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ON THE COVER



The U.S. and Israel combined campaign against Iran targeted air defenses, drone and missile sites, the country's top leaders, the Islamic Revolutionary Guard Corps, and key industrial sites. Fighting opened with successful strikes on over 1,000 targets on Day 1. Illustration by Eric Lee/staff

STAFF

Publisher

Burton M. Field

Editor in Chief

Tobias Naegele

Managing Editor

Chequita Wood

Senior Designer

Dashton Parham

News Editor

Greg Hadley

Pentagon Editor

Chris Gordon

Space Editor

Courtney Albon

Staff Writer

Matthew Cox

Staff Writer

Todd South

Aviation Writer

Stephen Losey

Production

Manager

Eric Chang Lee

Photo Editors

Jud McCrehin

Zaur Eylanbekov

AFA in Action

Editor

Patrick Reardon

Contributors

J. Michael Dahm,

Col. Phillip S.

Meilinger, USAF,

(Ret.)



ADVERTISING:

Christy Sitter

VP of Sales

703.247.5837

csitter@afa.org

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Epic Challenge

Operation Epic Fury got underway Feb. 28 with the largest assembly of U.S. airpower since 2003: Nearly 300 Air Force, Navy, and Marine Corps fighters, 20 bombers, dozens of tankers, and a fleet of electronic warfare, intelligence and surveillance, command and control, and other manned and unmanned aircraft, positioned globally, coordinated exquisitely. It was an Air Force-led demonstration of U.S. military power at its best.

Epic Fury showed what space and cyber integration can do at the operational level, extending control of the vertical dimension and enabling the accurate delivery of penetrating airpower with minimal collateral damage. Iran lost 90 percent of its ability to strike back in the first week alone—and the U.S. quickly achieved air supremacy.

Just a week before the war, readiness was a central focus of conversation at AFA's Warfare Symposium. The juxtaposition between readiness shortfalls and the exceptional performance of Airmen and Guardians over the past year in Operations Midnight Hammer, Absolute Resolve, and Epic Fury can be hard to square.

On the one hand, Air Force leaders have openly acknowledged maintenance backlogs, parts shortages, and unburned flying training hours. On the other, Airmen demonstrate devastatingly effective performance under pressure: Thousands of combat sorties significantly degraded the enemy, and combat losses were minimal—three F-15s lost to friendly fire, a dozen drones to surface-to-air missiles, and one tragic accident.

But facts are facts: The Air Force suffers both materiel and readiness challenges, as clearly acknowledged by its leadership. Years of inadequate investment in spare parts and supplies and rationalized reductions in maintenance and support personnel—coupled with an aging fleet and too few fifth-generation stealth jets—make it nearly impossible to keep up with the demands of multi-theater employment, exercises, and rotational presence.

Airmen prove daily that USAF's old planes can still operate, flying KC-135s that are past 60 years old and F-15Cs over 40. But it's not easy. You wouldn't take a 60-year-old car on a cross-country road trip, but the Air Force flies old planes daily—on long journeys into hostile territory.

No wonder Air Force Chief of Staff Gen. Ken Wilsbach is so focused on fixing as the key to flying and winning. You can't fly if you don't fix, and the repair bill goes up with every mission as airplanes age.

Expending over 11,000 munitions in 16 days of combat as the U.S. has done demonstrates the value of stockpiling weapons during peacetime. But according to the Royal United Services Institute (RUSI), an independent British defense research specialist, the U.S. is now within weeks of exhausting stockpiles of several weapons, including THAAD, Patriot, and JASSM-ER missiles.

Clearly, our Air Force can land a powerful punch. The question is, can it last 10 rounds against a fellow heavyweight?

Size and depth are factors that used to figure into U.S. military strategy. In the 1990s, the national defense strategy featured a built-in force-sizing factor: the ability to fight two "major regional contingencies"—or wars—simultaneously.

By the time President Barack Obama took office, the U.S. had effectively been fighting two wars for six years—one in Iraq and the other in Afghanistan. Seeking to pivot toward Asia and to diminish U.S. presence in the Mid-East, then-Defense Secretary Robert Gates openly questioned the two-war strategy.

This is how our Air Force became the oldest and smallest in its

history. New aircraft programs were slowed or cut short. Budgets for training, parts, and munitions were gutted. Squadrons were reduced from 24 to 16 airplanes, wings from three to two combat squadrons.

Meanwhile, Russia tests U.S. responses in Alaska and China rattles sabers in the South China Sea; both test our military in space and cyberspace.

Focused on one region, today's smaller force is inherently less able to deter misbehavior in others.

China is therefore front of mind. Among the most eye-opening discourses at AFA's Warfare Symposium last month was a startling presentation by retired Navy Cmdr. J. Michael Dahm, a China expert with AFA's Mitchell Institute for Aerospace Studies. Using open-source commercial satellite images, he demonstrated the growing capacity of China's air force and military aircraft industry. Reprinted in part on p. 38 of this issue, his work exposes China's unseen military expansion.

The Pentagon closed its eyes to that very reality nearly two decades ago, with persistent attempts to kill the F-22. It became the world's most capable fighter—ideally suited to the Pacific fight. But USAF bought too few, and the line has long been shut. While America still boasts unparalleled skill and capability as a fighting force—as demonstrated in Epic Fury—it no longer boasts unparalleled scale. China, having already surpassed the U.S. Navy in size, is now within two years of dwarfing U.S. airpower, as well.

In space, China is racing to catch up, and while it hasn't yet matched U.S. launch capabilities, it has or soon will have more launch capacity than our Space Force.

The coming budget debate in Congress can mitigate the imbalance between resources and requirements, but only if properly directed.

Restoring American supremacy in air and space is going to be expensive, and the Air Force and Space Force must be clear and decisive in setting requirements and defining objectives. Too often in the past, Air Force leadership has vacillated and lost the battle for investment. What's needed is clarity and a united focus.

The Air Force needs combat capacity, and that means acquiring many more F-35s, F-15EXs, and B-21s and continued development of the next-generation F-47, to replace its now antiquated forces. But it also means more tankers, which are too often the limiting factor in ongoing operations, and new E-7s to manage the battlespace and guard against tragedies like the March loss of a KC-135 over Iraq that killed six Airmen. It needs enhanced, jam-proof command, control and communications; improved logistics, and greater integration.

Off the radar for many is the value of USAF's MQ-9 fleet. While vulnerable to ground fire—some two dozen have been lost in Iran and Yemen in the recent past—they possess the unique ability to remain on station and provide both sensors and shooters where and when they're needed. They save lives, and we need more, not less.

Finally, enhancing U.S. space capabilities—both in space and on the ground—is fundamental for ensuring long-term national security. America needs to fully operationalize space, consolidate the essential warfighting assets not yet in the Space Force, and make USSF more operationally agile and responsive to ensure access to space and the ability to rapidly replace capability lost in the event of orbital conflict.

Spending \$1.5 trillion for defense is a huge price to pay—but if the alternative is watching the U.S. diminish and China grow, unchecked, to become the world's new dominant superpower, it's worth every penny.

Clearly, our Air Force can land a powerful punch. The question is, can it last 10 rounds against a fellow heavyweight?



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Assurance

I have rarely agreed with Gen. Merrill McPeak. But I do agree with his comments on flying hours in the November/December 2025 issue [p. 2].

Flying hours is the baseline program for all types of aircraft, not just the fighter world that he talks about. It also figures into things that support those all-important hours in the air building pilot proficiency. Things like fuels, life support and maintenance requirements, without which there would be no flying.

Proficiency isn't limited to combat pilots, McPeak's term, it's just as important for the tanker, airlift, and special ops world. Those combat pilots can't do their job without proficient tanker and airlift crews. Halfway to the fight you want to know the crew in the tanker is proficient and will be at the refueling track when scheduled.

It would be next to impossible to get the support people and equipment to forward operating locations quickly without proficient airlift crews. And knowing the rescue teams are fully proficient before climbing in that jet is more than reassuring.

So, I suppose determining which item to fund at what level for Air Force planners can be a tough problem. But the Air Force mission is to fly, fight, and win.

The only way to do that is get aircrews and everyone else connected to flying as proficient as possible. And that means fully fund Air Force flying hour programs.

CMSgt. Bill Leistiko,
USAF (Ret.)
Wichita, Kan.

Plan Ahead

Tobias Naegele wrote an excellent editorial entitled "Deterring Now Costs Less Than Winning Later," [January/February, p. 2]. He notes that the outstanding successes of Operations Midnight Hammer

and Absolute Resolve do not indicate the capacity of the U.S. air forces to "sustain a multiday attack plan."

Despite the superior equipment and tactical excellence of the U.S. air forces, the current lack of "aircraft, weapons reserves, and trained personnel" need to be resolved in the near term. President Donald Trump's \$1.5 trillion budget is a good start to enhance preparedness and readiness.

While I agree with everything stated by Naegele, I believe Congress needs to pass a bill that will authorize the administration to execute any possible operations that would defend American forces, people, facilities, and interests against foreign and domestic belligerents, terrorists and enemies, as required to maintain the peace and security of America.

This would also ensure the administration's domestic political opponents do not try to upset any operations after the fact.

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

Opposing Forces

"Instant Thunder and the Roots of Desert Storm" [January/February, p. 37] ranks among the best articles in the history of Air & Space Forces magazine, and I very much look forward to reading the rest of the series. Contained in the article were revelations that helped fill in a few gaps that until now never did make much sense to me, namely how the man universally credited with the basic Gulf War air plan, Col. John Warden, could have been relegated to D.C. vice be a part of the operations team who implemented the strategy.

Sadly, seeing the background provides another very disappointing reminder that at the heart of so many decisions lie the ugly beasts of human ego and prejudice. Gen. Chuck Horner was certainly a very courageous air warrior in Vietnam, but his

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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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- **Educate** the public on the critical need for unrivaled aerospace power and a technically superior workforce to ensure national security.
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treatment of Warden in that briefing was the epitome of unprofessional abuse of authority. I have since learned additional information about events in that briefing, how Horner continuously interrupted Warden, peppering him with condescending questions until finally, after implying that Warden ignored the threat of an Iraqi armored invasion of Saudi Arabia, Warden stated that Horner's concern was overwrought, and then apologized after saying it.

It seems everything Horner did in that briefing was designed to elicit just that sort of reaction, to justify taking Warden's plan but shunning Warden to the sidelines. Many reasons have been offered for this abuse, but the most repeated reason was Horner's prejudice that anyone out of Washington would ruin the air war in Kuwait and Iraq, same as John McNamara and Lyndon Johnson had done in Vietnam. This blind prejudice was inexcusable given Warden's own vast combat experience in Vietnam.

Warden was not some civilian egghead. He was a seasoned combat aviator just like Horner, from the same war, holding the exact same level of outrage over how the air war in Vietnam was restricted. Vice this being a common tie between the two men, Horner allowed his prejudice and ego to cloud his judgment. Warner's plan was proven effective, but Horner wanted to sideline him, to dismiss him as nothing more than another McNamara style egghead who could write papers but couldn't lead an air war. Warden remained a colonel until he retired, and Horner retired three years after the end of the Gulf War.

It seems evident that both men's careers would have fared better had Horner managed to show proper objectivity and decorum in that briefing back on Aug. 17, 1990.

Maj. Ken Stallings,
USAF (Ret.)
Douglasville, Ga.

Mission Critical

The current issue arrived today and, as is my custom, I started to read. This started well with an excellent article, "Telling USAF's Story is a Critical Mission" [January/February, p. 7] where author John Tirpak takes an unidentified Air Force colonel to task for being too modest during an interview carried by NBC.

I found myself nodding in agreement, until a few pages on I found Gen. Michael Guetlein, director of the Golden Dome project, saying he was being quiet not talking to the press, think tanks, or even

Congress "to preserve this capability to defend the nation from our adversaries."

While mulling this over, another excellent article, "Instant Thunder and the Roots of Desert Storm," reminded me that Gen. Mike Dugan was fired as Air Force Chief of Staff after an interview carried by the LA Times where his advocacy of airpower was thought to be too strong by more senior officials.

Perhaps a future issue can sort this out and relieve my whiplash.

Col. Michael R. Gallagher,
USAF (Ret.)
Eugene, Ore.

John A. Tirpak's "Telling USAF's Story is a Critical Mission" calls attention to what may well be the difference between whether the U.S. wins or loses a future conventional war.

Given limited defense budgets, U.S. political and military leaders must recognize the critical need to devote sufficient resources to ensuring the USAF possesses the most advanced assets in sufficient numbers even if it means the Army suffers from a smaller share of the defense budget. Ensuring the USAF receives sufficient resources requires that USAF leaders be able to explain to our political leaders, as well as the American public, why our airpower will be the key to warfighting success at the lowest possible cost in terms of American lives. Being able to tell why airpower is the key to success requires being able to explain how advances in technology have changed the way conventional wars on land must be fought.

Even as far back as World War II when airpower still depended on an aircrew's unaided vision to find enemy land forces, air power was changing how wars were fought. As German Field Marshal Rommel explained, "Anyone who has to fight, even with the most modern weapons, against an enemy in complete command of the air, fights like a savage against modern European troops, under the same handicaps and with the same chances of success." But now, thanks to truly significant advances in technology, finding enemy land forces no longer depends on an aircrew's unaided vision and thanks to advances in technology it is also now possible to precisely destroy these forces.

It is quite possible that Army leaders howled at Gen. Merrill McPeak's assertion about U.S. airpower's effectiveness in Desert Storm because they knew and feared the way that advances in technology were changing how conventional wars on land needed to be fought posed

a threat to the size of their share of the defense budget.

While Secretary of Defense Robert Gates was right that F-22s were not critical to the counterinsurgency campaigns in Afghanistan and Iraq, the real question that he should have addressed was whether the U.S. should have even chosen to fight these insurgencies that were consuming such a large portion of the defense budget and costing so many American lives.

It appears that both Gates and the Army failed to recognize why the U.S. has a very poor record of success in fighting insurgencies just as they have failed to admit that it is past time to change how the U.S. fights conventional wars on land.

Lt. Col. Price T. Bingham,
USAF (Ret.)
Melbourne, Fla.

Revolution or Evolution

The "Digital Revolution" began in the U.S. over 50 years ago in the early 1970s [See "Beasts in the Machine," January/February, p. 48]. Defense systems requirements and money largely funded the surge in digital systems research and development and brought together America's best and brightest computer hardware and software talent! Subsequent advancements increased our capabilities exponentially.

Our national deterrence strength surged, which greatly contributed to our Cold War victory. Today, adversaries and economic competitors are challenging our national security and continued world technical and economic dominance. It has become politically necessary to communicate our renewed emphasis to increase essential funding for both those long-standing digital initiatives and the continued evolution and domination of new emerging technologies.

The recent adoption of the new collective and "catchy" term "Artificial Intelligence"—"AI"—was deliberately chosen to make this happen! The "Digital Revolution" continues, and those early and subsequent initiatives are now conveniently if not deliberately "morphing" into today's preferred new term AI, the natural advancement, progression and "evolution" of digital data technology systems over the past 50-plus years, and our future.

Perhaps a more appropriate interpretation of the acronym "AI" is "American Ingenuity"

Lt. Col. Stephen Pedone,
USAF (Ret.)
Naples, Fla.



U.S. Air Force Col. Donovan Laskey, vice commander of the 374th Airlift Wing, squeezes out another pullup at Yokota Air Base, Japan. Starting March 1 a new Air Force fitness test began a three-month testing period, with plans to launch official tests in July. In a program intended to build "durable fitness habits," that last a lifetime, Airmen will be tested twice annually. Strength will be measured with different types of pushups; core strength with situps, crunches, or planks; and endurance with either two-mile runs or a high-intensity 20-meter shuttle run. Airmen will have options in each category.

An F-22A Raptor from the 154th Wing, Hawaii Air National Guard, deploys flares during exercise Sentry Aloha 26-1 over the Hawaiian Islands in January. Raptors deployed for Operation Epic Fury and, in a first, operated from an Israeli air base during a Middle East deployment.





A U.S. Air Force B-52H Stratofortress rises to take on fuel from a KC-135 Stratotanker over the Middle East, during Operation Epic Fury. The B-52 and KC-135 were acquired as a system for long-range Cold War bombing scenarios. More than 60 years later, they remain cornerstones in the U.S. Air Force Arsenal. By late March, more than two dozen bombers were supporting Epic Fury from RAF Fairford, U.K., including six B-52s and some 15 B-1 Lancers.

Cost of War



Staff Sgt. Madelyn Keech

"Obviously, it takes money to kill bad guys. ... So, we're going back to Congress and our folks there to ensure that we're properly funded for what's been done, for what we may have to do in the future, ensure that our ammunition is—everything's refilled."

—Defense Secretary **Pete Hegseth** during a Pentagon press briefing March 19 in reference to DOD's request of \$200 billion to pay for the Iran war.

Drone Threats Dwarf IED Threats

"What I can tell you is that the challenge of unmanned systems, the threat posed from unmanned systems, is going to far exceed the threat that we saw from IEDs ... where we made some progress, but never really got in front of it."

—Brig. Gen. **Matt Ross**, head of Joint Interagency Task Force-401, March 5 on the growing threat posed by drones. The U.S. spent \$20 billion trying to defeat IEDs—and the drone challenge is greater.

Space Ghost

"Operations to project power are very successful when you control the high ground. In wars of the past, the high ground was the air. In wars of the future—in wars of today—the high ground is space. You must control space in order to unlock all of those things that we, as a joint force, do better than anyone. What do we do better than anyone? We can project power to the other side of the planet. Sometimes we can show up with an element of surprise and secrecy. ... How do you do that? I'm not telling you because I want to do it again."

—Lt. Gen. **Gregory Gagnon**, commander of Space Force Combat Forces Command, at AFA's Warfare Symposium, Feb. 25.

Closing Kill Chains, MQ-9 Proves Its Value

"It turns out that when you have a platform with the persistence and the precision strike that the MQ-9 brings, it can close the kill chain better than most other platforms out there. ... The MQ-9 can bring multiple intelligence feeds, not to mention its own intelligence-collection capabilities, both with full-motion video, electronic intelligence, and different kinds of pods it can now carry. It can gather real-time intelligence at the very forward edge of the battlespace and find the dynamic targets, which, as we've heard, is CENTCOM's number one priority."

—Retired Brig. Gen. **Houston Cantwell**, a former F-16 Fighting Falcon and MQ-9 Reaper pilot, and now a fellow at the Mitchell Institute, in an interview with Air & Space Forces Magazine.



Christine Minoda/USAF

CONNECT TO SURVIVE

"I'm most worried about ... connectivity for our aircraft. [If] your mobility forces are not connected ... I do not have battlespace awareness. I need to train with and be integrated in the joint scheme of maneuver. ... I need connectivity so that I know what enemy is coming after me [we are then] able to respond to it. And that would then get into the survivability discussion. And it's not just for when we're at risk and at war, it's to train before we get there."

—Air Mobility Command's interim boss Lt. Gen. **Rebecca J. Sonkiss** on Feb. 24, at AFA's 2026 Warfare Symposium just weeks before a KC-135 crash killed six Airmen over Iraq, in part due to lack of connectivity.

AWESOME AIRMEN

"They're surrounded by technology and capabilities, and they'll do multiple aerial refueling efforts ... on the way there and ... on the way home. ... [They] do the things that we've tasked them to do, to put bombs on time, on target with the proper effects. And I know they're feeling a range of emotions, ... fear, of course, but their bigger fear is, 'Dear God, please don't let me screw this up,' the warrior's prayer that we all have in our souls. ... When you go spend just a minute with these incredible young Americans ... you cannot come away from that exchange not being hopeful for America's future. It is simply awesome."

—Gen. **Dan Caine**, Chairman of the Joint Chiefs of Staff, on the bomber crews flying in Operation Epic Fury against Iran.

Can You Hear Me in the Back?

"I am, some could say, loud and annoying when it comes to how we can ensure that we can maintain this fighting force at some of these units that are 100 percent combat veterans to ensure that talent, that experience doesn't walk out of the door during a normal, planned divestment."

—Lt. Gen. **John P. Healy** speaking at AFA's Warfare Symposium Feb. 26 on the brain drain if units don't get new planes when old ones are retired.

FACES OF THE FORCE



Todd Maki

Master Sgt. James Hodge (right), 66th Air Base Group first sergeant, Hanscom AFB, Mass., was awarded the AFSA Pitsenbarger Award for performing two heroic acts. In March, he freed two severely injured drivers trapped after a fiery car accident and provided first aid to both drivers as well as their passengers in Montgomery, Ala. Then, in a visit to an Airman in a hospital, Hodge was in a restroom when he heard noises from a stall and noticed a pool of blood. He forced his way into the stall, disregarding his own safety, and disarmed the man who had a severe, self-inflicted wound, applied a tourniquet, and saved his life. He said, "My parents raised me so that if you see someone needs help, you help them."



Josh Mahler/USAF

Six decades after joining the military, **Dr. Linda Spoonster Schwartz**, a retired flight nurse and Vietnam veteran, continues to advocate for veterans' health benefits. In 1986, she suffered a traumatic brain injury and had to be medically retired, then struggled to get the medical care she needed. Schwartz then began to advocate for veteran access to mental health care, employment opportunities, and housing and financial assistance. She also testified before Congress on roles for women in the military and promoted the creation of the Vietnam Women's Memorial. The Department of Veterans Affairs honored her in 2025 as one of its Women's Veteran Trailblazers.



Staff Sgt. Samuel Becker

Staff Sgt. Joseph Griffith, 45th Logistics Readiness Sq., was named Space Systems Command Air Terminal NCO of the Year in 2025. His team is responsible for moving, inspecting, ensuring, and processing cargo and passengers. From Patrick Space Force Base, Fla., mission partners rely on Griffith for delivery of food, infrastructure, critical supplies, water treatments, and construction materials. "What we're moving directly impacts people's ability to live and operate. These aren't items that can wait months on a ship, they're needed now," he said. His connection with his team is built on trust, approachability, and balance.



Tech. Sgt. Stuart Bright

2nd Lt. Renata Russell was named the USAFA Cadet of the Year from a pool of nearly 5,000 cadets. She served as Cadet Wing chief of staff, the third-highest position, and organized the first Military Service Academy Leadership Summit. In addition, as Basic Training Flight commander, Russell trained 27 recruits and streamlined programs for over 1,000 cadets. She is currently an undergraduate cyber warfare training student at the 33rd Training Sq. at Keesler, Air Force Base, Miss., and credits the excellent example her upperclassmen set for her while she was a freshman. Air Force Chief of Staff Gen. Kenneth Wilsbach presented her with the award on Jan. 30.



CAP

USAF Cadet 1st Class Anirivin Puttur, Mesa, Ariz., was selected as a 2026 Rhodes Scholar. The prestigious scholarship fully covers his post-graduate studies at the University of Oxford, U.K., where he will pursue a master's in engineering science. As a former Civil Air Patrol cadet, Puttur excelled in leadership positions and become cadet captain. "CAP gave me a solid foundation, not just in military customs and courtesies, but in real life leadership," he said. After completing the Soaring Program at the Academy, which trains cadets in glider operations, Puttur became an instructor pilot and performed on the elite Aerobatic Demonstration Team. In the future, he wants to become a test pilot or pursue advanced research in aeronautics.



Abbey Toronjio, Texas A&M University

The U.S. Space Force graduated the first class of its **Captain's Leadership Course** on Feb. 14 at Texas A&M University. Led by Space Training and Readiness Command's Space Delta 13, the four-week course is the first professional military education program designed specifically for captains in the Space Force. The course focuses on leadership, communication, space expertise, and joint integration. One of the 24 students, **Capt. Alexander Arietta**, 328th Weapons Sq. instructor with Space Delta 11, said, "the biggest takeaway for me was the focus on growth ... leadership doesn't have a finish line. You're always learning, adapting, and improving."



Tech. Sgt. Rachel Maxwell

The 563rd Rescue Group responded Feb. 5 to a commercial ship's request for immediate medical assistance to help a 19-year-old man aboard Maran Gas Olympias, a natural gas tanker in the Pacific Ocean, 340 nautical miles off the coast of Mexico. Due to limited pilot availability, Air Force **Lt. Col. Jeff Budis** (center), chief of exercises and air shows for Air Forces Southern, who maintains his rescue pilot qualifications, was also called in. Air Force **Capt. Nate Delaney** (right), 55th Rescue Sq., flew alongside Budis, along with **Staff Sgt. James Delaura** (left), 563rd Operations Support Sq., a special missions aviator. The rescue team flew 17 hours over two days to reach the patient and transport him ashore. The distance over open water required mission planning, multiple helicopter air-to-air refueling events, and coordination among pararescue teams and the tanker crew.

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

EPIC FURY



A U.S. Air Force B-52H Stratofortress taxis for takeoff at an undisclosed location in support of Operation Epic Fury, March 2, 2026. B-52 bombers opened with long-range precision missile strikes and by late March were carrying less costly satellite-guided bombs.

Early Lessons of Epic Fury

USAF, USSF Lead in Biggest Air Campaign Since 2003.

By Greg Hadley and Chris Gordon with Courtney Albon, Matt Cox, Steve Losey, and Todd South

When the U.S. and Israel launched strikes against hundreds of targets in Iran Feb. 28, they kicked off the most intense American air campaign in a generation. The exact end state of Operation Epic Fury remains unknown at this writing. But like other large-scale air campaigns of the past 40 years—Operation Desert Storm vs. Iraq in 1991, Operation Allied Force against Serbia in 1999, and Operation Iraqi Freedom in 2003—the results and lessons will have a profound impact on the future of airpower.

“If we’re just looking at pure airpower and the military competence with which the Air Force works, I think that we’re once again showing the Air Force at its best, with the precision munitions, demonstrating that we can penetrate sophisticated air defense and be successful,” said former Air Force Chief of Staff Gen. John Jumper in an interview with Air & Space Forces Magazine.

“So the lesson that we take forward, then becomes, we’re doing this over large distances—but when you pay attention to the Pacific looking forward, the tyranny of distance is even more egregious,” Jumper said. “I think we will learn a lot from what we’re going through now, and that will project into the future.”

The Air Force’s and Space Force’s performance over 10,000 combat flights as of March 23 included strikes against more than 10,000 Iranian targets, according to U.S. Central Command. Since the start of Epic Fury, the U.S. has employed every type of operational fighter, bomber and aerial tanker in the inventory, along with cargo, ISR, electronic warfare, and battle management aircraft. While CENTCOM did not detail how many aircraft have been deployed to support the operation or how many munitions have been expended, based on open-source flight tracking data, posts

from local aircraft spotters and satellite imagery, Air & Space Forces Magazine estimates that close to 300 Air Force, Navy and Marine Corps fighters and at least 20 bombers took part in operations.

A collective of open-source flight trackers that call themselves the Military Air Tracking Alliance counted about 75 refueling aircraft in the CENTCOM area of operations, and more than 700 mobility flights apparently related to the operation.

THE BUILDUP

Beginning in mid-January and throughout February, Air Force and Navy assets flowed into the region as negotiations over Iran’s nuclear ambitions continued between President Donald Trump’s administration and the Iranian regime ground to a stalemate.

While the U.S. typically keeps a squadron each of F-16s, F-15s, and A-10s in the CENTCOM AOR, along with KC-46 and KC-135 refueling units, additional combat units flowed into the region with stops at Lajes Field in the Azores or RAF Lakenheath in England. F-22s from Joint Base Langley-Eustis, Va., headed to Ovda Air Base in southern Israel, while KC-46 Pegasus and KC-135 Stratotanker aerial refueling aircraft flew to Ben Gurion International Airport, Israel’s main commercial airport, according to flight tracking data and photos posted on social media.

F-35s from the 158th Fighter Wing of the Vermont Air National Guard arrived on the heels of having taken part in Operation Absolute Resolve, the U.S. mission to capture Venezuela’s former president Nicolás Maduro in early January.

And U.S. Air Forces in Europe employed KC-135 tankers from RAF Mildenhall, F-35 and F-15E fighters from Lakenheath, and F-16 Fighting Falcons from Spangdahlem Air Base, Germany, among others.

Extra E-3 Sentry AWACS airborne command and control aircraft and E-11 BACN airborne communications relay aircraft deployed

to the Middle East and to Europe as well.

OPERATIONS

The initial strikes of Epic Fury—and Israel’s parallel operation, Roaring Lion—decapitated the regime and attacked more than 1,000 targets including air defenses, the Islamic Revolutionary Guard Corps, Iran’s ballistic missile enterprise, launchers and manufacturing facilities, and its navy, most of which was sunk.

The timing appeared based on U.S. intelligence that placed Iran’s Supreme Leader, Ayatollah Ali Khamenei in a specific place at a specific time; Israel killed him and a number of others as they met in his compound.

Iran retaliated with missiles and one-way attack drones targeting U.S. military bases in the region and civilian infrastructure belonging to countries allied with the U.S. Among the bases attacked were Al Udeid Air Base, Qatar; Ali Al Salem Air Base in Kuwait; Al Dhafra Air Base in the United Arab Emirates; Muwaffaq Al Salti Air Base in Jordan, and Naval Support Activity Bahrain.

At the start, U.S. forces employed a combination of space and cyber capabilities, along with penetrating aircraft and long-range standoff munitions to destroy Iran’s air defenses and other targets. The Space force efforts began before the first bombs were dropped, Chairman of the Joint Chiefs of Staff Gen. Dan Caine said. Those actions included “layering nonkinetic effects, disrupting and degrading Iran’s ability to see, communicate, and respond.”

Space Force Guardians deployed overseas and in the U.S. are supporting Operation Epic Fury, people familiar with the matter said, including members of Space Forces Central (SPACECENT), the USSF component to CENTCOM.

Guardians are tasked with conducting electronic warfare operations, missile warning and tracking, and providing key position, timing, and navigation to U.S. forces, likely missions that are being conducted in Epic Fury.

“Our Space superiority has been a critical enabler to this fight unseen by the world,” CENTCOM Commander Adm. Brad Cooper said March 11. “The Space Force is doing two things: First, they’re degrading Iranian capability, and second, they’re helping to protect American forces.”

Four stealthy B-2 bombers hit “hardened ballistic missile facilities” on Feb. 28, CENTCOM said, flying to and from the U.S. nonstop. F-35s and F-16s specializing in suppression of enemy air defenses joined them. There was even speculation that the ultra-secret, never-acknowledged RQ-180 drone was used for stealthy intelligence, surveillance, and reconnaissance after a mysterious aircraft appeared over an air base in Greece, though that remains unconfirmed.

The operation took a human toll on U.S. forces. Six Soldiers died March 1 when an Iranian attack drone hit a “tactical operation center” in Kuwait. The next day, three F-15E Strike Eagles were shot down over Kuwait in an apparent friendly fire incident—by a Kuwaiti F/A-18. That incident remains under investigation. All aircrew ejected safely.

In another tragic accident, two KC-135s touched in Iraqi airspace, crashing one and damaging the other, resulting in six Airmen dying in the deadliest USAF accident since 2023.

Within a few days, though, the U.S. had degraded Iran’s air defenses to the point that Caine said the U.S. had “air superiority” in the southern part of the country, and U.S. forces shifted from primarily using standoff weapons such as missiles to more “stand-in” weapons like satellite- and laser-guided bombs.

The United Kingdom, after initially refusing to allow the U.S. to use its bases for strikes, reversed course March 5, after an Iranian drone struck a U.K. base in Cyprus. Knowing that Iran could hit a European base raised concern throughout NATO.

The Cyprus attack set the stage for RAF Fairford in England to become the U.S. bomber force’s main hub of operations. Over the course of 10 days or so, 12 Lancers and six Stratofortresses landed at the base, representing 15 percent of those fleets combined, and an even larger portion of the operational fleet. These bombers, along with fighters, employed bunker-busting bombs like Joint Direct Attack Munitions and GBU-72 Advanced 5K Penetrators.

In briefings and videos, Defense Secretary Pete Hegseth, CENTCOM Commander Adm. Brad Cooper, and Caine said the pace of Iran’s ballistic missile and one-way attack drone launches slowed dramatically after the conflict’s first days. And in social media posts, CENTCOM showed off videos and images of Iranian missile and drone facilities, factories, and more being destroyed in strikes.

Many of those images appear to be feeds from MQ-9 Reaper drones, which played a key role in the operation, flying numerous orbits over Iran while gathering intelligence and taking out targets. Reapers enabled persistent intel over Iran and kept manned U.S. fighters farther from risky airspace, but Iran proved able to counter the unmanned airplanes, shooting down about a dozen MQ-9s in the first few weeks of the conflict, according to people familiar with the operations who asked not to be identified.

Leaders touted the campaign’s overall effectiveness at degrading Iran’s navy, its missile launchers and production facilities, and its nuclear program.

“It’s not just that Iran doesn’t have a functioning air force or that their entire navy is at the bottom of the Persian Gulf or their missile force is shrinking daily,” Hegseth said March 13. “Even more importantly, they also don’t have the ability to build more.”

Iran’s dwindling defenses damaged an Air Force F-35A March 19, wounding the pilot during a combat mission and forcing them to make an emergency landing, people familiar with the matter told Air & Space Forces Magazine. The aircraft was most likely damaged by a surface-to-air missile. Like the F-15E friendly fire incident and the KC-135 crash, U.S. Central Command said it is investigating the incident.

“The key takeaway is not that modern air warfare is risk-free” noted retired Air Force Lt. Gen. David A. Deptula in a commentary. “There is always a risk when you fly into a war zone ... the United States and its allies have fundamentally changed the cost calculus. Where previous generations accepted high attrition as the price of access, today’s force is engineered to minimize losses while maximizing operational effect.”

As Epic Fury stretched past three weeks, Iran tightened its noose on the Strait of Hormuz, a key strategic choke point through which roughly 20 percent of the world’s oil supply passes, pushing up global fuel prices.

THE LESSONS

In 1991, the U.S. and its allies flew more than 116,000 combat air sorties and dropped 88,500 tons of bombs over six weeks—resulting in a lightning fast 100-hour ground campaign. In 2003, the U.S. and allies flew more than 40,000 sorties, including nearly 21,000 strike sorties, over four weeks, and ground forces toppled Saddam Hussein’s regime in less than a month.

Yet Operation Allied Force stands as a different historical example. That 78-day campaign was waged entirely through the air, with U.S. and NATO forces flying 38,004 sorties, 10,484 of which were strike sorties.

Jumper led U.S. Air Forces in Europe at the time and while the political objectives of that campaign were “a bit confusing” at first, but President Bill Clinton eventually narrowed the scope into two core goals: force President Slobodan Milosevic to withdraw from Kosovo and end his attempt to kill or drive out all ethnic Albanians from Kosovo, then a part of Serbia.

U.S. military objectives in Iran have focused on ending its nuclear program, disrupting its missile enterprise, and destroying its navy. Jumper argued that airpower is working.

"We are continuing to demonstrate that which the Air Force does the best, and that is to penetrate and put heavy kinetics on target," he said.

While Desert Storm and Allied Force demonstrated the value of airpower, Jumper said they also helped the Air Force refine how it applies that airpower.

"In Desert Storm, I think we only had about 10 percent or maybe a little bit more than that of precision munitions," Jumper said. "By the time you get to 1999 and Allied Force, I think we're getting upward to 60 or 70 percent. ... So there was an increasing use of precision munitions, and certainly more sophisticated use of UAVs along the way."

More lessons from Iran will emerge over time, but Jumper identified one that already stands out to him.

"I think we're all aware of the fact that our readiness rates have been far below what they've been in previous confrontations, and we're having to pour, I believe from what I know, pretty much everything we have into the current effort," Jumper said. "I think in the previous engagements we were in, if you look at Allied Force, Iraqi Freedom, and Desert Storm, I think we probably maxed out

at about 70 percent of our force employed with enough left back to continue with training at some level and to keep some proficiency. I think that we're probably not quite able to do that [now], especially with our fifth-generation assets during this conflict."

Indeed, while the total number of aircraft used in Epic Fury is lower than the numbers for Desert Storm, Allied Force, and Iraqi Freedom, the overall size of the Air Force fleet has shrunk during that time. Shortages of parts, pilots, and training time are not reflected in what the Air Force pushed forward, but probably are in what had to be held back.

Air Force Chief of Staff Gen. Kenneth S. Wilsbach has made improving readiness the defining theme of his tenure, and continued on that note in a March 6 letter to the entire force, telling Airmen that "we need you ready" and "physical, mental, spiritual, and unit readiness are imperative."

Jumper predicted Wilsbach will maintain that focus. "Are we properly configured to be able to regenerate aircraft sorties, to generate sorties the way we need to, especially with our fifth-generation aircraft?" Jumper asked. "Do we have the parts? Do we have the sustainability to be able to do that?" Those are the key questions Wilsbach must work through. Next, he must "translate that into some sort of a Pacific scenario and ask the same question," Jumper said. "These are lessons that we need to learn," he said. ✪

Remembering 6 Airmen Killed in KC-135 Crash in March

By Matthew Cox

The six crew members killed March 12 in a tragic KC-135 Stratotanker crash in Iraq were the first Airmen to die while supporting Operation Epic Fury against Iran.

The plane was flying without communications and apparently collided with another KC-135, which landed safely, but damaged, in Israel. The Pentagon is investigating the accident.

The six Airmen killed in the crash are:

Klinner, Savino, and Pruitt were assigned to the 6th Air Refueling Wing at MacDill Air Force Base, Fla., but were part of the 99th Refueling Squadron stationed at Sumpter Smith Joint National Guard Base, Ala. Koval, Angst, and Simmons were assigned to the 121st Air Refueling Wing at Rickenbacker Air National Guard Base, Columbus, Ohio.

The crew of the KC-135, call sign ZEUS 95, included husbands, fathers, wives, mothers, sons, daughters, and siblings.

"Simmons entered the Air Force in 2017 and first became a security forces specialist before transitioning to become an in-flight refueling specialist, or boom operator, in 2022. Simmons deployed during Operation Freedom's Sentinel in 2018.

His mother, Cheryl Simmons, reflected on him as a "man of purpose," who knew the risks of service, recalling him saying, "I know I could lose my life, but this is what I want to do. I was born for this."

Koval's wife, Heather Koval, said in a statement that her husband "always put others before himself—until the very end."

Koval enlisted into the Air Force in 2006 and became a machinist with the Indiana National Guard's 122nd Fighter Wing. He was commissioned in 2018 with the 121st Air Refueling Wing, completed pilot training in January 2020, and then went on to complete instructor pilot training in 2024, according to his Air Force bio. He served multiple deployments.

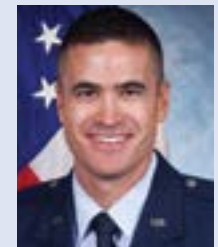
"He grew up dreaming about becoming a pilot and to stand beside him as he made his dreams come true was an honor," his wife wrote in a Facebook post.



Capt. Curtis J. Angst, 30, of Wilmington, Ohio



Maj. John A. Klinner, 33, of Auburn, Ala.



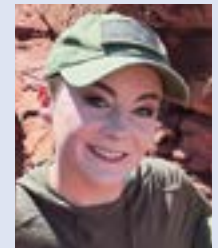
Capt. Seth R. Koval, 38, of Mooresville, Ind.



Capt. Ariana G. Savino, 31, of Covington, Wash.



Tech. Sgt. Tyler H. Simmons, 28, of Columbus, Ohio



Tech. Sgt. Ashley B. Pruitt, 34, of Bardstown, Ky.

Angst initially enlisted in the Ohio Air National Guard in May 6, 2015, then commissioned in 2021 and attended undergraduate pilot training in 2022, followed by the KC-135R Pilot Initial Qualification in 2024.

"He was dedicated to serving his country; he deeply valued the people he had the privilege to serve alongside," a family statement read.

Savino's family described her as "fierce, brave, passionate."

"We take comfort in knowing that Ariana died doing the one thing she loved the most—flying."

Savino, who was chief of current operations for the 99th Air

National Guard Bureau

Refueling Squadron, received her commission in 2017 through the Air Force Reserve Officer Training Corps from Central Washington University, Wash., graduated from training as a Combat Systems Officer in 2020, and then served at Robins Air Force Base, Ga., as a standardization and evaluation officer, assistant flight commander, and flight commander.

She became a KC-135 pilot in 2025.

Klinner served as chief of squadron standardizations and evaluations at the 99th. He entered the Air Force in 2017 through Air Force Reserve Officer Training Corps from Auburn University. After completing pilot training in November 2018, he was assigned to the 92nd Air Refueling Squadron at Fairchild Air

Force Base, Wash. He completed advanced instrument training and instructor pilot training in 2022, followed by evaluator pilot upgrade in 2024 while assigned to the 99th.

Pruitt was an assistant flight chief of operations and a KC-135 boom operator instructor for the 99th, according to the 6th Air Refueling Wing release. She entered the Air Force in May 2017 and completed Career Enlisted Aviator training in February 2018 and then the Initial Boom Operator course in July 2021. Pruitt had multiple deployments.

Survived by her husband Gregory, the father of their two children, he described his wife to the Associated Press: "In a word, radiant," he said. "If there was a light in the room, she was it."

ACC's New Readiness Metric

By Matthew Cox

AURORA, COLO.

When Air Combat Command began developing a simplified aircraft readiness metric two years ago, the aim was to turn voluminous data points into a single number that could enable commands at every echelon to know exactly how many planes they could get off the ground on any given day.

Now, with Gen. Kenneth S. Wilsbach, the former ACC commander, as Air Force Chief of Staff, that system is spreading to other major commands.

Readiness Informed Metrics, or RIM, goes beyond mission capable rates and other averages to focus instead on how much airpower a unit can generate. ACC's endorsement now has Air Mobility Command adopting the concept as well.

Ask any commander to explain readiness measurements and the answer is usually "complex." Mission capable rates are one of the best known metrics: Aircraft are deemed mission capable when they are able to perform at least one of their core missions, such as counterair, electronic warfare, ground attack, and data collection, as in the case of an F-35A Lightning II. In 2024, the mission capable rate for F-35As was 51.5 percent. But rates are averages, and don't speak to what units can do at a specific moment in time. So a squadron deployed for combat operations can show a 90 percent MC rate in theater, when its parts needs are prioritized, and fall well below 50 percent when it returns and is no longer at the front of the line. The Air Force stopped publicly releasing mission capable rates after 2024.

Break rates and fix rates—the percentage of aircraft requiring maintenance before they can be made mission capable, and the time required to make those repairs—are additional measures used by commanders to understand fleet readiness. While this provides more granular detail, these closely guarded numbers are also averages.

RIM boils all that down to a single number that tells if a unit can generate its assigned airpower requirements or, if not, how short of the goal it is. Squadron numbers can be rolled up into wings, wings into Numbered Air Forces, NAFs into a majcom, providing leaders at each level a way to understand their organization's readiness in comparison to their requirements.

RIM also arms higher-level commanders to more easily communicate risk to headquarters, combatant commands, and the Joint Staff and could potentially be used as a transparent means of communicating readiness to Congress in terms of resource needs, said Brig. Gen. Brian S. Laidlaw in one of the most detailed explanations of RIM to date.

"We still track fixed rates; we still track break rates; we still track



Jud McCrehin/Staff

ACC's Director of Operations, Brig. Gen. Brian Laidlaw, explains how RIM, or Readiness Informed Metrics, helps commands clearly state how much airpower they can generate.

how long it takes to get the jets back—all of those numbers are still valid," Laidlaw told Airmen at AFA's 2026 Warfare Symposium in February. "They are foundational to what we do, but we need to pick one [number] that we can rally around, that'll help us tell the story, that will align the enterprise."

RIM settles on "mission capable airplanes—something that we could see, something that we could touch, something that we can communicate across the enterprise and say, 'this is the minimum number of mission capable airplanes that we need,'" Laidlaw added. "That's the key to getting ready, since that became our North Star."

Laidlaw's comments align with Wilsbach's emphasis on readiness—to "fly and fix to fight and win our nation's wars," as he has said since becoming chief in November.

Air Force fighter, bomber, tanker, and other crews have been operating at a high tempo for the past year, beginning with Operation Rough Rider against the Houthis in Yemen, and following through with the Midnight Hammer raid on Iran's nuclear infrastructure last June, Absolute Resolve against Venezuela in January, and since Feb. 28, Operation Epic Fury against Iran.

Compared to the 1980s, today's Air Force operates with smaller squadrons and wings, each with fewer mission capable aircraft than in earlier generations. During the Cold War, each fighter wing had three squadrons of 24 fighters, and mission capable rates averaged 80 percent. When a wing deployed, it sent two squadrons, each fully manned and with 24 mission capable aircraft, leaving

behind the third wing which donated jets and crew to ensure the deployed squadrons were fully ready.

Today, fighter wings have just two squadrons, typically fewer than 24 aircraft each, and mission capable rates are just 60 percent or less. Deployed units send just 12 aircraft forward in a typical deployment, notes John Venable, a senior fellow at the Mitchell Institute for Aerospace Studies and a retired Air Force colonel.

Laidlaw recalled flying as a young officer in F-15C Eagle squadrons with 24 jets in the early 2000s. "When we did our phase one and our phase two exercises, if you didn't generate 24 aircraft during your exercise, someone was going to have to answer to that—that was the bar," Laidlaw said. "Over time, we haven't necessarily been able to do that."

Before implementing RIM, ACC officials analyzed years of readiness data, finding that mission-capable rates slowly degraded over time. Said Laidlaw: "What we saw when we looked at this was, over time, [how] we defined success was largely based on the previous year's performance." The net effect was that "year after year, you see [USAF] setting the goal post lower and lower."

With RIM, however, "we tie [readiness] directly to a mission, directly to a requirement," Laidlaw said. "Everyone can see that it's a whole number. Either I have the number of airplanes that I need to do what I've been tasked to do, or I do not have the number of airplanes I need to do my tasking."

That delivers a level of clarity that isn't there when leaders juggle percentages. Laidlaw would not provide specific RIM data, noting those figures are classified. But he did offer a hypothetical: a wing commander with 200 assigned aircraft and a RIM requirement of 150. "You know that you have to have 150 mission capable aircraft every day," Laidlaw said.

"When you show up at work in the morning and you look out the window and you look across the flight line, and there's only 100 airplanes out there that are mission capable," this much is clear: "We're 50 airplanes short."

Unlike other measures, which may look different depending on where in the wing you sit, RIM is the same for everyone: "It doesn't matter if you're wearing pilot wings, if you're wearing a maintenance badge, if you are from any one of the support agencies that are absolutely critical to building those mission capable rates, you get it immediately. ... It's simplicity."

What RIM also does is clarify the picture for senior commanders, Laidlaw said. ACC Gen. Adrian L. Spain chairs a video teleconference with ACC's wing commanders twice a month, and senior leaders from operations and sustainment also listen in.

"Each wing commander puts up there one slide front and center, prominent, large, and he or she gets to answer the question: Am I meeting my RIM, or am I not meeting my RIM number?" Laidlaw said. "It is clear as day. Everybody gets to see it up and down the chain of command."

Each commander is allowed three "detractors" that are keeping them from meeting the RIM target. When, at a recent meeting, one commander had an "abnormally high depot rate," it was clear the issue is not under his control.

"We've got to modernize to generate readiness for the future," Laidlaw said. "Well, that decision was made, in some cases, months, even years ago, by different commanders."

That's where Spain, as the overall commander, can step in and say, "Here's my risk decision. We're going to prioritize this and this," Laidlaw added. "Everyone up and down the chain sees it ... and now we go and we execute."

Brig. Gen. Derek M. Salmi, director of operations for strategic deterrence and nuclear integration at Air Mobility Command said AMC is now working to incorporate RIM into its processes, while tailoring the concept to the mobility mission.

"We recognize the value of RIM as a very powerful ... view of what the requirement is," Salmi said, adding that the command has "spent a lot of time ensuring that our North Star number is correct, so we are shooting for the right target."

Like ACC, AMC has incorporated RIM into its regular commanders updates.

"Every week, our maintenance professionals pick one of our major bucket systems, and we deep dive into it using the North Star number," Salmi said. The process is "aligning everyone to what the clear target is, what levers we're trying to pull all the way down to the wing level—to include more resources, more personnel, more equipment. So we're aligned and not working at cross-purposes."

While it remains unclear if RIM will be adopted in all the majcoms, under Wilsbach's leadership, the service has begun to use similar concepts as he ramps up the focus on readiness. In early February, Lt. Gen. Kenyon K. Bell, deputy chief of staff for logistics, engineering, and force protection, said at the Mitchell Institute for Aerospace Studies' Airpower Forum that his command is using a new framework, the "Air Craft Readiness Machine (ACRM)," to identify a North Star for tracking the availability of each aircraft in the USAF fleet as a means for prioritizing resources.

PILOT READINESS

RIM and ACRM are all about airplanes. What neither addresses is the people factors that squadron and wing commanders must watch, such as how frequently their people are flying.

Squadron commanders, whose focus is on their unit, rather than across a wing or majcom, find it difficult to separate materiel readiness—how many jets they can put on the ramp—and overall readiness—how many pilots can fly those jets off the ramp for real-life missions.


Air Force Lt. Col. Ryan Stillwell, a former B-1B Lancer squadron commander, said the two are intimately intertwined. Readiness assessments "should be based on how many sorties I need a month to keep my aircrew current and ready," he argued.

To Stillwell, currently an education fellow at Mitchell, if the only goal is to maximize the number of mission capable jets, "you'd barely ever fly," he said. "You would fix them and put them in a hangar, almost like a classic car. But that's in conflict with why we have to fly these airplanes: The whole point of higher MC rates, or in this case, number of MC aircraft, is to be able to fly them."

Another former B-1B squadron commander was similarly skeptical. Units track aircraft maintenance levels and crew flying hours very closely and that classified report "is pushed every month right from the squadron level and is reviewed by the majcom commander," the former officer said. "But I'll be completely frank with you: I personally never saw it drive any change at my level in the unit. ... Something actually has to happen ... to drive change."

Multiple former commanders said the reality is that squadrons will take on missions regardless because squadrons will "always find a way to get it done," one said. You don't go into anything intending to fail or to not give it your best effort, despite the constrained resources. You're still going to find a way to do it."

That said, former commanders acknowledged RIM can help higher-level leaders, including civilians lacking in knowledge about detailed maintenance statistics, get a clearer picture of how many combat assets units can generate.

"This isn't a panacea that will fix all the readiness problems," Stillwell said. But RIM can provide a "more consistent way to report the true state of the force ... that everybody can understand, whether it's within the Air Force, or within a command from the Pentagon, all the way up to Congress." 

CCA's AI Pilots Step into the Spotlight

By Greg Hadley

AURORA, COLO.

Just one year ago, Collaborative Combat Aircraft (CCA) took center stage as then-Chief of Staff Gen. David W. Allvin designated the two competing jet prototypes as the first unmanned fighters in Air Force history: General Atomics' YFQ-42A and Anduril Industries' YFQ-44A.

Twelve months later, it's the autonomy software flying those aircraft that's garnering the attention. Autonomy software, more than hardware, may prove the most valuable and enduring element of the CCA program.

Two autonomy software suites are competing, and both have flown aircraft from General Atomics and Anduril. Indeed, halfway through the Warfare Symposium, Anduril said its YFQ-44A had flown under two systems—one of the competitor's and its own system—in a single flight.

With AI the talk of the nation these days, Air Force CCAs are among the most challenging applications in the works. The "AI pilots" that will fly CCAs must be able to safely operate in tandem with crewed fighters and execute missions dictated by their human fighter pilot "quarterbacks."

Autonomy has been an objective capability since at least 2018, when the Air Force Research Laboratory was running its "Skyborg" experiments, noted Col. Timothy Helfrich, portfolio acquisition executive for fighters and advanced aircraft, during a panel discussion at the symposium.

Skyborg was software independent of the airframe, but even so, in a world where competitions have long been between competing airframes, industry focus turned to the hardware, not the software.

That has largely remained true as General Atomics and Anduril have battled in the media over preeminence while the Air Force awaits the final decision in what it's dubbed CCA Increment 1. But just as the Air Force began the hardware competition with five entries before narrowing to two, it likewise awarded contracts to five companies to work on autonomy software. Officials have thus far declined to name all of them.

In February, however, the Air Force finally lifted the lid on its software efforts. A Feb. 12 release revealed that Collins Aerospace had been paired with General Atomics to test Collins' "Sidekick" autonomy software, while Shield AI and Anduril would test Shield's "Hivemind" system.

Sidekick and Hivemind are artificial intelligence flight control and management software designed to fly any host platform, then learn to execute missions as directed.

"We see it as essentially the pilot in the seat," said Lt. Col. Matthew Jensen, commander of the Air Force's Experimental Operations Unit, which is developing tactics and procedures for operating autonomous systems and integrating them with manned fighters.

Just as pilots can and do switch aircraft, these AI systems can learn to fly different platforms. Shield AI's Ben "Billy Ray" Bradley, a retired Air Force pilot, told Air & Space Forces Magazine that the idea that the CCA program has locked its aircraft builders and software providers together into two competing teams isn't accurate.



ShieldAI

Shield AI's Hivemind autonomy software controls a Collaborative Combat Aircraft in a notional scenario.

"The Air Force has paired us with Anduril for flight, but we also, in simulation, can and do fly on the GA air vehicle," Bradley said. Hivemind has already flown General Atomics' MQ-20 Avenger, the aircraft on which the YFQ-42A was based.

"We are required—because the whole purpose is that we are agnostic to any platform—to be able to fly on both platforms in simulation," Bradley said. "But because you don't have all the time to go do actual flight tests, [the Air Force] partnered us with one platform to go do flight tests. But it's not as if we can't fly on GA's platform."

Hivemind has also flown multiple aircraft from drone-maker Kratos, and even a variant of Airbus' UH-72 Lakota helicopter. It's also scheduled to fly on Northrop Grumman's Talon IQ drone, a variant of Northrop's YFQ-48A Talon Blue CCA contender, though Shield AI declined to say when.

And it is the brains for Shield AI's own developmental CCA, dubbed X-BAT. One of the most eye-catching displays at the symposium was a 45 percent scale model of the X-Bat, which is designed to launch vertically from a trailerable launch rig. The model at the symposium came complete with "Powered by Hivemind" emblazoned on the wing.

The full-sized version Shield intends to fly later this year will be about the size of an F-16, powered by a GE F-100 engine, the same powerplant as the F-16.

Collins Aerospace has not been as public as Shield in detailing Sidekick's flights. But a spokesperson told Air & Space Forces Magazine that Sidekick flew on "three or four" platforms during its classified development.

Sidekick beat Hivemind in the race to fly one of the CCAs first. General Atomics announced Feb. 12 that Sidekick had flown the YFQ-42A earlier in the month, with a human on the ground managing the system.

That put Sidekick perhaps three weeks ahead of Shield AI, since it wasn't until Feb. 25 that Helfrich revealed at the conference that Hivemind had made its first flight with Anduril's YFQ-44A.

Both Sidekick and Hivemind "performed as expected," Helfrich added—which Lt. Col. Matthew Jensen, commander of the Air Force's Experimental Operations Unit (EOU), called a good first step.

“We’re probably treating it much like we would a student pilot: ‘Hey, let’s get through the basics: Can you stay in your space? Can you fly? Can you avoid other aircraft?’” Jensen said. “And then as we build confidence in that, we’ll start to add more and more capability, more and more challenges to it. And the goal is that eventually you have a transferable capability that is as good as your high-end, highly proficient fighter pilot.”

There was one wrinkle on the YFQ-44A flight, Helfrich noted, that demonstrated an important point about these new systems: “What we did was we flew one mission autonomy [from] Shield AI, and then in the same flight, without landing, we went and pivoted to a second mission autonomy, same flight.”

In essence, the drone had switched pilots midflight. The second pilot was Anduril’s “Lattice” AI flight software, and the company reported it executed the same test points as Hivemind.

Anduril was able to execute that midflight switch for the same reason Collins and Shield AI have been able to move their AI pilots between different aircraft: the Autonomy-Government Reference Architecture.

The A-GRA is a “baseline” of autonomy owned by the U.S. government. Every A-GRA-compliant aircraft must have flight autonomy software: “the parts that are highly coupled with your flight and safety-critical software, so just the basic things that make sure that the aircraft flies and it’s safe,” Helfrich said. And all A-GRA-compliant mission autonomy software must be able to connect to the aircraft’s flight autonomy software. When a human operator gives the basic direction for a CCA to take flight, the mission autonomy software is the pilot that makes the flight software takeoff.

A-GRA underpins the Air Force’s CCA program. Without it, the AI pilots would have to be customized to each aircraft, creating an extensive additional layer of programming. By standardizing the interface between the AI pilot and the internal flight system, the AI pilots can become interchangeable.

Bradley said it takes just weeks to direct the AI pilot so it can be integrated with a new platform, and Shield AI is getting faster and faster every time it puts Hivemind onto a new platform.

Decoupling the airframe from the AI pilot means the Air Force will have not one but two decisions to make as it narrows the field of competitors in Increment 1 later this year. With two aircraft and two pilot systems, there are four possible combinations to choose from.

Anduril’s midflight switch of mission autonomy software highlighted another aspect of the Air Force’s CCA program, one also demonstrated by the service’s surprise designation of Northrop’s YFQ-48A in December: As Gen. Dale R. White, the new czar for the Air Force’s top programs, including CCA, said: “If you’re eliminated from a competition, the door never remains closed.”

“You can continue to develop,” White said. “You may not get funded by the government, but at the end, if you think that you’re going to produce a better product, ... you can ... come back and still compete.” Anduril, for example, was never confirmed as being among the five companies competing for the CCA autonomy software contract, but in a blog post, the firm’s Senior Vice President for Engineering Jason Levin hinted that it had taken White’s advice and self-funded development of its AI Lattice pilot.

OPERATIONS DEVELOPMENT

Even before the Air Force narrows to a chosen airframe and AI pilot, the service is standing up an experimental team to develop operational concepts, tactics, and procedures for how CCAs will be used in practice.

Helfrich, in fact, said “the most important thing” his team will do to advance CCAs this year is not the down-select decision, but rather to put CCAs in the hands of Jensen’s Experimental Operations Unit this coming summer.

Putting CCAs under the operational control of Airmen is not testing, but experimenting, figuring out how the autonomy works and orienting the humans to work effectively with the AI pilots.

For the AI itself, this phase will be about finding the limits of the systems and injecting rapid updates to improve them. Helfrich described the starting point as fielding a “minimum viable product,” a common term in the tech world, as the first step to developing improvements.

“We’re setting up the structure of the program to be able to respond and integrate with the operator every single day,” he said. “And so what you get on Day One, that’s just the first step. You’re going to keep getting better and better.”

The A-GRA is key to that. Shield AI and Collins can update their AI pilots without worrying about the safety of the aircraft itself, because the aircraft’s flight software is already settled and the interfaces are standard.

Potential updates will address weaknesses in the AI pilot’s performance, enabling it to improve. Jensen noted that while the A-GRA sets a baseline, the systems are neither the same nor completely equal.

Like people, the AI pilots can improve, and so will the human pilots working with them, predicted Brig. Gen. David C. Epperson, commander of the U.S. Air Force Warfare Center.

“That’s the crux of having the EOU and getting platforms actually in their hands, so that we can start to get sets and reps,” Epperson said. “And what we’re going to see over time as these [vendors] change their mission autonomy [and] as we advance the program, ... we’re going to understand better how those changes matter to both the CCA, [and] the quarterback and how we train up that aircrew as we move forward.”

The entire effort is about building trust between the operators and the AI pilots, just as it is with building a team in a squadron.

“We actually have to deploy this in a way that allows our human brain to stay wrapped around the decision space, so that I can intuitively assess the inputs and the outputs,” said Lt. Gen. Luke C.G. Cropsey, military deputy to the assistant secretary of the Air Force for acquisition, technology, and logistics.

In other words, if the human pilot cannot understand why the AI pilot made the decision it did, Airmen won’t have the necessary confidence to trust the AI operationally. The AI has to react rationally to the human pilot’s instructions.


Jensen said his experimental unit embraces that perspective, and said he intends to have human pilots “debrief” with the autonomy software just like they currently do with each other after each sortie.

“I want to be able to talk to a large language model and explain what the autonomy did at a certain time and certain place, and [ask it to] provide the reasons why it did it,” he said.

Conceptually, that’s reasonable, but it’s hard to debrief a machine. Such a capability is still in development, but Helfrich and Jensen both said it’s critical to start building trust and familiarity now, rather than waiting to have every aspect of the AI pilot refined and trained to perfection first.

Jensen also said he plans to bring CCAs to major exercises “as soon as we can,” which may be unsettling to some.

“[That] will probably surprise some people when they show up to Red Flag and they’re like, ‘Why are the robots flying with us?’” Jensen said. “But you know, we’ll drive it and see what happens.”

The robots are coming, and it’s humans who will teach them—take them to the fight. 

Guard, Reserve Concerned About Fighters



Master Sgt. Megan Shaner

An F-16 Fighting Falcon assigned to the 148th Fighter Wing flies over Duluth, Minn., in March. With the capability to withstand nine times the force of gravity, the F-16 pushes the limits of human and aerodynamic performance.

By Todd South

AURORA, COLO.

Air National Guard and Air Force Reserve leaders warn that the Air Force must modernize their fighter fleets along with the Active force, or they risk losing combat-tested talent and making the reserve forces irrelevant in future operations.

Speaking at a media roundtable during AFA's Warfare Symposium in February, Lt. Gen. John P. Healy, chief of the Air Force Reserve, said more than 80 percent of his aircraft inventory is legacy jets with limited future lifespans.

"I am keenly aware of some of my units that are scheduled to divest without any plan of recapitalization," he said. "I am, some could say, loud and annoying when it comes to [ensuring] we can maintain this fighting force."

"Some of these units are 100 percent combat veterans," he added, and the challenge is "to ensure that talent, that experience doesn't walk out of the door during a normal, planned divestment."

The challenge is similar in the Air National Guard. Maj. Gen. Bryony Terrell, special assistant to the ANG director, said more than half of ANG fighter squadrons have no road map for modernization.

"Thirteen of our 24 fighter squadrons have no advanced



Jack Dempsey

Lt. Gen. John Healy, Commander, Air Force Reserve Command, expresses the need for modernized Guard and Reserve fighter fleets.

recapitalization plan," Terrell said. "Some are programmed to receive legacy aircraft, and some have no identified follow-on platform at all. The Air National Guard must modernize alongside the Air Force—not after it."

F-16 squadrons at Atlantic City, Air National Guard Base, N.J.; Buckley Space Force Base, Colo.; Joint Base San Antonio, Texas; and Morris Air National Guard Base, Ariz., are all at risk of losing aircraft, she said.

In the Reserve, according to Air Force Reserve spokesman Sean Houlihan:

- The 924th Fighter Group at Davis-Monthan Air Force Base, Ariz., deactivated its A-10 mission in September, without a follow-on fighter mission;
- The 926th Fighter Wing at Nellis Air Force Base, Nev., divested its last 10 operational F-16s in late 2025; and
- The 442nd Fighter Wing at Whiteman Air Force Base, Mo., is scheduled to lose its A-10s by the end of 2028.

Guard and Reserve leaders want to replace those legacy aircraft with new F-15EX and F-35 fighters, noting that the Air Force cannot meet mission requirements without their components. Air National Guard fighter units today represent 21 percent of the total Air Force, 30 percent of its combat power, and are responsible for 94 percent of homeland defense missions. They do all that for only 7 percent of the

total Air Force budget, according to a 2025 Guard fact sheet.

Chairman of the Joint Chiefs of Staff Gen. Dan Caine, himself a former Air Guardsman, cited the Guard and Reserve contributions to Operation Epic Fury in his first press conference after the war began.

“The integrated Reserve and National Guard forces have continued to demonstrate the value of America’s Reserve Forces, including the Wisconsin Army National Guard operating in Kuwait and Iraq and Air National Guard units from a variety of states, to include Vermont and Virginia,” he said.

Singling out the Vermont Air National Guard’s 158th Fighter Wing, he noted that its F-35 crews had been mobilized for and flown in support of Operation Absolute Resolve against Venezuela in January, then flew directly to the Middle East in anticipation of Epic Fury. The back-to-back operations highlight how central Guard and Reserve forces are to the overall Air Force.

A LONG-TERM PROBLEM

Heather Penney, director of studies and research at the Mitchell Institute for Aerospace Studies and a former Air National Guard F-16 pilot, said the rapid drawdown of the Cold War force—and under investment in the 2000s—paved the way for today’s aged force.

“We got to this position because of major divestments in the 1990s,” Penney said. “We cut the force structure in half and slowed down our recapitalization programs.”

Instead of acquiring 750 F-22s as originally planned, the Air Force bought only 187. Meanwhile, counterinsurgency campaigns in Afghanistan, Iraq, and Syria increased demand for airpower.

“We had less force structure and had to use it harder because of flying hours and operations in the Middle East,” Penney said. “We prematurely curtailed the lifespan of those aircraft.”

If a typical fighter lifespan is 30 years, the cost to maintain and sustain those aircraft starts rising at about the 15-year mark, she said.

Air National Guard spokesman Maj. Jonathon LaDue acknowledged that the Guard’s Block 30 F-16s have limited structural airframe life remaining and must be retired over the next decade. Newer Block 40, 42, 50, and 52 jets—now averaging 36 years old—are also challenged. Current plans call for keeping them in service until around 2040, when they will approach 50 years of age, LaDue wrote in an email response.

“Fifty-year service life fighters are not an acceptable deterrent in the current and future threat environments,” LaDue wrote.

Transferring legacy aircraft from the Active force to the reserve components doesn’t solve the problem. The fiscal 2026 budget request indicated seven Guard wings will receive post-block F-16s in the coming years, but while that buys time after legacy A-10 Thunderbolt IIs are retired, LaDue said, it “is not a valid Total Force recapitalization or an enduring mission.”

Healy, the Reserve chief, has sought to gain F-15E or EX jets to replace some retiring aircraft in the Reserve. “For every one of these 10 units that are going away, I’m looking at [whether] we can get an F-15 unit behind it—whether it’s a Strike Eagle or an EX,” Healy said. “I’m pressing hard. If we’re divesting of an F-16 unit, I want an F-35 unit behind it.”

Reserve units are more cost effective than Active units, Healy suggested, saying he can run an F-16 unit for \$12

million less than the Active force can annually. Savings are even higher for other platforms, he said: \$24 million less for an F-15EX unit and \$28 million less than an F-15E unit.

But whatever the cost is to operate, the central challenge facing the Air Force is the shrinking size of the fighter force. An August 2025 report to Congress projected adding 300 advanced fighters by 2030, when the total fighter force is projected to be 1,400 fighters, 240 more than in the inventory today. The problem is that the Air Force’s stated requirement is 1,558 manned fighters to “achieve missions with high confidence and low risk.”

The Pentagon is expected to release its 2027 budget request later this spring and could increase planned procurement numbers. F-15EX production is expected to reach 24 jets in fiscal 2027, according to the Air Force’s report, and if additional funding is available, that could rise as high as 36. Air Force F-35 purchases, meanwhile, have yet to top 48 in any given year, and last year were only 24.

Post-block F-16s will continue to be upgraded with active electronically scanned array radars, multifunctional information distribution systems, joint tactical radio systems and integrated viper electronic warfare suites, according to the report, and later-model F-22s will also continue to be upgraded. But the Air Force has no plans to update its oldest Block 20 F-22s, which are no longer seen as combat capable.

FEAR OF LOSING THE FLYING MISSION

All of that has Guard and Reserve leaders worried about future flying missions. Some units are already being converted to other uses. In 2023, Mansfield Lahm Air National Guard Base, Ohio, transitioned from a C-130 flying unit to the 179th Cyberspace Wing. In 2019, the Puerto Rico Air National Guard’s 156th Airlift Wing, previously a C-130 unit, transitioned to a contingency response and communications mission, LaDue wrote.

And last year, the Maryland Air National Guard divested all its A-10s and converted to a cyber wing. Maryland is now the only state in the Union without a flying mission in the Air Guard. That future could hit other states as well.

“Without replacement, 12 Air National Guard fighter squadrons are at risk of losing their airframes and flying missions in the next five years,” according to a 2025 ANG fact sheet.

TALENT EXIT

When a unit loses its flying mission, the change radically alters personnel requirements.

“It truly is a huge shift for everyone involved when flying is not the mission,” said Brig. Gen. Shannon “Sinjin” Smith, commander of the Idaho Air National Guard, offering his personal perspective.

In a 2025 Mitchell report, Penney argued that the Air Force can ill afford the loss of pilots in the reserve components, given that the total Air Force was already short of requirements by nearly 1,850 pilots. Unlike the Active force, which transfers Airmen when their units shut down, members in the Guard are on the hook if they want to move to take a new flying position elsewhere.

She argues that the Guard’s 89 percent average retention rate over the past two decades has been crucial to maintaining core expertise in the service, and that shutting down units now will disproportionately impact experience levels across the Air Force. By contrast, the Active component managed just 40 percent retention between 2017 and 2022.

“Most reserve component pilots have more flying hours, sorties, simulator time, and deployments than pilots in Active component squadrons,” Penney wrote. “Shuttering fighter squadrons in the reserve component will further stress the Active component.”

The fallout from cutting flying missions for the Guard and Reserve hits harder than for the Active component.

The Active duty moves people to the mission if a base closes, or a squadron is deactivated, Smith said. But when you remove the mission from a Guard or Reserve location, “most Guardsmen are not going to move to the new mission.”

Lags in reserve modernization also hurt retention of Active-duty talent in the Guard and Reserve.

“The odds of an F-35 pilot getting out of the Air Force and going to an F-16 unit are pretty low,” Smith said.

The modernization problems hitting the Guard and Reserve are not limited to fighters, Smith said.

“It’s way bigger than fighters,” he said. Tanker units and airlift missions face their own strains. Those have a ripple effect on fighters also.

“You can never have a fighter based where you need it without airlift and refueling,” Smith said.

Another Mitchell study, authored in 2025 by retired Col.

John Venable and Joshua Baker, noted that replacing an Active squadron on deployment takes two Guard or Reserve squadrons. Meanwhile, 10 Guard squadrons will be held back for homeland defense during a major war, leaving the Reserve with only six deployable squadrons, Venable’s report says. But realistically, only four Reserve squadrons could deploy to support combat operations in the Indo-Pacific.

Much will hinge on how successful the Air Force can be in increasing its budget over the next five years. Maximizing fighter production and leveraging cost savings through multiyear contracts would help, but only over time. Meanwhile, the Reserve cannot continue to divest without recapitalization, Healy said: “I think we’re finally at a point where we’re putting a stop to that.”

Terrell said fixing the modernization gap will rely on increasing F-35 and F-15EX purchases.

“If procurement opens up, I think there’s going to be a more open and balanced approach, and that’s what we’re hoping for,” Terrell said. “The key to all of that, though, is to have a plan. And right now, today, we don’t have a Total Force recapitalization plan that includes funding. So that means year-to-year we’re trying to figure out how the Air Force is going to roll out these platforms.”

SPACE

Space Force Aims for Growth

By Courtney Albon

AURORA, Colo.

Space Force leaders for years have been making a case for more funding and personnel to manage its growing slate of missions and responsibilities—from tracking and engaging more advanced missile threats to supporting an ever-expanding demand for launch services—and to operate in an increasingly dangerous threat environment.

After years of describing to lawmakers and Pentagon leaders the nature of that threat and the key role spacepower plays in deterring conflict in the domain and enabling the rest of the joint force, Chief of Space Operations Gen. B. Chance Saltzman told reporters during AFA’s Warfare Symposium that the message appears to finally be taking hold.

“I’m no longer having to defend to any of the key stakeholders that the threat should be taken seriously—we’re over that,” he said Feb. 24. “They recognize that the Space Force has to control the domain if we’re going to be successful in all the other domains for the joint force. And so, we’ve been pretty successful in advocating for an increase in those resources.”

The Space Force won a nearly \$14 billion boost to its budget



Chief of Space Operations Gen. B. Chance Saltzman says the days of having to explain the threats in space are past. “The Space Force has to control the domain ... [for the joint force] to be successful in all the other domains,” he said.

in fiscal 2026, which it will use to advance existing capabilities, like space-based sensing and domain awareness, as well as new missions, such as space-based moving target indication (MTI). Its total fiscal 2026 budget is around \$40 billion—more than double its first budget as an independent service, when the White House requested \$15 billion for fiscal 2021.

If current plans hold, senior leaders say, the fiscal 2027 request will be substantial. President Donald Trump has floated a total 2027 defense budget of \$1.5 trillion, although it's not clear if that would be in a single bill, or come in pieces, as last year when Congress first passed a reconciliation bill known as the Big Beautiful Bill Act. Many observers question whether the Pentagon can digest a spending increase of about 50 percent in a single year.

Space Force leaders aren't focused on the macro level, however, and instead on their specific needs. And they appear confident they will get more funding. "We've had a lot of increases, and we're going to continue to have increases," said Lt. Gen. Doug Schiess, deputy chief of space operations for operations.

KIT, INFRASTRUCTURE, AND PEOPLE

While Schiess and others didn't offer much detail, they did say they expect more funding for new space systems, new infrastructure, and personnel to support priorities like missile defense, space domain awareness, and targeting.

Air Force Secretary Troy Meink, in a tone-setting speech to kick off the conference Feb. 23, said "there's a lot of push" within the Defense Department to add space capabilities. Based on that demand, he added, "there's no question the Space Force is going to grow quite a bit."

Asked which missions the department must prioritize, Meink didn't hesitate: "All of them."

"It's a priority for the Air Force, the Department of War, to bring on more space capability," he said. "Just like air dominance, we need space dominance and all the different sets of programs that are required to allow us to do that."

Saltzman said the Space Force is looking to add capability in areas like testing and training infrastructure and space weapon systems in fiscal 2027. Lt. Gen. Philip Garrant, commander of Space Systems Command (SSC), highlighted space-based sensing and MTI, along with strategic investment in production capacity, as critical challenges.

Right now, Garrant said, industry lacks the capacity the Space Force wants. "Getting the people who are building these things to invest so that we can buy more" is what he and others want to see.

"Production and ramped-up production, and getting our industry partners to invest in facilitation so that we can then turn around and invest in production is a significant priority for us," Garrant told reporters.

The joint commander responsible for fighting in the space domain, Gen. Stephen Whiting of U.S. Space Command, highlighted one area where he'd like to see Space Force investment: new capabilities to deliver on-orbit logistics and refueling. About the pending budget plan, he said he's "heartened by what we're hearing about the dollar figures that are in play for this budget."

People are another major priority. The Space Force plans to increase recruiting and retention efforts, Saltzman said, and he and Chief Master Sergeant of the Space Force John Bentivegna say the service must ultimately double in size to manage the joint force's demand for space capabilities.

That means increasing both military and civilian personnel. Schiess said that while the service was designed to be "lean and agile," it is now time to grow.

"We're bringing new capability into those legacy systems, we're bringing on technology—AI and things like that—to make the crewed force smaller," he said. "We have incredible enlisted Guardians that are taking on more responsibilities.

But it's still a people problem."

The service lost about 14 percent of its civilian workforce when the federal government implemented mandatory cuts and deferred resignation and retirement programs a year ago—initiatives that disproportionately hurt USSF's acquisition enterprise. Garrant, whose Space Systems Command is comprised of mostly civilian experts, said Feb. 25 he now has additional hiring authorities to tackle the challenge. His team is implementing a workforce capitalization strategy to add more acquisition and contracting experts.

Kelly Hammett, director of the Space Rapid Capabilities Office (RCO), indicated he expects his team—and the service more broadly—may be allowed to expand its acquisition cadre. He described the Space Force's fiscal 2027 request as "large" and "pretty positive."

"That's much needed for me," he said. "I've been touting that for the whole entire time I've been here. We've asked every year and all the additional manpower authorizations for the last four years have gone to ops. ... But I think I'm going to get more people, which is good, because they keep giving me more programs."

Additional funding in 2027 would also help the Space RCO transition more emerging technologies developed through the Air Force and Space Force's AFWERX and SpaceWERX innovation arms into new and ongoing programs, he said.

FUNDING EXECUTION

Adding so much funding quickly—including the nearly \$14 billion in last year's reconciliation bill—brings challenges. It takes people and talent to manage new programs and operate new systems.

Decisions become more complicated if it's not clear whether funding levels will be sustained in future years or if the funding is a one-time injection. This was a key issue with funding received through the One Big Beautiful Bill Act last year. According to industry newsletter Inside Defense, the department plans to spend the entirety of that funding in fiscal 2026, a change from earlier plans which called for holding back \$38 billion for 2027.


Meink said that while having a steady, predictable budget is ideal, so is having more money now to increase production and get after other priorities.

"We'll make whatever we get work," he told reporters.

Garrant said executing reconciliation funding has been "a tremendous opportunity." Managing that increase has tightened SSC's relationship with the Air Force and the department's financial management offices as well as other stakeholders in the Office of Management and Budget and Congress to ensure money is spent efficiently.

"The expectation to submit spend plans and demonstrate our ability to effectively and responsively execute those dollars, that's been a really high demand signal from the administration and Congress," he said. "It's really caused us to sharpen our pencils and really have a really good approach."

As the service anticipates even more funding in 2027, Garrant and SSC's Deputy Commander Col. Andrew Menschner, said it will draw from those lessons and will continue to focus on developing its workforce to be able to manage that growth.

"We really do have to focus on the development of our Guardians, both military and civilian, to be able to execute the level of programs that are headed to Space Systems Command," Menschner said. "I think there's some real opportunity there to incorporate not only the lessons learned that we've had, but some of the new AI tools that we're bringing online." 

Gen. John Shaud, Former AFA Boss and SHAPE Commander, Dies at 92



Airman 1st Class Morgan Dailey

Retired Gen. John Shaud, former 92nd Bombardment wing commander, speaks with Col. Jeffrey Marshall, 92nd Air Refueling Wing vice commander at Fairchild Air Force Base, Wash., on a visit to the base in 2022.

By Tobias Naegele

Gen. John Shaud, who led AFA as Executive Director for seven years at the dawn of the 21st century, died at his home in McLean, Va., on March 13 of complications following a stroke. He was 92.

Born in Cleveland to schoolteacher parents in 1933, Shaud grew up as a child of the Great Depression and World War II and spent a year as a pre-med student at Lafayette College in Easton, Pa. But when an Ohio lawmaker offered him a vacant spot at the U.S. Military Academy at West Point, N.Y., he changed his trajectory completely.

“You had to be qualified for pilot training to go to the Air Force out of West Point,” he recalled in a 2014 interview. Setting his heart on that course as a cadet, he earned his pilot wings along with a commission in the Air Force upon graduating in 1956—three years before the first Air Force Academy class would graduate and earn their commissions.

Shaud headed off to pilot training at Reese Air Force Base, Texas, and from there to the 358th Bombardment Squadron

at Davis-Monthan Air Force Base, Ariz., where he flew B-47s.

Over the next 31 years he would fly 35 aircraft types, carrying his signature smile and good humor through combat in Vietnam and to command tours at every level. He flew B-52s with the 17th Bombardment Wing at Wright-Patterson Air Force Base, Ohio, then qualified in the RF-4C before departing for Southeast Asia, serving on the operations staff at the 388th Tactical Fighter Wing at Korat Royal Thai Air Force Base, Thailand, and later flying RF-4Cs at Tan Son Nhut Air Base, South Vietnam, with the 12th Tactical Reconnaissance Squadron.

In between flying tours, Shaud pursued his academic goals, earning a Master of Science degree from The George Washington University in 1967, a doctorate from Ohio State University in 1971, and graduating from the National War College in 1974.

Following staff duty at the Pentagon in Plans and Operations, he took command of the 92nd Bombardment Wing (Heavy) and, later, of the 47th Air Division, both at Fairchild Air Force Base, Wash. He was there when Mount St. Helens erupted in 1980, recalling later that “I knew we could fly from Spokane to Mount St. Helens. What I didn’t know was Mount St. Helens could fly

to us.” As volcanic ash approached the base, he had to cancel an air show and send people home as the sky “became like dusk.”

Following a brief tour as commander of the 57th Air Division, Shaud returned to Air Force headquarters, serving in a series of jobs as deputy director of plans, director of plans in the Office of the Deputy Chief of Staff, Plans and Operations, and as the three-star Deputy Chief of Staff for Personnel from September 1985 to August 1986.

He commanded Air Training Command at Randolph Air Force Base, Texas, from 1986 to 1988, and completed his career as Chief of Staff, Supreme Headquarters Allied Powers Europe in Mons, Belgium, serving there from 1988 to 1991.

Shaud had 5,600 flying hours over his career in the B-47, B-52, RF-4C, T-38 and C-21A, among others, including 251 combat hours in the RF-4C. His military decorations include the Distinguished Service Medal, Legion of Merit with oak leaf cluster, Distinguished Flying Cross, Meritorious Service Medal with oak leaf cluster, Air Medal with five oak leaf clusters, and Air Force Commendation.

Following his retirement from the Air Force, Shaud continued to serve in significant ways. He was Director of the Air Force Aid Society (now the Air & Space Forces Aid Society); was a senior mentor for the Pentagon’s Capstone Program, advising senior officers from all services newly promoted to flag rank; and in 1995 was named Executive Director of the Air Force Association, where he led the staff from 1995 to 2002.

During his AFA tenure, AFA worked with other associations in the Military Coalition to help pass legislation ensuring states could not impose income taxes on military retirees not living within their boundaries, but who served in those states during their careers, and helped secure an act of Congress ensuring an honor guard detail would be made available on request for any veteran’s funeral. He also led AFA’s efforts to celebrate the Air Force’s historic 50th birthday and set in motion efforts that would ultimately lead to the creation of the Air Force Memorial.

Even after retiring from AFA, Shaud continued to work. He was the first director of the Air Force Research Institute, leading it from 2008 to 2013, and for a decade was president of the SHAPE Officers Association.

In 2011, while leading the Air Force Research Institute, Shaud co-authored a prescient report with Adam B. Lowther analyzing “An Air Force Strategic Vision for 2020-2030.” The study described a future focus “likely to continue shifting from Europe to Asia, which will require a greater emphasis on long-range power projection by the Air Force ... that will double, in most cases, the distances the Air Force must fly to reach its primary operating areas.”

The report emphasized the necessity to integrate cyber and space as “particularly important in an Asia-centered

world” and advocated for increasing “global situational awareness” by means of affordable space and cyber capabilities as the “only means of conducting surveillance and reconnaissance of peer competitors.”

AFA staff recalled Shaud fondly. “General Shaud was a true American hero, a combat veteran of Vietnam, a thoughtful operational planner and visionary leader, and a great friend and partner in AFA,” said AFA President and CEO Lt. Gen. Burt Field, who holds the post Shaud held a quarter century ago. “He was a man of service, always an advocate for Airmen and airpower, and devoted to our Association. He will be deeply missed.”

Kenneth Goss, who worked under Shaud as Executive Director and was friends with him both before and after that tenure, recalled asking him which aircraft he liked best. Without hesitation, Shaud answered, “The B-47,” adding, as many an Air Force pilot has done, his eyes brightening above his wide grin, “You know, I am the Air Force’s greatest B-47 pilot.”

Another longtime AFA employee, John Tirpak, who recently retired after three decades at Air & Space Forces Magazine, captured Shaud’s memory in just three brief sentences: “He was always smiling; I never saw him angry. He loved AFA.”

In a 2018 awards ceremony, when he was presented with AFA’s Lifetime Achievement Award, Shaud demonstrated his own dedication and humility with two points. The first was recalling former Chief of Staff Gen. John Jumper describing the kind of young person attracted to Air Force service: “The Airmen, with a capital A, coming on board, were interested in becoming part of something greater than themselves, and wanted to be part of a team,” he said. “This reflected what I was thinking about when I joined the Air Force.”

The second point Shaud made was about what one does after hanging up the uniform. “The idea was to give back to this institution that meant so much to us,” he recalled, and he chose to do that through AFA. “Our mission,” he said, “is service.” ✪



Gen. John Shaud displays his signature smile from the cockpit.



Staff Sgt. Jackson Manske

F-16 pilots Lt. Col. William “Skate” Parks and Maj. Michael “Danger” Blea of the 480th Fighter Squadron dodged surface-to-missiles over Yemen on March 27, 2025. The successful evasions earned them each a Silver Star, the nation’s third-highest decoration for valor in combat.

Life or Death Over Yemen

How two F-16 pilots survived a Houthi SAMbush.

By Chris Gordon

About 15 seconds separated F-16 “Wild Weasel” pilots Lt. Col. William “Skate” Parks and Maj. Michael “Danger” Blea from life or death in the night skies over Yemen.

Along with multiple B-2 Spirit bombers and other aircraft, they were part of a complex mission to strike Houthi ballistic missile production facilities in Yemen on March 27, 2025. After the B-2s dropped their bombs, the F-16s peeled away from their targets, hoping to soon be “feet wet” over the Red Sea.

Suddenly, they were targets. Spotting a flash from the ground below, Parks and Blea realized they were in the crosshairs of an incoming surface-to-air missile, the hunter now becoming the hunted.

The Air Force granted Air & Space Forces Magazine interviews with Parks and Blea to discuss their harrowing mission, for which each earned a Silver Star—just two of fewer than 100 of the valor medals awarded to Airmen since the independent U.S. Air Force was founded in 1947. The Silver Star is the U.S. military’s third-ranking valor award, after the Medal of Honor and service crosses.

Neither the two pilots nor spokespeople for the

“We needed to make a personal, purposeful decision to start shifting closer to the danger area, which is not a fun decision ... definitely one we knew we had to.”

—Lt. Col. William Parks, former commander, 480th Expeditionary Fighter Squadron

Air Force would specify the enemy or country involved, but interviews with multiple current and former U.S. officials confirmed that the actions occurred over Yemen and the Red Sea. The squadron’s actions against the Houthis are also referenced in at least one other award citation.

This account of the mission and Operation Rough Rider, the 52-day air campaign against the Houthis, is based on interviews with current and former U.S. officials with knowledge of the air campaign.

Other awards were also earned that night. A tanker crew—two pilots and a boom operator who ventured into harm’s way—earned Distinguished Flying Crosses for their efforts. Parks was also awarded a Bronze Star for his overall command effort during the squadron’s deployment.

The operation was noteworthy for its unusual command structure. Ahead of Operation Rough Rider, then-commander of U.S. Central Command, Army Gen. Michael “Erik” Kurilla, switched control of air operations against the Houthis from Air Forces Central and the Combined Forces Air Component Commander, or CFACC, to the Joint Special Operations Command at Fort Bragg, N.C., led at the time by then-Vice Adm. Frank “Mitch” Bradley.

It was likely the first time a Middle East air campaign of this magnitude was run by JSOC, a decision that continues to be controversial among some current and retired military officers. While some former special operators say the shift was appropriate because JSOC has decades of experience taking down militant networks, critics of the move say the shift weighted the campaign too much toward hunting Houthi leaders and gave insufficient attention to developing and attacking targets the Houthis use to control the country, including air defense locations. Asked for comment, none of the commands involved, neither U.S. Central Command, Air Forces Central, nor U.S. Special Operations Command, would comment on the decision.

FIRST IN, LAST OUT

Operation Rough Rider, the overall campaign targeting the Houthis, launched on March 15, 2025. The aircraft carrier USS Harry S. Truman was based off the Yemeni coast, its deck brimming with F/A-18 Super Hornet multirole fighters and EA-18 Growler electronic attack jets. Remotely operated MQ-9 Reaper drones joined the operation.

By March 25, half a dozen B-2s were arriving on the Indian Ocean island of Diego Garcia, according to open-source data. Though the Air Force declined to comment on the role of the B-2s, people familiar with the operation say they took part in the March 27 attack.

Parks and Blea, members of the 480th Fighter Squadron

How JSOC Took Over the Air

Operation Rough Rider, the air campaign carried out against the Houthis in the spring of 2025, was President Donald Trump's first foray into military intervention since returning to the White House in January 2025.

It opened with a controversy: Just before the mission began, Vice President J.D. Vance, Defense Secretary Pete Hegseth, and then-National Security Advisor Michael Waltz exchanged views on the operation in a Signal chat that inadvertently included a journalist, the Atlantic's chief editor, Jeffrey Goldberg. The conversation, which Goldberg disclosed some days later, became a major distraction and contributed to Waltz's removal from that post.

But the air operation was remarkable in another way: It was led not by the U.S. Combined Forces Air Component Commander, but rather by the Joint Special Operations Command (JSOC) at Fort Bragg, N.C.

That put then-Vice Adm. Frank "Mitch" Bradley in command of the air campaign, a decision made by Army Gen. Michael "Erik" Kurilla, who commanded U.S. Central Command at the time.

This account of Operation Rough Rider is based on interviews with current and former U.S. officials familiar with air operations and military decision-making in the region, as well as airpower and regional security experts.

TRIGGER BASED

Giving the job to JSOC represented a major departure. For the past 35 years, major air campaigns across the Central Command area of operations have been led by the Combined Forces Air Component Commander, following well-established and long-standing military doctrine.

U.S. military doctrine holds that a Joint Force Air Component Commander (JFACC) is responsible for command and control of U.S. aerial assets in each combatant commander's area of responsibility. Typically, an Air Force general, the JFACC oversees all aircraft in the region, including naval aircraft launched from aircraft carriers in the area, and can sometimes include the launching of Tomahawk land attack cruise missiles. In the Middle East, where the commander also organizes the air assets of partner militaries, the JFACC is dubbed CFACC, for combined forces, which encompasses both joint force and allied partners.



Adm. Frank "Mitch" Bradley



Gen. Michael "Erik" Kurilla

With centralized oversight of the airspace and responsibility for targets, tactics, and strategy, the CFACC is designed and equipped to understand, map, track, and—when called upon—attack and dismantle adversary air defenses, command and control centers, and offensive capabilities.

But for the operation in Yemen, Kurilla favored a different structure, one that drew on his prior experience at JSOC, where he had been assistant commanding general from 2012 to 2014, and his chosen emphasis was trying to kill Houthi leaders and their militant network.

The objective was to strike a body blow against the Houthis and end the threat posed by Yemen's Houthi militia to international shipping traversing the Red Sea and the Gulf of Aden. The route is used for shipping between Europe and Asia, enabling ships to cut through the Red Sea and Suez Canal, rather than going all the way around the African continent—a savings of some 5,000 miles per trip.

Kurilla's first step toward assigning the mission to JSOC came in late December 2024, near the end of the Biden administration, when the CENTCOM boss shifted control of the MQ-9 Reapers operating over Yemen to JSOC.

Kurilla wanted the MQ-9s to play a greater role in targeting Houthi leaders, and thought JSOC might be able to take steps to preclude the Houthis from shooting them down.

The next step came with Operation Poseidon Archer. As then-President Joe Biden sought to degrade Houthi capabilities in December 2024 and January 2025, JSOC gained more authority over air operations over Yemen as they increased.

When Operation Rough Rider began in March 2025, the arrangement was continued. Once again, JSOC, under the command of Bradley, a Navy SEAL, was overseeing air operations over Yemen.

JSOC and its parent combatant command, U.S. Special Operations Command, are functional commands, possessing unique capabilities and expertise rather than focusing on a particular region of the world.

Thus, just months after the Yemen campaign was over, Bradley and JSOC also oversaw another unusual U.S. military operation: targeted strikes against alleged drug smugglers in the Caribbean Sea. Bradley was in charge of the much-scrutinized first strike on a drug smuggling boat on Sept. 2, 2025, in which two survivors clinging to the wreckage of their vessel were killed after the initial strike. He now commands U.S. Special Operations Command, which oversees JSOC, as a four-star admiral.



based at Spangdahlem Air Base, Germany, deployed to the Middle East in October 2024 and the unit remained there until July 2025. The Spangdahlem fighters are “Wild Weasels,” trained and equipped to suppress enemy air defenses, a mission known as SEAD that dates back to the Vietnam War.

The 480th F-16s carry Active Electronically Scanned Array radars and the laser-guided rocket system known as APKWS (Advanced Precision Kill Weapon System) to counter incoming drones. Their HARM Targeting System, or HTS pods, help them pick out and target



The 480th Fighter Squadron embraces the traditional Wild Weasel morale patch, which dates back decades.

enemy SAM sites.

Reflecting their roles of SEAD and protecting other aircraft, the Wild Weasel motto is “First In, Last Out,” which is repeated as a call-and-response among the unit. Their morale patches depict another catchphrase, using only its five-letter acronym—YGBSM—below an image of a confused weasel. The March 27 mission was Parks’ first night operation of the campaign. As the mission commander that night, he had begun his briefings two days prior, pressing his teammates to shift their mindset from operating as multirole fighter-bombers in Operation

Campaign Against Yemen

Neither U.S. Central Command nor U.S. Special Operations Command would comment on the command arrangements for Operation Rough Rider.

Attempts to reach Kurilla for comment were unsuccessful. A CENTCOM spokesperson declined to comment on JSOC’s role in Operation Rough Rider. The spokesperson reiterated CENTCOM remained in overall command of the mission.

GRADUALLY AND THEN SUDDENLY

JSOC has played a secretive but prominent role in U.S. counter-terrorism operations since the early 2000s. It has a track record in disrupting terrorist networks and killing terrorist leaders in Afghanistan, Iraq, Syria, and elsewhere. Its expertise in targeted operations in which the U.S. had clear air superiority stands in stark contrast to running a large air campaign involving both manned and unmanned aircraft against a foe equipped with innovative air defenses.

When Operation Rough Rider began in March 2025, JSOC led CENTCOM’s air campaign, even as the Air Force and the Combined Air Operations Center (CAOC) retained responsibility for the safety of USAF aircrews both in that operation and throughout the region.

Under this arrangement, JSOC was what the military calls the “supported command,” while Air Forces Central was in support. JSOC determined which targets to strike, the rough time attacks would occur, which weapons to employ, and often which aircraft would employ the munitions.

The CFACC retained authority on how to mitigate the risk to piloted aircraft. Thus, they would determine which planes should be involved in escorting the strike packages.

Sometimes the precise time on target for specific missions was discussed between JSOC and the CFACC, but generally JSOC determined this as well.

A NEW THREAT

The Houthis proved to be a challenging adversary, operating a vexing air defense system unfamiliar to U.S. operators. The full extent of the Houthis’ ad hoc integrated air defense has still not been fully understood by the U.S. military, current and former U.S. officials acknowledged. What was clear at the time, however, was that those defenses went beyond radar-guided surface-to-air missiles and employed passive sensors to detect and target U.S. aircraft.

One system that the Houthis employed was an Iranian-provided surface-to-air missile that homes in on the heat of its target, typically drones and helicopters. It is entirely passive and has no radar signature, can loiter in the skies and uses a proximity fuse so a direct hit is not

necessary. Iran has also used this system against MQ-9s during Operation Epic Fury.

“The Houthis are an interesting adversary,” a senior U.S. defense official told Air & Space Forces Magazine. “They’ve been fighting for a long time, fighting the Saudis, fighting the Emiratis. In a lot of aspects, they’re seasoned and they’re innovative.”

Over 52 days, JSOC employed U.S. Navy and Air Force fighters and B-2 Spirit bombers and Reapers against the Houthis, according to the U.S. military.

By the time the Trump administration ended the operation on May 6 and declared it a success, it was clear that the Houthis had also shown themselves to be effective and resilient defenders—in short, better than expected.

“They just thumbed their nose at us some more,” said Michael Knights, who studies the Houthis and other Iranian-aligned militias as the head of research at Horizon Engage, a strategic consultancy based in New York.

The Houthis had shot down at least half a dozen MQ-9s, building on their record over the previous two years, when they had downed at least six more.

Overflight restrictions imposed by some countries in the region, particularly in the initial phases of the campaign, forced some U.S. aircraft to fly a circuitous route before they could engage against the Houthis, in patterns that were sometimes predictable. Predictability increases risks, and history is rife with similar problems in past air campaigns, from World War II through Vietnam and more recently in Operations Deny Flight and Allied Force, when U.S. F-16s and an F-117 were shot down during the Bosnian and Kosovo wars.

USAF operators typically try to vary flight operations to avoid predictability. But some former and current officials say JSOC did not always give that perspective sufficient emphasis.

The Pentagon said the campaign against the Houthis significantly degraded the group’s capabilities, striking more than 1,000 targets and killing many Houthi leaders and operators.

But the U.S. never eliminated the top Houthi leadership and the deal to end the operation, in which the Houthis agreed to no longer target commercial shipping, did not extend to ending strikes on Israel. Indeed, the day before the cease-fire was announced, the Houthis attacked Israel’s Tel Aviv airport—which was not covered by the deal.

“It was not comfortable for the Houthis,” said Knights, but they held on.

“They took the best the U.S. had to throw at them, and they survived.”



Lt. Col. William "Skate" Parks, left, received his Silver Star from Air Force Chief of Staff Gen. Ken Wilsbach in November; Maj. Michael "Danger" Blea, who like Parks, dodged surface-to-air missiles over Yemen in March 2025, received his Silver Star for that mission from US Air Forces In Europe commander Lt. Gen. Jason Hinds in March 2026. The Silver Star is the nation's third-highest decoration for valor in combat.



Inherent Resolve against ISIS in Syria to instead focus on the SEAD mission in Yemen.

The U.S. military declined to identify the F-16s' home base in the Middle East, but airspace restrictions sent them over the Red Sea as they penetrated and exited Yemeni airspace.

On the night of March 27, they followed that route along with two other F-16s from their squadron. The mission was SEAD, intended to damage or destroy Houthi air defenses while also distracting the Houthis from the other part of the attack mission.

"The Wild Weasel mantra is to have the adversaries look at us and pay attention to us," Parks said. "That doesn't necessarily mean that we're desiring, wanting to, or even expecting to start getting fully shot at."

No sooner had the mission begun than it was clear the Houthis knew an operation was underway. Initially, the ground below began to sparkle like fireworks, but which were in fact a sign that they had been observed and, as some officials later assessed, that Houthi air defenders were signaling each other.

"They know we're here. We need them paying attention to us," Parks said. "We need to make a personal, purposeful decision to start shifting closer to the danger area, which is not a fun decision, but it was definitely one that we knew we had to do."

U.S. forces never fully grasped the full extent of the Houthi's ad hoc integrated air defense, say current and former U.S. officials. Later analysis indicates the Houthis combined radar-guided SAMs with visual observers and electro-optical and infrared sensors (EO/IR), passive means that U.S. sensors didn't pick up.

"We tried to understand what exactly was happening," a senior U.S. defense official told Air & Space Forces Magazine. "We made a concerted effort to understand all the pieces of information that they were obtaining to build their picture. And I don't think we ever had 100 percent clarity on that."

Parks and Blea had reached their objective near the Yemeni capital of Sanaa and each fired one anti-radiation AGM-88

HARM missile. The two HARMs were among nearly 50 fired within the campaign during almost two dozen engagements against surface-to-air missile sites and anti-aircraft artillery (AAA).

The Yemen campaign was the first by the U.S. military since 2011's Operation Odyssey Dawn against Libya to employ HARMs.

The missiles found their targets and the Houthi air defenses appeared silenced. But as the U.S. jets began to exit the country, the Houthis were playing possum, waiting for their chance to respond.

"The main strike goes through, and it happens in an instant, and then it was over, and everything was quiet," Parks said. The bombers' mission was successful and the strike packages began their exit. "There's no AAA, there's no nothing," Parks recalled. "The systems we've seen on air had turned off air, and now we're getting ready to go home."

But the aircraft were being tracked as they flew toward the Red Sea and the Houthis didn't turn on their radars until they had a SAM ready to launch at the American jets, a so-called SAMbush.

"It was an ambush because we did not get much indication ahead of time," Parks said. "We only had about 15 to 20 seconds of indications ahead of time. ... It's fair to say I do think they were using a lot of visual observation and EO/IR."

"Another reason that you might contextualize this as an ambush was the fact that this had happened after the strike occurred," he added. "The actual missiles started flying post-strike mission."

Parks had few options, so he headed straight for the missile—a method of last resort—as he tried to confuse the munition and cause it to overshoot.

"You see this bright white light, and you see the rocket with the first missile launch, and it's essentially directly underneath our position," Parks said. "We have enough time to make essentially a hard turn into this missile. It goes past right underneath my left wing, close enough I can hear the rumble, and that's something that's stuck with me to this day."

Parks had survived, but now Blea's life hung in the balance. "I watched the launch, and then I can see the missile the entire time," Blea said. "Then I start my threat reacting, according to how we train. And then I vividly remember thinking, this is my only chance. I have one chance to make this miss."

It did—barely. "It was flying within feet of the front of my nose," Blea said. Thirty feet, he estimated later, a distance that is less than the length of his aircraft—an F-16 is just under 50 feet long.

For the next quarter hour, the pilots would pull defensive maneuvers and dispense countermeasures.

"It is 15 minutes of that for a total of six missiles being shot at the two of us, and just working as a team to make sure that we are always making moves in the right direction to get safe, while also making sure that we are defending from these missiles," Blea said.

Because F-16s burn more fuel pulling Gs, the pilots now faced another challenge: Running out of gas would almost certainly lead to ejecting over hostile territory or into the Red Sea, neither one an appealing option.

In the event an F-16 engine is starved of fuel and flames out, pilots can keep their jets airborne for a few minutes using the aircraft's emergency power unit, fueled by hydrazine. The fly-by-wire F-16 becomes uncontrollable, however, once it loses its fly-by-wire controls.

"I did not want to punch out because I ran out of gas," Parks said. "We obviously were utilizing a much higher fuel rate. We're on afterburner for some of these higher G maneuvers. And so, considering we did that over 10 minutes, and we were leaving already with our planned recovery fuel, it almost immediately put us well behind on fuel."

Recognizing the risk, the Air Forces Central's Combined Air Operations Center, which was responsible for flight safety, swung into action.

A tanker crew was dispatched closer to enemy territory

and into harm's way. Blea headed for fuel first.

"I will forever owe a debt of gratitude to the tanker crews that night, because without question, without knowing the full details of what was going on, they immediately were just willing to support," Blea said.

Parks' Bronze Star citation notes the accomplishments of the 480th Expeditionary Fighter Squadron. Parks was the unit's commander, leading 56 Airmen and 12 F-16s. The squadron was one of the first to use APKWS as drone-killing air-to-air weapons and helped develop the "innovative tactics" employed to defeat enemy drones. It also used older AIM-9M Sidewinders, claiming the first air-to-air kill by an AIM-9M in over 30 years. The unit scored 108 total aerial kills of drones and cruise missiles during the deployment. Parks is now assigned to a role at the Pentagon while Blea remains with the 480th.

"The 480th executed a high-risk campaign against Houthi forces, employing over 134 bombs and 47 AGM-88 missiles while flying 9,000 hours and 1.4 thousand sorties under grave risk from 22 surface-to-air missile and air defense artillery engagements," the award citation states.

But the most rewarding response came when the pilots finally landed back at base and were greeted by the dozens of maintainers and other crew who kept the aircraft flying.

"I turn the corner into a parking spot, and I see probably in the range of 30 people standing up front from there," Blea said. "That's kind of the first time you allow your mind to kind of go back to that moment."

As Blea was unstrapping from his ejection seat, one of his close friends climbed up the ladder, exclaiming, "Dude, you're home!"

Then Parks approached Blea.

"Nothing needs to be said," Blea said, recalling the moment. "We look at each other, and we're like, 'Wow!' One, what a night. And two, we're both here. We did what we were meant to do. ... We both made it." ★



U.S. Air Force Maj. Michael Blea, in the cockpit of his F-16. Recalling his introduction to hostile enemy fire, he described the incoming missile "flying within feet of the front of my nose."



U.S. troops exit a C-5 Galaxy during Operation Desert Shield. The Air Force flew well over 35,000 airlift sorties in the first two months of Desert Shield, carrying more than 130,000 passengers and 120,000 short tons of cargo.

35 YEARS SINCE DESERT SHIELD

INTO THE DESERT

Mobilizing for Desert Shield

The biggest airlift campaign in history wasn't always pretty.
But it worked.

By Tobias Naegele

It was like picking up the population of a mid-size American city—Atlanta, Kansas City, Sacramento—and moving it halfway around the world. More than a half million people, vehicles, weapons, equipment, most of it moving by air from bases and stations across the United States, Europe and the Far East, to the deserts of the Arabian Peninsula.

It was a heavy lift—and a rush order.

Saddam Hussein's Iraqi Army flooded south into Kuwait Aug. 2, 1990, crossing the border to seize Kuwait's oil fields and then forging forward to take the entire country in a single, bold stroke. Iraq's battle-tested force had endured years of war with Iran, was armed with Soviet tanks and ground weapons, and backed by Soviet- and French-built fighter air-

Part 2 in a series about Operations Desert Shield and Desert Storm.

craft. It was the fourth-largest army in the world, and there was nothing but miles of open desert between it and the capitals of Saudi Arabia, Bahrain, the United Arab Emirates, and Qatar. If Saddam seized those countries, Iraq would control 40 percent of the world's oil supply.

Stopping him was instantly an international priority. As President George H.W. Bush and his national security team strategized in Washington, D.C., Army Gen. Norman Schwarzkopf, commander of U.S. Central Command, had the job of orchestrating a defense of America's Arab allies. But 1990's version of CENTCOM was hardly the organization it is today. The U.S. had no military bases in the Middle East back then and CENTCOM's Tampa, Fla., headquarters was best known as a sleepy command, an attractive destination for end-of-career officers planning their retirements.

U.S. Air Force via National Archives

On Aug. 3, a day after the invasion, Schwarzkopf outlined a preliminary force package to stop Saddam. Schwarzkopf wanted one Army corps, one Marine division, three aircraft carrier battle groups, the Air Force's 1st Tactical Fighter Wing, and 12 follow-on fighter squadrons as soon as he could get them into the region.

There was only one problem: According to the Air Force's Gulf War Air Power Survey, developed after the war to capture its history, airlifting all that into theater "exceeded Military Airlift Command's (MACs) capacity by a factor of six to seven."

Logistics were now at the top of everyone's agenda.



Gen. Hansford T. Johnson, commander of U.S. Transportation Command, stood up a Crisis Action Team on Aug. 4 to launch what would become one of the biggest airlift operations in the history of the world. Military flights began shuttling equipment to the desert on Aug. 7, followed by commercial flights Aug. 8.

Airlift requirements grew by the day. "Nobody wanted to travel light," the Airpower Survey's authors observed.

CENTCOM used a planning system called JOPEs—Joint Operation Planning and Execution System—to track and understand transport requirements. But JOPEs was overwhelmed by the sheer scale of Operation Desert Shield and the speed and frequency with which its users made changes. Commanders pulled out plans built years before by officers who had long since retired, and—predictably—viewed those as a mere starting point.

Between Aug. 11 and Aug. 13 alone, requirements for the first seven units to deploy rose 60 percent, according to the Gulf War Air Power Survey. Airlift requirements continued to exceed capacity for the next 40 days.

Finding where to put incoming military units was no less challenging. Host countries weren't eager to have the public

know U.S. operators were in residence on their bases. As Michael Gordon reported in the New York Times that August, journalists accredited by the U.S. military were told they could not name the bases where U.S. forces were establishing a presence in Saudi Arabia—even if it would be relatively obvious to anyone with a map. In Bahrain, he wrote, a government official held a press conference to endorse U.S. support—but refused to be quoted by name.

Conditions for troops were often primitive, Gordon wrote, describing Soldiers at what others confirmed to be Saudi Arabia's King Abdulaziz Air Base in Dhahran, resting under the shelter of a makeshift tent—boards laid across the space between two tanks.

Air Force units accustomed to routine deployment rotations where bases were ready to host them found the desert comparatively inhospitable. Col. Jerry Nelson was the vice commander of USAF's 401st Fighter Wing based at Torrejón Air Base, in Spain, and became the provisional wing commander when the wing's 614th Fighter Squadron deployed.

Departing Spain days ahead to set things up for the squadron, the wing staff got held over in Germany for 24 hours before they could fly into their deployment destination: Doha, Qatar.

Then-Lt. Col. Bruce "Orville" Wright, the squadron commander for the 614th, said most of his Airmen needed a map to figure out where they were going, never having heard of Qatar. Unsure what they might face en route, the squadron's 27 jets took on AIM-9 air-to-air missiles as they prepared to take off before dawn, radios off, their ground crews already loaded aboard two KC-10 tankers that would refuel them along the route.

"We thought we might have to fight our way in," recalled Wright, who retired as a three-star.

Though the unit deployed regularly, rotating through Turkey for their Cold War nuclear mission and falling in on working and living spaces as well as equipment, the air base in Qatar



Staff Sgt. Lee Corkran

A U.S. Air Force F-16C Fighting Falcon fighter from the 401st Tactical Fighter Wing refuels from an Air Force KC-135 Stratotanker as another F-16 waits in formation during Operation Desert Storm.

had none of those friendly features.

Wright described the scene: “It’s 110 degrees on the ramp and the KC-10 guys, young captains, just kept their airplanes sitting there with the APUs [auxiliary power units] running so the crew chiefs could get on and off and take care of the airplanes. The KC-10s were our hangar because there was no prep at all.”

Nelson, who had arrived first, had no time to prepare for the incoming fighters, and even unloading gear proved to be difficult. “Usually when we would deploy, you’d deploy on a C-5 or a C-141, and you lower the back door and you drive off whatever your equipment is,” he said. “But you can’t do that on a KC 10, and we didn’t have ladders for the people to go down, we didn’t have forklifts.”

Passengers exited through the flight crew’s stairs and though the Qataris offered a forklift to unload pallets aboard the tankers, the tines on the lift were too short for the job, and pallets had to be dismantled to get the gear out. “It took us 12 hours to unload,” Nelson said.

The Airmen were comfortably billeted at a local hotel, but the comfortable setup was too good to last.

“Gen. Charles “Chuck” Horner called me and said, ‘You’ve got to get out of that hotel, because General Schwarzkopf says you’re sitting ducks in there.’ I’d been thinking the same thing, but where do we go? We didn’t have tents. But we left and then ... we had guys sleeping in the back of pickup trucks, in the corner of the hangar, all of that kind of stuff,” said Nelson.

A day or so later the Qataris provided an unused barracks, which had rats—but no latrines or amenities. Troops ate meals ready to eat out of the bag until field kitchens and tents started to arrive, Nelson said, “nice ones, air-conditioned, and the civil engineers set them up.”



Meanwhile, Military Airlift Command, Military Sealift Command, and U.S. Transportation Command worked on

getting the Army and Marines into theater and MAC’s air wings swung into action to meet demand. At MAC headquarters at Scott Air Force Base, Ill., Maj. Gen. Vernon Kondra, deputy chief of staff for plans and programs, jotted down his own “List of Concerns” and limiting factors and delivered them to his colleague, the deputy chief for operations. Kondra had a lot of concerns, and evidently, so did MAC boss General Johnson, who dispatched his ops boss and reassigned Kondra that same day.

“At 4 o’clock the next morning, I went to my new office,” Kondra recalled in an oral history recorded 14 months later, in October 1991. “I found the list I had prepared the day before, waiting for me on my desk.”

Kondra took over an operation in progress. In August alone, MAC would move more than 70,000 passengers on 1,500 C-141 and C-5 missions. The C-141 Starlifters, which went into active service in 1964 and had undergone extensive depot work to rebuild their wing boxes and extend their design life were tired airplanes by this point. The C-5 Galaxy fleet, which had suffered similar issues, had been re-winged in the 1980s and by 1990 were flying without restrictions.

But maintenance was of great concern to Kondra.

“My biggest problem, when I took over, was that I didn’t know what I wasn’t doing,” he said. “I knew how many missions were flying, but I didn’t know how many good airplanes were sitting on the ground that could be flying. So I went to the maintenance guy, Maj. Gen. John Nowak, the MAC/LG ... and said, ‘John, I’m shutting the door, because this is heresy. Maintenance is going to drive this operation. You’re going to tell me how many in-commission airplanes you’ve got, and I’m going to schedule missions against them. As a matter of fact, I’m going to overschedule them. I’m going to make sure that every day there will be more missions scheduled than you have airplanes ... so that there will not be a good airplane sitting on the ground that isn’t flying.”

The difficulty was defining “in commission.” Kondra could



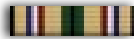
On file

C-5A Galaxy transports flew 2,000 sorties in August 1990 alone, hauling huge volumes of equipment and weapons half-way around the world. Some 84 percent of flights transited through Europe, more than half of those through Torrejón, Spain.



An air-to-air view of a multinational group of fighter jets, including, left to right, a Qatari F-1 Mirage, a French F-1C Mirage, a U.S. Air Force F-16C Fighting Falcon from the 401st Tactical Fighter Wing, a Canadian CF/A-18A Hornet, and a Qatari Alpha Jet, during Operation Desert Shield. The Mirages were helpful in training, as Iraq flew those planes as well.

track, station by station, airplane status and found he could push maintenance to release aircraft that still needed fixes, minor repairs that were not material to safety.



Then-Col. William Begert, who had taken command of the 60th Military Airlift Wing at Travis Air Force Base, Calif., in June, was also concerned with maintenance. In command only a matter of weeks, he was pulling long-haul flights to Saudi Arabia within days of Saddam's invasion.

"I think the first time I landed in Saudi was like three or four days" after the Aug. 2 invasion. "We were generating sorties like crazy. ... Very high tempo right from the start."

Travis jets left home, flew to U.S. bases, picked up Soldiers, Marines, "equipment, weapons—all that kind of stuff," recalled Begert, who eventually became a four-star commander.

Jets were rushed out of depots early and many standard procedures were being waived. "A number of our airplanes didn't have paint jobs—they were unpainted, raw silver," he recalled. "But they had finished enough of the depot work to get them going."

Looking like throwbacks to the 1950s, the unpainted jets provided essential capacity in a crisis. "We had to generate as much as we could on the ramp," Begert recalled. Raw-metal fuselages added a visual dimension to the expression "aluminum bridge" now being used to describe the flow of people and equipment to the Middle East.

Begert's wing deployed 3,500 of 9,000 Airmen, sending them to East Coast, European, and Middle East bases to help maintain the flow of people and gear. The associate Reserve wing was activated, including medical, maintenance, and aerial port personnel in addition to flight crew.

"The crews also were carrying broken airplanes and flying with stuff they ordinarily wouldn't fly with," said Begert, who flew missions every couple of weeks to keep an eye on his Airmen and operations downrange.

East Coast bases were the bottleneck as gear piled up, especially at Dover Air Force Base, Del. But maintenance also became an issue. "When airplanes came back from downrange, they needed work, they needed spare parts or an engine

change, those kinds of things, which were done in Europe and primarily on the East Coast," as airplanes limped back from missions, Begert said. Meanwhile, Travis had repair capacity, but no jets. "Airplanes would get fixed and they would deploy again off the East Coast." One coast had a backlog, the other excess repair capacity.

Begert suggested routing returning aircraft from Europe north, over the pole, rather than west, then landing at West Coast bases. "We still had plenty of capability at Travis and could work on those airplanes. Doesn't matter whether they're Travis airplanes or not. And we could generate them and send them back out." Sure that this would help generate more planes faster, he pushed his idea up the chain. "But I could never convince anybody to change the CONOPS, and that continued throughout Desert Shield."

Flying the polar route "would have been a fairly unusual thing," Begert acknowledged, still convinced the idea had merit. "But if you take a look at the world, it's only a couple hours of extra flying time. ... But that didn't prevail."

Downrange, operators found another bottleneck: Refueling aircraft on the ground. So many planes were landing in Saudi Arabia that ramps became overcrowded. Fuel was plentiful, but access to it became harder as the ramps became gridlocked.

C-141s couldn't refuel underway but C-5s could. But the tankers didn't belong to MAC in those days, and tribal barriers between major commands were hard to overcome. The Air Force's 500 or so tanker aircraft belonged to Strategic Air Command, and while SAC sent tankers downrange, that was to support the fighter and bomber aircraft in the theater. SAC deployed 115 KC-135s in the first phase of Desert Shield and would eventually deploy more than 300.

In the early stages, KC-135s flew "the Desert Express," carrying people and equipment in support of B-52s deploying to the Indian Ocean island of Diego Garcia. Flying from the U.S. to Hawaii and on to Guam, their contents would be transferred to KC-135Rs and KC-10s that could make the haul to Diego.

Forward-deployed tankers were generally unavailable to airlifters, however.

"The CONOPS didn't include tankers, really," Begert said.

“We did things the old-fashioned way, the way we had always done them, and for this massive deployment, it just kind of ended up bottlenecking everything on the East Coast.”

Bottlenecks also started showing up in theater. At Dhahran, so many airplanes were on the ramps that ground traffic became overwhelming, as planes couldn't get access to fueling stations.

Kondra recalled: “We had people waiting up to nine hours on the ground for fuel. We had too many airplanes on the ground; we had 28 on the ground there at one time, and there were not enough fuel pits to service them all.”

At Jubail, where the 1st Marine Expeditionary Brigade was trying to get in, C-5s were also held up by fuel. “The C-5s were going to go into Jubail [and] I wanted to have them in and out, because Jubail didn't have much refueling [capability],” Kondra explained. His idea was to aerially refuel before landing, then unload and take off and on the way out do another aerial refueling for the full flight home. “Then we wouldn't have to try to refuel on the ground. I was trying to cut the ground times down, because we were having to wait eight, nine hours for fuel.”

SAC declined to support the idea, however. “Somebody decided we didn't need them,” Kondra lamented. “Well, [true,] we didn't need them to get there and back, but we needed them to cut down on the ground times. But some people who don't understand ground time and throughput didn't look at it in those terms. ... We never did get the tankers.”

Kondra noted that on Aug. 29, six C-5s came in to Jubail, two met their ground times of about two hours, while the other four sat from four to 10 hours waiting on gas.

The problem wasn't just wasted time on the ground—it was extending mission time and wearing out crews.

Starting in Europe, a flight would onload, fly the mission, offload, and return. “If everything went perfectly it was about a 22-hour crew duty day,” Kondra said. “Then you throw in a nine-hour wait for fuel and you just went past the 24-hour crew duty day. We had people, in the initial stages, who went up to 36 hours.”

That was more than double normal limits. Pilots aren't

supposed to fly more than 120 hours in a 30-day period, a safety measure to ensure sufficient crew rest and attention while flying. While those limits can be broken for necessity in wartime, that became routine before summer turned to fall in September 1990.

Air Force Chief of Staff Gen. Mike Dugan questioned the need for more Reserve crews, and Kondra flew to Washington to explain. “At that time 44 percent of the C-141 crews in the system were at 150 hours,” he said. “The system was about to come to a screeching halt.”

The 30-day limit had already been raised from 125 to 150 hours of flight time but now another cap was in his sights: 275 hours in a 60-day time frame. “Now if you've got 150, that means you can only get 125 in the next 30 days,” Kondra said.

MAC's Johnson was prepared to authorize 400 hours in a 90-day period. Kondra had never before seen more than 330 hours. “I only gave two waivers, myself,” he said. “There may have been others, but I was supposed to be the one who did that. I gave two waivers to two crew members the night we moved Patriot missiles from Rhein Main [Germany] to Israel. They called me and said they had two crew members who would be over 330 by the time they got back, and I said, ‘Send them down—they have the waiver to go past 330—but when they come back, take them off and replace them with other crew members.’”

In addition to pilots, loadmasters were also in short supply. On missions with more than 40 passengers, two were needed. Waivers became routine, and some considered appointing Soldiers as temporary loadmasters to fill the requirement.

“Getting all our qualified loadmasters from the staff out and flying” was crucial, he said. Kondra pulled loadmasters from staffs “where they were figuring out the requirements and stuff.”

He used flying opportunities as incentives—“a reward for guys busting their butts 12, 14, 16 hours a day [at headquarters],” Kondra said. “We got them a break: I'd send them out for two weeks and let them go fly as qualified loadmasters.”

Adding Reserve aircrews also helped, enabling aircraft to be used for more hours in a day.



Marines headed to support the coalition forces participating in Operation Desert Shield board a Federal Express jet chartered by the Military Airlift Command in September 1991.



DOD

Soldiers cross the airfield after disembarking from an Air Force C-141 Starlifter as they deployed for Operation Desert Shield in August 1990. By 1992, most of the C-141 fleet was at or near the airlifter's 30,000 flight-hour service life.



Airlines provided additional aircraft via the Civil Reserve Air Fleet (CRAF), and foreign airlines offered to loan airplanes at reduced or no charges. This drew complaints from the CRAF partners so the U.S. determined that only aircraft loaned free of charge could be used, eliminating competition to CRAF carriers.

But foreign aircraft, while offered by allies, were difficult to employ. Kuwait offered two 747s and crews, but the Air Force never used them because of concerns about foreign crews handling whatever the Americans loaded on board.

CRAF jets were crewed by U.S. commercial aircrews, raising concerns among some about flying into potential combat hazards. Fears about chemical weapons and the need for protective gear were preeminent. "It became a very emotional issue with the [commercial] crews," Kondra said. USAF trained its aircrews on using chemical weapons gear, but the commercial crews had no training. "We didn't give them equipment to take with them initially, because we said they wouldn't know how to use it anyhow," Kondra said. "When the SCUDs started flying there was some real concern—and rightfully so."

Better late than never, the Air Force sent briefing teams to CRAF transit hubs in Europe, Kondra said. "We should have done that earlier. That was one for the lessons learned pile."

Transit bases, where Air Force aircrew laid over, were not all up to the task—ill equipped to take care of all the aircrew, not to mention Marines and Soldiers passing through en route to "the sand box."

At Torrejón, squadron commander Wright's wife, Keri, and other spouses cleaned out the commissary shopping for baking supplies to provide some relief there, but things didn't really improve, Begert said, until MAC's Johnson made a stopover there.


"We were having trouble at Torrejón with crew rest and getting on base and getting busses to go to the airplanes—all that kind of stuff," Begert recalled in a recent interview. "H.T. Johnson flew in there on the way to the AOR, and he got off the airplane—as a four-star—and the wing commander didn't meet the airplane. Johnson got back on the airplane, called [USAFE Commander Gen. Robert] Oaks." Shortly thereafter, the wing

commander made his way out to the airplane, trying to apologize. Torrejón belonged to Tactical Air Command, not MAC, so perhaps the wing commander didn't think such a courtesy was needed. But a four-star is a four-star, and that shouldn't have mattered. "So things got better after that," Begert said.

Flight operations were so intense it was inevitable, perhaps, that something would go wrong. On Aug. 29, the Air Force suffered the first losses of Operation Desert Shield when a C-5 lifted off from Ramstein Air Base, Germany. The crew went through its preflight checks, which included testing the reverse thrusters. Afterward, one engine remained stuck in reverse, but the indicator light that should have signaled that to the crew malfunctioned—the light remained off. Shortly after takeoff, the plane went down, killing 13. Four crew survived.

On hearing of it, Kondra went upstairs to brief Johnson. "That was a long walk, from the second floor to the third floor," he told his interviewer. "And I must say that there were doubts that went through my mind ... thoughts that said, 'Have we pushed too hard?' Because I had no idea what had caused the crash. I only knew it was at night; I had no idea what the crew duty day had been, had no idea what they had been doing beforehand. So you have those doubts."

Begert walked the crash site a few days later. It had been his airplane, but someone else's crew, and though the crash was under investigation, operations continued unabated. This was wartime, and in war you don't stop to think, because the mission remains. "You're going to have to carry the airplane with some broken things that in peacetime you might not carry," Begert said. "You've got to make decisions. But what you tried to have done all along [as the wing commander] is empower the aircraft commanders to be able to make those decisions."

On the ground, training was getting underway. Troops were digging in, developing routines. Planners worked long days, continuously revising their target sets and the weapons needed to destroy them. Logisticians juggled needs—choosing which to prioritize, a turbine for a Navy ship or six Cobra helicopters for the Marines—and when the warfighters didn't get what they wanted they complained. Of 1,500 missions, Kondra related, three caused someone "to raise hell." If you don't satisfy the customer 100 percent of the time, they'll only remember the times you fail. 



China's rapidly expanding aircraft program is evidenced by the rapid expansion of its Aviation Industry Corporation (AVIC), which constructed a new production plant, razing two small villages to make room for the new plant, which aligns with announced plans to build a new combat jet variant, the J-35A.

What Satellites Reveal about China's Military Expansion

The People's Liberation Army Air Force is growing at an alarming rate.

By Cmdr. J. Michael Dahm, USN (Ret.)

The world is changing—fast. And you don't need to have exclusive access to bespoke intelligence capabilities to see those changes yourself. Open-source intelligence sources can now inform public debate on national security issues like never before. Commercial satellite imagery accessible with a credit card offers anyone a store of information about economic and military developments in areas once totally obscured to the public, including Iran, Russia, North Korea, and China.

At the end of the Cold War, spy satellites like the "Keyhole 9" were the world's only source for collecting images of sites like the "132 Plant" in central China. The ability to capture those sites was so secretive that the images themselves were classified. In the early 1980s, 132 Plant, an aircraft factory, had just started full-rate production of the third-generation J-7 fighter, a Chinese copy of the 1960s-era Soviet Mig-21. Forty years later, commercial satellite

"Commercial satellite imagery reveals a great deal about China's growing air force—and what it might do next!"

images of that same plant in Chengdu, China, offer insights about the production of the People's Liberation Army Air Force (PLAAF) fifth-generation air superiority fighter, the J-20 Mighty Dragon. If you know where to look, commercial satellite imagery reveals a great deal about China's growing air force—and what it might do next.

In the 1980s, the Keyhole 9 satellite, code-named Hexagon, peered down from orbit on enemies and potential adversaries around the globe. Built by Lockheed Martin, Keyhole 9 was the size of an articulated two-segment city bus—60 feet long, 10 feet wide and weighing 15 tons. Even compared to the space shuttle, the Hexagon satellites were probably the most complicated mechanical platforms any nation has ever put into space. Inside Hexagon, 30 miles of high-resolution film fed through over 100 rollers at speeds up to 200 inches per second, enabling cameras to capture unique imagery. Exposed, the film was automatically rolled up into film recovery capsules and then ejected and sent back to Earth like an escape pod. A specially

equipped C-130 snagged the capsules as they parachuted over the ocean and brought the film in to be developed.

Many governments still satisfy their most pressing intelligence requirements using highly classified imaging satellites, although today those images are captured and transmitted digitally. What's changed is that hundreds of commercial satellites can now match many of those capabilities. Vantor's Worldview Legion satellite is a fraction of the size of the Keyhole 9, but captures extremely high-resolution color as well as multispectral and near-infrared images that can be downloaded soon after they are taken. Planet Labs' SkySat satellite, just about the size of a mini fridge, has similar capabilities. The number of companies offering commercial satellite imagery is growing every year. Some can even deliver synthetic aperture radar imagery or hyperspectral imagery.

Today's smaller, less costly satellites are deployed in constellations and enable increased revisit rates against targets around the world—sometimes even several times a day. This creates opportunities to observe military activity over time and chart changes in the scale and scope of operations and tactics. A series of satellite images captured in the fall of 2025 offer a compelling story about remote desert air bases in Western China and a large-scale PLAAF exercise.

An Oct. 30, 2025, satellite image of Hotan Air Base in China's Xinjiang region revealed 24 J-16 fighters belonging to the PLAAF's 99th Air Brigade, the only unit stationed at the base. The image also showed four H-6 bombers, 12 J-20 fighters, four Y-20 transports or tankers, and eight special mission aircraft, including several KJ-500 airborne early warning and control (AEW&C) aircraft. At the time, there were no reports of tensions in Xinjiang or on the nearby China-India border. The presence of such an array of aircraft indicated an unusual deployment in western China. Examining other commercial satellite images in the PLA's

western theater command at routine intervals revealed a major PLAAF exercise involving as many as eight air bases.

The exercise was most likely the PLAAF's annual "Red Sword," which is modeled after the U.S. Air Force's Red Flag exercises. It brings together PLAAF units from all over China. Several years ago, the PLAAF issued press releases about the large-force air combat exercise, but it has since gone quiet about the annual event. Commercial satellite imagery now allows open-source analysts to glimpse what is happening behind the veil of PLA operational security.

In early November 2025, all eight air bases involved in the exercise were imaged within a 24-hour period, allowing for an accurate count of aircraft at each base and a reasonably accurate total for all eight. We counted 194 aircraft on the ramp at the eight air bases, and while not all of those necessarily participated—and because others may have been flying or hidden in hangars when the satellites passed overhead—it is reasonable to surmise that the total exercise count could have exceeded 250 aircraft operating in an area spread over an area of over 1,200 nautical miles.

Satellite imagery alone cannot tell an analyst how many aircraft flew in a particular event, whether there was an opposition force, or how well the PLA aircraft executed their missions. What it can do, however, is offer insights. Golmud Air Base at the base of the Tibetan Plateau is home to a brigade of special mission aircraft. An October 2025 satellite image shows 12 J-20, eight J-10, and eight J-16 fighters lined up on the ramp next to three KJ-500 AEW&C aircraft. There is also a WZ-7 Soaring Dragon high-altitude long-endurance (HALE) UAV preparing to take off. A typical PLAAF fighter brigade comprises 24 or 36 aircraft, which raises questions about why these small detachments may have been deployed to this remote base. These aircraft might have been conducting dissimilar air combat training (DACT): fighters flying



Satellite base images courtesy of Planet Labs; analysis by J. Michael Dahm

Observing China's remotest air bases at regular intervals creates a record of aircraft deployments and activities, revealing an array of aircraft that indicate a major military exercise in late 2025, most likely Red Sword, roughly equivalent to the U.S. Air Force's Red Flag.

against different types of fighters. They might have made up part of an exercise “blue force.” (PLA exercises dub enemy forces “blue” and friendly forces “red,” the opposite of U.S. designations.) Taken as a single force package, however, the mix of 4th- and 5th-generation fighters and the KJ-500s may indicate that the PLAAF is advancing toward exercising fighter integration—developing tactics, techniques, and procedures to combine 5th-generation sensing and stealth capabilities with 4th-generation aircraft in mixed formations.

Archived commercial satellite imagery is also a powerful tool to monitor developments in military activity over time. Satellite images of probable Red Sword exercise activity at the end of 2023 and 2024 reveal that the 2025 exercise was the largest Red Sword event over the past several years in terms of participating air bases and number of aircraft.

Each year, the PLA Air Force executes a series of weeks-long large-scale exercises to hone combat capabilities and prepare for large-scale conflict. Red Sword exercises are about force-on-force, system-of-systems air combat. “Blue Shield” is the PLAAF’s principal air and missile defense exercise, while “Qingdian” is a large-scale electronic warfare exercise. There are also PLAAF-wide aircrew competitions each year—“Golden Helmet” for fighter air combat and “Golden Dart” for ground attack and bombing.

The PLA, meanwhile, attempts to actively shape narratives surrounding Taiwan and East Asian security by announcing and executing flashy one- or two-day exercises in the Taiwan Strait with names like “Joint Sword” and “Justice Mission.” Social media and news outlets amplify these PLA influence operations by reposting PLA video of live-fire drills and the potential threat to Taiwan. But the PLAAF can only generate two days of sorties in southeast China for these displays without stressing aircrew, maintenance, or logistics. In contrast, using open-source intelligence to analyze large-scale exercises offers less filtered indicators about PLA capabilities

and the air threat facing China’s neighbors.

Commercial satellite imagery is also useful in examining how foreign military infrastructure changes over time, enabling analysts to discern force development trajectories and future intentions. Extensive construction at or near Chinese air bases, naval bases, and space launch facilities indicates aggressive growth.

One example can be found near a PLA Rocket Force garrison in eastern China. The 611 Brigade operates the DF-26 road-mobile, intermediate-range ballistic missile. The DF-26 can deliver a 3,000-pound warhead over 2,000 nautical miles—far enough to earn it the nickname “Guam Killer” or the “Guam Express.” The missile can cover the distance from the 611 Brigade garrison to Guam in about 17 minutes. With a high-loft trajectory, the missile could reach U.S. and Japanese bases in Okinawa and the Ryukyu Islands in about half that time.

In the event of a war, the 611 Brigade most likely would not shoot missiles from its garrison location, but by means of mobile transporter-erector-launchers (TELs), the brigade would disperse to hide sites from which troops would set up, launch, break down, move, set up, and shoot again. Those “scoot-and-shoot” operations in public areas are not without counter-targeting risks. They also add to missile firing timelines and make logistics and resupply more difficult. A simple solution would be to construct missile hide sites in a secure area near the missile brigade garrison—and that may be exactly what the PLA Rocket Force did.

A review of archived commercial satellite imagery reveals that the 611 Brigade has built a network of roads, man-made tunnels, and over four dozen launch pads in the hills north of the garrison. The sprawling facility may be nothing but training infrastructure: a “combat town” for missile TELs where they exercise movement, set up, camouflage, fire, and reposition. But the size of the facility and the number of con-



Satellite base images courtesy of Planet Labs; analysis by J. Michael Dahm

A parallel buildup at a second base in remote western China reveals a diverse array of aircraft, suggesting the potential for integrated operation among different types.



Satellite base images courtesy of Planet Labs; analysis by J. Michael Dahm

The PLA Rocket Force's 611 Brigade has constructed multiple roads, tunnels, and launch pads in the hills north of its main facility. This could be for training, or it could be designed to enable the PLA to move its transporter-erector-launchers as in a "shell game," making it harder to target mobile DF-26 launchers during a conflict.

crete shelters and launch pads suggest instead that the DF-26 brigade may intend to use the area to play a "shell game" in military conflict: Now you see the TEL, now you don't.

An integrated deception strategy might have dummy missile TELs and camouflage netting distributed throughout the complex. The hide sites are in a secure area, away from public view near the garrison. Personnel and supplies are only minutes away, allowing the brigade to stay on high alert for weeks. Hitting every hide site and launch pad in the complex might take over 100 weapons, based on a rough weaponeering analysis of the facility. Even then, the complex could be filled with decoys and devoid of any operational TELs and missiles.

Hunting mobile missiles, especially deep inside adversary territory, is an extremely challenging mission that consumes intelligence, reconnaissance, and airstrike resources. The United States and its allies learned this lesson by conducting extensive, but often unsuccessful, "Scud hunts" for Iraqi Scud missiles during the 1991 Gulf War. U.S. and Israeli forces have reportedly met with greater success against Iranian missile TELs in more recent operations, but the after-actions on those engagements are not yet available. In any case, the infrastructure developments at the 611 Brigade—either as a training facility or an operational launch base—are an indication that the PLA Rocket Force is actively working to create a next-level "Scud hunt" challenge for China's adversaries and employ a survivable force to strike targets across East Asia.

This openly available intelligence literally hides in plain sight. While a purportedly leaked video of a new PLA aircraft or weapon will generate headlines around the world, images like these offer more information but less drama. The airplane videos fit a PLA narrative—true or otherwise—about advanced Chinese military technology and capabilities. The satellite images, however, require significant commitments of

time and money to acquire and analyze. But they tell a story the PLA cannot easily hide. Examining satellite imagery of military infrastructure investments probably provides better indicators of PLA goals and objectives than a few images of new PLA hardware flashing across social media.

In December 2024, Chinese aircraft manufacturers revealed what social media and news outlets quickly identified as a PLA "6th-generation" aircraft. What aviation enthusiasts dubbed the "J-36" fighter-bomber and "J-50" fighter were photographed conducting initial flight testing over Chinese aircraft factories in Chengdu and Shenyang, respectively. What followed was a steady drumbeat of "leaked" photos and additional flight tests over these densely populated areas before the aircraft disappeared from public view in summer 2025.

In August 2025, Planet Labs satellites captured an image of the J-36 at China's aircraft test and evaluation base in Lop Nur, China. Seventeen days later, another satellite image of the base revealed the J-50 sitting outside the hangar. It is possible that extraordinarily security-conscious Chinese engineers made a mistake in revealing the J-36 at Lop Nur—and then made a second mistake in revealing the J-50. The base, which has been called China's "Area 51," is located in an area so remote that it once served as China's testing ground for above-ground nuclear tests.

But perhaps the exposure of China's next-generation prototype aircraft was not an accident. As China and the PLA attempt to shape narratives about military capabilities, Chinese authorities may now assume that someone is always watching from space. If China wants to continue a drip of information about their next-generation aircraft that predictably creates a torrent of speculation on the internet, commercial satellite imagery now provides a vehicle for that effort as well.

Beyond the appearance of two prototype aircraft that may never go into production, we can zoom out to literally see the bigger picture at the test and evaluation base. Looking at the base infrastructure provides a better indication of China's investment in advanced aircraft development. Construction activity at the Lop Nur base began in August 2025, around the time when the J-36 was first spotted at the base. Six months later, in February 2026, the base added 60,000 square feet of hangar space and over 300,000 square feet of facility space. Some of that is probably test and evaluation facilities, and some may be additional housing for personnel. Whatever the case, in just a few months China effectively doubled the size of this remote testing base. These infrastructure investments underscore how seriously China takes its aircraft development competition with the West.

Possibly more concerning than new types of aircraft is the number of aircraft that Chinese factories can produce. Again, examining PLA infrastructure and military aircraft factories provides critical insights into what China aims to do in terms of inventory.

China's military aircraft industry is controlled by a state-owned conglomerate known as the Aviation Industry Corp. of China, or AVIC. There are seven major aircraft factories across China that specialize in the production of different types of military aircraft.

Commercial satellite imagery of AVIC's Changhe Aircraft Industry Corp. reveals the plant is currently completing about 1 million square feet of additional manufacturing space, having begun construction in mid-2024. The Changhe plant is responsible for building attack helicopters and heavy-lift transport helicopters—the types that would likely play a key role in a cross-strait operation against Taiwan. The expanded facility represents a 30 percent increase in manufacturing space and likely indicates that China will acquire new attack

helicopters and heavy-lift helicopters in the coming years.

The Chengdu Aircraft Corp. factory featured at the top of this article is the plant where the J-36 was seen taking off and landing in 2024 and 2025. Beyond research and development, the factory is now almost completely dedicated to manufacturing 5th-generation J-20 air superiority fighters. The plant is reportedly running five production lines for the J-20, with estimated production between 100 and 120 aircraft per year. Looking back at infrastructure development over time supports that assessment. Satellite images show some 800,000 square feet of additional manufacturing space was completed by 2021. By 2022, another 2.5 million square feet of manufacturing space was added, and in 2024, what Chinese sources describe as an "aviation equipment test base" was added—another 500,000 square feet of manufacturing space, which may represent the research and development facility behind the J-36.

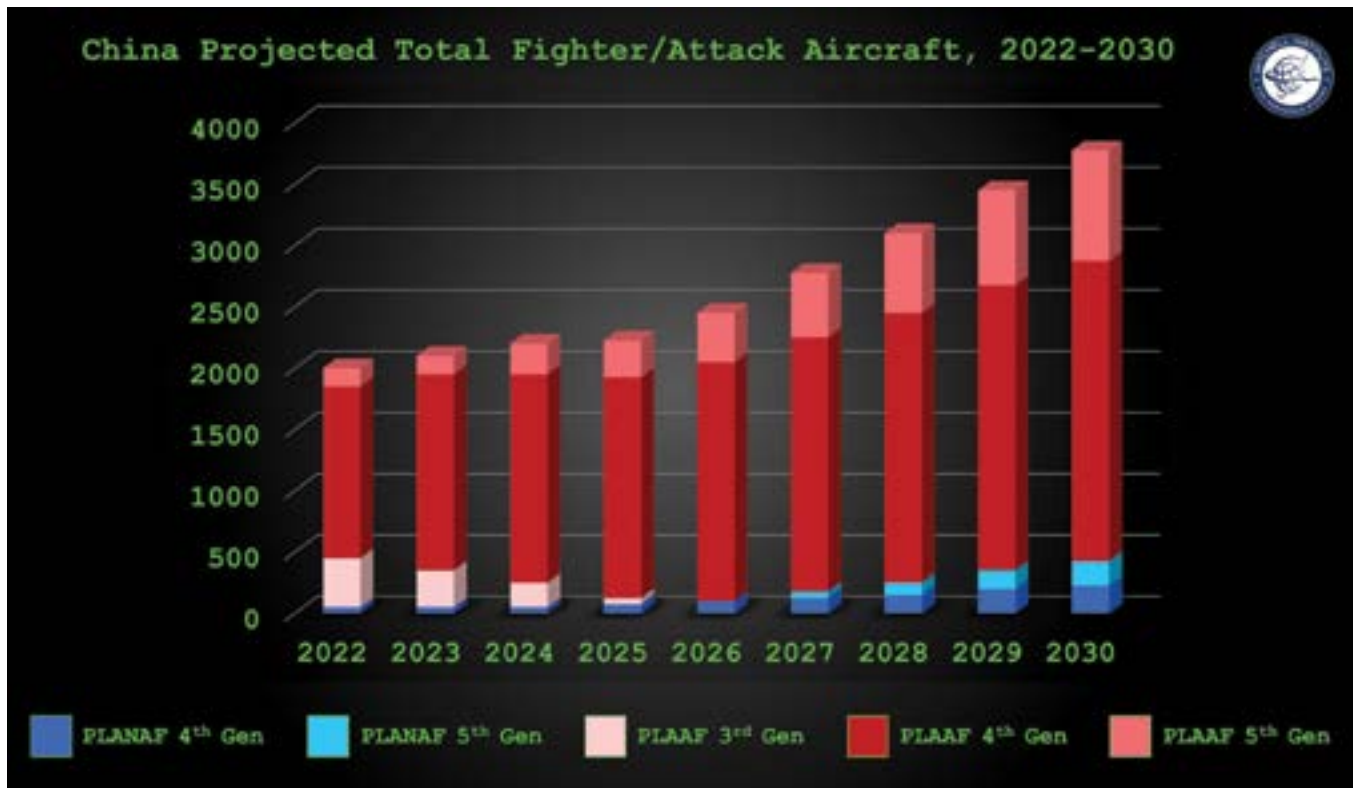
As of early-2026, 50 acres on the north side of the plant have been cleared, probably for another expansion of the Chengdu plant.

Infrastructure expansions have not been observed at China's other fighter production plant in Shenyang, where the J-50 was seen performing flight tests last year. The Shenyang Aircraft Corp. factory only saw a modest increase in manufacturing space since 2023—about 500,000 square feet. The plant currently produces the PLAAF's J-16 and the carrier-based J-15 for the PLA Navy—the planes are Chinese derivatives of the Russian Su-30 and Su-33, respectively. The Shenyang factory is also responsible for initial production of the 5th-generation J-35, which, based on external appearances, is a Chinese copy of the U.S. F-35. AVIC recently announced that, in addition to producing the J-35 for the PLA Navy, the PLAAF has also ordered a variant designated the J-35A.

In order to facilitate production of the J-35 at the Shen-



The rapid expansion of an aircraft plant demonstrates the rapid addition of manufacturing space: 800,000 square feet in 2021, another 2.5 million square feet in 2022, and another 500,000 square feet in 2024. This progression may follow the growth of the J-36 program.



Mitchell Institute

The PLAAF's plans for 5th-generation aircraft production show China's rapid fleet growth and modernization and ambitions to field a world-class air force capable of deploying and operating globally—a challenge U.S. air superiority unparalleled since the fall of the Soviet Union in 1990.

yang plant, AVIC would need to stop or significantly slow production of J-15s and J-16s. But AVIC seems to have selected a third option—build an entirely new aircraft production plant. Two and a half years ago, two small villages were razed just 10 miles north of the existing plant and construction is underway on what appears to be a new production facility.

The factory is still in the final stages of construction. My analysis of commercial satellite imagery indicates the manufacturing complex has about 4 million square feet of total manufacturing space, a 12,000-foot runway, and what appears to be a large glass and steel headquarters building. This new factory is probably where AVIC will produce the J-35 for the PLA Air Force and Navy and could play a role in future aircraft development and production.

The expansions at the two fighter production plants, combined with the new manufacturing facility north of Shenyang, represent over 8 million square feet of additional aircraft manufacturing space—more square footage than Lockheed-Martin's entire U.S. F-35 manufacturing production complex in Fort Worth, Texas.

By any measure, China's inventory of fighter and attack aircraft will grow significantly over the next five years. Chinese media reports supported by commercial satellite imagery analysis shows the PLA Air Force purged itself of its 3rd-generation J-7 and J-8 fighters by or before 2025. Having now replaced those older aircraft with newer models, the PLAAF can focus on growth.

Based on observed factory infrastructure growth and other open-source reporting, AVIC may soon have the capacity to produce as many as 300 4th- and 5th-generation fighters for the PLA each year. That would put the PLA Navy and Air Force on a trajectory to have more fighters than the U.S. Air

Force, Navy, and Marine Corps by 2028. By 2029, China could have the largest fighter force in the world—and be poised to continue to grow.

All of this raises a central question: Why is the PLA trying to grow its Air Force and aircraft carrier fleet. It is overkill to generate so much capacity simply for a Taiwan contingency. The more likely reason is ambition.

For decades, China has declared its intention to build a world-class military by the middle of this century—to be on par with the U.S. military by 2049. China's military has been given a mission by the Communist Party to defend China's overseas interests and secure China's investments along its "Belt and Road." China's economy craves natural resources and foreign markets, which are growth drivers that must be secured against threats. This is a mission that China's military, and the PLA Air Force in particular, has struggled to fulfill up to this point in time.

A larger, more capable future force could change that. Based on Chinese investments and the expansion of their aircraft manufacturing infrastructure, China is clearly building an expeditionary air force. Nothing observed suggests China will limit its military to an East Asian sphere of influence in the next decade. By the 2030s, China's air force will seek to expand its reach far beyond East Asia.

Taiwan, therefore, is just an opening act. Global resource competition is China's main event.

In the very near future, the U.S. Air Force will face challenges from the PLAAF in parts of the world for which there is no U.S. operational plan and in which the U.S. Air Force lacks force design, basing infrastructure, and, most importantly, capacity.

The time is now for the U.S. Air Force to prepare for that future.



Established in 2022, the Polaris Awards honor individuals and teams who embody the highest standards of the Guardian Values—Character, Commitment, Connection, and Courage. Each year officer, enlisted, and civilian Guardians across the Space Force are nominated. Chosen from more than 15,000 eligible Guardians, these four individuals and one team are the future ambassadors of the Space Force and the 2025 Polaris Award awardees.

CHARACTER

The first value because it lays the foundation for trust, teamwork, and good order and discipline.

MAJOR ADRIANE PAYN

Chief, Mission Assurance Branch
National Reconnaissance Office

Major Adriane Payn exemplifies what it means to be a Guardian through her leadership, accountability, and unwavering dedication to mission success. After graduating with honors from the University of the Pacific and earning a master's degree from Troy University, she commissioned in 2016 and has consistently delivered excellence in every role. Currently serving as a Mission Assurance Branch Chief, Major Payn leads a team of more than 150 personnel responsible for safeguarding the nation's most critical space assets. She oversees the quality assurance of more than \$6 billion in satellite hardware, ensuring systems meet the highest performance and reliability standards. Over the past year, she reviewed more than 1,600 manufacturing requests, identifying and resolving issues that could have jeopardized mission timelines. When unapproved parts were discovered, she acted decisively and kept senior leadership fully informed. Major Payn also identified a critical flaw in a software tool, saving more than \$300,000 and a month of program execution time. When contractor performance fell short, she led a comprehensive investigation and implemented corrective actions across multiple programs. Beyond the mission, Major Payn is a dedicated advocate for women in STEM, helping raise more than \$12,000 in scholarship funding. Her integrity, courage, and commitment set a powerful example for Guardians across the Space Force.



COMMITMENT

This value is defined as the pursuit of mastery of themselves, their profession, and domain.



SPECIALIST 4 LOGAN PINDER

Multiple Intelligence Fusion Analyst
Space Operations Command

Specialist Four Pinder demonstrates extraordinary commitment and initiative through his mastery of operational intelligence and rapid impact across the Space Force. Since joining the service in March 2023, he has distinguished himself through unmatched dedication, innovation, and technical expertise. Pinder played a key role in establishing the Space Force's first real-time intelligence squadron, directly shaping how intelligence supports operational decision-making. Leveraging self-taught programming skills, he developed a data converter that reduced file processing time from 100 hours to five minutes, saving \$850,000 and enabling a critical capability for a new satellite sensor. He also created the Space Force's first multi-intelligence training program, teaching analysts to integrate multiple intelligence disciplines into a single operational framework. This program is now used across multiple missions and earned recognition from the Chief of Space Operations. Pinder's efforts directly supported seven Special Operations Forces missions in Europe and the Indo-Pacific. He trained 57 analysts to integrate space intelligence with joint operations, enabling coordination with more than 300 warfighters and protecting assets. Selected for elite cyber programs, Pinder's expertise strengthens integration across space, cyber, and intelligence.

CONNECTION

This value emphasizes that Guardians are connected by a common purpose greater than themselves.

SERGEANT MICHAEL CAMPOS

Crew Chief, Cyber Aggressor
Space Training and Readiness Command

Sergeant Campos embodies connection—to the mission, his teammates, and the United States Space Force—by delivering advanced training that prepares Guardians to defend critical space systems against cyber and space threats. He began his career in the Air Force in 2019 as a network technician, earning an early promotion to Senior Airman. During a deployment supporting Operation Enduring Freedom, he was selected as one of the first Airmen to transfer into the Space Force. Campos strengthens the force through collaboration and shared expertise. In 2025, he hosted cyber training seminars for 60 leaders, bridging the cyber and space communities. He also trained a team for Space Flag 25-2, a large-scale exercise preparing Guardians for complex, contested space operations. During the Cyber Spartan exercise, Campos led his team in adversary operations, simulating nation-state cyberattacks to train 20 operators and help secure a \$10 billion national launch. Beyond mission execution, he prioritizes people, leading 19 physical training sessions, providing individual mentorship, and preventing a suicide by dedicating 60 days to safeguard a fellow Guardian. Through mentorship, resilience, and dedication, Campos builds the connections that unite Guardians, strengthen the mission, and reinforce the Space Force community.



COURAGE

This value ensures Guardians do what needs to be done, and say what needs to be said, because it is the right thing to do.

FIRST LIEUTENANT ROBERT BARTKOWIAK

Orbital Warfare Test, Project Officer
Space Training and Readiness Command

Lieutenant Bartkowiak exemplifies courage, leading with boldness, innovation, and a willingness to take smart risks to accomplish the mission. As a lead test director, he is shaping the future of orbital testing for a \$12.3 billion program. He began his career in the Air Force in 2012 as a biomedical equipment technician before earning his degree and commissioning into the Space Force, graduating at the top of his class. In 2025, he performed the duties of a field-grade officer, securing \$42 million to reactivate a dormant satellite for testing. During a high-stakes test, he made the critical decision to reposition satellites, overcoming a major network failure and keeping the mission on track. When a key system lost contact, his quick thinking restored control through a previously impossible solution, now adopted across Space Operations Command. In recognition of his leadership, he was by-name requested to lead a \$21 million U.S. Space Command test involving 57 personnel across five locations, advancing innovation across the command. Through bold decision-making, technical mastery, and relentless dedication, Lieutenant Bartkowiak embodies the courage, initiative, and forward-thinking essential to the Space Force mission.



TEAM EXCELLENCE

Team embodying all four Guardian values: Character, Commitment, Connection, and Courage. It is a premier, annual service-level honor highlighting teams that display exceptional innovation and teamwork to achieve mission success.



ARCHER TEAM

Space Operations Command

The Archer Team truly embodies the Guardian values of Character, Commitment, Connection, and Courage. The team demonstrated exceptional *character* by leading Guardian Arena III, helping 18 Guardians qualify for the national event. They also led their base's Combined Federal Campaign, raising \$2.2 million for 5,000 charities and becoming the No. 2 contributor in the national campaign. Their pioneering culture earned them the Department of the Air Force Guardian Intelligence Award and Space Operations Command's Innovator Team of the Year. To build *connections*, the team supported the STEM to Space initiative, running

robotics competitions for 1,600 students across 10 states. They managed 150 volunteers, raised \$125,000 for local STEM programs, and created a professional development forum to cultivate peer networks among local leaders. Their *commitment* to service was clear when they helped finalize the Space Force's first advanced intelligence training program, closing critical readiness gaps and getting six new tactics approved. They also developed coding tools that accelerated analysis for 47 global sensors, improving operational speed and effectiveness. Displaying true *courage*, the team led a \$1.7 million intelligence system installation with no prior experience, finishing two days early and increasing operational support capacity by 130 percent. They also coordinated intelligence assets that enabled 15 successful operations against adversary space targets.

Gagnon Recognized as Space Visionary



Jud McCrehin/staff

Lt. Gen. Gregory Gagnon (second from left) accepts AFA's Jerome F. O'Malley Space Visionary Award for his leading role in reshaping space operations and his innovative thinking for combat-ready forces. Deputy Chief of Space Operations Lt. Gen. Doug Schiess, AFA Board Chair Kathleen Ferguson, AFA President and CEO Lt. Gen. Burt Field, and Shannon O'Malley Burg presented the award at AFA's 2026 Warfare Symposium.

AURORA, COLO.

The Air & Space Forces Association presented Lt. Gen. Gregory Gagnon with the Gen. Jerome F. O'Malley Space Visionary Award at the 2026 Warfare Symposium on Feb. 25. The award honors vision, risk-taking, and innovation that advance U.S. Space Force operational capabilities.

As commander of U.S. Space Force Combat Forces Command, Gagnon leads more than 12,000 Guardians and Airmen responsible for generating and delivering combat-ready space forces worldwide. Under his direction, Space Operations Command was restructured and redesignated as Combat Forces Command to better align with emerging offensive and defensive warfighting demands, reinforcing a readiness-first approach and a shift toward a true warfighting service.

A career intelligence officer and cyberspace operations expert, Gagnon brought a nontraditional background that enabled him to challenge legacy assumptions and drive operational innovation. He fostered a culture of experimentation, advanced intelligence integration, and data analytics, and

accelerated force design, training, and deployment models.

Drawing on extensive joint and intelligence experience, his leadership has reshaped how the Space Force organizes, equips, and employs combat-ready space forces, exemplifying the visionary spirit embodied by General O'Malley.

The award was presented by Deputy Chief of Space Operations for Operations Lt. Gen. Douglas Schiess; AFA Board Chair Kathleen Ferguson; AFA President & CEO Lt. Gen. Burt Field, USAF (Ret.); and General O'Malley's daughter, Shannon O'Malley Burg.

O'Malley was a pioneer of U.S. military spacepower who championed integrating space into everyday operations and emphasized agility, technological advancement, and forward-looking leadership. His legacy underscores the critical role of innovation in space for national security and future readiness.

AFA established the O'Malley Award in 2021 to recognize the critical contributions of outstanding Space Force leaders to U.S. national security. The first recipient of the award was the U.S. Space Force and last year's winner was Gen B. Chance Saltzman, Chief of Space Operations. 

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

Hoyt S. Vandenberg

America's longest serving Air Force Chief.

Hoyt S. Vandenberg was born in Milwaukee on Jan. 24, 1899. In high school he was a good athlete but a mediocre student; nonetheless, he received an appointment to West Point. Upon graduation he opted for the Air Service.

Vandenberg did well in pilot training, and for the next decade flew fighters. He was an outstanding "stick" and by 1934 had amassed over 3,000 flying hours. He then began a series of educational assignments at the Air Corps Tactical School, the Command and General Staff School, and the Army War College.

Upon graduating from the War College in 1939, he was assigned to the Air Staff. He did extremely well and in just two years rose from captain to colonel.

During the World War II Vandenberg served as a staff officer, planner, diplomat, and then commander of the Ninth Air Force during the Army's drive across France and Germany. With over 4,000 aircraft and 200,000 personnel, it was the largest tactical air unit in history. By the end of the war Van, as he was often called, was a lieutenant general.

Upon returning to the Air Staff, Vandenberg studied atomic weapons, and his resultant memo proposed an "atomic strike force," an elite unit equipped with the best aircraft, crews, equipment, and training. This memo was the blueprint for the formation of Strategic Air Command.

After a stint as the director of Central Intelligence, Vandenberg was named deputy commander of the Army Air Forces and promoted to general. At age 48, he was the second-youngest four-star general in American history till that time—only Ulysses S. Grant had advanced more rapidly.

When Gen. Carl "Tooe" Spaatz retired, Vandenberg took his place as the second-ever Air Force Chief of Staff. He was immediately confronted by the Berlin crisis. The Soviets blockaded the city, and for the next nine months the U.S. led a continuous airlift operation that supplied Berliners with everything needed, from food to medical supplies to coal until the Soviets relented in May 1949. The Berlin Airlift was a great triumph for the West, achieved by airpower without a shot being fired.

Vandenberg faced other challenges. The rapid demobilization after the war left the services devastated, and as is often the case during fiscal austerity, interservice rivalry abounded. The conflict between the Air Force and Navy was especially fierce as they jostled over whether the nation should buy more bombers or more aircraft carriers. In the end, the country did both.

In June 1950 North Korean troops exploded across the 38th Parallel.

It was assumed the Soviets were behind the invasion and that this attack was a feint, with the real danger in Europe. This belief was to shape U.S. policy over the next three years.

Neither the South Koreans nor the Americans were ready for the North Korean onslaught. Yet, General of the Army Douglas MacArthur in Tokyo remained confident he could defeat them, and soon launched his brilliant Inchon campaign. The North Koreans were routed, and MacArthur received permission to advance into North Korea. This led to Chinese intervention.

To MacArthur, the Chinese had snatched victory from his grasp. He was angry and made several inopportune public statements before being fired by the President. The resulting Senate hearings were exciting, but little changed in Korea. Vandenberg, like most American leaders, did not want to widen the war with attacks on China or Russia.

For the next two years the war settled into a slugging match as both sides dug in across a rugged no-man's land.

The Air Force flew thousands of interdiction and close air support sorties, while also winning air superiority over the entire peninsula.

Vandenberg's views on the war evolved after

1950. He was opposed to widening the war during the MacArthur hearings, but as the war dragged on, he agreed with his uniformed colleagues that it was time to consider the use of atomic weapons. Threats of escalation were effective, and an armistice was signed in July 1953.

Hoyt Vandenberg's career was marked by sustained and quiet competence. He was an outstanding aviator and junior officer, while serving in a number of command and staff positions. As Air Force Chief of Staff—serving there longer than any other Chief—he encountered and overcame enormous hurdles.

He was unusually successful at arguing his position within the joint environment. His ability to pick quality subordinates, such as Curtis LeMay, Lauris Norstad, and Nate Twining, was one of his greatest strengths. He also moved the Air Force into modern technology, pushing for rocket development, computers, thermonuclear experimentation, and an all-jet inventory. A man of vision, Vandenberg proved the ideal choice for building a newly independent Air Force. Vandenberg died of cancer six months after retirement, so he never wrote his memoirs. ✪

"Hoyt S. Vandenberg: The Life of a General" (Indiana, 1989) by Phillip S. Meilinger, is the only biography ever written about the second CSAF.

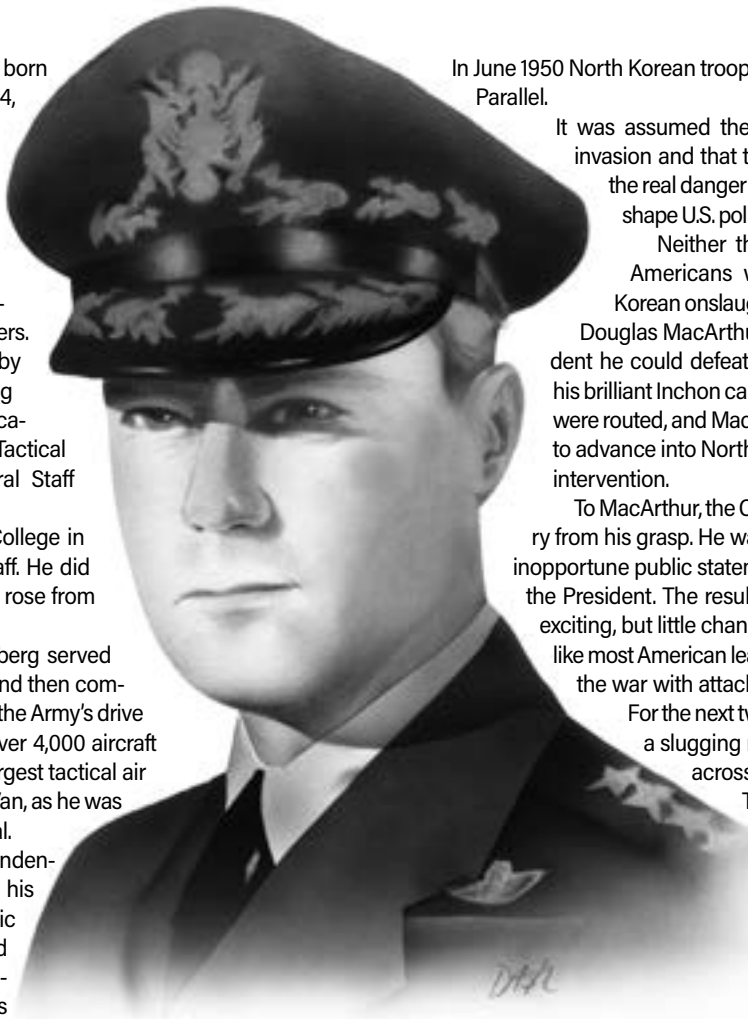


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