Airman 1st Class Ivy Thomas/ANG

Tech. Sgt. Christopher Hubenthal

A C-130 Hercules arrives at Yokota Air Base, Japan, in support of Mobility Guardian 2023. The massive mobility air forces exercise spanned the Pacific and included six major allies—Australia, Canada, France, Japan, New Zealand, United Kingdom—in addition to the United States.

Thousands Join In on Massive Mobility Exercise

By Chris Gordon

The U.S. Air Force, the other military services, and allied forces kicked off Mobility Guardian 2023 in July, the most ambitious iteration of the biennial air mobility exercise ever. Spread out across the Indo-Pacific area of operations and led by Air Mobility Command, the highly anticipated logistics exercise tests U.S. preparedness for long-range, distributed operations in the vast Indo-Pacific region.

"This year's MG23 reflects an evolution from the exercise's previous three U.S.-based iterations and aims to understand and overcome distance to deliver the mobilization, deployment, and sustainment functions that the joint force, allies, and partners depend on to respond to challenges worldwide," AMC announced as the event got underway.

The exercise "will turn planned integration into operational integration within the theater," said Gen. Mike Minihan, the head of Air Mobility Command. Mobility Air Forces (MAFs) will stretch "to meet future demands and protect shared international interests with our allies and partners."

Australia, Canada, France, Japan, New Zealand, and the United Kingdom took part in the challenge.

Planning for Mobility Guardian started more than a year ago. In its fourth iteration, the 2023 edition is the largest "full-spectrum readiness exercise" in AMC's 31-year history. Some 3,000 AMC Airmen and Guardians participated, supporting a wider force of 15,000 participants, with AMC acting as the "cohesive glue" throughout the Pacific, the command said.

"AMC's role in enabling the meaningful maneuver of forces throughout the theater underscores the necessity of logistics and realistic interoperability in the region," the command said. Airlift, aerial refueling, aeromedical evacuation, command and control, and humanitarian and disaster assistance missions were exercised over the two and a half weeks.

Minihan, previously the deputy commander at U.S. Indo-Pacific Command, got in trouble last winter for a spirited memo to his forces pumping them up to be prepared for a possible fight with China. With the U.S. and its allies working out the kinks in the still-new Agile Combat Employment strategy, in which U.S. combat air forces disperse from large established bases to small, remote operating locations, delivery of food, fuel, parts, and ammunition logistics will be the key to success—or failure.

"This is a proving ground for the MAF's new status quo tested through the application of flexible and agile concepts," said Lt. Col. Jake Parker, Mobility Guardian exercise director.

COMBINED, JOINT TEAM

Headquartered at Joint Base Pearl Harbor-Hickam, Hawaii, the Exercise Control Group brought together of Air Force, Joint, and allied planners, connecting a diverse breadth of functions.

"The collaboration and connection formed alongside our DOD teammates and our allies and partners during planning and execution will pay dividends today, tomorrow and into our unquestionably complex future," said Parker.

Planners from a U.S. Marine Air and Ground Task Force (MAGTF) leveraged Mobility Guardian and integrated their own exercise into the schedule. "The Marine Corps happens to be performing exercises in theater at the same time and we needed a lift in order to move our people out into the theater and conduct our exercises," explained Sgt. Heather Dilcher, 3rd Marine Aircraft Wing.

The 60th Air Mobility Wing from Travis Air Force Base, Calif., offered a C-5M Super Galaxy, with the capacity to carry 281,000 pounds more than 2,500 nautical miles without aerial refueling.

Noting that this "is my first time working jointly," Dilcher said she'd gotten all the support the Corps needed. The MAGTF planning team and the 60th AMW coordinated the move, including removing and folding helicopter rotors to ensure multiple aircraft could fit inside the Super Galaxy.

Not everything was expected to go so smoothly over the two weeks of nonstop operations, of course. Previewing the exercise at AFA's Warfare Symposium in March, Minihan made clear Mobility Guardian is a learning experience, not a graduation exercise.

"Some things won't go perfect," he said. "We'll go back and we'll work harder to get it, and we'll close gaps as quick as we can."

USAF Seeks to Halve F-15E Force to Pave Way for Modernization

By Chris Gordon

The Air Force plans to cut its F-15E fleet to 99 aircraft by 2028—cutting more than 100 Strike Eagles in an ongoing sacrifice of current fighting capacity in the hopes of accelerating future modernization and capability.

Air Force budget documents released in May show USAF's plan to upgrade 99 F-15Es with the Eagle Passive Active Warning Survivability System (EPAWSS), an electronic warfare suite on the newer F-15EX designed to help the fourth-generation fighters evade sophisticated integrated air defenses to stand in and fight, rather than remain at standoff distances. But to do that, the Air Force also intends to retire 119 F-15Es, which average more than 30 years of age.

The F-15Es fleet is equipped with two engine types, with the newer models powered by Pratt & Whitney F100-PW-229 jet engines and the older ones powered by earlier F100-PW-220s. The Air Force intends to keep only the jets with the newer, -229 engines.

Asked about the plan by Sen. Ted Budd (R-N.C.) during his confirmation hearing to become Chairman of the Joint Chiefs of Staff, Air Force Chief of Staff Gen. Charles Q. Brown Jr. said his aim must be to "balance capability and capacity."

Budd, whose state includes Seymour Johnson Air Force Base, N.C.—one of five F-15E bases nationwide—questioned whether the Air Force was sacrificing too much in capacity.

Brown acknowledged it is a difficult choice. In budget justification documents, the Air Force states: "Prioritizing modernization efforts to keep pace with near-peer competitors requires difficult trade-offs with existing aircraft inventories and programs. ... The Air Force determined the best mix for the fighter fleet calls for maintaining an F-15E fleet of 99 aircraft with the more powerful engine (F100-PW-229) and shifting resources to maximize procurement of newer fighters and capabilities."

EPAWSS will replace an "analog, federated [EW] system with a next-generation, digital, fully integrated EW suite that enables the F-15 to operate in a modern threat environment," according to the Air Force Life Cycle Management Center.

Airman 1st Class Olivia Gibson

The Air Force plans to keep only those F-15Es powered by the newer F100-PW-229 Pratt & Whitney engines, and upgrade them with EPAWSS, an advanced electronic warfare capability.

Congress could block the retirements, as they did with planned cuts to the A-10 force for years. The Air Force is already rapidly drawing down its F-15C/D fleet, having worn those aircraft out beyond their anticipated service lives. Retiring the F-15Es is still a future years plan, with no cuts anticipated before fiscal 2025 at the earliest. With the Air Force acquiring new F-35s at a rate of about 48 per year, plus 12 to 24 F-15EXs, the capacity can be made up over time.

In total, the Air Force plans to buy 104 F-15EX Eagle IIs, including 24 in fiscal 2024.

Meanwhile, USAF plans to retire 57 F-15C/D models in fiscal 2024.

"As we do this, it's not just the platforms themselves, it's the other aspects of our command and control in terms of bringing some reconnaissance capabilities [in which] we will continue to invest," Brown said. The key, he added, is to strengthen the remaining fleet by making them more capable and "more relevant and combat capable as we go forward."

Staff Sgt. John Linzmeier/ANG

1st Lt. Sheldon Lee, 169th Air Defense Squadron air battle manager, operates an electronic training system in 2022, at Wheeler Army Air Field, Hawaii. DOD is working on a new set of standards and guidelines to improve handling of classified information.

Time to Improve Classified Information Regulations

By David Roza

The Department of Defense completed a 45-day review of classified information programs, policies, and procedures in the wake of a massive security leak, determining that the "overwhelming majority" of personnel with access to classified materials are "trustworthy," but more clarity is needed in the regulations governing classified data, Secretary of Defense Lloyd J. Austin III said in a July 5 memo.

The review followed the arrest of Airman 1st Class Jack Teixeira, a Massachusetts Air National Guardsman, who allegedly shared a trove of classified documents on a group chat website, covering topics from insights into the war in Ukraine to information relating to the Indo-Pacific and Middle East theaters of operation.

The review "identified areas where we can and must improve accountability measures to prevent the compromise of [Classified National Security Information], to include addressing insider threats," Austin wrote.

A senior defense official briefing reporters on background said the review focused on "department policies and procedures."

Of particular concern, the official said, was inconsistencies in the way low-level security managers interact with the Defense Counterintelligence and Security Agency (DCSA), which is charged with protecting such information. More two-way dialogue is essential for continuously vetting individuals for trustworthiness.

"As we've transitioned to continuous vetting, we need to get to that local area security manager and make sure they understand what is available to them, what information they can have on their personnel, how important that accountability relationship is," the official said.

Continuous monitoring supplements full-scale security clearance, recognizing that people's behaviors can change gradually, and that someone verified as trustworthy years ago may not be trustworthy tomorrow. Beyond fostering a dialogue with DCSA, the Department of Defense also needs to clarify its standards for handling classified information, the official said. These standards, which vary between organizations and between different varieties of classified information, can be difficult to keep straight, the official said.

"As someone who's read a lot of DOD policies, they are not the clearest documents always," the official noted. "I am not surprised that as they've layered on top of each other … and as this complex classified information environment has grown, that there's a need to make sure that we are looking at them from a stand-back distance to make sure they're understandable and that our workforce can use them to the best of their ability."

Ambiguity leads to inconsistencies in how standards are applied. For example, the official cited a requirement for top secret control officers, who Air Force regulations say are responsible for "receiving, dispatching, and maintaining accountability of all top secret documents." But while public-facing policy states that Top Secret Control Officers are optional, the official said, other policies state that they are mandatory.

"Then if you get into what is a reportable offense and who you have to report it to … some of that is also confusing," the official said. "If you're a local-level security manager managing a joint unit for example, who do you report it to, how do you do all of that?"

Clear regulations are especially needed to keep pace with the increasing number of locations handling classified materials.

Security breaches come about not necessarily because of a single point of failure, but because many factors come together. The 45-day review provided a chance "to make sure that we looked at this as quickly as possible to make sure that we made the improvements that we could quickly," the official said, even as the Teixeira investigation continues.

That kind of self-assessment is in line with industry best practices for mitigating insider threats. Daniel Costa, technical manager of enterprise threat and vulnerability management at The National Insider Threat Center at Carnegie Mellon's Software Engineering Institute, told Air & Space Forces Magazine in April, that there is no single answer to this kind of challenge.

"There's an inherent risk that comes along with doing business," he said. "What we're talking about is human nature, and thinking about insider threats as an inherent risk to organizations requires real careful planning and organization-wide participation to reduce that risk to acceptable levels."

Besides the 45-day military-wide review, the Department of the Air Force is conducting a review of its policies regarding classified information and an Inspector General review of security practices at Teixeira's unit, the 102nd Intelligence Wing.

In his June 30 memo, Austin directed all Department of Defense component heads to take a range of steps: ensure that Department of Defense personnel are assigned to a Security Management Office; ensure Sensitive Compartmented Information Facilities (SCIFs) comply with Intelligence Community Directive requirements; ensure all SCIFs and Special Access Program Facilities (SAPFs) are accounted for in a centralized tracking system; confirm that use of personal and portable electronic devices is prohibited in those facilities; that Top Secret Control Officers are required for top secret information; and that a Joint Management Office for Insider Threat and Cyber Capabilities is established for monitoring threats and user activity across all military networks.

To enhance communication with the DSCA, Austin directed the Undersecretary of Defense for Intelligence and Security, Ronald S. Moultrie, to analyze training needs and to examine and/or improve the way continuous vetting data is shared and reported, sharing that information within the military. Austin set a series of deadlines from July 31 to Dec. 31 for those steps to be completed.

Yet Austin also said it's important not to overcorrect, given that the vast majority of personnel willingly and diligently comply. DOD must avoid imposing unnecessarily restrictive policies on information sharing that can undermine mission effectiveness.

"The department is mindful of the need to balance information security with [the] requirement to get the right information to the right people at the right time to enhance our national security," DOD stated in a fact sheet about the security review.

OPERATIONS

U.S. Drones, Russian Fighters Clash (Again) Over Syria

By Chris Gordon

Russian fighter aircraft harassed U.S. MQ-9s over Syria multiple times in July, dropping flares in their flight path and interfering with their flight paths, as the Russians escalated to "a new level" of aggressive behavior, according to U.S. officials.

On July 5 at around 10:40 a.m. local time, three U.S. MQ-9 Reaper drones on a mission against ISIS targets were intercepted by three Russian Su-35 fighter jets, flying "harassing" maneuvers, according to U.S. military officials. The following morning, Russian Su-34 and Su-35 fighters intercepted two MQ-9s conducting another anti-ISIS mission. One day later, Russian jets interfered with three MQ-9s again over a period of about two hours.

The conflict is arising in western Syria, an area where Russia operates freely and where U.S. forces operate only after alerting the Russians to their presence. That kind of deconfliction has been taking place for years. What's new is the way Russia is responding when U.S. drones fly in that airspace.

"These events represent another example of unprofessional and unsafe actions by Russian air forces operating in Syria, which threaten the safety of both coalition and Russian forces," Air Forces Central Commander Lt. Gen. Alexus G. Grynkewich said in July 6 statement. Grynkweich condemned Russia's "dangerous behaviors."

In the July 7 incident, U.S. forces were en route to attack Usamah al-Muhajir, an ISIS leader, who was killed on the mission. No civilians were killed.

Grynkewich said in a July 7 statement—before the strike—that "during the almost two-hour encounter, Russian aircraft flew 18 unprofessional close passes that caused the MQ-9s to react to avoid unsafe situations."

To demonstrate the Russian behavior, the Pentagon swiftly declassified and released video of the first two incidents captured from the Reapers' on-board cameras.

Among the Russian tactics, they have dropped parachute flares and engaged afterburners in front of the U.S. drones. The MQ-9 Reapers carry air-to-ground missiles as well as intelligence, surveillance, and reconnaissance capabilities. The U.S. is not threatening Russian or Syrian assets, only ISIS, U.S. officials said.

"We have made it clear that we remain committed to the defeat of ISIS throughout the region," CENTCOM Commander Army Gen. Michael "Erik" Kurilla added in a statement. "ISIS remains a threat, not only to the region but well beyond."

Grynkewich and other U.S. military officials continue to raise alarm over Russian flying behavior over Syria, saying it endangers both sides' forces and risks inhibiting U.S. operations against ISIS, which Russia ostensibly supports.

F-22s were sometimes used in the past to escort the U.S. strike missions on ISIS militants in northeast Syria as part of Operation Inherent Resolve, the anti-ISIS campaign, because of the threat from Russian planes, but the U.S. has diminished airpower presence in the region to focus more on the Pacific and Europe since the ISIS self-declared caliphate was defeated. AFCENT

USAF

Parachute flares deployed by Russian SU-35 fighters, as photographed by U.S. MQ-9 Reapers on July 5, 2023, over Syria. The Reapers were en route to attacking an ISIS target, flying in Russian controlled airspace. The Russian fighters sought to disrupt the operation, threatening the safety of both U.S. and Russian forces.

currently has around two and a half squadrons of fourth-generation F-16s and F-15Es fighters, as well as A-10s and MQ-9s based in the region.

A Russian Ministry of Defense official, Oleg Gurinov, said U.S. coalition drones were spotted flying over an area where Russian and Syrian forces were conducting drills.

"We remind that the Russian side bears no responsibility for the safety of flight of unmanned aerial vehicles (UAVs), which were not agreed with the Russian side," Gurinov said, according to the state-owned TASS news agency.

Pentagon Press Secretary Air Force Brig. Gen. Patrick S. Ryder dismissed Russian accounts in a July 6 briefing. "We have been in Syria for many years now fighting ISIS as part of an international coalition," Ryder said. "That is no surprise to anyone. … To suggest that somehow, you know, this is our fault, it's ridiculous."

Russia has also challenged two French Rafale aircraft flying near the Iraqi-Syrian border. "The pilots maneuvered in order to control the risk of an accident before continuing their patrol," the French military said in a tweet.

Grynkewich said Russia's interference undermines American efforts to defeat the remnants of ISIS—a goal Russia ostensibly supports.

"We urge Russian forces in Syria to cease this reckless behavior and adhere to the standards of behavior expected of a professional air force so we can resume our focus on the enduring defeat of ISIS," Grynkewich said. "The safety of military personnel and the success of the mission against ISIS depend on the professional and responsible conduct of all forces operating in the region."

CLOSE ENCOUNTERS

After a pause in Russian air activity near U.S. positions over the winter, Russian warplanes resumed regular overflights of U.S. positions in Syria beginning in March. That same month, a U.S. base in northeast Syria was targeted in a strike by Iranian-backed militia in an incident that killed an American contractor.

The U.S. has around 900 troops in Syria to assist its Kurdish allies in fighting the remnants of ISIS. Russia is supporting the regime of Bashar Al-Assad. Grynkewich has said that Russian jets violate mutually agreed-upon deconfliction protocols designed to reduce the risk of inadvertent conflict in Syria and to keep the two nations' air forces separate in eastern Syria. Since spring, Air Forces Central has said Russian jets have come as close as 500 feet from manned U.S. aircraft and considerably closer to uncrewed drones. Russians have also overflown U.S. troops dozens of times in violation of protocol.

The U.S. recently deployed F-22s to the region. A-10s and other U.S. aircraft have been used to patrol Arabian Gulf waters, after Tehran stepped up seizures of commercial vessels. Iran has captured nearly 20 commercial craft since 2021, according to the U.S.

Naval Forces Central said the guided-missile destroyer USS McFaul has successfully blocked attacks on two commercial vessels by chasing away Iranian aggressors.

Russia and Iran have become increasingly cooperative since Russia's invasion of Ukraine last year, with Iran providing drones to Russia, among other cooperative efforts, including their mutual support for the Assad government in Syria.

Grynkewich said Russia should honor its agreements and operate in a more responsible way over Syria.

USAF

Drone view of the Russian SU-35 fighter aircraft closing in on a U.S. MQ-9 aircraft on July 5 over Syria, in what Air Force officials call unsafe and unprofessional actions.

CMSAF Bass to Airmen: We Must Enforce Standards

By David Roza

Chief Master Sergeant of the Air Force JoAnne S. Bass joined the Air Force in the 1990s, the years that followed the collapse of the Soviet Union, the overwhelming victory in Desert Shield/Desert Storm, the post-Cold War drawdown, the reduction of barriers to combat service by women, and the introduction of Don't Ask/Don't Tell, the first step allowing open service by LGBTQ troops.

It was a lot of change in a short period of time, and the resulting tumult and distractions ultimately led to breakdowns in discipline—and safety. Now, nearly 30 years later, Bass wants to head off breakdowns in discipline and the trouble they can yield. In a June 20 letter Airmen, she wrote:

> *"We live in extraordinary times and I remain proud of how our Air Force responds to each challenge. Yet, based on my travels and conversations with Airmen of all ranks, I have noticed a common concern regarding standards. History shows that when standards erode, military capabilities and readiness decline. We can't afford to let this happen and still expect to keep pace with the rapid expansion of the Chinese military, Russian aggression, and other emerging global challenges."*

Bass went on to urge Airmen to answer the "higher calling" of their service: "What sets us apart from everyone else," she wrote, "is a relentless adherence to standards. This is what makes us the world's greatest Air Force."

In an exclusive interview with Air & Space Forces Magazine, Bass said the trigger for her message was really the number of questions about discipline—and how and when to correct other Airmen—that kept coming up wherever she went.

"All healthy organizations, all strong teams, [need to] take a step back and reflect on what is good and what things they can do to continue to get better at their profession and at their trade," she said in the interview. "There wasn't one thing that triggered this, it really was more, 'Hey, we've got to always police ourselves up to make sure that we remember that we are part of a profession of arms and that we are holding ourselves to a higher standard than an everyday American.'"

What resonated for Bass was history: Two deadly incidents in 1994 that led to the 1996 publication of USAF's "Blue Book," which was revised and republished in 2022. In the first incident, a pair of F-15s mistakenly shot down two Army Black Hawk helicopters, killing 26 Americans after an AWACS crew misidentified the choppers as Iraqi Mi-24 Hinds. Two months later, aircrew lost control of a B-52 while pushing the aircraft beyond its limits

"History shows that when standards erode, military capabilities and readiness decline," wrote Chief Master Sergeant of the Air Force JoAnne Bass in a message to all Airmen. "We can't afford to let this happen and still expect to keep pace with the rapid expansion of the Chinese military, Russian aggression, and other emerging global challenges."

Mike Tsukamoto/staff

during practice for an airshow.

The two incidents raised fears that the post-drawdown force itself had been pushed beyond its capacity. But they may only have been the beginning of what turned out to be a tumultuous decade. Opposition to new rules encouraging women to fly combat aircraft, mandatory sexual harassment training, political discord over gays in the military, and deployments that involved the U.S. military in Somalia, Haiti, and the Middle East shook the force.

Then-Chief of Staff Gen. Ronald Fogleman decided the Air Force needed to be shaken up. He applied the U.S. Air Force Academy's Core Values—Integrity First, Service Before Self, Excellence In All We Do—to the entire service. That's when he and his personnel chief, Lt. Gen. Billy J. Boles, published the original "Blue Book."

Bass acknowledged that today's Air Force is also juggling momentous changes and political upheaval, all while undergoing a massive modernization push, developing new concepts like Agile Combat Employment, and gearing up for a different kind of security posture in which China looms as a peer and pacing military threat. The COVID-19 pandemic, polarizing politics, and rapidly changing societal attitudes, including toward military service, shifted the ground below. An unprecedented recruiting shortfall adds to the challenge.

At the same time, the Air Force has made accommodations to attract and retain the force of today. Major changes to appearance standards, including looser regulations on hair length, color, and styles; facial hair; tattoos; uniforms; morale patches; handbags; physical fitness testing; and new rules allowing Airmen to keep their hands in their pockets have generated controversy.

One security forces master sergeant, who asked that his name be withheld, told Air & Space Forces Magazine: "The past five years there have been so many changes, it's hard to keep up." Worse, he added, "as a senior NCO, trying to keep up with the new standards, if you make the wrong correction now you look like you don't know what you're talking about."

Bass said she is well aware of such concerns.

"I have absolutely heard from our Airmen that there are too many changes … and they don't know what those standards are," she said. "What I would offer is, we cannot rationalize that 'there are too many changes and that's why we can't uphold standards.' We, as Airmen, absolutely know what right is and what right looks like, and [if unsure] we can look up what those standards are."

Another Airman told Air & Space Forces Magazine that he worried he might be accused of being racist or sexist if he tried to enforce particular grooming and appearance standards. Asked about that concern, Bass said the key is to enforce standards fairly and with respect.

"If you're being fair, just, and true, then good order and discipline is going to prevail," she said. Airmen should not be afraid to share high expectations and to hold each other accountable.

"We can't be afraid to do those things," Bass stated. "That gets back to being a disciplined force, ... [NCOs] just have to be fair and you can do so in a way that is respectful."

Times are always changing, and generations are always shifting. Bass urged that it's important to remember that and try to understand the world as younger Airmen see it.

"When I was a young Airman 30 years ago, I remember the folks who'd been in a long time talked about my generation and how we lacked standards," Bass noted. "So it's interesting how history repeats itself. … I'm excited for this generation, because this generation is going to help us get after and tackle some of the toughest challenges that we've ever had, and we need to make sure that we cultivate the landscape so that they're able to be the best versions of themselves."

Bass said her letter was intended to remind Airmen of the rigid discipline required to be the best Air Force in the world, the best possible warfighting organization. "We must set high standards and execute to them because the line between average and elite airpower is razor thin," she wrote. "In our profession, second-best won't cut it."

The objective is to ensure the U.S. Air Force can win wars and what will make that possible is the core values and high standards that helped build that force in the first place, Bass said. But she admitted those issues may not always be at the front of every junior Airman's mind.

"When I was young Airman Bass, I wasn't necessarily reflecting on core values, I was just trying to do my job and do it well," she recalled. "But as leaders, it's important to understand the broader picture. … This uniform is a reminder to myself that this is a commitment to duty, it's a profession of arms, and in that we must hold ourselves to higher standards."

Among the deadly mishaps in 1994 that prompted Fogleman's focus on values was a deadly friendly fire incident in which two Air Force F-15 pilots mistook two Army Black Hawk helicopters for Iraqi aircraft, and shot them down. The helicopters were carrying international military and diplomatic officials over Iraq; all 26 on board were killed. The Government Accountability Office concluded that discipline problems in the F-15 community at the time played a role in the incident.

That same year, a B-52 pilot flying over Washington state took the bomber beyond its operational limits, losing control of the aircraft, and killing all four officers aboard.

"When leadership fails and a command climate breaks down, tragic things can happen," Air Force Maj. Tony Kern wrote in a 1995 case study about the crash. "This is the story of failed leadership and a command climate which had degenerated into an unhealthy state of apathy and non-compliance—a state which contributed to the tragic crash."

Those events played a role in the original rollout of the Air Force Blue Book, which codified the branch's three core values: Integrity First, Service Before Self, and Excellence In All We Do.

"The small things led to bigger things," Bass said. "We can't ever allow ourselves to go back."

Still, tying the styling of hair to safety seems a stretch to some Airmen. An aircraft armaments master sergeant who spoke with Air & Space Forces Magazine noted that in his experience, different career fields adhere to grooming standards differently.

"What gets me is this assumption that if you have a slip up in grooming standards then you're going to slip up at work," said the master sergeant, who asked not to be named publicly. "Correlation doesn't always equal causation."

> *"In our profession, second best won't cut it. We must hold ourselves and others accountable. When any of us walk by or tolerate something below our standards, we damage our credibility. Our Nation is counting on us to remain the world's greatest Air Force. Together let's rise to the challenge of upholding the highest standards. … When something isn't right … not up to standards, have the moral courage to do something about it."*

For her part, Bass emphasized that standards are about professionalism: taking pride in the service means embracing the rules as they exist and applying them fairly and consistently to the Airmen around you. Bass argued that attitude is key to ensuring the Air Force remains the best in the world.

Unlike those crashes, Bass said her letter had no single triggering event. "We needed just a quick vector check," she said. "And we needed to put that out there for all Airmen."

Image from C-SPAN video

Air Force Chief of Staff Gen. Charles Brown, testifying during his confirmation to be Chairman of the Joint Chiefs of Staff, is expected to be confirmed by the Senate. He would succeed Army Gen. Mark Milley, whose term ends on Sept. 30.

6 Key Insights from the Next Chairman of the Joint Chiefs

By Greg Hadley

Air Force Chief of Staff Gen. Charles Q. Brown Jr.'s testimony before the Senate Armed Services Committee on July 11 at his confirmation hearing to become the next Chairman of the Joint Chiefs of Staff offered extensive statements from lawmakers in between questions to the general. Over the course of two and a half hours, Brown answered questions about topics ranging from the potential sale electromagnetic spectrum to the future of Homestead Air Reserve Base in Florida.

But among his responses common themes emerged, offering new insight into how Brown will approach the Chairman's role.

AN OPERATOR'S PERSPECTIVE

Brown emphasized his operational experience repeatedly—as well as his relative outsider status in the Pentagon, where he has spent comparatively little time for such a high-ranking officer.

"For the 11 years prior [to becoming Chief of Staff], I served in seven assignments across four combatant commands—EUCOM, AFRICOM, CENTCOM, and INDOPACOM. I've held leadership positions focused on our five national security challenges—China, Russia, North Korea, Iran, and violent extremists," said Brown. "So, I arrive before you having spent less time as a general officer in Washington, D.C., and more time with our fielded forces allies and partners, either in conflict or preparing for conflict. Having led warfighters abroad shapes my thinking. As a result, I'm mindful of the security challenges at this consequential time and the need to accelerate to stay ahead of the growing threat."

Brown's experience in Command of Pacific Air Forces, at Air Forces Central, and as Deputy Commander of U.S. Central Command exposed him to allies' top military leaders, an asset for any Chairman seeking to build international consensus.

"One of the benefits that I've had as having served as a commander of Pacific Air Forces is the number of air chiefs and chiefs of defense and in some cases, ministers of defense that I've known personally, had a chance to engage with," said Brown. "That dialogue to me is hugely important to determine how best we can move forward and break down barriers and identify areas that we can work together on … not only as a military, but also between our nations, as well. And that's where my focus will be: to continue that dialogue to ensure we can work together and then highlight where the challenges may be and then work with the right entities to be able to move forward to ensure that we are able to win the next war if called upon to do so, but definitely deter or avoid war."

ANALYTICAL ENGINEER

Brown's studious reputation is that of analytical thinker who studies issues deeply, tendencies that were on full display in his confirmation hearing.

"I'm an engineer by background, so doing assessments and doing analysis is how I think about things," Brown told Sen. Roger Wicker (R-Miss.) when asked about shifting resources within Europe. "And that's something we do need to do not just for Europe, but I would say for all of our major security challenges, to continue to reassess."

Brown's analytical approach melded well with that of Air Force Secretary Frank Kendall, and his toward analysis helped shaped the Air Force's modernization program, including divesting older platforms to fund the development of future systems.

"I've often talked about how we have to balance risk over time and look at capability and capacity," Brown explained. "Because we can't just try to modernize completely at the risk of today's operations, and at the same time, we can't maintain all capability

for today's operations and not have the capabilities [needed for] the threats we see forthcoming. And so between that, as you look at that iron triangle, it's the balance between those.

"We can work on emotion, but emotion doesn't work. It's really the analysis that we have to go through to be able to determine how we make those tough calls."

If confirmed, Brown pledged to foster an environment as Chairman in which "you step away from your own empirical interests and then we do what's best, not just for your part of the organization, but what's best for the entire organization."

CHINA AND THE INDO-PACIFIC

Brown mentioned China—America's "pacing challenge," according to the National Defense Strategy—just once by name throughout his entire testimony. Yet he had plenty to say about the Indo-Pacific region and offered hints about his views on deterrence and readiness for conflict with the Chinese.

"You cannot wait until the crisis occurs to be able to deploy capability," Brown said. "You have to pre-position capability and have that in place. You have to work with allies and partners to have access to locations, so you can put capability into place. And that's an area that we are focused on not only as an Air Force, but I'd also say as a joint force."

Brown highlighted Air Mobility Command's massive Mobility Guardian exercise, as well as CORONA South, a recent logistics-focused tabletop exercise held in June among senior leaders.

RUSSIA'S WAR ON UKRAINE

Brown said logistics figures high on the list of lessons from the war in Ukraine.

"I think the Russians learned if you don't pay attention to the logistics, it's hard to win and hard to move forward," he said. "I think we also learned that the timeline for military operations, particularly in a conflict, sometimes takes longer than we might expect, and that is also a challenge."

But Brown also noted how NATO allies came together to support Ukraine with arms and intelligence, the importance of Ukrainians' intense will to fight, and the enduring lessons about airpower and the need to achieve air superiority, are the war's key takeaways.

INDUSTRIAL BASE

Questions regarding America's defense industrial base have grown more urgent in recent months, and Brown himself said during the hearing that he believes Russia's invasion of Ukraine has "exposed" cracks in the base as U.S. weapons stockpiles dwindle. To combat that, he urged lawmakers to approve the Pentagon's request for multiyear procurement buys of certain munitions, saying they are necessary to offer steady demand to contractors.

"Just based on experience when I was air commander for United States Central Command during the defeat ISIS campaign, and we had some similar conversations back in 2017-ish time frame when North Korea was very active. We did some reviews and did highlight it then," Brown said of the industrial base's problems. "Now it's highlighting even more so. And it's the aspect of why it's important for us to not only invest in the platforms but invest in munitions that they have enough stockpile, particularly the advanced munitions that are most effective."

THE APOLITICAL MERITOCRACY

Brown sought to stay above political debates during his hearing, declaring that he would set a "personal example" of staying apolitical and urging civilian leaders to keep the military out of political fights. But several senators pressed him on Air Force diversity, equity, and inclusion policies, with some lawmakers suggesting the service was engaging in what Sen. Eric Schmitt (R-Mo.) called "race-based politics."

Brown responded that he believes service members simply want a "fair opportunity to perform" and that they must be qualified for the positions they fill.

"I'll just tell you from my own career: When I came in, and flying F-16s, I didn't want to be the best African American F-16 pilot; I want to be the best F-16 pilot," Brown said. "I would say the same thing when I went to be an instructor at the weapons school … [and in] every position I've had throughout my career. I wanted it because I was the best and qualified. I did not want to be provided a position of promotion based on my background. I wanted it to be based on the quality of my work. And I think that's the aspect that all of our service members look for: They want a fair opportunity, but they also be rewarded for their performance."

SPACE

Meet the Nominated Space Force Four-Stars

By Chris Gordon

U.S. military space operations are set for a changing of the guard, with Space Force Lt. Gen. Stephen N. Whiting nominated to be the four-star head of U.S. Space Command (SPACECOM) and Lt. Gen. Michael A. Guetlein nominated to be the next Vice Chief of Space Operations.

Both must first be confirmed by the U.S. Senate.

Whiting is currently head of Space Operations Command (SpOC) at Peterson Space Force Base, Colo., the service's component command to SPACECOM. SpOC is one of three Space Force field commands and supplies forces for communications; command and control; domain awareness; intelligence, surveillance, and reconnaissance; and more.

SPACECOM was established months ahead of the Space Force, in 2019, as a distinct combatant command responsible for military operations beyond 100 kilometers above sea level. The Space Force is responsible for organizing, training, and equipping space forces.

USSF

Lt. Gen. Stephen Whiting

USSF

Lt. Gen. Michael Guetlein

Once confirmed, Whiting will take over SPACECOM from Army Gen. James Dickinson, marking the first time the Space Force has had more than two four-star generals. Meanwhile, Guetlein will succeed Gen. David D. Thompson as the USSF's second-highest ranking officer. Thompson has been the service's first and only Vice Chief since the role was created in October 2020.

As head of Space Systems Command (SSC), the Space Force's acquisition field command headquartered in Los Angeles, Guetlein has been an outspoken proponent of accelerating space technology development and deployment and of focusing on the threat posed by U.S. rivals, particularly China. Prior to taking up command of SSC, Guetlein was deputy director of the National Reconnaissance Office.

Lt. Gen. Philip A. Garrant, currently a member of the Space Staff as deputy chief of space operations for strategy, plans, programs, and requirements, is set to succeed Guetlein at SSC, retaining his current rank.

Thompson is expected to retire. SPACECOM's deputy commander is also a Guardian, Lt. Gen. John E. Shaw, who assumed that role in 2020.

Whiting and Guetlein's confirmation to their new roles may take time—they are among 250 general officer nominations currently on hold. Sen. Tommy Tuberville (R-Ala.) placed a blanket hold on all military promotions earlier this year in protest of a Department of Defense policy authorizing the military to pay for out-of-state members and dependents to access reproductive health care, such as abortions and in-vitro fertilization, if those services are not available where they are located.

USSF

Lt. Gen. Philip Garrant

The Senate could circumvent Tuberville's hold by holding roll call votes on every nomination individually, but with so many nominations backed up, that is increasingly unlikely.

Meanwhile, the selection of a permanent headquarters for SPACECOM is also in flux. The decision has been bogged down by political squabbling and investigations ever since then-President Trump selected Redstone Arsenal, near Huntsville, Ala., as its future home. Air Force Secretary Frank Kendall has yet to decide whether to finalize the Alabama selection or to keep the command at its temporary home in Colorado Springs, Colo.

SPACECOM's New Senior Enlisted Leader

Chief Master Sgt. Jacob C. Simmons will succeed Marine Corps Master Gunnery Sgt. Scott H. Stalker as Senior Enlisted Leader at U.S. Space Command, the Pentagon announced.

Currently the senior enlisted leader at Space Operations Command (SpOC), also at Peterson Space Force Base, Colo., Simmons took that role in 2022, following in the footsteps of Chief Master Sgt. John Bentivegna (recently tapped to become the next Chief Master Sergeant of the Space Force) and Chief Master Sgt. of the Space Force Roger A. Towberman, the second-ever Guardian.

"Space is ubiquitous," Simmons said at AFA's Air, Space & Cyber Conference in September 2022. "It is involved in every mission, it is involved in every capability, and it must be intertwined as such."

Simmons was one of the five finalists to replace outgoing Towberman to become the second-ever senior noncommissioned officer in the service's history.

"I enlisted into the military because I wanted to do something that mattered; something I could be proud doing until I figured out which way was up for my life," Simmons said in a 2018 interview. "Growing up at Fort Hood, Texas, I actually had every intention of joining the Army and would have been a Soldier had I not listened to a still small voice during one life-changing event," Simmons said. "While getting set to sign my very final piece of Army enlistment paperwork at MEPS [Military Entrance Processing Station], an Airman walked by in service dress. I stopped just shy of the oath when I realized that in my eagerness to get life started, I didn't research all of my options. I owed myself that."

USSF

Chief Master Sgt. Jacob Simmons said Guardians must work closely with members of the other services—be integrated and interoperable.

Study: US Needs Counterspace Weapons for Space Superiority

By Greg Hadley

The Space Force and U.S. Space Command should field counterspace weapons and related capabilities to ensure space superiority in the future, according to a senior Space Force operator and also a new paper from the Mitchell Institute for Aerospace Studies.

Fielding such weapons will require a shift in mindset and major changes in policy, classification, force structure, and personnel, said Maj. Gen. David N. Miller, director of operations, training, and force development for U.S. Space Command.

"I think we're past the point of, 'Is space a warfighting domain?' I think we're past the point of, 'Has space been weaponized?'" Miller said June 27 at a rollout event for the new Mitchell Institute paper. He cited China's demonstration of a fractional orbital bombardment system and Russia's test of a direct ascent anti-satellite missile.

Retired Col. Charles S. Galbreath, senior resident fellow for space studies at the Mitchell Institute, argues in a new research paper that the U.S. needs its own counterspace capabilities to counter those threats and deter China and Russia from putting such weapons to use.

"Recognizing space as a warfighting domain means any serious effort to achieve space security must include space weapons," Galbreath wrote. "It's oxymoronic to establish a new military service charged with protecting interests in space without arming it with the weapons it must have to accomplish its mission."

Space is just like any other warfighting domain, said retired Gen. Kevin P. Chilton, Explorer Chair of the Mitchell Institute's Spacepower Advantage Center of Excellence. "If you are a Soldier talking about the land domain, a Sailor talking about the maritime domain, or an Airman talking about the air domain, you'd be demanding those capabilities: situational awareness and the ability to find, fix, target, track and if necessary, kill an adversary in their domain."

Space is no different, he said. But because space was for so long a peaceful, permissive environment and because destructive actions there can create dangerous debris fields that last for decades and threaten every satellite in that orbit, counterspace weapons have long been considered taboo.

Those hurdles continue, Miller said. "There was an almost equating of space superiority with protect and defend," Miller said. "And we began to see, while that may have been useful in some circles ... that ultimately undermined the discussion of where we needed to be in our operating concepts as the service the nation expects to provide space superiority."

The very fact of China's and Russia's counterspace capabilities makes clear the need to "stop debating if it's a warfighting domain, stop debating whether there are weapons, and get to the point of how do we responsibly, as part of the joint and combined force, deter conflict that nobody wants to see," Miller added. "But if we do see [conflict, the U.S. must] demonstrate our capability to win as a part of a joint combined team."

"Stop debating whether it's a warfighting domain, ... whether there are weapons, and get to the point of how do we responsibly ... deter conflict."
—SPACECOM Director of Operations, Training, and Force Development Maj. Gen. David Miller

Chief of Space Operations Gen. B. Chance Saltzman has pushed that capability part of his "Competitive Endurance" theory. In particular, Miller highlighted the importance of an expanded intelligence enterprise giving SPACECOM more awareness and information to conduct a full range of operations in space.

"[It's] making sure we have both the intelligence capability and capacity, as well as the day-to-day surveillance and where needed, the focused reconnaissance capability, to provide precision tracking, custody, and, if necessary, targeting information in order to disrupt space-enabled threats," Miller said.

Miller called for "a culture of campaigning" that goes beyond posturing and focuses on tailored operations that demonstrate to adversaries that the U.S. is prepared to act. That means not just weapons, but extensive training.

"That's a pipeline that doesn't exist right now," Galbreath noted. "All of the operators, all of the Guardians, need to be aware of what threats are out there and how they might present to the systems they operate or are fielding."

Investing in test and training infrastructure has been a top priority for Saltzman in his early tenure as CSO, and Miller indicated that the entire service is shifting how it develops personnel through both education, training, and leadership opportunities.

The Space Force will also need help from industry, which will also need to shift its approach to the domain, said Robert Atkin, vice president of special space systems at General Atomics.

"In the beginning, the primary thing that we focused on when building spacecraft was, will it survive launch and will it survive the radiation environment?" Atkin said. "We didn't pay any attention to the fact that someone may be trying to shoot us down or kill us in some other way. And I think the adversaries have accelerated that, and we have kind of underestimated how fast they were doing that and how fast they were capable of doing that."

Among the recommendations in his research paper, Galbreath called for the Space Force and industry to work together to develop defensive and offensive capabilities—quickly. He also argued for:

- Clear guidance from senior military and civilian leaders on the need for counterspace weapons;
- A counterspace force design developed by the Space Warfighting Analysis Center;
- Improvements from the Space Force in space situational awareness; telemetry, tracking, and control of satellites; and test and training infrastructure ; and
- Additional funding for the Space Force from Congress.

1st Lt. Megan Hirlehey, left, a pilot with the 171st Air Refueling Wing, poses with her father, Master Sgt. Kevin Clancy, a crew chief with the 171st ARW, on July 6 before Clancy marshaled Hirlehey's first flight.

Senior Master Sgt. Shawn Monk/ANG

38-Year KC-135 Crew Chief Marshals His Daughter's First Takeoff

By David Roza

Master Sgt. Kevin Clancy has launched KC-135 tail number 58-0045 countless times over his career as a crew chief, but one flight July 6 was different from the rest. This time, his own daughter was taking his pride and joy down the runway.

"I went over the checklist again and again in my head that day," Clancy told Air & Space Forces Magazine. "You launch hundreds of jets over the years, but this one had my kid on it."

1st Lt. Megan Hirlehey was 0045's co-pilot that day on her first mission assigned to the Pennsylvania Air National Guard's 171st Air Refueling Wing. Hirlehey had practically grown up on the wing's base outside Pittsburgh, where Clancy has worked since the late 1980s.

"I wanted to do this ever since I was a kid," she said.

Aerial refueling has long been a family affair for the two Airmen. As first reported in a recent press release, Clancy stayed on base for five straight days during the high-alert period immediately after Sept. 11, 2001. At one point his wife and two daughters stopped by to drop off a clean set of clothes, and during the visit one of the KC-135 pilots, Brian Krawchyk, took the kids to a refrigerator on base.

"He said, 'Close your eyes,' and then he opened the door and it was full of ice cream," Clancy recalled. "The family joke is that that's what made Megan decide to join the Guard."

For her part, Hirlehey remembers seeing flight-suited aviators walking around the base and wanting to join their ranks, but it wasn't the easiest journey. She enlisted with the 171st shortly before graduating high school in 2008, serving in the base's education and training office and as an aerial port specialist at the base's air terminal. Her goal was to commission and become a pilot, but there was a problem: at 5-foot-2, she did not meet the Air Force's height requirement, and she was unable to get a waiver.

Her luck turned a few years later when the Air Force changed its height requirements to expand the pool of eligible pilot candidates. She finally received a waiver and was approved in 2019, but there was another problem: the COVID-19 pandemic, which made an already-long process that much longer.

Hirlehey's patience paid off: she commissioned in 2020, made it through the Air Force's pilot training pipeline, and reported back to the 171st earlier this year.

"It's just very surreal to be back here," she said. "I watched the pilots walk around here for 15 years wanting to be one of them."

As the day of Hirlehey's first flight with the wing drew near, Clancy requested to work in the aircraft hangar that day to make sure he could see his daughter take off. He got more than that: the mission planners made sure Hirlehey's first flight was on 58-0045, the jet Clancy had served on as dedicated crew chief for six years. At one point Clancy named the jet "Global Reach" and designed nose art of the jet refueling a B-52 bomber over the Western Hemisphere.

"I called it 'Global Reach' because that's what tankers provide to the Air Force," he said.

Over the course of countless hours keeping an aircraft ready to fly, many crew chiefs come to think of their jets as their own flesh and blood. On July 6, Clancy watched his daughter fly away with his baby, so to speak. The crew chief waved the aircraft out

of the chocks and saluted on its way out. He stood on the pilot's side, according to standard practice, so he could not directly see Hirlehey through the cockpit window, but he walked away "smiling ear to ear" nonetheless.

"With a jet that old there's always a chance something might not work," he said. "I was so thankful that she didn't have to go to a spare."

A few hours and an uneventful flight later, Hirlehey returned the KC-135 safe and sound, and Clancy turned the jet around so it was ready for the next mission. The flight marked a changing of the guard: as Hirlehey begins her own flying career, Clancy is set to retire in three months after 38 and a half years in uniform. The flight was "kind of the last thing I'm hanging around for," he said.

The old hand was grateful to end things on such a high note.

"Not many crew chiefs get to retire with this honor," he said.

Senior Airman Zachary Willis

A 21st Airlift Squadron loadmaster guides a 60K-loader to a C-17 Globemaster III, to load cargo in support of Mobility Guardian 2023 in July at Yokota Air Base, Japan. Loadmaster is one of 33 Air Force specialties that will no longer qualify for special duty assignment pay starting in fiscal 2024.

3,700 Airmen No Longer Rate Special Duty Assignment Pay

By Greg Hadley

Flight engineers, loadmasters, and sensor operators are among the 3,700 Airmen who will stop receiving special duty assignment pay (SDAP) over the next year, Air & Space Forces Magazine has confirmed.

All told, 33 Air Force specialties will no longer qualify for SDAP starting in fiscal 2024. The payments range from $75 to $450 per month, and vary based on skill level, assignment location, and training.

The cuts will be gradual—communities being phased out will continue to receive half their prior amount through fiscal 2024, then lose it entirely in fiscal 2025.

Officials planned similar cuts a year ago, only to reverse course before the changes went into effect. Exactly who will or won't be eligible has been withheld from public view. The Air Force offered no justification for withholding the actual list, which it has released in the past. The other military services also routinely publish details of who qualifies for the special pay, which is worth from $75 to $450 per month.

According to Air Force budget documents, the 3,708 Airmen who will no longer receive SDAP will suffer a net lost of $4.04 million, or about $90 per month on average. Most will actually lose $75 or $150 per month.

Last year, when the Air Force also planned SDAP cuts, the reductions would have been less far reaching, with 489 Airmen losing a total of $1.5 million, or an average of $255 per month. Air Force Secretary Frank Kendall canceled that plan amid an outcry over pay cuts at a time of high inflation.

According to the Air Force release, the board reviewing requests for SDAP this year were unaware of the budgeted funds for the program until after each request was considered.

The Space Force hosted its own SDAP board for the first time for fields that had moved into its jurisdiction. That board approved 14 job specialties, while cutting three, adding two, and "rolling" one into an existing approval. Space Force budget documents indicate funding and the number of Guardians included in the program is expected to stay flat in 2024. The Space Force followed the Air Force's lead and withheld the list from public release, linking from a public press release to a private webpage. Department of the Air Force public affairs officials were unable to offer an explanation for withholding the details.

Special Duty Assignment Pay Changes

Jobs That No Longer Qualify

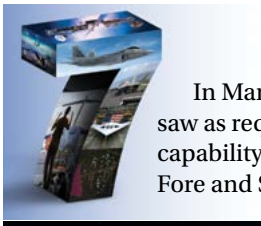
- President's Emergency Ops Center
- Cryptologic Language Analyst
- Electronic Security Systems
- Aircraft Battle Damage Repair Exp Depot Mx
- Defense Threat Reduction Agency (DTRA)
- 361st Intelligence, Surveillance, and Reconnaissance Group (ISRG)
- Defense Couriers
- 31st Communication Squadron and 39th Communication Squadron NC3
- Army Support Weather Ops
- Flight Attendants
- 52nd Munitions Maintenance Group NC3
- Airborne Mission System Operators
- Flight Engineers
- Loadmasters
- Sensor Operators
- Special Mission Aviators
- Contracting
- RPA Cyber Technicians
- International Enlisted Engagements Managers
- RPA Ops – Weather Support
- Modular Airborne Fire Fighting System
- SuperHigh Frequency Operators
- Advanced Intelligence Instructors
- Ski Mission – Flight Eng and Loadmasters
- Airborne MSS – Host Nation Riders
- 55th Operations Group Management Operator
- 336th Training Squadron & 98th DRA Aircrew Flight Equipment
- Diagnostic Med Sonogram
- Honor Guard
- ANG RPA Cyber Ops
- Radar, Airfield, & Weather Systems
- Casualty Cell
- Military Working Dog Handlers
- Airmen who join these job communities after the start of fiscal 2024 on Oct. 1 will not qualify for the 50 percent SDAP rate offered to those being phased out of the program.

Jobs Where Pay Will Be Reduced

- Military Human Intelligence
- 724th Special Tactics Group Operations Support
- Subsurface Analyst
- Parachuting Instructor
- 33rd Cyberspace Operations Squadron Operating Location Alpha
- Mission Field Chief
- Special Ops Surgical Team
- Airmen in specialties getting their SDAP rates reduced will have a 90-day grace period after the start of the fiscal year before those cuts go into effect.

Jobs That Will Newly Qualify

- Material Management
- Bomber Airborne Maintenance Support
- United States Air Force Academy Enlisted Faculty Instructor
- Special Missions Support



Update on the Operational Imperatives

In March 2022, Air Force Secretary Frank Kendall defined seven Operational Imperatives, the key areas he saw as requiring coordinated focus and investment in order to more rapidly deliver "meaningful operational capability to the warfighter." Since then, the OIs have gained ground as the central organizing principle for Air Fore and Space Force investment. Here is an update on where each of the seven stands today.

Northrop Grumman illustration

Northrop Grumman's low-Earth orbit constellation of satellites detecting missile launches by an unidentified adversary. Northrop Grumman was selected to build 14 satellites with infrared sensors for the Space Development Agency's Tranche 1 Tracking Layer (T1TRK) to detect, identify, and track hypersonic weapons and missiles from their earliest stages of launch through interception.

OPERATIONAL IMPERATIVE NO. 1

Space Order of Battle

By Greg Hadley

CHALLENGE

We need to protect our space capabilities, protect the services that we provide from space to our joint forces, and defeat the other side's space capabilities, which try to do the same thing for their forces.

When Air Force Secretary Frank Kendall first unveiled his seven Operational Imperatives at the AFA Warfare Symposium in 2022, he said developing a resilient and effective space order of battle was "perhaps the broadest" of those seven, yet also "the one with the most potential impact."

Within a year, Chief of Space Operations U.S. Space Force Gen. B. Chance Saltzman laid out his theory of "Competitive Endurance," presenting his guiding principles for defining that future order of battle.

Underlying Saltzman's competitive endurance theory is the necessity to deny adversaries first-mover advantage.

"The visibility, predictability, and reconstitution timelines associated with current military space architectures favor the actor that goes on the offense first," Saltzman said. "This is an unstable condition that works against deterring attacks on space assets. We can't have that."

Ever since China launched its first successful anti-satellite test in 2007, it's been clear that "exquisite" purpose-built satellites are at risk. Gen. John E. Hyten, as head of U.S. Strategic Command in 2017, called these U.S. satellites "big, fat, juicy targets." Saltzman's predecessor, Gen. John W. "Jay" Raymond, acknowledged in 2022 that, though "they're the world's best capabilities … they're hard to defend."

The Space Force's primary solution is proliferation—more satellites in more orbits. Instead of a few "juicy" targets, the Space Force will field an orbiting mesh network comprised of hundreds if not thousands of satellites, making the task of destroying such a constellation too great, too complex to even consider.

APPROACH

Focus on resilient space capabilities that can be protected, survive attack, degrade gracefully under attack, and be reconstituted in a reasonable time, if necessary. Develop capabilities to deny potential adversaries the ability to attack from space U.S. terrestrial assets.

The Space Development Agency (SDA) is leading the way on this endeavor, its massive "Proliferated Warfighter Space Architecture (PWSA)" is the first application of this new approach in military space. Placing hundreds of satellites in low-Earth orbit, SDA aims to increase the number of Space Force satellites by at least four to six times by the end of the decade.

"We'll have hundreds and hundreds of these satellites up there," SDA Director Derek M. Tournear said April 5 at the Mitchell Institute's Spacepower Security Forum. "It will cost more to shoot down a single satellite than it will cost to build that single satellite. We just completely changed that value equation."

SDA launched the first of 28 planned "Tranche 0" satellites for its constellation in April, with 150 to come in Tranche 1 beginning in 2024. Tournear plans more than 250 in Tranche 2, which are projected to start launching in 2026.

Meanwhile, SDA's rapid acquisition focus is spreading. The Space Force's Space Systems Command (SSC) is developing a Resilient Missile Warning/Missile Tracking constellation in mid-Earth orbit with at least 36 satellites. These will be launched in phases or "epochs," with nine spacecraft in the first round.

Frank Calvelli, assistant secretary of the Air Force for space acquisition and integration, has praised the approach and essentially codified it in his own acquisition rules.

"I think orbit diversification, getting into LEO, getting into MEO, getting into elliptical orbits, like a polar orbit or a halo orbit—even trying some crazy things on other orbits that are available—I think is really going to add a lot of resiliency," Calvelli said in June 2022.

To cost-effectively develop a proliferated space architecture, Calvelli offers four basic strategies:

- Build smaller systems;
- Use existing technology and designs to minimize non-recurring engineering;
- Award contracts for no more than three years from start to launch; and
- Stick to fixed-price contracts to guard against price shock.

Maj. Gen. David N. Miller, director of operations at U.S. Space Command said in a June webinar that achieving perfection is no longer the objective. "There is with SDA ... and I know SSC is moving toward it as well, a desire to move toward more ... baseline-capable systems that don't have to be state of the art: They can be state of the world."

While the cost of building and launching satellites continues to decline, the Space Force is ramping up investment, spending in the years to come to meet its goals. The service is requesting a 15 percent increase in 2024 alone.

The Space Force wants $12.2 billion for PWSA satellites in the next five years, plus another $3.5 billion on MEO missile warning/missile tracking. That's on top of a projected $9.2 billion in research, development, test, and evaluation for Next-Gen OPIR in the next five years, plus another $2.5 billion for new GPS satellites and $1.3 billion for GPS research and development.

There will be hurdles, though. In its annual review of significant Pentagon weapons programs released in May, the Government Accountability Office cautioned that SDA "faces challenges with integrating a complex system of multiple vendors and segments into a proliferated constellation of hundreds of satellites," while the Next-Gen OPIR program has "several high-risk" components and is likely to miss its first launch date. Members of the House Appropriations defense subcommittee also noted the service's plans have "serious shortfalls and disconnects" and proposed a $1 billion cut to USSF's $30 billion budget request.

ON THE GROUND

Achieving space resilience will also require work on ground systems, noted Assistant Secretary of Defense for Space Policy John F. Plumb in February.

Securing ground stations and launch systems against cyberattack are among the most important steps that must be taken now, without delay. Saltzman has called cyber vulnerabilities the "backdoor" to the Space Force's space systems and Lt. Gen. Stephen N. Whiting, head of Space Operations Command, has warned that "cyberspace is the soft underbelly" of the Space Force.

Calvelli wants the Space Force to "ensure ground systems and modifications are completed and ready for operations before launch of a new capability." And Whiting noted that cybersecurity is now integrated from the start of system development. Meanwhile, Space Force Mission Defense Teams monitor the cybersecurity of the service's systems.

ACCELERATING LAUNCH

On the launch front, the Space Force is steadily moving forward "tactically responsive" launch," or the ability to rapidly send satellites into space.

The Victus Nox mission will test this capability some time in 2023. The aim is to be intentionally unclear about dates—to keep contractors guessing—and then give satellite maker Millennium Space Systems 60 hours' notice to deliver a ready-for-launch spacecraft. Launch services provider Firefly Aerospace would then get 24 hours' notice before the satellite must lift off.

A second tactically responsive launch mission is planned for 2024.

COUNTERSPACE

While resiliency has become a defining watchword for the Space Force, the order of battle envisioned by Kendall and other leaders isn't solely defensive.

"Our terrestrial forces ... cannot survive and perform their missions if our adversary's space-based operational support systems, especially targeting systems, are allowed to operate with impunity," Kendall said in 2022.

Counterspace systems—kinetic and nonkinetic weapons that can disrupt or destroy satellites in orbit—were long considered taboo when space was a peaceful domain, but given Chinese and Russian tests, this is no longer the case.

"It wasn't that long ago that you couldn't say space and offense in the same sentence together," noted retired Lt. Gen. David A. Deptula, dean of AFA's Mitchell Institute recently. Not anymore.

Indeed, Saltzman is already calling for "responsible counterspace campaigning," by demonstrating U.S. capability. This is necessary, says retired Col. Charles S. Galbreath, senior resident fellow for space studies at the Mitchell Institute. He argued in a June research paper that space must be seen as more than a benign environment. "Recognizing space as a warfighting domain means any serious effort to achieve space security must include space weapons," Galbreath wrote. "It's oxymoronic to establish a new military service charged with protecting interests in space without arming it with the weapons it must have to accomplish its mission."

Many of the Space Force's counterspace efforts are hidden behind a wall of classification. In its 2024 budget request, however, the service did request $64 million in research and development and $36 million in procurement for its two acknowledged counterspace weapons, the Counter Communications System and Bounty Hunter, both of which are nonkinetic.

USAF graphic

The first product to emerge from the Air Battle Management Systems (ABMS) program, "Capability 1," was a communications pod that could be carried by a KC-46 Pegasus tanker, enabling the secure communications systems aboard the F-22 Raptor and F-35 Lightning II to communicate. ABMS seeks to network all operational systems to enable JADC2 at combat-relevant speeds.

OPERATIONAL IMPERATIVE NO. 2

Operationally Focused ABMS

By Chris Gordon

CHALLENGE

We must identify and invest in the specific applications of ABMS that provide a measurable operational advantage to our warfighters.

The U.S. military sees networked data capabilities as the foundation of its strategy to counter China and Russia in a world of intensified competition. The vision is compelling: Data from sensors in the air, on land, at sea, and in space could be shared seamlessly among weapons systems, shortening kill cycles and increasing defensive complexity for adversaries.

Originally conceived as "multidomain warfare," the concept evolved over time to be known first as joint all-domain command and control (JADC2) and then, earlier this year, the Department of Defense tacked on "combined" in front, recognizing the importance of operations involving international partners.

Under the Pentagon's plan, each service is responsible for developing a portion of the CJADC2 ecosystem; the Department of the Air Force's piece is the Advanced Battle Management System (ABMS).

Secretary of the Air Force Frank Kendall has noted that complex command and control efforts have historically overpromised and underdelivered. Before his arrival at Department headquarters, the Air Force was engaged in a series of ABMS experiments, which Kendall deemed "just a demonstration that you show what cool thing you could do," but not meaningful operational capabilities commanders could rely on for combat.

When Kendall rolled out his seven Operational Imperatives in March 2022, "Operationally Focused ABMS" was high on the list.

"One of the findings of the operational imperative work to date is, we have not appreciated the scale of the effort needed to modernize," Kendall said at AFA's Air, Space, and Cyber Conference in September 2022. "Our efforts to date have not been adequately focused, nor have they been adequately integrated."

Kendall appointed Brig. Gen. Luke C.G. Cropsey to be the department's point man for command, control, communications battle management (C3BM) and ABMS efforts.

APPROACH

The Department must move beyond conceptual demonstrations and experiments to focus its investments on specific capabilities with clear, quantifiable mission value and operational impact.

Cropsey is the third person to head ABMS acquisition efforts since 2019, his focus distinguishing what is feasible from what is fantasy.

"If you turn engineers loose without supervision, they will absolutely, guaranteed find a solution for which you have no problem," Cropsey said in July. "So our first order of business was to make sure that we were solving a real problem that mattered fundamentally."

Speaking to reporters in November, Cropsey described his challenge this way: "The technical integration challenge that we have is how do we combine all those different parts and pieces across that whole kill chain—across those find, fix, track, target, engage, and assessment activities—so that we can make the effects that we need to happen actually a reality." Kendall envisions a future in which major command and control centers can be more distributed and less vulnerable than the major air operations centers the Air Force runs in Hawaii and Qatar.

"We have to move away from the AOC, the current concept as he outlined the department's fiscal 2024 budget request. "We're still doing the engineering work to define exactly what those are going to be."

Yet another problem is efficiently connecting Air Force technology with systems devised by and for the other services, noted the Government Accountability Office in a January 2023 report: "Each military department often produces its own solutions for command and control and other military departments may not be aware of ongoing efforts."

Even as straightforward as just controlling airspace can be a problem. At a Project Convergence exercise last year at Fort Irwin, Calif., Army Chief of Staff Gen. James C. McConville, an advocate for connecting battlefield sensors and shooters, complained about the "industrial age" approach to managing airspace among crewed and uncrewed aircraft and surface-fired rockets.

Project Convergence made clear how much further the services need to go. "It's complicated," Kendall said. "There are a lot of players in the game, and getting everybody in line is going to be tough."

China and Russia both prioritize neutralizing U.S. command and control systems as a means to take away a vital U.S. advantage. To counteract that, ABMS must be designed to operate in the face of cyberattacks and electronic jamming, not to mention long-range fires designed to shoot down airborne platforms. The Air Force is retiring aging E-3 Sentry AWACS airborne command and control aircraft in favor of the E-7 Wedgetail, while E-8 JSTARS aircraft will go away entirely, with much of that mission shifting to space-based capabilities.

That means the Space Force may take on a battle management role, "which is an entirely new capability for it," according to Kendall.

But the Space Force's role means there will be even more systems to integrate.

About the same time Cropsey came into his role, the Department of the Air Force conceived of the ABMS Digital Infrastructure, essentially a digital backbone for linking a plethora of systems. The Air Force is seeking software-defined network technologies to enable a rapidly reconfigurable, secure network to connect senors and C2 systems.

"If you don't have the digital infrastructure that allows you to connect the things across that architecture, you're at a dead stop," Cropsey said in July. The Air Force has also experimented with turning KC-135s, which first entered service in the 1950s, into airborne communications relay platforms that feed data into ABMS. New KC-46 Pegasus aircraft would also have that capability under the so-called ABMS Capability Release 1, which was originally envisioned as a way for the F-35 and F-22 to share data, which they currently cannot do because of differences in their communication systems. But plans to integrate the F-22 were scrapped as the service plans to replace the Raptor with the Next Generation Air Dominance platform.

The Air Force also plans to field a new Cloud-Based Command and Control network, known as CBC2, to integrate air defense data to support homeland defense. Previously dubbed Capability Release 2, the system will aggregate and feed data to North American Aerospace Defense Command, including from commercial sources, and replace older and disparate systems.

"If you think about the way that we plan, we do requirements, we budget, we do acquisition programs, they're all kind of weapons systems-centric in the way that we think about and execute them," Cropsey told reporters in November. "This problem is fundamentally different."

Solving it is "the hardest acquisition job I've ever given anybody," Kendall said in September.

In its final form, ABMS will feed into a Department of the Air Force "Battle Network," Air Force Chief of Staff Gen. Charles Q. Brown Jr. said at AFA's Warfare Symposium in March. "We'll have decision advantage for the Air Force, for the Space Force, for the joint force, and for the coalition," he said.

Master Sgt. Matthew Plew

The E-3 Airborne Early Warning and Control System (AWACS), shown here, and the E-8 Joint Surveillance Target Attack Radar System (JSTARS) were revolutionary capabilities when introduced decades ago. New and increasing threats and the emergence of new technologies are driving the search for more advanced solutions to replace them.

Staff Sgt. Nicolas Erwin/illustration

The E-7A, as shown in this illustration, will replace the E-3 Sentry Airborne Warning and Control System (AWACS). The U.S. is working with Australia, Britain, and Boeing to accelerate the program.

OPERATIONAL IMPERATIVE NO. 3

Moving Target Engagement

CHALLENGE

In a hypothetical scenario with a well-resourced adversary, U.S. forces could be faced with numerous ground moving targets and aerial moving targets. We must be capable of engaging those threats simultaneously, in high numbers, and in a time-compressed situation where a few hours are likely to decide the outcome of the conflict. Traditional airborne moving target intelligence, surveillance, and reconnaissance sensors will be threatened.

By Greg Hadley

If the U.S. is drawn into a conflict with China, the scale would be unlike anything the world has seen since World War II.

The People's Liberation Army (PLA) has more than 15,000 tanks and artillery pieces. Its Navy has more than 300 warships. The PLA Rocket Force has hundreds of ballistic and cruise missiles, and the PLA Air Force has several thousand aircraft.

Put it all together, and "we can expect strikes on the scale of 100,000 aimpoints or more in the area of the Taiwan Straits," said retired Lt. Gen. David A. Deptula, dean of the Mitchell Institute for Aerospace Studies.

The sheer number of targets presents a massive challenge. The Air Force, in the midst of a major modernization drive, is divesting legacy air and ground moving target indicator (AMTI/GMTI) platforms. The solutions it develops to replace those aim to accelerate the "kill chain" and leverage capabilities in orbit to do missions formerly done from the air.

Exactly what that will look like remains unclear. In March, the Air Force Scientific Advisory Board said one of its four studies in 2023 will focus on AMTI/GMTI, with the goal of producing an "independent assessment of the feasibility of developing and deploying a system incorporating aircraft and satellites to provide surveillance and targeting of moving targets in [highly contested environments]."

The board was set to brief Air Force Secretary Frank Kendall in July and deliver a final report in December.

AGING, UNSURVIVABLE AIRCRAFT

Some plans are already in place. For years, Air Force leaders have bemoaned the service's reliance on E-3 Airborne Warning and Control System (AWACS) and E-8 Joint Surveillance Target Attack Radar System aircraft, used for airborne and ground targeting, respectively.

Air Combat Command boss Gen. Mark D. Kelly has called the E-3s "unsustainable without a Herculean effort," and Maj. Gen. James D. Peccia III, then-deputy assistant secretary for budget, said in 2022 that, in contested airspace, the E-8s "would be gone in a minute."

The AWACS fleet averages more than 40 years old and the JSTARS fleet is more

APPROACH

Leverage capabilities, such as next-generation sensors and decision support provided by our ABMS investments, to acquire and, if necessary, prosecute targets, prioritizing those that would deny our access to an area of operations.

than 20. Both platforms have seen mission capable rates plunge in recent years: 63 percent for E-3s at the turn of the fiscal year, and under 50 percent for E-8s.

Both fleets are small—around 30 E-3s are left, and just about a dozen E-8s—so "the loss of even a few of these types … could have a disproportionate impact on collapsing U.S. combat operations," noted a Mitchell Institute research paper released in May.

The Air Force has talked of replacing these aircraft for 20 years now, beginning with a 2003 plan to field the never-built E-10 Multi-Sensor Command and Control Aircraft (MC2A). USAF has talked about the Advanced Battle Management System (ABMS) for close to a decade, but that concept morphed over time from a platform to more of a networked approach to interconnecting multiple systems and platforms. ABMS as now envisioned is the Air Force's contribution to joint all-domain command and control (JADC2), expansive enough to merit its own operational imperative.

So when it comes to targeting, the Department of the Air Force is thinking broadly and well beyond conventional platforms.

"There's a lot of technology out there to do moving target indication, whether it's airborne, you can get it from the ground and ground surveillance radars, you can do it from space to certain extent," Patrick "Mike" Shortsleeve, General Atomics Aeronautical Systems vice president of DOD strategic development, told Air & Space Forces Magazine. "But the reality is, you're going to need all of those to be able to do this, and each of them bring their own advantages and disadvantages."

FROM SPACE

Transferring at least some of the targeting mission to space has long been a goal. A 2012 Targeting Roadmap called for integrating "emerging capabilities of space and cyberspace into a holistic targeting process."

With the creation of the Space Force in 2019, that idea took on new urgency. In 2021, then-Chief of Space Operations Gen. John W. "Jay" Raymond said USSF would assume the mission of providing space-based tactical intelligence, surveillance, and reconnaissance.

The Intelligence Community has traditionally owned space-based ISR, but its priority is strategic in nature in support of National Command Authorities; the Space Force is seeking to carve out a means to leverage space to support tactical military operations.

Lt. Gen. Stephen N. Whiting, head of Space Operations Command, said in May that he sees progress. "I just don't think we should be concerned if we do land in a place that says 'Hey, the Space Force will have retained capability for our own purposes to support tactical warfighting like the other services do,'" Whiting said, suggesting the service may launch its own ISR satellites to complement those of the National Reconnaissance Office and industry.

Indeed, the Space Force is seeking $243 million to start developing "Long Range Kill Chains," a program to provide a space-based Ground Moving Target Indicator system that can replace "a portion" of the JSTARS portfolio, according to budget documents.

This system will "provide actionable information on adversary surface targets to the warfighter through the Advanced Battle Management System as an integral part of the joint all-domain command and control concept."

USSF anticipates a five-year investment of about $1.2 billion, noting that "proper funding is critical to ensure this system is in place to support the warfighter before all of the JSTARS aircraft retire."

The Space Force is working with the National Reconnaissance Organization on the program. The NRO Director said in April his agency will have a prototype moving target indicator in orbit in "eight to 12 months." It is not clear how or even whether that effort is related to "Long Range Kill Chains."

While the technology is available, sorting out roles will be critical said Shortsleeve, whose last assignment as an Airman was overseeing the command and control and ISR portfolios in the budget office.

"I've found that if you follow the money where it's going, you start to really realize whoever controls the money controls whatever the capabilities," Shortsleeve said. "So the money is kind of under that NRO umbrella, under the military intel programs. So it's kind of like, 'Alright, who really is going to have control of these capabilities?' Because ultimately, the people far forward in the fight want to have that control, whether it's through Space Force or NRO, but there's going to be some challenges there if they haven't identified who exactly is going to provide that specific support and which satellites would do that."

FROM THE SKY

While space and cyber offer tantalizing new capabilities for the targeting mission, Air Force Secretary Frank Kendall has stated that the AMTI/GMTI mission needs to be cost-effective and will continue to have "airborne components, manned and uncrewed aircraft."

The most prominent of those aircraft is the E-7 Wedgetail, a modified Boeing 737 Next Generation with a mechanical electronic scanning array (MESA) radar system that will replace the E-3.

How quickly those E-7s will get into the Air Force fleet remains unclear, though. The service first announced plans to procure the Wedgetail in April 2022, followed by a contract with Boeing in February. At the time, the Air Force expected the first E-7 to be ready for operational duty by 2027, with 24 more by 2032—a relatively quick timeline by usual Pentagon standards.

Meanwhile, the first of 13 AWACS aircraft headed to the Boneyard in April, with two more planned to retire in 2024, leaving a fleet of just 18 aircraft.

Kendall is looking to "accelerate" the E-7 Wedgetail buy, and indicated Boeing wants to help. USAF listed $596 million in unfunded priorities for that purpose this spring, but it's not yet clear if Congress will fund the need.

Kendall has noted that it takes two years to build the 737 Next Generation airframes, then another two years to outfit them with the Wedgetail gear. There are also a number of other countries buying the E-7, potentially putting the U.S. toward the back of the line.

However, other countries with the E-7 may prove crucial in speeding up the USAF process—In February, Kendall spoke with U.K. Minister for the Armed Forces James Heappey about ways for the two countries to collaborate on the aircraft, specifically to "accelerate U.S. Air Force procurement and fielding of the platform."

The Royal Air Force has ordered three Wedgetails, with the first being converted from a secondhand Boeing 737 Next Generation airliner and delivered in 2024. With the U.K. slated to get the aircraft first, Program Executive Officer for the digital directorate Steven D. Wert has suggested the U.S. Air Force may be able to conduct necessary testing on the RAF Wedgetail.

Meanwhile, Air Force Chief of Staff Gen. Charles Q. Brown Jr. told Congress in May that U.S. Airmen will train in Australia this summer and learn from the Royal Australian Air Force

operators who are already flying E-7s.

Both existing and future unmanned aircraft will play a role as well, Shortsleeve suggested. Much of the Air Force's current work on unmanned aircraft is focused on Collaborative Combat Aircraft—semi-autonomous drones that will team with manned fighters. At least some of those drones may carry ISR and sensing capabilities, extending a platform's target tracking.

"You need to be able to see first to shoot first," said Shortsleeve. "If we're going to rely on our sensors to get as close as we can to do it, you can only do that in two ways. One is you put a manned fighter in there and they run a high risk. Or … this is that teaming that the Air Force is looking at for that for what they want to do with unmanned-manned type of fighters and stuff. You have some stuff that's forward that you can take that greater risk, assign them the task that they need to try that provide that input back to the actual shooter."

OPERATIONAL IMPERATIVE NO. 4

Image from AFRL video

An autonomous aircraft developed for the Air Force Research Laboratory flew in formation with an F-22 from Edwards Air Force Base, Calif., in July. AFRL's Strategic Development, Planning and Experimentation Office has driven development of its Skyborg Vanguard autonomous aircraft.

Tactical Air Dominance

By John A. Tirpak

CHALLENGE

Controlling the air domain is an imperative if the nation and U.S. allies are to be successful in future operations. The Air Force's tactical fleet has to be affordable. The F-35, F-15EX, and Next-Generation Air Dominance fighter are too expensive to fully equip an Air Force of the size needed; a less costly, uncrewed autonomous aircraft—some of which may be attritable—must be in the mix.

APPROACH

The NGAD family-of-systems includes a new crewed platform. It will also partner with uncrewed combat aircraft, requiring connectivity between those platforms, the sensors that support them, the suite of weapons they carry, and more. This concept includes notionally one or more unmanned combat aircraft operating in a formation controlled by a single, modern, crewed aircraft—principally the NGAD, but also the F-35.

The Air Force is taking a near-, mid-, and long-term approach to preserving the advantage in tactical aviation it still holds and to regain advantages it has lost in recent years.

It's the Air Force's job to achieve air superiority for the joint force, when and where it's needed. Air superiority not only protects U.S., allied, and partner territory and forces, it ensures freedom of operation and movement for coalition assets; both intelligence, surveillance, and reconnaissance (ISR) aircraft as well as mobility aircraft and surface forces. Air superiority is achieved "when friendly operations are able to proceed without prohibitive interference from opposing forces," according to the Air Force's 2016 "Air Superiority 2030 Flight Plan."

Air Force fighter modernization was underfunded since the 1990s, with new aircraft added at a rate far below the 72 new fighters a year needed to keep the fleet under 28 years of age. Against a vetted requirement for 381 F-22 fighters, for example, the Air Force was only permitted to acquire 186.

During that period, the U.S. was focused on counterinsurgency operations in Afghanistan and Iraq—without a peer adversary in the air to worry about. But China, Russia, and other potential opponents studied U.S. designs and concepts of operation, developing highly sophisticated air defenses and fifth-generation aircraft intended to challenge America's ability to control the air. The Air Force now projects that the F-22—by all accounts, the world's greatest air superiority fighter—will be outclassed by Chinese capabilities circa 2030.

At the same time, the Air Force's fighter capacity to cover theater commander needs in multiple places at once has been sharply diminished by retirements and divestitures, and the service has declined to set a force-sizing metric to establish a base number of aircraft.

Many of the reductions to U.S. combat air forces have come as a result of older aircraft aging out due to structural fatigue or obsolescence.

To counteract those trends, the Air Force is pursuing four objectives to regain air superiority:

1. Field leap-ahead fighter technology that can reliably prevail in any conflict.

2. Build enough fighter capacity to cover multiple theaters of operation simultaneously. That means enough aircraft to endure wartime attrition, something the Air Force has not seen in 30 years.

3. Deter potential aggressors by convincing them that the cost of attacking U.S. allies, partners, or interests far outweighs likely gains.

4. Achieve all of the above before China or any other adversary can build a qualitative or quantitative advantage able to negate U.S. capabilities.

Air Force Secretary Frank Kendall, Air Force Chief of Staff Gen. Charles Q. Brown, Jr., and Chief of Space Operations B. Chance Saltzman wrote in their 2024 budget posture statement that, "For over 75 years, the Air Force has dominated opponents in the air," but now the People's Republic of China "is challenging that dominance, and we cannot afford complacency, nor can we afford Air Force capability and capacity composed largely of fighters that cost as much as or more than the F-35."

NEAR-TERM INVESTMENT

After years of paying lip service to the goal of buying 72 fighters a year, USAF requested 48 F-35As and 24 F-15EXs in its fiscal 2024 proposal. They will be somewhat offset by the retirement of F-15C/Ds, which have exceeded their planned service lives. But the Air Force will also upgrade some of its F-15E Strike Eagle fleet with the Eagle Passive Active Waring Survivability System (EPAWSS) electronic warfare suite. It also will update its F-16s with active electronically scanned array (AESA) radars, among other improvements.

USAF is also upgrading its most advanced F-22 fighters, with new sensors, stealth, communications, and navigation systems, as well as new weapons—including the AIM-260 Joint Advanced Tactical Missile (JATM). The JATM should restore the F-22's first-look, first-kill capability against adversary fifth-generation fighters. It will have three or four times the range of the AIM-120 AMRAAM that U.S. fighters carry today.

The fifth-generation F-35, with new capabilities in its Block 4 version, will be the "backbone" of the Air Force fighter force. With over 350 now in service, the Air Force continues to aim for a total of 1,763 F-35s. At the same time, USAF is working toward closing out its planned purchase of F-15EX fighters. The Air Force would end production at 104 jets if current plans are approved, but Congress could add to that number and the final buy may be closer to the original plan of 144.

MID-TERM OUTLOOK

Circa 2030, the Air Force expects to retire the F-22 fleet in favor of the Next-Generation Air Dominance (NGAD) family of systems. The centerpiece of NGAD is a highly classified ultra-stealthy sixth-generation crewed aircraft, but it will be complemented by an undisclosed number of Collaborative Combat Aircraft (CCA). These uncrewed, autonomous jets will be equipped for sensing, ISR and jamming functions, and some could carry additional munitions or serve as decoys.

NGAD fulfills the first objective of the tactical air dominance requirement: an air superiority capability that can prevail over any adversary. Intended to far surpass China's fifth-generation J-20 fighters, NGAD seeks to recover the leap-ahead status enjoyed by the F-22 when it was first deployed. NGAD is being designed from the outset to be rapidly and easily upgradeable, employing an open systems architecture to enable rapid integration of new sensors and weapons, added processing power, and updated software. NGAD technology demonstration programs began about 2015 and at least one prototype has flown. The Air Force expects to award a contract for the crewed aircraft element in 2024.

The Air Force initially aimed to have multiple NGADs in development at once, fielding new designs every 5 to 8 years, but that approach proved too expensive, Kendall said earlier this year. A single platform will be selected instead. Each NGAD is likely to cost "hundreds of millions" of dollars, he acknowledged, adding that the initial acquisition objective could be a force of about 200 aircraft.

The Navy's NGAD, also known as FA-XX, is a separate program, and while the services say they'll compare notes and share technologies, the jets won't be variants of one another, like the three versions of the F-35 used by the Air Force, Navy, and Marine Corps.

The Air Force NGAD may come in two variants, though: one configured to operate in the relatively confined European theater and another with an extended-range model optimized to cover the "tyranny of distance" in the Pacific theater.

The Air Force is seeking $2.33 billion for NGAD development in fiscal 2024, and $26 billion through fiscal 2028. In his markup of the fiscal 2024 defense bill, House Armed Services chair Mike Rogers (R-Ala.) took $550 million out of NGAD without explanation, although he characterized the cut as a "deferment," suggesting it will be added back later.

The Air Force will complement NGAD with Collaborative Combat Aircraft, which are envisioned as adding fighter capacity without the costly life-support systems that drive up the cost of crewed aircraft. Kendall has said he is notionally looking for airframes at less than half the cost of an F-35.

The aim is a fleet of perhaps 1,000 to 2,000 CCAs that would vastly expand the aerial armada the Air Force can deploy, presenting a cost-imposing problem for China, which would have to treat each airframe as a full-up threat. The U.S. could absorb CCA losses at less cost in life and treasure than an all-crewed force. Greater attrition is expected in peer combat.

Although several types of CCAs were envisioned originally, Kendall has more recently suggested that USAF will select a single base platform "chassis" fitted with a modular airframe which can support a variety of specialized kits for different mission sets, such as Suppression/Destruction of Enemy Air Defenses (SEAD/DEAD), ISR, jamming and electronic warfare, and communications.

"A reasonable way to think about it is an airframe with different payloads that can be swapped out, depending on the mission," Kendall explained in a speech at the McAleese defense conference in March."

The CCA concept will be developed in parallel with the technology. Operators will get rough prototypes as soon as possible to try out tactics, techniques, and procedures for manned-unmanned teaming in air combat. It's essential that aircrews learn to trust and be confident in autonomous partners. All of this will likely redefine what constitutes a squadron. The Air Force is studying various mixes of crewed and uncrewed aircraft..

The Air Force has asked for $392 million to invest in CCAs in fiscal 2024, rising to $3 billion per year by fiscal 2028, for a total of $5.8 billion across the five-year budget plan. CCAs are funded within the NGAD account in fiscal 2024.

LONG-TERM OUTLOOK

In the 2030s, the Air Force plans to field at least 200 NGADs, up to 2,000 CCAs, 600 additional F-35s, and potentially another new aircraft, a "fifth-gen-minus" aircraft late in the decade. Dubbed either the MR-F or MR-X, this jet would replace the F-16 for use in theaters with lesser air defense threats. At present rates, the Air Force won't field its final F-35 until the late 2040s.

Airman 1st Class Callie Norton

U.S. Air Force Airman 1st Class Michael Eresh-Archuleta, left, material management journeyman with the 627th Logistics Readiness Squadron, and Staff Sgt. Oden Bagley, aircraft hydraulics specialist with the 62nd Maintenance Squadron, marshal out a C-17 Globemaster III during Agile Combat Employment Training at Joint Base Lewis-McChord, Wash., in April 2022.

Resilient Basing

By Chris Gordon

CHALLENGE

We must deny our adversaries an easy targeting opportunity and the perceived vulnerability that a small number of known fixed locations provides.

For decades, the U.S. Air Force has operated mainly from large forward operating bases, reflecting the calculation that the risk of conflict with a peer adversary largely disappeared with the demise of the Soviet Union. In the Middle East, regional foes lacked the ability to hold such bases under aerial threat. Elsewhere, the Department of Defense consolidated bases in the name of economic efficiency.

Now all those assumptions are turned on their head. China and Russia now see denying the U.S. military the ability to operate from its large forward operating bases in a crisis as the first step in blocking the U.S. during conflict, limiting its ability to project power. Both Iran's and North Korea's growing missile programs pose similar risks. Indeed, Tehran demonstrated its ability to threaten bases in January 2020, when it fired nearly a dozen missiles at U.S. forces at Al Asad Air Base in Iraq.

"The general impression over the past few decades that U.S. air bases were somehow sanctuaries was a historical anomaly," noted a January 2023 RAND report.

The Air Force has 33 permanent overseas bases, all locations well known to potential adversaries. Significantly, many of the Pacific bases are well within the range of Chinese missiles.

"The threat has grown qualitatively and quantitatively," said Stacie Pettyjohn of the Center for a New American Security.

The Pentagon's latest report card on China's People's Liberation Army provides a similar assessment. "The PRC's military modernization efforts have rapidly transformed the PLA's missile force," it states. "PLA writings frame logistics and power projection assets as potential vulnerabilities in modern warfare, which aligns with the PLA's expanding ability to conduct strikes against regional air bases, logistics and port facilities, communications, and other ground-based infrastructure."

In response, the Air Force has made "Resilient Basing" a top priority. What that means is less about new technology and weapons and more about augmenting USAF's ability to repair runways, harden facilities against missile and cyber attack, and operate in the face of electronic jamming. The deployment of additional missile defense systems is also important, though base defense remains largely an Army mission.

APPROACH

A mix of investments in resilient forward basing for current and planned tactical aircraft. The concept that the Department of the Air Force is pursuing in this regard, called Agile Combat Employment (ACE), is a strong step in the right direction, but a range and combination of concepts must be considered and resourced.

The Air Force is also pursuing a new way of war. At the direction of Air Force Secretary Frank Kendall and Air Force Chief of Staff Gen. Charles Q. Brown, Jr., Agile Combat Employment or ACE has become a fundamental operating concept.

ACE reduces reliance on large central bases in favor of a flexible hub-and-spoke system, in which the service can rapidly disperse forces to spartan locations, complicating an adversary's targeting and defensive schemes. By taking advantage of airpower's flexibility, USAF would carry out a new twist on an island-hopping campaign in the Pacific.

The basic precepts of the Air Force plan have been endorsed by outgoing Chairman of the Joint Chiefs of Staff Army Gen. Mark A. Milley. The fundamental character of warfare "is actually changing in really significant and radical ways," he said at a June 30 National Press Club event. "The battlefield of the future will require rapid and constant movement and the ability to remain small and relatively invisible just to survive," he said. "If you're dead, you're not going to be any contribution to fighting the war."

Carrying out ACE, however, is easier said than done. ACE demands a more distributed system of command and control, as well as major logistical shifts, such as prepositioning parts, equipment, and fuel at some potential bases in anticipation of future use.

"Additional work is being done to identify and create capabilities and formalized training programs to field an agile force that sets the theater and establishes distributed command and control," the service said in its posture statement to the House Armed Services Committee.

"Logistics has always been a great strength of American airpower, and we will not let it become a weakness," said Lt. Gen. Tom Miller, deputy chief of staff for logistics, engineering, and force protection, after table-top exercises at MacDill Air Force Base, Fla., put numerous new concepts to the test, including how to supply forces across vast distances in the western Pacific.

Changes to individual training are also in the works. The Air Force aims to rely on Multi-Capable Airmen, skilled beyond their specialties, to do an increasing variety of work.

In May, Airmen skilled in administrative and other non-engineering work traveled from Mountain Home Air Force Base, Idaho, to Dobbins Air Reserve Base, Ga., for a crash course in runway repair. Going from classroom to cutting concrete in three days, finance, personnel, medics, and others learned to repair simulated craters from missile strikes, according to the Air Force.

"The reason we're doing Multi-Capable Airmen is that we may be back in a combat situation where we have a lot of casualties," Kendall said during an event at the Center for a New American Security in June.

Other services changing operational concepts will also demand changes from the Air Force. For example, the Marine Corps' new force design calls for small groups of Marines to be dispersed throughout islands in the western Pacific where, they would be equipped with anti-ship missiles to bottle up the Chinese fleet. The Army is likewise developing new models for the region.

"There's certain things that are common to all of us: fuel, water, food, munitions—things that we could all use," Brown said at a June 7 event at the Mitchell Institute for Aerospace Studies. "That's going to drive some logistics challenges that I think we need to work through as a joint force."

U.S. Transportation Command, under Air Force Gen. Jacqueline Van Ovost, is already working on how to ensure the U.S. military can be properly supplied.

"We need to make sure we can assuredly move that fuel and get it to where it needs to go," Van Ovost said June 6 during a Brookings Institution event when asked about supporting concepts such as ACE. "We also need to relook where our fuel posture is to meet the requirements."

The Air Force operates a vast air refueling fleet that operates under TRANSCOM as part of Air Mobility Command. But the vast majority of U.S. military fuel is transported by sea, a capability that has been neglected over the years

Another critical step is top-level diplomacy to secure the basing options and defense cooperation that the Air Force and other services require.

President Joe Biden hosted the leaders of Japan, South Korea, India, and the Philippines this year, as leaders of all four countries made official state visits to Washington, D.C., during the first half of 2023.

That diplomacy has yielded expanded access to operating bases in the Philippines, increased bomber presence in Korea, new drone sales to India, and F-16 sales to the Philippines. Japan is buying hundreds of land-attack cruise missiles from the U.S.

The U.S. is also building on its already tight relations with Australia to help Canberra acquire its own nuclear-powered submarines and to collaborate on unmanned aircraft and command and control operations. That would lead to increased Air Force deployments, adding another potential hub in the ACE spoke. Australia is planning a major upgrade to B-52 facilities at Royal Australian Air Force Base Tindal in the Northern Territory, which could see it become an important staging base for American strategic bomber and other large aircraft.

The administration has also pledged $7.1 billion in its 2024 budget to the Marshall Islands, Micronesia, and Palau to renew compacts with those countries that give the U.S. military basing options.

"There's a strategic calculation on the part of the Biden administration to build up our allies," said Patrick Cronin, an Asia-Security expert at the Hudson Institute.

Some experts say new approaches to basing, while helpful, are not enough, in and of themselves, to counter the Chinese and that a more fundamental shift in Air Force thinking is called for.

"There's no silver bullet," said David Ochmanek of the RAND Corporation, a former deputy assistant secretary of defense for force development and a former Air Force officer.

Ochmanek said the Air Force needs to embrace the concept of mass, such as thousands of small unmanned systems, which could be set aloft from mobile launchers on the ground, as well as palletized munitions.

"I really think the big indicator of a cultural change in the Air Force will be when they unambiguously embrace runway independence," he said. "As the Chinese deploy more and more ballistic and cruise missiles, all of which are very accurate, it's not possible, at least with currently available active defense systems, to comprehensively protect any single base or group of bases against large salvos."

In its proposed fiscal 2024 budget, the Air Force plans to invest $1.2 billion in resilient basing. New funding "represents a maturation of ACE concepts," according to Air Force spokeswoman Ann Stefanek, to "start of long-term projects, such as infrastructure improvements of nontraditional airfields, prepositioning assets, and agile communications."

A vital step will be putting the ACE concept into practice on regularly, so the Air Force can demonstrate its aircraft would not be sitting ducks in a crisis, but could rapidly disperse into a warfighting posture and, thus, strengthen deterrence, Pettyjohn said.

It's time, she said, for the Air Force to move beyond preaching ACE to "routinely practicing it so you know that you can do it."

USAF

The B-21 Raider represents the next generation of global strike for the Air Force. Unveiled in December 2022, the new stealth bomber is smaller than the B-2 it resembles while incorporating a host of advanced stealth and related features.

Global Strike

By John A. Tirpak

CHALLENGE

Our long-range strike capacity must be resilient against advanced threats with increasing range and sophistication but also affordable.

The Air Force's primary platform for air attack against the most heavily defended targets will be the sixth-generation B-21 Raider, featuring a degree of stealth "orders of magnitude" stealthier than the B-2A Spirit it will replace.

Like the B-2, the B-21 is being built by Northrop Grumman, but unlike its predecessor, it will feature an open systems architecture, enabling the Air Force to plug in upgrades from potentially any supplier. The Air Force, not Northrop, will own the technical baseline of the bomber, allowing any capable competitor to offer improvements to its electronic warfare systems, weapons, and software.

The B-21 will replace the B-1B Lancer and the stealthy B-2A Spirit, both slated to retire from front-line service in the early 2030s. Though structural analyses indicate that the B-1 and B-2 could conceivably serve into the 2040s, Air Force Global Strike Command foresees keeping two bomber types rather than four, with a fleet consisting of at least 100 B-21s and 76 B-52Js.

Even that fleet, though bigger than today's bomber force, may be too small. Past AFGSC commanders and other experts say 145 B-21s is the minimum needed to sustain the necessary operational tempo in a future air campaign against a peer adversary. AFA's Mitchell Institute for Aerospace Studies argues for 225, for a total bomber force of 300, including 75 B-52s.

Mitchell posits that in a theater war with China, with an initial target list of at least 100,000 aimpoints, only stealthy bombers delivering direct-attack weapons can achieve those kinds of numbers with any kind of efficiency.

APPROACH

The U.S. will need to supplement current and next-generation, crewed platforms with lower-cost complementary uncrewed systems. The technologies are available now to introduce uncrewed aircraft in the system-of-systems context, both at the tactical level with NGAD and at the more strategic level with the B-21.

The first B-21 program "usable asset" is anticipated circa 2025, but initial operational capability, which is classified, may be later. Production capacity is said to be limited to about 12 aircraft per year; any more than that would require significant added tooling and workforce investments, according to Air Force and Northrop Grumman officials.

While development of the B-21 is being conducted under a cost-plus contract, production will be under a fixed-price deal not to exceed $550 million per copy in 2010 base year dollars, or about $772 million adjusted for inflation.

Air Force and congressional leaders have praised the B-21 for being on-time and on-budget, but its first flight is now more than a year behind initial estimates. The first plane rolled out in December 2022, but no engine runs or taxi tests have been acknowledged yet; the Air Force still predicts first flight before the end of this year.

Air Force Secretary Frank Kendall, Air Force Chief of Staff Gen. Charles Q. Brown Jr., and Chief of Space Operations Gen. B. Chance Saltzman have described the sixth Operational Imperative as focused on "ways to improve the cost-effectiveness of the family of systems surrounding the B-21 bomber."

The B-21 is "more than a new platform," they wrote in their fiscal 2024 posture statement. The sixth OI identifies "new weapons, sensors, and communications that can make the B-21 more effective in the joint tactical fight," particularly to deliver "precision weapon effects en masse to numerous targets anywhere in the world."

B-52S FOREVER

Along with the new B-21, the Air Force is extending the life of the B-52H Stratofortress with a new radar from BAE Systems, new Rolls-Royce engines, and new navigation, networking, communications and weapons, all integrated by Boeing. The 76 B-52s, once upgraded, will be designated B-52Js, and will all have completed the upgrade by the early 2030s. They are then expected to remain operable into the 2050s, approaching 100 years of age before they retire.

Armed with new nuclear-armed AGM-181 Long-Range Standoff (LRSO) missiles and a variety of conventional standoff weapons, the B-52Js will be able to operate at standoff ranges early in a conflict and later as a direct-attack bomber once air superiority is reached. It will also perform minelaying and anti-ship missions.

Plans to arm the B-52 with the Air Force's first operational hypersonic missile—the AGM-183 Air-launched Rapid-Response Weapon (ARRW)—have now been canceled. A second hypersonic effort, the developmental Hypersonic Attack Cruise Missile (HACM), and other classified long-range conventional weapons are in the pipeline.

Equipping the B-52J with a version of the radar used in the Navy's F/A-18E/F fighter is the first element of the B-52J upgrade, with initial operational capability expected in 2027. The engine replacements, featuring Rolls-Royce F130 engines in place of the original Pratt & Whitney TF33s, will begin about 2028, with the entire fleet to be equipped by 2035.

NEW WEAPONS

The stealthy AGM-181 LRSO, developed by Raytheon Technologies, will succeed the 50-year-old AGM-86B Air-Launched Cruise Missile (ALCM) around 2030. Aboard the B-52J, it will complement the B-21 as an airborne strategic deterrent. Air Force leaders have said a conventional variant could be a possibility. A portion of the ALCM inventory was converted to Conventional ALCMs, some of which were used in the 1991 Gulf War. Those weapons were the first operational missiles to use the Global Positioning System for targeting.

STRATEGIC-RANGE UNCREWED SYSTEMS

A 2022 summary of the seven Operational Imperatives said, "The U.S. will need to supplement current and next-generation, crewed platforms with lower-cost complementary uncrewed systems." This concept has been part of the B-21 "family of systems" since the program's start, but how the Air Force plans to pursue this approach has never been explained in detail.

The Air Force's summary says that "this initiative, similar to the initiative associated with the NGAD [Next Generation Air Dominance] system, has to do with identifying the components of a B-21 family of systems, including uncrewed combat aircraft." It goes on to say that long-range strike capacity must be "resilient against advanced threats with increasing range and sophistication" and must be "affordable."

Autonomous, uncrewed aircraft for this application "are available now … both at the tactical level with NGAD and at the more strategic level with the B-21," the Air Force said.

Secretary Frank Kendall initially spoke of strategic-range uncrewed aircraft to enable and supplement the B-21, but later said that idea was not cost-effective.

Analysis showed that taking the crew out of a small, tactical aircraft deliver significant savings, but those savings do not scale for a large, long-range bomber, where crew support costs are "a small fraction of the [overall] cost," he said.

Still, that does not rule out the use of uncrewed collaborative aircraft that might help enable the B-21 to penetrate hostile airspace, even if they do not continue deep into enemy territory. The B-21 itself was contracted to be an "optionally manned" system, meaning that it could be enabled to fly without a crew. The Air Force says it has not removed this requirement.

The future years defense plan calls for investing $20 billion in B-21 production through 2028, plus another $13 billion for research, development, testing, and evaluation.

Airman 1st Class William Pugh

The Air Force's long-range bomber plan includes retaining 75 long- range B-52J bombers to fly standoff missions, along with as many as 225 B-21 bombers capable of penetrating the most advanced adversaries' radars.

Staff Sgt. John Linzmeier

Total Force weapons specialists from the 154th and 15th Aircraft Maintenance Groups arm an F-22 Raptor with inert munitions at the Pacific Missile Range Facility, Barking Sands, Hawaii, in March. Achieving this significant milestone for the first time during a Joint Base Readiness exercise enhances the F-22 Raptors' agile combat employment capabilities by successfully rearming them.

Readiness to Deploy and Fight

By David Roza

CHALLENGE

Analyze the mobilization and support chain to ensure the entire system is hardened against all threats an enemy might present so the Department of the Air Force can meet its commitments to combatant commanders.

APPROACH

Identify gaps and vulnerabilities in the department's ability to transition to and support current and projected operational plans in a contested environment and prioritize solutions.

The COVID-19 pandemic and Russia's invasion of Ukraine exposed weaknesses in the industrial base and supply chains the U.S. military depends on for spare parts, munitions, and other key services and supplies. For the Air Force, those revelations exacerbate anticipated shortfalls in airlift and aerial refueling capacity to meet the requirements of wartime scenarios with a peer adversary in the Indo-Pacific region.

Regardless of what happens in the opening salvos of any fight, the question that weighs most heavily is logistics: Can the Air Force sustain far-flung front-line forces to win the fight?

"The severe challenges we face today with readiness would be even more pronounced in a conflict, so we need new approaches to enhance resilience and facilitate fighting under attack in a conflict," said Timothy Walton, a senior fellow at the Hudson Institute, in an interview.

Among those challenges are shortfalls in weapons production, gaps in refueling, storage, and prepositioning capacity, potential vulnerabilities to cyberattacks, as well as training, materiel readiness, and operational complacency and flexibility.

"We're coming off a couple of decades of conflict in which all of our comms were essentially secured, we were not competing with a peer, and I think most of us in the room believe the next conflict will be quite different from that," said Brian Morrison, vice president and general manager of cyber systems at General Dynamics, at the AFA Warfare Symposium in March.

Strengthening the defense industrial base, diversifying supply chains, and fortifying information networks are ambitious and required—but there is no silver bullet.

"Many of the other operational imperatives identify systems of systems or warfighting areas," Walton said. "This one is a bit broader. … The rub is that it is unlikely to be any single system or class of systems that will be the solution."

Transitioning to a wartime posture involves building new infrastructure around the world, modernizing aircraft, and a combined and joint approach to warfighting that involves close coordination with allies and the other U.S. military branches. Over time, it will require more investment to develop additional airlift and refueling

platforms—and new authorities and systems to deploy warfighters more rapidly.

"You have to ultimately convince a variety of stakeholders, at both the Department of Defense level and ultimately Congress, that what you're asking for is needed, that it is the right investment," said Dahlia Goldfeld, a senior information scientist at the RAND Corporation, in an interview. "That's hard because there are a variety of competing factors. What a certain congressman wants may not be what the Airmen within the logistics directorate think is the most important thing."

Yet Congress does appear to be listening. The House Armed Services Subcommittee on Seapower and Projection Forces engaged on the matter of recapitalizing the Air Force's aging KC-135 tankers, directing the Air Force in its markup of the 2024 National Defense Authorization bill to prepare a business-case analysis, along with Joint Staff-validated requirements, for a replacement tanker. It also asked for options to fulfill the Next-Generation Air Refueling System requirement, a longer-term need, before the KC-135 recapitalization strategy is completed.

Such language, Walton said, shows "keen congressional interest in identifying solutions for contested logistics, next-generation tankers, and next-generation mobility aircraft."

Longer-term, the Air Force is investigating new concepts like rocket-delivered cargo, pre-positioned stocks of fuel and ammunition, and even mobile jet fuel factories that could reduce dependence on long, vulnerable fuel supply lines. Though some of these capabilities may be a long way off, their development is part of the branch's renewed focus on reducing vulnerabilities and strengthening resilience in its logistics, Walton said. While some of these capabilities are still conceptual, he added, the fact that they are getting attention shows the seriousness with which the Air Force is addressing vulnerabilities.

Likewise, the Air Force wants to shift away from a top-down, hierarchical command and control structure to a more distributed structure where units are encouraged to take greater initiative if isolated from higher commanders.

"I think part of this is a shift in mindset," Walton said. "We want to encourage air and space units to generate promising courses of action and execute them on their own initiatives, even if they lose communications."

Case in point: During Exercise Resolute Sentinel in South America, Airmen were tasked to rapidly relocate and operate from austere bases, exercising the Agile Combat Employment concept of operations. Airmen set up a forward area refueling point (FARP) on July 12, gassing up an A-10 from an HC-130 in a remote airfield. But first they had to overcome a supply problem: "The A-10s need additives for their fuel," spokesman Lt. Col. Mickey Kirschenbaum told Air & Space Forces Magazine. "We thought we had a contractor here that was going to provide that, and they weren't able to. So we had to come up with a solution to ferry fuel from one location to the other and then put the additives in so the A-10s can fly. … We've been doing a lot of events like that, overcoming obstacles that you would see in a deployed location."

Airmen in that and other exercises have also emulated operations in which communications were jammed or disabled. Such threats make information security among the most crucial aspects of fortifying supply networks, both the physical infrastructure and the software and communications they depend on. Achieving real information security requires understanding and buy-in from everyone in the warfighting enterprise.

"Most of the penetrations we've had have not been unbelievably sophisticated attacks, they've been known exploits or exploits of known vulnerabilities that we had the means and the knowledge to remediate," Morrison said. "The first thing we all have to think about, all the time, is: Are we doing what I would call cyber hygiene?"

Are proper procedures being followed, are all the defenses up, or are guardrails disabled for people's convenience? "I assure you that those two or three peer adversaries are working every day to break our codes, to get inside our sensors, to read our communications, to hear what we're saying to each other," he said.

That's now, before a conflict is underway. The intensity of those probes and challenges will only increase over time. The only way to stay ahead is to move faster, iterate better and more agile solutions rapidly, to gain ground on a persistent foe. He cited the rapid development of Mine-Resistant Ambush Protected vehicles during the wars in Iraq and Afghanistan as an example of cutting through the usual bureaucracy to rush capability to warfighters in desperate need for better protection 15 years ago.

"There was no question about, 'How am I going to get paid for this? Are the requirements lying flat? Do we have all the contract terms?' It was urgency to mission, and then we'll let everything else sort out along the way," Morrison said. "Everybody's got lawyers, everybody's got contracts. We've got to worry about them. But I would love for all of us together to get back to that moment of urgency, because I think we are [already] in a hot war."

Staff Sgt. Jake Seawolf/ANG

Developing new operational concepts, capabilities, and plans will bolster deterrence and maintain the U.S. military's competitive advantage. During an ACE joint exercise in 2022, 151st ARW members unload a Polaris Military RZR from a KC-135R tanker at Dugway Proving Ground, Utah.

Winning the Kill Chain Competition

Planners must think backward from the target to optimize the kill chains used to attack.

Two U.S. Air Force F-16 Fighting Falcon aircraft fly over the U.S. Air Force Central Command area of responsibility during a mission supporting Combined Joint Task Force—Operation Inherent Resolve, in March 2021.

Staff Sgt. Trevor McBride

By Heather Penney

The kill chain competition is among the foundational struggles of every military conflict. Adversaries compete in capabilities, capacity, geography, and industrial and financial resources can shift the balance of power in conflict from one side to the other, which is why these are priorities in both peace and war. No competition, however, is as central as the command and control kill chains that deliver weapons on targets. Should kill chains break at scale, it can lead to the catastrophic loss of a conflict.

Kill chains are not just as an abstract concept, but rather is made up of physical sensors, datalinks, platforms, and weapons, each with its own tangible characteristics and limitations. Each also has specific informational, physical, and network requirements. For the U.S. Air Force to maintain its kill chain advantage, it must evolve its kill chains to counter adversary strategies to break them.

Planners must think backward from the target to optimize the kill chains used to attack it. Target characteristics dictate which platforms, sensors, and capabilities planners use; nodes that perform similar functions but have different characteristics may not be interchangeable. The type and precision of the sensors used to locate and track a target, the type of weapon and effect, and even the bandwidth and latency of the kill chain's datalinks must be tailored to the target and mission.

Heather Penney is a senior resident fellow at the Mitchell Institute for Aerospace Studies. Download the entire report at *http://MitchellAerospacePower.org.*

This is why kill chains the Air Force developed over the past 20 years for operations in the Middle East are insufficient for a peer conflict in the Pacific. Many of the Air Force's current kill chains are insufficient for the geography of the Indo-Pacific and the threats posed by China's modernized People's Liberation Army (PLA).

In the Middle East, a flight of F-16s could loiter for hours in a kill box, waiting for a weapons release order from the joint force air component commander in the nearby air operations center (AOC) with relatively low risk. That won't be possible over Taiwan, where communications will be contested, and aircraft will be hundreds of miles from the nearest air operations center. Loitering there would likely prove fatal.

Secretary of the Air Force Frank Kendall's Operational Imperatives aim to create the capabilities needed to conduct effective operations in that fight.

Kill chains must also be able to withstand adversary attacks, which can be either defensive or offensive in nature. Defensive attacks consist of Area Access/Area Denial threats that force non-stealthy U.S. platforms to operate beyond useful ranges for sensing or weapons delivery; camouflage and decoys intended to cause U.S. forces to waste weapons; or "shoot-and-scoot" tactics intended to deny the U.S. the ability to gather precise target data.

Offensive attacks include jamming or disabling space constellations in low-Earth orbit, destroying command nodes like AWACs, or jamming Link-16 and other datalinks to isolate U.S. platforms and prevent them from sharing information to progress the kill chain.

CHINA'S "SYSTEM DESTRUCTION"

China has ardently studied how the U.S. military conducts combat operations, starting with the U.S. military's ability to successfully close kill chains at war-winning scale, speed, and scope during Operation Desert Storm. That experience drove the PLA to change from a warfighting concept that seeks to achieve victory by attriting opposing forces to "system destruction warfare." This warfighting concept deliberately seeks to disrupt, degrade, and destroy the system of systems that defines the U.S. operational architecture. The PLA seeks to destroy kill chains by attacking U.S. sensor networks, datalinks, and command and control (C2) architectures, and other nodes. This strategy seeks to dismantle the pillar of America's asymmetric advantage in combat—the system of systems that U.S. forces rely on to conduct modern warfare.

Legacy military kill chains are linear and vulnerable to China's system destruction warfare, which put every step of U.S. kill chains at risk—from sensors to shooters to the networks that connect them and the data they share. The very technologies that make the U.S. kill chains so efficient and effective makes them more vulnerable to system destruction warfare—especially if assets required to complete multiple kinds of kill chains are only available in limited numbers.

For example, an airborne AWACS or future implementation of today's JSTARS (Joint Surveillance Target Attack Radar System) might support multiple steps in multiple kill chains. Without enough, the loss of such high-demand, low-density nodes could cripple the U.S. military kill chains, slowing the pace and scale needed to achieve a theater commander's objectives.

The risk to the force from this vulnerability is amplified by the fact that the Air Force today lacks the force size needed for peer conflict.

RIPE FOR CHANGE

Since the mid-2000s, the Air Force's combat aircraft inventory has been the smallest and oldest in its 76-year history as

What is a Kill Chain?

A kill chain is the process used to put Air Force missiles or bombs on target. The Air Force breaks the kill chain down into six discrete steps: find, fix, track, target, engage, and assess. Since the late 1990s, Airmen have used this "F2T2EA" model to find and destroy targets and to understand the relationship between the sensors, platforms, and weapons employed to close those kill chains.

Find. The first step of any kill chain is to find the target. Surveillance operations study battlespace to detect and characterize potential targets.

Fix. Once a potential target is found, targeting data passes to one or more sensors to "fix," or locate its position relative to the rest of the battlespace, and then to positively identify it—with sufficient fidelity to engage it with weapons—as the desired target.

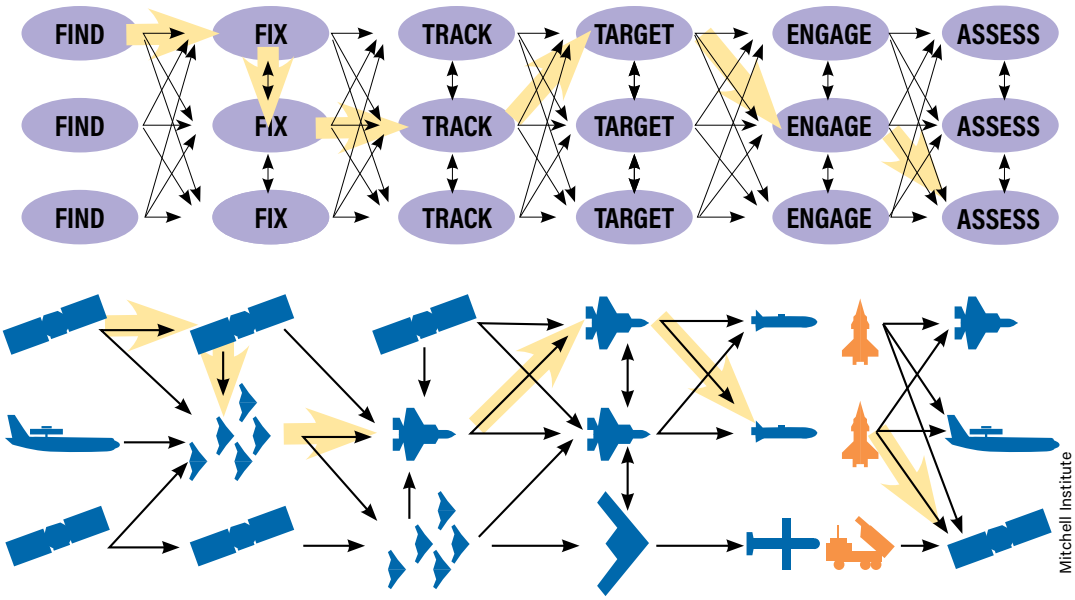
Track. Targets' location and identity must be continuously tracked—what warfighters call maintaining "positive custody." If positive custody of a target is lost, the kill chain is broken, and the process must revert to an earlier step.

Target. When it's time to **engage,** targets are assigned based on the specific requirements for each target. A mobile target requires a different solution than a bunker buried beneath the ground, for example.

Even after a target is attacked, the kill chain continues. Sensors must be assigned to **assess** the damage and determine if additional munitions are necessary.

Critical Attributes that Create a Kill Chain Advantage

A system-of-system approach to kill chains (i.e., a kill web) can increase the scale of potential kill chains. The more compatible and interconnected the nodes of a kill chain system are, the more possible paths exist for kill chain closure. This pathing optionality can provide resilience when some nodes or networks are degraded or destroyed, frustrate adversary targeting through unpredictability, and increase the scale of possible kill chains within the operational system.



Mitchell Institute

a separate military service. To compensate, the Air Force has made its kill chains more efficient and effective by leveraging advanced technologies, such as high-speed computer processing and datalinks. These enhancements maintain lethality even as the combat force shrinks. These new kill chains were optimized for theater contingency operations and low-intensity conflict in the permissive environments exemplified by Operations Enduring Freedom, Iraqi Freedom, Inherent Resolve, and other similar fights involving non-peer adversaries—those without sophisticated means to systematically disrupt U.S. kill chains. The dynamic and fleeting nature of high-value targets in these conflicts drove the Air Force to develop means to initiate and close kill chains in a matter of minutes and with precision.

In a peer conflict, however, kill chains will have to engage dynamic and fleeting targets at a scale, scope, and speed unprecedented in modern warfare.

According to one former defense official, roughly 80 percent of targets in the early phase of a Chinese *fait accompli* invasion of Taiwan are anticipated to be mobile or quickly relocatable. Detecting these targets and initiating the kill chain will require ISR assets to be in the right place at the right time continuously, searching for and detecting moving targets. Strike forces will have just minutes or less to complete kill chain before targets relocate or take steps to negate attacks.

The scale of the battlespace and unprecedented volume of potential targets in a conflict with China pose complications, as thousands of kill chains must be closed against thousands of targets simultaneously across thousands of square miles of ocean and landmass. With limited resources to cover so much geography and so huge a volume of targets, every ISR asset, weapon system, and platform in the battlespace will be needed to complete those kill chains nearly simultaneously.

Yet, it's also clear that today's U.S. kill chains are rigid, offering narrow and predictable options to share information with only a limited mix of sensors, aircraft, or weapons. Relationships between functional nodes are fixed, and kill chains are generally unable to adapt when elements are lost, or datalinks are disrupted. Finally, the centralized decision-making that characterized U.S. operations over the past 20 years is not scalable to the size of a peer-to-peer war in the Indo-Pacific.

BUILDING THE FUTURE KILL CHAIN ADVANTAGE

The Air Force is developing new capabilities and operational concepts to create more flexible, resilient, and lethal kill chain options in the future. The Advanced Battle Management System (ABMS) program is specifically intended to deliver that new capability.

Key Attributes of a Successful Kill Chain: Scale, Scope, Speed, and Survivability

Building a future kill chain that can prosecute targets as fluidly as possibly requires a focus on four measures of a kill chain's effectiveness: scale, scope, speed, and survivability.

Scale. Increasing the number of nodes directly translates to the ability to engage more targets. Increasing the functions each node can execute also expands the number of kill chains U.S. forces can prosecute at once. This is one reason why Air Force Secretary Frank Kendall has expressed a nominal intent to procure at least 1,000 uninhabited Collaborative Combat Aircraft (CCA) to complement some 200 Next Generation Air Dominance (NGAD) fighters. Likewise, developing and deploying proliferated low-Earth orbit satellite constellations and stockpiling stores of advanced weapons will be necessary to enable the closing of the thousands of kill chains required to take on a peer rival in conflict.

Scope. Quantity is key to increasing the scope of kill chain operations because a single kill chain system, like a single combat aircraft, cannot be in more than one place at a time. The Air Force must increase the quantity of physical kill chain platforms and expand their range to achieve greater scope. Range is crucial in the Indo-Pacific, which spans 16 time zones.

Greater weapon range increases the area each kill chains can cover. Mitchell Institute analyses indicate that precision-guided munitions with ranges of 50 to 250 nm that can be delivered in large quantities by reusable stealthy fighters and bombers would not only extend the range of kill chains, but also compress the time to close kill chains, and achieve "affordable mass" for strikes against very large target sets.

Speed. The Air Force should increase the speed of weapons where feasible. Higher-speed air-launched missiles and "stand-in," penetrating combat aircraft like the F-35 and B-21 can both accelerate kill chains by reducing the time from launch to strike.

Space-based communications, meanwhile, can also increase speed, especially when linking nodes beyond line-of-sight. The Air Force's future low-Earth-orbit satellite transport layer will become an essential backbone for kill chains executing in highly contested battlespace. Using laser communications and native processing, LEO constellations could provide up to 350 megabits (Mbps) per second of instantaneous bandwidth to support kill chain operations, 25 times faster than today's Link 16 terminals can deliver at a maximum of 14 Mbps.

Digital technology can also help. Developing automated tools for air battle managers and fused, accurate, and timely common operating pictures would facilitate rapid target pairing and kill chain construction. Automating kill chain functions, such as identifying and prioritizing threats and targets, pairing targets with weapons to maximize probability of kill, and efficiently managing fuel and weapons would greatly reduce air battle managers' task saturation.

Survivability. Radar energy, heat signatures, and other emissions must be mitigated to avoid detection by adversaries' warning and targeting systems. Datalinks featuring low probability-of-intercept/low probability-of-detection (LPI/LPD) are essential for operating in highly contested environments. Likewise, directionally focused datalinks, power modulation, frequency hopping, or even the use of new technologies, such as laser communications quantum radio frequencies may enhance overall network survivability.

Similarly, redundancy is another crucial requirement. When network nodes fail, systems must be able to heal themselves, operating less like a conventional point-to-point network, and more like a mesh of interconnected systems.

There are many factors that are moving the U.S. Air Force toward developing a more disaggregated force design, but the earliest that its warfighters could expect to see nascent versions of this future force is likely to be in the early 2030s. As aggressively as the Air Force is working to develop the technologies, operational concepts, architecture, and other enablers for ABMS, they are still not mature. The Air Force needs a bridge strategy to ensure it can achieve a kill chain advantage as it migrates into this future force.

ABMS seeks to increase potential kill chain pathways across operating domains. By connecting systems and rapidly sharing information across a large network of sensors and platforms, the U.S. aims to increase the resiliency of its kill chains against Chinese countermeasures. For instance, instead of separate linear kill chains, ABMS could help create "kill webs" that operate much like self-healing mesh networks.

In this distributed or disaggregated battle network, each step in the kill chain—the find, fix, track, target, engage, and assess (F2T2EA) process—could be performed by different platforms and even, potentially, in different domains. For example, a satellite sensor might detect and find a potential target, then pass it to an airborne sensor to fix and track the target, updating and maintaining the target's position and identification before passing it off again to a ground-based battle management node. That battle manager might then task a weapon system, perhaps an airborne bomber, to engage the target with appropriate weapons. Finally, a satellite might guide the bomber's weapons to the designated target. Afterward, an airborne sensor conducting battle damage assessment would help battle managers determine if another engagement was required. This meshed approach makes the overall operational system less predictable and harder to counter.

Air Force Chief of Staff Gen. Charles Q. Brown Jr. describes ABMS as a joint kill chain that will take "data, put it into a cloud, and then be able to access the data through applications, and not do it service by service by service." Rather than distinct Air Force, Army, Navy, and Marine Corps kill chains, the architecture would enable all the services to leverage sensors, platforms, and weapons from any service branch to prosecute targets with the scale, scope, speed, and survivability necessary to defeat China.

Scale in this case is the capacity of an operational system to generate and close hundreds or thousands of kill chains simultaneously; scope refers to the ability of a kill chain to span great distances and operate persistently over time; speed is the ability to outpace adversary efforts to deny, disrupt, or break a kill chain; and survivability is the ability to sustain operational effectiveness under attack.

ENDURING KILL CHAIN ADVANTAGES

During and immediately following the Cold War, the Air Force consolidated its kill chains and relied more on ad-

vanced weapons systems like the B-2 Spirit bomber F-22 Raptor fighter, which were equipped with highly advanced technologies that enabled them to initiate and close kill chains independently.

The B-2's unique range, high payload capacity, and stealth enabled kill chains of unprecedented scope, speed, and survivability. The F-22's supercruise, stealth, powerful sensors, and the ability to rapidly fuse sensor data gave pilots a "first look, first kill" advantage, closing kill chains against enemy fighters faster than they could respond.

While such systems have been derided as "exquisite" by critics, it is the very characteristics that made them exquisite that gave them unrivaled ability to survive and close kill chains against enemy systems independently in contested environments.

Air Force leaders should not abandon this approach. Rather, it should increase the number of fifth- and sixth-generation aircraft available to amplify kill chain advantages in scale, scope, speed, and survivability. The Air Force should accelerate its procurement of F-35s and B-21 bombers, while sustaining all its F-22s and B-2s. At the same time, it should develop advanced munitions suitable for fifth-generation aircraft; increase datalink interoperability among its platforms; and rapidly field Collaborative Combat Aircraft to increase the number of weapons available per combat sortie.

To optimize kill chain scope, fifth-generation aircraft also must be able to support both organic and off-board kill chains. The F-35's planned Block 4 upgrade includes datalink connectivity needed to support such distributed kill chains.

Fifth-generation aircraft can finally provide survivable kill chains in high-threat and spectrum-contested battlespaces. This is an Air Force advantage that is currently unmatched by China's PLA and other potential adversaries. To maintain this comparative advantage, the Air Force must continue to invest in improvements to its fifth-generation aircraft to offset China's increasingly capable countermeasures.

Fifth-generation fighters will be important to the Air Force's overall force design in the near-term as a bridge to the service's Next Generation Air Dominance (NGAD) family of systems. Strategically, fifth- and sixth-generation combat aircraft are crucial to assure kill chain dominance because of their ability to initiate and complete every step of the kill chain process on their own.

CONCLUSION AND RECOMMENDATIONS

In the near- to mid-term, the Air Force should:

■ **Maximize F-35 and B-21 production rates.** The F-35 is the only fifth-generation aircraft in production in the U.S. today that can provide a kill chain advantage now and long into the future. The B-21, now nearing first-flight, will soon provide similar advantages. To achieve kill chain scale and scope and mitigate risk in this decade, the Air Force should maximize the rate at which it procures both aircraft.

■ **Aggressively invest in modernizing and improving the range and survivability of the F-35 and F-22.** While developing NGAD, the Air Force can increase the survivability and reach of its existing kill chains while it works to mature the new technologies that will come with NGAD.

■ **Develop and produce survivable air-to-air and air-to-ground weapons suitable for fifth- and sixth-generation combat aircraft operations.** Increasing the number of kill chains per sortie that fifth-generation aircraft can complete will have a direct impact on the timing and mission effectiveness of any air campaign. Enhancing survivability is key after decades of fighting in largely uncontested battlespace.

Wang Zixiao/Xinhua via China Ministry of Defense

A Chinese J-10 fighter taking off during readiness patrol and military exercises. China's Air Force cannot yet match the survivable kill chains of U.S. fifth-generation aircraft, such as the F-35.

■ **Map out and connect the right sensors, platforms, and weapons, not necessarily every weapon.** For kill chains to be highly effective, not everything needs to be connected to everything all the time. The Air Force should work to better understand which systems need to be connected when to increase the scale, scope, and survivability of its kill chains.

■ **Develop advanced networks and invest in connectivity across the force.** Current kill chains cannot bridge most service, system, or network boundaries. Enhancing the connectivity of fifth-generation aircraft with other aircraft and strike capabilities across the force will empower both to be multifunction nodes supporting theater commanders' kill chain operations.

In the mid-to-far-term, the Air Force should:

■ **Develop automated tools to help air battle managers. Automation can enable battle managers to identify, validate, evaluate, and construct kill chains more rapidly.** A disaggregated kill chain presents tremendous complexity to battle managers, especially when the physical, locational, and informational characteristics of each node are "in play." In a highly dynamic battlespace, battle managers need automated or intelligent tools to facilitate the real-time identification of kill chain options for target pairing.

■ **Accelerate development of Collaborative Combat Aircraft.** CCAs in quantity have the potential to be force multipliers, increasing the reach of the Air Force's fifth- and sixth-generation aircraft and multiplying the number of targets that can be attacked. Quantity also bolsters survivability.

■ **Develop and launch a space-based sensing and data transport layer.** High-volume sensing and communication constellations can dramatically boost the scale, scope, speed, and survivability of airborne kill chains.

■ **Accelerate development of NGAD and procure the aircraft quickly and in sufficient numbers to sustain the force.** Cutting production too soon undermined the effectiveness of the F-22 fleet and, by extension, the Air Force's ability to project power.

These recommendations are not "quick kill" fixes that can be achieved by simply trading off current force capacity. Yet, senior DOD leaders must consider the ultimate cost of not pursuing kill chain dominance as it develops its future force design. A defeat at the hands of a peer adversary would have devastating long-term consequences for the security of the United States and its allies and partners.

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A U.S. Air Force OV-10 Bronco over Southeast Asia in the early 1970s with the 23rd Tactical Air Support Squadron (TASS). The Broncos directed U.S. aircraft in operations against convoys and supply dumps. The aircraft's last combat sortie took place on Aug. 15, 1973, after which it returned to Ubon Air Base in Thailand, where it remained for nearly a year.

Image courtesy of Australian War Memorial

Flying the Last Missions in Cambodia

50 years after the U.S. ended operations in support of Khmer allies, the last pilot out looks back.

By Darrel Whitcomb

It is an historical footnote now, lost in the larger story of the Vietnam War. As our nation wound down its participation in that conflict, the last chapter of that tragedy played out in Cambodia. There, U.S. air units supported the Cambodian Army until that effort was terminated by congressional action on Aug. 15, 1973.

But the memories of those last days have come back to me as we approach the 15th anniversary of date. The memories are strong because I was one of the last pilots to fly those missions on that last day. I was a young captain assigned as a forward air controller or FAC as we called ourselves, and I was a proud member of the 23rd Tactical Air Support Squadron or TASS, located at Nakhon Phanom Air Base in Thailand. We also had a detachment at Ubon Air Base, Thailand.

"[This is] the most difficult campaign I've had to fight since I have been commander."
—7th Air Force Commander Capt. John Vogt

Activated in 1966 to work against the growing Ho Chi Minh Trail, in Laos, the 23rd TASS was the one of five TASSes, which at one time had patrolled over the skies of South Vietnam, Cambodia, and Laos. But as America withdrew from the conflict, the other proud TASSes had been deactivated and the remaining pilots and navigators had been consolidated in the 23rd. In 1973, it remained as the sole FAC unit in the war, and as the focus of our remaining effort shifted to Cambodia, so did the 23rd. We flew the OV-10 "Bronco" and used the radio call signs of "Nail" and "Rustic."

I was Nail 25, a moniker I carry proudly to this day.

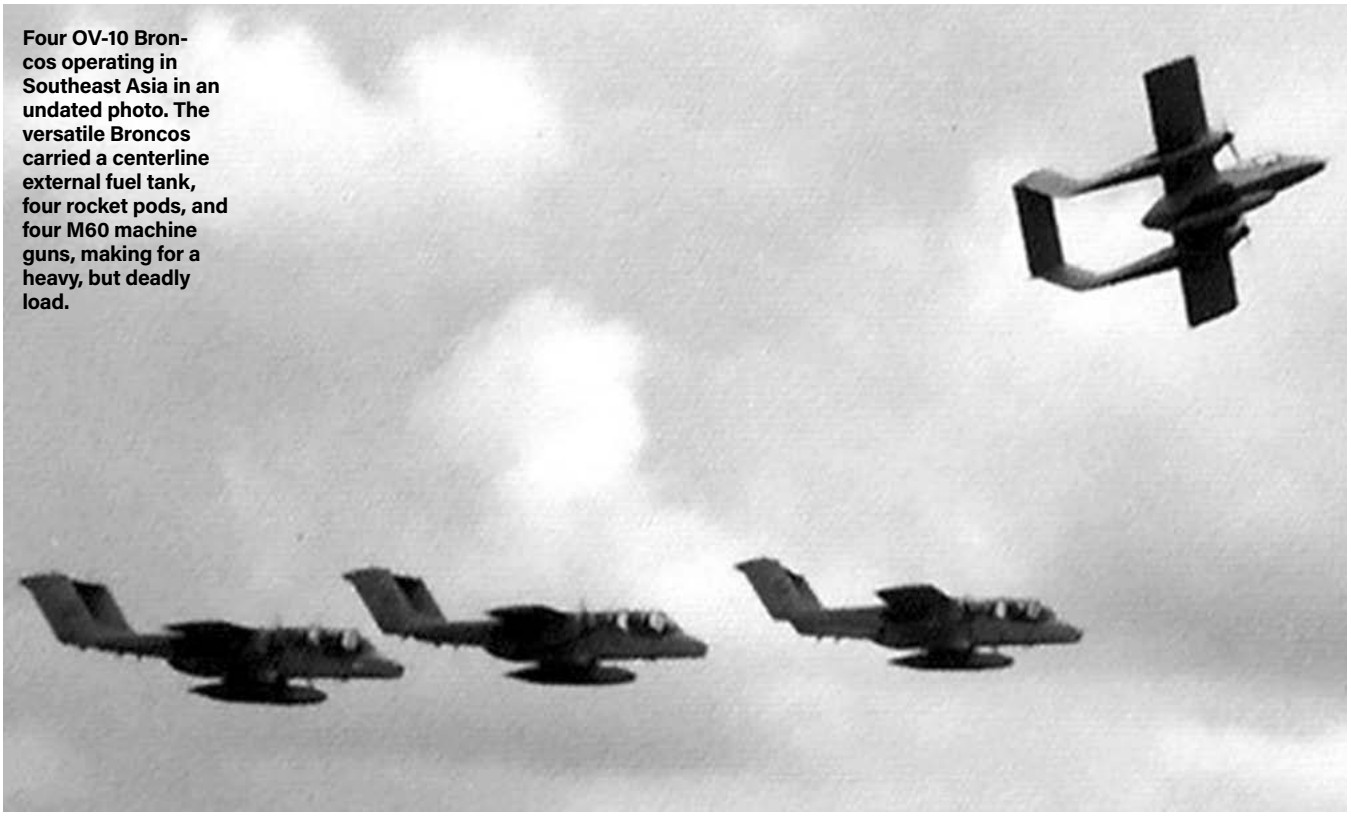
Image courtesy of Darrel Whitcomb

Capt. Richard "Dick" Gray, killed in action June 5, 1973, in an undated photo. Gray was among a number of Forward Air Controllers who died in action during the last summer of the war.

Throughout that spring and summer, operating out of our detachment site at Ubon Air Base, we flew the length and depth of Cambodia, as a key component of the efforts of 7th Air Force to support our Khmer allies. Gen. John W. Vogt was the 7th commander and recalled that this campaign, because of the convoluted politics of the conflict, was "the most difficult campaign I've had to fight since I have been commander of 7th Air Force." That was saying a lot since he had commanded 7th Air Force the previous year through the Easter Offensive and the Linebacker campaigns.

But we FACs were not aware of all of that. Daily, we flew our assigned missions, We searched for targets in the northeast portion of the country at the southern end of the Ho Chi Minh Trail. We flew into Phnom Penh and worked directly for the Cambodian Army. We provided convoy cover over the critical shipping which came up the Mekong River. We directed airstrikes in support of isolated friendly towns or locations or capped resupply airdrops by C-130 cargo aircraft. And more critically, we ran search and rescue missions for the crews of downed aircraft. The gunners of Cambodia, while not as numerous as those in Laos and North Vietnam, could be just as deadly as their up-country cousins. And sadly, we lost some of our young FACs there; Capt. Joe Gambino and Capt. Dick Gray were killed that summer. Their names as well as the names of F-4, F-111, and Jolly Green crews are up on the Vietnam Wall, near the bottom of panel W-1.

As the congressionally mandated cutoff approached, we did not want to add to that list, and we became very protective of each other. Consequently, on the last day, the squadron commander, Lt. Col. Howie Pierson directed that everybody would fly with two persons per aircraft. He had Capt. Bob Negley with him. He also decided that he and the detachment commander, Lt. Col. Bill Powers, with Capt. Wayne Wroten in his back seat, would fly the last sorties. Additionally, he directed 1st Lt. Charlie Yates and myself to also fly so that if anything happened, he would have "old heads" to handle it. I was all of 25 years old, but had been in the squadron the longest. Charlie had previously done hard duty with the now deactivated 20th TASS in South Vietnam. Charlie had 1st Lt.



Four OV-10 Broncos operating in Southeast Asia in an undated photo. The versatile Broncos carried a centerline external fuel tank, four rocket pods, and four M60 machine guns, making for a heavy, but deadly load.

Image courtesy of Darrel Whitcomb

Woody Baker with him. I had Capt. Bob Haley with me.

Taking off as the last four sorties, each of us flew missions in separate areas. After we had been directed to terminate, we would make sure that everyone else was out ahead of us, and then come home together.

My assigned mission was to work with Army units in contact with enemy troops south of Phnom Penh. Dutifully, I orbited over my troops and directed three flights of F-4s from Ubon Air Base, and A-7s from Korat Air Base, also in Thailand. The ground commander was most appreciative of the support and asked for more. I forwarded his request to the airborne control aircraft above. But instead of more fighters, I was sent the terse message to terminate—for us, the war was over. I told the ground commander. He sadly acknowledged my call.

In the background, I could hear small arms fire. Their war was not over. As I was leaving, he asked me to contact his control center in Phnom Penh and ask them to send Cambodian fighters to support him. I did so, knowing that the pitiful number of small T-28s we left the Cambodian Air Force was grossly inadequate for the job that they would now have to do for themselves.

Then I pointed my trusty OV-10 north for the flight back to Ubon Air Base. Passing over Phnom Penh, I turned on my smoke generator and did loops and rolls over the city—kind of an impromptu air show. Somebody watched because it was later mentioned in Newsweek Magazine.

I could hear the earlier FACs departing to the north ahead of us. One of our young guys, 2nd Lt. Robyn Read had a serious flight instrument problem and needed some help. But 2nd Lt. Jo Slagle joined up with him and led him home. Great work by two of our youngest guys. Otherwise, the flight back to the Thailand border was uneventful; no more problems and nobody behind us. Our mission was complete.

Pierson ordered us to join up as a four-ship formation for the leg to Ubon. We needed to rendezvous and had radios on the aircraft which helped us to do that. But one aircraft had to transmit a signal for the rest of us to home in on. So Charlie Yates pulled out his trusty harmonica and played "Turkey in the Straw" as we guided on his signal. That made the papers too.

As we joined up, Pierson stated that he would lead the flight for the approach and landing. Charlie would be number two. Powers would be number three. Since I had been in the squadron the longest, Pierson gave me the honor of being the last to land. I treasure that kindness to this day.

We tightened up the formation as we flew over the runway. Turning on our smoke generators, we looked like the Thunderbirds coming down initial for the active runway. Each aircraft made a tight break to the left. We landed in sequence, taxied into our squadron area, and shut down our engines. All our other personnel were there to greet us with cold beer and congratulations. The base photographer recorded it all. And our wonderful wing commander, Col. Bill Owens, was there to shake our hands. He even made a speech, something about mission or whatever. We weren't listening; our feelings were much different. Some were glad it was over. Others were just ready to go home. Some felt empty and wondered what we would do now. But the important thing was that it was over, and we were all safe.

Later, I read that some historian had determined that the last sortie of the war had actually been flown by some A-7 pilot from Korat. What? Those guys were out bombing for us. We watched them leave and then played rear guard for all of them as they flew home.

And of course, our forces did fly in the Mayaguez rescue and the evacuations from Phnom Penh and Saigon in 1975. So even that claim is wrong. It means that our missions that "last" day in Cambodia are but a footnote in the long history of that war.

Yet sometimes footnotes are important. Sometimes that is where the truth resides. The historians would not know. They never flew the missions. We did; and we own the footnotes.

AFA Nominees 2023-2024

Candidates for National Officers and Directors.

The Air & Space Forces Association Nominating and Governance Committee met by video conference on April 11 & 17, 2023, and selected candidates to send forward for open National Officer positions and National Director positions on the Board of Directors. The Committee consists of a Chair and Vice Chair of the Committee as well as at least three actively serving AFA Directors. The Chair and the Vice Chair of the Committee shall be the two most recent past serving Chairs of the Board, unless the Board determines to elect a different Chair or Vice Chair by a majority vote of the Board. The slate of the candidates will be presented to the delegates in September.

VICE CHAIR OF THE BOARD, FIELD OPERATIONS

Chris Canada, Bellevue, Neb., is the current AFA Nebraska State President and previous Midwest Region President. He has held Board positions with Project Management Institute (PMI), Heartland Chapter (a non-profit 501(c) (3)), for the past six years, in roles including VP Communications and Marketing; VP Operations; President; and Chair of the Board. He has also sat on the Board of Trustees for Sanitation and Improvement District 243 for the past nine years, in roles including Board Clerk and Compliance Officer. Canada has experience in project and program management through many years in military and post-military. He has been a certified Project Management Professional (PMP) for 10 years and a Certified Scrum Master (CSM) for agile processes for seven years. He also has professional experience in budget management, including two years as the Director of Staff for the U.S. Air Force's second largest combat wing.

A message from Chris Canada: Under our recently approved bylaws, there are four positions on the Board of Directors that ensure Field representation for our great Association: the three Area Directors and the VCoB-FO. I have been a member of our Association since 1980, a life member since 1985, and active for decades—I understand our history, strengths, and challenges. It would be great to say that I have all the answers too, but that just isn't so. I have and will continue to "roll up my sleeves" to work on solutions to our challenges, believe in and live our Association's mission, and embrace optimism about its' future so our Association can continue successfully as "the force behind the forces." I have and shall continue to support our Association through time, talent, and treasure at the Chapter, State, Regional, and National levels. When you are committed to a cause or organization, then it's just that simple.

Ross Lampert, Hereford, Ariz., is currently AFA's Field Council Field Leadership Development Chair and has previously served as an AFA Chapter, State, and Region President. Having already served on the AFA Executive Committee as the National Secretary, he has experience in Board operations. He has a deep knowledge of Field Operations having served and led at the Chapter, State, Region, and National levels since 2001.

A message from Ross Lampert: I have had a long-standing interest in Field leadership, especially in improving and strengthening it. It's the reason I founded both the Field Council's Training Subcommittee and the Field Leadership Development Team. I have studied volunteer leadership since the start of the previous decade. Having served on the Field Council since 2012, however, I've seen that leadership in volunteer organizations is fundamentally different from that in the military or in industry. While previous Field Operations Vice Chairmen have been concerned about Field leadership, they have not put the focused attention on it that's needed to make the kinds of improvements AFA needs. While I know the Field Ops Vice Chair has many other duties, I believe this must be the No. 1 focus: without effective Field leaders, AFA cannot be an effective organization.

I have established a legacy endowment to AFA that will provide additional annual funding to support Field Operations or AFA's STEM education activities. The Field Operations and Education Vice Chairs (or their successors) will determine each year how the money will be used. As the Southwest Region President and National Secretary, I routinely requested reimbursement for only half of my travel expenses.

NATIONAL DIRECTOR AT LARGE

The Nominating and Governance Committee submits four names for National Director at Large. Two will be elected for a three-year term.

Col. Joseph H. Abegg, Eastampton, N.J., is AFA's New Jersey State President. He served 29 years in the Air Force and has been an active member of the Civil Air Patrol for 50 years as a CAP Command Pilot and former National Director of Emergency Services. He sits on the Board of Directors for the Spaatz Association; is the Chair of the Eagles Advisory Committee CAP Northeast Region; and has nine years of experience lobbying State and Federal Legislators for CAP. He received AFA's Meritorious Service Award in 2022.

A message from Col. Abegg: My decades of executive and strategic leadership, knowledge, and experience with the military, corporate, civilian, and aerospace industries provide me with the necessary tools to be a valued asset to the Leadership

of AFA. I bring unique skill sets to the table having operated classified missions on five continents, having been the on-scene commander at a BENT SPEAR in a foreign country, having witnessed six UAP events, and having nine years of consecutive experience lobbying the Senate and the House on Capitol Hill on behalf of CAP.

As a member of the Board of Directors of the Spaatz Association, I have experience in lobbying 12 Aerospace and Defense Corporations for donations. I am an annual Commander's Circle donor to both the Civil Air Patrol and the Spaatz Association.

With the challenges ahead with our pacing threat(s) and with the pending disclosure of the known non-human presences and technologies, the need for AFA to take the lead to educate, advocate, and support Air & Space activities has never been greater, and philanthropy needs a higher priority.

Bill Harding, the past president of one of AFA's Schriever Chapters, has been closely involved with AFA's evolution to support the Space Force, as well as the Air Force. He helped lead the Schriever Chapter to be named AFA's Outstanding Large Chapter in 2022, and co-chaired AFA's Space Working Group (SWG) for more than two years, where he helped survey Guardians to get a pulse on what Guardians want from AFA. The SWG was instrumental in providing AFA leadership with insight into space issues and influencing the ultimate rebranding of AFA to the Air & Space Forces Association. Bill served in the Air Force for 28 years.

A message from Bill Harding: I served 28 years Active duty in the Air Force. But looking at my career assignments and accomplishments, I recognize that I would be in the Space Force if I served today. I want to ensure AFA continues to support both Guardians and Airmen. I believe AFA is the right organization to ensure support of both services within the Department of the Air Force and want to ensure that we continue supporting Airmen that, even today, still support the Space mission, as well as Airmen and Guardians supporting air missions. In addition to bringing more Space experience to the Board, I want to bring a Field perspective to the National level. After over a decade of serving in AFA Field positions, I feel like the logical move for me is to run for National Director at Large.

As an independent consultant, my Non-Federal Entity (NFE) activities, primarily AFA, are non-invoiced volunteer hours. I continue to raise my hand to help because I believe in the mission. That has included a number of instances where I've prioritized AFA activities over paid consulting activities. On the positive side, AFA participation provides exposure to senior Air Force and Space Force leaders, and an understanding of strategic issues which make me a better independent consultant.

Gen. Robin Rand, USAF (Ret.), Universal City, Texas, currently sits on AFA's Board of Directors as an appointed National Director. Rand served on Active duty in the United States Air Force for over 40 years. He entered the service in 1974 and graduated from the United States Air Force Academy in 1979 with a Bachelor of Science Degree in Aviation Science. He also has a Master of Science degree in aeronautical science from Embry-Riddle Aeronautical University; and Master of Arts Degree in National Security Policy from the Naval War College.

During his military career, that included six overseas assignments, he had multiple flying assignments; served as an air liaison officer with the U.S. Army; and completed staff tours on the Joint Staff, Office of the Secretary of Defense, Office of the Secretary of the Air Force, and Headquarters Air Force. He was a military command pilot with over 5,100 flying hours, mostly in the F-16, including more than 480 combat hours.

His command duties included the 36th Fighter Squadron at Osan Air Base, Korea; USAF Weapons School at Nellis Air Force Base, Nev.; 8th Fighter Wing at Kunsan Air Base, Korea; 56th Fighter Wing at Luke Air Force Base, Ariz.; 332nd Air Expeditionary Wing at Balad Air Base, Iraq; 12th Air Force and Air Forces Southern at Davis-Monthan Air Force Base, Ariz.; Air Education and Training Command at Randolph Air Force Base, Texas; and his last assignment prior to retiring was Commander, Air Force Global Strike Command and Commander, Air Forces Strategic-Air, U.S. Strategic Command, at Barksdale Air Force Base, La.

After retiring from the Air Force in September 2018, he served as Chief Executive Officer, Gary Sinise Foundation, a veterans and first responders nonprofit support organization, until July 2021. Currently, he is the Arnold Air Society and Silver Wings Chair of the Board of Trustees; Top Aces Corporation proxy board member; Air and Spaces Forces Association board member; United Stated Air Force Academy Falcon Foundation trustee; policy adviser for the Vice President of Research and Partnerships at the University of Oklahoma; Victory Strategies managing director; senior consultant for several for-profit companies; and United States Air Force adjunct contract professor and senior mentor.

NATIONAL DIRECTOR, EAST AREA

The Nominating and Governance Committee submitted one name for National Director, East Area, who will be elected for a three-year term.

Todd Freece, Oviedo, Fla., is currently the AFA Florida State and Region President, and a previous Chapter President. He spent more than 26 years as a USAF officer with positions at all levels across a diverse set of organizations and assignments including Astronautical Engineer, Space Operations Officer and Commander.

A message from Todd Freece: I want to serve in this role because AFA continues to face a great deal of change. I believe the nature of how AFA is organized needs to adapt to the changing social environment and input from the field is essential to the AFA Board of Directors. I believe I can bring credibility of my field experience and face these changes professionally.

By Janelle Stafford

How AFA's STEM Education Programs Can Help Grow Chapters

Courtesy of AFA

The Gerrity Chapter served as the host chapter for the Texoma Region Conference, held in Oklahoma City in July 2022. Tonja Norwood, CareerTech STEM Program Manager (left), Charles Koutahi, Francis Tuttle Technology Center Instructor (center) and Jeff James, Gerrity Chapter President (right) presented to the 50-plus in attendance on how to build a strong STEM Education network using CyberPatriot and StellarXplorers.

Education is one of the three mission pillars of the Air & Space Forces Association. We promote and facilitate education for the next generation of leaders in science, technology, engineering, and math (STEM). AFA's premier STEM education programs, CyberPatriot and StellarXplorers, have inspired thousands of American students all over the world. But for those AFA Chapters who are seeking new members and community partners on a local scale, there are creative ways to leverage AFA's STEM education programs to build chapter engagement while pursuing our mission of Education.

Laurie Orth is the AFA Savannah Chapter President, a classically trained musician, and a music and STEAM educator. For years now, Orth has been introducing space science to eager elementary students by combining STEM and music education. She travels the country presenting her space-themed music curriculum to other elementary music educators, which uses "rocket" recorder musical instruments to expose students to SpaceX Falcon 9 rockets, reusable boosters, launch pads, and space travel. She has also written original songs, like "Elements of Orbit" and "I'm a Little Rocket" (available on her website and YouTube channel) to introduce concepts like orbital mechanics and rocket science math to K-2 students.

As a chapter leader and former CyberPatriot coach, Orth has found that the CyberPatriot and StellarXplorers programs are great opportunities for AFA to connect with STEM educators, middle- and high-school-aged students, as well as Civil Air Patrol and JROTC cadets and instructors.

The Central Oklahoma Gerrity Chapter has also used AFA's STEM education program to build a strong statewide network and further AFA's mission in the process. This includes its strong partnership with Oklahoma CareerTech, which has helped the Gerrity Chapter achieve a statewide reach. It did not take long for the curriculum of the CyberPatriot and StellarXplorers programs to prove their value to CareerTech's State STEM Program Manager, Tonja Norwood.

Not only do CareerTech locations throughout Oklahoma annually provide multiple teams for CyberPatriot and StellarXplorers, but Norwood was instrumental in seeking and obtaining certification for the programs to be taught as approved curriculum in the "Oklahoma's Promise" program. This program helps 8th- through 11th-graders earn tuition scholarships for college or technology centers. Although there are also teams and participants from public schools, scout troops, and churches, the CareerTech structure has helped to produce multiple national finalist teams to both the CyberPatriot and StellarXplorers Finals Competition over the past several years.

Most recently, Oklahoma's Edmond North High School JROTC OK-81 took first place in StellarXplorers IX National Finals in Houston in April. Successes like these can generate national interest in AFA's STEM education programs, which translates into more support and involvement at the local chapter level.

In addition to CareerTech, Oklahoma's AFA STEM Education Coalition also includes community partners such as the Oklahoma Aeronautics Commission, SpacePort Oklahoma, the FAA Mike Monroney Aeronautical Center, AFJROTC, Civil Air Patrol, and Tinker Air Force Base, Okla. The Gerrity Chapter will facilitate STEM City at the 2023 Tinker Air Show this summer, introducing AFA's STEM Education programs to a new generation of students who may be the next generation of pilots, maintainers, and engineers.

Not every community has an active base, Guard, or Reserve unit, but they do all have teachers—and we all need a workforce. That's where AFA can make a difference.

By Col. Phillip S. Meilinger, USAF (Ret.)

Bernard Schriever

The Bomber Pilot Who Rocketed the Air Force into Space.

Bernard Schriever is considered the father of the U.S. space and missile program. He was born in Bremen, Germany, in 1910 but immigrated to Texas with his mother in 1917. He attended Texas A&M and then joined the Army and became a pilot. His first operational tour was in 1933 at March Field, Calif., flying bombers: his commander was Henry H. "Hap" Arnold, the deputy was Carl A. "Tooey" Spaatz, and another pilot on the field was Ira C. Eaker—an impressive crew.

He was only a reserve officer, so seeing no future in the Air Corps, he left in 1937 to fly for the airlines. One year later, however, Arnold coaxed him back into the service with a regular commission. After a tour in the Engineering Division as a test pilot at Wright Field, Ohio, Schriever earned a master's degree in aeronautical engineering at Stanford University. Upon graduation he returned to the cockpit and became a B-17 pilot in the Southwest Pacific, flying 33 combat missions. His abilities as an engineer were, however, increasingly obvious, so Gen. George C. Kenney of the Far East Air Forces made him one of his chief maintenance officers.

He returned to the Pentagon in late 1945 and "Hap" Arnold once again took a hand, making Schriever head of the Scientific Liaison Branch. For the rest of his career, he remained in the engineering sector, but stayed involved in research and development. To Schriever, this was the future, and he would have a major impact on what aircraft and systems would be developed and procured. This often brought him into conflict with operational commanders who had their own thoughts on such matters. He had serious problems with Gen. Curtis E. LeMay at Strategic Air Command, and these conflicts were over things such as the best air refueling method, whether bombers should penetrate at high altitude or low, and indeed, which bombers should be bought at all. LeMay resented the forceful pushback from the young colonel, but Schriever held his ground and won as many arguments as he lost. His intellect, calmness, and logical approach made him very persuasive.

One of the biggest areas of disagreement concerned ballistic missiles. Schriever believed in them; LeMay preferred manned bombers. Schriever had the backing of the Air Staff and would ultimately prevail in this battle. In addition, the thermonuclear breakthrough in the early 1950s meant that warheads could be built that were far more powerful but also a fraction of the size of early atomic devices. Later, LeMay would grudgingly admit that Schriever had been right.

Interestingly, Schriever had no experience with missiles or rockets up to that time. Yet, he was highly intelligent, a quick learner, and was a visionary. He saw the future and realized how important these mechanisms would soon become.

As commander of the Western Development Division as a brigadier general, he was put in charge of the missile program. Schriever was responsible not only for pushing the concept of missiles and rockets, but also ensuring they were built. Timing was important. The Soviets were known to be developing nuclear-tipped ballistic missiles as well, so the race to get there first was a top national priority.

The first Atlas long-range missile squadron was activated in April 1958, and the first Thor intermediate missile unit was stood up four months later. The Minuteman, another Schriever project, would be set in silos four years later. If there ever was a missile gap, it quickly closed.

USAF

Gen. Bernard Schriever, known as the "Father of Air Force Space and Missiles," with some of the systems created under his leadership. His management philosophy and leadership made rapid development possible.

Because these missiles were designed to carry nuclear weapons intercontinentally, it was obvious that accurate targeting would be necessary. This required spy satellites. Schriever took charge of those programs as well, which quickly expanded to include communications, weather, and launch warning satellites. He was responsible for missiles and space.

In July 1961 Schriever was promoted to full general and made commander of Air Force Systems Command (AFSC). This huge organization, headquartered at Andrews Air Force Base in Maryland, was responsible for all development, research, and acquisition of Air Force systems. By 1963, AFSC was employing 27,000 military and 37,000 civilian personnel, and Schriever was responsible for 40 percent of the Air Force budget.

Bernard Schriever was an effective organizer and manager, but also an adept leader who inspired loyalty among his subordinates. He had rules about leadership: never set a rule that was enforceable; always get the staff on your side first; and always show that you care—about your people and their tasks. It was commonsensical and sound advice that obviously worked.

Schriever *retired in 1966 and became an elder statesman within the air and space community for the next 40 years. There are two good biographical studies on Schriever: a book chapter by Karl Mueller in John Andreas Olsen, "Airpower Pioneers" (Naval Institute, 2023), and a full biography by Neil Sheehan, "A Fiery Peace in a Cold War: Bernard Schriever and the Ultimate Weapon" (Random House, 2009).*

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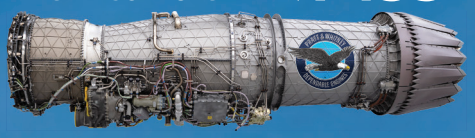

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