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ON THE COVER



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Two bald eagles on the hunt at a U.S. river come at their prey with talons poised.

It's All in the Numbers

This Almanac edition is Air Force Magazine's 64th since the first Almanac appeared in August 1958, 11 years after the U.S. Air Force became independent armed service. Gen. Thomas D. White, the Air Force's fourth chief—and the first chief born in the 20th century—led the Air Force then. Sputnik—the world's first synthetic satellite—had reached orbit just 10 months earlier.

It would be four more years before the proud parents of Charles Q. Brown Jr. and John "Jay" Raymond welcomed their newborns into the world. Little could they imagine their bouncing baby boys would someday be chiefs of staff of the U.S. Air Force and the U.S. Space Force.

There were 870,156 Active-duty Airmen in 1958, nearly triple today's active force. Today, even if you add in every Guardian, Guardsman, Reservist, and civilian, that Total Force is just 82 percent as large as the Active force was 64 years ago.

The danger now is that Americans don't know Airmen anymore—let alone Guardians. In 1945, 16 of every 1,000 Americans were members of the Army Air Forces. Most Americans had a first- or second-degree personal connection with an Airman. As 1.6 million veterans returned home, that connection endured for many years.

Today, however, the average American is no more likely to meet an Airman or Guardian than to come across a red-headed vegan. Each accounts for exactly 1 tenth of 1 percent of the U.S. population.

Our public is largely unaware of the tiny sliver of humanity responsible for deterring nuclear war, defending U.S. and allied interests around the globe, wielding the most lethal, precise, and rapid power projection capability in the U.S. military, protecting the homeland from air- and spaceborne threats, and ensuring uninterrupted precise navigation and timing the world over.

Yet in taking Airmen and Guardians for granted, we risk everything.

When the U.S. Air Force thoroughly dominated the skies in the 1991 Persian Gulf War, it defined the future of warfare for every sophisticated nation on Earth. The combination of technical prowess embodied by stealth and the devastating accuracy of precision bombing should have turned the page on warfare forever. Instead, it lulled Americans into a false sense of security. We had the world's greatest Air Force. What could go wrong?

Three decades later America is at risk of squandering that hard-earned title. Our aircraft are now too old and too few; our Airmen fly too infrequently. China, meanwhile, took to heart those lessons from Desert Storm and invested heavily to catch up. Some argue they already have. Without air superiority, America's ability to deter aggression and fight and win, if necessary, will continue to erode. The stakes could not be higher.

Some highlights of this looming crisis taken from the pages of this Almanac edition:

- America continues to invest less in the Air Force than in either the Army or Navy.

- The youngest B-52 bomber is over 60. The Air Force has not acquired a single new bomber in more than 15 years.

- The average USAF aircraft is approaching 30. New Airmen joining the force expecting the latest in innovative technology are instead climbing into their fathers' and perhaps even their grandfathers' planes.

- Our KC-135s and RC-135s are also as old as the Air Force Chief of Staff. It's wonderful we built planes that last, but sad that the Air Force flies its planes twice as long as the Navy sails its ships.

- Pilot training hours were lower in 2021 than in 2020; for fighters, they were lower than in 2018. Flying 6.8 hours a month on average is less than half of what is required.

- Old planes cost more to maintain. For every \$1 the Air Force invests in operations and maintenance, it spends just 39 cents on new weapons programs. That's down from 69 cents in 2015. You can't maintain a technological edge with that ratio.

- Some \$40.2 billion will simply pass through the Air Force budget to other agencies this year, rather than buy new Air Force aircraft and weapons. It's money reasonable people assume is being invested in our Air Force but, due to budgetary sleight of hand, is spent elsewhere.

Only half of Americans are old enough to have been around the last time U.S. pilots consistently faced air-to-air combat threats. During the Vietnam War, the chances of getting shot out of the sky were unreasonably high. It took a national effort to ensure that we would not go to war that way again—an effort that combined technology, doctrine, training, and tactics, as well as a national investment strategy. With too little time practicing against challenging competition, our Airmen face risks unlike any they have seen before.


"World's Greatest Air Force" is not a lifetime title like "Supreme Court Justice."

An arbitrary and inadequate Department of the Air Force budget, disconnected from the national defense strategy, makes too many compromises. This year, the Air Force offered to retire its oldest F-22 Raptors—the most capable fighters in the world—early rather than upgrade them, not because they are not needed, but because there are too many other pressing demands to fund these upgrades. Likewise, the Air Force asked for just 33 new F-35s in the 2022 budget; it should be acquiring 72 every year. Congress will likely come to the rescue on some of these needs, but having made too many compromises for too long, the Air Force is in a hole so deep that it could take decades to recover.

"World's Greatest Air Force" is not a lifetime title like "Supreme Court Justice." It is achieved only through a combination of bold and consistent investment, perpetual and creative innovation, continuous and calculated risk-taking, and dynamic and persistent training.

It also takes honest reckoning.

Our nation cannot build a national defense strategy that demands 60 combat-rated fighter squadrons and then try to sneak by with 57. Nor can our Air Force continue to teach pilots to fly in T-38 trainers introduced in the 1960s. We cannot let pilots fly only a couple of times a month and hope they are ready to take on peer threats.

The most critical role of the Air Force is to deter enemies from even considering challenging American might. Fighting and winning is only necessary if deterrence fails. But both rely equally on the readiness of the U.S. Air Force to not just match but exceed any foe. Our Airmen sign up to meet that challenge. Our nation owes them the investment to ensure they are equipped and trained to be ready and able—and not just willing—to take on any enemy, any time. 

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EMSO is NOT a domain

Electromagnetic Spectrum Operations is a critical enabling/support warfighting capability [See “Dominating the Spectrum,” March, p. 44]. The Electromagnetic Spectrum (EMS) is embedded in all other domains and is a key element of Information Warfare (IW). Information dominance is ubiquitous and relies primary on speed and adaptability. We must be able to aggregate our IW capabilities to be lethal and to disaggregate them to survive. Information Warfare includes: Cyber, SIGINT, IO, EW, and ISR. It is extremely naive to suggest that the EW or EMSO community owns or has dominion over the entire spectrum. It would be analogous to saying since space covers the universe, space is the only relevant domain.

All elements of IW access, dwell and exploit the electromagnetic spectrum. There are strong divergences between those who believe and those who disbelieve that EMSO should be a domain. DOD, the Joint Staff, and service leaders know that EMSO is an enabling and integrating capability that enhances the effects of all other domains, i.e. land, sea, air, space, and cyber. The JADC2 and joint warfighting concepts developed by the Joint Chiefs of Staff in 2021 realized that spectrum dependent, multifunctional systems certainly overlap and are now effectively transforming the operational battlespace. These key warfighting documents chose NOT to include EMSO as a domain but included EW effectiveness in the cyber domain rubric. Each of the IW elements are linked but not compromised.

The fundamental essence of EW or EMSO is to sense and respond faster in the spectrum than an adversary can. The latest example is Skylink, a 24-hour reprogramming capability that enabled continued support to Ukrainian forces

despite Russia’s jamming and denial techniques. While it may be popular with many of the pro domain EMSO advocates, especially those whose voices exceed their experience or strategic insights, one should never confuse leadership with popularity.

The cyber domain is an appropriate current term for representing all the functions that are spectrum dependent and vital to multi-domain operations. This is not the time to shirk our realities to the growing influence of the overarching cyber domain. The A2/6 [DCS for ISR and Cyber Effects Operations] leadership team is leading the way to give IW its appropriate priority.

Maj. Gen. Kenneth R. Israel,
USAF (Ret.)
Sterling, Va.

NO FOCUS, NO FIGHTING

The article [“Space Force Focuses on Fighting,” January/February, p. 25] purports to describe how the US Space Force is focused on fighting. Nothing was written to support this. It revealed that in three years, the Space Force has made org charts, partnered with some universities, watched as the Russians blew up a satellite in space, and were prohibited from discussing space weapons (and apparently can’t speak of it still). I had hoped to see some weapons. The quotes from the five generals were disjointed and the future direction for Space Force remains illusive. The article should have been titled “VUGRAPHS CAN BE DEADLY IN SPACE.” Poor job.

Mark L. Lupfer
Colorado Springs, Colo.

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WRITE TO US

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

The most popular answer to the spectrum threats to our space systems by our adversaries is develop a 'resilient space architecture' ["Accelerating Change at Space Force Delta 45," May, p. 47]? Since when have we based our warfare strategy on defense only? I thought we always attempt to deter first, then fight, and win if deterrence fails. A resilient space architecture offers no deterrence. Do we really think our adversaries will choose not to attack our space systems because they are built to withstand these attacks? Sounds like the Maginot Line before World War II. Deterrence requires an offense capability that can be used against our adversaries space systems should they attack. The vice president's recent announcement of a self-imposed ban on direct-ascent anti-satellite missile testing is consistent with a no deterrence approach. Do we really think this policy will encourage Russia and China to follow suit? Their leaders must find our strategy laughable.

Col. Dennis Beebe,
USAF (Ret.)
Solvang, Calif.

Old Intelligence

"Replacing Aging ISR," [April, p. 27] tried to provide a status report of current Air Force ISR programs, but it lacked

an insight of DOD ISR capabilities that could be refunded, upgraded or enhanced to meet some new needs.

I served as an intelligence officer in the Air Force for 20 years, on Active duty (1967-87) and another 24.5 years as a civilian employee (1988-2012). I worked on collection, exploiting, and disseminating all sources of intelligence to support DOD FLIP production, strategic targeting, tactical mission planning, air-ground operations coordination, information operations, and advanced weapon systems development.

I was fortunate to serve during a 40-year period when ISR was highly supported by DOD and operators. In most of my Air Force assignments, intelligence was integrated in the operations directorate and divisions at the Majcom, NAF, and unit levels. That gave intelligence the authority and power of a general officer, which enhanced support to units and influence at the COCOM and Air Staff.

In the mid-1980s, I provided the intelligence support to a Majcom team that worked on a joint service program to replace the SR-71. It failed because the Navy did not think they needed it to support their mission needs. I would submit that a replacement for a SR-71 could still satisfy many tactical needs stated in the article, including collecting

ISR where launching of geosynchronous or low orbiting satellites are not practicable.

Another disappointment was the Air Force inactivation of a wartime HUMINT collection program. Although Lt. Gen. David A. Deptula, then HQ USAF DCS/ISR, reinstated a new HUMINT program, when I retired it was far short of a wartime program that could establish sources for collecting information on moving, movable, and mobile targets in underground shelters, under natural cover, or camouflage. Knowing the location of such potential targets before they are deployed could be easier to destroy than tracking them to fix and target them. Debriefing of survivors, defectors, and detainees of bombed out targets would give an insight on the need for retargeting or not.

Use of drones to perform some tactical attack missions was definitely an improvement but it still needed other imagery or human intelligence support to be totally successful.

Finally, DOD multi-spectral measurement and signature intelligence (MASINT) programs that can provide ISR to support tactical operations need to be upgraded and refunded, if necessary. When I retired 10 years ago, I had yet to see the DOD MASINT community step

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up to successfully provide actionable intelligence and support tactical operations that they were intended to do at the unit and AOC levels.

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

Cancer and Pilots

The April issue contained several letters about prostate cancer and possible causes so I thought I would comment based on my personal experience and treatment ["Letters: Air Sick," p. 3].

I, and several members of Pilot Class 57-R, suffered with prostate cancer. Three of us were treated with proton radiation therapy, successfully.

Two of us were treated at the Loma Linda Medical Center in California. While there I attended a lecture about prostate cancer and its treatment with proton radiation.

The doctor/physicist explained the pilots and other flight crew members spend a lot of time in the air flying closer to the sun. This increases the exposure to proton radiation from the sun which increases risk of prostate cancer.

In fact, pilots and crew members who fly in the Arctic have an increased risk. This risk is also present for male airline pilots.

Current and future space flights to Mars will greatly increase the exposure of pilots to proton radiation and its side effects.

Another fact is genetics. If your father suffered from prostate cancer then you are at a 50 percent risk of getting it.

Bill Doerler
Pennington, N.J.

Diversity Concerns

Following a couple of letters in the March issue of Air Force Magazine, I'd like to state a fact: Neither the USAF nor any other uniformed American armed service has ever availed itself of the potential quality force structure that was, is, and will continue to be, present in this country. Why? Because none of those services has taken a single step to seek out, acknowledge, mentor, or encourage the many who have heard the summons of the trumpet but were discouraged, demeaned, turned away, and otherwise deterred from the service they sought to join.

My own case is but one illustration. My life plan from the time I was in grade school was simple: Join the Air Force,

become a pilot, and fly until I no longer could. From the very start I faced opposition. People in the Black community told me "they don't want you," people outside that community usually laughed or said "a Negro pilot?" as if I were discussing an alien being. My local recruiting office gave the White kids jacket patches; I got a laugh and was directed to the Army recruiter down the hall. He wasn't much more welcoming.

In high school I tried to find a way around this. Someone directed me to the Civil Air Patrol. Good idea, but they didn't want any "Negro members" either. I tried to find a kindred spirit at our local airport, someone who'd let me ride along with them. No luck there, either.

I had a relative who had been in the USAF in the 1950s. I told him what I had been doing. He told me, 'You might as well stop now. You've already gone further than most in this, and you have had no success. What does that tell you?'

I am sure that I am far from the only Black/Asian/female or other "diversity subject" who tried and tried to find a way into a service I loved and respected, even though it turned me away at every attempt. So, those who are resistant to change or "diversity" and who think that concern about this is "woke," I ask you: What makes you think that you have had the best candidates in your service, other than the fact that said candidates looked like you?

Norman E. Gaines Jr.
Hartsdale N.Y.

In response to Lt. Col. (Ret.) Price Bingham's letter in the May issue, I will say this: Diversity of leadership and Airmen is a fine thing, but the overarching goal is a more capable military service (in this case the USAF). If the goal is simply "diversity for diversity's sake," then we are definitely way down a spiraling rabbit hole.

Yes, all militaries (including USAF) are somewhat slow to change and adapt, plus by nature, conservative organizations that do, on occasion, need a little kick in the butt to incorporate change. (This is a given.) Yet, even with that given, it appears to me that the DOD is pushing diversity of everything under the sun as the goal. If diversity doesn't make us a better fighting force, more capable of defending America's interests, then diversity is not a noble goal.

The diversity push is all well and good,

but if we have no metrics to prove it is making the U.S. military more capable, then it is irrelevant to the mission. Unfortunately, these diversity metrics will probably be collected after the next major military confrontation. Until that unfortunate event occurs, the DOD will continue its diversity push without any indication of how it affects the mission of the U.S. military (for good or ill) and that will be a shame.

Lt. Col. Marshall Miller,
USAF (Ret.)
Piedmont, S.D.

The Real Threat

I am shocked that we are still building so many new manned fighting aircraft.

I think the B-21 program could be reduced by half and monies be better spent on the pilotless Tomahawk Land Attack Missile and/or drone technology.

The Tomahawk has more than proven itself as *the* most effective significant air weapon in our arsenal.

The Trident missiles in our nuclear submarine fleet, combined with ICBMs present a more formidable worse-case air defense or offense than America could possibly require. The Tomahawks and drones can surely handle any local conflicts. I much prefer seeing *fewer* of our fighting men put in harm's way.

Aside from President [Vladimir] Putin and Russia, the enemies America now faces are either rogue nations or terrorists. The possibility of the USA requiring *more* conventional bombers does not seem reasonable.

I do not understand how old-school bombing tactics are relevant to present US defense. Sure, we still need a worthy conventional, manned fighter and bomber force, but surely not in the numbers currently being stated by the U.S. Air Force? The living, breathing fighter pilot is not completely obsolete, but I am glad to say that it is an occupation that will likely not exist in 20 or 30 years. Yes, the romantic in me is sadly disappointed, but I will gladly trade this for the life of a single U.S. Airman.

I do not dismiss that we must be prepared for the usual or the unusual—even the highly improbable and/or perceived impossible attack, but I believe this can easily be accommodated by fewer B-21 bombers. Please don't misunderstand me. The new B-21 represents outstanding technology that we absolutely need.

Alas, I wish I could say that I am not

extremely concerned with the military threats facing the U.S. I am frightened to my core. But I believe these new threats will not resemble a scenario that would require the use of B-21s.

As a favorite senator once said, "A billion here and billion there, and pretty soon you are talking about real money!" I cannot help thinking that cutting the B-21 program by 30 to 50 percent would free up funds that would better help the U.S. defense in other areas (e.g., improved computer/web security, or a dirty bomb terrorist attack). Plus, improving the Tomahawk should always be considered. Successful weapons are not built in a single stroke, but through long years of trial and error.

I am far more worried about our enemies in the Mid East employing "dirty bombs" via terrorist tactics. What form this might take is unknown, but I suspect a Tomahawk or a drone will be more useful than a B-21 with such a threat.

I view North Korea as the United States' most underestimated enemy. North Korea presently is wreaking havoc on the web. The attack on Bangladesh, and North Korea's successful

hacking of the SWIFT system seem far more relevant and immediate than any possible requirement for conventional bombing sorties.

The North Koreans do not want to destroy the web. For them, the web is a valuable source of foreign cash reserves. However, they will go too far, make another mistake—like the British NHS debacle—and thoroughly undermine the average web user's faith and confidence in global web security. I speak specifically of personal banking and the millions of relatively small purchases and transactions made daily that are now the backbone of the Earth's economy.

My fear? That we end up with a perfectly functional, 100% intact WEB network that no one will again dare to use. What this would do to the world's economy would be devastating and UNTHINKABLE.

Worse, I fear we are closer to this event than most people understand.

What would happen if 10,000 U.S. personal bank accounts were suddenly wiped out accidentally by the North Koreans? Remember that the British NHS attack was an accident! Or a rogue nation, such as Iran or Syria, purposely

making the WEB so unsafe that no one would dare to perform a simple Google search!

I am now old and retired; however, I worked teaching Computer Science and in Wall Street IT, banking, brokerage, trading, and insurance for over 35 years.

After what I have seen from the North Koreans since the attack on Sony and the theft of almost all of Bangladesh's meager foreign cash reserves (this required hacking the satellite-based SWIFT System), I think any sort of overwhelming WEB attack is possible, and eminent.

Frightened? You bet I am!

Don Hoffman
Tacoma, Wash.

In Search of ...

Service members/relatives who served at **Eglin AFB, Fla., March 1949-June 1950** and appeared in the film "12 O'Clock High," a list of the pilots/aircrews who flew in the film from the **First Experimental Guide Missile Group**, and any members of the **3203rd Aircraft Maintenance Group**. **Contact:** Bruce Orriss at bruceorriss@gmail.com (310) 337-1938.

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DOD/USN

"Unidentified Aerial Phenomena are a potential national security threat. And they need to be treated that way. ... For too long, the stigma associated with UAPs has gotten in the way of good intelligence analysis. Pilots avoided reporting, or were laughed at when they did. DOD officials relegated the issue to the back room, or swept it under the rug entirely, fearful of a skeptical national security community. ... Today, we know better. UAPs are unexplained, it's true. But they are real. They need to be investigated. And any threats they pose need to be mitigated."

—Rep. André Carson (D-Ind.), panel chair for a House Intelligence Subcommittee hearing on Unexplained Aerial Phenomenon [May 17].

Permission Denied

"The A-10 is a great platform for a [permissive] environment. ... I don't see very many [permissive] environments that we're going to roll into in the future."

—Air Force Chief of Staff Gen. Charles Q. Brown, House Armed Services Committee [April 27].



Zhang Haichao/China Ministry of Defense

Incoming

"Today, our competitors possess the means to strike critical infrastructure in the homeland with advanced kinetic capabilities such as intercontinental ballistic missiles, hypersonic missiles, and sea- and air-launched advanced cruise missiles, while also possessing robust non-kinetic cyber and information capabilities. ... Both Russia and China will possess the conventional capabilities, across multiple domains, to present a persistent, proximate threat to North America. If left unresolved, these could place power projection capabilities at risk, resulting in the U.S. military being forced to 'fight to get to the fight.'"

—Gen. Glen D. VanHerck, commander of USNORTHCOM, and Gen. Jacqueline D. Van Ovost, commander, USTRANSCOM, Op-Ed, Marine Corps Times [June 2].

Who's In?



White House/Facebook

"Yes—that's the commitment we made. We agree with the 'one China' policy. We signed on to it [and] all the attendant agreements made from there. But the idea that [Taiwan] can be taken by force—just taken by force—it's just not, it's just not appropriate."

—President Joe Biden, responding to a reporter asking if the U.S. would respond militarily if China moved to take Taiwan by force [May 24].



Taiwan Military News Agency/MOD

"Mr. Biden said 'America is in.' That means Japan will be in, too."

—Naruhige Michishita, vice president, National Graduate Institute for Policy Studies in Tokyo, responding to President Joe Biden's comment that U.S. military will defend Taiwan from China invasion, The New York Times [May 23].

Dust in the Wind



Capt. Kip Sumner

"If [Pratt & Whitney] is in the audience, and if they're listening, watch out. I'm coming at you in a very angry mood. ... You gave us an engine, and it doesn't work. Or it worked for a little while until we get some dust around it, and then it doesn't work. What the hell? What's going on here?"

—House Armed Services Committee Readiness panel chair Rep. John Garamendi (D-Calif.) [April 28].

STRATEGIC ERROR...

"Russia has created what the Russian president always wanted to prevent!"

—German Foreign Minister Annalena Baerbock on Finland and Sweden's request to join NATO, The Washington Post [May 16].

STRATEGIC RISK ...

"If this is left to stand, if there is no answer to this aggression, if Russia gets away with this cost-free, then so goes the so-called international order. ... And if that happens, then we're entering into an era of seriously increased instability."

—Gen. Mark A. Milley, Chairman of the Joint Chiefs of Staff, to CNN, [April 27].



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AFCENT Tests ACE in Combat

The commander of U.S. Air Forces Central (AFCENT), Lt. Gen. Gregory M. Guillot, spoke with Air Force Magazine from the AFCENT headquarters at Al Udeid Air Base, Qatar.



Tech. Sgt. Maeson Elleman

Lt. Gen. Gregory Guillot, 9th Air Force commander, during a tour at Uvda Air Base, Israel, for Blue Flag 21.

Q: How has CENTCOM changed?

A: The big difference ... is the complexity of what we see out in the airspace. When I was here years ago, it was certainly a challenging environment. Certainly conflict is always challenging, and we faced some significant threats.

But the complexity in the air today, for example over [and near] Syria, is much greater than it was back then because there are so many different actors flying in the same airspace at the same time. There are, I'd say, seven different countries all flying up there, and one of the countries is AFCENT—the U.S. Air Force, U.S. Navy, U.S. Marine Corps, and all our joint partners being counted as one air force. There are six other air forces that fly in that airspace, and they all have different rules to follow, and the rules of engagement ... it puts a lot of pressure on our Airmen to ... be able to react and fly in that environment.

Q: Who are the other air forces flying in and around Syria?

A: You'll see Russia. You'll see Israel, Turkey, Syria, of course, Iraq, Iran or their proxies, and AFCENT.

Q: Of the 21 nations in the AOR, how many are friendly?

A: Eighteen of the 21, we have friendly relations with. One, Yemen, of course, is in a civil war. ... Then Syria and Iran are the 20 and 21.

Q: AFCENT's transition to joint distributed operations was prompted by Iran getting more weapons. What else factored into that?

A: The nature of Iran's increasing capability was a primary driver in the decision to distribute our command and control operations, but there are a number of other benefits.

Distributing keeps us from having a single point of failure, and not just due to enemy attacks but due to power outages, storms that can come through ... or maybe limited access diplomatically to the region.

By distributing our capability, we make sure that we don't have any one single point of failure in our command and control operations. ... It allows other regions and their AOCs to use our equipment and vice versa, if needed. ... We're finding that operational C2, which is ... the mission we conduct at a CAOC, is becoming more and more location-agnostic, and it's more the capabilities and how we can spread them. ... In our new distributed manner, it's easier to get to a distributed location,

... so you can tap into that expertise on a short-term basis and have them participate in a planning session, and then they can go back to doing their job, ... in the past we just wouldn't have access to them.

... Here locally, on a daily basis, the ops and intel [O&I] brief ... used to be attended by 25 people or so in a conference room. Since we started distributing, we adjusted the timing of our battle rhythm. That meeting is now in the afternoon here at Al Udeid. So everybody at Shaw can participate, and then we can have out stations, all the wings, dial in. The wings didn't use to participate in that because they couldn't be in the building. And we even have some international partners that can dial in. So instead of 25 to 30 people attending the O&I in a day, now we have over 400 participants dialing in ... and sharing the information and getting guidance and direction on a daily basis.

Q: Where are you now in the distribution process?

A: There are two levels of command and control that we were directed to distribute. The first level was the tactical command and control, and that's the air battle managers who talk to the aircraft and give them direction and threat warning, etc. ... They were operational in May 2021 out of the Army Central Command headquarters at Shaw Air Force Base, [S.C.] ...

On the ... CAOC level, we had probably 40 people at Shaw when the direction was given, and now we're probably over 200.

More than the people, it's the functions. We've taken significant functions of the AOC—the strategy function, the air mobility function, the ATO or air tasking order production ... all of those functions are now at Shaw.

Here at Al Udeid, we still run the combat operations 24/7... but we have the ability to do that for some period of time out of Shaw if we need to. We regularly exercise where we will move some people back and run from two different locations simultaneously to ensure that we could do that in a crisis.

Q: How is AFCENT implementing Agile Combat Employment?

A: We use [ACE] here in AFCENT on a daily basis, and we share notes with PACAF and USAFE all the time on how we can take the way they do ACE in their theaters, which is driven by their geography, and use it in ours. And we try to share our lessons learned with them.

I think the big benefit we have here in AFCENT is when we conduct ACE: One, we do it every day as part of our operations. And two, we do it in combat every day. So we don't do ACE as an exercise or as a demonstration, we actually do it every day in combat.

What we've found is it gives us a lot of resiliency. By moving our forces around, it helps us avoid if we have a runway outage somewhere or bad weather in a location. Or, in a hypothetical situation, if we weren't able to have airspace access due to a diplomatic disagreement, it allows us to still generate combat air power and not be locked out of any one location.

Also it shortens, many times, the transit time—so our time airborne is more effectively spent in the target area instead of transiting to and from the target area.

We have some great innovations that we've been able to employ in combat that we've brought back to the Air Force, and now those are being implemented Air Force-wide.

Probably the most significant example is the hot-pit refueling of the KC-135 tankers. ... What hot-pit refueling is, that means you don't shut the airplane down when it's on the ground, and you refuel it while it's still running. And the reason is, airplanes generally, once they're running, stay running really well.

When we do that, and keep the engines running, we can generate multiple sorties from the same aircraft and even swap out crews, in some cases, ... the KC-135 had never done the hot-pit refueling. Our Airmen in this theater put in a proposal, got the approval through Air Mobility Command, and we've been doing it for coming up on two years. In fact, we had one mission where it had seven different sorties by the same KC-135. I think it had either three or four crews involved that swapped out, and it was over 24 hours, and the airplane never turned off. And under normal circumstances, that airplane would have either flown once or twice, and we got seven combat missions out of it.

What we're putting a lot of emphasis on [now] is how do we logistically sustain ACE now that you're operating at multiple locations, and then how do we command and control from the ground—so that a wing commander who's used to only worrying about her or his base now probably has three or four cluster bases that they're responsible for.

Q: Could you optimize ACE with artificial intelligence?

A: We have an initiative—it's actually a U.S. [North American Aerospace Defense Command/Northern Command] initiative that we're trying to partner with them on—that puts artificial intelligence into all of our radar sensors that can help us detect threats out there.

We're trying to put AI into a lot of our CAOC functions where we can more seamlessly plan and replan changes to missions, for instance, if an aircraft—a tanker or a fighter aircraft—[falls out], using AI to help us reflow how we get our airplanes out there to make sure that we can still cover all of our responsibilities.

And there are a number of other areas where we're trying to do that. Gen. [Michael "Erik"] Kurilla, our new commander in CENTCOM, is very interested in innovation and certainly in AI, and so we're standing up an office in our headquarters to see what other potential uses of machine learning and AI that we could bring into our organization. And yes, those capabilities will definitely play a role in ACE.

Q: How do AFCENT's layered counter-UAS systems work?

A: Our adversaries in the region are increasingly using UAVs to attack our partners and also U.S. and coalition locations. And it's a threat that seems to be growing very rapidly.

The top part of the layer would be using airborne radar, whether on an AWACS or on a fighter aircraft, to try to detect these UAVs. We also can use our own unmanned vehicles to look out there and try to pick up the UAVs.

Once we do, we go into that layer to see which system—between the airborne layers, all the way to ground-based sensors, which can pick them up either with radars or even visually or optically—which one has the best capability to detect, identify, and then ultimately engage, if necessary, the UAVs that are threatening our ground locations.

So that's the layer. It starts in the airborne with the detection capability, maybe by AWACS, into fighter aircraft, and then as you get closer to the base that you're defending, using a variety of systems and sensors at those bases to take a layered approach to make sure that nothing can slip in between a seam and damage our base and hurt our military personnel.

Q: What sorts of sensors?

A: There are radars involved. There are electro-optical systems that are involved. ... I'm responsible and my command is responsible for the air portion of it, but at a certain range, it transitions to being the base commander's responsibility to defend the base as they get in closer.

So we have to, through data links and other measures, make sure that the ground commander can see the air picture and vice versa so we can seamlessly hand off that track, if necessary, to make sure that the best system engages it. ... There's both kinetic and nonkinetic ways that we can defeat them from the ground-based systems as well, and that's part of the layer that I was describing—different overlapping ways to sense and different overlapping ways to defeat. ... Sometimes we'll shoot it down with a fighter, and other times, it's best knocked out nonkinetically by the ground or kinetically by the ground.

Q: Are you doing that in multiple places?


We do it at all of the AFCENT bases, and then we also do it in support of all of the other bases that are in the region that are not run by AFCENT.

Q: What else has the cooperation with other countries brought about?

A: Hand in hand with the increasing complexity has been the increase in partnerships that we have with fellow air forces here in the region.

There's three ways that we help General Kurilla meet his objectives. ... The first one is to deter state-on-state action from Iran at the state level. By having strong partnerships and making sure that any potential adversary looks across the region and doesn't just see the U.S. presence but sees the U.S. working together—fully integrated with multiple partners—I think is a very strong deterrence.

The second area ... is by assuring partners of our commitment to the region, to peace, and to stability in the Middle East. We show that not only with the combat actions that you and I talked about already, but also by performing defensive exercises with our partners. Also when Gen. [Anthony J.] Cotton from Air Force Global Strike Command sends B-52s or B-1s over into the region on Bomber Task Force missions, that is an assurance to our partners not only that they're there to help defend the region, but also how quickly they can get over here. ... I think we had 10 different countries [that] flew on the wing of those B-52s as they crossed the region. That, I think, is a very important sign of both deterrence and assurance.

Then the third way is to respond if there is an attack on the U.S. or coalition, or on our partners, that we can show with air power how quickly, and with precision and lethality, we can respond to threats where and when needed. And those are often conducted with partners. 

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The 418th Flight Test Squadron, out of Edwards Air Force Base, Calif., offload fuel from a KC-46 Pegasus tanker to an E-4B Nightwatch airborne operations center from Offutt Air Force Base, Neb., over Southern California in April. The E-4B is part of the National Military Command System, intended to support the President in times of national emergency, such as a nuclear attack, and the Defense Secretary and staff during overseas travel. At least one E-4B is on alert 24/7, with a global watch team at multiple bases around the world. The Boeing 747-200 airframe is equipped with shielding to enable it to withstand electromagnetic pulse and nuclear and thermal effects.



Capt. Joshua Thompson

An Air Force MC-130J Commando II skims over New Zealand's South Island, affording a unique view to three members of the Royal New Zealand Air Force's 40 Squadron in May. Two MC-130Js from the 353rd Special Operations Wing flew in formation with a RNZAF C-130H Hercules as part of Exercise Teak Net 22. New Zealand's Air Force counted more than 1,000 aircraft at the end of World War II. Today, it operates fewer than 50, including C-130s, P-3 Orions, T-6 Texans, and a variety of helicopters.



Airman 1st Class Timothy Harrison, a conventional maintenance crewmember with the 2nd Munitions Squadron at Barksdale Air Force Base, La., readies tail kits for installation during a Combat Ammunition Production Exercise in April. The 2MUNS CAPEX event tested Airmen's ability to keep up with demand when the base's B-52H bombers take part in sustained combat operations.

Airman 1st Class William Pugh

By John A. Tirpak

A Strategy on the Installment Plan



Yang Pan/China Ministry of Defense

The new NDS puts a steady focus on China, considered the U.S' pacing threat. China's vast economic resources for such advanced weaponry as these J-20 fifth-generation advanced fighter jets, is fueling its rapid military growth.

Wars and provocations notwithstanding, delay of the National Defense Strategy leaves Capitol Hill and Congress scrambling for direction.

The 2022 National Defense Strategy places China front and center as America's "pacing threat" and dubs Russia, three months into its ruthless and thus far unsuccessful invasion of Ukraine, an "acute" threat—meaning it poses a lesser concern over the long-term.

Yet two months after providing a two-page synopsis of the NDS, the Pentagon has yet to issue the final draft. Instead, leaders sporadically fill in details through senior leader speeches and Capitol Hill testimony. That's left the entire community—the operational military, Congress, and the defense industry—without comprehensive guidance for the future.

According to a White House summary, Defense Secretary Lloyd Austin's defense strategy largely echoes the 2018 version prepared under then-Secretary James Mattis. That document reset America's defense priorities after 20 years of focus on violent extremism toward a primary focus on confronting "great power competition" with both China and Russia. By pegging China as the single top competitor, the new NDS acknowledges Beijing's rapid military growth and its vast economic resources to ensure continued growth and investment.

Austin's spin on the strategy elevates an "all-of-government approach" as the only effective means of challenging America's competitors. The administration claims this year marks the first "fully integrated" re-examination of the NDS, the Nuclear Posture Review, Missile Defense Review, and National Security Strategy—which enfold them all—and that doing so ensures "tight linkages between our strategy and our resources." The all-of-government approach combines "soft power" diplomacy and economic pres-

sure with "hard power" military capability to avert conflict and promote peace and democracy.

THE NEW NDS SETS FOUR PRIORITIES:

- Defend the homeland against "the growing multi-domain threat" posed by China.
- Deter attacks against U.S. interests, allies, and partners.
- Deter aggression by being able to win wars—"prioritizing the [People's Republic of China] in the Indo-Pacific" and placing the "Russia challenge in Europe" as a second priority.
- Build a "resilient Joint force and defense ecosystem," such that the defense industrial base is capable of both innovation and surge production.

With China pacing U.S. investment, the strategy also pledges the U.S. "will collaborate with our NATO Allies and partners to reinforce robust deterrence in the face of Russian aggression."

Austin's four NDS priorities distill eleven goals of the 2018 version into a simpler construct. It addresses, but does not specifically call out as priorities topics such as "maintaining favorable balances of power" in each region around the world; deterring terrorists from attacking the U.S.; discouraging the proliferation of weapons of mass destruction; and accelerating defense acquisition.

The NDS sees North Korea, Iran, and violent extremist organizations as lesser threats and identifies climate change and pandemics as "transforming the context" in the operational environment because of their potential to trigger food shortages, political instability, and large-scale migration.

The strategy says the U.S. must increase its ability to "withstand, fight through, and recover quickly from disruption," whether caused by natural, military, or cyber effects. It also highlights military alliances and cooperative agreements as national advantages

and force-enhancers in almost every aspect of national defense.

The NDS' focus on all-of-government "integrated deterrence" includes a "lethal, resilient, sustainable, survivable, agile, and responsive joint force;" close cooperation with partners and allies; active "campaigning," meaning day-to-day operations to prepare for and deter conflict, such as international and joint exercises; and "building enduring advantages" with new technology and a professional defense workforce.

An unclassified half-page summary of the Nuclear Posture Review, released at the same time, is similarly shrouded from full transparency. The U.S. "seeks strategic stability" and to avoid "costly arms races," it says, emphasizing that America's nuclear arsenal is built for deterrence and to be used only "in extreme circumstances to defend the vital interests" of the U.S., its partners, or allies.

And in an even briefer comment, the White House said its Missile Defense Review says: "Missiles are a principal means for projecting military power, which makes missile defense a key component of integrated deterrence." The review "assures the vital contributions of missile defenses to a resilient defense posture that reduces adversary confidence in missile use, reassures allies, and offers military options to avoid risks of escalation."

THREE FYDPS

Deputy Defense Secretary Kathleen Hicks, speaking at the Reagan Forum in early May, said the Pentagon has fulfilled its obligation to give Congress a classified summary of the NDS. But rapidly evolving events, particularly in Ukraine, demand additional attention to "get that right." A strategy, she said, is "something you live and execute," not merely a "document."

The NDS should be "constantly reviewed and updated," she noted, anticipating release of the National Security Strategy, which encompasses all the other strategic reviews, "in the coming months." She said it is not yet "a finalized document."

Hicks said the NDS takes what she called a "three-FYDP" approach to building a new force structure, referring to three five-year, Future Years' Defense Plans.

The Pentagon knows what forces it needs now, through 2027, she said, and it knows what it must have to be competitive with China in the 2030s, which she characterized as the "force design" period, "with all the robots and stuff."

The here-and-now 2023-27 FYDP will focus on "that 'campaigning' and deterrent capability," she added. Emphasis is on cyber and space resilience, force survivability, and new munitions. She said the Pentagon must also modernize the strategic nuclear deterrent, in which "we were under-invested for so long that we're now having to pay that price."

She called 2027 a "notable" benchmark because that's when China is expected to have the capabilities needed to seize Taiwan.

The next, or middle FYDP, is the challenge, Hicks stated. The Pentagon has to build a credible plan to field its objective force, one that Congress, the military, and the industry can collectively fulfill.

The Pentagon has to convince Congress that "we have ... a viable pathway" to the 2030s, she said. Failing to win that trust and confidence "is what keeps sliding us back."

To get there, Hicks sees "pathway finders," technology and operational experiments, and prototypes to prove the case, she said. Heavy investment in software is needed to tie concepts such as joint all-domain command and control to "actual capabilities that can be fielded."

"I think that's where we have to make a lot of progress," she said. Congress must grant the Pentagon new authorities to accelerate development and, perhaps, to bypass traditional impediments to introducing equipment; slowdowns eat up time and resources the

nation cannot spare to counter the growing threat from Beijing.

But Congress must work with the administration to avoid adding topline spending earmarked for "new programs that we can't support and can't afford in the out-years, and that doesn't cover inflation," Hicks said. "That is my No. 1 concern."

In an April meeting with defense writers, Hicks said one of her biggest worries is that Congress has too little patience with the Pentagon when it comes to testing new systems. New technologies are fraught with risk, she said, asking that Capitol Hill allow the Pentagon leeway to take more risks.

The U.S. "used to be first in class" in its willingness to "test, learn a little, test, fail, learn some more," she said. But today she sees "real resistance" to that on Capitol Hill, where lawmakers seem uncomfortable with "concurrency" and "technically risky approaches."

She said, "We have to be willing to fail."

LESSONS FOR TAIWAN

Hicks acknowledges the Pentagon has been preoccupied with helping Ukraine resist Russia's invasion, but said DOD has to be able to "walk and chew gum and the same time."

That conflict offers "clear takeaways" for Taiwan, underscoring that the U.S. can help Taiwan now by providing equipment and advice so the island can better defend itself.

Ukraine has also shown that the "will to fight and demonstrated capability to fight" are powerful force multipliers. Taiwan, she said, should "make sure they are investing in themselves in the self-defense that they need to have."

Finally, the international outrage over Russia's invasion and the largely united response has shown that western economies have a "huge throw-weight" in nonkinetic, economic power. "When they choose to bring that to bear, it can have devastating effect," Hicks said.

These are all lessons that China should also be learning, she added: The "big takeaway ... on the costs of aggression."

THE PRICE OF DELAY

The Pentagon provided a classified summary of the NDS to Congress just a few days before presenting it with the fiscal 2023 budget request, which also lacked out-year spending plans. This was the very same "first FYDP" Hicks was talking about.

Sen. Deb Fischer (R-Neb.), of the Senate Armed Services Committee, voiced frustration over the lack of detail in April: "I think having this hearing without any detailed information about the budget, and when we are unable to openly discuss any of the administration's strategy documents, directly undermines the committee's ability to conduct its oversight work." She said that was "contrary to the spirit of transparent government."

Likewise, a long-time defense expert said the Pentagon's two-page summary "doesn't provide enough detail to be actionable." Providing Congress a secret version of the NDS helps some, but the unclassified version "is essential for communicating throughout the government and industry."

Only some "members and staff can or will be able to read the classified document," the expert said. Ultimately, "the lack of an NDS really undercuts the administration's budget request."

But the NDS's function as a means to communicate the Pentagon's priorities and objectives to industry is also a lost opportunity and a concerning delay. The NDS is an important way to let the industry know what leadership is thinking. Yet even if the delayed release has diminished the overall value of the NDS as the underlying insight informing the 2023 budget request, its release sooner rather than later can still make a difference, the long-term budget watcher said: "It's late—but not too late." 🌟



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Unleashing Tech so Airmen 'Train as They Fight'

Air Force leaders want Airmen to train as they fight, but the barriers to executing true distributed mission operations are everywhere: simulators and networks need to communicate, combat systems need to talk to simulators, international partners need access to one or another component of the live, virtual, and constructive training continuum.

The Air Force The Air Force search for answers may lie in a legacy Defense Advanced Research Projects Agency program that enabled Navy training with joint and allied partners. Called the Navy Continuous Training Environment (NCTE), HII developed and matured in partnership with the Navy, it offers a comprehensive toolset for solving the Air Force's LVC training challenges, said Michael Aldinger, vice president and Air Force lead for HII's LVC Solutions Group.

"The Air Force and Navy DMO programs are focused on 'Train as you Fight,'" Aldinger said. "The concept is to prepare the warfighter to execute their missions successfully. The training systems we integrate are concurrent with the platforms in the field, so our distributed architectures enable the warfighter to train with the teams they're going to deploy."

LVC integrates live action operators, others operating virtually in simulators, and constructive simulations injected into both training domains. The goal is the most realistic training possible, so when warfighters find themselves in the middle of action, they are already well versed in what to do.

"A critical aspect of integrating these domains together is developing interoperability standards based on training objectives," Aldinger said. "HII's enterprise approach utilizes common standards, tools, and procedures for the entire spectrum of training, so it can scale from the unit level all the way to the joint and even coalition level. It's one single set of tools to govern all levels up to and including very large scale."

An LVC enterprise training architecture provides an interconnected network that enables effective distributed mission operations.

"The value of distributed mission operations is that disparate simulators located at bases throughout the world are interoperable and interconnected, providing our warfighters the means to train together as a team from multiple locations. That is why DMO provides an ideal solution for achieving war-



Mass Communication Specialist 3rd Class Jesse Schwab/USN

The Navy Continuous Training Environment connected live, virtual, and constructive participants in an August 2021 Large-Scale Exercise that spanned 17 timezones around the globe.

fighter readiness," Aldinger added.

HII developed its technology and enterprise architecture approach for more than a decade developing the NCTE.

"In 2021, the Navy executed a large-scale, two-week exercise using our LVC enterprise approach with 25 ships and 25,000 participants, including live aircraft and simulators, live ships at sea, and live ships dockside that were all pulled into one, single event," Aldinger said. "This capability enables training at the unit level for ships, small team training for air, joint training across services, and coalition partners like Australia, Japan, and UK, all together in large-scale exercises."

An enterprise architecture that embraces open-source solutions is critical for overcoming current limitations to speed and agility that are essential for effective warfighter training.

"HII's enterprise approach to LVC removes the proprietary aspect of existing solutions," Aldinger said. "The Air Force has been clear that proprietary solutions impact agility and speed because it keeps solutions in the hands of the few. That limits innovation because only one specific contractor can evolve a designated program to solve a problem."

But nonproprietary solutions are better aligned to the goals of Air Force leaders.

"Nonproprietary solutions are important because everyone has access to the data," Aldinger said. "With the disparate solutions out there today, everyone is developing their own solution, and you're not all building toward a common goal. That limits who can contribute effectively. If we want to realize the innovation the Air Force is requesting, all-inclusive stakeholder involvement is going to be critical."

Nonproprietary solutions enable new and

advancing technologies to be applied to distributed mission operations across the enterprise.

"DMO has evolved dramatically, but there's so much more that can still be done with developing technologies such as AI/ML," Aldinger said. "You hear a lot from the Air Force, 'We need more innovation,' and by eliminating the proprietary nature of their programs, they will get more innovation, agility, and speed, because now you have stakeholders solely focused on the warfighter and getting the right technical solutions in place."

Everything becomes easier once there is a common interface and connecting mechanism, Aldinger said.

"With the LVC enterprise, we utilize common tools to support all aspects of the event life cycle, from training system standards compliance evaluation through to event coordination and distributed execution," he explained. "Then, after the event is over, there are tools to evaluate the performance of the pilots. [The LVC enterprise] offers a very broad spectrum of capability that is really at the center of defining the training framework"

This is especially critical for the most advanced weapons and platforms.

"Fifth Generation brings a whole new level of training fidelity and capability to the Air Force," Aldinger said. "If we're going to be successful with the integration and operations of the F-35 and beyond, we must improve testing fidelity, as well. Instead of having two separate environments for testing and training, they can unify these two into one high-fidelity architecture."

That will save money across the enterprise, Aldinger said.

"An enterprise approach is going to reduce the cost of maintenance and sustainment, improve stakeholder collaboration and innovation, and focus your team on an all-domain future," Aldinger said. "There's going to be substantial cost savings in that alone."

But the savings and benefits extend beyond that.

"The future of training is joint all domain, whether it be subsurface, surface, air, space, or cyberspace," Aldinger said. "Today, all these domains are being trained separately and across the commands. As we head into the future, it must all be within an enterprise architecture so that we are training the warfighter and preparing them to win."



Flying Hours in Decline

After a brief one-year recovery, flying hours have begun falling.

Tech. Sgt. John Raven

Active-duty flying hours for fighter pilots declined 16 percent on average in 2021, falling to 6.8 hours per month.

By John A. Tirpak

Active-duty Air Force pilots flew fewer hours in fiscal 2021 than the previous year, giving back gains made the prior year, but Air National Guard and Air Force Reserve pilots gained back some additional training in the same period.

Flying hours are a critical barometer for Air Force readiness and indicative of factors such as pilot and spare parts availability, speed of throughput at depots, and operations budgets. Inadequate flying hours reduces pilot proficiency and historically correlates with increased accident rates.

According to Air Force figures provided to Air Force Magazine for this Almanac issue, pilot flying hours across all types of aircraft in the Active-duty force, on average, declined to 10.1 hours per month in fiscal 2021, down from 10.9 hours in 2020. In 2019, flying hours averaged just 6.8 per month, down sharply from 10.7 in 2018. Historically, the Air Force has sought to give combat pilots 200 or more training hours per year, or a minimum of 16 hours per month.

Air Force Secretary Frank Kendall, responding to questions during a visit to the Heritage Foundation June 1, expressed disappointment with the decline.

"I'm not happy with where we are," he said. After a decade of operating under the Budget Control Act of 2011, the service has "never recovered," he said.

On the plus side, Kendall said, rapid advances in

technology mean Airmen are able to "do more with simulators" today, gaining extremely high-fidelity virtual training that is far less costly than flying real aircraft, which require fuel, parts, and maintenance. Simulators also allow aviators to rehearse emergencies that can't be practiced in a real, flying airplane.

Declines were particularly high for some of the most demanding training, such as fighter pilots.

Active-duty fixed-wing hours averaged just 6.1 hours per pilot per month in fiscal 2021, down steeply from 8.7 hours in pandemic-challenged 2020. Air National Guard fixed-wing training hours fell from 10.8 to 7.9, while Air Force Reserve pilots saw training rise from 4.8 hours in fiscal 2020 to 10.9 in 2021.

Tanker flying time for the Active duty was flat, but Guard pilots saw a downturn from 10.4 to 9.4, while Reserve pilots flew more, up to 9.1 hours from 8.3 the year before. Retirements of the KC-10 tanker may have affected flying time, although new KC-46s are also entering the force.

Trainer aircraft time dropped about 20 percent for Active-duty pilots, from 9.6 hours to 8 per month. Guard trainer pilot time was flat at about one hour per month, while Reserve hours fell precipitously from 2.9 to 0.4 hours.

Reconnaissance hours were up for pilots in that category, from 7 per month to 8.4. Reserve time in recon was flat at 5.3 to 5.4, but Guard recon time fell from 9 hours a month to 8.1.

"I'm not happy with where we are."

—Air Force Secretary Frank Kendall

AVERAGE PILOT TRAINING HOURS PER MONTH BY AIRCRAFT TYPE

AIRCRAFT TYPE	COMPONENT	2018	2019	2020	2021
Airlift	Active Duty	12.7	8.0	12.2	12.0
	ANG	9.8	5.8	10.3	9.3
	Reserve	10.7	5.2	8.3	9.3
BACN	Active Duty	26.0	21.6	23.4	9.2
	ANG				2.3
	Reserve				
Bomber	Active Duty	6.1	4.0	7.2	7.1
	ANG	4.2	1.6	2.2	1.4
	Reserve	3.5	2.9	4.7	4.6
Fighter	Active Duty	8.2	5.7	8.1	6.8
	ANG	7.1	4.2	6.4	7.3
	Reserve	5.2	3.9	5.5	6.7
Fixed Wing	Active Duty	9.0	5.7	8.7	6.1
	ANG	6.8	5.8	10.8	7.9
	Reserve			4.8	10.9
Recon	Active Duty	7.8	4.7	7.0	8.4
	ANG	8.0	5.7	9.0	8.1
	Reserve	5.7	2.7	5.3	5.4
Rescue	Active Duty				
	ANG	1.6			
	Reserve				
Rotary	Active Duty	6.8	4.5	6.9	6.5
	ANG	5.8	3.9	7.9	6.4
	Reserve	8.5	3.4	4.9	6.9
Special Ops	Active Duty	11.1	6.6	13	11.6
	ANG	6.9	3.7	5.8	10.1
	Reserve	5.0	3.0	5.2	5.9
Tanker	Active Duty	13.6	8.0	12.1	12.0
	ANG	12.4	7.5	10.4	9.4
	Reserve	10.0	5.7	8.3	9.1
Trainer	Active Duty	10.2	6.8	9.6	8.0
	ANG	7.9	1.7	0.2	1.0
	Reserve	1.2	2.2	2.9	0.4

Source: U.S. Air Force

Contract Red Air Not Up to the Challenge at Nellis, Alaska

By John A. Tirpak

Fifth-generation fighters need fifth-generation adversaries to train high-end capabilities—so the Air Force is giving up on privatized adversary air companies at Nellis Air Force Base, Nev., and the Joint Pacific Alaska Range Complex (JPARC) Alaska. Instead, Air Combat Command will create its own permanent F-35 Aggressor capability.

“These contracts aren’t very effective at Nellis at the high-end training environment,” Lt. Gen. David S. Nahom, deputy chief of staff for plans and programs, told the Senate Armed Services Committee in May. “What they provide is not giving us what we need.”

When ACC decided to let lapse its \$280 million contract with Draken International, signed in 2018, Draken issued layoff notices. That prompted Sen. Jacky Rosen (R-Utah) to question Nahom over concerns there will be a shortage of



A Draken Mirage F1 conducts its first adversary air flight against Air Force F-15E Strike Eagles at Nellis AFB, Nev., in 2020. USAF has let the Draken adversary air contract lapse.

Draken International

aggressor capability while the Air Force stands up its own F-35 Aggressor unit. She cited an Air Force response to query that indicated 63 percent of Aggressor hours are supplied by contractors.

Nahom said the Air Force didn't need a fifth-generation adversary aircraft as recently as "five, six years ago," but that today China fields such fighters, and USAF's two marquee fighter training ranges need adversaries that can mimic those capabilities.

"As the China threat has stepped up, we have to step up our replication," Nahom said. "What the contractor is providing there at Nellis ... is not what we need ... for that high-end piece." The Nevada Test and Training Range and the JPARC complex in Alaska "are the only two places that you get that high-end training anywhere in the world."

Adversary air vendors "do wonderful work for the Air Force, especially at our Formal Training Units, or FTUs, where we train basic fighter pilots how to fly," he said, that kind of work will continue.

But "the Nellis training range is a national treasure," he said. USAF is also moving toward greater virtual training, Na-

hom added, "because a lot of things cannot be replicated in 'real.'" While actual flying hours are critical, USAF's investment "in a virtual simulation environment" is also essential to "ensure that our aircrews maintain that edge."

Draken's for-hire Adversary Air force includes Russian MiG-21s, U.S. A-4 Skyhawks, French Mirage F1s, and the derivative South African Atlas Cheetah, as well as Czech Aero L-159A Honey Badgers and MB-339s. Recently, it began acquiring ex-Dutch F-16A/Bs. Airborne Tactical Advantage Company (ATAC), Tactical Air Support, Air USA, Blue Air Training, Coastal Defense, and Top Aces Corp also offer such services.

ACC once envisioned contracting as much as \$6.4 billion of adversary air work at 12 bases, including 40,000 hours of air-to-air and 10,000 hours of close air support work. It's not clear how much of that work will now be absorbed by ACC.

An industry source said Draken was given only 60 days notice of the contract lapse, after the Air Force "led them to believe they would still be in high demand."

There is "no published Air Force vision" for Adversary Air or electronic warfare aggressors, he said. ✪

Air Force Awards \$604M Contract to Rebuild Tyndall as 'Base of Future'

By Greg Hadley

More than three-and-a-half years after Hurricane Michael pummeled Tyndall Air Force Base, Fla., the base took a major step toward its quest to rebuild as the "base of the future" in May, awarding a \$604 million contract that the Air Force called its largest-ever military construction contract.

The deal funds 11 projects to support the flight line for Tyndall's F-35s, including:

- Three aircraft maintenance hangars
- A maintenance fuel cell hangar
- A weapons load training hangar
- Group headquarters
- Squadron maintenance complex
- Flight simulator facility
- Corrosion control facility
- Parking apron
- Aircraft support equipment storage.

The U.S. Army Corps of Engineers awarded the contract to Hensel Phelps, among the nation's biggest construction contractors. The Air Force Civil Engineer Center's Natural Disaster Recovery Division is also involved in the project. Construction is slated to begin late this summer, but no completion date has been publicly announced yet. The base may not be fully rebuilt until 2028, officials said.

"The rebuild gives us the unique opportunity to reimagine how we accommodate the needs of the F-35," said Col. Travis Leighton, the Natural Disaster Recovery Division chief. "We're leveraging cutting-edge technology to increase cybersecurity and perimeter defense, enhance base safety, and equip Airmen to execute the missions of today and tomorrow."

To guard against future storm damage, new buildings will be built to withstand winds up to 165 miles per hour and will



Senior Airman Jacob Destas

Once this model of the future Tyndall projects springs to life, the base will boast flood- and wind-resistant structures and a modern digital infrastructure.

be built to account for up to seven feet of future sea level rise. "Smart" building technologies, such as occupancy sensors, will be built in from the start.

Congress appropriated \$5.3 billion combined to restore Tyndall and Offutt Air Force Base, Neb., which was devastated by major flooding around the same time. Most of that investment will be at Tyndall. More money may yet be needed. The Air Force's 2023 MILCON budget request for fiscal 2023 noted an unfunded priority of \$286 million for natural disaster recovery at Tyndall, Offutt, and Joint Base Langley-Eustis, Va. Brig. Gen. William H. Kale III, the Air Force director of civil engineers, said additional requests will likely follow in fiscal 2024 as well. ✪



B-21's First Flight Postponed to 2023

Northrop Grumman

A notional B-21 Raider flies over California's real Edwards Air Force Base in this illustration. First flight is anticipated in the first six months of 2023.

By John A. Tirpak

The first B-21 bomber will not make its first flight until 2023, at least six months later than planned, the service said in May. While leaders offered no single explanation for the setback, the service said the Raider program is still on track to meet baseline cost, schedule, and performance targets established at Milestone B award.

Rapid Capabilities Office director Randall G. Walden, who predicted last year that the B-21 would fly in “mid-2022,” said in March the first flyable B-21 was largely assembled and starting calibration testing. Air Force and industry sources still expect the first B-21 to be rolled out this calendar year.

Lt. Gen. David S. Nahom, the Air Force's deputy chief of staff for plans and programs, said in May that as many as 145 B-21s could be needed, a 45 percent jump from the 100 specified earlier. But a full acquisition plan and strategy still awaits completion of engineering and manufacturing development, and the requirement could shift with emerging strategy and technology.

Air Force Chief of Staff Gen. Charles Q. Brown Jr. told the Senate Armed Services Committee on May 3 that an “ongoing analysis” of B-21 requirements and indicated how

many “other capabilities that work with the B-21”—such as additional escorts—could alter the equation. Brown said the Air Force is “working through crewed and uncrewed collaborative platforms that can work very closely with the B-21.”

Calling the program “on track,” Brown also said the Air Force is doing all it can to ensure the plane is “easier to maintain ... to increase aircraft availability.”

Members of the Senate and House Armed Services Committees have praised the B-21 program, with Sen. Tom Cotton (R-Ark.) calling it an “exquisitely run program.” The Air Force plans to invest nearly \$20 billion in B-21 procurement and another \$12 billion in research and development over the five years from fiscal 2023 through 2027.

The B-21 is planned to succeed the B-1B and B-2 bombers, but exactly when remains unclear. The Air Force has long promised the B-21 will be a “available” for combat use in the “mid-2020s” and announced three years ago that it would retire its B-2s and B-1s in 2031 and 2032, respectively. But Nahom said all plans hinge on the B-21's progress and pledged the aging bombers will remain until they “shake hands” with the B-21s that replace them.

As for when the first B-21 takes to the skies, an Air Force spokeswoman would say only that will be “data- and event-driven, not a date-driven event.”

Next Air Force One Will Arrive 2-3 Years Late, USAF Says

By John A. Tirpak

The next presidential airplanes will arrive up to 36 months late, the most recent program delay to strike a major Air Force acquisition. Assistant Air Force Secretary for Acquisitions, Technology, and Logistics Andrew P. Hunter told lawmakers in May that the VC-25B had slipped again, up from a 17-month delay reported earlier. It's "quite a significant delay," he said.

Boeing is the sole-source contractor for the next "Air Force One," officially the VC-25B. There will be two aircraft, both 747-8s that are being customized for the role. Delaying a further two to three years "means we will have to sustain [the existing 30-year-old] aircraft longer," Hunter said, which will have a direct impact on future budgets requiring "further resources to cover the gap."

An Air Force spokesperson said the delay "is due to a combination of factors," including "impacts from the COVID-19 pandemic," a change of vendors for the interior work, "wiring design timelines and test execution rates."

The Air Force "recommends" that the "objective"—or goal delivery time—should be set at 24 months, while the "threshold," or must-have, be set at 36 months, according to



Boeing illustration

The coming VC-25B—better known as "Air Force One"—will be a two-jet fleet based on the Boeing 747-8. COVID-19 and supplier setbacks have the project up to three years behind schedule.

the spokesperson. The Pentagon's acquisition and sustainment chief, William LaPlante, will decide on the timing after "an update to the acquisition program baseline," she said.

"Based on how the contract was written, as the expected completion date moves to the right, the threshold date also moves to the right," she noted. "The new schedule baseline will contain the updated completion timeline." ✪

DOD's LaPlante Sees Risk in Sentinel ICBM

By Greg Hadley

No sooner had William LaPlante been confirmed as undersecretary of defense for acquisition and sustainment in April than he announced a series of "deep dives" into plans to modernize the three legs of the nuclear triad, starting with the program he views as having the most significant risk—the LGM-35A Sentinel intercontinental ballistic missile, known until recently as the Ground Based Strategic Deterrent.

LaPlante told the Senate Armed Services strategic forces subcommittee in May that of all the nuclear modernization efforts underway—including the B-21 bomber and the Columbia-class submarine—the Sentinel has the furthest to go.

"They're somewhat early—one or two years into the engineering, manufacturing, and development—trying to get to a first flight," LaPlante noted. "I would say ... there's still a significant risk."

Radiation-hardened electronics and the nuclear infrastructure are the primary areas of concern, he said. "I intend to look into it, and I will give you that assessment of where that is," LaPlante said.

The Sentinel, formerly called GBSD (for Ground-Based Strategic Deterrent) is to replace 50-year-old Minuteman III missiles and officials have said it cannot be further delayed without risking the credibility of the U.S. intercontinental ballistic missile force.

The Air Force is seeking \$3.6 billion for the Sentinel program in fiscal 2023, plus \$444 million in military construction for infrastructure improvements. Current plans would see initial operational capability by 2029.



Image from DOD video

The new Undersecretary of Defense for Acquisition and Sustainment, William LaPlante, has concerns about the Sentinel ICBM.

Adm. Charles "Chas" A. Richard, head of U.S. Strategic Command, warned the Senate panel that any delays to that timeline will have real-world impacts.

"Weapons program delays have driven us past the point where it is possible to fully mitigate operational risks," Richard said. "In some cases, we're simply left to assess the damage to our deterrent. Further programmatic delays, budget shortfalls, or policy decisions to lower operational requirements to meet infrastructure capacity will result in operational consequences."

Already, Richard warned, the U.S. has a "deterrence and assurance gap against the threat of limited nuclear employment." That issue, Richard said, has been highlighted in recent months by Russia's invasion of Ukraine and threats to use low-yield nuclear weapons; and by China's "strategic breakout" in rapidly and massively upgrading its nuclear arsenal. ✪

USAF Sets Cyber Standards for Commercial SATCOM Vendors

By Shaun Waterman

MAY 31, 2022

The U.S. Space Force finally rolled out new cybersecurity standards for its commercial satellite vendors on May 28, saying those who could meet them might be able to charge more.

“We expect that cost [of security] to be reflected in the services that we’re buying,” Space Force official Jared Reece told Air Force Magazine. “If we’re going to want a more secure solution, we’re going to have to be willing to pay for that capability.”

The Commercial Satellite Communications Office, or CSCO, the office in Space Systems Command where Reece works, buys private sector satellite bandwidth for the U.S. military services. CSCO will begin third party cybersecurity assessments in September, Reece explained, piloting the process with a handful of volunteer vendors.

“Based on our conversations with industry, there’s a number of companies itching to go,” he said.

The Infrastructure Asset Pre-Assessment program, or IA-Pre,
(Continued on next page.)



Van Ha/USAF

A one-off, third party certification of commercial payloads meeting cyber security requirements could speed approvals, but may cost the U.S. in private satellite bandwidth.

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that Reece manages at CSCO, is designed to pre-qualify particular commercial assets, like a satellite constellation and its ground system, as meeting federal cybersecurity standards.

IA-Pre grew out of concerns about the ability of peer and near-peer adversaries to use cyber weapons to cripple commercial satellite networks on which the U.S. military increasingly relies. These fears were dramatically realized by the Russian malware hack that knocked thousands of users of Viasat's KA-SAT European network—including large swathes of the Ukrainian military—offline, just as the tanks rolled across the border.

Viasat executives told Air Force Magazine in March that the hackers would not have been able to execute their attack on any of the networks the company operates for the U.S. military.

IA-Pre replaces the current questionnaire-based process, where vendors self-attest to meeting cyber standards every time they submit a bid. Instead, they undergo a one-off third-party assessment, plus mandatory follow-up reporting on a monthly basis. Once a system passes the assessment and is compliant, it can be added to the Approved Platforms List (APL), Reece said.

Having an APL of pre-certified cybersecure assets will speed up procurement of commercial services and avoid unnecessary duplication of cybersecurity acquisition requirements, Reece noted last year. Vendors will be incentivized to comply with IA-Pre because of changes in the acquisition rules that govern the way CSCO buys commercial services.

"I don't have any misconceptions that everyone is going to be ready to go on Day One," he said. As IA-Pre requirements are phased in, Reece said, the incentive to comply will grow, even

if costs may be higher.

Reece said CSCO has replaced the Lowest Price Technically Acceptable standard, which drove military acquisition officials to choose the lowest bidder who promised to meet the requirement, with a new Best Value Tradeoff, so higher-priced bids can be accepted if they offer greater value.

"As we implement this into our contracts, and it becomes a preference, and that's the focus of the trade-off criteria, hopefully that will incentivize industry to get their assessment scheduled and get their assets on the APL," Reece said.

But by September 2023 the process will no longer be voluntary. Only those on the APL will be able to compete.

Alexander Purves, chief commercial officer with the Providence Access Company, a satellite consultancy, said the extended timeline was understandable in view of the pandemic and the fact that the functions and personnel of CSCO had moved twice as IA-Pre was being developed—from the Defense Information Systems Agency to the Air Force in 2018 and then to Space Force in 2020—all the while developing and managing over 100 major satellite procurements every year.

"I do not see this as a delay in IA-Pre, I see this as a competing number of pressures on the Space Force to do many things with a small team," he said.

"The third party infrastructure will lag behind and I'm not saying that as a negative. As a practicality, it's not on the top of their to-do list when the program has not yet been released and when they may not have any direction from their prime contractors or others further up the [supply] chain," he said. ❖

What Happens If GPS Goes Dark?

By Greg Hadley

What's in store for an F-35 flying above the Indian Ocean at 35,000 feet if the GPS satellite constellation suddenly goes dark? asked Sen. Angus King (I-Maine) of Vice Chief of Space Operations Gen. David D. Thompson at a May Senate Armed Services strategic forces subcommittee hearing.

Thompson said pilots are trained to operate in GPS-denied airspace and while there would be certain "mission impact," those Airmen find their way home. But, Thompson added, "It is perhaps fair to say that we've come to rely on [GPS] solely and exclusively and too heavily."

Just 33 satellites make up the GPS constellation and there is no present plan to replace GPS with an entirely new program.

The Department of the Air Force is working on projects "to augment [GPS], to supplement it, to provide additional means of being able to navigate and position and conduct missions," Thompson said. Indeed, the entire Pentagon has come to see preserving space-based navigation as essential. "Inside all of the services—especially the Army—they're looking at a host of technologies and methodologies for positioning and navigation," Thompson said. "I would say probably inside the Department of Defense, I think we finally have enough



U.S. Space Force Vice Chief of Space Operations Gen. David Thompson said the U.S. is working to augment GPS in the near future.

people who have woken up to the fact that GPS is the world standard, will remain the world standard for a long time, but we have to be prepared for those who wish to deny us GPS and ... be able to fight through that and be effective."

Several years ago, the Navy made headlines when it brought back "celestial navigation" at the U.S. Naval Academy—navigating by the stars.

But while media coverage of that change mainly focused on the idea of returning to centuries-old navigation methods such as the sextant, Thompson indicated that new methods to complement GPS would still be high-tech.

“They’re developing techniques for celestial navigation automatically without a navigator, a human navigator, required—and frankly, to be able to do it in daylight, when the human eye can’t see stars. There’s technology in that regard,” Thompson said.

“Many years ago, onboard navigation, inertial navigation systems, were the way we conducted business in the ’50s and ’60s before GPS was rampant. It’s time to reinvest in those technologies and those capabilities, I think, to advance them. There’s even techniques that allow systems to measure the

magnetic field of the Earth and based on the variations in the Earth’s magnetic field, figure out where you are. ... There are a lot of ways to solve this problem.”

In 2020, the Army launched a new office and laboratory dedicated to the modernization of position, navigation, and timing [PNT]. And in 2021, the Air Force’s Strategic Development Planning and Experimentation Office, alongside the Naval Surface Warfare Center, flight-tested new PNT technologies from open software architectures fused together.

Such moves, Thompson and King agreed, are necessary to build on moving forward.

“Somebody’s got to be thinking about this,” King said. “Because in a conflict, if I’m the adversary, the first thing I’m going to do is try to knock out GPS in order to blind us.” ✪

12 Senators Push to Launch New Space National Guard

By Greg Hadley

Twelve senators are backing legislation to create a Space National Guard, reigniting a debate over how the Space Force will organize its part-time components.

Sen. Dianne Feinstein (D-Calif.) and Sen. Marco Rubio (R-Fla.) introduced the Space National Guard Establishment Act on May 10, with four Democrats and six Republicans joining them in co-sponsoring the legislation.

“Without a National Guard component for Space Force, we risk losing many talented individuals who want to keep serving their country and their states after they leave Active duty, and that is simply unacceptable,” Feinstein said in a statement. “Creating a Space Force National Guard would also save money and ensure a smoother process in the event we need to activate personnel. Not establishing a Space National Guard was a mistake when Space Force was created, and this bill will remedy that.”

The bill faces an uncertain future in the Senate Armed Services Committee, which proposed simply changing the name of the Air National Guard to the Air and Space National Guard a year ago.

Those advocating for a Space National Guard argue that Air National Guard units won’t have direct ties to the Space Force and have been “orphaned” as the Air Force got out of the space business.

Brig. Gen. Steven J. Butow, commander of the California Air National Guard, said during a recent virtual Schriever Spacepower Forum hosted by AFA’s Mitchell Institute for



Space-oriented units in the Air National Guard would transition to a new Space National Guard under a plan advanced by a bipartisan group of a dozen senators. Guardsmen like Hawaii ANG Airmen 1st Class Kayla Musrasrik-Romero, left, and Airmen 1st Class Michael Carvalho, of the Hawaii ANG Det. 1 would transition to the Space Guard under the plan.

Aerospace Studies that the SASC proposal to keep space in the Air Guard “fails to recognize the way that we operate.”

People, he said, “are creatures of doctrine, and doctrine comes from lessons learned in the battlespace. ... Unity of command, unity of effort—these are very important concepts. ... If you don’t own it, you don’t control it.”

Butow said it would be “unfair” to set the Space Force free while at the same time keep one arm tied “behind the Chief of Space Operations’ back because you gave him a less than full complement of capability.” ✪

Whiting: USSF Plans to Add 3 New Intelligence Squadrons

By Amanda Miller

The Space Force plans to add three new intelligence squadrons in the next two years, doubling the number of squadrons in Space Delta 7, said Lt. Gen. Stephen N. Whiting, commander of the service's Space Operations Command.

In an online discussion hosted by the Mitchell Institute for Aerospace Studies, Whiting described the advances the Space Force has made in intelligence since becoming an independent military service. The Space Operations Command sits "at the nexus" of the Space Force and the newly re-created U.S. Space Command, Whiting explained. Known as "SpOC," the command possesses "all the operational capability in the Space Force."

SpOC leads missions "like space domain awareness, electromagnetic warfare, missile warning, operational-level command and control, defensive cyber capabilities, intelligence, surveillance, and reconnaissance, satellite communications, precision, navigation, and timing, orbital warfare," he said. Adding more intelligence activities would contribute to the command's priority of being "ISR-led and cyber secure."

Whiting said intelligence is the area in which the Space Force has made the most progress since its creation in De-

ember 2019. "When we stood up the Space Force, we went all around the U.S. Air Force to find all the places that intelligence was being done, either for space or from space, and we brought all of that in, in partnership with the Air Force, and it all transferred over to the Space Force," Whiting said. The result was Space Delta 7, the command's intelligence, surveillance, and reconnaissance delta, which has detachments that embed within each of the command's other numbered deltas.

"So if you're the Delta 4 commander at Buckley [Space Force Base] outside of Denver and you have the global missile warning responsibility, your S-2 function—your intel function—is actually a detachment of that Delta 7. And that major who runs that detachment? ... They take their day-to-day direction from Delta 4," Whiting said.

He said the plan to add three more intelligence squadrons is "all fully funded—all the billets are already in place." The new squadrons will include a threat analysis squadron, a targeting squadron, and a PED squadron, short for processing, exploitation, and dissemination.

"So we are really getting after the intel requirements that our space warfighters need, and those intel Guardians are just leading the way for us, and we're very, very proud of what they've done." ✪

Missile Defense Agency Wants Its Own Satellites

By Greg Hadley

MAY 11, 2022

The Space Development Agency is advancing its plans for missile tracking and warning satellites—and the Missile Defense Agency hopes to add its own satellites to that architecture, as well, the agency's director told a congressional panel in May.

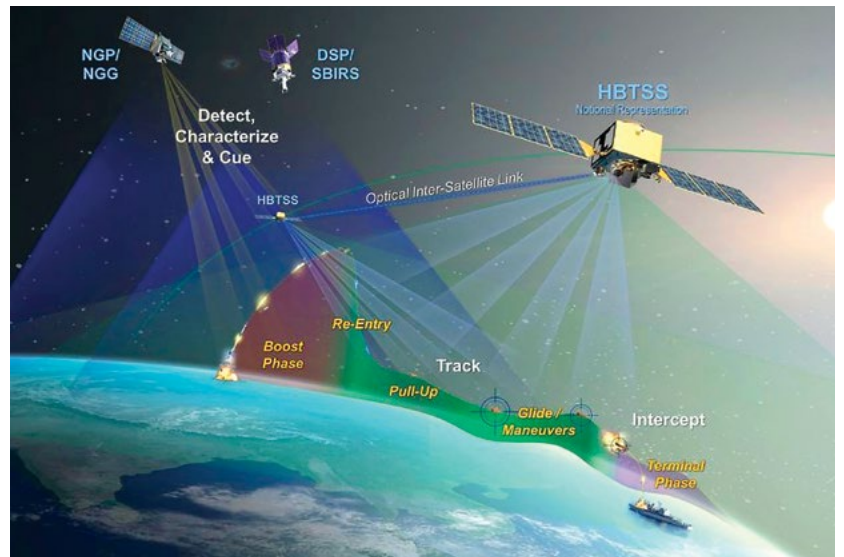
MDA Director Vice Adm. Jon A. Hill told lawmakers that his agency's Hypersonic and Ballistic Tracking Space Sensor (HBTSS) is intended to work with SDA's satellites to help track hypersonic and ballistic missiles

HBTSS has "two major roles," Hill told Rep. Doug Lamborn (R-Colo.): "The first is to pick up the dim targets that cannot be seen by the current architecture today. The second is the advanced hypersonic threat, which has a global maneuver capability, we need the ability to see it from space."

Two prototypes of the HBTSS are scheduled to launch in March 2023, Hill said. "We'll collect that data as a way to prove out that concept. We did a lot of work on the ground to show that we can extract those hot targets over a warm Earth. Now it's about getting it into space and pulling that data down," Hill said.

MDA's plans for missile tracking are progressing alongside SDA's work to develop and deploy a "Tracking Layer" as part of its planned multi-use satellite constellation. SDA has already awarded contracts for the initial tranche of satellites. The layer could go live in low-Earth orbit as soon as 2025.

Both the Tracking Layer and the HBTSS are intended for low-Earth orbit. And as SDA is scheduled to transition into



New Hypersonic and Ballistic Tracking Space Sensor satellites would track threats, handing off targeting coordinates to U.S. defenses on land, at sea, and in the air.

the Space Force in October 2022, the three organizations are working together to advance the larger missile tracking mission.

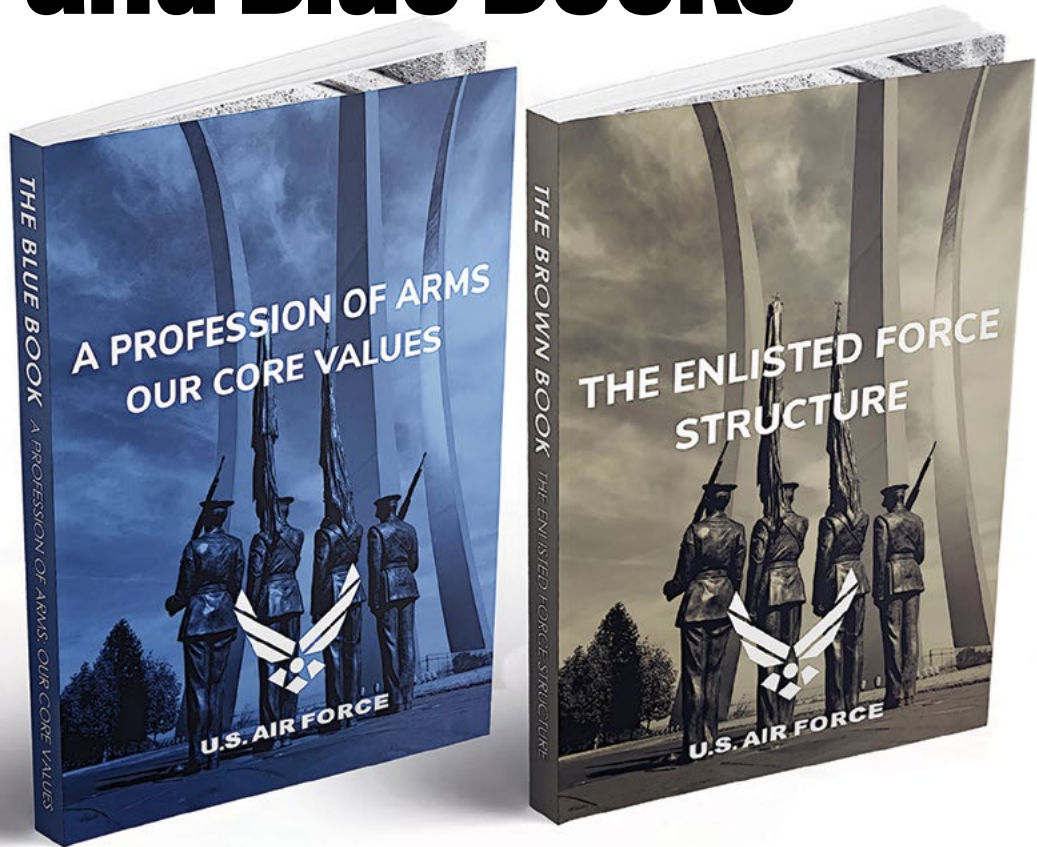
"We're staying very close to the Space Force as we make decisions on the overall architecture, and our vision is that the HBTSS will be a part of the overall constellation for dealing with that global maneuvering threat," Hill said.

Meanwhile, U.S. Space Command is eager for all these systems to come onboard, its deputy commander, Lt. Gen. John E. Shaw, told Congress.

"We're interested in any capabilities that are going to help us with any of these threats," said Shaw. "And as MDA has pursued this particular program, HBTSS, the advantage of this is that we have a perspective from space that is invaluable and will allow us to get after a lot of these threats." ✪

USAF Updates its Brown and Blue Books

The Air Force recently updated the contents of “The Enlisted Force Structure and The Profession of Arms: Our Core Values,” more commonly known among Airmen as the “Brown” and “Blue” books. The updates outline modernized development changes within the Air Force, in line with the vision to accelerate change.



Travis Burcham/USAF

By Greg Hadley

The Air Force updated its Blue and Brown Books in May, issuing new versions of the blue “Profession of Arms: Our Core Values” and the brown “Enlisted Force Structure.”

The new texts come as USAF pivots away from conflict in the Middle East to meet peer threats from China and Russia, necessitating fundamental changes in the way Airmen approach the future.

“In order for us to have talented Airmen that we need in the Air Force of 2030, we can’t just ... walk through the motions and haphazardly get after stuff and update as needed,” Chief Master Sergeant of the Air Force JoAnne S. Bass told Air Force Magazine. “We need to be deliberate about every single thing that we’re doing.”

The new Books are now available online, and printed copies will be provided to new recruits, at professional military education centers, and through combat aviation advisers. Individual commands will also receive details on how to get hard copies.

THE LITTLE BLUE BOOK

In the mid 1990s, Chief of Staff Gen. Ronald R.

“In order for us to have talented Airmen that we we need in the Air Force of 2030, we can’t just ... walk through the motions.”

—CMSAF JoAnne Bass

Fogleman turned to Gen. Billy J. Boles, head of Air Education and Training Command, to codify the service’s core values—integrity, service, and excellence—to create a slim pamphlet to promulgate those ideas across the force. Dubbed the “Little Blue Book,” it was actually an update to Air Force Regulation 30-1, “Air Force Standards,” first published in 1983.

The new version is just 16 pages, including the Airman’s Creed, the Code of Conduct, the Air Force Oaths, and the Core Values: Integrity First, Service Before Self, and Excellence in All We Do.

Included in the new version, however, is a paragraph reiterating that Airmen have a responsibility to not engage in or tolerate “harassment, sexual assault, sexual harassment, stalking, bullying, extremism, and discrimination.” Another change: a new section under Integrity First that highlights personal humility.

“A person of integrity grasps and is sobered by the extraordinary task of defending the Constitution of the United States,” the new paragraph reads. “We practice humility by putting others before ourselves. We seek to add value through community and humanitarian support. We serve with gratitude and without arrogance.”

The new Blue Book closes with the Air Force’s new

mission statement, released in 2021: “To fly, fight, and win ... air power anytime, anywhere.”

THE LITTLE BROWN BOOK

The brown book, better known as Air Force Instruction 36-2618, “The Enlisted Force Structure,” is given to every Airmen at Basic Military Training. It spells out the “professional standards and roles and responsibilities for each enlisted rank,” laying down the structure that governs more than 265,000 enlisted Airmen.

The new edition includes expanded sections detailing the Air Force’s core missions, the Air Force Speciality Codes, and the concept of multi-capable Airmen—a key tenet of the Air Force’s Agile Combat Employment concept. It too emphasizes that all Airmen have a responsibility to help foster “a culture of respect and trust,” and adds sections on teamwork, leadership, and “followership.”

The publication also includes a new chapter dedicated to the Air Force’s 24 foundational competencies and 10 Airman Leadership Qualities, which will form the basis for the service’s feedback, evaluation, and development.

The ALQs, in particular, “represent the performance characteristics we want to define, develop, incentivize, and measure in our Airmen,” Lt. Gen. Brian T. Kelly, deputy chief of staff for manpower, personnel, and services, said in a recent Air Force release. These include: job proficiency, initiative, adaptability, inclusion and teamwork, emotional intelligence, communication, stewardship, accountability, decision-making, and innovation—and including them in the document that defines the DNA of the

enlisted force is a natural fit.

WHAT’S NEXT

In April the Air Force released “The Blueprint,” a 32-page resource and reference for enlisted Airmen containing essential information on everything from Air Force Specialty Codes to different programs Airmen can tap into when leaving the service. Bass calls it a “cradle-to-grave blueprint on an Airman’s career.”

“We’ve got to think about the long game, and we have to play the long game,” Bass said. “And if we’re going to tap the Airmen that we need, whether it’s 2030, 2035, 2040, it has to be deliberate.”

There’s still one more foundational document to come—the “Purple Book.” As detailed in the Action Plan, the Purple Book will include “values, capabilities, and warfighting concepts of the joint force team and [connect] Air Force doctrine to the Department of Defense purpose and mission.”

The Air Force’s push to tie itself more deeply to the joint force has been underway for years—the vision of a tightly integrated joint force was perhaps the defining legacy of former Chief of Staff Gen. David L. Goldfein—and the Purple Book, targeted for release this summer, seeks to help Airmen further that goal.

“Our team will work with the J7 [joint force development] to help develop a Purple Book that will be focused on how developing the joint leaders that we need, that are able to talk joint, train joint, and to some degree, understand and integrate more ... with our brothers and sisters from the other services,” Bass said. ✪

Refusing COVID Vaccine Draws General Discharge in Most Cases

By Greg Hadley

The Air Force has now separated 287 Airmen for refusing to get the COVID-19 vaccine, and 281—98 percent—received general discharges, the service reported to Congress in April. The Space Force, meanwhile, has yet to discharge a single Guardian for vaccine refusal. Three U.S. Air Force Academy cadets were allowed to graduate but could not be commissioned after declining vaccination.

Other services separated far more members as a result of the vaccine dispute. As of late April, the Marine Corps had separated 1,968 Marines; the Navy 798 Sailors; and the Army 345 Soldiers.

Under the 2022 National Defense Authorization Act, service members who refuse the COVID-19 vaccine cannot receive anything less than a general discharge under honorable conditions.

The services, however, have taken very different approaches beyond that. The Marine Corps has given 78 percent of those it separated a general discharge, while the Navy has given all honorable discharges. The Air Force has granted the fewest honorable discharges.

The difference has significant implications for future benefits: Those with a general discharge do not qualify for the educational benefits from the GI Bill, which can be worth hundreds of thousands of dollars. Nor can they typically



Joshua Seybert/USAF

The Air and Space Forces have thus far discharged the fewest members for declining the COVID-19 vaccine.

re-enlist in the service later.

For the three graduating Air Force Academy cadets, the stakes remain unsettled. The Academy Board decided to permit the three to graduate with bachelor of science degrees but withhold commissions “as long as they remain unvaccinated.” The three have until Aug. 1 to comply, or risk having to reimburse the government for the cost of their four-year degrees. ✪

Air Force E-7 Promotion Rate Hits Lowest Point in More than a Decade

By Greg Hadley

Only 14.8 percent of eligible tech sergeants were selected for promotion to master sergeant in the latest promotion cycle, the lowest rate since 2010. Some 4,040 tech sergeants will advance to master sergeant, the fewest in years.

Recent changes to the enlisted grade structure were partly to blame, but the greater factor was the record-high retention in the wake of the COVID-19 pandemic, which increased the number of candidates.

The last time rates dipped below 20 percent was 2013 and 2014, when force reductions led to reduced promotion rates. ❄

YEAR	ELIGIBLE	PROMOTED	PERCENT RATE
2022	27,296	4,040	14.80
2021	24,721	4,676	18.92
2020	22,286	4,649	20.86
2019	19,422	4,733	24.37
2018	20,866	6,176	29.60
2017	20,169	5,166	25.61
2016	21,504	5,019	23.34
2015	23,619	5,301	22.44
2014	22,678	4,073	17.96
2013	37,608	5,654	15.03
2012	19,809	5,464	27.58
2011	19,538	6,618	33.87
2010	21,829	5,424	24.85

Source: Air Force Personnel Center

Space Force OKs Neck Tattoos, USAF Eyes Bushier Mustaches

By Greg Hadley

The Space Force eased appearance and uniform policies in May for tattoos, facial hair, and makeup. And the Air Force may soon follow suit.

The Space Force's new Guidance Memorandum allows Guardians to sport a one-inch neck tattoo—as long as it remains in the back of the neck. Like the Air Force, the Space Force will also allow one tattoo per hand in the shape of a ring, no more than 3/8 of an inch wide.

"There are no other size or placement limitations on tattoos," as long as they comply with Department of the Air Force regulations, the memo adds.

The Space Force also authorized longer mustaches, extending 1/4 of an inch horizontally from the corners of the mouth, in line with proposed changes anticipated from the Air Force, which currently limits mustaches to extend only to the corners of the mouth. A leaked Air Force memo detailing the same standards as the Space Force circulated on social media recently, but no official changes have been announced for the older service.

Airmen of past years might be surprised to learn that the Space Force will allow male Guardians to wear cosmetics, such as foundation and concealer, "to cover scars or blemishes."

In addition to those grooming and appearance standards, the Space Force memo also laid out several new uniform policies and pieces for Guardians' Air Force dress uniforms, while the Space Force waits for its own version.

Those changes were previewed by Chief Master Sergeant of the Space Force Roger A. Towberman earlier this year in a video message sent to Guardians in which he said the moves were intended to "space it up a little bit."

Among the tweaks, Guardians will now be able to wear the service's enlisted rank insignia as available. They can also swap out the buttons on their service dress coat to ones that feature the Space Force's "Delta, Globe, and Orbit," switch their nameplates to hexagonal ones, wear new U.S. collar insignia also featuring a hexagon, and sport the new Space Force Service Cap Badge on wheel and bucket caps.

Finally, the memo allows Guardians to wear gray shirts

and black shorts or seats as PT gear "in lieu of the Air Force PTG pending release and availability of the official Space Force PTG at a Guardian's home station military clothing sales store." ❄

Six Pilots Set AMC Endurance Record With 24.2-Hour KC-46 Tanker Flight

By Greg Hadley

A KC-46 Pegasus crewed by Airmen from the 22nd Air Refueling Wing stayed aloft for more than 24 hours, establishing a new Air Mobility Command record and covering more than 9,000 miles in their flight, the Air Force announced in May.

The 24.2-hour, record-breaking flight—which lasted from May 5 to 6—demonstrated the KC-46's endurance. Six pilots, three boom operators, a photojournalist, and a physician assistant took part in the flight. Two-pilot teams swapping out every four hours while a backup pilot team gathered data and took notes. The physician assistant monitored the aircrew for health and safety.

During the flight, the KC-46 performed dry contacts with another KC-46, refueled four Marine Corps F-35s, and was itself refueled by another KC-46. The flight path included both the northern and southern borders of the U.S., as well as the East and West Coasts. Aviation enthusiasts tracked the flight path, which started and ended at McConnell Air Force Base, Kan., passing over roughly three dozen states.

Planning for the flight took several weeks and required in-the-air adjustments, according to the Air Force, as severe weather in certain areas forced the crew to adjust the route.

"This 24-hour sortie is a critical step in the operational evolution of tankers and the role the KC-46 plays in that," Col. Nate Vogel, 22nd Air Refueling Wing commander, said in the statement. "This sortie helps mobility forces identify how best to operate on long-duration sorties from human, to machine, to mission aspects. Long-duration flights are inherently full of risk, and conducting this operation now allows us to identify those risks, and then build and apply mitigations in a more controlled environment."

While the May 5 to 6 flight marks a new record for AMC, past Air Force flights lasted longer. In 2001, B-2 bombers flew from Whiteman Air Force Base, Mo., across the Pacific to strike Afghanistan at the start of Operation Enduring Freedom, spending 40 consecutive hours in the air. ❄

No Air Superiority, No Quick Win in Wargame

By John A. Tirpak

May 17, 2022

A recent wargame run by the Center for a New American Security followed a 2027 scenario in which China invades Taiwan; as the game played out, neither side achieved air superiority, both sides took heavy losses, and China failed to achieve its *fait accompli* objective.

The game highlighted Chinese advances in military technology and highlighted logistics as crucial in the defense of Taiwan. Sponsored by NBC television's "Meet the Press," the wargame posited a Chinese invasion of Taiwan after a new government in Taipei sought to declare permanent independence from Beijing. China still views Taiwan as a "breakaway province," even now 73 years after Chinese Nationalists escaped to the island and established it as a separate government. While China has long professed that it wants peaceful "reunification" with Taiwan, it has also consistently warned that it could reclaim the island, located just 100 miles from the mainland—by force, if necessary.

In recent months, many have expressed concern that China would take advantage of the West's attention on the Russian invasion of Ukraine to move against Taiwan. Director of National Intelligence Avril Haines told Congress on May 10 that the Intelligence Community doesn't expect that to happen, saying China doesn't believe it's ready.

The "Blue Team" in the wargame was led by Michele Flournoy, chair of the CNAS board of directors, who was a short-list candidate to be Secretary of Defense under President Joe Biden. Also on that team was retired Gen. James M. "Mike" Holmes, former commander of Air Combat Command, now an adjunct fellow at CNAS, as well as Reps. Mike Gallagher (R-Wis.) and Mikie Sherrill (D-N.J.) of the House Armed Services Committee. Analysts from CNAS and other think tanks populated both teams.

After three rounds of play—representing perhaps several weeks of combat—China had "paid a tremendous cost, primarily in ships ... and aircraft, and the crews that are on those ships and aircraft," Holmes said in an interview with Air Force Magazine. However, China was "able to get a foothold on the island," seizing much of the northern region and Taipei. The game ended with a ground war about to play out, with neither side enjoying a clear advantage.

Holmes' takeaway was that "even though China has lots of advantages and proximity to Taiwan," and a large magazine of weapons, "it's still a giant effort to get a significant force across that water in the face of determined opposition." Given the assumptions and rules of the game, "They weren't able to get it done in that short-range timeline that they hoped." He also



Taiwan Air Force F-16s from the 21st and 23rd Fighter Wing/Tactical Fighter Group maneuver in tight formation during an exercise in 2021. A recent Center for a New American Security wargame pitting Taiwan against China showed no clear victor.

Taiwan Ministry of Defense/Military News Agency

noted that for the Blue forces, the logistics of getting equipment, personnel, and materiel to the fight was overwhelmingly the most important factor.

When the game ended, the U.S. and its allies had set the conditions to bring in more air power, Holmes said, which could have provided an edge in a subsequent ground war, if the game had continued.

"At the strategic and operational levels," the CNAS exercise "rhymes" with many of the things we see in our more detailed wargaming," Lt. Gen. S. Clinton Hinote, deputy chief of staff for strategy, integration and requirements, said in a written response to questions from Air Force Magazine. He said CNAS does "outstanding work in this area" and called the exercise credible, tapping "great minds with lots of experience."

Asked about the result that air superiority could not be achieved by either side, Hinote said control of the air "is likely to be contested over Taiwan in a way we have not seen in a long time. We are used to dominating" in this aspect of warfare, but China has "invested in modern aircraft and weapons to fight us." He also chalked up the air-to-air stalemate in part to the tyranny of distance in the Pacific, making it hard to "project enough power to establish and maintain control."

There is "no one silver bullet" that will guarantee control of the air, Hinote added, which is why the Air Force is seeking a portfolio of air-to-air capabilities, including the E-7 Wedgetail AWACS replacement, the Next Generation Air Dominance (NGAD) family of systems with "crewed and uncrewed" components, and an upgraded F-22. With Congress' help, he said, the Air Force can field new systems within the time frame of the game, "and that would make a difference." ★

USAF's ARRW Finally Goes Hypersonic

By Greg Hadley

MAY 16, 2022

The Air Force conducted its first successful test of the Air-launched Rapid Response Weapon, or ARRW, on May 14, snapping a streak of three consecutive failed tests and giving the beleaguered hypersonics program a much-needed boost.

The AGM-183A ARRW separated from the wing of a B-52H Stratofortress off the California coast, after which its booster ignited and burned for an “expected duration” propelling the missile at more than five times the speed of sound.

The 419th Flight Test Squadron and the Global Power Bomber Combined Test Force from Edwards Air Force Base, Calif., executed the test. “The test team made sure we executed this test flawlessly,” said Lt. Col. Michael Jungquist, 419th FLTS commander and GPB CTF director. “We’re doing everything we can to get this game-changing weapon to the warfighter as soon as possible.”

ARRW’s success comes after three failed booster flight tests in April, July, and December 2021. That led the Air Force to



Giancarlo Casem/USAF


Master Sgt. John Malloy and Staff Sgt. Jacob Puente secure an AGM-183A ARRW under the wing of a B-52H.

cut procurement funding for the missile in its 2022 and 2023 budget requests. At the same time, the Air Force seeking to shift funding in 2023 to the Hypersonic Attack Cruise Missile. After spending upward of \$300 million in 2021 and 2022 on ARRW, the service requested just \$114.98 million in 2023, while asking for \$316.89 million to fund HACM.

ARRW is a boost-glide weapon fired into the atmosphere and uses the energy from its rocket to fly toward its target; HACM is propelled by air-breathing engine technology.

With this successful test of ARRW, Brig. Gen. Heath A. Collins, Air Force program executive officer for weapons, released a statement projecting confidence about the Air Force’s hypersonics efforts.

“This was a major accomplishment by the ARRW team, for the weapons enterprise, and our Air Force,” Collins said. “The team’s tenacity, expertise, and commitment were key in overcoming the past year’s challenges to get us to the recent success. We are ready to build on what we’ve learned and continue moving hypersonics forward.”



Robin Olds Portrait Bust

Now Available

Sculptor and former USAF pilot James Nance has announced the release of a limited edition, 2/3 life scale, bronze, cabinet bust of Robin Olds. The bust is modeled after his monumental statue of General Olds at the USAFA Air Warrior Combat Memorial.

This museum quality, fine art, American made, bronze sculpture is officially endorsed and licensed by the Robin Olds estate.

A major portion of the sale proceeds will be donated to the Red River Valley Fighter Pilot Association museum construction, the USAF Academy Foundation, and the USAFA Air Warrior Combat Memorial maintenance fund.

For more information please visit www.jamesnancesculpture.com

Images Reveal Advanced F-22 Capabilities

By John A. Tirpak

An artist's concept of the F-22 posted on Instagram by Gen. Mark D. Kelly, head of Air Combat Command, offers an official glimpse of new capabilities for the Raptor, including a possible first look at the highly classified AIM-260 Joint Advanced Tactical Missile.

The image, released April 27, shows three F-22s flying in formation, each carrying what appear to be stealthy extended-range fuel tanks and slender outer wing pods with a chiseled aperture at their leading edges. In the picture, one of the F-22s has launched a missile, which is neither an AIM-120 Advanced Medium-Range Air-to-Air Missile nor an AIM-9X Sidewinder, the two air-to-air missiles already known to be qualified for the fighter.

The tanks seem to be the same ones described in new Air Force budget documents, while the pods are likely infrared search and track and/or electronic warfare systems. The only new missile publicly identified for the F-22 is the JATM.

The Air Force has spent more than \$12 billion to continually upgrade the F-22 since production of the fighter ended in 2010. Revelations such as Kelly's image usually precede new systems operating where they can be seen publicly.

Kelly did not comment on the new features. The post accompanying the image noted the 15th anniversary of the first 12-minute airshow demonstration of the F-22, flown by demo pilot Paul D. "Max" Moga, now a brigadier general and Commandant of Cadets at the U.S. Air Force Academy. Back then, the F-22 was the only operational fifth-generation fighter in the world.

Separately, aviation photographer James Reeder captured a photo of an Air Force F-22 Raptor from the 411th Test and Evaluation Squadron at Edwards Air Force Base, Calif., flying with mysterious pods hanging from underwing mounts. That image, taken near Lockheed's Palmdale, Calif., facility, home of its Skunk Works advanced development shop, recalls that Lockheed's early 2000s proposal for an FB-22 bomber variant of the Raptor included stealthy external fuel tanks and stealthy outer-wing pods that could open to release a non-stealthy munition. The potential for stealth aircraft carrying stores externally while preserving their low observability thus dates back at least 20 years.

The Air Force's justifications for the fiscal 2023 budget request identify the new fuel tanks as the Low Drag Tank and Pylon system (LDTP), which USAF calls a "critical capability" to maintaining air superiority. The new tanks and pylons extend the F-22's range while preserving its "lethality and survivability," USAF said. They allow the F-22 to fly supersonically yet stealthily, but can also be jettisoned using "smart rack pneumatic technology," apparently producing a stealthy-smooth surface after the tanks have been released.

Providing the F-22 with an infrared search and track (IRST) system has been an Air Force priority almost since the Raptor entered service, as such a system provides an important way to



Gen. Mark Kelly, ACC commander, posted on Instagram an illustration of new F-22 capabilities for F-22s, including a possible first look at the classified AIM-260 Joint Advanced Tactical Missile.

USAF illustration


spot an adversary whose radar cross section has been reduced.

In 2017, Lockheed F-22 program manager Ken Merchant told Air Force Magazine, "We really don't have the real estate" inside the F-22 for a system like the F-35's electro-optical targeting system, or EOTS, noting at the time, "we're looking at other options." Because an IRST cannot be placed on the F-22's nose or under the chin of the aircraft—as they are on most fighters that have them—the two pods would provide full coverage to the front, as well as expanded capability to the sides.

It's also likely that the pods have some kind of electronic warfare function. Lockheed's "Legion Pod" IRST, which has flown on the F-15, has considerable unused internal space that the company has said could be used for other sensors, functions, or fuel. In fact, company literature mentions that the Legion Pod has "other sensors" but doesn't describe them.

The JATM, the existence of which was first revealed at an Air Force Life Cycle Management Center industry conference in 2019, is also being developed by Lockheed Martin, and is set to begin replacing the AIM-120 AMRAAM sometime soon. When it was first mentioned, the Air Force said it would achieve initial operational capability in 2022. The JATM has been described by USAF officials as having sharply expanded range over the AMRAAM, to match or exceed the capability of newer versions of China's PL-15, which outranges the AMRAAM and has diminished the F-22's "first look, first shot" capability.

It's also believed the JATM, which will be adopted by the Navy as well, has a multi-mode seeker, with both radar and infrared capabilities, with heightened resistance to jamming. Industry observers have speculated the missile will have a novel propulsion system, but the ACC artwork doesn't show an air intake or unusual propulsive apertures, as on Lockheed's "Cuda" advanced missile.

The artwork published by Kelly suggests the new missile will fit inside the F-22's weapons bay, meaning it will not be appreciably larger than AMRAAM. The artwork may be deliberately misleading, however. The image also suggests a modular, "stacked" propulsion system, meaning the missile could be configured for longer- or shorter-ranged missions. 



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FACES OF THE FORCE



Airman 1st Class Rachel Perkinso

Capt. Taylor Bye became the first woman to be honored with the Koren Kolligian, Jr. Trophy, awarded to those who perform outstanding feats of airmanship and skill to avert or minimize the seriousness of an aircraft mishap, on May 11 at the Pentagon. Bye, an A-10C Thunderbolt II pilot assigned to the 23rd Wing at Moody Air Force Base, Ga., was flying a training sortie two years ago, when her A-10's gun experienced a catastrophic failure and her canopy was sent soaring through the sky during flight. After putting the throttles in max, pitching the aircraft nose up and lowering her seat to reduce the wind blast, Bye was able to execute a "belly" landing with the help of her team on the ground and her wingmen.



Capt. Kip Summer

Col. Yosef "Hitman" Morris, from the 388th Fighter Wing retired from Active duty in early April, completing a career filled with historic firsts. Among them, Morris was in the first cadre of F-35A pilots at Eglin Air Force Base, Fla., he flew one of two first operational F-35As in the entire service to Hill, he served as director of operations for Hill's first F-35 squadron and for the F-35A's first overseas deployment, and he led the F-35A's first combat deployment and sorties in Iraq in 2019. Morris was the last of the original leadership from that first F-35 squadron to retire.



Airman 1st Class Chase Sullivan

On April 21, **Lt. Col. Vanessa Wilcox** assumed command of the 96th Bomb Squadron at Barksdale Air Force Base, La., becoming the first woman ever to lead a B-52 squadron. Wilcox had served as Deputy Group Commander for the 2nd Mission Support Group and as Director of Operations for the 20th Bomb Squadron. "I am humbled and grateful for the opportunity to lead this historic squadron. ... "I'm proud to serve alongside the men and women of the 96th BS to build upon a legacy left ... over its 105-year tenure," Wilcox said.



USAF

On Feb. 16, 2022, USAF's oldest living general, **Lt. Gen. Harry Goldsworthy**, died, at age 107. A recipient of the Distinguished Service Medal, Legion of Merit, and the Air Medal, he held a number of posts throughout more than 30 years in the military—he flew B-25s and B-29s, helped oversee wings being equipped with the B-39 and Minuteman ICBM, and served in Puerto Rico, Wright-Patterson AFB, Ohio, at the Pentagon, and the Philippines. In retirement, he was involved with the March Field Air Museum near March ARB, Calif.

Retired Air Force **Maj. William F. Whitson** served as a missileer at RAF Greenham Common AB, U.K., as the U.S. deployed the Ground



Courtesy

Launched Cruise Missile to Europe in the 1980s. After retiring from service, becoming a lawyer, and finishing a 20-year career in the legal profession, Whitson returned to RAF Greenham Common for his debut novel—"The Librarian: Intrigue at RAF Greenham," a historical espionage thriller recounting a tense moment in the Cold War.



Courtesy

Hannah Hart made history April 22, becoming the first-ever prior service member to join the U.S. Space Force when she enlisted as a Space Systems Operator. Hart spent four years as an Active-duty Airman, transferred to the Reserve as a staff sergeant, and went back to school. She'll pursue a bachelor's degree and a commission while undergoing technical training in USSF. Hart credited in part her husband, **Tech. Sgt. Jeffery Hart**, a U.S. Air and Space Force enlisted accessions recruiter.



Michelle Gigante/USAF

Senior Airman Myah Periman of the 919th SOW was named AFRC's 2022 Outstanding Airman of the Year in April. A geospatial imagery analyst, she garnered the highest tier of certification possible, became a mission supervisor, and leads a team of six. Officials credited her with helping to prevent two civilian casualties during a kinetic strike in a combat operation, and she has also served as training lead for her flight.



Nicholas Plich/USAF

In 2001, **Capt. Zlatoslava Karga** immigrated to the U.S. from Ukraine, leaving behind her mother Luba. For years, Karga, now the 60th Operational Medical Readiness Squadron psychiatric nurse practitioner at Travis Air Force Base, Calif., asked her mother to join her, only for her to refuse. But Russia's invasion of Ukraine changed the situation, and Karga sprang into action to coordinate her mother's evacuation from Kyiv amid the conflict. With the help of a GoFundMe, her husband Rob, and a lengthy trip by car, bus, and plane, Karga was able to get her mother out of the combat area and into the U.S.

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

Accelerating Warfighter Solutions That Enable Agile Combat Employment

By Adam Wells

Our national defense priority is now once again on the high-end fight, requiring the Services to embrace the need to modernize rapidly. However, in many cases our military advantage has eroded away from decades of resisting change on an institutional level, and lack of budget to effectively transform. With the real threat of near peer conflict

looming, some might say our peers have surpassed our capabilities, leaving many to ask if it is too little, too late.

For decades, USAF maintenance support equipment has been one of the least funded portions of the budget. Many of these items were delivered with the aircraft they support roughly 40 years ago. Importantly, while the aircraft have undergone numerous upgrades, such as supporting Smart weapons, the armament support equipment which is required to keep them fully mission capable has often been neglected. In fact, most armament test equipment has become obsolete, in that the equipment does not support the functional testing requirements of the modernized aircraft armament systems.

Enabling Agile Combat Employment

As the U.S. Air Force further refines what is needed to Fly, Fight, and Win, a new doctrine note was recently released defining the concept called Agile Combat Employment (ACE). ACE, like the overarching directive to Accelerate Change or Lose from Gen. Charles Q. Brown, Jr., requires many elements to be successful.

To be most effective, those in the Air Force responsible for procuring armament test equipment need to



A Marvin Test Solutions MTS-3060A SmartCan Universal Armament Test Set with adapter and cable kit.

Marvin Test Solutions

adopt a new method of assessing and replacing obsolete armament support equipment. In other words, modify their approach to adapt to the ACE concept that demands innovative approaches such as armament test equipment easy for multi-capable Airmen to employ across the multiple types of armed aircraft they will be required to support found in tailored force packages. ACE puts a premium on easy to use, easy to sustain, easy to deploy, high-performance, small footprint, and rapid test time equipment. The armament support equipment should be capable of supporting all Air Force armament test. Most current Air Force armament test sets can only test the aircraft they were fielded with, and as stated earlier, often lack the ability to perform the functional tests required to support Smart weapons.

For full realization of the maximum potential of ACE and other concepts needed to Fly, Fight, and Win, warfighters should be exploiting existing advancements, most importantly COTS solutions to reduce acquisition cost and fielding time. One such COTS solution was developed by Marvin Test Solutions and is deployed worldwide since 2011 – The MTS-3060A, SERD #75A77, Universal O-Level Armament Test Set known globally as the Smart-

Can™. The SmartCan is the most advanced hand-held armament test set serving on the flightline today in 12 countries, and most recently purchased by the Air National Guard to support all of their armament test needs on their A-10, F-16, and F-15 fleets.

SmartCan has the power to address many of the current test gaps found in the armament community and the capacity to meet future requirements. Importantly, the ANG has

published post-demonstration reports addressing the capabilities of the SmartCan™ to support not only their aircraft, but those of Air Combat Command as well, including their F-15Es and F-16 Block 50s.

In order to ensure today's, and future, armament test needs are met across the USAF's inventory of armed aircraft, commonality, capability and configurability should serve as the cornerstone for armament test equipment managers with the overall goal to support tailored force packages with a minimal footprint. Importantly, the SmartCan has already proven its ability to eliminate many armament test sets on the flightline and support multiple aircraft. SmartCan, for more than a decade, has been helping to transform air forces and their flightlines' maintenance operations around the world meeting these goals.

Final thought: the threats to National Security move at the speed of our enemies and not at the pace of the bureaucracy. Change should not should not be prevented or delayed; aggressive action is needed at all levels to ensure that high tech solutions have the foundational support required to maximize their effects. Now more than ever, it is time to accelerate change or lose. And, losing is not an option.

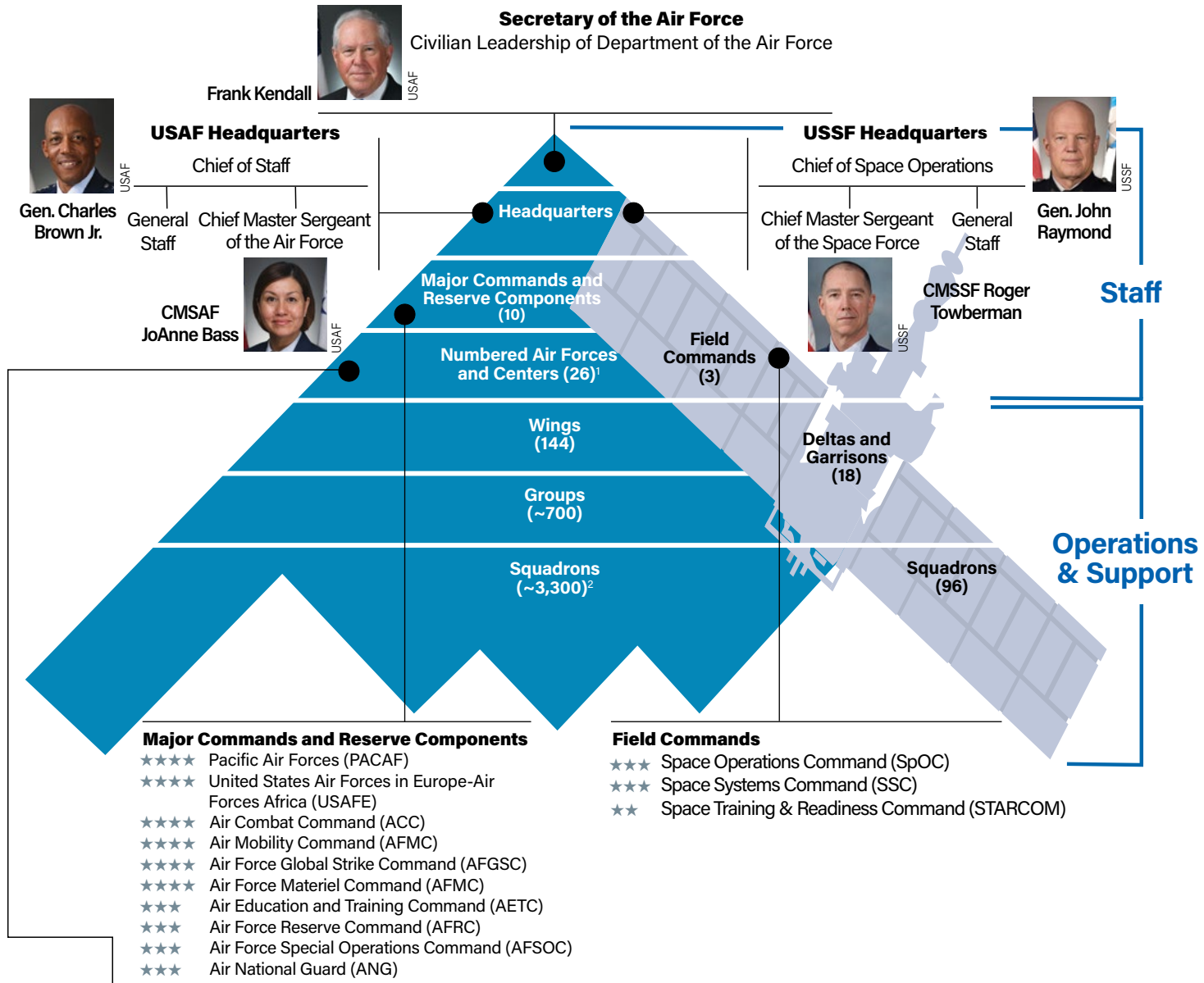
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Glossary	167

This Almanac was compiled by Amanda Miller, Aaron M.U. Church, and the staff of Air Force Magazine. We especially acknowledge the help of the Secretary of the Air Force Office of Public Affairs, Air Staff agencies, major commands, and reserve components in bringing up to date the comparable data from last year's Almanac—THE EDITORS.

DEPARTMENT OF THE AIR FORCE

The U.S. Air Force and U.S. Space Force are distinct military services contained within a single Department of the Air Force (DAF). The two services can be viewed as parts of the same pyramid, with each echelon of each service falling in parallel under a single Department Secretary at the top.



Numbered Air Forces

Numbered Air Forces (NAFs) that support Unified Combatant Commands are designated Component Numbered Air Forces (C-NAFs).

C-NAFs

- ★★★ **1st Air Force/AFNORTH**—Supports U.S. Northern Command to ensure air defense of continental United States
- ★★ **3rd Air Force**—Supports U.S. European Command/U.S. Africa Command
- ★★★ **7th Air Force**—Supports U.S. Forces Korea
- ★★ **8th Air Force/Air Forces Strategic**—Supports U.S. Strategic Command and is responsible for all USAF bombers
- ★★ **12th Air Force/AFSOUTH**—Air component of U.S. Southern Command
- ★★★ **U.S. Air Forces Central/AFCENT³**—Supports U.S. Central Command

(★) Stars indicate commander's rank.

¹For a list of NAF-equivalent centers, see AFMC listing on p. 83

²312 operational and ~ 3,000 support squadrons

³AFCENT is officially a "Named Air Force"

⁴Also supports Unified Combatant Commands

NAFs

- ★★ **2nd Air Force**—Part of AETC, responsible for all USAF non-flying technical training
- ★★ **4th Air Force**—Supports AFRC
- ★★★ **5th Air Force⁴**—Supports PACAF
- ★★ **9th Air Force**—Deployable, operational Joint Task Force
- ★★ **10th Air Force**—Supports Air Force Reserve units nationwide
- ★★★ **11th Air Force**—Provides forces to PACAF
- ★★★ **16th Air Force**—Information warfare operations
- ★★ **18th Air Force⁴**—Operational component of Air Mobility Command
- ★★ **19th Air Force**—Trains aircrews for manned and unmanned aircraft; air battle managers; and weapons directors
- ★★ **20th Air Force**—Responsible for ICBMs and nuclear operations support for Air Force Global Strike Command
- ★★ **22nd Air Force**—Responsible for AFRC C-130 and WC-130 units operated by Air Mobility Command



PERSONNEL

DAF TOTAL FORCE END STRENGTH

(As of Sept. 30, 2021)

FISCAL YEAR	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
USAF Active Duty										
Officers	62,349	61,004	60,961	61,597	62,640	63,902	64,245	64,873	Enacted 64,957	Requested 61,544
Enlisted	250,104	246,322	252,762	256,983	258,978	263,976	265,369	265,658	262,609	257,856
Cadets	3,879	4,031	4,160	4,207	4,262	4,223	4,176	4,103	4,140	4,000
Total USAF Active Duty	316,332	311,357	317,883	322,787	325,880	332,101	333,790	334,634	331,706	323,400
USSF Active Duty										
Officers							84	3,656	4,334	4,314
Enlisted							1	2,907	4,067	4,286
Total USSF Active Duty							85	6,563	8,401	8,600
Civilian Personnel										
Direct hire (excluding technicians)	129,120	129,985	131,965	140,116	135,879	139,536	140,848	147,434*	145,024**	147,373
ANG technicians	22,225	23,448	23,044	22,542	21,705	17,502	14,970	10,994	9,885	9,778
AFRC technicians	10,429	8,501	8,384	7,872	7,648	7,714	9,027	7,224	7,111	6,696
Total direct hire	161,774	161,934	163,393	170,530	165,232	164,752	164,845	165,652	162,020	163,847
Indirect hire	4,823	4,090	3,704	4,570	4,202	4,190	3,694	3,728	4,014	4,014
Total Civilian Personnel	166,597	166,024	167,097	175,100	169,434	168,942	168,539	169,380	166,034	167,861
Air National Guard										
Selected Reserve Officers	15,024	15,084	14,593	15,257	15,401	15,495	15,990	16,377	15,089	15,204
Selected Reserve Enlisted	91,356	90,644	90,907	90,413	92,068	91,702	91,424	92,106	93,211	93,196
Total ANG	106,380	105,728	105,500	105,670	107,469	107,197	107,414	108,483	108,300	108,400
Air Force Reserve Command										
Selected Reserve Officers	13,817	13,937	14,896	13,672	13,716	14,042	14,458	14,947	14,849	14,609
Selected Reserve Enlisted	55,967	54,557	54,304	55,126	54,987	55,347	54,598	55,623	55,451	55,391
Total AFRC Selected Reserve	69,784	68,494	69,200	68,798	68,703	69,389	69,056	70,570	70,300	70,000
Individual Ready Reserve Officers	11,222	7,302	7,492	7,492	6,593	7,631	7,631	7,631	7,631	7,631
IRR Enlisted	24,271	29,449	29,359	29,359	21,801	20,683	20,683	20,683	20,683	20,683
Total IRR	35,493	36,751	36,851	36,851	28,394	28,314	28,314	28,314	28,314	28,314
Total AFRC	105,277	105,245	106,051	105,649	97,097	97,703	97,370	98,884	98,614	98,314
TOTAL FORCE	694,586	688,354	696,531	709,206	699,880	705,610	707,198	717,944	713,055	706,575

Sources: Fiscal 2023 President's Budget Request

*Enacted **Requested

DAF ACTIVE DUTY AIRMEN MALE/FEMALE, 1950-2021

(As of Sept. 30, 2021)

	1970	1980	1990	2000	2010	2019	2020	2021
Cadets								
Female	0	504	553	658	966	1,176	1,194	1,182
%	0	11.4	12.7	15.4	21.2	27.9	28.6	28.8
Male	4,144	3,907	3,817	3,617	3,592	3,047	2,982	2,921
%	100	88.6	87.3	84.6	78.8	72.2	71.4	71.2
Total	4,144	4,411	4,370	4,275	4,558	4,223	4,176	4,103
Enlisted								
Female	8,987	60,803	60,803	55,011	50,946	54,205	55,273	55,644
%	1.4	13.2	14	19.2	19.3	20.5	20.8	20.9
Male	652,559	399,517	374,385	231,620	212,491	209,771	210,279	210,014
%	98.6	86.8	86	80.8	80.7	79.4	79.2	79.1
Total	661,546	460,320	435,188	286,631	263,437	263,976	265,552	265,658
Officer								
Female	4,667	8,493	13,331	11,819	12,363	13,932	14,325	14,671
%	3.6	8.7	13.3	17.1	18.7	21.8	22.3	22.6
Male	125,136	89,156	86,714	57,204	53,838	49,970	49,920	50,202
%	94.6	91.3	86.7	82.9	81.3	78.2	77.7	77.4
Total	129,803	97,649	100,045	69,023	66,201	63,902	69,598	64,873
Grand Total	795,493	562,380	539,603	359,929	334,196	332,101	339,326	334,634

Sources: Defense Manpower Data Center: Table of Active Duty Females by Rank/Grade and Service, September 2021, and Active Duty Military Personnel by Rank/Grade, September 2021

ACTIVE DUTY AIR & SPACE PERSONNEL END STRENGTH: 1930-TODAY

(As of Sept. 30, 2021)

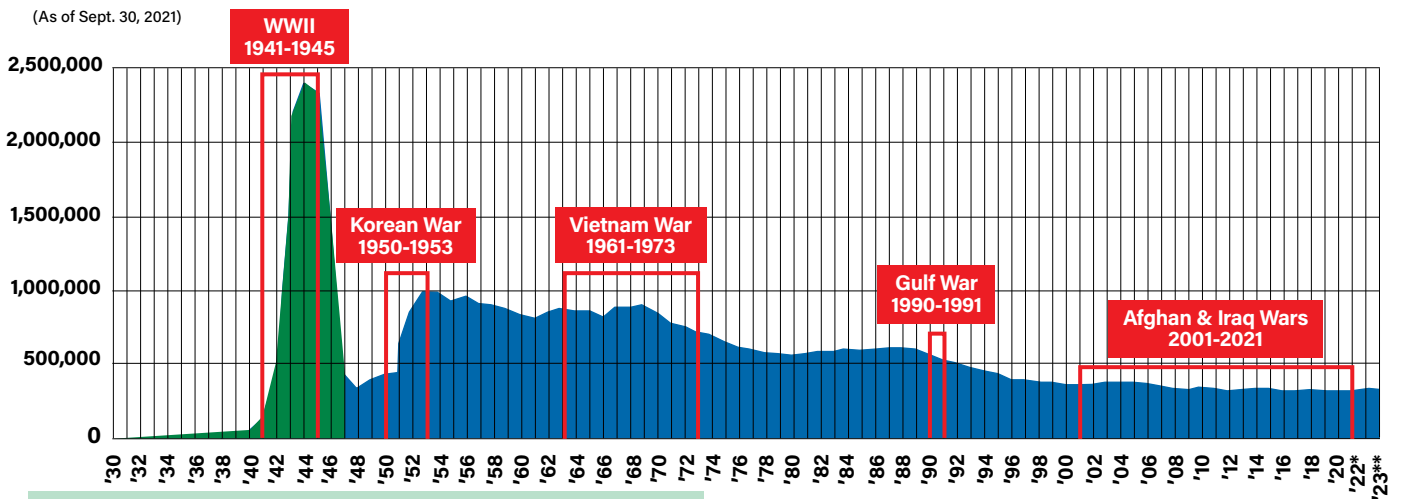
YEAR	NUMBER	YEAR	NUMBER	YEAR	NUMBER	YEAR	NUMBER
1907	3	1937	19,147	1967	897,494	1997	377,385
1908	13	1938	21,089	1968	904,850	1998	367,470
1909	27	1939	23,455	1969	862,353	1999	360,590
1910	11	1940	51,165	1970	791,349	2000	355,654
1911	23	1941	152,125	1971	755,300	2001	353,571
1912	51	1942	764,415	1972	725,838	2002	368,251
1913	114	1943	2,197,114	1973	691,182	2003	375,062
1914	122	1944	2,372,292	1974	643,970	2004	376,616
1915	208	1945	2,282,259	1975	612,751	2005	353,696
1916	311	1946	455,515	1976	585,416	2006	348,953
1917	1,218	1947	305,827	1977	570,695	2007	333,495
1918	195,023	1948	387,730	1978	569,712	2008	327,379
1919	25,603	1949	419,347	1979	559,455	2009	333,408
1920	9,050	1950	411,277	1980	557,969	2010	334,196
1921	11,649	1951	788,381	1981	570,302	2011	333,370
1922	9,642	1952	983,261	1982	582,845	2012	332,918
1923	9,441	1953	977,593	1983	592,044	2013	330,694
1924	10,547	1954	947,918	1984	597,125	2014	316,332
1925	9,670	1955	959,946	1985	601,515	2015	311,357
1926	9,674	1956	909,958	1986	608,199	2016	317,883
1927	10,078	1957	919,835	1987	607,035	2017	322,787
1928	10,549	1958	871,156	1988	576,446	2018	329,880
1929	12,131	1959	840,435	1989	570,880	2019	332,101
1930	13,531	1960	814,752	1990	535,233	2020	329,797
1931	14,780	1961	821,151	1991	510,432	2021	334,634
1932	15,028	1962	884,025	1992	470,315	2022*	340,107
1933	15,099	1963	869,431	1993	444,351	2023**	332,000
1934	15,861	1964	856,798	1994	426,327		
1935	16,247	1965	824,662	1995	400,409		
1936	17,233	1966	887,353	1996	389,001		

From 1907-1946, these Airmen were part of the U.S. Army. See p. 100 on organizational history.

*Planned **Requested

DAF ACTIVE DUTY END STRENGTH

(As of Sept. 30, 2021)



*Planned **Requested

ACTIVE DUTY BY REGION

(As of Sept. 30, 2021)

REGIONS	1960	1970	1980	1990	2000	2010	2018	2019	2020	2021
U.S. and Territories	633,327	565,098	445,886	418,027	291,260	277,123	270,503	276,090	277,818	303,007
Europe	104,899	72,937	76,788	69,296	32,901	30,963	27,085	27,649	27,762	29,896
East Asia, Pacific	50,679	139,666	32,263	33,558	22,030	12,649	20,372	20,698	20,644	22,053
Africa, Mideast, S. Asia	11,160	608	674	376	8,972	891	450	2,076	2,032	2,162
Western Hemisphere	14,106	5,348	2,211	2,356	345	339	2,119	440	436	454
Other	581	7,692	147	11,620	146	12,231	1,138	1,096	1,105	1,183
TOTAL*	814,752	791,349	557,969	535,233	355,654	334,196	321,667	328,049	329,797	358,755

*Not including cadets.

**Not including Space Force.

Source: Air Force Personnel Center



DAF ACTIVE DUTY BY COMMAND

(As of Sept. 30, 2021)

MAJOR COMMANDS	
Air Combat Command	87,775
Air Education and Training Command	62,312
Air Force Global Strike Command	30,989
Air Force Materiel Command	19,872
Air Force Reserve Command	64
Air Force Special Operations Command	16,895
Air Mobility Command	45,729
Pacific Air Forces	32,697
U.S. Air Forces Europe-AFA	24,785
TOTAL	321,054
FIELD OPERATING AGENCIES (FOAS)	
Air Force Agency for Modeling and Simulation	8
Air Force Audit Agency	0
Air Force Cost Analysis Agency	14
Air Force Flight Standards Agency	132
Air Force Historical Research Agency	0
Air Force Inspection Agency	97
Air Force Legal Operations Agency	613
Air Force Manpower Analysis Agency	175

Source: Air Force Personnel Center; fiscal 2023 President's Budget

FIELD OPERATING AGENCIES (FOAS)	
Air Force Medical Readiness Agency	274
Air Force Mortuary Affairs Operations	29
Air Force Office of Special Investigations	141
Air Force Operations Group	45
Air Force Personnel Center	739
Air Force Public Affairs Agency	56
Air Force Review Boards Agency	31
Air Force Safety Center	53
Air National Guard Readiness Center	46
National Air and Space Intelligence Center	139
TOTAL	2,592
DIRECT REPORTING UNITS	
Air Force District of Washington	130
Air Force Operational Test and Evaluation Center	334
U.S. Air Force Academy	356
TOTAL	884
Space Force	6,563
OTHER	34,225
TOTAL ACTIVE DUTY	365,318

ACTIVE DUTY BY BASE, 2021 vs. 2011

(As of Sept. 30, 2021)

BASE	2021	2011	# CHANGE	% CHANGE
JB San Antonio-Lackland, Texas	20,057	17,406	2,651	15.2
Ramstein AB, Germany	10,117	9,471	646	6.8
Hurlburt Field, Fla.	9,944	8,314	1,630	19.6
Nellis AFB, Nev. [1]	8,556	9,900	-1,344	-13.6
JB Langley-Eustis, Va.	8,373	7,986	387	4.8
Shaw AFB, S.C.	7,948	5,912	2,036	34.4
Travis AFB, Calif.	7,500	6,571	929	14.1
Kadena AB, Japan	7,121	6,673	448	6.7
Eglin AFB, Fla.	7,016	5,771	1,245	21.6
Davis-Monthan AFB, Ariz.	6,939	6,643	296	4.5
JB Andrews, Md.	6,727	7,603	-876	-11.5
Offutt AFB, Neb.	6,446	5,405	1,041	19.3
Minot AFB, N.D.	6,303	5,323	980	18.4
Wright-Patterson AFB, Ohio	6,265	5,813	452	7.8
Sheppard AFB, Texas	6,085	5,357	728	13.6
JB Elmendorf-Richardson, Alaska	6,003	5,608	395	7.0
JB Pearl Harbor-Hickam, Hawaii	5,951	5,030	921	18.3
JB McGuire-Dix-Lakehurst, N.J.	5,846	4,855	991	20.4
Barksdale AFB, La.	5,701	5,814	-113	1.9
Osan AB, South Korea	5,657	5,308	349	6.6
Scott AFB, Ill.	5,349	5,109	240	4.7
Tinker AFB, Okla.	5,219	5,876	-657	-11.2
Cannon AFB, N.M.	5,166	4,275	891	20.8
Luke AFB, Ariz.	5,152	3,917	1,235	31.5
Moody AFB, Ga.	5,131	4,654	477	10.2
Dyess AFB, Texas	5,102	5,093	9	0.2
Holloman AFB, N.M.	5,054	4,030	1,024	25.4
Aviano AB, Italy	4,882	4,444	438	9.9
RAF Lakenheath, U.K.	4,855	4,636	219	4.7
Seymour Johnson AFB, N.C.	4,835	4,814	21	0.4
Hill AFB, Utah	4,806	3,864	942	24.4
Pentagon, Va.	4,707	4,179	528	12.6
RAF Mildenhall, U.K.	4,648	4,035	613	15.2
Keesler AFB, Miss.	4,587	5,263	-676	-12.8
Whiteman AFB, Mo.	4,396	3,786	610	16.1
Spangdahlem AB, Germany	4,273	4,815	-542	-11.3
Beale AFB, Calif.	4,271	3,937	334	8.5
MacDill AFB, Fla.	4,099	3,649	450	12.3
JB Charleston, S.C.	3,952	3,783	169	4.5
Robins AFB, Ga.	3,892	3,918	-26	0.7
Little Rock AFB, Ark.	3,861	5,185	-1,324	-25.5
Peterson SFB, Colo.	3,855	3,832	23	0.6
Dover AFB, Del.	3,854	3,525	329	9.3

BASE	2021	2011	# CHANGE	% CHANGE
Fairchild AFB, Wash.	3,850	2,861	989	34.6
Mountain Home AFB, Idaho	3,847	3,553	294	8.3
Goodfellow AFB, Texas	3,836	4,513	-677	-15.0
Fort Meade, Md.	3,805	2,583	1,222	47.3
Ellsworth AFB, S.D.	3,667	3,535	132	3.7
Malmstrom AFB, Mont.	3,580	3,129	451	14.4
JB Lewis-McChord, Wash.	3,538	3,680	-142	4.0
Yokota AB, Japan	3,527	2,931	596	20.3
Kirtland AFB, N.M.	3,441	3,460	-19	-0.5
F.E. Warren AFB, Wyo.	3,437	3,128	309	9.0
Maxwell AFB, Ala.	3,267	2,915	352	12.1
Eielson AFB, Alaska	3,248	1,925	1,323	68.7
McConnell AFB, Kan.	3,199	3,023	176	5.8
Creech AFB [1]	3,187	n/a	n/a	n/a
JB San Antonio-Randolph, Texas	3,052	2,938	114	3.9
Edwards AFB, Calif.	3,046	2,652	394	14.9
Bolling AFB, D.C.	2,897	2,986	-89	3.0
Misawa AB, Japan	2,812	2,950	-138	4.7
U.S. Air Force Academy, Colo.	2,811	2,460	351	14.3
Vandenberg SFB, Calif.	2,656	2,809	-153	5.4
Kunsan AB, South Korea	2,586	2,506	80	3.2
Pope Field, N.C.	2,523	2,574	-51	2
Andersen AFB, Guam	2,302	2,070	232	11.2
Tyndall AFB, Fla.	2,302	2,748	-446	16.2
Patrick SFB, Fla.	1,987	1,777	210	11.8
Grand Forks AFB, N.D.	1,970	1,457	513	35.2
Buckley SFB, Colo.	1,825	1,443	382	26.5
Schriever SFB, Colo.	1,777	1,616	161	10.0
MCB Quantico, Va. [2]	1,720	n/a	n/a	n/a
Hanscom AFB, Mass.	1,597	1,655	-58	-3.5
Incirlik AB, Turkey	1,581	1,429	152	10.6
JB San Antonio-Fort Sam Houston, Texas	1,562	1,322	240	18.2
Columbus AFB, Miss.	1,551	1,592	-41	-2.6
Laughlin AFB, Texas	1,416	1,479	-18	-1.2
Altus AFB, Okla.	1,443	1,381	62	4.5
Los Angeles AFB, Calif.	1,288	1,400	-112	-8.0
Vance AFB, Okla.	1,283	1,209	74	6.1
USAG Stuttgart, Germany	835	1,265	-430	-34.0
Errors in data	3	2	n/a	n/a
Brooks City-Base, Texas [3]	0	28	n/a	n/a
Lajes Field, Portugal [4]	0	663	n/a	n/a
Total	358,755	329,029		

[1] Nellis AFB's personnel included Creech AFB until FY2020.

[2] Air Force personnel first recorded in 2012.

[3] Closed in 2012.

[4] Personnel grouped with the Ramstein Air Base, Germany, host wing in 2015.

*Not including Active-duty Space Force.



TOTAL FORCE ENLISTED: AIRMEN AND GUARDIAN BY SPECIALTY CODE (AFSC)

(As of Sept. 30, 2021)

AFSC	TOTAL	AFSC	TOTAL	AFSC	TOTAL
1A0 In-Flight Refueling Spc	1,949	3D0 Cyberspace Ops	10,721	8H0 Amn Dorm Leader	321
1A1 Flight Eng	1,373	3D1 Client Sys	20,083	8I0 Supt, IG	281
1A2 Aircraft Ldm	4,596	3E0 Civil Engineer	3,782	8I1 Inspections Coordinator	300
1A3 Airborne Mission Sys Spc	2,352	3E1 HVAC, Refrigeration	2,601	8I2 Complaints Resolution Coordinator	11
1A6 Flight Attendant	354	3E2 Pavements and Construction Equip	3,378	8K0 Software Development Specialist	1
1A8 Airborne ISR	2,543	3E3 Structural	2,891	8L1 Enlisted Air Advisor-Basic	0
1A9 Spc Mission Aviator	1,315	3E4 Infrastructure Sys	3,000	8L7 Enl Combat Aviation Advisor (SOF)	33
1B0 Cyber Warfare Operations Supt	30	3E5 Engineering	1,650	8P0 Courier	73
1B4 CW Ops	1,771	3E6 Ops Mgmt	1,270	8P1 Defense Attache	135
1C0 Aviation Rsc Mgmt	3,266	3E7 Fire Protection	6,010	8R0 Enlisted Accessions Recruiter	1,817
1C1 Air Traffic Control	3,427	3E8 Explosive Ordnance Disposal	2,000	8R2 Second-Tier Recruiter	973
1C3 C2 Ops	3,029	3E9 Emergency Mgmt	1,788	8R3 Third-Tier Recruiter	564
1C5 C2 Battle Mgmt Ops	2,475	3F0 Personnel	10,274	8S0 Missile Facility Mgr	194
1C6 Space Sys Ops	1,781	3F1 Services	7,858	8S2 Combat Crew Communications	3
1C7 Airfield Mgmt	1,274	3F2 Education and Training	2,753	8T0 PME Instructor	660
1C8 Radar, Airfield, and Weather Sys	2,026	3F3 Manpower	543	8T1 Enl PME Instructional Sys Designer	32
1D7 Defensive Cyber Ops	2,778	3F4 Equal Opportunity	417	8U0 Unit Deployment Mgr	255
1N0 Intelligence	6,733	3F5 Administration	6,577	9A0 Enl Amn, Disqualified for Reasons Beyond Ctrl	334
1N1 Imagery Analysis	4,007	3H0 Historian	12	9A1 Enl Amn, Disqualified for Reasons Within Ctrl	185
1N2 Sigint	2,591	3N0 Public Affairs	1,961	9A2 Enl Airman Awaiting Discharge, Separation, or Ret for Reasons Within Ctrl	100
1N3 Cryptologic Language Analyst	3,605	3N1 Regional Band	533	9A3 Enl Awaiting Dis, Sep, or Ret for Reasons Beyond Ctrl	47
1N4 Network Intel Analysis	4,731	3N2 Premier Band - The USAF Band	174	9A5 Enl Amn Temp Ineligible for Retraining, Disqualified for Reasons Beyond Ctrl	71
1N7 Humint Spc	149	3N3 USAF Academy Band	36	9C0 Chief Master Sergeant of the Air Force	1
1N8 Targeting Analyst	781	3P0 Security Forces	41,192	9C1 Executive Asst to the CMSO	1
1P0 Aircrew Flight Equip	4,320	3S0 Force Support Manager	2	9D1 Key Developmental Senior Enlisted Positions	34
1S0 Safety	784	4A0 Health Services Mgmt	4,424	9E0 Command Chief Master Sergeant	419
1T0 SERE Specialist	735	4A1 Medical Materiel	1,444	9E1 Command Chief Executive Assistant	18
1U0 RPA Sensor Operator Manager	2,516	4A2 Biomedical Equip	749	9E2 Individual Mobilization Augmentee to CCMS	10
1U1 RPA Pilot Manager	75	4B0 Bioenvironmental Eng	1,320	9G1 Group Supt	890
1W0 Weather	3,287	4C0 Mental Health Svc	1,092	9H0 Academic Faculty Inst	1
1Z1 Pararescue	852	4D0 Diet Therapy	242	9J0 Prisoner	17
1Z2 Combat Control	662	4E0 Public Health	1,521	9L0 Interpreter/Translator	66
1Z3 TACP	1,661	4H0 Cardiopulmonary Lab	512	9L1 Enl Engagement Mgr/Int'l Affairs	3
1Z4 Special Recon	972	4J0 Physical Medicine	334	9M0 Military Entrance Processing	1
2A0 Avionics	1,800	4M0 Aerospace and Ops Physiology	264	9M4 Chief, Medical Enl Force	18
2A2 SOF/PR Integrated Comm/Nav/Mission Sys	1,963	4N0 Aerospace Medical Svc	12,148	9N0 SECAF Enl Legislative Fellows	2
2A3 Fighter/RPA Maint	21,477	4N1 Surgical Svc	724	9Q0 Reserve Force Generation and Oversight NCO	13
2A5 Airlift/Special Mission Aircraft Maint	22,507	4P0 Pharmacy	822	9S0 Chief Master Sergeant of the Space Force	1
2A6 Aircraft Sys	29,512	4R0 Diagnostic Imaging	924	9S1 Scientific Applications Spc	581
2A7 Aircraft Metals Technology	9,534	4T0 Medical Lab	1,370	9T0 Basic Enl Amn	10,880
2A8 Mobility AF Integrated Comms/Nav/Mission Sys	4,837	4V0 Optometry	386	9T1 Officer Trainee	219
2A9 Bomber/Spc Integrated Comms/Nav/Mission Sys	2,807	4Y0 Dental	3,084	9T2 Pre-Cadet Assigned	564
2F0 Fuels	4,980	5J0 Paralegal	1,439	9T4 AF Institute of Tech or Ed With Industry Enl Students	0
2G0 Logistics Plans	1,667	5R0 Religious Affairs	965	9T5 Basic Special Warfare Enlisted Airman	220
2M0 Missile and Space Sys Maint	1,880	6C0 Contracting	1,926	Unknown/other	65
2P0 Precision Measurement Equipment Lab	873	6F0 Financial Mgmt and Comptroller	3,720		
2R0 Maintenance	902	7S0 Special Investigations	1,250		
2R1 Maint Prod Mgmt	1,742	8A1 Career Assistance Advisor	288		
2S0 Materiel Mgmt	10,771	8A2 Enlisted Aide	74		
2T0 Traffic Mgmt	2,897	8A3 Protocol	71		
2T1 Ground Trans	3,419	8B0 Military Training Instructor	704		
2T2 Air Trans	11,409	8B1 Military Training Leader	416		
2T3 Vehicle Mgmt	5,559	8B2 Academy Military Training NCO	123		
2W0 Munitions Maint	10,434	8C0 Amn and Family Readiness Center NCO	230		
2W1 Aircraft Armament Sys	10,576	8D1 Language and Culture Advisor	1		
2W2 Nuclear Weapons	828	8F0 First Sergeant	2,696		
		8G0 USAF Honor Guard	279		
		8G1 USAF Installation Honor Guard Prgm Mgr	90		



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TOTAL FORCE OFFICERS: AIRMEN AND GUARDIAN BY SPECIALTY CODE (AFSC)

(As of Sept. 30, 2021)

AFSC	TOTAL	AFSC	TOTAL	AFSC	TOTAL			
10C	Ops Cmdr	644	42B	Physical Therapist	213	60C	Sr Materiel Leader-Upper Echelon	25
11B	Bomber Pilot	651	42E	Optometrist	182	61C	Chemist/Nuclear Chemist	73
11E	Experimental Test Pilot	180	42F	Podiatric Surgeon	17	61D	Physicist/Nuclear Eng	190
11F	Fighter Pilot	3,961	42G	Physician Asst	908	62E	Development Eng	2,405
11G	Generalist Pilot	455	42N	Audiology/Speech Pathologist	31	62S	Materiel Leader	15
11H	Helicopter Pilot	940	42P	Clinical Psychologist	318	63A	Acquisition Mgr	2,975
11K	Trainer Pilot	1,704	42S	Clinical Social Worker	317	63G	Sr Materiel Leader-Lower Echelon	100
11M	Mobility Pilot	8,342	42T	Occupational Therapist	20	63S	Materiel Leader	184
11R	Recon/Surveillance/EW Pilot	981	43A	Aerospace and Operational Physiologist	88	64P	Contracting	902
11S	Spc Ops Pilot	1,635	43B	Biomedical Scientist	123	65F	Financial Mgmt	826
11U	RPA Pilot	304	43D	Dietitian	39	65W	Cost Analysis	71
12B	Bomber Combat Systems Officer (CSO)	682	43E	Bioenvironmental Eng	403	71S	Spc Investigations	478
12E	Experimental Test CSO	25	43H	Public Health Officer	287	80C	Cmdr, Cadet Squadron, USAF Academy	47
12F	Fighter CSO	464	43P	Pharmacist	319	81C	Instructor, Officer Training School	102
12G	Generalist CSO	136	43T	Biomedical Lab	161	81D	ROTC Det. Commander and Professor of Aerospace Studies	164
12H	Rescue CSO	109	44A	Chief, Hospital/Clinic Svcs	77	81L	Education and Training Leader	12
12K	Trainer CSO	168	44B	Preventive Medicine	25	81T	Instructor	1,020
12M	Mobility CSO	504	44D	Pathologist	80	82A	Academic Program Mgr	97
12R	Recon/Surveillance/EW CSO	935	44E	ER Services Physician	352	83R	Recruiting Svc	160
12S	Spc Ops CSO	641	44F	Family Physician	621	84H	Historian	12
12U	RPA	80	44G	General Practice Physician	105	85G	USAF Honor Guard	6
13A	Astronaut	5	44J	Clinical Geneticist	2	86M	Ops Mgmt	258
13B	Air Battle Mgr	1,885	44K	Pediatrician	370	86P	C2	89
13C	Spc Tactics	1	44M	Internist	528	87G	Wing IG	253
13L	Air Liaison Officer	0	44N	Neurologist	37	87I	Director, Wing Inspections	140
13M	Airfield Ops	333	44O	Physician	49	87Q	Director, Complaints Resolution	116
13N	Nuclear and Missile Ops	1,174	44P	Psychiatrist	173	88A	Aide-de-camp	43
13O	Multi-Domain Warfare Officer	29	44R	Diagnostic Radiologist	166	88B	Protocol Officer	14
13S	Space Ops	2,103	44S	Dermatologist	39	88C	Sexual Assault Response Coordinator	16
14F	Info Ops	137	44T	Radiotherapist	7	89E	Officer Air Advisor Advanced	1
14N	Intelligence	5,566	44U	Occupational Medicine	16	89G	Officer Combat Aviation Advisor	31
15A	Operations Research Analyst	449	44Y	Critical Care Medicine	67	90G	General Officer	526
15W	Weather and Environmental Svcs	556	44Z	Allergist	24	91C	Cmdr	195
16F	Regional Affairs Strategist	412	45A	Anesthesiologist	193	91W	Wing Cmdr	489
16G	AF Ops Staff Officer	817	45B	Orthopedic Surgeon	123	92J	Non-Designated Lawyer	4
16K	Software Development Officer	7	45E	Ophthalmologist	52	92M	Health Prof Scholarship Prgm	
16P	Political-Military Affairs Strategist	315	45G	Obstetrician and Gynecologist	173		Med Student	295
16R	Planning and Programming	770	45N	Otorhinolaryngologist	56	92P	Physician Assistant Student	25
17C	Cyberspace Warfare Ops Cmdr	23	45S	Surgeon	312	92R	Chaplain Candidate	82
17D	Warfighter Comms Ops	3,252	45U	Urologist	33	92S	Student Officer Authorization	1,858
17S	Cyberspace Effects Ops	1,172	46A	Nursing Admin	222	92T	Pilot Trainee	3,542
18A	Attack RPA Pilot	1,654	46F	Flight Nurse	1,073	93P	Patient	17
18E	Experimental Test RPA Pilot	13	46N	Clinical Nurse	3,456	95A	Non-extended Active Duty USAFR Academy Liaison Officer or CAP Reserve Asst Prgm Officer	14
18G	Generalist RPA Pilot	105	46P	Mental Health Nurse	79	96B	Disq Officer, Reasons Within Control	6
18R	Recon RPA Pilot	354	46S	Operating Room Nurse	230	96D	Officer N/A for Use in Awarded AFSC for Cause	23
18S	Special Ops RPA Pilot	366	46Y	Adv Practice RN	728	97E	Executive Officer	810
19Z	Special Warfare	760	47B	Orthodontist	37	99G	Gold Bar Diversity Recruiter	15
20C	Logistics Cmdr	384	47D	Oral and Maxillofacial Pathologist	6		Unknown/other	1,424
21A	Aircraft Maint	2,123	47E	Endodontist	31			
21M	Munitions and Missile Maint	313	47G	Dentist	1,063			
21R	Logistics Readiness	2,337	47H	Periodontist	53			
30C	Support Cmdr	547	47K	Pediatric Dentist	18			
31P	Security Forces	993	47P	Prosthodontist	56			
32E	Civil Eng	1,970	47S	Oral and Maxillofacial Surgeon	74			
35B	Band	23	48A	Aerospace Medicine Physician Spc	144			
35P	Public Affairs	660	48G	General Med Officer, Flight Surgeon	211			
38F	Force Support Officer	2,421	48R	Residency Trained Flight Surgeon	898			
40C	Medical Cmdr	233	48V	Pilot-Physician	469			
41A	Health Services Admin	1,867	51J	Judge Advocate	1,957			
			52R	Chaplain	1,232			

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DOD PERSONNEL

DOD TOTAL FORCE END STRENGTH

(In thousands, as of Sept. 30, 2021)

FISCAL YEAR	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Active-Duty Military											
USAF	331	316	311	317	323	326	328	330	328	323	323
Army	532	508	491	475	476	476	484	481	487	476	473
Marine Corps	196	188	184	184	185	186	186	181	180	177	177
Navy	324	326	328	325	324	330	337	342	348	348	346
USSF								*	7	8	9**
Full-time Guard and Reserve	77	77	76	76	75	79	83	87	90	93	n/a
Total	1,460	1,415	1,390	1,378	1,382	1,397	1,422	1,421	1,439	1,425	n/a

Selected Reserve											
Air National Guard	106	106	106	106	106	107	107	107	109	108	108
AFRC	71	70	68	69	69	69	69	69	71	70	70
Army National Guard	358	354	350	342	344	335	336	336	338	336	336
Army Reserve	198	195	199	198	194	189	191	189	184	190	190
Marine Corps Reserve	40	39	39	38	39	38	38	36	35	32	33
Navy Reserve	62	59	57	58	58	59	60	59	58	59	58
Total	835	824	819	812	810	797	801	796	794	795	795

Appropriated-Fund Civilian Full-time Equivalents											
DAF	180	167	166	167	167	170	172	170	173	175	176
Army	256	207	206	195	191	189	190	251	250	186	187
Navy/Marine Corps	208	193	199	204	206	209	218	220	205	212	214
Defense Agencies	129	189	187	189	191	193	216	114	114	213	214
Total	773	756	758	755	756	761	796	755	742	785	791

Sources: Defense Manpower Data Center, Number of Military and DOD Appropriated Fund (APF) Civilian Personnel Permanently Assigned; National Defense Budget Estimates for 2022 and 2023

*85 military personnel had transferred into the USSF as of Sept. 30, 2020. **8,600

Totals may not add precisely due to rounding.

DOD MILITARY DEMOGRAPHICS BY SERVICE

(As of Sept. 2021)

	DOD*		DAF		Army		Marine Corps		Navy	
Total	1,333,822		329,614		481,254		180,958		341,996	
HIGHEST EDUCATIONAL ACHIEVEMENT										
No High School Diploma or GED	1,454	0.1	58	0.0	606	0.1	29	0.0	761	0.2
High School Diploma/GED or Some College	891,790	66.9	170,743	51.8	330,710	68.7	153,043	84.6	237,294	69.4
Associate Degree	115,877	8.7	61,063	18.5	27,631	5.7	4,025	2.2	23,158	6.8
Bachelor's Degree	190,664	14.3	51,617	15.7	78,655	16.3	18,223	10.1	42,169	12.3
Advanced Degree	109,331	8.2	39,738	12.1	41,526	8.6	4,809	2.7	23,258	6.8
Unknown	24,706	1.9	6,395	1.9	2,126	0.4	829	0.5	15,356	4.5
ETHNICITY										
Hispanic or Latino	230,029	17.2	51,231	15.5	80,116	16.6	42,553	23.5	56,129	16.4
Not Hispanic or Latino	1,103,793	82.8	278,383	84.5	401,138	83.4	138,405	76.5	285,867	83.6
MARITAL STATUS										
Divorced	63,487	4.8	19,482	5.9	24,244	5.0	5,475	3	14,286	5.0
Married	665,764	49.9	177,339	53.8	249,520	51.8	72,646	40.1	166,259	48.6
Never Married	602,452	45.2	132,568	40.2	206,922	43.0	102,745	56.8	160,217	46.8
Other***	2,119	0.2	225	0.1	568	0.1	92	0.1	1,234	0.1
RACE										
American Indian or Alaska Native	14,366	1.1	2,381	0.7	3,550	0.7	1,886	1.0	6,549	1.9
Asian	63,888	4.8	14,029	4.3	24,178	5.0	5,783	3.2	19,898	5.8
Black or African American	229,970	17.2	49,038	14.9	102,308	21.3	18,696	10.3	59,928	17.5
Native Hawaiian or Other Pacific Islander	15,507	1.2	3,965	1.2	5,580	1.2	1,949	1.1	4,013	1.2
Multi-racial****	39,702	3.0	14,843	4.5	n/a	n/a	2,359	1.3	22,500	6.6
White	918,408	68.9	233,845	70.9	326,810	67.9	144,465	79.8	213,288	62.4
Other/Unknown	51,981	3.9	11,513	3.5	18,828	3.9	5,820	3.2	15,820	4.6
SEX										
Female	229,933		69,564		74,592		16,148		69,629	
Male	1,103,889		260,050		406,662		164,810		272,367	

*DOD numbers combine both active and reserve; the others are Active-duty only. **85 members had joined the Space Force as of Sept. 30, 2020.

Includes annulled, widowed, and unknown. *Army and Army Reserve do not report "Multi-racial"

Source: 2020 Demographics Profile of the Military Community



DOD ACTIVE DUTY BY ENLISTED/OFFICER AND SEX

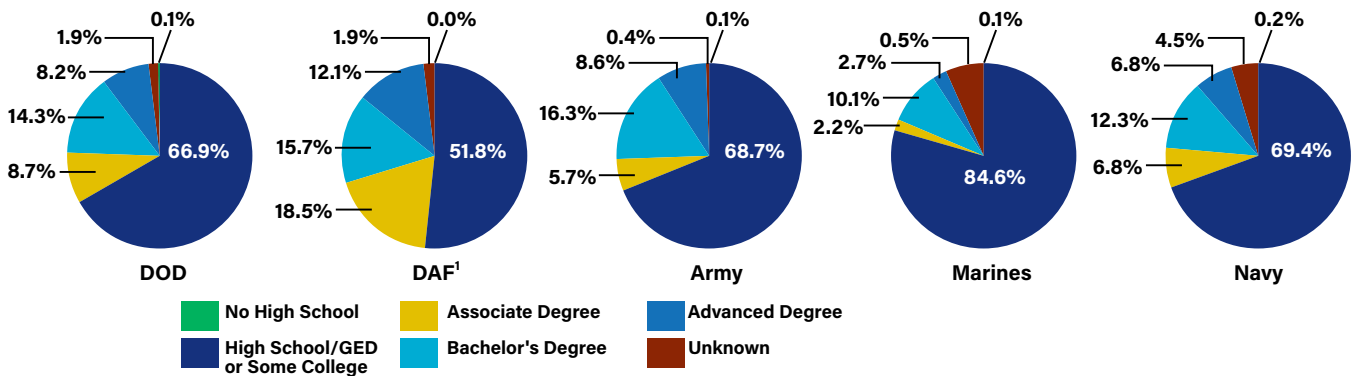
(As of Sept. 30, 2021)

	DOD		DAF		ARMY		MARINE CORPS		NAVY	
		%		%		%		%		%
CADET/MIDSHIPMAN	13,040		4,103		4,483		N/A		4,454	
Female	3,538	27.1	1,182	28.8	1,071	23.9	n/a	n/a	1,285	28.9
Male	9,502	72.9	2,921	71.2	3,412	76.1	n/a	n/a	3,169	71.1
ENLISTED	1,099,378		265,658		388,564		157,977		287,179	
Female	186,357	17.0	55,644	20.9	57,585	14.8	14,320	9.1	58,808	20.5
Male	913,021	83.0	210,014	79.1	330,979	85.2	143,657	90.9	228,371	79.5
OFFICER	236,061		64,873		93,443		21,701		56,044	
Female	45,331	19.2	14,671	22.6	17,235	18.4	1,981	9.1	11,444	20.4
Male	190,730	80.8	50,202	77.4	76,208	81.6	19,720	90.9	44,600	79.6
TOTAL ACTIVE DUTY	1,348,479		334,634		486,490		179,678		347,677	

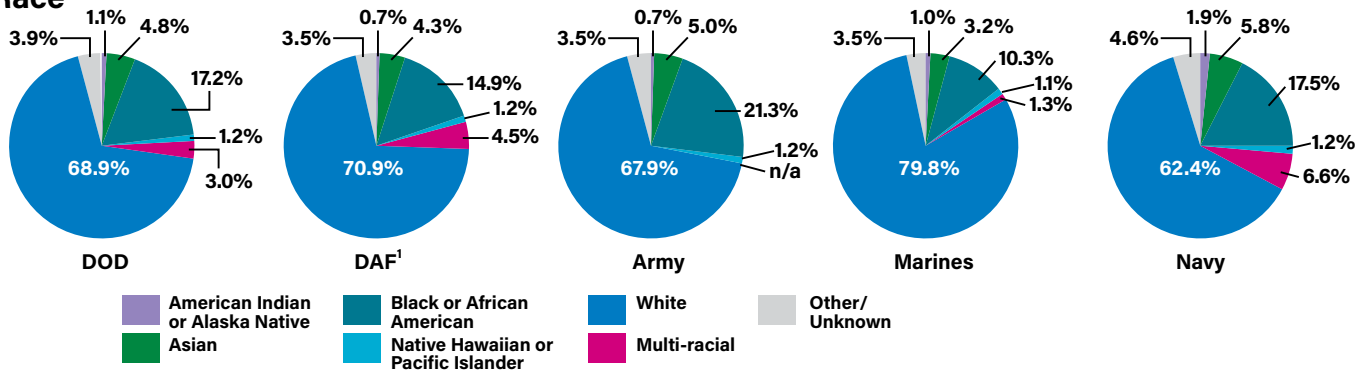
Sources: Defense Manpower Data Center, Active Duty Military Personnel by Rank/Grade and Service; and Table of Active Duty Females by Rank/Grade and Service

DOD MILITARY DEMOGRAPHICS BY SERVICE

Education



Race



¹—Only 85 members had joined the Space Force as of Sept. 30, 2020.

PAY & ALLOWANCES

MONTHLY MILITARY BASIC PAY

(Effective Jan. 1, 2022)

	YEARS OF SERVICE															
	PAY GRADE < 2	2	3	4	6	8	10	12	14	16	18	20	22	24	26	
COMMISSIONED OFFICERS	O-10	0	0	0	0	0	0	0	0	0	0	16,975	16,975	16,975	16,975	
	O-9	0	0	0	0	0	0	0	0	0	0	16,445	16,682	16,975	16,975	
	O-8	11,636	12,017	12,270	12,341	12,656	13,183	13,306	13,807	13,951	14,382	15,006	15,581	15,966	15,966	15,966
	O-7	9,668	10,118	10,325	10,491	10,790	11,085	11,427	11,768	12,110	13,183	14,090	14,090	14,090	14,090	14,162
	O-6	7,332	8,055	8,583	8,583	8,616	8,985	9,035	9,035	9,548	10,455	10,988	11,521	11,824	12,131	12,725
	O-5	6,112	6,885	7,362	7,451	7,749	7,927	8,318	8,606	8,977	9,544	9,814	10,081	10,384	10,384	10,384
	O-4	5,274	6,104	6,512	6,603	6,981	7,386	7,892	8,285	8,558	8,715	8,805	8,805	8,805	8,805	8,805
	O-3	4,637	5,256	5,672	6,185	6,482	6,807	7,017	7,363	7,544	7,544	7,544	7,544	7,544	7,544	7,544
	O-2	4,007	4,563	5,255	5,433	5,544	5,544	5,544	5,544	5,544	5,544	5,544	5,544	5,544	5,544	5,544
	O-1	3,477	3,620	4,376	4,376	4,376	4,376	4,376	4,376	4,376	4,376	4,376	4,376	4,376	4,376	4,376
	O-3E	0	0	0	6,185	6,482	6,807	7,017	7,363	7,655	7,823	8,051	8,051	8,051	8,051	8,051
O-2E	0	0	0	5,433	5,544	5,721	6,019	6,249	6,421	6,421	6,421	6,421	6,421	6,421	6,421	
O-1E	0	0	0	4,376	4,672	4,845	5,022	5,195	5,433	5,433	5,433	5,433	5,433	5,433	5,433	
ENLISTED MEMBERS	E-9	0	0	0	0	0	5,789	5,921	6,086	6,280	6,477	6,791	7,057	7,336	7,764	
	E-8	0	0	0	0	4,739	4,949	5,078	5,234	5,402	5,706	5,861	6,123	6,268	6,626	
	E-7	3,294	3,596	3,734	3,915	4,058	4,303	4,441	4,685	4,889	5,027	5,175	5,233	5,425	5,528	5,921
	E-6	2,849	3,136	3,274	3,409	3,549	3,864	3,988	4,226	4,298	4,351	4,413	4,413	4,413	4,413	
	E-5	2,610	2,786	2,921	3,059	3,273	3,498	3,682	3,704	3,704	3,704	3,704	3,704	3,704	3,704	
	E-4	2,393	2,516	2,652	2,787	2,906	2,906	2,906	2,906	2,906	2,906	2,906	2,906	2,906	2,906	
	E-3	2,161	2,297	2,436	2,436	2,436	2,436	2,436	2,436	2,436	2,436	2,436	2,436	2,436	2,436	
	E-2	2,055	2,055	2,055	2,055	2,055	2,055	2,055	2,055	2,055	2,055	2,055	2,055	2,055	2,055	
	E-1	1,833	1,833	1,833	1,833	1,833	1,833	1,833	1,833	1,833	1,833	1,833	1,833	1,833	1,833	

Note—Basic pay for O7-O10 is limited to Level II of the Executive Schedule during 2022 (\$16,974.90)
Basic pay for O6 and below is limited to Level V of the Executive Schedule in effect during 2022 (\$13,775.10)

ANNUAL PAY FOR FEDERAL CIVILIANS

(Effective Jan. 1, 2022)

Grade	GENERAL SCHEDULE									
	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8	Step 9	Step 10
GS-1	\$ 20,172	\$ 20,849	\$ 21,519	\$ 22,187	\$ 22,857	\$ 23,249	\$ 23,913	\$ 24,581	\$ 24,608	\$ 25,234
GS-2	22,682	23,222	23,973	24,608	24,886	25,618	26,350	27,082	27,814	28,546
GS-3	24,749	25,574	26,399	27,224	28,049	28,874	29,699	30,524	31,349	32,174
GS-4	27,782	28,708	29,634	30,560	31,486	32,412	33,338	34,264	35,190	36,116
GS-5	31,083	32,119	33,155	34,191	35,227	36,263	37,299	38,335	39,371	40,407
GS-6	34,649	35,804	36,959	38,114	39,269	40,424	41,579	42,734	43,889	45,044
GS-7	38,503	39,786	41,069	42,352	43,635	44,918	46,201	47,484	48,767	50,050
GS-8	42,641	44,062	45,483	46,904	48,325	49,746	51,167	52,588	54,009	55,430
GS-9	47,097	48,667	50,237	51,807	53,377	54,947	56,517	58,087	59,657	61,227
GS-10	51,864	53,593	55,322	57,051	58,780	60,509	62,238	63,967	65,696	67,425
GS-11	56,983	58,882	60,781	62,680	64,579	66,478	68,377	70,276	72,175	74,074
GS-12	68,299	70,576	72,853	75,130	77,407	79,684	81,961	84,238	86,515	88,792
GS-13	81,216	83,923	86,630	89,337	92,044	94,751	97,458	100,165	102,872	105,579
GS-14	95,973	99,172	102,371	105,570	108,769	111,968	115,167	118,366	121,565	124,764
GS-15	112,890	116,653	120,416	124,179	127,942	131,705	135,468	139,231	142,994	146,757

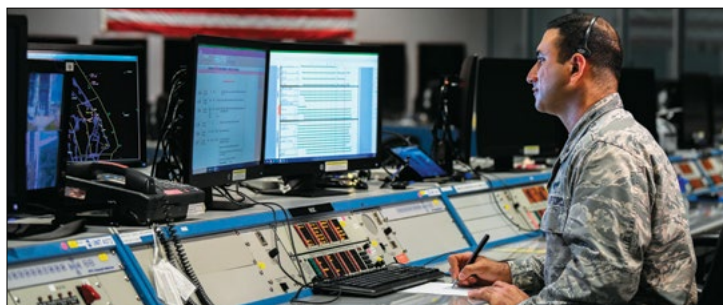
Does not include locality pay assigned by geographic area, such as 19.18% for Dayton, Ohio, and 30.48% for Washington, D.C. Source: Office of Personnel Management

SENIOR EXECUTIVE SERVICE PAY

(Effective Jan. 1, 2022)

SES Pay System Structure	Minimum	Maximum
Certified SES performance appraisal system	\$135,468	\$203,700
Noncertified SES performance appraisal system	\$135,468	\$187,300

Source: Office of Personnel Management



1st Lt. Ahmed Said, a range squadron range operations commander, at Cape Canaveral Space Force Station, Fla.

Airman First Class Thomas Sjoberg

SAMPLE HOUSING ALLOWANCES

(As of Jan. 1, 2022)

Pay Grade	San Antonio JB San Antonio		Niceville-Valparaiso, Fla. Eglin AFB		Fairfield, Calif. Travis AFB		Hampton, Va. JB Langley-Eustis		Albuquerque, N.M. Kirtland AFB	
	No Dependents	Dependants	No Dependents	Dependants	No Dependents	Dependants	No Dependents	Dependants	No Dependents	Dependants
O-7 to O-10	\$2,208	\$1,944	\$2,910	\$2,517	\$3,375	\$2,961	\$2,502	\$1,878	\$2,043	\$1,830
O-6	2,193	1,923	2,889	2,487	3,348	2,934	2,484	1,863	2,031	1,827
O-5	2,178	1,887	2,868	2,331	3,324	2,931	2,466	1,851	2,019	1,824
O-4	2,076	1,863	2,712	2,238	3,159	2,925	2,202	1,806	1,935	1,818
O-3	1,938	1,818	2,493	2,037	2,958	2,880	1,839	1,773	1,836	1,809
O-2	1,833	1,749	2,082	1,983	2,925	2,784	1,803	1,716	1,803	1,737
O-1	1,803	1,530	1,986	1,956	2,832	2,631	1,743	1,647	1,797	1,473
E-9	1,980	1,812	2,562	2,019	3,000	2,865	1,941	1,761	1,854	1,803
E-8	1,911	1,806	2,397	1,995	2,952	2,841	1,830	1,749	1,830	1,797
E-7	1,869	1,665	2,229	1,980	2,943	2,724	1,821	1,692	1,821	1,635
E-6	1,836	1,542	2,085	1,959	2,928	2,640	1,806	1,650	1,806	1,488
E-5	1,791	1,410	1,968	1,833	2,811	2,454	1,728	1,524	1,788	1,401
E-4 to E-1	1,662	1,248	1,965	1,599	2,724	2,112	1,689	1,290	1,632	1,275

Source: Defense Travel Management Office

AVIATION INCENTIVE PAY HAZARDOUS DUTY INCENTIVE PAY

(Effective since Oct. 1, 2017)

Years of Service as Aviation Officer	Monthly Rate
Two or fewer	\$150
More than two	\$250
More than six	\$700
More than 10	\$1,000
More than 22	\$700
More than 24	\$450
Four of fewer	\$225
More than four	\$350
More than eight	\$500
More than 14	\$600

Source: Defense Finance and Accounting Service

(Effective since Jan. 1, 2017)

Duty	Rate per month
Aircrew Members	\$250
Parachute Duty, Static Line	\$150
Parachute Duty, Military Free Fall	\$225
Flight Deck Duty	\$150
Demolition Duty	\$150
Experimental Stress Duty	\$150
Toxic Fuels (or Propellants) Duty	\$150
Toxic Pesticides Duty	\$150
Dangerous Viruses (or Bacteria) Lab Duty	\$150
Chemical Munitions Duty	\$150
Maritime Visit, Board, Search, Seizure (VBSS) Duty	\$150
Polar Region Flight Operations Duty	\$150
Weapons of Mass Destruction Civil Support (WMDCS) Team	\$150

Source: Defense Finance and Accounting Service

SUBSISTENCE ALLOWANCE

(Effective Jan. 1, 2022)

Officers	Enlisted Members
\$280.29/month	\$406.98/month



U.S. Air Force Staff Sgt. Roman Evseev, 37th Airlift Squadron loadmaster, assists a jumpmaster during Stolen Cerberus IX at Elefsina Air Base, Greece, May 4, 2022. Sixty Hellenic air force members jumped from the aircraft as part of the exercise.

Airman 1st Class Alexcia Givens

RANK INSIGNIA OF THE ARMED

FORCES

Air Force		Space Force		Army		Navy & Coast Guard		Marine Corps																			
Officer	Enlisted	Officer	Enlisted	Officer	Enlisted	Officer	Enlisted	Officer	Enlisted																		
O-1	Second Lieutenant	E-1	Airman Basic No insignia	E-9	Chief Master Sergeant	O-1	Second Lieutenant	E-1	Specialist 1	O-1	2nd Lieutenant	W-1	Warrant Officer 1	E-1	Private	O-1	Ensign	W-1	USN Warrant Officer 1	E-1	Seaman Recruit	O-1	2nd Lieutenant	W-1	Warrant Officer 1	E-1	Private
O-2	First Lieutenant	E-2	Airman		First Sergeant	O-2	First Lieutenant	E-2	Specialist 2	O-2	1st Lieutenant	W-2	Warrant Officer 2	E-2	Private E-2	O-2	Lieutenant Junior Grade	W-2	USN Chief Warrant Officer 2	E-2	Seaman Apprentice	O-2	1st Lieutenant	W-2	Chief Warrant Officer 2	E-2	Private First Class
O-3	Captain	E-3	Airman First Class		Command Chief Master Sergeant The star device shown here denotes an E-9 who serves in a 9E000 position as a command's senior enlisted adviser.	O-3	Captain	E-3	Specialist 3	O-3	Captain	W-3	Warrant Officer 3	E-3	Private First Class	O-3	Lieutenant	W-3	USN Chief Warrant Officer 3	E-3	Seaman	O-3	Captain	W-3	Chief Warrant Officer 3	E-3	Lance Corporal
O-4	Major	E-4	Senior Airman		Chief Master Sergeant of the Air Force	O-4	Major	E-4	Specialist 4	O-4	Major	W-4	Warrant Officer 4	E-4	Corporal Specialist	O-4	Lieutenant Commander	W-4	USN Chief Warrant Officer 4	E-4	Petty Officer Third Class	O-4	Major	W-4	Chief Warrant Officer 4	E-4	Corporal
O-5	Lieutenant Colonel	E-5	Staff Sergeant		Chief Sergeant of the Air Force	O-5	Lieutenant Colonel	E-5	Sergeant	O-5	Lieutenant Colonel	W-5	Warrant Officer 5	E-5	Sergeant	O-5	Commander	W-5	USN Chief Warrant Officer 5	E-5	Petty Officer Second Class	O-5	Lieutenant Colonel	W-5	Chief Warrant Officer 5	E-5	Sergeant
O-6	Colonel	E-6	Technical Sergeant		Senior Enlisted Advisor of the U.S. Space Force	O-6	Colonel	E-6	Technical Sergeant	O-6	Colonel	E-6	Staff Sergeant	O-6	Captain	E-6	Petty Officer First Class	O-6	Colonel	E-6	Staff Sergeant						
O-7	Brigadier General	E-7	Master Sergeant First Sergeant			O-7	Brigadier General	E-7	Master Sergeant	O-7	Brigadier General	E-7	Sergeant First Class	O-7	Rear Admiral Lower Half	E-7	Chief Petty Officer	O-7	Brigadier General	E-7	Gunnery sergeant						
O-8	Major General	E-8	Senior Master Sergeant First Sergeant			O-8	Major General	E-8	Senior Master Sergeant	O-8	Major General	E-8	Master Sergeant First Sergeant	O-8	Rear Admiral Upper Half	E-8	Senior Chief Petty Officer	O-8	Major General	E-8	Master Sergeant First Sergeant						
O-9	Lieutenant General					O-9	Lieutenant General	E-9	Chief Master Sergeant	O-9	Lieutenant General	E-9	Sergeant Major Command Sergeant Major	O-9	Vice Admiral	E-9	Master Chief Petty Officer Command Master Chief Petty Officer	O-9	Lieutenant General	E-9	Master Gunnery Sergeant Sergeant Major						
O-10	General					O-10	General	E-9	Chief Master Sergeant of the Space Force	O-10	General General of the Army (Reserved for wartime only)	O-10	Sergeant Major of the Army	O-10	Admiral Fleet Admiral (Reserved for wartime only)	E-9	Master Chief Petty Officer of the Navy and Coast Guard	O-10	General	E-9	Sergeant Major of the Marine Corps						

AWARDS AND DECORATIONS

Shown in order of precedence.

 Medal of Honor (AF)	 Air Force Cross	 Defense Distinguished Service Medal	 Distinguished Service Medal (AF)	 Silver Star
 Defense Superior Service Medal	 Legion of Merit	 Distinguished Flying Cross	 Airman's Medal	 Bronze Star Medal
 Purple Heart	 Defense Meritorious Service Medal	 Meritorious Service Medal (AF)	 Air Medal	 Aerial Achievement Medal
 Joint Service Commendation Medal	 Air Force Commendation Medal	 Joint Service Achievement Medal	 Air Force Achievement Medal	 Air Force Combat Action Medal
 Presidential Unit Citation (AF)	 Joint Meritorious Unit Award	 Gallant Unit Citation	 Air Force Meritorious Unit Award	 Air Force Outstanding Unit Award
 Air Force Organizational Excellence Award	 Prisoner of War Medal	 Combat Readiness Medal	 Air Force Good Conduct Medal	 Good Conduct Medal
 Air Reserve Forces Meritorious Service Medal	 Outstanding Airman of the Year Ribbon	 Air Force Recognition Ribbon	 American Defense Service Medal	 American Campaign Medal
 Asiatic-Pacific Campaign Medal	 European-African-Middle Eastern Campaign Medal	 World War II Victory Medal	 Army of Occupation Medal	 Medal for Humane Action
 National Defense Service Medal	 Korean Service Medal	 Antarctica Service Medal	 Armed Forces Expeditionary Medal	 Vietnam Service Medal
 Southwest Asia Service Medal	 Kosovo Campaign Medal	 Afghanistan Campaign Medal	 Iraq Campaign Medal	 Inherent Resolve Campaign Medal
 Global War on Terrorism Expeditionary Medal	 Global War on Terrorism Service Medal	 Korean Defense Service Medal	 Armed Forces Service Medal	 Humanitarian Service Medal
 Military Outstanding Volunteer Service Medal	 Air & Space Campaign Medal	 Nuclear Deterrence Operations Service Medal	 Air Force Overseas Ribbon-Short	 Air Force Overseas Ribbon-Long
 Air Force Expeditionary Service Ribbon	 Air Force Longevity Service Award Ribbon	 Air Force Special Duty Ribbon	 USAF Basic Military Training Instructor Ribbon	 Air Force Recruiter Ribbon
 Armed Forces Reserve Medal	 USAF NCO PME Graduate Ribbon	 USAF Basic Military Training Honor Graduate Ribbon	 Small Arms Expert Marksmanship Ribbon	 Air Force Training Ribbon

Continued from previous page

 Philippine Defense Ribbon	 Philippine Liberation Ribbon
 Philippine Independence Ribbon	 Philippine Presidential Unit Citation
 ROK Presidential Unit Citation	 RVN Gallantry Cross with Palm
 United Nations Service Medal	 United Nations Medal
 NATO Meritorious Service Medal	 NATO Medal for Yugoslavia
 NATO Medal for Kosovo	 Article 5 NATO Medal-Eagle Assist
 Article 5 NATO Medal-Active Endeavor	 Non-Article 5 NATO Medal-Balkans
 Non-Article 5 NATO Medal-ISAF*	 Republic of Vietnam Campaign Medal
 Kuwait Liberation Medal, Kingdom of Saudi Arabia	 Kuwait Liberation Medal, Government of Kuwait
 Republic of Korea Korean War Service Medal	

*International Security Assistance Force

Devices



Bronze Star

For number of campaigns or operations, multiple qualifications, or an additional award of an authorized ribbon.



Silver and Bronze Stars

When worn together on a single ribbon, silver stars are worn to wearer's right of a bronze star.



Silver Oak Leaf Cluster

For sixth, 11th, etc., entitlements or in lieu of five bronze OLCs.



Valor Device

Denotes heroism above what is normally expected while engaged in direct combat with an enemy of the U.S., or an opposing foreign or armed force, with exposure to enemy hostilities and personal risk; not an additional award; only one per ribbon; worn to the wearer's right of OLCs on the same ribbon.



Combat Device

Denotes meritorious service or achievement performed under combat conditions.



Hourglass Device

Issued for the Armed Forces Reserve Medal in bronze for 10 years of service, silver for 20, and gold for 30.



Mobility Device

Worn with the Armed Forces Reserve Medal to denote Active Duty status for at least one day during a contingency; here with number of mobilizations.



Wintered Over Device

Worn on Antarctica Service Medal to denote staying on the Antarctic continent over the winter—bronze for one; gold, two; silver, three.



Silver Star

One silver star is worn in lieu of five bronze service stars.



Bronze Oak Leaf Cluster

For second and subsequent awards.



Silver and Bronze OLCs

Silver OLCs are worn to the wearer's right of the bronze OLCs on the same ribbon.



Arrowhead Device

Shows participation in assigned tactical combat parachute, glider, or amphibious assault landing; worn on campaign medals, Korean Service Medal, and Armed Forces and GWOT Expeditionary medals.



Remote Device

Denotes hands-on employment of a weapons system, performed remotely without personal physical combat risk that had a direct and immediate effects on the outcome of an engagement or specific effects on a target.



Arctic Device

Worn on Air Force Overseas Ribbon-Short for service north of Arctic Circle; one per ribbon; worn to the wearer's right of OLCs.



Nuclear Device

Worn on the Nuclear Deterrence Operations Service Medal to indicate direct support.



Plane Device

Worn on Army of Occupation Medal for 90 consecutive days in direct support of the Berlin Airlift, June 26, 1948, to Sept. 30, 1949.

USAF Specialty Berets

Airmen in seven USAF specialties are authorized to wear a colored beret along with the insignia of that particular field.



Combat Controller/Special Tactics Officer



Pararescue/Combat Rescue Officer



Security Forces



Survival, Evasion, Resistance, and Escape



Tactical Air Command and Control

(Tactical Air Control Party crest)



Air Liaison Officer (TACP flash and rank)



Weather Parachutist

2022 USAF & USSF ALMANAC

SPENDING



A C-130 Hercules assigned to the 133rd Airlift Wing sits on the flight line in St. Paul, Minn., Jan. 8, 2022. The wing's mission is to create resilient, multi-capable Airmen who anticipate, operate, and innovate across dynamic domains.

Tech. Sgt. Austen Adair/ANG

Each year, the President submits a budget request to Congress. Congress can add to or subtract from that request, and does, on an item by item basis. After debate, which takes months, Congress must pass both an Authorization bill that directs the President's spending and an Appropriation bill to fund those programs. The Defense Department Budget rolls up the total spending by each

military department—the Departments of the Air Force (which also includes the Space Force), the Navy (which also includes the Marine Corps), and the Army. Budget figures sometimes disagree, either because of rounding or because of different approaches to financial reporting. Variations appearing among the tables on the following pages are due to one or the other factor.

DOD BUDGET AUTHORITY

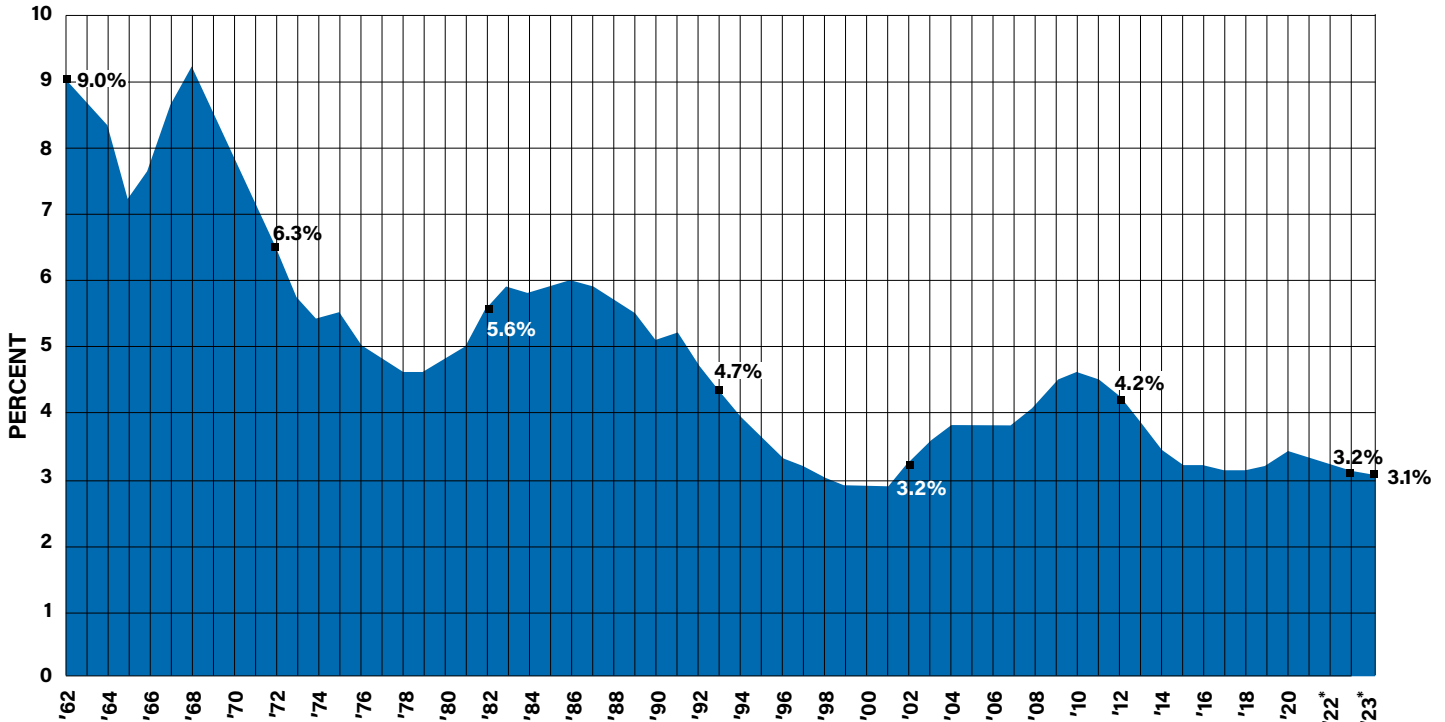
(\$ billions)

	2018	2019	2020	2021	Enacted*	Requested**
					2022*	2023**
Base Budget	\$521.4	\$523.5	\$600	\$616	\$633	\$635
With Supplementals***	\$595.7	\$626.2	\$671	\$688	\$723	\$704

***2021 includes supplemental funding for U.S. Capitol Security (\$521 million) and Operation Allies Welcome (\$500 million). 2022 includes supplemental funding for Operation Allies Welcome (\$6.512 billion), Natural Disaster Relief (\$895 million), Red Hill Bulk Fuel Storage Facility (\$350 million), and Ukraine (\$6.528 billion).
Source: Budget of the U.S. Government, Fiscal Year 2023

DOD SPENDING AS PERCENTAGE OF GDP

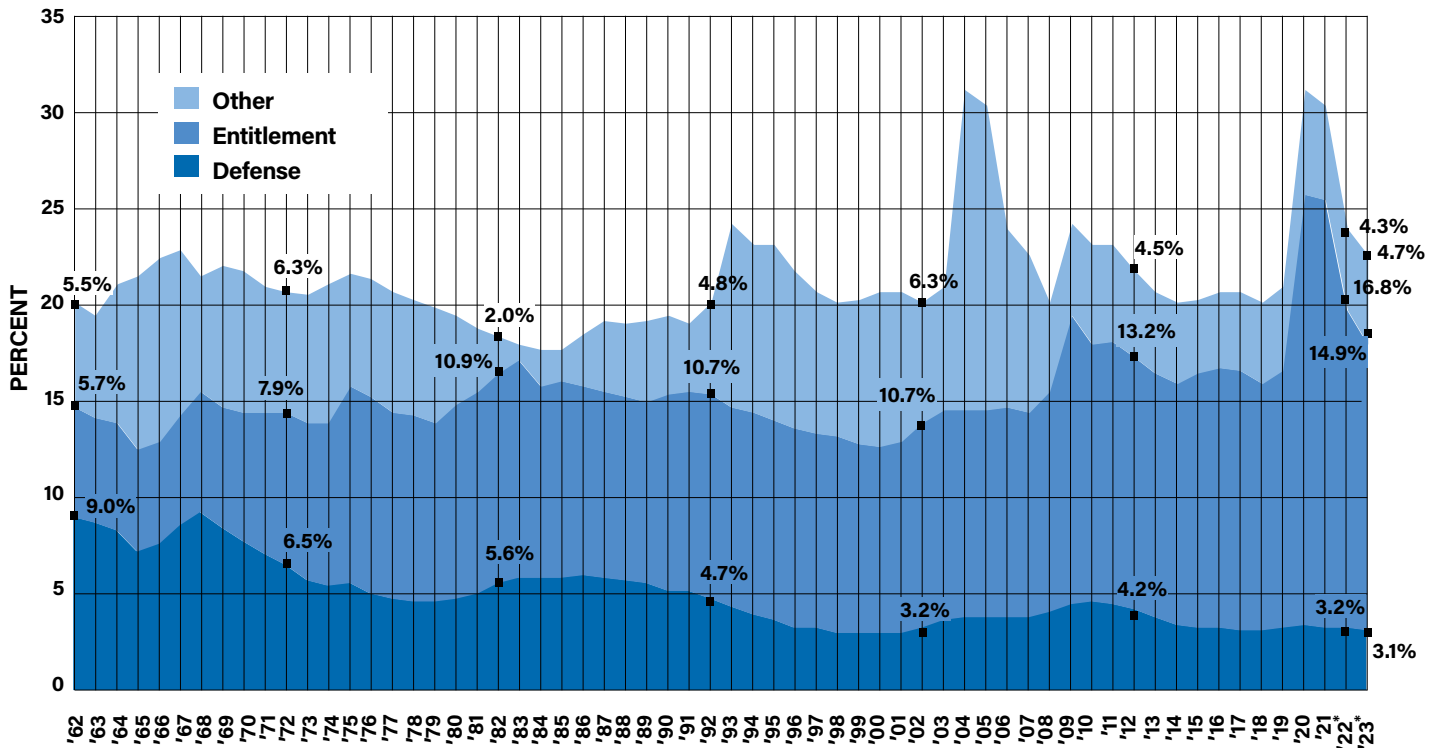
Percent by Fiscal Year



Based on—*estimate. Source: Budget of the U.S. Government, Fiscal Year 2023



FEDERAL SPENDING AS A PERCENTAGE OF GDP



Based on 1—enacted and 2—requested amounts. Sources: Sources: Budget of the U.S. Government, Fiscal Year 2023; White House Office of Management and Budget's Historical Tables

FEDERAL SPENDING AS PERCENTAGE OF GROSS DOMESTIC PRODUCT (GDP)

YEAR	TOTAL %	DEFENSE %	ENTITLEMENTS %	OTHER %	YEAR	TOTAL %	DEFENSE %	ENTITLEMENTS %	OTHER %
1962	20.2	9.0	5.7	5.5	1993	24.3	4.3	10.5	9.5
1963	19.6	8.7	5.5	5.4	1994	23.2	3.9	10.5	8.8
1964	21.2	8.3	5.6	7.3	1995	23.3	3.6	10.4	9.3
1965	21.6	7.2	5.3	9.1	1996	21.9	3.3	10.4	8.2
1966	22.5	7.6	5.3	9.6	1997	20.7	3.2	10.2	7.3
1967	22.9	8.6	5.7	8.6	1998	20.2	3.0	10.2	7.0
1968	21.6	9.2	6.4	6.0	1999	20.4	2.9	9.9	7.6
1969	22.2	8.4	6.3	7.5	2000	20.8	2.9	9.8	8.1
1970	21.9	7.8	6.7	7.4	2001	20.7	2.9	10.0	7.8
1971	21.1	7.1	7.4	6.6	2002	20.2	3.2	10.7	6.3
1972	20.7	6.5	7.9	6.3	2003	21.0	3.6	11.0	6.4
1973	20.6	5.7	8.2	6.7	2004	31.3	3.8	10.8	16.7
1974	21.2	5.4	8.5	7.3	2005	30.5	3.8	10.8	15.9
1975	21.7	5.5	10.3	5.9	2006	24.1	3.8	10.9	9.4
1976	21.5	5.0	10.3	6.2	2007	22.7	3.8	10.7	8.2
1977	20.8	4.8	9.7	6.3	2008	20.2	4.1	11.4	4.7
1978	20.4	4.6	9.7	6.1	2009	24.3	4.5	15.1	4.7
1979	20.0	4.6	9.3	6.1	2010	23.2	4.6	13.4	5.2
1980	19.6	4.8	10.1	4.7	2011	23.3	4.5	13.7	5.1
1981	18.9	5.0	10.5	3.4	2012	21.9	4.2	13.2	4.5
1982	18.5	5.6	10.9	2.0	2013	20.7	3.8	12.7	4.2
1983	18.0	5.9	11.3	0.8	2014	20.2	3.4	12.6	4.2
1984	17.7	5.8	10.0	1.9	2015	20.4	3.2	13.3	3.9
1985	17.7	5.9	10.2	1.6	2016	20.8	3.2	13.6	4.0
1986	18.6	6.0	9.9	2.7	2017	20.7	3.1	13.6	4.0
1987	19.2	5.9	9.7	3.6	2018	20.2	3.1	12.9	4.2
1988	19.1	5.7	9.6	3.8	2019	21.0	3.2	13.4	4.4
1989	19.3	5.5	9.5	4.3	2020	31.3	3.4	22.4	5.5
1990	19.5	5.1	10.3	4.1	2021	30.5	3.3	22.2	5.0
1991	19.1	5.2	10.4	3.5	2022 estimate	24.1	3.2	16.6	4.3
1992	20.2	4.7	10.7	4.8	2023 estimate	22.7	3.1	14.9	4.7

Sources: Budget of the U.S. Government, Fiscal Year 2023; White House Office of Management and Budget's Historical Tables

DOD BUDGET BY SERVICE, INCLUDING PASS-THROUGH

(\$ in millions)

	2021		Enacted 2022		Requested 2022	
	\$	%	\$	%	\$	%
Department of the Air Force	\$204,574	29.0	\$222,279	29.4	\$234,116	30.1
USAF	152,818*	21.7*	156,300**	20.7**	169,500***	21.9
USSF	15,420*	2.2*	17,400**	2.3**	24,500***	3.2
Pass-Through	35,763*	5.1*	41,437	5.5	40,173	5.2
Army	174,040	24.7	174,845	23.1	177,315	22.9
Department of the Navy	206,936	29.4	221,302	29.3	230,848	29.9
Navy	163,659****	23.0****	172,256****	22.8****	180,506	23.4
Marine Corps	44,638****	6.4****	49,471****	6.5****	50,342	6.5
Defense Agencies	119,184	16.9	138,125	18.3	130,721	16.9
Total	704,734		756,560		773,000	

May not add due to rounding.

*Enacted

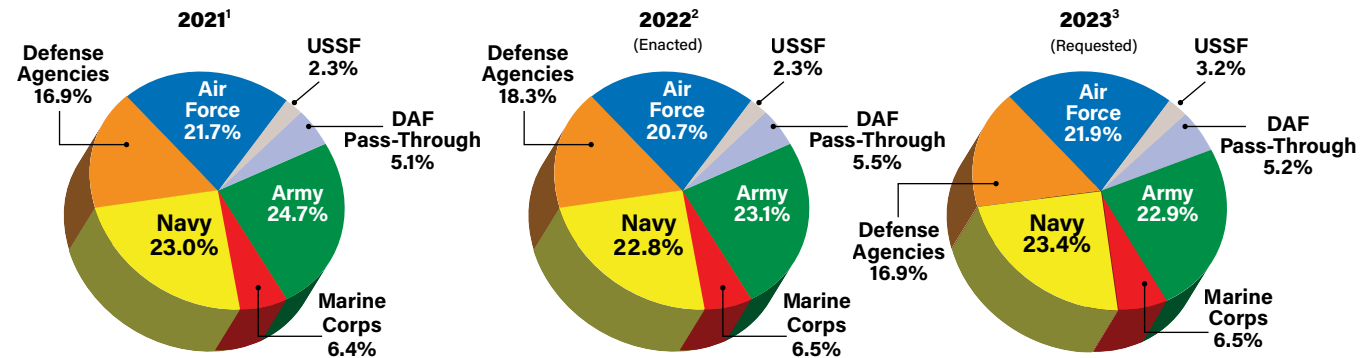
**Requested. Limited detail available

***Limited detail available

****Figures provided in the Department of the Navy's FY 2022 Budget Card differ from those provided in the Defense Department's Budget Request Overview.

Sources: Defense Budget Overview, United States Department of Defense Fiscal Year 2023 Budget Request; Department of the Air Force and Department of the Navy FY 2023 budget documents.

DOD BUDGET SHARES: 2021 vs. 2022 vs. 2023



1—Actual, except the Department of the Air Force, which provided enacted amounts

2—Enacted, except the Department of the Air Force, which provided requested amounts. The Navy and Defense Department separately provided differinging amounts, meaning 0.8 percent of the enacted total may be distributed between the Air Force, Space Force, Marine Corps, and Navy.

3—Requested

DOD BUDGET SHARES BY MILITARY DEPARTMENT

(\$ millions)

										Enacted	Requested
	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	
DAF*	\$152,392	\$153,567	\$164,009	\$171,457	\$190,359	\$196,066	\$206,691	\$204,574	\$222,279	\$234,116	
%	26.2	27.2	27.9	28.1	28.3	28.3	29.0	29.0	29.4	30.3	
Army	\$162,246	\$150,887	\$151,296	\$159,018	\$178,260	\$181,166	\$184,195	\$174,040	\$174,845	\$177,315	
%	27.9	26.7	25.7	26.1	26.5	26.1	26.2	24.7	23.1	22.9	
Navy/Marine Corps	\$164,397	\$160,512	\$170,325	\$174,058	\$190,489	\$197,778	\$209,383	\$206,936	\$221,302	\$230,848	
%	28.29	28.39	28.97	28.57	28.31	28.54	29.8	29.4	29.3	29.9	
Defense Agencies	\$102,153	\$100,437	\$102,348	\$104,754	\$113,853	\$117,991	\$122,955	\$119,184	\$138,125	\$130,721	
%	17.6	17.8	17.4	17.2	16.9	17.0	17.5	16.9	18.3	16.9	
Total	\$581,188	\$565,403	\$587,978	\$609,287	\$672,960	\$693,001	\$723,224	\$704,734	\$756,560	\$773,000	

*Includes Pass-Through

Source: Defense Budget Overview, United States Department of Defense Fiscal Year 2022 Budget Request

DOD BUDGET BY SPENDING CATEGORY

(Base budget not including war funding; current \$ billions)

							Enacted	Requested
	2016	2017	2018	2019	2020	2021	2022	2023
Military Personnel	\$138.30	\$139.00	\$136.00	\$144.70	\$149.90	\$162.80	\$166.70	\$173.90
O&M	\$247.80	\$258.10	\$199.70	\$231.40	\$237.20	\$283.60	\$294.60	\$309.30
Procurement	\$119.90	\$126.00	\$107.00	\$133.80	\$129.10	\$140.70	\$145.20	\$145.90
RDT&E	\$70.60	\$74.80	\$71.80	\$94.10	\$103.60	\$105.90	\$118.80	\$130.10
Military Construction	\$7.60	\$7.60	\$6.40	\$8.80	\$9.90	\$7.10	\$13.30	\$10.20
Family Housing	\$1.50	\$1.40	\$1.20	\$1.60	\$1.50	\$1.40	\$1.50	\$2.00
Revolving Funds	\$2.30	\$2.30	\$1.50	\$1.90	\$2.30	\$2.20	\$2.10	\$1.60
Total	\$588.00	\$609.20	\$523.70	\$616.40	\$633.30	\$703.70	\$742.30	\$773.00

Base budget, not including overseas contingency operations, a.k.a. war funding, in fiscal years 2015-2021. OCO are not listed separately in the fiscal 2022 request; instead, the base request includes \$42.1 billion for Direct War and Enduring Operations costs.

*Actual figures for fiscal 2020 had not been published by the Defense comptroller by press time.

Source: Defense Budget Overview, United States Department of Defense Fiscal Year 2023 Budget Request; National Defense Budget Estimates for 2022

DAF BUDGET BY SPENDING CATEGORY

(Base budget in \$ billions; does not include war or emergency funding)

								Enacted	Requested
	2015	2016	2017	2018	2019	2020	2021	2022	2023
Military Personnel	\$33.62	\$34.03	\$34.57	\$34.70	\$37.41	\$39.40	\$42.80	\$38.60	\$40.40
O&M	\$44.60	\$44.44	\$45.92	\$50.19	\$51.24	\$53.40	\$65.50	\$69.00	\$72.00
Procurement	\$33.91	\$40.94	\$38.10	\$41.74	\$43.18	\$43.30	\$47.80	\$27.10	\$29.30
RDT&E	\$23.57	\$24.46	\$27.34	\$28.95	\$40.55	\$45.30	\$46.20	\$41.70	\$49.20
Military Construction	\$1.05	\$1.65	\$1.99	\$2.18	\$1.95	\$2.40	\$1.30	\$3.50	\$2.40
Family Housing	\$0.33	\$0.49	\$0.34	\$0.34	\$0.40	\$0.40	\$0.40	\$0.40	\$0.60
Revolving and Management	\$0.07	\$0.06	\$0.06	\$0.07	\$0.08	\$0.20	\$0.40	\$0.50	\$0.10
Total	\$137.14	\$146.07	\$148.00	\$158.16	\$174.81	\$184.50	\$204.50	\$180.80	\$194.00

PERCENTAGE CHANGE	2015	2016	2017	2018	2019	2020	2021	2022	2023
Military Personnel	-4.3	1.2	1.6	0.4	7.8	5.3	8.6	9.8	4.7
O&M	3.1	-0.4	3.3	9.3	2.1	4.3	22.7	5.3	4.3
Procurement	8.4	20.7	-6.9	9.5	3.5	0.2	10.4	43.3	8.1
RDT&E	-0.5	3.8	11.8	5.9	40.1	11.6	2.0	9.7	18.0
Military Construction	-19.1	58.3	20.3	9.7	-10.6	20.0	45.8	169.2	-31.4
Family Housing	-29.5	50	-31.7	0	17.9	0.0	0.0	0.0	50.0
Revolving and Management	-55.4	-6	1.6	4.7	16.4	100.0	100.0	0.3	-80.0
Total	1.4	6.5	1.5	15.8	1.8	5.5	10.8	-11.6	7.3

Source: Defense Budget Overview, United States Department of Defense Fiscal Year 2023 Budget Request; National Defense Budget Estimates for FY 2022.

DAF SPENDING VS. PASS-THROUGH

(Total Obligation Authority; \$ in billions)

								Enacted*	Enacted*	Enacted	Requested	
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
DAF	\$128.9	\$116.4	\$120.8	\$120.8	\$129.8	\$136.6	\$151.5	\$156.8	\$168.1	\$168.20	180.8	193.9
Pass-Through	33.1	29.8	31.3	31.7	33.1	34.3	37.2	37.8	39.0	37.3	41.4	40.2
Total	162	146.2	152.1	152.5	162.9	170.9	188.7	194.6	207.1	205.5	222.3	234.1
Pass-Through %	20.4%	20.4%	20.6%	20.8%	20.3%	20.1%	19.7%	19.4%	18.8%	18.2%	18.6%	17.2%

*Actual spending figures distinguishing DAF spending from pass-through spending weren't available for fiscal 2020 or 2021 by press time. Sources: Department of Defense and Department of the Air Force Fiscal Year 2022 and 2023 Budget Requests

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MAJOR USAF PROGRAMS

RDT&E

PROGRAM	2021	2022	2023	2024	2025	2026	2027
		Enacted	Request	FYDP	FYDP	FYDP	FYDP
BOMBER							
B-1B	15.3	39.1	13.1	14.1	16.3	2.0	0.0
B-2A	147.4	131.6	112.0	112.0	20.7	0.0	0.0
B-21	2,744.5	2,872.6	3,253.6	2,322.1	1,707.7	1,527.0	1,261.7
B-52	453.6	646.8	770.3	732.3	567.2	345.7	309.1
FIGHTER/ATTACK							
A-10	24.3	34.2	72.4	70.0	16.6	0.0	0.0
F-15C/D/E	230.3	239.6	213.3	52.0	41.6	41.6	31.3
EPAWSS	165.7	112.00	68.0	14.0	0	0	0
F-15EX	79.9	107.1	83.8	0.0	0.0	0.0	0.0
F-16	197.6	225.6	244.7	183.2	183.6	133.4	136.4
F-22	642.1	647.3	559.7	566.2	541.4	543.2	528.7
F-35	104.3	69.4	70.7	58.9	55.7	57.9	58.9
NGAD	869.7	1,524.7	1,657.7	1,655.2	3,017.1	3,527.5	3,536.5
F-35 BLK 4 C2D2	684.9	1,105.4	1,014.7	808.9	687.0	667.1	684.9
F-35 Mods	-	-	-	-	-	-	-
HELO							
HH-60W	32.2	62.3	59.0	26.4	31.0	2.2	2.2
UH1 Replacement	34.5	16.1	17.9	27.9	9.0	9.7	0.0
ICBM							
Minuteman III Squadrons	63.5	113.6	69.7	33.0	3.1	3.1	3.1
Ground-Based Strategic Deterrent	1,397.5	2,553.5	3,614.3	3,614.6	3,255.8	3,190.1	2,628.7
MMIII Fuze Modernization	151.2	129.7	98.4	72.8	14.3	0.0	0.0
Minuteman III Modifications	-	-	-	-	-	-	-
ISR/BM/C3							
Air and Space Operations Center	50.1	90.0	177.8	171.4	173.0	176.9	180.8
DCGS	14.1	24.6	26.9	27.5	28.0	28.6	29.2
CRC	15.5	9.9	6.6	17.5	17.8	18.2	18.6
E-3	108.8	167.0	239.7	599.9	415.3	294.0	160.3
E-3 Block 40/45	-	-	-	-	-	-	-
E-8	-	-	-	-	-	-	-
ABMS	152.7	268.9	231.4	556.1	681.5	870.8	614.7
E-4B	3.94	26.3	25.7	21.2	3.6	0	0
Compass Call	15.2	91.3	49.1	88.0	81.7	130.6	119.8
MQ-9	103.2	79.1	98.5	80.9	44.7	45.6	46.6
RQ-4	163.3	83.1	68.8	68.2	12.9	0.0	0.0
RC-135	45.1	42.7	42.4	43.3	41.6	45.2	46.3
U-2 Mods	36.6	35.8	20.2	20.6	24.1	0.0	0.0
MOBILITY							
C-5	22.7	17.5	6.1	0.0	20.7	51.3	52.5
C-17	11.7	16.4	25.4	0.0	0.0	0.0	0.0
C-32	6.2	0.0	0.0	0.0	0.0	0.0	0.0
C-130J	6.2	24.10	11.10	14.10	14.40	14.70	15.00
KC-10 (ATCA)	-	-	-	-	-	-	-
KC-135	4.6	3.6	13.0	7.3	0.0	0.0	0.0
KC-46	35.8	47.1	197.5	73.7	93.4	0.0	0.0
PAR (VC-25B)	720.2	655.7	492.9	372.9	161.0	20.4	0.0
VC-25A	-	-	-	-	-	-	-
MUNITION							
AIM-9	18.8	33.0	34.5	43.1	34.7	16.0	16.3
AIM-120	50.1	51.3	52.7	33.6	53.7	51.4	52.5
JASSM	63.7	117.3	117.2	99.8	21.9	5.1	5.2
SDB1	-	-	-	-	-	-	-
SDB2	20.0	32.1	27.7	29.1	29.7	24.1	24.7
JDAM	6.6	0.0	0.0	0.0	0.0	0.0	0.0
SiAW	145.9	166.6	283.2	270.2	379.6	718.1	226.8
AGM-65	-	-	-	-	-	-	-
LRASM	-	-	-	-	-	-	-
AGM-114 Hellfire	-	-	-	-	-	-	-
ARRW	374.4	318.7	115.0	0.0	0.0	0.0	0.0
LRSO	373.5	599.0	928.9	964.25	720.9	599.7	278.1
SOF							
CV-22B	17.8	17.2	10.1	18.1	16.3	16.7	17.1
HC-130/MC-130	9.8	0.7	0.3	0.9	0.7	0.7	0.8
Block 8X (HC-130J/MC-130J)	5.7	46.1	47.7	11.9	24.0	24.5	25.1
TRAINERS							
T-6	1.6	0.2	7.6	39.1	35.9	6.2	6.4
T-7A	-	-	-	-	-	-	-
T-38	8.4	4.5	9.6	2.3	0.1	0.1	0.1
T-1	-	-	-	-	-	-	-



MAJOR USAF PROGRAMS

Procurement

PROGRAM	2021	2022 Enacted	2023 Request	2024 FYDP	2025 FYDP	2026 FYDP	2027 FYDP
BOMBER							
B-1B	17.8	27.4	36.3	15.7	18.8	18.2	16.5
B-2A	30.8	29.9	106.8	97.2	45.3	52.5	48.5
B-21	N/A	108.0	1,606.5	3,441.2	4,413.8	4,604.5	5,055.4
B-52 Mods	18.1	70.4	127.9	276.4	620.5	1,086.6	1,156.4
FIGHTER/ATTACK							
A-10 Mods	135.8	83.6	84.0	85.1	80.5	52.1	0.0
F-15C/D/E Mods	161.6	179.0	194.4	34.7	29.5	114.6	24.7
EPAWSS	147.8	149.8	259.8	268.6	318.9	329.1	336.2
F-15EX	1,367.1	1,252.4	2,686.3	2,698.0	0.0	0.0	0.0
F-16 Mods	613.3	612.4	700.5	564.8	698.2	767.2	694.5
F-22 Mods	357.6	408.0	764.2	792.4	798.1	825.9	869.7
F-35	6,237.6	4,560.1	3,915.6	3,484.8	4,436.5	5,157.9	5,016.6
NGAD	-	-	-	-	-	-	-
F-35 BLK 4 C2D2	35.1	130.5	273.9	311.4	349.6	352.1	383.8
F-35 Mods	220.8	247.9	414.4	485.1	530.9	538.4	549.4
HELO							
HH-60W	938.3	743.9	707	310.9	42.1	0.0	0.0
UH1 Replacement(MH-139)	194	141.4	156.2	282.1	420.7	537.7	356.1
ICBM							
Minuteman III Squadrons	-	-	-	-	-	-	-
Ground-Based Strategic Deterrent	0.0	8.9	0.0	610.6	502.7	5,689.9	6,410.6
MMIII Fuze Modernization	43.5	100.8	137.4	157.9	160.2	115.1	92.1
Minuteman III Modifications	81.1	88.6	68.2	48.4	46.9	16.2	10.3
ISR/BM/C3							
Air and Space Operations Center	15.4	23.0	2.6	3.2	2.9	3.0	3.0
DCGS	140.2	261.1	217.7	206.7	67.8	104.6	174.3
CRC	28.6	43.4	9.6	8.3	80.7	60.1	36.8
E-3	107.3	91.3	54.2	28.3	32.3	0.8	0.8
E-3 Block 40/45	47.3	24.8	0.0	0.0	0.0	0.0	0.0
E-8	22.0	16.3	16.6	6.5	37.3	37.9	38.8
ABMS	-	-	-	-	-	-	-
E-4B	44.1	19.1	6.0	20.6	38.8	43.1	44.0
Compass Call	181.0	195.1	16.6	144.3	93.8	101.4	193.1
MQ-9	338.1	92.3	17.0	0.0	0.0	0.0	0.0
RQ-4 (Mods?)	3.4	3.2	1.3	30.1	9.1	9.2	0.4
RC-135	191.3	207.6	212.9	219.5	221.0	224.0	228.9
U-2 Mods	120.2	121	81.7	71.4	69.2	12.9	13.2
MOBILITY							
C-5	50.3	20.3	46.0	24.3	57.8	32.1	32.8
C-17	44.8	54.6	152.0	141.6	90.3	123.1	144.8
C-32	2.9	1.9	4.1	0.0	0.0	0.0	0.0
C-130J	797.1	2,385.2	75.3	34.8	0.0	0.0	0.0
KC-10 (ATCA)	0.1	1.9	3.4	0.0	0.0	0.0	0.0
KC-135	2.3	0.2	2.0	103.0	98.9	98.4	100.5
KC-46	2,728.10	2,289.0	2,684.5	3,030.9	2,907.0	2,953.5	1,533.9
PAR (VC-25B)	-	-	-	-	-	-	-
VC-25A	2.0	0.1	2.1	1.1	1.1	0.0	0.0
MUNITION							
AIM-9	119.8	102.5	111.9	95.1	106.1	126.7	128.8
AIM-120	306.0	214.0	320.1	231.5	330.8	462.4	1,040.9
JASSM	710.6	710.6	785.0	852.7	999.2	994.9	1,001.7
SDB1	53.6	72.9	46.5	80.2	81.0	80.7	82.0
SDB2	185.1	275.9	279.0	263.1	228.4	208.0	211.3
JDAM	347.0	48.6	252.0	131.5	120.8	341.8	135.8
SiAW	-	-	78.0	47.7	207.8	273.6	254.7
AGM-65	0.2	0.0	0.0	0.0	0.0	0.0	0.0
LRASM	19.8	0.0	114.0	87.3	87.3	104.9	92.4
AGM-114 Hellfire	183.5	103.7	1.0	1.0	0.0	0.0	0.0
ARRW	0.0	0.0	46.6	0.0	0.0	0.0	0.0
LRSO	0.0	0.0	31.5	69.2	140.0	303.0	1,096.1
SOF							
CV-22B	206.2	0.0	0.0	0.0	0.0	0.0	0.0
HC-130/MC-130	76.6	148.0	139.0	123.7	185.2	207.9	91.3
Block 8.X (HC-130J/MC-130J)	383.1	220.0	40.4	10.1	10.4	10.7	10.9
TRAINERS							
T-6	9.3	8.7	6.2	3.3	156.6	413.6	145.7
T-7A	-	-	10.5	322.0	489.2	558.0	892.2
T-38	40.8	45.0	111.7	114.5	82.7	51.9	87.4
T-1	4.5	0.9	6.3	2.1	0.1	0.1	0.1



2022 USAF & USSF ALMANAC

EQUIPMENT

AIRCRAFT TOTAL ACTIVE INVENTORY (TAI)

(As of Sept. 30, 2021)

	ACTIVE	ANG	AFRC	TOTAL FORCE	AVG. AGE
Bomber					
B-1B Lancer	45	0	0	45	34.40
B-2A Spirit	20	0	0	20	26.35
B-52H Stratofortress	58	0	18	76	59.80
Total	123	0	18	141	40.18
Fighter/Attack					
A-10C Thunderbolt II	141	85	55	281	40.30
F-15C Eagle	87	122	0	209	36.72
F-15D Eagle	9	14	0	23	36.55
F-15E Strike Eagle	218	0	0	218	29.43
F-15EX	2	0	0	2	0.50
F-16C Fighting Falcon	441	287	52	780	31.09
F-16D Fighting Falcon	108	45	2	155	31.91
QF-16A	66	0	0	66	36.27
F-22A Raptor	165	20	0	185	15.19
F-35A Lightning II	282	20	0	302	4.34
Total	1,519	593	109	2,221	26.23
Special Operations Forces					
AC-130J Ghost Rider	24	0	0	24	3.94
AC-130W Stinger II	7	0	0	7	32.11
CV-22B Osprey	52	0	0	52	8.30
MC-130H Combat Talon II	10	0	0	10	31.87
MC-130J Commando II	46	0	0	46	5.89
Total	139	0	0	139	13.68
ISR/BM/C3					
E-3B Sentry (AWACS)	10	0	0	10	43.53
E-3G Sentry (AWACS)	21	0	0	21	41.37
E-4B NAOC	4	0	0	4	47.38
E-8C JSTARS	16	0	0	16	20.8
TE-8A JSTARS (trainer)	1	0	0	1	30.7
E-9A	2	0	0	2	29
E-11A BACN	3	0	0	3	9.73
EC-130H Compass Call	9	0	0	9	47.09
EC-130J Commando Solo	7	0	0	7	21.27
MQ-1B Predator	2	0	0	2	20.46
MQ-9A Reaper	299	24	0	323	6.05
NC-135W (test bed)	1	0	0	1	59.5
P-9A	3	0	0	3	5
RC-26B Condor	0	11	0	11	26.4
RC-135S Cobra Ball	3	0	0	3	59.47
RC-135U Combat Sent	2	0	0	2	56.65
RC-135V Rivet Joint	8	0	0	8	56.94
RC-135W Rivet Joint	12	0	0	12	58.08
RQ-4B Global Hawk	31	0	0	31	10.71
TC-135W (trainer)	3	0	0	3	59.3
TU-2S Dragon Lady (trainer)	4	0	0	4	36.92
U-2S Dragon Lady	27	0	0	27	38.85
WC-130J Hercules	0	0	10	10	20.45
WC-135R	2	0	0	2	58.55
WC-135W Constant Phoenix	1	0	0	1	59.4
Total	471	35	10	516	32.99

	ACTIVE	ANG	AFRC	TOTAL FORCE	AVG. AGE
Tanker					
HC-130J Combat King II	19	12	6	37	5.23
KC-10A Extender	48	0	0	48	36.79
KC-46A	29	12	7	48	1.48
KC-135R Stratotanker	138	140	62	340	59.46
KC-135T Stratotanker	30	24	0	54	61.59
Total	264	188	75	527	27.43
Transport					
C-5M Super Galaxy	36	0	16	52	34.32
C-12C Huron	16	0	0	16	45.17
C-12D Huron	6	0	0	6	37.43
C-12F Huron	3	0	0	3	36.25
C-12J Huron	4	0	0	4	33.72
C-17A Globemaster III	146	50	26	222	19.04
C-20H	1	0	0	1	27
C-21A Learjet	19	0	0	19	36.50
C-32A Air Force Two	4	0	0	4	23
C-32B Air Force Two	0	2	0	2	18.24
C-37A Gulfstream V	9	0	0	9	20.47
C-37B Gulfstream V	7	0	0	7	5.59
C-40B	6	0	0	6	17.65
C-40C Clipper	0	3	4	7	15.76
C-130H Hercules	0	99	42	141	29.21
C-130J Super Hercules	107	27	10	144	11.57
LC-130H Hercules	0	10	0	10	36.06
VC-25A Air Force One	2	0	0	2	30.95
Total	366	191	98	655	26.55
Helicopter					
HH-60G Pave Hawk	48	18	16	82	27.70
HH-60U Pave Hawk	3	0	0	3	9.37
HH-60W	13	0	0	13	0.39
TH-1H Iroquois (trainer)	28	0	0	28	40.53
UH-1N Iroquois	63	0	0	63	49.59
Total	155	18	16	189	25.52
Trainer					
T-1A Jayhawk	177	0	0	177	26.91
AT-6C	1	0	0	1	0.90
T-6A Texan II	442	0	0	442	15.98
T-38A Talon	53	0	0	53	54.86
(A)T-38B Talon	6	0	0	6	58.12
T-38C Talon	439	0	0	439	55.25
T-41D Mescalero	4	0	0	4	52.1
T-51A Cessna	3	0	0	3	16.2
T-53A Kadet II	24	0	0	24	9.66
TG-15A&B	5	0	0	5	17.80
TG-16A	19	0	0	19	9.64
UV-18B Twin Otter	3	0	0	3	37.53
Total	1,176	0	0	1,176	32.81
GRAND TOTAL	4,213	1,025	326	5,564	27.48

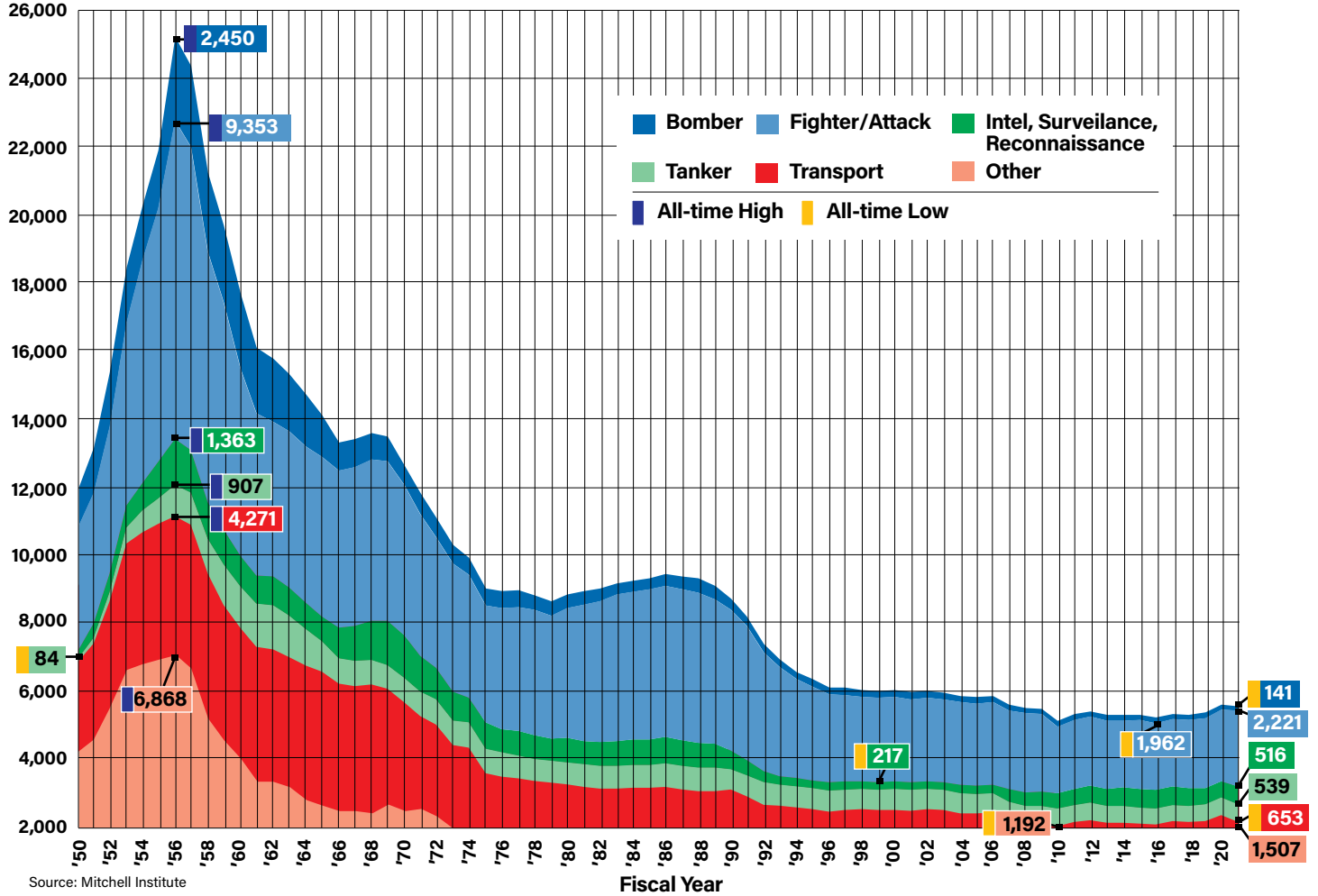
Total active inventory (TAI): aircraft assigned to operating forces for mission, training, test, or maintenance. Includes primary, backup, and attrition reserve aircraft. For other aircraft acronyms, see Gallery of Weapons.

ICBMs IN SERVICE OVER TIME

(As of Sept. 30, 2021)

TYPE OF SYSTEM	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Minuteman III	450	450	450	450	450	450	406	400	400	400	400
Total ICBMs	450	450	450	450	450	450	406	400	400	400	400

USAF AIRCRAFT INVENTORY, FY50-21 TOTAL ACTIVE AIRCRAFT



Source: Mitchell Institute

TOTAL NUMBER OF ACTIVE DUTY AIRCRAFT IN SERVICE OVER TIME

(As of Sept. 30, 2021)

ACTIVE	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Bomber	144	144	141	141	140	140	139	139	140	140	123
Fighter/Attack	1,287	1,289	1,287	1,273	1,312	1,282	1,297	1,332	1,370	1,391	1,519
Special Ops Forces	105	117	122	124	144	132	138	135	144	154	139
ISR/BM/C3	381	413	394	444	437	434	441	432	428	422	471
Tanker	247	246	243	244	239	236	234	215	238	289	264
Transport	429	425	413	410	381	384	363	356	361	366	366
Helicopter	151	170	138	137	157	160	131	154	159	159	155
Trainer	1,190	1,213	1,189	1,195	1,187	1,194	1,211	1,181	1,180	1,179	1,176
Total Active Duty	3,934	4,017	3,927	3,968	3,997	3,962	3,954	3,944	4,015	4,100	4,213

ANG	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Bomber	0	0	0	0	0	0	0	0	0	0	0
Fighter/Attack	639	635	630	585	611	577	575	575	577	594	593
Special Ops Forces	4	4	4	4	4	4	4	1	0	0	0
ISR/BM/C3	80	87	86	88	91	89	93	78	59	59	35
Tanker	189	189	187	185	184	181	181	185	181	164	188
Transport	242	232	223	207	207	212	210	208	208	319	191
Helicopter	17	17	17	17	17	17	17	17	23	23	18
Total ANG	1,171	1,164	1,147	1,086	1,114	1,080	1,080	1,064	1,048	1,159	1,025

AFRC	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Bomber	18	18	18	18	18	18	18	18	18	18	18
Fighter/Attack	100	101	95	104	111	111	109	109	109	109	109
Special Ops Forces	10	5	4	0	0	0	0	0	0	0	0
ISR/BM/C3	12	11	11	10	10	10	10	10	10	10	10
Tanker	72	72	71	68	68	72	72	72	74	73	75
Transport	152	148	147	145	139	101	91	96	98	140	98
Helicopter	15	15	15	15	15	15	15	15	15	16	16
Total AFRC	379	370	361	360	361	327	315	320	324	366	326
TOTAL FORCE	5,484	5,551	5,435	5,414	5,472	5,369	5,349	5,328	5,387	5,625	5,564

2021 AIRCRAFT MISSION CAPABLE RATES

(As of Oct. 19, 2021)

MDS	2021 12-HOUR FIX %	2021 BREAKS %	2021 MC %	MDS	2021 12-HOUR FIX %	2021 BREAKS %	2021 MC %
A-10C	63.77	9.52	72.54	HC-130J	46.45	9.06	76.1
AC-130J	56.6	8.19	83.84	HC-130N	0	0	0
AC-130U	0	0	0	HH-60G	58.35	10.99	71.06
AC-130W	48.36	16.25	75.27	KC-10A	54.68	7.31	79.23
AT-38B	47.83	5.66	73.68	KC-46A	47.37	2.76	71.37
B-1B	15.82	27.71	40.69	KC-135R	50.59	10.98	71.24
B-2A	60.63	27.66	58.58	KC-135T	54.27	13.35	69.81
B-52H	32.92	45.9	59.45	LC-130H	35.16	14.58	42.94
C-5M	43.31	12	57.43	MC-12W	0	0	100
C-12C	0	0	98.60	MC-130H	50.87	17.89	74.72
C-12D	0	0	100	MC-130J	56.29	9.81	79.03
C-12F	0	0	83.61	MQ-9A	54.13	3.17	89.91
C-12J	0	0	100	OC-135B	33.33	45	67.03
C-17A	57.23	2.57	80.11	QF-16A	15.38	17.57	51.13
C-21A	0	0	100	QF-16C	9.43	10.35	58.35
C-32A	0	0.5	86.74	RC-135S	48.48	21.15	85.52
C-37A	0	0.34	96.09	RC-135U	29.41	15.89	81.82
C-37B	0	0.4	89.91	RC-135V	35.94	20.19	73.07
C-40B	50	0.56	91.05	RC-135W	38.21	22.29	66.42
C-40C	50	0.43	85.97	RQ-4B	45.79	11.54	65.84
C-130H	34.67	6.03	69.49	T-1A	67.41	8.86	74.03
C-130J	57.73	3.81	75.65	T-6A	65.21	5.02	70.96
CV-22B	38.26	32.56	50.95	T-38A	62.84	6.48	72.47
E-3B	47.1	33.84	55.78	T-38C	53.1	6.88	62.98
E-3C	0	0	0	TC-130H	66.67	43.59	67.88
E-3G	45.04	47.08	60.65	TC-135W	52.38	14.79	80.30
E-4B	33.33	6.03	57.11	TE-8A	50	14.63	70.22
E-8C	57.7	31.35	61.54	TH-1H	58.98	8.55	74.15
EC-130H	56.5	36.18	66.86	TU-2S	59.57	12.02	56.28
EC-130J	9.09	9.24	64.09	U-2S	61.24	12.45	75.62
EQ-4B	41.67	6.82	79.92	UH-1N	58.2	6.35	82.14
F-15C	63.7	13.7	69.48	WC-130J	36.84	9.36	53.47
F-15D	63.84	10.74	68.56	WC-135C	0	16.67	85.64
F-15E	60.67	14.7	66.24	WC-135W	12.50	47.06	48.27
F-16C	58.88	9.17	71.53				
F-16D	55.85	8.93	69.32				
F-22A	56.02	9.33	50.81				
F-35A**			68.8				
				Total	56.74	7.82	71.53

** F-35 Data pulled from Lockheed Martin's JDL data; MDS: Mission Design Series.

PILOT TRAINING HOURS/MONTH BY AIRCRAFT TYPE 2018-2021

COMPONENT	2018	2019	2020	2021	AIRCRAFT TYPE	COMPONENT	2018	2019	2020	2021		
ALL MDS	Active Duty	10.7	6.8	10.9	10.1	RECON	Active Duty	7.8	4.7	7	8.4	
	ANG	9.3	5.3	9	8.6		ANG	8	5.7	9	8.1	
	AFRC	8	4.2	7.2	8.3		AFRC	5.7	2.7	5.3	5.4	
AIRCRAFT TYPE	2018	2019	2020	2021	RESCUE	Active Duty						
	AIRLIFT	Active Duty	12.7	8		12.2	12	ANG	1.6			
	ANG	9.8	5.8	10.3		9.3	AFRC					
AFRC	10.7	5.2	8.3	9.3	ROTARY	Active Duty	6.8	4.5	6.9	6.5		
BACN	Active Duty	26	21.6	23.4		9.2	ANG	5.8	3.9	7.9	6.4	
ANG				2.3		AFRC	8.5	3.4	4.9	6.9		
AFRC					SPEC OPS	Active Duty	11.1	6.6	13	11.6		
BOMBER	Active Duty	6.1	4	7.2		7.1	ANG	6.9	3.7	5.8	10.1	
ANG	4.2	1.6	2.2	1.4		AFRC	5	3	5.2	5.9		
AFRC	3.5	2.9	4.7	4.6	TANKER	Active Duty	13.6	8	12.1	12		
FIGHTER	Active Duty	8.2	5.7	8.1		6.8	ANG	12.4	7.5	10.4	9.4	
ANG	7.1	4.2	6.4	7.3		AFRC	10	5.7	8.3	9.1		
AFRC	5.2	3.9	5.5	6.7	TRAINER	Active Duty	10.2	6.8	9.6	8		
FIX WING	Active Duty	9	5.7	8.7		6.1	ANG	7.9	1.7	0.9	1	
ANG	6.8	5.8	10.8	7.9		AFRC	1.2	2.2	2.9	0.4		
AFRC			4.8	10.9								

NOTE: These reflect Flying Hours only and do not include Simulator Hours.

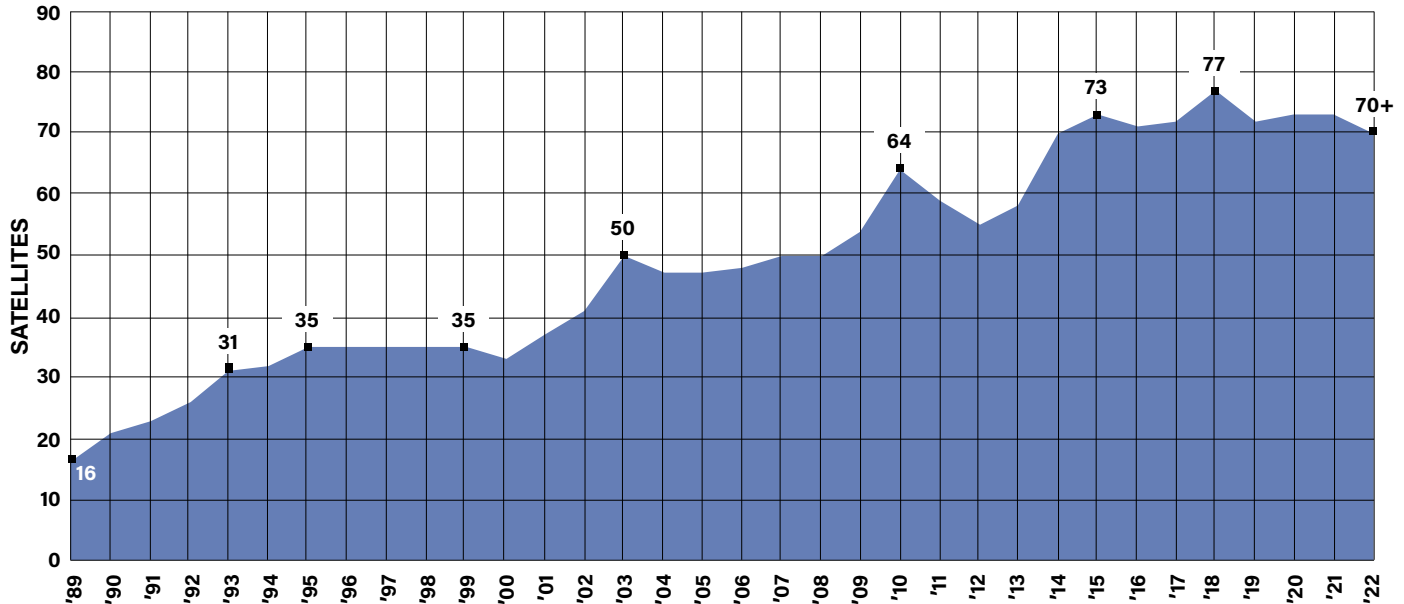




U.S. SPACE FORCE

The U.S. Space Force was created on Dec. 20, 2019. The Space Force exists as a separate military service within the Department of the Air Force, with its own service chief. The Chief of Space Operations is a member of the Joint Chiefs of Staff.

TOTAL SATELLITES OVER TIME



U.S. SPACE FORCE BUDGET SUMMARY

(\$ billions)

Funding	2022 (Estimated)	2023 (Requested)
Operations & Maintenance	\$3.4	\$4.0
Research, Development, Test & Evaluation	11.3	15.8
Military Personnel		1.0
Procurement	2.8	3.6
Total	17.4	24.5
Authorized Manpower	2022 (Enacted)	2023 (Requested)
Military	8,400	8,600
Civilian	4,364	4,927
Total Force Personnel	12,764	13,527

Source: Fiscal 2023 Department of the Air Force Budget Overview

SPACE FORCE PERSONNEL BY AFSC AND SEX

Enlisted

CAFSC	Female		Male		Total	
	#	%	#	%	#	%
1C6-Space Sys Ops	164	5.64	817	28.10	981	33.75
1N0-All Source Intelligence Anlst	64	2.20	142	4.88	206	7.09
1N1-Imagery Analysis	12	0.41	6	0.21	18	0.62
1N2-Signals Intel Analysis	60	2.06	218	7.50	278	9.56
1N4-Network Intel Analysis	32	1.10	41	1.41	73	2.51
1N8-Targeting Anlst	4	0.14	9	0.31	13	0.45
3D0-Operations Manager	84	3	310	10.66	394	13.55
3D1-Cyberspace Support Manager	116	3.99	780	27	896	30.82
9E0-Command CMSgt	0	0.00	2	0.07	2	0.07
9G1-Group Senior Enl Leader	0	0.00	1	0.03	1	0.03
Unknown	4	0.14	41	1.41	45	1.55
Total Space Force Enlisted	540	18.58	2,367	81.42	2,907	100

Officer

Core AFSC	Female		Male		Total	
	#	%	#	%	#	%
13A-Astronaut	0	0	2	0.05	2	0.05
13S-Space Ops	376	10.28	1,324	36.21	1,700	46.50
14N-Intelligence	47	1	91	2.49	138	3.77
17D-Warfighter Comm Ops	26	1	124	3.39	150	4.10
17S-Cyberspace Effects Ops	3	0.08	15	0.41	18	0.49
62E-Development Engineer	114	3.12	859	23.50	973	26.61
63A-Acquisition Manager	108	3	529	14.47	637	17.42
90G-General Officer	2	0.05	16	0.44	18	0.49
Unknown	4	0.11	16	0.44	20	0.55
Total Space Force Officer	680	18.60	2,976	81.40	3,656	100





Gen. John W. "Jay" Raymond, Chief of Space Operations

Headquarters: Pentagon, Va.
Date of current designation: Dec. 20, 2019

Secretary of the Air Force

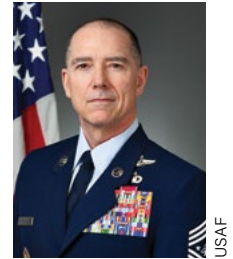
Chief of Space Operations & Senior Enlisted Adviser (E-9)

Vice Chief of Space Operations

Director of Staff

Support

- Staff Action Group
- Protocol
- Resources
- IT & Admin
- Total Force Integration



Chief Master Sgt. Roger A. Towberman, Senior Enlisted Leader

USSF PERSONNEL

Active Duty as of Dec. 20, 2020	
Active duty entering via transfers and accessions:	2,253
Selects**:	6,111

*As of Dec. 20, 2020
 **Does not guarantee transfer

CAREER FIELDS

Space Force began accepting transfers Sept. 1, 2020, in the following career fields:

Enlisted		Officer	
1C6	Space Systems Operations	13S	Space Operations
1NX	Space Intelligence	14N	Space Intelligence
3D0	Cyber Operations Officer	17D	Cyber Operations
		17X	Cyber Warfare
		63A	Acquisitions
		62E	Acquisitions Engineer

FIELD COMMANDS



Space Operations Command

Headquarters: Peterson SFB, Colo.
Date of activation: Oct. 21, 2020
Commander: Lt. Gen. Stephen N. Whiting

MAJOR UNITS	LOCATION	MISSION
Space Delta 2	Peterson SFB, Colo.	Space domain space awareness
Space Delta 3	Peterson SFB, Colo.	Electronic warfare
Space Delta 4	Buckley SFB, Colo.	Missile warning
Space Delta 5	Vandenberg SFB, Calif.	Operational level command and control
Space Delta 6	Schriever SFB, Colo.	Satellite control network, defensive
Space Delta 7	Peterson SFB, Colo.	ISR
Space Delta 8	Schriever SFB, Colo.	SATCOMS, position, navigation, timing
Space Delta 9	Schriever SFB, Colo.	Defensive ops, Space domain awareness
Buckley Garrison	Buckley SFB, Colo.	Mission support



Space Systems Command

Headquarters: Los Angeles AFB, Calif.
Date of activation: Aug. 13, 2021
Commander: Lt. Gen. A. Michael Guetlein

MAJOR UNITS*	LOCATION	MISSION
Four Corps: Atlas/Development/Production/Enterprise	Los Angeles AFB, Calif.	Acquisition
Space Development Agency**	Pentagon	Acquisition
Space Launch Delta 30	Vandenberg SFB, Calif.	Space launch, ICBM test, launch range operations
Space Launch Delta 45	Patrick SFB, Fla.	Space launch, launch range operations
Space Rapid Capabilities Office	Kirtland AFB, N.M.	Acquisition



Space Training and Readiness Command

Headquarters: Peterson SFB, Colo.
Date of activation: Aug. 23, 2021
Commander: Maj. Gen. Shawn N. Bratton

MAJOR UNITS*	LOCATION	MISSION
Space Delta 1	Vandenberg SFB, Calif.	Space training
25th Space Range Squadron	Schriever SFB, Colo.	Operates the space test and training range
527th Space Aggressor Squadron	Schriever SFB, Colo.	Simulates adversary threats for training
705th Combat Training Squadron Operating Location Alpha	Schriever SFB, Colo.	Virtual exercises
National Security Space Institute	Peterson SFB, Colo.	Space education and training
USAF Warfare Center, Detachment 1	Schriever SFB, Colo.	Operational test and evaluation, tactics development, and training

*Partial list as known at press time
 **Transfers from the Office of the Secretary of Defense to USSF before fiscal 2023.



USSF HISTORICAL LINEAGE

The U.S. Space Force traces its roots to the beginning of the Cold War, with the first Air Force space programs starting in 1945. USAF's Western Development Division, under Gen. Bernard A. Schriever, was established in 1954 as the first dedicated space organization within the U.S. Armed Forces. Military space forces were organized under several different Air Force major commands until they were unified when Air Force Space Command was established in September 1982. In December 2019, AFSPC became the cornerstone for the U.S. Space Force as a separate military branch. Below, we trace space organizational lineage within the Department of the Air Force. Because the space mission was—and to some extent still is—spread across several commands, offices, organizations, divisions, and services, some entries are concurrent and non-USAF organizations are not listed. This Space Force history is not intended to be all-inclusive.

WESTERN DEVELOPMENT DIVISION

Gen. Bernard A. Schriever	July 1, 1953	May 31, 1957
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AIR FORCE BALLISTIC MISSILE DIVISION

Gen. Bernard A. Schriever	June 1, 1957	April 24, 1959
Maj. Gen. Osmond J. Ritland	April 25, 1959	March 31, 1961

SPACE AND MISSILE SYSTEMS ORGANIZATION

Lt. Gen. John W. O'Neill	July 1, 1967	Aug. 31, 1969
Lt. Gen. Samuel C. Phillips	Sept. 1, 1969	Aug. 24, 1972
Lt. Gen. Kenneth W. Schultz	Aug. 25, 1972	Aug. 28, 1975
Lt. Gen. Thomas W. Morgan	Aug. 29, 1975	April 28, 1978
Lt. Gen. Richard C. Henry	April 29, 1978	Sept. 30, 1979

SPACE DIVISION

Lt. Gen. Richard C. Henry	Oct. 1, 1979	May 1, 1983
Lt. Gen. Forrest S. McCartney	May 1, 1983	Sept. 30, 1986
Lt. Gen. Aloysius G. Casey	Oct. 9, 1986	June 23, 1988
Lt. Gen. Donald L. Cromer	June 24, 1988	March 14, 1989

BALLISTIC MISSILE OFFICE

Maj. Gen. John W. Hefner	Oct. 1, 1979	Oct. 31, 1980
Maj. Gen. Forrest S. McCartney	Oct. 31, 1980	May 19, 1982
Maj. Gen. Aloysius G. Casey	May 19, 1982	Sept. 30, 1986
Maj. Gen. Edward P. Berry Jr.	Sept. 30, 1986	March 14, 1989

SPACE SYSTEMS DIVISION (SSD) AND BALLISTICS SYSTEM DIVISION (BSD)

Lt. Gen. Donald L. Cromer (SSD)	March 15, 1989	May 31, 1991
Lt. Gen. Edward P. Barry Jr. (SSD)	July 8, 1991	June 30, 1992
Lt. Gen. Edward P. Barry Jr. (BSD)	March 15, 1989	May 30, 1989
Brig. Gen. Ralph G. Tourino (BSD)	May 30, 1989	May 4, 1990

SPACE AND MISSILE SYSTEMS CENTER

Lt. Gen. Edward P. Barry Jr.	July 1, 1992	Nov. 16, 1994
Lt. Gen. Lester L. Lyles	Nov. 16, 1994	Aug. 18, 1996

SPACE SYSTEMS DIVISION (SSD) AND BALLISTIC SYSTEMS DIVISION (BSD)

Maj. Gen. Osmond J. Ritland (SSD)	April 1, 1961	May 13, 1962
Lt. Gen. Howell M. Estes Jr. (SSD)	May 14, 1962	Oct. 2, 1962
Maj. Gen. Ben I. Funk (SSD)	Oct. 3, 1962	Aug. 31, 1966
Maj. Gen. Paul T. Cooper (SSD)	Sept. 1, 1966	June 30, 1967
Maj. Gen. Thomas P. Gerrity (BSD)	April 1, 1961	June 30, 1962
Lt. Gen. W. Austin Davis (BSD)	July 1, 1962	July 18, 1964
Maj. Gen. Harry Sands Jr. (BSD)	July 20, 1966	June 30, 1967
Maj. Gen. John L. McCoy (BSD)	July 20, 1966	June 30, 1969

SPACE AND MISSILE SYSTEMS CENTER

Lt. Gen. Roger G. DeKok	Aug. 18, 1996	Aug. 12, 1998
Lt. Gen. Eugene L. Tattini	Aug. 13, 1998	May 25, 2001
Lt. Gen. Brian A. Arnold	May 25, 2001	May 20, 2005
Lt. Gen. Michael A. Hamel	May 20, 2005	May 16, 2008
Lt. Gen. John T. Sheridan	May 16, 2008	June 3, 2011
Lt. Gen. Ellen M. Pawlikowski	June 3, 2011	June 19, 2014
Lt. Gen. Samuel A. Greaves	Jun 19, 2014	March 22, 2017
Lt. Gen. John F. Thompson	March 22, 2017	Aug. 1, 2021



Gen. Bernard A. Schriever was the chief architect of the U.S. Air Force's early ballistic missile and space programs.

AIR FORCE SPACE COMMAND

Gen. James V. Hartinger	Sept. 1, 1982	July 30, 1984
Gen. Robert T. Herres	July 30, 1984	Oct. 1, 1986
Maj. Gen. Maurice C. Padden	Oct. 1, 1986	Oct. 29, 1987
Lt. Gen. Donald J. Kutyna	Oct. 29, 1987	March 29, 1990
Lt. Gen. Thomas S. Moorman Jr.	March 29, 1990	March 23, 1992
Gen. Donald J. Kutyna	March 23, 1992	June 30, 1992
Gen. Charles A. Horner	June 30, 1992	Sept. 13, 1994
Gen. Joseph W. Ashy	Sept. 13, 1994	Aug. 26, 1996
Gen. Howell M. Estes III	Aug. 26, 1996	Aug. 14, 1998
Gen. Richard B. Myers	Aug. 14, 1998	Feb. 22, 2000
Gen. Ralph E. Eberhart	Feb. 22, 2000	April 19, 2002
Gen. Lance W. Lord	April 19, 2002	April 1, 2006
Lt. Gen. Frank G. Klotz (acting)	April 1, 2006	June 26, 2006
Gen. Kevin P. Chilton	June 26, 2006	Oct. 3, 2007
Lt. Gen. Michael A. Hamel (acting)	Oct. 3, 2007	Oct. 12, 2007
Gen. C. Robert Kehler	Oct. 12, 2007	Jan. 5, 2011
Gen. William L. Shelton	Jan. 5, 2011	Aug. 15, 2014
Gen. John E. Hyten	Aug. 15, 2014	Oct. 25, 2016
Gen. John W. Raymond	Oct. 25, 2016	Jan. 14, 2020

U.S. SPACE FORCE

Gen. John W. Raymond	Jan. 14, 2020
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SPACE OPERATIONS COMMAND (SpOC)

Lt. Gen. Stephen N. Whiting	Oct. 2020
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SPACE SYSTEMS COMMAND (SSC)

Lt. Gen. Michael Guetlein	Aug. 13, 2021
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SPACE TRAINING AND READINESS COMMAND (STARCOM)

Maj. Gen. Shawn N. Bratton	Aug. 23, 2021
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SATELLITES IN SERVICE OVER TIME

(As of Sept. 30, 2021)

TYPE OF SYSTEM	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
AEHF	1	2	2	3	3	3	3	4	5	5	5	6
ATRR	0	1	1	0	0	0	1	1	1	1	1	1
DMSP	6	4	4	6	6	6	5	5	4	4	4	4
DSCS	8	8	8	7	6	6	6	6	6	6	6	6
GPS	34	30	31	38	41	37	35	31	29	31	31	32
GSSAP	0	0	0	2	2	4	4	4	4	4	4	6
Milstar	5	5	5	5	5	5	5	5	5	4	4	5
ORS-5									1	1	1	1
SBIRS	1	1	2	2	2	2	3	7	6	6	6	7
SBSS	1	1	1	1	1	1	1	2	1	1	1	1
WGS		3	3	4	6	7	7	9	10	10	10	10
Total Satellites*	59	55	58	70	73	71	72	77	72	73+	73+	70+

*Classified systems not listed.

AEHF: Advanced Extremely High Frequency; ATRR: Advanced Technology Risk Reduction; DMSP: Defense Meteorological Satellite Prg.; DSCS: Defense Satellite Communications System; GPS: Global Positioning System; GSSAP: Geosynchronous Space Situational Awareness Prg.; ORS-5: Operationally Responsive Space-5; SBIRS: Space Based Infrared System; SBSS: Space Based Surveillance System; WGS: Wideband Global SATCOM.

MAJOR USSF PROGRAMS

RDT&E

(Current \$ millions)

	2021	2022 (enacted)	2023	2024	2025	2026	2027
AEHF	2.8	0.0	0.0	0.0	0.0	0.0	0.0
Counterspace Systems	44.2	59.8	57.5	67.3	4.3	2.1	2.1
Next-Gen OPIR	2,318.9	125.9	3,479.5	2,951.4	2,439.8	1,599.0	1,436.2
Space Fence	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Weather System Follow-On	77.4	53.4	0.0	10.6	7.0	0.0	0.0
Protected Tactical Service	193.3	229.3	294.8	360.4	349.0	345.7	465.3
Protected Tactical Enterprise Service	105.7	100.3	121.1	91.8	149.1	121.5	235.5
Space Test Program	25.7	20.1	25.4	30.3	30.3	29.8	30.4
Space C2 Software Pilot	0.0	0.0	155.1	122.6	123.6	126.3	128.8
Polar MILSATCOM	123.5	112.2	67.5	26.5	10.3	0.0	0.0
Wideband Global SATCOM	0.0	0.0	48.4	49.5	0.0	0.0	0.0
GPS III Space Segment	10.4	7.2	1.6	0.0	0.0	0.0	0.0
GPS III Follow-On Satellites	275.8	246.3	265.9	247.8	190.7	193.9	167.4
GPS III Operational Control Segment	460.9	402.5	359.7	274.9	82.5	22.9	6.6
Ballistic Missile Defense Radars	21.8	12.3	18.6	13.8	9.1	1.5	0.0

MAJOR USSF PROGRAMS

PROCUREMENT

(Current \$ millions)

	2021	2022 (enacted)	2023	2024	2025	2026	2027
AEHF	2.8	0.0	0.0	0.0	0.0	0.0	0.0
Counterspace Systems	49.2	64.8	62.7	67.3	4.3	2.1	2.1
Next-Gen OPIR	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Space Fence	11.3	0.0	0.0	0.0	0.0	0.0	0.0
Weather System Follow-On	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Protected Tactical Service	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Protected Tactical Enterprise Service	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Space Test Program	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Space C2 Software Pilot	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Polar MILSATCOM	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Wideband Global SATCOM	N/A	N/A	N/A	N/A	N/A	N/A	N/A
GPS III Space Segment	21.1	84.5	103.3	122.8	76.0	50.4	2.8
GPS III Follow-On Satellites	597.8	852.9	657.6	664.1	683.4	714.0	749.0
GPS III Operational Control Segment	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ballistic Missile Defense Radars	24.2	31.0	18.1	N/A	N/A	N/A	N/A





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USAF MAJOR COMMANDS AND AIR NATIONAL GUARD

The Air Force has nine major commands and two Air Reserve Components. (Air Force Reserve Command is both a majcom and an ARC.) In late 2019, Air Force Space Command was redesignated U.S. Space Force, a separate military branch under the Department of the Air Force.

As significant subdivisions of the Air Force, major commands conduct a considerable part of the service's mission and are directly subordinate to Headquarters USAF.

Majcoms are organized on a functional basis in the U.S. and on a geographic basis overseas. In addition to accomplishing designated portions of USAF's worldwide activities, they organize, administer, equip, and train their

subordinate elements.

The majcom sits atop a skip-echelon staffing structure, which means every other organizational level (i.e., majcom, wing, and squadron) will have a full range of staff functions. The other organizations (NAF, group, and flight) are tactical, mission-centered echelons. These tactical echelons are designed to increase operational effectiveness without the burden of additional staff functions.

AFGSC



Air Force Global Strike Command

Headquarters: Barksdale AFB, La.

Date of current designation: Aug. 7, 2009

Commander: Gen. Anthony J. Cotton*

Primary Mission

Organize, train, equip, maintain, and provide ICBM forces and long-range bomber forces to combatant commanders; provide installation mission support.

AFGSC Structure



AFGSC AIRCRAFT BY TYPE	
B-1B	43
B-2A	19
B-52H	56
E-4B	4
T-38A	14
UH-1N	25

PERSONNEL	
Active Duty	30,989

EQUIPMENT (TOTAL AIRCRAFT INVENTORY)	
Bomber	118
Helicopter	25
ICBM	400
ISR/BM/C3	4
Trainer	14

Source: U.S. Air Force Total Aircraft Inventory (TAI) as of Sept. 30, 2021

MAJOR UNITS	LOCATION	AIRCRAFT/MISSION/WEAPON
2nd Bomb Wing (BW)	Barksdale AFB, La.	B-52H
5th BW	Minot AFB, N.D.	B-52H
7th BW	Dyess AFB, Texas	B-1B
28th BW	Ellsworth AFB, S.D.	B-1B
90th Missile Wing (MW)	F. E. Warren AFB, Wyo.	Minuteman III, UH-1N
91st MW	Minot AFB, N.D.	Minuteman III, UH-1N
341st MW	Malmstrom AFB, Mont.	Minuteman III, UH-1N
377th Air Base Wing	Kirtland AFB, N.M.	Nuclear operations, expeditionary force training, base support
509th BW	Whiteman AFB, Mo.	B-2A, T-38C
576th Flight Test Squadron	Vandenberg SFB, Calif.	Minuteman III
595th Command and Control Group	Offutt AFB, Neb.	Command and control, E-4B

*Nominated to be commander USSTRATCOM on June 8, 2022.



ACC



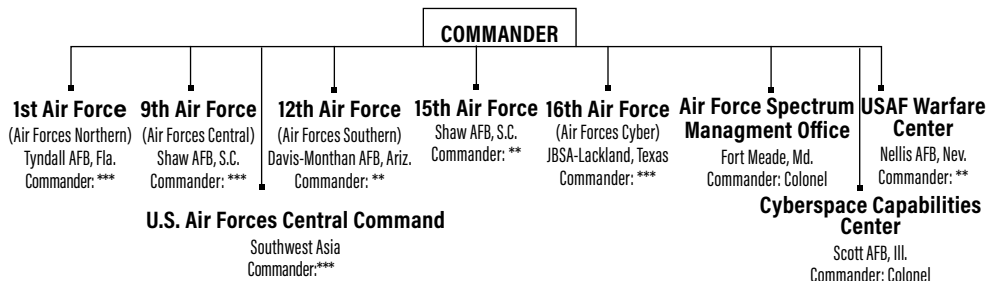
Air Combat Command

Headquarters: JB Langley-Eustis, Va.
Date of current designation: June 1, 1992
Commander: Gen. Mark D. Kelly

Primary Mission

Primary force provider of combat air power—fighter, conventional bomber, reconnaissance, battle management, and electronic combat aircraft—to combatant commands. Provide command, control, communications, and intelligence (C3I) systems. Conduct global information operations.

ACC Structure



PERSONNEL		EQUIPMENT (TAI)	
Active Duty	87,775	Fighter/Attack	766
		Helicopter	52
		ISR/BM/C3	341
		Trainer	42

MAJOR UNITS	LOCATION	AIRCRAFT/MISSION/WEAPON
1st Fighter Wing (FW)	JB Langley-Eustis, Va.	F-22, T-38A
4th FW	Seymour Johnson AFB, N.C.	F-15E
9th Reconnaissance Wing	Beale AFB, Calif.	RQ-4, T-38A, U-2
20th FW	Shaw AFB, S.C.	F-16CM
23rd Wing	Moody AFB, Ga.	A-10C, HC-130J, HH-60G
53rd Wing	Eglin AFB, Fla.	A-10C, BQM-167A, E-9A, F-15C/D/E, F-16C/D, F-22A, F-35A, HC-130J, HH-60G, MQ-9, QF-4, QF-16, RQ-4, U-2
55th Wing	Offutt AFB, Neb.	EC-130H, OC-135B, RC-135S/U/V/W, TC-135S/W, WC-135
57th Wing	Nellis AFB, Nev.	A-10C, EC-130, F-15, F-15E, F-16, F-22A, F-35A, HH-60G (23rd Wing), MQ-9
67th Cyberspace Wing	JBSA-Lackland, Texas	Cyberspace operations
70th ISR Wing (ISRW)	Fort Meade, Md.	Cryptologic operations
93rd Air Ground Operations Wing	Moody AFB, Ga.	Battlefield Airmen operations, support
99th Air Base Wing (ABW)	Nellis AFB, Nev.	Base spt.
319th Reconnaissance Wing	Grand Forks AFB, N.D.	Base spt.
325th FW	Tyndall AFB, Fla.	F-22A
355th Wing	Davis-Monthan AFB, Ariz.	A-10, EC-130H, (55th Wing), F-16CG, HC-130J, HH-60G (23rd Wing)
363rd ISRW	JB Langley-Eustis, Va.	Multi-intelligence analysis, targeting
366th FW	Mountain Home AFB, Idaho	F-15E
388th FW	Hill AFB, Utah	F-16C/D, F-35A
432nd Wing	Creech AFB, Nev.	MQ-1, MQ-9, RQ-170
480th ISRW	JB Langley-Eustis, Va.	DCGS, cyber ISR, CFACC support, signals intelligence integration
461st Air Control Wing (ACW)	Robins AFB, Ga.	E-8C (AA)
505th Command and Control Wing	Hurlburt Field, Fla.	Command and control operational-level tactics, testing, training
552nd ACW	Tinker AFB, Okla.	E-3B/C/G
557th Weather Wing	Offutt AFB, Neb.	Weather information
601st Air Operations Center	Tyndall AFB, Fla.	Plan and direct air operations
616th Operations Center	JBSA-Lackland, Texas	Plan and direct cyber operations
633rd ABW	JB Langley-Eustis, Va.	Joint base facilities support
688th Cyberspace Wing	JBSA-Lackland, Texas	Information operations, engineering installations
AF Rescue Coordination Center	Tyndall AFB, Fla.	National search and rescue coordination
AF Technical Applications Center	Patrick SFB, Fla.	Nuclear treaty monitoring, nuclear event detection

ACC AIRCRAFT BY TYPE

A-10	115	F-15X	2	RC-135S	3
AT-38	6	F-16C	149	RC-135U	2
AT-6	1	F-16D	19	RC-135V	8
E-3B	6	F-22A	107	RC-135W	9
E-3G	21	F-35A	122	RQ-4B	30
E-9A	2	HC-130J	16	T-38A	39
E-11	3	HH-60G	27	TC-135W	3
EC-130	9	HH-60W	9	TU-2S	4
F-15C	18	MQ-1	2	U-2S	27
F-15D	3	MQ-9	209	WC-135R	2
F-15E	158	P-9A	3	WC-135W	1

Source: U.S. Air Force Total Aircraft Inventory (TAI) as of Sept. 30, 2021



AETC



Air Education and Training Command

Headquarters: JBSA-Randolph, Texas

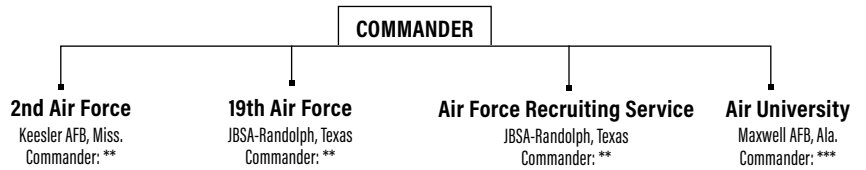
Date of current designation: July 1, 1993

Commander: Lt. Gen. Brian S. Robinson

Primary Mission

Recruit, train, and educate airmen through basic military training, initial and advanced technical training, and professional military education.

AETC Structure



PERSONNEL		EQUIPMENT (TAI)	
Active Duty	62,312	Fighter/Attack	236
		Helicopter	22
		Tanker	24
		Trainer	1,130
		Transport	50

MAJOR UNITS	LOCATION	AIRCRAFT/MISSION/WEAPON
12th Flying Training Wing (FTW)	JBSA-Randolph, Texas	T-1A, T-6A, T-38C (CSO at NAS Pensacola, Fla.)
14th FTW	Columbus AFB, Miss.	T-1A, T-6A, T-38C (A-29 at Moody AFB, Ga.)
17th Training Wing (TRW)	Goodfellow AFB, Texas	Technical training
33rd Fighter Wing (FW)	Eglin AFB, Fla.	F-35
37th TRW	JBSA-Lackland, Texas	Basic military and technical training
42nd Air Base Wing (ABW)	Maxwell AFB, Ala.	Base support
47th FTW	Laughlin AFB, Texas	T-1A, T-6A, T-38C
49th Wing	Holloman AFB, N.M.	MQ-1, MQ-9, QF-16
56th FW	Luke AFB, Ariz.	F-16, F-35
56th ARS	Altus AFB, Okla.	KC-46
58th Special Operations Wing	Kirtland AFB, N.M.	CV-22, HC-130J/P/N, HH-60G, MC-130H/J/P, UH-1N, TH-1H
59th Medical Wing	JBSA-Lackland, Texas	Wilford Hall Ambulatory Surgical Cntr.
71st FTW	Vance AFB, Okla.	T-1A, T-6A, T-38C
80th FTW	Sheppard AFB, Texas	T-6A, T-38C
81st TRW	Keesler AFB, Miss.	Technical training
82nd TRW	Sheppard AFB, Texas	Technical training
97th Air Mobility Wing	Altus AFB, Okla.	C-17, KC-135R, KC-46
314th Airlift Wing	Little Rock AFB, Ark.	C-130J
502nd ABW	JBSA-Fort Sam Houston, Texas	JBSA facilities support
AF Profession of Arms Center of Excellence	JBSA-Randolph, Texas	Professional training
AF Institute of Technology	Wright-Patterson AFB, Ohio	Postgraduate education
Carl A. Spaatz Center for Officer Education	Maxwell AFB, Ala.	Officer professional military education (PME)
Curtis E. LeMay Center for Doctrine Dev. & Education	Maxwell AFB, Ala.	Air Force doctrine development
Ira C. Eaker Center for Leadership Dev.	Maxwell AFB, Ala.	Professional and technical continuing education
Jeanne M. Holm Center for Officer Accessions and Citizen Development	Maxwell AFB, Ala.	Officer training, ROTC and JROTC oversight
Muir S. Fairchild Research Information Cntr.	Maxwell AFB, Ala.	Information resources
Thomas N. Barnes Center for Enlisted Education	Maxwell AFB, Ala.	Enlisted PME

AETC AIRCRAFT BY TYPE

C-130J	14	KC-135R	17	T-51A	3
C-17A	17	KC-135T	1	T-53A	24
CV-22B	9	KC-46A	7	TG-15A	2
F-16C	83	MC-130J	5	TG-15B	3
F-16D	51	MQ-9	24	TG-16A	19
F-35A	115	T-1A	177	TH-1H	28
HC-130J	3	T-6A	442	UH-1N	10
HH-60G	8	T-38C	427	UV-18B	3
		T-41D	4		

Source: U.S. Air Force Total Aircraft Inventory (TAI) as of Sept. 30, 2021



AFMC



Air Force Materiel Command

Headquarters: Wright-Patterson AFB, Ohio

Date of current designation: July 1, 1992

Commander: Lt. Gen. Duke Z. Richardson

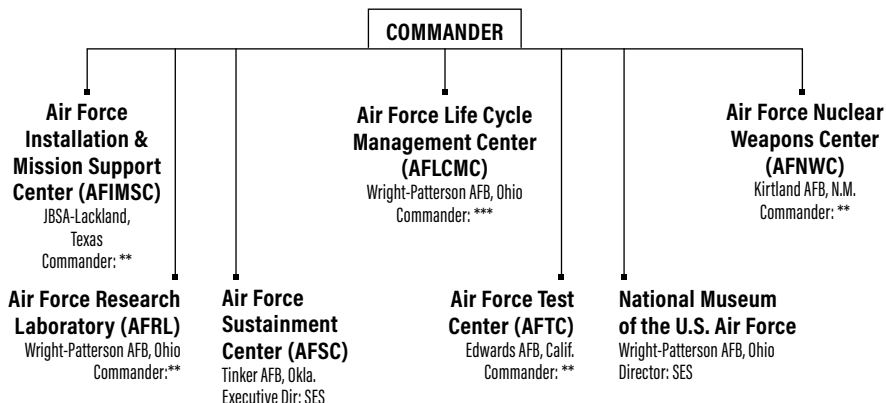
AFMC Structure

Primary Mission

Research, develop, procure, test, and sustain USAF weapon systems.

PERSONNEL	
Active Duty	19,872
EQUIPMENT (TAI)	
Bomber	5
Fighter/Attack	49
Helicopter	5
ISR/BM/C3	18
Tanker	2
Trainer	15
Transport	24

Source: U.S. Air Force Total Aircraft Inventory (TAI) as of Sept. 30, 2021



	MAJOR UNITS	LOCATION	AIRCRAFT/MISSION/WEAPON	AFMC AIRCRAFT BY TYPE
AFIMSC	AF Civil Engineer Center	JBSA-Lackland, Texas	Installation support (civil engineering)	A-10C 2
	AF Financial Management Center of Expertise	Buckley SFB, Colo.	Installation support (financial analysis)	B-1B 2
	AF Financial Services Center	Ellsworth AFB, S.D.	Installation support (payment processing)	B-2A 1
	AF Installation Contracting Center	Wright-Patterson AFB, Ohio	Enterprise contracting support	B-52H 2
	AF Security Forces Center	JBSA-Lackland, Texas	Installation support (security forces programs)	C-12C 16
	AF Services Center	JBSA-Lackland, Texas	Installation support (lodging, recreation)	C-12D 6
	AF Prg. Exec. Officer-Agile Combat Support	Wright-Patterson AFB, Ohio	Sys. acquisition	C-12F 1
	AFPEO-Armament	Eglin AFB, Fla.	Sys. acquisition	C-12J 1
AFLCMC	AFPEO-Battle Management	Hanscom AFB, Mass.	Sys. acquisition	F-15C 2
	AFPEO-Business and Enterprise Sys.	Maxwell AFB-Gunter Annex, Ala.	Sys. acquisition	F-15E 5
	AFPEO-C3I and Networks	Hanscom AFB, Mass.	Sys. acquisition	F-16C 12
	AFPEO-Fighters and Advanced Aircraft	Wright-Patterson AFB, Ohio	Sys. acquisition	F-16D 22
	AFPEO-ISR and Special Operations Forces	Wright-Patterson AFB, Ohio	Sys. acquisition	F-22A 4
	AFPEO-Mobility and Training Aircraft	Wright-Patterson AFB, Ohio	Sys. acquisition	F-35A 2
	AFPEO-Presidential Aircraft Recapitalization	Wright-Patterson AFB, Ohio	Sys. acquisition	HH-60U 3
	AFPEO-Tanker	Wright-Patterson AFB, Ohio	Sys. acquisition	KC-135R 2
	88th Air Base Wing (ABW)	Wright-Patterson AFB, Ohio	Base spt.	MQ-9A 16
				NC-135W 1
AFNWC	AFPEO-Nuclear Command, Control, and Communications	Hanscom AFB, Mass.	Sys. acquisition	RQ-4B 1
	AFPEO-Strategic Sys.	Kirtland AFB, N.M.	Sys. acquisition	T-38C 15
	Aerospace Sys.	Wright-Patterson AFB, Ohio	Research and development (R&D)	UH-1N 2
AFRL	AF Office of Scientific Research	Arlington, Va.	Research	
	AF Strategic Development Planning and Experimentation Office	Wright-Patterson AFB, Ohio	R&D	
	Directed Energy	Kirtland AFB, N.M.	R&D	
	Information	Rome, N.Y.	R&D	
	Materials and Manufacturing	Wright-Patterson AFB, Ohio	R&D	
	Munitions	Eglin AFB, Fla.	R&D	
	Sensors	Wright-Patterson AFB, Ohio	R&D	
	Space Vehicles	Kirtland AFB, N.M.	R&D	
AFSC	711th Human Performance Wing	Wright-Patterson AFB, Ohio	Airman performance R&E	
	Ogden Air Logistics Complex (ALC)	Hill AFB, Utah	Weapons sustainment	
	Oklahoma City ALC	Tinker AFB, Okla.	Weapons sustainment	
	Warner Robins ALC	Robins AFB, Ga.	Weapons sustainment	
	72nd ABW	Tinker AFB, Okla.	Base support	
	75th ABW	Hill AFB, Utah	Base and Utah Test and Training Range support	
	78th ABW	Robins AFB, Ga.	Base support	
AFTC	448th Supply Chain Management Wing	Tinker AFB, Okla.	Depot line repairables and consumables	
	635th Supply Chain Operations Wing	Scott AFB, Ill.	Global sustainment support	
	Arnold Engineering Development Complex	Arnold AFB, Tenn.	Flight, space, and missile ground testing	
	96th Test Wing (TW)	Eglin AFB, Fla.	Aircraft/system testing, base & range support	
	412th TW	Edwards AFB, Calif.	Aircraft/system testing, base & range support	
	U.S. Air Force Test Pilot School	Edwards AFB, Calif.	Pilot, navigator & engineer training for flight tests	



AFRC



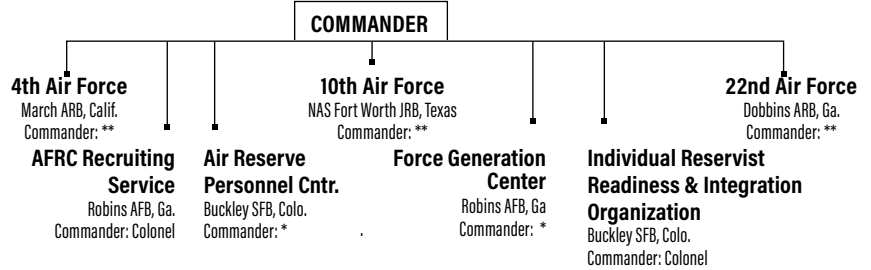
Air Force Reserve Command

Headquarters: Robins AFB, Ga.

Date of current designation: Feb. 17, 1997

Commander: Lt. Gen. Richard W. Scobee

AFRC Structure



Primary Mission

Provide strike, air mobility, special operations forces, rescue, aeromedical evacuation, aerial firefighting and spraying, weather reconnaissance, cyberspace operations, ISR, space, flying training, and other capabilities to support the Active-duty force and assist with domestic and foreign disaster relief.

PERSONNEL	
Selected Reserve	70,570

AFRC AIRCRAFT BY TYPE			EQUIPMENT (TAI)	
A-10	55	F-16C	Bomber	18
B-52H	18	F-16D	Fighter/Attack	109
C-130H	42	HC-130J	Helicopter	16
C-130J	10	HH-60G	ISR/BM/C3	16
C-17A	26	KC-135R	Tanker	69
C-40	4	KC-46A	Transport	98
C-5M	16	WC-130J		

MAJOR UNITS	LOCATION	AIRCRAFT/MISSION/WEAPON
94th Airlift Wing (AW)	Dobbins ARB, Ga.	C-130H
301st Fighter Wing (FW)	NAS JRB Fort Worth, Texas	F-16
302nd AW	Peterson AFB, Colo.	C-130H (including Modular Airborne Firefighting System)
307th Bomb Wing	Barksdale AFB, La.	B-52H
310th Space Wing	Schriever AFB, Colo.	Space control and operations and warning, information operations
315th AW (classic associate)	JB Charleston, S.C.	C-17
349th Air Mobility Wing (classic associate)	Travis AFB, Calif.	C-5, C-17, KC-10
403rd Wing	Keesler AFB, Miss.	C-130J, WC-130J
419th FW (classic associate)	Hill AFB, Utah	F-35A
433rd AW	JBSA-Lackland, Texas	C-5M, formal training unit
434th Air Refueling Wing (ARW)	Grissom ARB, Ind.	KC-135R
439th AW	Westover ARB, Mass.	C-5M
442nd FW	Whiteman AFB, Mo.	A-10C
445th AW	Wright-Patterson AFB, Ohio	C-17
446th AW (classic associate)	JB Lewis-McChord, Wash.	C-17
452nd AMW	March ARB, Calif.	C-17, KC-135R
459th ARW	JB Andrews, Md.	KC-135R
482nd FW	Homestead ARB, Fla.	F-16C
507th ARW	Tinker AFB, Okla.	KC-135R
512th AW (classic associate)	Dover AFB, Del.	C-5M, C-17
514th AMW (classic associate)	JB McGuire-Dix-Lakehurst, N.J.	C-17, KC-10
655th ISR Wing	Wright-Patterson AFB, Ohio	Intelligence
908th AW	Maxwell AFB, Ala.	C-130H
910th AW	Youngstown ARS, Ohio	C-130H
911th AW	Pittsburgh ARS, Pa.	C-17
914th ARW	Niagara Falls ARS, N.Y.	KC-135R
916th ARW	Seymour Johnson AFB, N.C.	KC-135R, KC-46A
919th Special Operations Wing (classic associate)	Duke Field, Fla.	AC-130U, C-145A, C-146, C-208, MC-130H, MQ-9, PC-12, U-28
920th Rescue Wing	Patrick SFB, Fla.	HC-130K/J, HH-60G
926th Wing (classic associate)	Nellis AFB, Nev.	F-15C, F-15E, F-16, F-22A, F-35A, MQ-9 (Creech AFB, Nev.), RQ-4 (Beale AFB, Calif.)
927th ARW (classic associate)	MacDill AFB, Fla.	KC-135R
931st ARW (classic associate)	McConnell AFB, Kan.	KC-1355R, KC-46A
932nd AW	Scott AFB, Ill.	C-40C
934th AW	Minneapolis-St. Paul ARS, Minn.	C-130H
940th ARW	Beale AFB, Calif.	KC-135R
944th FW (classic and active associate)	Luke AFB, Ariz.	A-10 (active associate-Davis Monthan AFB, Ariz.) F-15E (Seymour Johnson AFB, N.C.), F-16 (Luke AFB and Holloman AFB, Ariz.), F-35A (Luke AFB and Eglin AFB, Fla.)
960th Cyberspace Wing	JBSA-Lackland, Texas	Cyberspace operations

Source: TAI as of Sept. 30, 2021



AFSOC



Air Force Special Operations Command

Headquarters: Hurlburt Field, Fla.

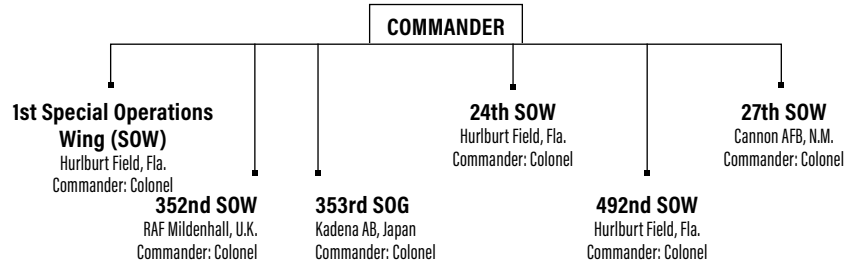
Date of current designation: May 22, 1990

Commander: Lt. Gen. James C. "Jim" Slife

Primary Mission

Organize, train, equip, maintain, and provide special operations air power forces to combatant commanders.

AFSOC Structure



AFSOC AIRCRAFT BY TYPE

AC-130J	24
AC-130W	10
CV-22B	43
MC-130H	10
MC-130J	41
MQ-9A	50

PERSONNEL	
Active Duty	16,895

EQUIPMENT (TAI)	
ISR/BM/C3	50
Special Operations Forces	135

Source: U.S. Air Force Total Aircraft Inventory (TAI) as of Sept. 30, 2021

MAJOR UNITS	LOCATION	AIRCRAFT/MISSION/WEAPON
1st Special Operations Group (SOG)	Hurlburt Field, Fla.	AC-130J, CV-22, MC-130H, MQ-9, U-28A
27th SOG	Cannon AFB, N.M.	AC-130W, C-146A*, CV-22B, MC-130J, MQ-9, U-28A
720th Special Tactics Group (STG)	Hurlburt Field, Fla.	Special tactics operations
724th STG	Pope Field, N.C.	Special tactics operations
752nd SOG	RAF Mildenhall, U.K.	CV-22, MC-130J

*Owned by U.S. Special Operations Command



Master Sgt. Christopher Boitz

An AC-130J Ghost Rider out of Hurlburt Field, Fla., takes part in a gunship legacy flight paying tribute to Air Force Special Operations Command's heritage and showcasing its newest gunship to the public.



AMC



Air Mobility Command

Headquarters: Scott AFB, Ill.

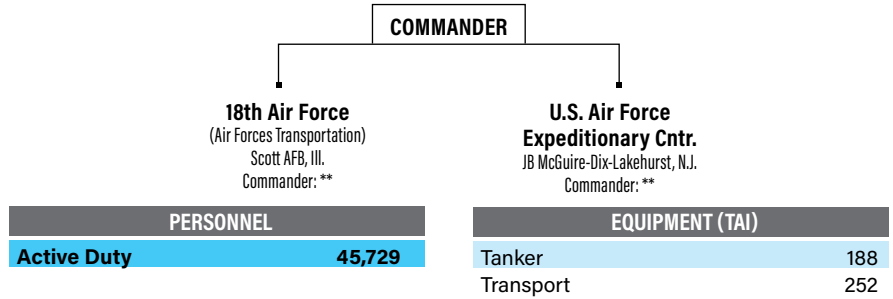
Date of current designation: June 1, 1992

Commander: Gen. Jacqueline D. Van Ovost

Primary Mission

Organize, train, equip, maintain, and provide air mobility forces to sustain worldwide air power operations.

AMC Structure



MAJOR UNITS	LOCATION	AIRCRAFT/MISSION/WEAPON
6th Air Refueling Wing (ARW)	MacDill AFB, Fla.	C-37, KC-135R
19th Airlift Wing (AW)	Little Rock AFB, Ark.	C-130H/J
22nd ARW	McConnell AFB, Kan.	KC-135R, KC-46A
60th Air Mobility Wing (AMW)	Travis AFB, Calif.	C-5, C-17, KC-10
62nd AW	JB Lewis-McChord, Wash.	C-17
87th Air Base Wing (ABW)	JB McGuire-Dix-Lakehurst, N.J.	Joint base facilities support
89th AW	JB Andrews, Md.	C-20B, C-32A, C-37A/B, C-40B, VC-25A
92nd ARW	Fairchild AFB, Wash.	KC-135R
305th AMW	JB McGuire-Dix-Lakehurst, N.J.	C-17, KC-10
317th AW	Dyess AFB, Texas	C-130J
375th AMW	Scott AFB, Ill.	C-21, C-40 (AA), KC-135R (AA)
436th AW	Dover AFB, Del.	C-5, C-17
437th AW	JB Charleston, S.C.	C-17A
515th Air Mobility Operations Wing (AMOW)	JB Pearl Harbor-Hickam, Hawaii	Contingency airfield operations
521st AMOW	Ramstein AB, Germany	Contingency airfield operations
618th Air Operations Center	Scott AFB, Ill.	Tanker Airlift Control Center operations
621st Contingency Response Wing	JB McGuire-Dix-Lakehurst, N.J.	Rapidly deployable bare-base operations
628th ABW	JB Charleston, S.C.	Joint base facilities support

AMC AIRCRAFT BY TYPE	
C-130J	65
C-17A	120
C-21A	14
C-32A	4
C-37A	4
C-37B	7
C-5M	36
KC-10A	48
KC-135R	97
KC-135T	21
KC-46A	22
VC-25A	2

Source: U.S. Air Force Total Aircraft Inventory (TAI) as of Sept. 30, 2021



Staff Sgt. Byle Shedrian Williams runs preflight checks on aircraft at Joint Base Charleston, S.C., in February.

Senior Airman Karla Parra

PACAF



Pacific Air Forces

Headquarters: JB Pearl Harbor-Hickam, Hawaii

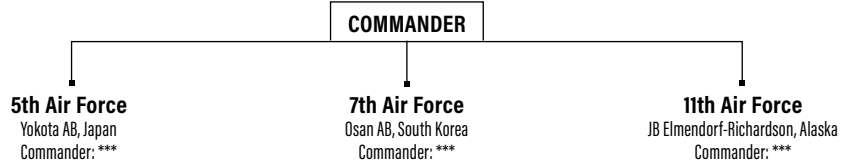
Date of current designation: July 1, 1957

Commander: Gen. Kenneth S. Wilsbach

Primary Mission

Provide U.S. Pacific Command integrated expeditionary Air Force capabilities, including strike, air mobility, and rescue forces.

PACAF Structure



PERSONNEL		EQUIPMENT (TAI)	
Active Duty	32,697	Fighter/Attack	309
		Helicopter	13
		ISR/BM/C3	4
		Tanker	15
		Transport	30

MAJOR UNITS	LOCATION	AIRCRAFT/MISSION/WEAPON
3rd Wing	JB Elmendorf-Richardson, Alaska	C-12, C-17, E-3, F-22A
8th Fighter Wing (FW)	Kunsan AB, South Korea	F-16C/D
15th Wing	JB Pearl Harbor-Hickam, Hawaii	C-17A, C-37A, C-40B, F-22A (AA), KC-135R (AA)
18th Wing	Kadena AB, Japan	E-3B/C, F-15C/D, HH-60G, KC-135R
35th FW	Misawa AB, Japan	F-16C/D, F-35A
36th Wing	Andersen AFB, Guam	Operational platform for rotating combat forces
51st FW	Osan AB, South Korea	A-10C, F-16C/D
354th FW	Eielson AFB, Alaska	F-16C/D
374th Airlift Wing	Yokota AB, Japan	C-12J, C-130H, UH-1N
607th Air Operations Center (AOC)	Osan AB, South Korea	Plan and direct air operations
611th AOC	JB Elmendorf-Richardson, Alaska	Plan and direct air operations
613th AOC	JB Pearl Harbor-Hickam, Hawaii	Plan and direct air operations
673rd Air Base Wing	JB Elmendorf-Richardson, Alaska	Joint base facilities support
Regional Support Center	JB Elmendorf-Richardson, Alaska	Remote facility operations, communications, engineering

PACAF AIRCRAFT BY TYPE

A-10C	24	E-3B	4	F-35A	43
C-12F	2	F-15C	49	HH-60G	9
C-12J	3	F-15D	4	KC-135R	12
C-130J	14	F-16C	123	KC-135T	3
C-17A	9	F-16D	12	UH-1	4
C-37A	2	F-22A	54		

Source: U.S. Air Force Total Aircraft Inventory (TAI) as of Sept. 30, 2021



An HC-130J refuels an HH-60G Pave Hawk helicopter during a combat search and rescue training event at Osan Air Base, South Korea.

Staff Sgt. Douglas Loranca

USAFE-AFA



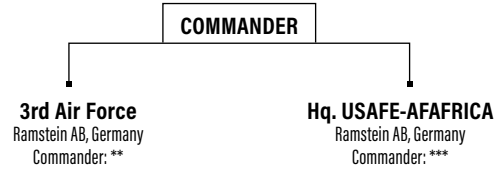
U.S. Air Forces in Europe - Air Forces Africa

Headquarters: Ramstein AB, Germany
Date of current designation: April 20, 2012
Commander: Gen. Jeffrey L. Harrigan

Primary Mission

Serves as the air component for U.S. European Command and U.S. Africa Command, directing air operations, including warfighting and humanitarian/peacekeeping actions, and maintains combat-ready forces for NATO responsibilities.

USAFE-AFA Structure



PERSONNEL	
Active Duty	24,785

EQUIPMENT (TAI)	
Fighter/Attack	153
Helicopter	4
Tanker	15
Transport	22

MAJOR UNITS	LOCATION	AIRCRAFT/MISSION/WEAPON
31st Fighter Wing (FW)	Aviano AB, Italy	F-16C/D, HH-60G
39th Air Base Wing	Incirlik AB, Turkey	Operational location for deployed U.S. and NATO forces
48th FW	RAF Lakenheath, U.K.	F-15C/D, F-15E, HH-60G
52nd FW	Spangdahlem AB, Germany	F-16J
86th Airlift Wing	Ramstein AB, Germany	C-21A, C-37A, C-130J
100th Air Refueling Wing	RAF Mildenhall, U.K.	CV-22, KC-135R/T, MC-130J, RC-135V/W
435th Air Ground Operations Wing	Ramstein AB, Germany	Battlefield airmen support and operations
501st Combat Support Wing	RAF Alconbury, U.K.	Facilitates support for seven geographically separated units
603rd Air Operations Center	Ramstein AB, Germany	Plan and direct air operations

USAFE-AFA AIRCRAFT BY TYPE					
C-130J	14	F-15D	2	HH-60G	4
C-21A	5	F-15E	55	KC-135R	10
C-37A	3	F-16C	74	KC-135T	5
F-15C	18	F-16D	4		

Source: U.S. Air Force Total Aircraft Inventory (TAI) as of Sept. 30, 2021

Airman 1st Class Dajea Harrison assembles a 7.62 GAU-1 minigun system on an HH-60G Pave Hawk during the 3rd quarter Rapid Aircraft Generation and Employment (RAGE) event at Aviano Air Base, Italy, in 2021.



Senior Airman Brooke Moeder

ANG



Air National Guard

Headquarters: Washington, D.C.
Date of current designation: Sept. 18, 1947
Director: Lt. Gen. Michael A. Loh

Primary Mission

Provide combat capability to the Active-duty force and security for the homeland. Support U.S. domestic and foreign humanitarian and disaster relief.

PERSONNEL	
Selected Reserve	106,853

EQUIPMENT (TAI)		
Fighter/Attack	593	Tanker 176
Helicopter	42	Transport 181
ISR/BM/C3	68	

WING (STATE)	SYSTEM/MISSION
101st Air Refueling Wing (Maine)	KC-135R, CC
102nd Intelligence Wing (Mass.)	DCGS, cyber, ISR, EISG, WXF
103rd Airlift Wing (Conn.)	C-130H
104th Fighter Wing (Mass.)	F-15C/D
105th AW (N.Y.)	C-17, EIS, WXF
106th Rescue Wing (N.Y.)	HC-130, HH-60G, GA
107th ATKW (N.Y.)	MQ-9
108th Wing (N.J.)	KC-135R, C-32B, intel, SOS
109th AW (N.Y.)	LC-130
110th Wing (Mich.)	MQ-9, AOG, C2, cyber
111th Attack Wing (Pa.)	MQ-9, cyber, EIS
113th Wing (D.C.)	C-40C, F-16C/D, WXF
114th FW (S.D.)	F-16C/D
115th FW (Wis.)	F-16C/D, RC-26B, WXF
116th Air Control Wing (Ga.)	E-8C, WXF
117th ARW (Ala.)	KC-135R, DCGS
118th Wing (Tenn.)	MQ-9, cyber
119th Wing (N.D.)	MQ-9, ISR, WXF
120th AW (Mont.)	C-130H, WXF
121st ARW (Ohio)	KC-135R, WXF
122nd FW (Ind.)	A-10C
123rd AW (Ky.)	C-130J, CRG, special tactics, WXF, intel
124th FW (Idaho)	A-10C, TACP, cyber
125th FW (Fla.)	F-15C/D, WXF
126th ARW (Ill.)	KC-135R, SCMS
127th Wing (Mich.)	A-10C, KC-135T, WXF
128th ARW (Wis.)	KC-135R
129th RQW (Calif.)	HC-130J, HH-60G, GA
130th AW (W.Va.)	C-130H, RC-26B
131st Bomb Wing (Mo.)	B-2 (CA*)
132nd Wing (Iowa)	MQ-9, cyber, ISR
133rd AW (Minn.)	C-130J, ALCF, WXF
134th ARW (Tenn.)	KC-135R
136th AW (Texas)	C-130H, ALCF, WXF
137th SOW (Okla.)	MC-12, EIS, SOS, TACP
138th FW (Okla.)	F-16C/D, EIS, WXF
139th AW (Mo.)	C-130H, AATTC (ANG/AFRC), ATCS
140th Wing (Colo.)	F-16C/D, CEF, WXF
141st ARW (Wash.)	KC-135R, CC, RC-26B, intel
142nd FW (Ore.)	F-15C/D, special tactics, WXF
143rd AW (R.I.)	C-130J, cyber
144th FW (Calif.)	F-15C/D, WXF
145th AW (N.C.)	C-17, CEF, MAFFS
146th AW (Calif.)	C-130J, ALCF, MAFFS, WXF
147th Attack Wing (Texas)	MQ-9, RC-26, TACP, EIS, WXF

WING (STATE)	SYSTEM/MISSION
148th FW (Minn.)	F-16C/D
149th FW (Texas)	F-16C/D
150th SOW (N.M.)	Special ops training (CA*), RC-26B
151st ARW (Utah)	KC-135R
152nd AW (Nev.)	C-130H, DCGS
153rd AW (Wyo.)	C-130H, MAFFS
154th Wing (Hawaii)	C-17 (CA*), F-22, KC-135R, intel, WXF
155th ARW (Neb.)	KC-135R
156th AW (Puerto Rico)	WC-130H
157th ARW (N.H.)	KC-135R, KC-46A
158th FW (Vt.)	F-16C, F-35A, WXF
159th FW (La.)	F-15C/D, CC
161st ARW (Ariz.)	KC-135R
162nd Wing (Ariz.)	F-16, RC-26B, WXF
163rd Attack Wing (Calif.)	MQ-9, FTU, WXF
164th AW (Tenn.)	C-17A
165th AW (Ga.)	C-130H, CRTIC, AOS
166th AW (Del.)	C-130H, cyber
167th AW (W.Va.)	C-17A
168th Wing (Alaska)	KC-135R
169th FW (S.C.)	F-16C/D, ATCS
171st ARW (Pa.)	KC-135R/T, WXF
172nd AW (Miss.)	C-17, ALCF
173rd FW (Ore.)	F-15C/D, FTU, ATCS
174th Attack Wing (N.Y.)	MQ-9, RC-26B, AOC, FTU,
175th Wing (Md.)	A-10C, CEF, cyber, intel
176th Wing (Alaska)	C-17 (CA*), HC-130J, HH-60G, GA, RAOC
177th FW (N.J.)	F-16C, AOS, WXF
178th Wing (Ohio)	MQ-9, cyber, ISR, MCE
179th AW (Ohio)	C-130H
180th FW (Ohio)	F-16C/D
181st IW (Ind.)	DCGS, ISR, TACP, WXF
182nd AW (Ill.)	C-130H, CC, TACP
183rd Wing (Ill.)	CRF, DCGS
184th IW (Kan.)	CACS, cyber, DCGS, ISR, NOSS, TACP
185th ARW (Iowa)	KC-135R
186th ARW (Miss.)	KC-135R, RC-26B, AOG, ATCS
187th FW (Ala.)	F-16C/D, RC-26B
188th Wing (Ark.)	MQ-9, MCE, ISR, DCGS
189th AW (Ark.)	C-130H, intel, FTU, WXF
190th ARW (Kan.)	KC-135R, CW
192nd Wing (Va.)	F-22 (CA*), cyber, DCGS
193rd SOW (Pa.)	EC-130J, AOS, CC, cyber, TACP
194th Wing (Wash.)	CC, CW
195th Wing (Calif.)	DCGS, intel

*Classic associate



FOAS, DRUS, & CIVIL AIR PATROL

A FOA is a Field Operating Unit, an organization that performs a specialized function not performed by any other command, which reports to Headquarters, USAF. A Direct Reporting Unit (DRU) reports directly to the Chief of Staff. The Air Force Auxiliary is the Civil Air Patrol. **Personnel numbers are for Active duty.**

Air Force Agency for Modeling and Simulation (AFAMS)



Headquarters: Orlando, Fla.
Date of Current Designation: June 3, 1996
Type: Field Operating Agency (FOA)
Reports to: Deputy Chief of Staff, Operations
Mission: Support and facilitate integrated, realistic

and efficient operational training across warfighter domains to enhance full-spectrum readiness. **Personnel:** 8
www.afams.af.mil

Air Force Audit Agency (AFAA)



Headquarters: Pentagon
Date of Current Designation: Dec. 31, 1971
Type: FOA
Reports to: Secretary of the Air Force
Mission: Provide independent, objective, and quality

internal audit service. **Personnel:** 0
www.afaa.af.mil

Air Force Cost Analysis Agency (AFCAA)



Headquarters: Arlington, Va.
Date of Current Designation: Aug. 1, 1991
Reports to: SECAF/Deputy Assistant Secretary for Cost and Economics
Type: FOA

Mission: Responsible for developing and validating life-cycle cost estimates and analyses and develop independent cost estimates, assessments and analysis on major space, aircraft, weapons, electronics, and information systems.
Personnel: 14
www.saffm.hq.af.mil

Air Force District of Washington (AFDW)



Headquarters: JB Andrews, Md.
Date of Current Designation: July 7, 2005
Type: Direct Reporting Unit (DRU)
Reports to: Chief of Staff of the Air Force
Mission: Orchestrate support for National Capital

Region activities; train, equip, and provide forces for contingency, homeland, and ceremonial support operations worldwide.
Personnel: 130
www.afdw.af.mil

Air Force Flight Standards Agency (AFFSA)



Headquarters: Tinker AFB, Okla.
Date of Current Designation: Oct. 1, 1991
Type: FOA
Reports to: Department of the Air Force, Operations
Mission: Focuses on the systems, software, and

strategic support given to operational commanders; maintains service-level flying and AO publications, training regulations, and equipment; and provide 24/7 air traffic control and landing systems support. **Personnel:** 132 **Website:** not available

Air Force Historical Research Agency (AFHRA)



Headquarters: Maxwell AFB, Ala.
Date of Current Designation: Sept. 1, 1991
Type: FOA
Reports to: DAF
Mission: Research, record, and disseminate history; collect, preserve, and manage historical document collection and oral history program; determine unit lineage and honors; verify aerial victory credits. **Personnel:** 0

Personnel: 0
www.afhra.af.mil

Air Force Inspection Agency (AFIA)



Headquarters: Kirtland AFB, N.M.
Date of Current Designation: Aug. 1, 1991
Type: FOA

Reports to: SECAF, Inspector General
Mission: Provide independent assessments of operations and activities; conduct nuclear surety inspection oversight, training, and certification; serve as primary action arm of the Secretary of the Air Force's inspection system.

Personnel: 97
www.afinspectorgeneral.af.mil

Air Force Legal Operations Agency (AFLOA)



Headquarters: JB Andrews, Md.
Date of Current Designation: Sept. 1, 1991
Type: FOA

Reports to: AF Judge Advocate General
Mission: Administer military justice programs; provide legal research technology and train legal professionals; support the Department of Justice in civil or criminal litigation pertaining to the Air Force. **Personnel:** 613

www.afjag.af.mil

Air Force Manpower Analysis Agency (AFMAA)



Headquarters: JBASA-Randolph, Texas
Date of Current Designation: June 1, 2015
Type: FOA

Reports to: Headquarters, USAF
Mission: Shapes Air Force and DOD manpower resourceing decisions through the delivery of timely determinants, data analytics, consultant services, and enterprise tools and training.

Personnel: 175
www.afmaa.af.mil

Air Force Medical Readiness Agency (AFMRA)



Headquarters: Falls Church, Va.
Date of Current Designation: June 28, 2019
Type: FOA

Reports to: AF Surgeon General
Mission: Enterprise-level policy development, management and oversight of medical readiness programs, strategic partnerships, medical capability development, operational medical logistics, dental operations, and programs unique to the deployed environment and to the Air Force. The Air Force activated the agency while simultaneously deactivating the Air Force Medical Operations Agency and Air Force Medical Support Agency.

Personnel: 274
www.airforcemedicine.af.mil

Air Force Mortuary Affairs Operations (AFMAO)



Headquarters: Dover AFB, Del.
Date of Current Designation: Jan. 6, 2009
Type: FOA

Reports to: DCS, Manpower, Personnel, and Services, Hq. USAF
Mission: Ensure respectful handling, dignity, and honor of the fallen; provide care, service, and support to family of the fallen; transfer remains.

Personnel: 29
www.mortuary.af.mil



Air Force Office of Special Investigations (AFOSI)



Headquarters: Quantico, Va.
Date of Current Designation: Dec. 20, 1971
Type: FOA
Reports to: IG, Office of the SECAF
Mission: Provide investigative service to USAF commanders; identify, exploit, and neutralize criminal, terrorist, and intelligence threats; combat threats to information systems and technologies; defeat fraud affecting acquisitions and base-level capabilities. **Personnel:** 141
www.osi.af.mil

Air Force Operational Test and Evaluation Center (AFOTEC)



Headquarters: Kirtland AFB, N.M.
Date of Current Designation: April 4, 1983
Type: DRU
Reports to: Hq, USAF
Mission: Inform the Warfighter and Acquisition through operational test.
Personnel: 334
www.afotec.af.mil/

Air Force Operations Group (AFOG)



Headquarters: Pentagon
Date of Current Designation: April 1, 1995
Type: FOA
Reports to: DAF
Mission: Provide 24-hour watch on current operations; train and staff Crisis Action Team; develop weather data for National Command Authority, Joint Chiefs of Staff, National Military Command Center, Army Operations Center, and other federal agencies. **Personnel:** 45
Website: not available

Air Force Personnel Center (AFPC)



Headquarters: JBSA-Randolph, Texas
Date of Current Designation: Oct. 1, 1995
Type: FOA
Reports to: Office of DCS, Manpower and Personnel, Hq USAF
Mission: Identify proper grades, specialties, and skill levels for USAF mission; manage assignments; monitor professional development; plan and schedule expeditionary forces; oversee Airmen and family readiness centers; assist casualty reporting and Missing in Action/Prisoner of War actions.
Personnel: 739
www.afpc.af.mil

Air Force Public Affairs Agency (AFPAA)



Headquarters: JBSA-Lackland, Texas
Date of Current Designation: Oct. 1, 2008
Type: FOA
Reports to: Office of the SECAF for Public Affairs
Mission: Develop and sustain public affairs products; provide combat camera and graphics support; test emerging technologies; manage public affairs personnel deployments.
Personnel: 56
www.publicaffairs.af.mil

Air Force Review Boards Agency (AFRBA)



Headquarters: JB Andrews, Md.
Date of Current Designation: Aug. 1, 1991
Type: FOA
Reports to: Assistant SECAF for Manpower and Reserve Affairs
Mission: Manage military and civilian appellate processes; serve as lead agent for DOD Physical Disability Board of Review.
Personnel: 31
www.afrba-portal.cce.af.mil

Air Force Safety Center (AFSEC)



Headquarters: Kirtland AFB, N.M.
Date of Current Designation: Jan. 1, 1996
Type: FOA
Reports to: DAF
Mission: Manage mishap prevention, risk management, and nuclear surety programs; provide flight, ground, weapons, human factors, and space safety technical assistance; oversee major command mishap investigations and evaluate corrective actions; direct safety education programs.
Personnel: 53
www.safety.af.mil

Air National Guard Readiness Center (ANGRC)



Headquarters: JB Andrews, Md.
Date of Current Designation: June 1, 1992
Type: FOA
Reports to: National Guard Bureau (Pentagon)
Mission: Provides resources, policy oversight, and guidance to ensure ANG wings and geographically separated units are ready, trained, and equipped for homeland and global operations.
Personnel: 46
www.ang.af.mil/about/ANGRC

DOD Cyber Crime Center (DC3)



Headquarters: Linthicum, Md.
Date of Current Designation: Jan. 15, 2021
Type: FOA
Reports to: IG, Office of the SECAF
Mission: Provides digital and multimedia forensics, specialized cyber training, technical solutions development, and cyber analytics for the following DOD mission areas: cybersecurity and critical infrastructure protection; law enforcement and counterintelligence; document and media exploitation, counterterrorism, and safety inquiries.
Personnel: 0
www.dc3.mil

National Air and Space Intelligence Center (NASIC)



Headquarters: Wright-Patterson AFB, Ohio
Date of Current Designation: Feb. 20, 2003
Type: FOA
Reports to: Deputy Chief of Staff for Intelligence, Surveillance, Reconnaissance, and Cyber Effects Operations
Mission: To discover and characterize air, space, missile, and cyber threats to enable full-spectrum multi-domain operations, drive weapon system acquisition, and inform national defense policy.
Personnel: 139
www.nasic.af.mil

US Air Force Academy (USAFA)



Headquarters: Colorado Springs, Colo.
Date of Current Designation: April 1, 1954
Type: DRU
Reports to: Chief of Staff of the Air Force
Mission: Develop, educate, and inspire young men and women to become USAF officers with knowledge, character, and discipline.
Personnel: 356
Cadets: 4,000+
www.usafa.edu

Civil Air Patrol (CAP)



Headquarters: Maxwell AFB, Ala.
Date of Current Designation: Dec. 1, 1941
Type: Auxiliary
Reports to: CAP Board of Governors/National Commander
Mission: Provide operational capabilities to support search and rescue, disaster relief, a nationwide communications network, and counter drug and homeland security missions; conduct leadership training, and career and technical education for CAP Cadet Program; promote aerospace education.
Total Volunteers: ~61,000
www.gocivairpatrol.com



AIR FORCE WINGS

There are 144 Active-duty wings in the U.S. Air Force. There are 37 wings in the Air Reserve (see list on p. 84) and 90 wings in the Air National Guard (see list on p. 89). All of them trace their history to the 1st Pursuit Wing, formed in France by the American Expeditionary Forces of the U.S. Army in July 1918. The term "wing" has remained in use ever since.

Air wings in World War II were administrative and operational organizations that typically controlled multiple combat groups and service organizations. Today's wings are smaller, dating their history to 1948, when the newly independent Air Force established permanent combat wings consisting of a combat group, an air base group, a maintenance and supply group, and a medical group.

In most cases, wings' numerical designator evolved from the combat group that preceded it. For example, today's 14th Flying Training Wing traces its history to the 14th Fighter Wing and, before that, the 14th Fighter Group. Each group within the wing takes on the wing's numerical designator.

Every wing has a distinct mission and scope, whether that is operational, managing an air base, or performing specialized missions such as intelligence or training. Operational wings typically consist of an operations group and provide their own maintenance, supply, munitions, and often base support. Those that are tenant organizations rely on host commands to provide base and related support services.



1st Fighter Wing
JB Langley-Eustis, Va.
ACC
F-22, T-38A



1st Special Operations Wing
Hurlburt Field, Fla.
AFSOC
AC-130J/U, CV-22, MC-130, MQ-9, U-28A



2nd Bomb Wing
Barksdale AFB, La.
AFGSC
B-52H



3rd Wing
JB Elmendorf-Richardson, Alaska
PACAF
C-12, C-17, E-3, F-22



4th Fighter Wing
Seymour Johnson AFB, N.C.
ACC
F-15E



5th Bomb Wing
Minot AFB, N.D.
AFGSC
B-52H



6th Air Refueling Wing
MacDill AFB, Fla.
AMC
C-37, KC-135



7th Bomb Wing
Dyess AFB, Texas
AFGSC
B-1B



8th Fighter Wing
Kunsan Air Base, South Korea
PACAF
F-16C/D



9th Reconnaissance Wing
Beale AFB, Calif.
ACC
RQ-4, T-38A, U-2



10th Air Base Wing
U.S. Air Force Academy, Colo.
USAFA
Education, Medical, Infrastructure



11th Wing
JB Andrews, Md.
AFDW
UH-1N



12th Flying Training Wing
JB San Antonio-Randolph, Texas
AETC
T-1A, T-6A, T-38C



14th Flying Training Wing
Colombus AFB, Miss.
AETC
T-1A, T-6A, T-38C



15th Wing
JB Pearl Harbor-Hickam, Hawaii
PACAF
C-17, C-37, C-40B, F-22, KC-135



17th Training Wing
Goodfellow AFB, Texas
AETC
Technical Training, Crypto/Intelligence Training-All Services





18th Wing
Kadena Air Base, Japan
PACAF
E-3, F-15C/D, HH-60,
KC-135



19th Airlift Wing
Little Rock AFB, Ark.
AMC
C-130H/J



20th Fighter Wing
Shaw AFB, S.C.
ACC
F-16CM



22nd Air Refueling Wing
McConnell AFB,
Kan.
AMC
KC-46, KC-135



23rd Wing
Moody AFB, Ga.
ACC
A-10, HC-130J, HH-60



24th Operations Wing
Hurlburt Field, Fla.
AFSOC
Special Training and
Tactics



27th Special Operations Wing
Cannon AFB, N.M.
AFSOC
AC-130J, C-46, CV-22, MC-
130J, MQ-9, U-28A



28th Bomb Wing
Ellsworth AFB, S.D.
AFGSC
B-1B



31st Fighter Wing
Aviano Air Base, Italy
USAFE-AFAFRICA
F-16C/D, HH-60



33rd Fighter Wing
Eglin AFB, Fla.
AETC
F-35



35th Fighter Wing
Misawa Air Base,
Japan
PACAF
F-16CM



36th Wing
Andersen AFB,
Guam
PACAF
Host Unit, Base
Operations



37th Training Wing
JB San Antonio-
Lackland, Texas
AETC
Host Unit, Training
Operations



39th Air Base Wing
Incirlik Air Base,
Turkey
USAFE-AFAFRICA
Host Unit, Base
Operations/Support



42nd Air Base Wing
Maxwell-Gunter
AFB, Ala.
AETC
Host Unit, Air
University Support

EXPEDITIONARY WINGS

Expeditionary wings include headquarters staffs, but do not own their own aircraft and personnel. Instead, deployed personnel and equipment are assigned based on mission requirements.



332nd Air Expeditionary Wing
Southwest Asia
(Undisclosed Locations)
ACC
A-10C F-15E, F-16C, HC-130P,
HH-60G, KC-135R, MQ-9



379th Air Expeditionary Wing
Al Udeid Air Base, Qatar
ACC
B-1, B-52, C-17, C-21,
C-130H/J, E-8C, KC-135,
RC-135V/W



380th Air Expeditionary Wing
Al Dhafra Air Base, UAE
ACC
E-3, KC-10, RQ-4, U-2



386th Air Expeditionary Wing
Ali Al Salem Air Base,
Kuwait
ACC
C-130E/H, EC-130



47th Flying Training Wing
Laughlin AFB, Texas
AETC
T-1A, T-6A, T-38C



48th Fighter Wing
RAF Lakenheath, U.K.
USAFE-AFAFRICA
F-15C/D, F-15E, HH-60



49th Wing
Holloman AFB, N.M.
AETC
MQ-9



51st Fighter Wing
Osan Air Base,
South Korea
PACAF
A-10, F-16C/D



52nd Fighter Wing
Spangdahlem Air
Base, Germany
USAFE-AFAFRICA
F-16C/D



53rd Wing
Eglin AFB, Fla.
ACC
*Testing and Evaluation. A-10,
B-1B, B-2, B-52H, BQM-167,
E-9A, F-15C/D/E, F-16C/D, F-22,
F-35, HC-130J, HH-60, MQ-9,
QF-16, RQ-4, U-2*



55th Wing
Offutt AFB, Neb.
ACC
*EC-130H, OC-135B,
RC-135S/U/V/W, TC-
135S/W, WC-135*



56th Fighter Wing
Luke AFB, Ariz.
AETC
Training. F-16, F-35



57th Wing
Nellis AFB, Nev.
ACC
*Training and Tactics.
A-10, E-3C, E-8C, EC-130,
F-15C/C/E, F-16, F-22,
F-35, HH-60, MQ-9, RC-135*



58th Special Operations Wing
Kirtland AFB, N.M.
AETC
*Training, Special Operations.
Combat Search and
Rescue. CV-22, HC-130J/
P/N, HH-60, MC-130H/J/P,
TH-1H, UH-1N*



59th Medical Wing
JB San Antonio, Texas
AETC
*Military Medical
Services*



60th Air Mobility Wing
Travis AFB, Calif.
AMC
C-5M, C-17, KC-10



62nd Airlift Wing
JB Lewis-McChord, Wash.
AMC
C-17



67th Cyberspace Wing
JB San Antonio-
Lackland, Texas
ACC
Cyber Operations



**70th Intelligence,
Surveillance, and
Reconnaissance Wing**
Fort George Meade, Md.
AFISRA
ACC
*Primary provider of signals
intelligence to national
leaders and combat
commanders*



71st Flying Training Wing
Vance AFB, Okla.
AETC
T-1A, T-6A, T-38C



72nd Air Base Wing
Tinker AFB, Okla.
AFMC
*Host Unit, Base
Operations and Support*



75th Air Base Wing
Hill AFB, Utah
AFMC
*Host Unit, Base
Operations and Support*



76th Maintenance Wing
Tinker AFB, Okla.
AFMC
*Aircraft Depot
Maintenance, Repair,
Modifications*



78th Air Base Wing
Robins AFB, Ga.
AFMC
*Host Unit, Base
Operations and Support*





80th Flying Training Wing
Sheppard AFB, Texas
AETC
T-6A, T-38C



81st Training Wing
Keesler AFB, Miss.
AETC
*Electronics Training for
USAF, USN, USA, USMC, CG,
Federal/Civilian Personnel*



82nd Training Wing
Sheppard AFB, Texas
AETC
*Host Unit, Base
Operations and Support*



86th Airlift Wing
Ramstein Air Base,
Germany
USAFE-AFAFRICA
C-21, C-37A, C-40B,
C-130J



87th Air Base Wing
JB McGuire-Dix-
Lakehurst, N.J.
AMC
*Host Unit, Base
Operations and Support*



88th Air Base Wing
Wright-Patterson AFB,
Ohio
AFMC
*Host Unit, Base Oper-
ations and Support*



89th Airlift Wing
JB Andrews, Md.
AMC
C-20B, C-32A, C-37A/B,
C-40B, VC-25A



90th Missile Wing
F.E. Warren AFB, Wyo.
AFGSC
Minuteman III, UH-1N



91st Missile Wing
Minot AFB, N.D.
AFGSC
Minuteman III, UH-1N



92nd Air Refueling Wing
Fairchild AFB, Wash.
AMC
C-17, KC-135



93rd Air Ground Operations Wing
Moody AFB, Ga.
ACC
*Manage/Provide com-
bat-ready TACAIR personnel,
battlefield weather, and force
protection assets*



94th Airlift Wing
Dobbins ARB, Ga.
AFRC
C-130H



96th Test Wing
Eglin AFB, Fla.
AFMC
*Aircraft Test and Evalua-
tion Center. A-10, F-15C/E,
F-16CG/CJ, UH-1N*



97th Air Mobility Wing
Altus AFB, Okla.
AETC
C-17, KC-46, KC-135



99th Air Base Wing
Nellis AFB, Nev.
ACC
*Host unit, base installation
and support, Nevada Test
and Training Range*



100th Air Refueling Wing
RAF Mildenhall, U.K.
USAFE-AFAFRICA
CV-22, KC-135, MC-130J,
RC-135V/W



301st Fighter Wing
Naval Air Station JRB,
Fort Worth, Texas
AFRC
F-16C/D



302nd Airlift Wing
Peterson SFB, Colo.
AFRC
*C-130H (Modular
Airborne Firefighting
System)*



305th Air Mobility Wing
JB McGuire-Dix-
Lakehurst, N.J.
AMC
C17, KC-10



307th Bomb Wing
Barksdale AFB, La.
AFRC
B-52H





310th Space Wing
Schriever SFB, Colo.
AFRC
*Space operations,
control, warning*



314th Airlift Wing
Little Rock AFB, Ark.
AETC
C-130J



315th Airlift Wing
JB Charleston, S.C.
AFRC
C-17



317th Airlift Wing
Dyess AFB, Texas
AMC
C-130J



319th Reconnaissance Wing
Grand Forks AFB, N.D.
ACC
RQ-4



325th Fighter Wing
Tyndall AFB, Fla.
ACC
F-22



341st Missile Wing
Malmstrom AFB, Mont.
AFGSC
Minuteman III, UH-1N



349th Air Mobility Wing
Travis AFB, Calif.
AFRC
C-5M, C-17, KC-10



352nd Special Operations Wing
RAF Mildenhall, U.K.
AFSOC
MC-130J, CV-22



354th Fighter Wing
Eielson AFB, Alaska
PACAF
F-16C/D



355th Fighter Wing
Davis-Monthan AFB, Ariz.
ACC
A-10, EC-130, F-16, HC-130J, HH-60



363rd Intelligence, Surveillance, and Reconnaissance Wing
JB Langley-Eustis, Va.
ACC
Analysis for air, space and cyber operations, ISR, testing, tactics development



366th Fighter Wing
Mountain Home AFB, Idaho
ACC
F-15E



374th Airlift Wing
Yokota Air Base, Japan
PACAF
C-12J, C-130J, UH-1N



375th Air Mobility Wing
Scott AFB, Ill.
AMC
C-21, C-40, KC-135, NC-21



377th Air Base Wing
Kirtland AFB, N.M.
AFGSC
Base support, nuclear operations, expeditionary force training



388th Fighter Wing
Hill AFB, Utah
ACC
F-35A
F-16C/D



403rd Wing
Keesler AFB, Miss.
AFRC
C-130J, WC-130J



412th Test Wing
Edwards AFB, Calif.
AFTC
Base support, aircraft flying, systems testing, maintenance, engineering, test pilot school



419th Fighter Wing
Hill AFB, Utah
AFRC
F-35A





432nd Wing
Creech AFB, Nev.
ACC
MQ-9, RQ-170



433rd Airlift Wing
JB San Antonio-
Lackland (Kelly Field
Annex), Texas
AFRC
C-5M



434th Air Refueling Wing
Grissom AFB, Ind.
AFRC
KC-135



**435th Air Ground
Operations Wing**
Ramstein Air Base,
Germany
USAFE-AFAFRICA
Expeditionary airfield
operations



436th Airlift Wing
Dover AFB, Del.
AMC
C-5M, C-17



437th Airlift Wing
JB Charleston, S.C.
AMC
C-17



439th Airlift Wing
Westover AFB, Mass.
AFRC
C-5M



442nd Fighter Wing
Whiteman AFB, Mo.
AFRC
A-10C



445th Airlift Wing
Wright-Patterson AFB,
Ohio
AFRC
C-17



446th Airlift Wing
JB Lewis-McChord
(McChord Field), Wash.
AFRC
C-17



**448th Supply Chain
Maintenance Wing**
Tinker AFB, Okla.
AFMC
Supply chain
management and global
logistics



452nd Air Mobility Wing
March ARB, Calif.
AFRC
C-17, KC-135



459th Air Refueling Wing
JB Andrews, Md.
AFRC
KC-135



461st Air Control Wing
Robins AFB, Ga.
ACC
E-8C



480th ISR Wing
JB Langley-Eustis, Va.
ACC
DCGS, ISR, cyber
support/operations for
USAF



482nd Fighter Wing
Homestead AFB, Fla.
AFRC
F-16C



**501st Combat Support
Wing**
RAF Alconbury, U.K.
USAFE-AFAFRICA
Administrative support



502nd Air Base Wing
JB San Antonio-
Sam Houston, Texas
AETC
Installation support



**505th Command &
Control Wing**
Hurlburt Field, Fla.
ACC
Training, tactics,
operations, command/control



507th Air Refueling Wing
Tinker AFB, Okla.
AFRC
KC-135



509th Bomb Wing
Whiteman AFB, Mo.
AFGSC
B-2



512th Airlift Wing
Dover AFB, Del.
AFRC
C-5M, C-17



514th Air Mobility Wing
JB McGuire-Dix-
Lakehurst, N.J.
AFRC
C-17, KC-10



**515th Air Mobility
Operations Wing**
JB Pearl Harbor-
Hickam, Hawaii
AMC
Contingency airfield
operations/logistics



**521st Air Mobility
Operations Wing**
Ramstein Air Base,
Germany
AMC
Contingency airfield
operations/logistics



552nd Air Control Wing
Tinker AFB, Okla.
ACC
E-3



557th Weather Wing
Offutt AFB, Neb.
ACC
*Worldwide weather
information for USAF
and unified combatant
commands*



**621st Contingency Re-
sponse Wing**
JB McGuire-Dix-
Lakehurst, N.J.
AMC
*Air mobility operations,
training, development*



628th Air Base Wing
JB Charleston, S.C.
AMC
*Base support,
administration,
operations*



633rd Air Base Wing
JB Langley-Eustis, Va.
ACC
*Base support,
administration,
operations*



**635th Supply Chain
Operations Wing**
Scott AFB, Ill.
AFMC
*Global supply chain
management*



**655th Intelligence,
Surveillance, and
Reconnaissance Wing**
Wright-Patterson AFB,
Ohio
AFRC
Intelligence operations



673rd Air Base Wing
JB Elmendorf-
Richardson, Alaska
PACAF
*Joint base facilities
support*



688th Cyberspace Wing
JB San Antonio-
Lackland, Texas
ACC
*Cyberspace military
operations, intelligence,
communications*



711th Human Performance Wing
Wright-Patterson AFB, Ohio
AFRL
*Human performance research
in air, space, cyberspace*



908th Airlift Wing
Maxwell AFB, Ala.
AFRC
C-130H



910th Airlift Wing
Youngstown-Warren
Air Reserve Station,
Ohio
AFRC
C-130H



911th Airlift Wing
Pittsburgh Air Reserve
Station, Pa.
AFRC
C-17



914th Air Refueling Wing
Niagara Falls Air
Reserve Station, N.Y.
AFRC
KC-135



916th Air Refueling Wing
Seymour Johnson
AFB, N.C.
AFRC
KC-135





919th Special Operations Wing
Duke Field, Fla.
 AFRC
C-130, C-145A, C-146A, MQ-9, U-28



920th Rescue Wing
Patrick SFB, Fla.
 AFRC
HC-130N, HH-60



926th Wing
Nellis AFB, Nev.
 AFRC
F-16, F-15C/E, F-22, F-35, RQ-4, MQ-9



927th Air Refueling Wing
MacDill AFB, Fla.
 AFRC
KC-135



931st Air Refueling Wing
McCConnell AFB, Kan.
 AFRC
KC-46, KC-135



932nd Airlift Wing
Scott AFB, Ill.
 AFRC
C-40



934th Airlift Wing
Minneapolis-St. Paul Joint Air Reserve Station, Minn.
 AFRC
C-130



940th Air Refueling Wing
Beale AFB, Calif.
 AFRC
KC-135



944th Fighter Wing
Luke AFB, Ariz.
 AFRC
A-10, F-15E, F-16C, F-35A

USAF AIRCRAFT TAIL CODES

- | | | |
|---|---|---|
| <p>AC 177th FW (ANG), Atlantic City Arpt., N.J.
 AF USAF Academy, Colo.
 AK 3rd Wing (PACAF), JB Elmendorf-Richardson, Alaska
 354th FW (PACAF), Eielson AFB, Alaska
 176th Wing (ANG), JB Elmendorf-Richardson, Alaska
 AL 187th FW (ANG), Montgomery Regional Arpt., Ala.
 AP 12th FTW (AETC), NAS Pensacola, Fla.
 AV 31st FW (USAFE), Aviano AB, Italy
 AZ 162nd Wing (ANG), Tucson Arpt., Ariz.
 BB 9th RW (ACC), Beale AFB, Calif.
 Det. 2, 53rd Wing (ACC), Beale AFB, Calif.
 BD 307th BW (AFRC), Barksdale AFB, La.
 CA 129th RQW (ANG), Moffett ANGB, Calif.
 144th FW (ANG), Fresno Yosemite Arpt., Calif.
 163rd ATKW (ANG), March ARB, Calif.
 CB 14th FTW (AETC), Columbus AFB, Miss.
 CH 432nd Wing (ACC), Creech AFB, Nev.
 CO 140th Wing (ANG), Buckley SFB, Colo.
 CT 103rd AW (ANG), Bradley ANGB, Conn.
 D 100th ARW (USAFE), RAF Mildenhall, U.K.
 DC 113th Wing (ANG), JB Andrews, Md.
 DM 355th FW (ACC), Davis-Monthan AFB, Ariz.
 DR 943rd RQG (AFRC), Davis-Monthan AFB, Ariz.
 DY 7th BW (AFGSC), Dyess AFB, Texas
 ED 412th TW (AFMC), Edwards AFB, Calif.
 EG 33rd FW (AETC), Eglin AFB, Fla.
 EL 28th BW (AFGSC), Ellsworth AFB, S.D.
 EN 80th FTW (AETC), Sheppard AFB, Texas
 ET 96th TW (AFMC), Eglin AFB, Fla.
 FC 336th TRG (AETC), Fairchild AFB, Wash.
 FE 90th MW (AFGSC), F. E. Warren AFB, Wyo.
 FF 1st FW (ACC), JB Langley-Eustis, Va.
 192nd FW (ANG), JB Langley-Eustis, Va.
 FL 920th RQW (AFRC), Patrick SFB, Fla.
 FM 482nd FW (AFRC), Homestead ARB, Fla.
 FS 188th Wing (ANG), Fort Smith Arpt., Ark.
 FT 23rd Wing (ACC), Moody AFB, Ga.</p> | <p>GA 116th ACW (ANG), Robins AFB, Ga.
 165th AW (ANG), Savannah Hilton Head Arpt., Ga.
 HD Det. 1, 53rd Wing (ACC), Holloman AFB, N.M.
 HH 15th Wing (PACAF), JB Pearl Harbor-Hickam, Hawaii
 154th Wing (ANG), JB Pearl Harbor-Hickam, Hawaii
 HL 388th FW (ACC), Hill AFB, Utah
 419th FW (AFRC), Hill AFB, Utah
 HO 49th Wing (ACC), Holloman AFB, N.M.
 IA 132nd Wing (ANG), Des Moines Arpt., Iowa
 ID 124th FW (ANG), Boise Air Terminal, Idaho
 IN 122nd FW (ANG), Fort Wayne, Ind.
 JZ 159th FW (ANG), NAS JRB New Orleans, La.
 KC 442nd FW (AFRC), Whiteman AFB, Mo.
 LA 2nd BW (AFGSC), Barksdale AFB, La.
 LF 56th FW (AETC), Luke AFB, Ariz.
 LI 106th RQW (ANG), F. S. Gabreski Arpt., N.Y.
 LN 48th FW (USAFE), RAF Lakenheath, U.K.
 MA 104th FW (ANG), Barnes Arpt., Mass.
 MD 175th Wing (ANG), Warfield ANGB/Martin State Arpt., Md.
 MI 127th Wing (ANG), Selfridge ANGB, Mich.
 MM 341st MW (AFGSC), Malmstrom AFB, Mont.
 MN 133rd AW (ANG), Minn.-St. Paul Arpt./ARS, Minn.
 148th FW (ANG), Duluth Arpt., Minn.
 MO 366th FW (ACC), Mountain Home AFB, Idaho
 MT 5th BW (AFGSC), Minot AFB, N.D.
 91st MW (AFGSC), Minot AFB, N.D.
 NY 174th ATKW (ANG), Hancock Fld., N.Y.
 OF 55th Wing (ACC), Offutt AFB, Neb.
 OH 179th AW (ANG), Mansfield Lahm Arpt., Ohio
 180th FW (ANG), Toledo Express Arpt., Ohio</p> | <p>OK 137th SOW (ANG), Will Rogers ANGB, Okla.
 138th FW (ANG), Tulsa Arpt., Okla.
 552nd ACW (ACC), Tinker AFB, Okla.
 OS 51st FW (PACAF), Osan AB, South Korea
 OT 31st TES (ACC), Edwards AFB, Calif.
 49th TES (ACC), Barksdale AFB, La.
 53rd Wing (ACC), Eglin AFB, Fla.
 88th TES (ACC), Nellis AFB, Nev.
 337th TES (ACC), Dyess AFB, Texas
 422nd TES (ACC), Nellis AFB, Nev.
 556th TES (ACC), Creech AFB, Nev.
 Det. 4, 53rd Wing (ACC), Creech AFB, Nev.
 RA 12th FTW (AETC), JBSA-Randolph, Texas
 RS 86th AW (USAFE), Ramstein AB, Germany
 SA 149th FW (ANG), JBSA-Lackland, Texas
 SC 169th FW (ANG), McEntire JNGB, S.C.
 SD 114th FW (ANG), Joe Foss Fld., S.D.
 SJ 4th FW (ACC), Seymour Johnson AFB, N.C.
 SP 52nd FW (USAFE), Spangdahlem AB, Germany
 SW 20th FW (ACC), Shaw AFB, S.C.
 TD 53rd WEG (ACC), Tyndall AFB, Fla.
 TX 147th ATKW (ANG), Ellington Fld., Texas
 301st FW (AFRC), NAS Fort Worth JRB, Texas
 TY 325th FW (ACC), Tyndall AFB, Fla.
 VN 71st FTW (AETC), Vance AFB, Okla.
 WA 57th Wing (ACC), Nellis AFB, Nev.
 WI 115th FW (ANG), Truax Fld., Wis.
 WM 72nd TES (AFGSC), Whiteman AFB, Mo.
 509th BW (AFGSC), Whiteman AFB, Mo.
 WP 8th FW (PACAF), Kunsan AB, South Korea
 WV 130th AW (ANG), Yeager Arpt., W.Va.
 WW 35th FW (PACAF), Misawa AB, Japan
 XL 47th FTW (AETC), Laughlin AFB, Texas
 YJ 374th AW (PACAF), Yokota AB, Japan
 ZZ 18th Wing (PACAF), Kadena AB, Japan</p> |
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W. Stuart Symington, left, first Secretary of the U.S. Air Force and Gen. Carl Spaatz, first Air Force Chief of Staff, at a press conference announcing the new organizational set-up for the new Department of the Air Force in 1947.

AIR FORCE LEADERS THROUGH THE YEARS

USAF

The Nation's Air Arm and Its Early Leaders

DESIGNATION	COMMANDER	DATES OF SERVICE	
AERONAUTICAL DIVISION, US SIGNAL CORPS Aug. 1, 1907 - July 18, 1914			
Chief, Aeronautical Division	Capt. Charles deForest Chandler	Aug. 1, 1907	June 30, 1910
	Capt. Arthur S. Cowan	July 1, 1910	June 19, 1911
	Capt. Charles deForest Chandler	June 20, 1911	Sept. 9, 1913
	Maj. Samuel Reber	Sept. 10, 1913	July 17, 1914
AVIATION SECTION, US SIGNAL CORPS^a July 18, 1914 - May 20, 1918			
Chief, Aviation Section	Lt. Col. Samuel Reber	July 18, 1914	May 5, 1916
	Lt. Col. George O. Squier	May 20, 1916	Feb. 19, 1917
	Lt. Col. John B. Bennet	Feb. 19, 1917	June 30, 1917
	Maj. Benjamin D. Foulois	June 30, 1917	Nov. 12, 1917
	Brig. Gen. Arthur I. Dade	Nov. 12, 1917	Feb. 27, 1918
	Col. Lawrence Brown	Feb. 27, 1918	May 20, 1918
DIVISION OF MILITARY AERONAUTICS, SECRETARY OF WAR May 20, 1918 - May 24, 1918			
Director of Military Aeronautics	Maj. Gen. William L. Kenly (Kept same title three months into absorption by Air Service)	May 20, 1918	August 1918
AIR SERVICE May 24, 1918 - July 2, 1926			
Director of Air Service	John D. Ryan	Aug. 28, 1918	Nov. 27, 1918
	Maj. Gen. Charles T. Menoher	Jan. 2, 1919	June 4, 1920
Chief of Air Service	Maj. Gen. Charles T. Menoher	June 4, 1920	Oct. 4, 1921
	Maj. Gen. Mason M. Patrick	Oct. 5, 1921	July 2, 1926
AIR CORPS^b July 2, 1926 - Sept. 18, 1947			
Chief of Air Corps	Maj. Gen. Mason M. Patrick	July 2, 1926	Dec. 13, 1927
	Maj. Gen. James E. Fechet	Dec. 14, 1927	Dec. 19, 1931
	Maj. Gen. Benjamin D. Foulois	Dec. 20, 1931	Dec. 21, 1935
	Maj. Gen. Oscar Westover	Dec. 22, 1935	Sept. 21, 1938
	Maj. Gen. Henry H. Arnold	Sept. 29, 1938	June 20, 1941
ARMY AIR FORCES (AAF) June 20, 1941 - Sept. 18, 1947			
Chief, Army Air Forces	Lt. Gen. Henry H. Arnold	June 20, 1941	March 9, 1942
Commanding General, AAF	Gen. of the Army Henry H. Arnold ^c	March 9, 1942	Feb. 9, 1946
	Gen. Carl A. Spaatz	Feb. 9, 1946	Sept. 26, 1947
UNITED STATES AIR FORCE^d Sept. 18, 1947			
Chief of Staff	Gen. Carl A. Spaatz	Sept. 26, 1947	April 29, 1948

^a Between April 1917 and May 1918, the Aviation Section was known by various other names: Aeronautical Division, Airplane Division, Air Division, and Air Service Division.

^b The Air Corps became a subordinate element of the Army Air Forces June 20, 1941. Since the Air Corps had been established by statute in 1926, its disestablishment required an act of Congress, which did not take place until 1947. Between March 9, 1942, and Sept. 18, 1947, the Air Corps continued to exist as a combatant arm, and personnel of the Army Air Forces were still assigned to the Air Corps.

^c The title General of the Army for Henry H. Arnold was changed to General of the Air Force by an act of Congress May 7, 1949. The position of Chief of Staff was established by a DOD-approved Army-Air Force Transfer Order issued Sept. 28, 1947.

^d For U.S. Space Force lineage, see p. 75.



Air Force Leaders

SECRETARY OF THE AIR FORCE

Stuart Symington	Sept. 18, 1947	April 24, 1950	Donald B. Rice	May 22, 1989	Jan. 20, 1993
Thomas K. Finletter	April 24, 1950	Jan. 20, 1953	Michael B. Donley (acting)	Jan. 20, 1993	July 13, 1993
Harold E. Talbott	Feb. 4, 1953	Aug. 13, 1955	Gen. Merrill A. McPeak (acting)	July 14, 1993	Aug. 5, 1993
Donald A. Quarles	Aug. 15, 1955	April 30, 1957	Sheila E. Widnall	Aug. 6, 1993	Oct. 31, 1997
James H. Douglas Jr.	May 1, 1957	Dec. 10, 1959	F. Whitten Peters*	Nov. 1, 1997	Jan. 20, 2001
Dudley C. Sharp	Dec. 11, 1959	Jan. 20, 1961	Lawrence J. Delaney (acting)	Jan. 20, 2001	June 1, 2001
Eugene M. Zuckert	Jan. 23, 1961	Sept. 30, 1965	James G. Roche	June 1, 2001	Jan. 20, 2005
Harold Brown	Oct. 1, 1965	Feb. 14, 1969	Peter B. Teets (acting)	Jan. 20, 2005	March 25, 2005
Robert C. Seamans Jr.	Feb. 15, 1969	May 14, 1973	Michael L. Dominguez (acting)	March 25, 2005	July 29, 2005
John L. McLucas*	May 15, 1973	Nov. 23, 1975	Preston M. Geren (acting)	July 29, 2005	Nov. 3, 2005
James W. Plummer (acting)	Nov. 23, 1975	Jan. 2, 1976	Michael W. Wynne	Nov. 3, 2005	June 20, 2008
Thomas C. Reed	Jan. 2, 1976	April 6, 1977	Michael B. Donley*	June 21, 2008	June 21, 2013
John C. Stetson	April 6, 1977	May 18, 1979	Eric K. Fanning (acting)	June 21, 2013	Dec. 20, 2013
Hans M. Mark*	May 18, 1979	Feb. 9, 1981	Deborah Lee James	Dec. 20, 2013	Jan. 19, 2017
Verne Orr	Feb. 9, 1981	Nov. 30, 1985	Lisa S. Disbrow (acting)	Jan. 20, 2017	May 16, 2017
Russell A. Rourke	Dec. 6, 1985	April 7, 1986	Heather A. Wilson	May 16, 2017	May 31, 2019
Edward C. Aldridge Jr.*	April 8, 1986	Dec. 16, 1988	Matthew P. Donovan (acting)	June 1, 2019	Oct. 16, 2019
James F. McGovern (acting)	Dec. 16, 1988	April 29, 1989	Barbara M. Barrett	Oct. 16, 2019	Jan. 20, 2021
John J. Welch Jr. (acting)	April 29, 1989	May 21, 1989	John P. Roth (acting)	Jan. 20, 2021	July 28, 2021
			Frank Kendall III	July 28, 2021	

*Served as acting Secretary: McLucas until July 18, 1973; Mark until July 26, 1979; Aldridge until June 9, 1986; Peters until July 30, 1999; Donley until Oct. 17, 2008.

CHIEF OF STAFF OF THE AIR FORCE

Gen. Carl A. Spaatz	Sept. 26, 1947	April 29, 1948	Gen. John Michael Loh (acting)	Sept. 18, 1990	Oct. 27, 1990
Gen. Hoyt S. Vandenberg	April 30, 1948	June 29, 1953	Gen. Merrill A. McPeak	Oct. 27, 1990	Oct. 25, 1994
Gen. Nathan F. Twining	June 30, 1953	June 30, 1957	Gen. Ronald R. Fogleman	Oct. 25, 1994	Sept. 1, 1997
Gen. Thomas D. White	July 1, 1957	June 30, 1961	Gen. Ralph E. Eberhart (acting)	Sept. 1, 1997	Oct. 6, 1997
Gen. Curtis E. LeMay	June 30, 1961	Jan. 31, 1965	Gen. Michael E. Ryan	Oct. 6, 1997	Sept. 6, 2001
Gen. John P. McConnell	Feb. 1, 1965	July 31, 1969	Gen. John P. Jumper	Sept. 6, 2001	Sept. 2, 2005
Gen. John D. Ryan	Aug. 1, 1969	July 31, 1973	Gen. T. Michael Moseley	Sept. 2, 2005	July 12, 2008
Gen. George S. Brown	Aug. 1, 1973	June 30, 1974	Gen. Duncan J. McNabb (acting)	July 12, 2008	Aug. 12, 2008
Gen. David C. Jones	July 1, 1974	June 20, 1978	Gen. Norton A. Schwartz	Aug. 12, 2008	Aug. 10, 2012
Gen. Lew Allen Jr.	July 1, 1978	June 30, 1982	Gen. Mark A. Welsh III	Aug. 10, 2012	July 1, 2016
Gen. Charles A. Gabriel	July 1, 1982	June 30, 1986	Gen. David L. Goldfein*	July 1, 2016	Aug. 6, 2020
Gen. Larry D. Welch	July 1, 1986	June 30, 1990	Gen. Charles Q. Brown Jr.	Aug. 6, 2020	
Gen. Michael J. Dugan	July 1, 1990	Sept. 17, 1990			

*Gen. Charles Q. Brown Jr. was confirmed to be USAF Chief of Staff on June 9, 2020.

VICE CHIEF OF STAFF OF THE AIR FORCE

Gen. Hoyt S. Vandenberg	Oct. 10, 1947	April 28, 1948	Gen. Lawrence A. Skantze	Oct. 6, 1983	July 31, 1984
Gen. Muir S. Fairchild	May 27, 1948	March 17, 1950	Gen. Larry D. Welch	Aug. 1, 1984	July 31, 1985
Lt. Gen. Lauris Norstad (acting)	May 22, 1950	Oct. 9, 1950	Gen. John L. Piotrowski	Aug. 1, 1985	Jan. 31, 1987
Gen. Nathan F. Twining	Oct. 10, 1950	June 29, 1953	Gen. Monroe W. Hatch Jr.	Feb. 1, 1987	May 24, 1990
Gen. Thomas D. White	June 30, 1953	June 30, 1957	Gen. John Michael Loh	May 25, 1990	March 25, 1991
Gen. Curtis E. LeMay	July 1, 1957	June 30, 1961	Gen. Michael P. C. Carns	May 16, 1991	July 28, 1994
Gen. Frederic H. Smith Jr.	July 1, 1961	June 30, 1962	Gen. Thomas S. Moorman Jr.	July 29, 1994	July 11, 1997
Gen. William F. McKee	July 1, 1962	July 31, 1964	Gen. Ralph E. Eberhart	July 11, 1997	May 26, 1999
Gen. John P. McConnell	Aug. 1, 1964	Jan. 31, 1965	Gen. Lester L. Lyles	May 27, 1999	April 17, 2000
Gen. William H. Blanchard	Feb. 19, 1965	May 31, 1966	Gen. John W. Handy	April 17, 2000	Nov. 5, 2001
Lt. Gen. Hewitt T. Wheless (acting)	June 13, 1966	July 31, 1966	Gen. Robert H. Foglesong	Nov. 5, 2001	Aug. 11, 2003
Gen. Bruce K. Holloway	Aug. 1, 1966	July 31, 1968	Gen. T. Michael Moseley	Aug. 12, 2003	Sept. 2, 2005
Gen. John D. Ryan	Aug. 1, 1968	July 31, 1969	Gen. John D. W. Corley	Sept. 2, 2005	Sept. 17, 2007
Gen. John C. Meyer	Aug. 1, 1969	April 30, 1972	Gen. Duncan J. McNabb	Sept. 17, 2007	Sept. 4, 2008
Gen. Horace M. Wade	May 1, 1972	Oct. 31, 1973	Gen. William M. Fraser III	Oct. 8, 2008	Aug. 27, 2009
Gen. Richard H. Ellis	Nov. 1, 1973	Aug. 18, 1975	Gen. Carrol H. Chandler	Aug. 27, 2009	Jan. 14, 2011
Gen. William V. McBride	Sept. 1, 1975	March 31, 1978	Gen. Philip M. Breedlove	Jan. 14, 2011	July 27, 2012
Gen. Lew Allen Jr.	April 1, 1978	June 30, 1978	Gen. Larry O. Spencer	July 27, 2012	Aug. 6, 2015
Gen. James A. Hill	July 1, 1978	Feb. 29, 1980	Gen. David L. Goldfein	Aug. 6, 2015	July 1, 2016
Gen. Robert C. Mathis	March 1, 1980	May 31, 1982	Gen. Stephen W. Wilson	July 22, 2016	Nov. 16, 2020
Gen. Jerome F. O'Malley	June 1, 1982	Oct. 5, 1983	Gen. David W. Allvin	Nov. 16, 2020	

CHIEF MASTER SERGEANT OF THE AIR FORCE

CMSAF Paul W. Airey	April 3, 1967	July 31, 1969	CMSAF David J. Campanale	Oct. 26, 1994	Nov. 4, 1996
CMSAF Donald L. Harlow	Aug. 1, 1969	Sept. 30, 1971	CMSAF Eric W. Benken	Nov. 5, 1996	July 30, 1999
CMSAF Richard D. Kisling	Oct. 1, 1971	Sept. 30, 1973	CMSAF Frederick J. Finch	July 30, 1999	July 1, 2002
CMSAF Thomas N. Barnes	Oct. 1, 1973	July 31, 1977	CMSAF Gerald R. Murray	July 1, 2002	June 30, 2006
CMSAF Robert D. Gaylor	Aug. 1, 1977	July 31, 1979	CMSAF Rodney J. McKinley	June 30, 2006	June 30, 2009
CMSAF James M. McCoy	Aug. 1, 1979	July 31, 1981	CMSAF James A. Roy	June 30, 2009	Jan. 24, 2013
CMSAF Arthur L. Andrews	Aug. 1, 1981	July 31, 1983	CMSAF James A. Cody	Jan. 24, 2013	Feb. 17, 2017
CMSAF Sam E. Parish	Aug. 1, 1983	June 30, 1986	CMSAF Kaleth O. Wright	Feb. 17, 2017	Aug. 14, 2020
CMSAF James C. Binnicker	July 1, 1986	July 31, 1990	CMSAF JoAnne S. Bass	Aug. 14, 2020	
CMSAF Gary R. Pflugston	Aug. 1, 1990	Oct. 25, 1994			



MAJOR COMMAND AND ANG LEADERS

This section presents the leaders of USAF's Major Commands and the Air National Guard (ANG) under a command's current designation. **Leaders of historic Air Force major commands (and of active commands' previous designations) are listed online.**

AIR COMBAT COMMAND		
Gen. John Michael Loh	June 1, 1992	June 23, 1995
Gen. Joseph W. Ralston	June 23, 1995	Feb. 28, 1996
Lt. Gen. Brett M. Dula (acting)	Feb. 28, 1996	April 5, 1996
Gen. Richard E. Hawley	April 5, 1996	June 11, 1999
Gen. Ralph E. Eberhart	June 11, 1999	Feb. 8, 2000
Gen. John P. Jumper	Feb. 8, 2000	Aug. 25, 2001
Lt. Gen. Donald G. Cook (acting)	Aug. 25, 2001	Nov. 14, 2001
Gen. Hal M. Hornburg	Nov. 14, 2001	Nov. 17, 2004
Lt. Gen. Bruce A. Wright (acting)	Nov. 17, 2004	Feb. 3, 2005
Lt. Gen. William Fraser III (acting)	Feb. 3, 2005	May 27, 2005
Gen. Ronald E. Keys	May 27, 2005	Oct. 2, 2007
Gen. John D. W. Corley	Oct. 2, 2007	Sept. 10, 2009
Gen. William M. Fraser III	Sept. 10, 2009	Sept. 13, 2011
Gen. Gilmory Michael Hostage III	Sept. 13, 2011	Nov. 4, 2014
Gen. Herbert J. Carlisle	Nov. 4, 2014	March 10, 2017
Gen. James M. Holmes	March 10, 2017	Aug. 28, 2020
Gen. Mark D. Kelly	Aug. 28, 2020	

For past leaders, see Tactical Air Command in Historic Major Command Leaders.

AIR EDUCATION AND TRAINING COMMAND		
Gen. Henry Viccellio Jr.	July 1, 1993	June 20, 1995
Gen. Billy J. Boles	June 20, 1995	March 17, 1997
Gen. Lloyd W. Newton	March 17, 1997	June 22, 2000
Gen. Hal M. Hornburg	June 22, 2000	Nov. 10, 2001
Lt. Gen. John D. Hopper Jr. (acting)	Nov. 10, 2001	Dec. 15, 2001
Gen. Donald G. Cook	Dec. 15, 2001	June 17, 2005
Gen. William R. Looney III	June 17, 2005	July 2, 2008
Gen. Stephen R. Lorenz	July 2, 2008	Nov. 17, 2010
Gen. Edward A. Rice Jr.	Nov. 17, 2010	Oct. 10, 2013
Gen. Robin Rand	Oct. 10, 2013	July 21, 2015
Lt. Gen. Darryl L. Roberson	July 21, 2015	Nov. 16, 2017
Lt. Gen. Steven L. Kwast	Nov. 16, 2017	July 26, 2019
Lt. Gen. Marshall B. Webb	July 26, 2019	

For past leaders see Air Training Command in Historic Major Command Leaders.

AIR FORCE GLOBAL STRIKE COMMAND		
Lt. Gen. Frank G. Klotz	Aug. 7, 2009	Jan. 6, 2011
Lt. Gen. James M. Kowalski	Jan. 6, 2011	Oct. 23, 2013
Lt. Gen. Stephen W. Wilson	Oct. 23, 2013	July 28, 2015
Gen. Robin Rand	July 28, 2015	Aug. 21, 2018
Gen. Timothy M. Ray	Aug. 21, 2018	Aug. 27, 2021
Gen. Anthony J. Cotton	Aug. 27, 2021	

For past leaders, see Strategic Air Command in Historic Major Command leaders.

AIR FORCE MATERIEL COMMAND		
Gen. Ronald W. Yates	July 1, 1992	June 30, 1995
Gen. Henry Viccellio Jr.	June 30, 1995	May 9, 1997
Lt. Gen. Kenneth Eickmann (acting)	May 9, 1997	May 29, 1997
Gen. George T. Babbitt Jr.	May 29, 1997	April 20, 2000
Gen. Lester L. Lyles	April 20, 2000	Aug. 22, 2003
Gen. Gregory S. Martin	Aug. 22, 2003	Aug. 19, 2005
Gen. Bruce Carlson	Aug. 19, 2005	Nov. 21, 2008
Gen. Donald J. Hoffman	Nov. 21, 2008	June 5, 2012
Gen. Janet C. Wolfenbarger	June 5, 2012	June 8, 2015
Gen. Ellen M. Pawlikowski	June 8, 2015	Sept. 1, 2018
Lt. Gen. Robert D. McMurry Jr. (interim)	Sept. 1, 2018	May 31, 2019
Gen. Arnold W. Bunch Jr.	May 31, 2019	June 13, 2022
Lt. Gen. Duke Z. Richardson	June 13, 2022	

AIR FORCE RESERVE COMMAND		
Maj. Gen. Robert A. McIntosh	Feb. 17, 1997	June 9, 1998
Maj. Gen. David R. Smith (acting)	June 9, 1998	Sept. 25, 1998
Lt. Gen. James E. Sherrard III	Sept. 25, 1998	June 1, 2004

Maj. Gen. J. J. Batbie Jr. (acting)	June 1, 2004	June 24, 2004
Lt. Gen. John A. Bradley	June 24, 2004	June 24, 2008
Lt. Gen. Charles E. Stenner Jr.	June 24, 2008	July 30, 2012
Lt. Gen. James F. Jackson	July 30, 2012	July 15, 2016
Lt. Gen. Maryanne Miller	July 15, 2016	Sept. 7, 2018
Lt. Gen. Richard W. Scobee	Sept. 7, 2018	

For past leaders, see Air Force Reserve in Historic Major Command Leaders.

AIR FORCE SPECIAL OPERATIONS COMMAND		
Maj. Gen. Thomas E. Eggers	May 22, 1990	June 30, 1991
Maj. Gen. Bruce L. Fister	June 30, 1991	July 22, 1994
Maj. Gen. James L. Hobson Jr.	July 22, 1994	July 9, 1997
Maj. Gen. Charles R. Holland	July 9, 1997	Aug. 5, 1999
Lt. Gen. Maxwell C. Bailey	Aug. 5, 1999	Jan. 16, 2002
Lt. Gen. Paul V. Hester	Jan. 16, 2002	July 1, 2004
Lt. Gen. Michael W. Wooley	July 1, 2004	Nov. 27, 2007
Lt. Gen. Donald C. Wurster	Nov. 27, 2007	June 24, 2011
Lt. Gen. Eric E. Fiel	June 24, 2011	July 3, 2014
Lt. Gen. Bradley A. Heithold	July 3, 2014	July 19, 2016
Lt. Gen. Marshall B. Webb	July 19, 2016	May 31, 2019
Lt. Gen. James C. Slife	June 1, 2019	

On Dec. 20, 2019, Air Force Space Command was redesignated U.S. Space Force, and Gen. John W. Raymond became Chief of Space Operations, USSF.

AIR MOBILITY COMMAND		
Gen. Hansford T. Johnson	June 1, 1992	Aug. 25, 1992
Gen. Ronald R. Fogleman	Aug. 25, 1992	Oct. 18, 1994
Gen. Robert L. Rutherford	Oct. 18, 1994	July 15, 1996
Gen. Walter Kross	July 15, 1996	Aug. 3, 1998
Gen. Charles T. Robertson Jr.	Aug. 3, 1998	Nov. 5, 2001
Gen. John W. Handy	Nov. 5, 2001	Sept. 7, 2005
Lt. Gen. Christopher Kelly (acting)	Sept. 7, 2005	Oct. 14, 2005
Gen. Duncan J. McNabb	Oct. 14, 2005	Sept. 7, 2007
Gen. Arthur J. Lichte	Sept. 7, 2007	Nov. 20, 2009
Gen. Raymond E. Johns Jr.	Nov. 20, 2009	Nov. 30, 2012
Gen. Paul J. Selva	Nov. 30, 2012	May 5, 2014
Gen. Darren W. McDew	May 5, 2014	Aug. 11, 2015
Gen. Carlton D. Everhart II	Aug. 11, 2015	Sept. 7, 2018
Gen. Maryanne Miller	Sept. 7, 2018	Aug. 20, 2020
Gen. Jacqueline D. Van Ovost	Aug. 20, 2020	Oct. 5, 2021
Gen. Michael A. Minihan	Oct. 5, 2021	

For past leaders, see Military Airlift Command in Historic Major Command Leaders.

AIR NATIONAL GUARD		
Col. William A. R. Robertson	Nov. 28, 1945	October 1948
Maj. Gen. George G. Finch	October 1948	Sept. 25, 1950
Maj. Gen. Earl T. Ricks	Oct. 13, 1950	Jan. 4, 1954
Maj. Gen. Winston P. Wilson	Jan. 26, 1954	Aug. 5, 1962
Maj. Gen. I. G. Brown	Aug. 6, 1962	April 19, 1974
Maj. Gen. John J. Pesch	April 20, 1974	Jan. 31, 1977
Maj. Gen. John T. Guice	Feb. 1, 1977	April 1, 1981
Maj. Gen. John B. Conaway	April 1, 1981	Nov. 1, 1988
Maj. Gen. Philip G. Killey	Nov. 1, 1988	Jan. 28, 1994
Maj. Gen. Donald W. Shepperd	Jan. 28, 1994	Jan. 28, 1998
Maj. Gen. Paul A. Weaver Jr.	Jan. 28, 1998	Dec. 3, 2001
Brig. Gen. David Brubaker (acting)	Dec. 3, 2001	June 3, 2002
Lt. Gen. Daniel James III	June 3, 2002	May 20, 2006
Lt. Gen. Craig R. McKinley	May 20, 2006	Nov. 17, 2008
Maj. Gen. Emmett Titshaw (acting)	Nov. 17, 2008	Feb. 2, 2009
Lt. Gen. Harry M. Wyatt III	Feb. 2, 2009	March 22, 2013
Lt. Gen. Stanley E. Clarke III	March 22, 2013	Dec. 18, 2015
Maj. Gen. Brian G. Neal (acting)	Dec. 18, 2015	May 10, 2016
Lt. Gen. L. Scott Rice	May 10, 2016	July 28, 2020
Lt. Gen. Michael A. Loh	July 28, 2020	



MAJOR COMMAND AND ANG LEADERS (continued)

PACIFIC AIR FORCES

Gen. Laurence S. Kuter	July 1, 1957	Aug. 1, 1959
Gen. Emmett O'Donnell Jr.	Aug. 1, 1959	Aug. 1, 1963
Gen. Jacob E. Smart	Aug. 1, 1963	Aug. 1, 1964
Gen. Hunter Harris Jr.	Aug. 1, 1964	Feb. 1, 1967
Gen. John D. Ryan	Feb. 1, 1967	Aug. 1, 1968
Gen. Joseph J. Nazzaro	Aug. 1, 1968	Aug. 1, 1971
Gen. Lucius D. Clay Jr.	Aug. 1, 1971	Oct. 1, 1973
Gen. John W. Vogt Jr.	Oct. 1, 1973	July 1, 1974
Gen. Louis L. Wilson Jr.	July 1, 1974	June 3, 1977
Lt. Gen. James A. Hill	June 3, 1977	June 15, 1978
Lt. Gen. James D. Hughes	June 15, 1978	June 8, 1981
Lt. Gen. Arnold W. Braswell	June 8, 1981	Oct. 8, 1983
Gen. Jerome F. O'Malley	Oct. 8, 1983	Sept. 25, 1984
Gen. Robert W. Bazley	Sept. 25, 1984	Dec. 16, 1986
Gen. Jack I. Gregory	Dec. 16, 1986	July 22, 1988
Gen. Merrill A. McPeak	July 22, 1988	Nov. 5, 1990
Lt. Gen. James B. Davis	Nov. 5, 1990	Feb. 19, 1991
Gen. Jimmie V. Adams	Feb. 19, 1991	Jan. 22, 1993
Gen. Robert L. Rutherford	Jan. 22, 1993	Oct. 12, 1994
Gen. John G. Lorber	Oct. 12, 1994	July 7, 1997
Gen. Richard B. Myers	July 7, 1997	July 23, 1998
Gen. Patrick K. Gamble	July 23, 1998	April 9, 2001
Lt. Gen. Lansford E. Trapp (acting)	April 9, 2001	May 4, 2001
Gen. William J. Begert	May 4, 2001	July 2, 2004
Gen. Paul V. Hester	July 2, 2004	Nov. 30, 2007
Gen. Carrol H. Chandler	Nov. 30, 2007	Aug. 19, 2009
Gen. Gary L. North	Aug. 19, 2009	Aug. 3, 2012
Gen. Herbert J. Carlisle	Aug. 3, 2012	Oct. 16, 2014
Gen. Lori J. Robinson	Oct. 16, 2014	May 11, 2016
Lt. Gen. Russell J. Handy (acting)	May 11, 2016	July 12, 2016
Gen. Terrence J. O'Shaughnessy	July 12, 2016	May 20, 2018
Lt. Gen. Jerry P. Martinez (acting)	May 20, 2018	July 26, 2018
Gen. Charles Q. Brown Jr.	July 26, 2018	July 8, 2020
Gen. Kenneth S. Wilsbach	July 8, 2020	

*For past leaders, see Far East Air Forces in Historic Major Command Leaders.

U.S. AIR FORCES IN EUROPE-AIR FORCES AFRICA

Lt. Gen. John K. Cannon	Aug. 7, 1945	Aug. 14, 1947
Brig. Gen. John F. McBlain (acting)	Aug. 14, 1947	Oct. 20, 1947



Gen. Jerome O'Malley, then Commander in Chief of Pacific Air Forces (CINCPACAF), inspects the cockpit of an F-16 Fighting Falcon. O'Malley served as chief in the mid 1980s.



Staff Sgt. Jerry Freshman

Gen. Mark Welsh, then U.S. Air Forces in Europe (USAFE) commander, left, with Chief Master Sgt. David Williamson during an all-call at RAF Mildenhall in 2011. Welsh went on to become U.S. Air Force Chief of Staff in 2012.

Lt. Gen. Curtis E. LeMay	Oct. 20, 1947	Oct. 16, 1948
Lt. Gen. John K. Cannon	Oct. 16, 1948	Jan. 21, 1951
Gen. Lauris Norstad	Jan. 21, 1951	July 27, 1953
Lt. Gen. William H. Tunner	July 27, 1953	July 1, 1957
Gen. Frank F. Everest	July 1, 1957	Aug. 1, 1959
Gen. Frederic H. Smith Jr.	Aug. 1, 1959	July 1, 1961
Gen. Truman H. Landon	July 1, 1961	Aug. 1, 1963
Gen. Gabriel P. Disosway	Aug. 1, 1963	Aug. 1, 1965
Gen. Bruce K. Holloway	Aug. 1, 1965	Aug. 1, 1966
Gen. Maurice A. Preston	Aug. 1, 1966	Aug. 1, 1968
Gen. Horace M. Wade	Aug. 1, 1968	Aug. 1, 1969
Gen. Joseph R. Holzapple	Feb. 1, 1969	Sept. 1, 1971
Gen. David C. Jones	Sept. 1, 1971	July 1, 1974
Gen. John W. Vogt	July 1, 1974	Sept. 1, 1975
Gen. Richard H. Ellis	Sept. 1, 1975	Aug. 1, 1977
Gen. William J. Evans	Aug. 1, 1977	Aug. 1, 1978
Gen. John W. Pauly	Aug. 1, 1978	Aug. 1, 1980
Gen. Charles A. Gabriel	Aug. 1, 1980	June 30, 1982
Gen. Billy M. Minter	July 1, 1982	Nov. 1, 1984
Gen. Charles L. Donnelly Jr.	Nov. 1, 1984	May 1, 1987
Gen. William L. Kirk	May 1, 1987	April 12, 1989
Gen. Michael J. Dugan	April 12, 1989	June 26, 1990
Gen. Robert C. Oaks	June 26, 1990	July 29, 1994
Gen. James L. Jamerson	July 29, 1994	July 17, 1995
Gen. Richard E. Hawley	July 17, 1995	April 4, 1996
Gen. Michael E. Ryan	April 4, 1996	Oct. 6, 1997
Lt. Gen. William J. Begert (acting)	Oct. 6, 1997	Dec. 5, 1997
Gen. John P. Jumper	Dec. 5, 1997	Jan. 13, 2000
Gen. Gregory S. Martin	Jan. 13, 2000	Aug. 12, 2003
Gen. Robert H. Foglesong	Aug. 12, 2003	Dec. 6, 2005
Gen. William T. Hobbins	Dec. 6, 2005	Dec. 10, 2007
Lt. Gen. Robert D. Bishop Jr. (acting)	Dec. 10, 2007	Jan. 9, 2008
Gen. Roger A. Brady	Jan. 9, 2008	Dec. 13, 2010
Gen. Mark A. Welsh III	Dec. 13, 2010	July 31, 2012
Gen. Phillip M. Breedlove	July 31, 2012	May 10, 2013
Lt. Gen. Noel T. Jones (acting)	May 10, 2013	Aug. 2, 2013
Gen. Frank Gorenc	Aug. 2, 2013	Aug. 11, 2016
Gen. Tod D. Wolters	Aug. 11, 2016	May 1, 2019
Gen. Jeffrey L. Harrigian	May 1, 2019	

For past leaders, see U.S. Strategic Air Forces in Europe in Historic Major Command Leaders.



HEADQUARTERS DOD LEADERS

SECRETARY OF DEFENSE					
James V. Forrestal	Sept. 17, 1947	March 28, 1949	Frank C. Carlucci	Nov. 23, 1987	Jan. 20, 1989
Louis A. Johnson	March 28, 1949	Sept. 19, 1950	Richard B. Cheney	March 21, 1989	Jan. 20, 1993
George C. Marshall	Sept. 21, 1950	Sept. 12, 1951	Les Aspin	Jan. 21, 1993	Feb. 3, 1994
Robert A. Lovett	Sept. 17, 1951	Jan. 20, 1953	William J. Perry	Feb. 3, 1994	Jan. 23, 1997
Charles E. Wilson	Jan. 28, 1953	Oct. 8, 1957	William S. Cohen	Jan. 24, 1997	Jan. 20, 2001
Neil H. McElroy	Oct. 9, 1957	Dec. 1, 1959	Donald H. Rumsfeld	Jan. 20, 2001	Dec. 18, 2006
Thomas S. Gates	Dec. 2, 1959	Jan. 20, 1961	Robert M. Gates	Dec. 18, 2006	July 1, 2011
Robert S. McNamara	Jan. 21, 1961	Feb. 29, 1968	Leon E. Panetta	July 1, 2011	Feb. 27, 2013
Clark M. Clifford	March 1, 1968	Jan. 20, 1969	Chuck Hagel	Feb. 27, 2013	Feb. 17, 2015
Melvin R. Laird	Jan. 22, 1969	Jan. 29, 1973	Ashton B. Carter	Feb. 17, 2015	Jan. 19, 2017
Elliot L. Richardson	Jan. 30, 1973	May 24, 1973	James N. Mattis	Jan. 20, 2017	Dec. 31, 2018
James R. Schlesinger	July 2, 1973	Nov. 19, 1975	Patrick M. Shanahan (acting)	Jan. 1, 2019	June 24, 2019
Donald H. Rumsfeld	Nov. 20, 1975	Jan. 20, 1977	Mark T. Esper	July 23, 2019	Nov. 9, 2020
Harold Brown	Jan. 21, 1977	Jan. 20, 1981	Lloyd J. Austin III	Jan. 22, 2021	
Caspar W. Weinberger	Jan. 21, 1981	Nov. 23, 1987			

CHAIRMAN OF THE JOINT CHIEFS OF STAFF					
Gen. of the Army Omar N. Bradley	Aug. 16, 1949	Aug. 15, 1953	Gen. Colin L. Powell, USA	Oct. 1, 1989	Sept. 30, 1993
Adm. Arthur W. Radford, USN	Aug. 15, 1953	Aug. 15, 1957	Adm. David Jeremiah, USN (acting)	Oct. 1, 1993	Oct. 24, 1993
Gen. Nathan F. Twining, USAF	Aug. 15, 1957	Sept. 30, 1960	Gen. John M. Shalikashvili, USA	Oct. 25, 1993	Sept. 30, 1997
Gen. Lyman L. Lemnitzer, USA	Oct. 1, 1960	Sept. 30, 1962	Gen. Henry H. Shelton, USA	Oct. 1, 1997	Oct. 1, 2001
Gen. Maxwell D. Taylor, USA	Oct. 1, 1962	July 1, 1964	Gen. Richard B. Myers, USAF	Oct. 1, 2001	Sept. 30, 2005
Gen. Earle G. Wheeler, USA	July 3, 1964	July 2, 1970	Gen. Peter Pace, USMC	Sept. 30, 2005	Oct. 1, 2007
Adm. Thomas H. Moorer, USN	July 2, 1970	July 1, 1974	Adm. Michael G. Mullen, USN	Oct. 1, 2007	Sept. 30, 2011
Gen. George S. Brown, USAF	July 1, 1974	June 20, 1978	Gen. Martin E. Dempsey, USA	Sept. 30, 2011	Sept. 25, 2015
Gen. David C. Jones, USAF	June 21, 1978	June 18, 1982	Gen. Joseph F. Dunford Jr., USMC	Sept. 25, 2015	Sept. 30, 2019
Gen. John W. Vessey Jr., USA	June 18, 1982	Sept. 30, 1985	Gen. Mark A. Milley, USA	Oct. 1, 2019	
Adm. William J. Crowe Jr., USN	Oct. 1, 1985	Sept. 30, 1989			

VICE CHAIRMAN OF THE JOINT CHIEFS OF STAFF					
Gen. Robert T. Herres, USAF	Feb. 6, 1987	Feb. 28, 1990	Adm. Edmund Giambastiani Jr., USN	Aug. 12, 2005	Aug. 3, 2007
Adm. David E. Jeremiah, USN	March 1, 1990	Feb. 28, 1994	Gen. James E. Cartwright, USMC	Aug. 4, 2007	Aug. 4, 2011
Adm. William A. Owens, USN	March 1, 1994	Feb. 27, 1996	Adm. James A. Winnefeld Jr., USN	Aug. 4, 2011	July 31, 2015
Gen. Joseph W. Ralston, USAF	March 1, 1996	Feb. 29, 2000	Gen. Paul J. Selva, USAF	July 31, 2015	Nov. 21, 2019
Gen. Richard B. Myers, USAF	March 1, 2000	Oct. 1, 2001	Gen. John E. Hyten, USAF	Nov. 21, 2019	Nov. 19, 2021
Gen. Peter Pace, USMC	Oct. 1, 2001	Aug. 12, 2005	Adm. Christopher W. Grady, USN	Dec. 20, 2021	

UNIFIED COMMAND, NATIONAL GUARD BUREAU, AND NORAD LEADERS

This section presents the leaders of DOD's Unified Commands, the National Guard Bureau, and NORAD under the current designation.

Leaders of historic DOD commands (and of active commands' previous designations) are listed online.



Sgtist Class Jim Greenhill/National Guard Bureau

Then-NORTHCOM commander Gen. Victor Renuart Jr. addresses the National Guard's 2009 Joint Senior Leadership Conference on whole-of-government defense in 2009.

U.S. AFRICA COMMAND					
Gen. William E. Ward, USA	Oct. 1, 2008	March 9, 2011			
Gen. Carter F. Ham, USA	March 9, 2011	April 5, 2013			
Gen. David M. Rodriguez, USA	April 5, 2013	July 18, 2016			
Gen. Thomas D. Waldhauser, USMC	July 18, 2016	July 26, 2019			
Gen. Stephen J. Townsend, USA	July 26, 2019				

U.S. CENTRAL COMMAND					
Gen. Robert C. Kingston, USA	Jan. 1, 1983	Nov. 27, 1985			
Gen. George B. Crist, USMC	Nov. 27, 1985	Nov. 23, 1988			
Gen. H. Norman Schwarzkopf, USA	Nov. 23, 1988	Aug. 9, 1991			
Gen. Joseph P. Hoar, USMC	Aug. 9, 1991	Aug. 5, 1994			
Gen. J. H. Binford Peay III, USA	Aug. 5, 1994	Aug. 13, 1997			
Gen. Anthony C. Zinni, USMC	Aug. 13, 1997	July 6, 2000			
Gen. Tommy R. Franks, USA	July 6, 2000	July 7, 2003			
Gen. John P. Abizaid, USA	July 7, 2003	March 16, 2007			
Adm. William J. Fallon, USN	March 16, 2007	March 31, 2008			
Lt. Gen. Martin Dempsey, USA (acting)	March 31, 2008	Oct. 31, 2008			
Gen. David H. Petraeus, USA	Oct. 31, 2008	June 30, 2010			
Lt. Gen. John R. Allen, USMC (acting)	June 30, 2010	Aug. 11, 2010			
Gen. James N. Mattis, USMC	Aug. 11, 2010	March 22, 2013			
Gen. Lloyd J. Austin III, USA	March 22, 2013	March 30, 2016			
Gen. Joseph L. Votel, USA	March 30, 2016	March 28, 2019			
Gen. Kenneth F. McKenzie Jr., USMC	March 28, 2019	April 1, 2022			
Gen. Michael E. Kurilla, USA	April 1, 2022				

U.S. EUROPEAN COMMAND					
Gen. Matthew B. Ridgway, USA	Aug. 1, 1952	July 11, 1953			
Gen. Alfred M. Gruenther, USA	July 11, 1953	Nov. 20, 1956			
Gen. Lauris Norstad, USAF	Nov. 20, 1956	Nov. 1, 1962			
Gen. Lyman L. Lemnitzer, USA	Nov. 1, 1962	May 5, 1969			
Gen. Andrew J. Goodpaster, USA	May 5, 1969	Nov. 1, 1974			
Gen. Alexander M. Haig Jr., USA	Nov. 1, 1974	June 27, 1979			
Gen. Bernard W. Rogers, USA	June 27, 1979	June 25, 1987			



UNIFIED COMMAND, NATIONAL GUARD BUREAU, AND NORAD LEADERS (continued)

Gen. John R. Galvin, USA	June 25, 1987	June 23, 1992
Gen. John M. Shalikashvili, USA	June 23, 1992	Oct. 21, 1993
Gen. George A. Joulwan, USA	Oct. 21, 1993	July 10, 1997
Gen. Wesley K. Clark, USA	July 10, 1997	May 2, 2000
Gen. Joseph W. Ralston, USAF	May 2, 2000	Jan. 16, 2003
Gen. James L. Jones, USMC	Jan. 16, 2003	Dec. 4, 2006
Gen. Bantz J. Craddock, USA	Dec. 4, 2006	June 30, 2009
Adm. James G. Stavridis, USN	June 30, 2009	May 10, 2013
Gen. Philip M. Breedlove, USAF	May 10, 2013	May 3, 2016
Gen. Curtis M. Scaparrotti, USA	May 3, 2016	May 3, 2019
Gen. Tod D. Wolters, USAF	May 3, 2019	

U.S. NORTHERN COMMAND

Gen. Ralph E. Eberhart, USAF	Oct. 1, 2002	Nov. 5, 2004
Adm. Timothy J. Keating, USN	Nov. 5, 2004	March 23, 2007
Gen. Victor E. Renuart Jr., USAF	March 23, 2007	May 19, 2010
Adm. James A. Winnefeld Jr., USN	May 19, 2010	Aug. 4, 2011
Gen. Charles H. Jacoby Jr., USA	Aug. 4, 2011	Dec. 5, 2014
Adm. William E. Gortney, USN	Dec. 5, 2014	May 13, 2016
Gen. Lori J. Robinson, USAF	May 13, 2016	May 24, 2018
Gen. Terrence J. O'Shaughnessy	May 24, 2018	Aug. 20, 2020
Gen. Glen D. VanHerck, USAF	Aug. 20, 2020	

U.S. INDO-PACIFIC COMMAND

Adm. John H. Towers, USN	Jan. 1, 1947	Feb. 28, 1947
Adm. Louis E. Denfeld, USN	Feb. 28, 1947	Dec. 3, 1947
Adm. Dewitt C. Ramsey, USN	Dec. 3, 1947	April 30, 1949
Adm. Arthur W. Radford, USN	April 30, 1949	July 10, 1953
Adm. Felix B. Stump, USN	July 10, 1953	July 31, 1958
Adm. Harry D. Felt, USN	July 31, 1958	June 30, 1964
Adm. U. S. Grant Sharp, USN	June 30, 1964	July 31, 1968
Adm. John S. McCain Jr., USN	July 31, 1968	Sept. 1, 1972
Adm. Noel A. M. Gayler, USN	Sept. 1, 1972	Aug. 30, 1976
Adm. Maurice E. Weisner, USN	Aug. 30, 1976	Oct. 31, 1979



Mass Communication Specialist 1st Class James E. Foehl/USN

Lt. Gen. Daniel Leaf served as acting Commander of U.S. Pacific Command in March 2007. Leaf is the only USAF member to serve even temporarily as the chief of the unified command.

Adm. Robert L. J. Long, USN	Oct. 31, 1979	July 1, 1983
Adm. William J. Crowe Jr., USN	July 1, 1983	Sept. 18, 1985
Adm. Ronald J. Hays Jr., USN	Sept. 18, 1985	Sept. 30, 1988
Adm. Huntington Hardisty, USN	Sept. 30, 1988	March 1, 1991
Adm. Charles R. Larson, USN	March 1, 1991	July 11, 1994
Lt. Gen. Harold Fields, USA (acting)	July 11, 1994	July 19, 1994
Adm. Richard C. Macke, USN	July 19, 1994	Jan. 31, 1996
Adm. Joseph W. Prueher, USN	Jan. 31, 1996	Feb. 20, 1999
Adm. Dennis C. Blair, USN	Feb. 20, 1999	May 2, 2002
Adm. Thomas B. Fargo, USN	May 2, 2002	Feb. 26, 2005
Adm. William J. Fallon, USN	Feb. 26, 2005	March 12, 2007
Lt. Gen. Daniel Leaf, USAF (acting)	March 12, 2007	March 26, 2007
Adm. Timothy J. Keating, USN	March 26, 2007	Oct. 19, 2009
Adm. Robert F. Willard, USN	Oct. 19, 2009	March 9, 2012
Adm. Samuel J. Locklear III, USN	March 9, 2012	May 27, 2015

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 Rockmart, GA 30153

UNIFIED COMMAND, NATIONAL GUARD BUREAU, AND NORAD LEADERS (continued)

Adm. Harry B. Harris Jr., USN	May 27, 2015	May 31, 2018
Adm. Philip S. Davidson, USN	May 31, 2018	April 30, 2021
Adm. John C. Aquilino, USN	April 30, 2021	

U.S. SOUTHERN COMMAND

Gen. Andrew P. O'Meara, USA	June 6, 1963	Feb. 22, 1965
Gen. Robert W. Porter Jr., USA	Feb. 22, 1965	Feb. 18, 1969
Gen. George R. Mather, USA	Feb. 18, 1969	Sept. 20, 1971
Gen. George V. Underwood, USA	Sept. 20, 1971	Jan. 17, 1973
Gen. William B. Rosson, USA	Jan. 17, 1973	Aug. 1, 1975
Lt. Gen. Dennis P. McAuliffe, USA	Aug. 1, 1975	Oct. 1, 1979
Lt. Gen. Wallace H. Nutting, USA	Oct. 1, 1979	May 24, 1983
Gen. Paul F. Gorman, USA	May 24, 1983	March 1, 1985
Gen. John R. Galvin, USA	March 1, 1985	June 6, 1987
Gen. Fred F. Woerner, USA	June 6, 1987	Oct. 1, 1989
Gen. Maxwell R. Thurman, USA	Oct. 1, 1989	Nov. 21, 1990
Gen. George A. Joulwan, USA	Nov. 21, 1990	October 1993
Maj. Gen. W. Worthington, USAF (acting)	October 1993	Feb. 17, 1994
Gen. Barry R. McCaffrey, USA	Feb. 17, 1994	March 1, 1996
RAdm. James Perkins, USN (acting)	March 1, 1996	June 26, 1996
Gen. Wesley K. Clark, USA	June 26, 1996	July 13, 1997
RAdm. Walter F. Doran, USN (acting)	July 13, 1997	Sept. 25, 1997
Gen. Charles E. Wilhelm, USMC	Sept. 25, 1997	Sept. 8, 2000
Gen. Peter Pace, USMC	Sept. 8, 2000	Sept. 30, 2001
Maj. Gen. G. D. Speer, USA (acting)	Sept. 30, 2001	Aug. 18, 2002
Gen. James T. Hill, USA	Aug. 18, 2002	Nov. 9, 2004
Gen. Bantz J. Craddock, USA	Nov. 9, 2004	Oct. 19, 2006
Adm. James G. Stavridis, USN	Oct. 19, 2006	June 25, 2009
Gen. Douglas M. Fraser, USAF	June 25, 2009	Nov. 19, 2012
Gen. John F. Kelly, USMC	Nov. 19, 2012	Jan. 14, 2016
Adm. Kurt W. Tidd, USN	Jan. 14, 2016	Nov. 26, 2018
Adm. Craig S. Faller, USN	Nov. 26, 2018	Oct. 29, 2021
Gen. Laura J. Richardson, USA	Oct. 29, 2021	

Formerly US Caribbean Command Nov. 1, 1947. Redesignated June 6, 1963. For historical leaders, see US Caribbean Command in Historic Unified Command Leaders section.

U.S. SPECIAL OPERATIONS COMMAND

Gen. James J. Lindsay, USA	April 16, 1987	June 27, 1990
Gen. Carl W. Stiner, USA	June 27, 1990	May 20, 1993
Gen. Wayne A. Downing, USA	May 20, 1993	Feb. 29, 1996
Gen. Henry H. Shelton, USA	Feb. 29, 1996	Sept. 25, 1997
Gen. Peter J. Schoomaker, USA	Nov. 5, 1997	Oct. 27, 2000
Gen. Charles R. Holland, USAF	Oct. 27, 2000	Sept. 2, 2003
Gen. Bryan D. Brown, USA	Sept. 2, 2003	July 9, 2007
Adm. Eric T. Olson, USN	July 9, 2007	Aug. 15, 2011
Adm. William H. McRaven, USN	Aug. 15, 2011	Aug. 28, 2014
Gen. Joseph L. Votel, USA	Aug. 28, 2014	March 30, 2016
Gen. Raymond A. Thomas, USA	March 30, 2016	March 29, 2019
Gen. Richard D. Clarke, USA	March 29, 2019	

U.S. STRATEGIC COMMAND

Gen. George L. Butler, USAF	June 1, 1992	Feb. 13, 1994
Adm. Henry G. Chiles Jr., USN	Feb. 14, 1994	Feb. 21, 1996
Gen. Eugene E. Habiger, USAF	Feb. 22, 1996	June 25, 1998
Adm. Richard W. Mies, USN	June 26, 1998	Nov. 30, 2001
Adm. James O. Ellis Jr., USN	Nov. 30, 2001	July 9, 2004
Gen. James E. Cartwright, USMC	July 9, 2004	Aug. 10, 2007
Lt. Gen. Robert Kehler, USAF (acting)	Aug. 10, 2007	Oct. 3, 2007
Gen. Kevin P. Chilton, USAF	Oct. 3, 2007	Jan. 28, 2011
Gen. Robert Kehler, USAF	Jan. 28, 2011	Nov. 15, 2013
Adm. Cecil D. Haney, USN	Nov. 15, 2013	Nov. 3, 2016
Gen. John E. Hyten, USAF	Nov. 3, 2016	Nov. 18, 2019
Adm. Charles A. Richard, USN	Nov. 18, 2019	

Merged the functions of U.S. Space Command into U.S. Strategic Command Oct. 1, 2002.

U.S. TRANSPORTATION COMMAND

Gen. Duane H. Cassidy, USAF	July 1, 1987	Sept. 21, 1989
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Gen. H. T. Johnson, USAF	Sept. 22, 1989	Aug. 24, 1992
Gen. Ronald R. Fogleman, USAF	Aug. 25, 1992	Oct. 17, 1994
Gen. Robert L. Rutherford, USAF	Oct. 18, 1994	July 14, 1996
Gen. Walter Kross, USAF	July 15, 1996	Aug. 2, 1998
Gen. Charles T. Robertson Jr., USAF	Aug. 3, 1998	Nov. 5, 2001
Gen. John W. Handy, USAF	Nov. 5, 2001	Sept. 7, 2005
Gen. Norton A. Schwartz, USAF	Sept. 7, 2005	Aug. 11, 2008
VAdm. Ann E. Rondeau, USN (acting)	Aug. 12, 2008	Sept. 4, 2008
Gen. Duncan J. McNabb, USAF	Sept. 5, 2008	Oct. 14, 2011
Gen. William M. Fraser III, USAF	Oct. 14, 2011	May 5, 2014
Gen. Paul J. Selva, USAF	May 5, 2014	July 31, 2015
VAdm. William Brown, USN (acting)	July 31, 2015	Aug. 26, 2015
Gen. Darren W. McDew, USAF	Aug. 26, 2015	Aug. 24, 2018
Gen. Stephen R. Lyons, USA	Aug. 24, 2018	Oct. 15, 2021
Gen. Jaqueline D. Van Ovost	Oct. 15, 2021	

NATIONAL GUARD BUREAU

Maj. Gen. Butler B. Miltonberger, USA	Feb. 1, 1946	Sept. 29, 1947
Maj. Gen. Kenneth F. Cramer, USA	Sept. 30, 1947	Sept. 4, 1950
Maj. Gen. Raymond H. Fleming, USA*	Sept. 5, 1950	Feb. 15, 1953
Maj. Gen. Earl T. Ricks, USAF (acting)	Feb. 16, 1953	June 21, 1953
Maj. Gen. Edgar C. Erickson, USA	June 22, 1953	May 31, 1959
Maj. Gen. Winston P. Wilson, USAF (acting)	June 1, 1959	July 19, 1959
Maj. Gen. Donald W. McGowan, USA	July 20, 1959	Aug. 30, 1963
Maj. Gen. Winston P. Wilson, USAF	Aug. 31, 1963	Aug. 31, 1971
Maj. Gen. Francis S. Greenlief, USA	Sept. 1, 1971	June 23, 1974
Lt. Gen. La Vern E. Weber, USA	Aug. 16, 1974	Aug. 15, 1982
Lt. Gen. Emmett H. Walker Jr., USA	Aug. 16, 1982	Aug. 15, 1986
Lt. Gen. Herbert R. Temple Jr., USA	Aug. 16, 1986	Jan. 31, 1990
Lt. Gen. John B. Conaway, USAF	Feb. 1, 1990	Dec. 1, 1993
Maj. Gen. Raymond Rees, USA (acting)	Jan. 1, 1994	July 31, 1994
Lt. Gen. Edward D. Baca, USA	Oct. 1, 1994	July 31, 1998
Lt. Gen. Russell C. Davis, USAF	Aug. 4, 1998	Aug. 3, 2002
Maj. Gen. Raymond Rees, USA (acting)	Aug. 4, 2002	April 10, 2003
Lt. Gen. H. Steven Blum, USA	April 11, 2003	Nov. 16, 2008
Gen. Craig R. McKinley, USAF	Nov. 17, 2008	Sept. 7, 2012
Gen. Frank J. Grass, USA	Sept. 7, 2012	Aug. 3, 2016
Gen. Joseph L. Lengyel, USAF	Aug. 3, 2016	Aug. 3, 2020
Gen. Daniel R. Hokanson, USA	Aug. 3, 2020	

*Fleming served as acting Chief until Aug. 14, 1951.

NORTH AMERICAN AEROSPACE DEFENSE COMMAND

Gen. Earle E. Partridge, USAF	Sept. 12, 1957	July 30, 1959
Gen. Laurence S. Kuter, USAF	Aug. 1, 1959	July 30, 1962
Gen. John K. Gerhart, USAF	Aug. 1, 1962	March 30, 1965
Gen. Dean C. Strother, USAF	April 1, 1965	July 29, 1966
Gen. Raymond J. Reeves, USAF	Aug. 1, 1966	July 31, 1969
Gen. Seth J. McKee, USAF	Aug. 1, 1969	Sept. 30, 1973
Gen. Lucius D. Clay Jr., USAF	Oct. 1, 1973	Aug. 29, 1975
Gen. Daniel James Jr., USAF	Sept. 1, 1975	Dec. 5, 1977
Gen. James E. Hill, USAF	Dec. 6, 1977	Dec. 31, 1979
Gen. James V. Hartinger, USAF	Jan. 1, 1980	July 30, 1984
Gen. Robert T. Herres, USAF	July 30, 1984	Feb. 5, 1987
Gen. John L. Piotrowski, USAF	Feb. 6, 1987	March 30, 1990
Gen. Donald J. Kutyna, USAF	April 1, 1990	June 30, 1992
Gen. Charles A. Horner, USAF	June 30, 1992	Sept. 12, 1994
Gen. Joseph W. Ashy, USAF	Sept. 13, 1994	Aug. 26, 1996
Gen. Howell M. Estes III, USAF	Aug. 27, 1996	Aug. 13, 1998
Gen. Richard B. Myers, USAF	Aug. 14, 1998	Feb. 22, 2000
Gen. Ralph E. Eberhart, USAF	Feb. 22, 2000	Nov. 5, 2004
Adm. Timothy J. Keating, USN	Nov. 5, 2004	March 23, 2007
Gen. Victor E. Renuart Jr., USAF	March 23, 2007	May 19, 2010
Adm. James A. Winnefeld Jr., USN	May 19, 2010	Aug. 4, 2011
Gen. Charles H. Jacoby Jr., USA	Aug. 4, 2011	Dec. 5, 2014
Adm. William E. Gortney, USN	Dec. 5, 2014	May 13, 2016
Gen. Lori J. Robinson, USAF	May 13, 2016	May 24, 2018
Gen. Terrance J. O'Shaughnessy	May 24, 2018	Aug. 20, 2020
Gen. Glen D. VanHerck, USAF	Aug. 20, 2020	



USAF & USSF INSTALLATIONS



Airman 1st Class Jose Miguel Tamondong

F-35As line up in formation at Eielson Air Force Base, Alaska, the Air Force's northern-most base on U.S. soil.

Domestic

Listings include installations owned, operated by, or hosting substantial Department of the Air Force activities. For a map, see p. 110. For sources and definitions see p. 121.

Active Reserve Guard Range USSF

ALABAMA

■ **Dannelly Field**, Montgomery Regional Airport, Ala. 36108. **Nearest city:** Montgomery. **Phone:** 334-394-7200. **Acres:** 70. **Total Force:** civilian, 0; military, 1,237. **Component:** ANG. **Unit/mission:** 187th FW, fighter, ISR operations. **History:** Originally named for Ens. Clarence Dannelly, Navy pilot killed in WWII.

■ **Hall ANGS**, Dothan Regional Airport, Ala. 36303. **Nearest city:** Dothan. **Phone:** 334-596-0184. **Acres:** 21. **Total Force:** civilian, 0; military, 256. **Component:** ANG. **Unit/mission:** 280th Special Operations Communications Squadron, strategic air defense.

■ **Maxwell AFB**, Ala. 36112. **Nearest city:** Montgomery. **Phone:** 334-953-1110. **Acres:** 3,530 (Maxwell), 355 (Gunter annex). **Total Force:** civilian, 2,589; military, 4,131. **Active-duty USAF:** enlisted, 1,635; officer, 1,632. **Owning command:** AETC. **Unit/mission:** 42nd ABW (AETC), support; 908th AW (AFRC), air mobility operations; Air Force

Historical Research Agency (USAF), historical documentation, research; Air University (AETC); Hq. Civil Air Patrol (USAF), management; Hq. Air Force Judge Advocate General Corps (USAF), management; PEO-Business and Enterprise Systems (AFMC), acquisition. **History:** Activated 1918 at the site of the Wright brothers' flight school. Named for 2nd Lt. William C. Maxwell, killed in air accident Aug. 12, 1920. **Museum:** Air Park. **Inn:** 334-953-3931. (Maxwell); 334-416-2501 (Gunter). **Golf:** Cypress Tree.

■ **Sumpter Smith ANGB**, Birmingham-Shuttlesworth Intl. Airport, Ala. 35217. **Nearest city:** Birmingham. **Phone:** 205-714-2855. **Acres:** 140. **Total Force:** civilian, 0; military, 1,710. **Component:** ANG. **Unit/mission:** 99th ARS (AMC) (active associate), air mobility operations; 117th ARW, air mobility, intelligence operations. **History:** Named for Col. Walter Sumpter Smith, electrical engineer and pilot.

ALASKA

■ **Clear AFS**, Alaska 99704. **Nearest city:** Fairbanks. **Phone:** 907-585-6110. **Acres:** 11,438. **Total Force:** civilian, 0; military, 118. **Owning command:** USSF. **Unit/mission:** 13th SWS (USSF), 213th SWS (ANG), missile warning. **History:** Dates from 1961.

■ **Eielson AFB**, Alaska 99702. **Nearest city:** Fairbanks. **Phone:** 907-377-1110. **Acres:** 24,919. **Total Force:** civilian, 685; military, 3,227. **Active-duty USAF:** enlisted, 2,977; officer, 271. **Owning command:** PACAF. **Unit/mission:** 168th ARW (ANG), air mobility operations; 354th FW (PACAF), aggressor force, fighter, Red Flag-Alaska operations, Joint Pacific Alaska Range Complex support; Arctic Survival School (AETC), training. **History:** Activated October 1944. Named for Carl Ben Eielson, Arctic aviation pioneer who died in Arctic rescue mission in November 1929. **Museum:** Heritage Park. **Inn:** 907-377-1844.

■ **JB Elmendorf-Richardson**, Alaska 99506. **Nearest city:** Anchorage. **Phone:** 907-552-1110. **Acres:** 13,455 (Elmendorf), 60,027 (Richardson). **Total Force:** civilian, 309; military, 13,450. **Active-duty USAF:** enlisted, 5,113; officer, 890. **Owning command:** PACAF. **Unit/mission:** 3rd Wing (PACAF), air mobility, C2, fighter operations; 176th Wing (ANG), air mobility, personnel recovery operations; 477th FG (AFRC), fighter operations; 673rd ABW (PACAF), support; 715th AMOG (AMC), air mobility operations; Alaskan NORAD Region, operational leadership; Hq. 11th Air Force (PACAF), operational leadership; Hq. Alaskan Command (PACOM), management. **History:** Activated July 1940. Formed as joint base under Air Force lead 2010. Elmendorf named

for Capt. Hugh M. Elmendorf, killed Jan. 13, 1933, flying an experimental fighter. Richardson named for Army Brig. Gen. Wilds P. Richardson, who served in Alaska territory from 1897 to 1917. **Museum:** Kulis ANGB Museum. **Inn:** 907-552-2454. **Golf:** Moose Run.

■ **Joint Pacific Alaska Range Complex**, Alaska. **Nearest city:** Fairbanks. **Phone:** 907-552-2341. **Owning command:** ALCOM. **Available airspace:** 65,000 square miles. **Acres of maneuver land:** 1.5 million. **Unit/mission:** Unit training, joint training exercises.

ARIZONA

■ **Barry M. Goldwater Range**, Ariz. **Nearest city:** Gila Bend. **Phone:** 623-856-7216. **Acres:** 1,102,325 (BMGR East, Air Force); 692,800 (BMGR West, Marine Corps). **Owning command:** AETC. **Unit/mission:** 56th Range Management Office, range operations. Includes Gila Bend Air Force Auxiliary Field. **History:** Training range on the U.S. southern border used by military pilots since 1941 that now hosts more than 68,000 training sorties a year.

■ **Davis-Monthan AFB**, Ariz. 85707. **Nearest city:** Tucson. **Phone:** 520-228-1110. **Acres:** 10,529. **Total Force:** civilian, 1,815; military, 7,726. **Active-duty USAF:** enlisted, 5,982; officer, 957. **Owning command:** ACC. **Unit/mission:** 55th ECG (ACC), electronic combat operations; 214th RG (ANG), RPA operations; 309th Aerospace Maintenance and Regeneration Group (AFMC), aerospace vehicle storage, regeneration; 355th Wing (ACC), fighter operations; 563rd RQG (ACC), personnel recovery operations; 924th FG (AFRC), fighter operations; 943rd RQG (AFRC), personnel recovery operations; Hq. 12th Air Force (ACC), operational leadership. **History:** Activated 1927. Named for two local aviators: 2nd Lt. Samuel H. Davis Jr., killed Dec. 28, 1921, and 2nd Lt. Oscar Monthan, killed March 27, 1924. **Museum:** Pima Air and Space Museum. **Inn:** 520-228-3309.

■ **Goldwater ANGB**, Phoenix Sky Harbor Intl. Airport, Ariz. 85034. **Nearest city:** Phoenix. **Phone:** 602-302-9004. **Total Force:** civilian, 0; military, 829. **Component:** ANG. **Unit/mission:** 161st ARW, air mobility operations.

■ **Luke AFB**, Ariz. 85309. **Nearest city:** Phoenix. **Phone:** 623-856-1110. **Acres:** 4,833. **Total Force:** civilian, 1,170; military, 7,259. **Active-duty USAF:** enlisted, 4,668; officer, 484. **Owning command:** AETC. **Unit/mission:** 56th FW (AETC), training, Barry M. Goldwater Range operations; 944th FW (AFRC), training. **History:** Activated 1941. Named for 2nd Lt. Frank Luke Jr., observation balloon-busting ace of WWI and first aviator to receive MOH, killed in action Sept. 29, 1918. **Museum:** Air Park. **Inn:** 623-935-2641. **Golf:** Falcon Dunes.

■ **Morris ANGB, Tucson Intl. Airport**, Ariz. 85706. **Nearest city:** Tucson. **Phone:** 520-295-6192. **Total Force:** civilian, 0; military, 1,817. **Component:** ANG. **Unit/mission:** 162nd Wing, fighter, ISR, RPA (at Davis-Monthan AFB, Ariz.) operations, training.

ARKANSAS

■ **Ebbing ANGB, Fort Smith Regional Airport**, Ark. 72903. **Nearest city:** Fort Smith. **Phone:** 479-573-5100. **Acres:** 144. **Total Force:** civilian, 0;

military, 944. **Component:** ANG. **Unit/mission:** 188th Wing, RPA, ISR.

■ **Little Rock AFB**, Ark. 72099. **Nearest city:** Jacksonville. **Phone:** 501-987-1110. **Acres:** 7,151. **Total Force:** civilian, 680; military, 5,025. **Active-duty USAF:** enlisted, 3,394; officer, 467. **Owning command:** AMC. **Unit/mission:** 19th AW (AMC), air mobility operations; 913th AG (AFRC), 189th AW (ANG), air mobility operations, training; 314th AMW (AETC), training. **History:** Base opened Oct. 9, 1955. **Inn:** 501-988-1141. **Golf:** Deer Run.

CALIFORNIA

■ **Beale AFB**, Calif. 95903. **Nearest city:** Marysville. **Phone:** 530-634-3000. **Acres:** 22,451. **Total Force:** civilian, 885; military, 5,399. **Active-duty USAF:** enlisted, 3,648; officer, 623. **Owning command:** ACC. **Unit/mission:** 7th SWS (AF-SPC), missile warning; 9th RW (ACC), ISR, RPA operations; 195th Wing (ANG), DCGS, intel; 548th ISRG (ACC), DCGS; 940th Air Refueling Wing (AFRC), KC-135R. **History:** Opened October 1942 as Army's Camp Beale. Named for Edward F. Beale, a former Navy officer who became a hero of the Mexican-American War and early developer of California, as well as a senior appointee/diplomat for four presidents. Transferred to USAF 1948. Designated AFB April 1951. **Museum:** Edward F. Beale Museum. **Inn:** 530-634-3662. **Golf:** Coyote Run.

■ **California ANGB**, Fresno Yosemite Intl. Airport, Calif. 93727. **Nearest city:** Fresno. **Phone:** 559-454-5100. **Acres:** 77. **Total Force:** civilian, 0; military, 1,805. **Component:** ANG. **Unit/mission:** 144th FW, fighter, ISR operations.

■ **Channel Islands ANGS**, Calif. 93041. **Nearest city:** Oxnard. **Phone:** 805-986-8000. **Acres:** 206. **Total Force:** civilian, 3,844; military, 1,042. **Component:** ANG. **Unit/mission:** 146th AW, air mobility, MAFFS operations.

■ **Edwards AFB**, Calif. 93524. **Nearest city:** Rosamond. **Phone:** 661-277-1110. **Acres:** 307,517. **Total Force:** civilian, 4,024; military, 2,192. **Active-duty USAF:** enlisted, 2,397; officer, 649. **Owning command:** AFMC. **Unit/mission:** 412th TW (AFMC), T&E, base support; Hq. Air Force Test Center (AFMC), T&E management; U.S. Air Force Test Pilot School (AFMC), training. **History:** Muroc Bombing and Gunnery Range established September 1933. Designated Muroc AAB 1942. Renamed in 1949 for Capt. Glen W. Edwards, killed June 5, 1948, in crash of YB-49 "Flying Wing." **Museum:** Air Force Flight Test Museum. **Inn:** 661-277-3394/4101. **Golf:** Muroc Lake.

■ **Los Angeles AFB**, Calif. 90245. **Nearest city:** El Segundo. **Phone:** 310-653-1110. **Acres:** 56. **Total Force:** civilian, 1,378; military, 1,491. **Active-duty USAF and USSF:** enlisted, 333; officer, 955. **Owning command:** USSF. **Unit/mission:** 61st ABG (USSF), support; Hq. Space Systems Command (USSF), acquisition, R&D. **History:** Designated Los Angeles AFS April 30, 1964. Redesignated Los Angeles AFB Sept. 15, 1987. SMC, activated July 1, 1992, dates from Air Research and Development Command's Western Development Division, activated July 1, 1954. **Museum:** SMC Heritage Center. **Inn:** 310-653-8296.

■ **March ARB**, Calif. 92518. **Nearest city:** Moreno Valley/Riverside. **Phone:** 951-655-4138.

Acres: 2,385. **Total Force:** civilian, 0; military, 6,671. **Component:** AFRC/ANG. **Unit/mission:** 452nd AMW (AFRC), air mobility operations; 163rd ATKW (ANG), RPA operations, training; Hq. 4th Air Force (AFRC), operational leadership. **History:** Activated March 1, 1918. Named for 2nd Lt. Peyton C. March Jr., who died of injuries sustained in a crash Feb. 18, 1918. **Inn:** 951-655-5241. **Golf:** General Old.

■ **Moffett Federal Airfield**, Calif. 94035. **Nearest city:** Mountain View. **Phone:** 650-603-9129. **Acres:** 112. **Total Force:** civilian, 605; military, 988. **Component:** ANG. **Unit/mission:** 129th RQW, personnel recovery operations. **History:** Activated as NAS Sunnyvale April 1933. Renamed Moffett Field June 1933 for Rear Adm. William A. Moffett, killed in crash of USS Akron airship April 4, 1933. Later renamed to Moffett Air National Guard Base.

■ **Pillar Point AFS**, Calif. **Nearest city:** Half Moon Bay. **Phone:** 650-728-3246. **Acres:** 55. **Owning Command:** USSF. **Unit/mission:** supports space and ballistic missile launches. **History:** Opened as an Army observation post in 1940; taken over by the Navy in 1958 as a control site for missile testing; transferred to the Air Force in 1964.

■ **Sepulveda ANGS**, Calif. 91406. **Nearest city:** Van Nuys. **Phone:** 858-276-9351. **Acres:** 26. **Total Force:** civilian, 0; military, 218. **Component:** ANG. **Unit/mission:** 261st Cyberspace Operations Squadron, mission assurance and threat mitigation support.

■ **Travis AFB**, Calif. 94535. **Nearest city:** Fairfield. **Phone:** 707-424-1110. **Acres:** 6,446. **Total Force:** civilian, 1,663; military, 9,763. **Active-duty USAF and USSF:** enlisted, 6,039; officer, 1,461. **Owning command:** AMC. **Unit/mission:** 60th AMW (AMC), 349th AMW (AFRC), air mobility operations; David Grant USAF Medical Center. **History:** Activated May 17, 1943. Named for Brig. Gen. Robert F. Travis, killed Aug. 5, 1950. **Museum:** Heritage Center. **Inn:** 707-424-8000. **Golf:** Cypress Lakes.

■ **Vandenberg SFB**, Calif. 93437. **Nearest city:** Lompoc. **Phone:** 805-606-1110. **Acres:** 118,312. **Total Force:** civilian, 1,261; military, 2,797. **Active-duty USAF and USSF:** enlisted, 1,961; officer, 695. **Owning command:** USSF. **Unit/mission:** Space Launch Delta 30 (USSF), space and launch range operations, host unit; 381st TRG (AETC), training; 576th FLTS (USSF), test; 21st SOPS (USSF), space operations; Hq. Space Operations Command (USSF), operational leadership; Joint Space Operations Center (STRATCOM), space C2 operations. **History:** Originally Army's Camp Cooke; activated October 1941. Reassigned to USAF June 7, 1957. Renamed for Gen. Hoyt S. Vandenberg, USAF's second Chief of Staff. **Museum:** Space and Missile Heritage Center. **Inn:** 805-606-1844.

COLORADO

■ **Buckley SFB**, Colo. 80011. **Nearest city:** Aurora. **Phone:** 720-847-9431. **Acres:** 4,234. **Total Force:** 7,463. **Active-duty USAF and USSF:** enlisted, 1,399; officer, 426. **Owning command:** USSF. **Unit/mission:** 140th Wing (ANG), air mobility, fighter operations, mobile missile warning; Buckley Garrison (USSF); 566th IS (ACC), intelligence; Air Reserve Personnel Center,



Guard and Reserve personnel support. **History:** Activated April 1, 1942, as gunnery training facility. ANG assumed control from Navy 1959. Became Active-duty Air Force facility Oct. 1, 2000. Renamed Buckley Space Force Base on June 4, 2021. Named for 1st Lt. John H. Buckley, WWI flier, killed Sept. 17, 1918. **Inn:** 720-847-5899.

■ **Cheyenne Mountain AFS**, Colo. 80914. **Nearest city:** Colorado Springs. **Phone:** 719-556-7321 (Peterson AFB). **Acres:** 567. **Total Force:** part of Peterson AFB. **Owning command:** USSF. **Unit/mission:** 721st MSG (USSF), support; NORAD/NORTHCOM Alternate Command Center, Integrated Tactical Warning and Attack Assessment operations, training. **History:** operational April 20, 1966.

■ **Greeley ANG**, Colo. 80631. **Nearest city:** Greeley. **Phone:** 720-259-5001. **Acres:** 17. **Total Force:** civilian, 95; military, 297. **Component:** ANG. **Unit/mission:** 233rd Space Group, missile warning and space launch detection. **History:** Activated January 1996.

■ **Peterson SFB**, Colo. 80914. **Nearest city:** Colorado Springs. **Phone:** 719-556-7321. **Acres:** 1,442. **Total Force:** civilian, 3,722; military, 5,825. **Active-duty USAF and USSF:** enlisted, 2,793; officer, 1,062. **Owning command:** USSF. **Unit/mission:** Space Delta 2, space domain awareness; Space Delta 3, space electromagnetic warfare; Space Delta 4, strategic and theater missile warning; 52nd AS (AMC) (active associate), 200th AS (ANG), air mobility operations; 302nd AW (AFRC), air mobility, MAFFS operations; Hq. AFSPC, management; Hq. NORAD, Hq. NORTHCOM, operational leadership. Part of the USSF's Peterson-Schriever Garrison. **History:** Activated 1942. Named for 1st Lt. Edward J. Peterson, killed Aug. 8, 1942. **Museum:** Peterson Air and Space Museum. **Inn:** 719-556-7851. **Golf:** Silver Spruce.

■ **Schriever SFB**, Colo. 80912. **Nearest city:** Colorado Springs. **Phone:** 719-567-1110. **Acres:** 5,634. **Total Force:** civilian, 0; military, 2,665. **Active-duty USAF and USSF:** enlisted, 1,112; officer, 665. **Owning command:** USSF. **Unit/mission:** Peterson-Schriever Garrison (USSF), 310th SW (AFRC), space operations; Detachment 1, USAF Warfare Center (ACC/USSF), R&D. Part of the USSF's Peterson-Schriever Garrison. **History:** Activated as Falcon AFS Sept. 26, 1985. Redesignated AFB June 13, 1988. Renamed for Gen. Bernard A. Schriever June 5, 1998.

■ **U.S. Air Force Academy**, Colo. 80840. **Nearest city:** Colorado Springs. **Phone:** 719-333-1110. **Acres:** civilian, 1,606; military, 2,175. **Total Force:** civilian, 1,606; military, 2,175. **Active-duty USAF:** enlisted, 1,347; officer, 943. **Next Higher Echelon of Command:** HQ Air Force. **Unit/mission:** Air Force Academy (USAFA), education/training; Preparatory School, education/training; 10th ABW (Air Force Academy), support; 306th FTG (AETC), training. **History:** established April 1, 1954; headquartered at Lowry AFB until August 1958. Moved to permanent location in Colorado Springs August 1958. **Museum:** Visitor Center. **Inn:** 719-472-1940. **Golf:** Eisenhower.

CONNECTICUT

■ **Bradley ANGB**, Conn. 06026. **Nearest cities:** Hartford, Conn., and Springfield, Mass. **Phone:** 860-292-2460. **Acres:** 148. **Total Force:** civilian, 235; military, 0. **Component:** ANG. **Unit/mission:** 103rd AW, air mobility operations. **History:** Named

for Lt. Eugene M. Bradley, killed in P-40 crash August 1941.

DELAWARE

■ **Dover AFB**, Del. 19902. **Nearest city:** Dover. **Phone:** 302-677-3000. **Acres:** 3,824. **Total Force:** civilian, 0; military, 5,127. **Active-duty USAF:** enlisted, 3,453; officer, 401. **Owning command:** AMC. **Unit/mission:** 436th AW (AMC), 512th AW (AFRC), air mobility operations; Air Force Mortuary Affairs Operations (USAF). **History:** Activated December 1941. Inactivated 1946. Reactivated February 1951. **Museum:** Air Mobility Command Museum. **Inn:** 302-677-2840. **Golf:** Eagle Creek.

■ **New Castle ANGB**, New Castle Airport, Del. 19720. **Nearest city:** Wilmington. **Phone:** 302-323-3408. **Acres:** 78. **Total Force:** civilian, 457; military, 1,592. **Component:** ANG. **Unit/mission:** 166th AW, air mobility, cyber operations.

DISTRICT OF COLUMBIA

■ **JB Anacostia-Bolling**, D.C. 20032. **Nearest city:** Washington, D.C. **Phone:** 703-545-6700. **Acres:** 1,027. **Total Force:** civilian, 1,958; military, 3,132. **Active-duty USAF:** enlisted, 1,883; officer, 1,014. **Bolling owning command:** AFDW. **Unit/mission:** 11th Operations Group (AFDW), support; 579th MDG (AFDW), clinic operations; Hq. Surgeon General (USAF). **History:** Activated October 1917 with Army air and Navy elements. Formed joint base under Navy lead 2010. Naval Support Facility Anacostia named for adjacent Anacostia River. Bolling named for Col. Raynal C. Bolling, first high-ranking Army Air Service officer killed in WWI. **Inn:** Navy Gateway: 202-664-8587

FLORIDA

■ **Avon Park AFR**, Fla. **Nearest city:** Avon Park. **Phone:** 863-452-4120. **Acres:** 100,929. **Total Force:** civilian, 55; military, 44. **Owning command:** ACC. **Unit/mission:** 598th Range Squadron, training.

■ **Cape Canaveral SFS**, Fla. 32920. **Nearest city:** Cocoa Beach. **Phone:** 321-494-5933. **Acres:** 16,239. **Total Force:** civilian, 541; military, 417. **Active-duty USAF and USSF:** (Part of Patrick SFB). **Owning command:** USSF. **Unit/mission:** Space Launch Delta 45th (USSF), space launch operations. **History:** formerly NAS Banana River. Site of Joint Long Range Proving Ground 1949. USAF took sole control 1950. Combined with NASA to form John F. Kennedy Space Center 1973. Designated Cape Canaveral AS in 1974. **Museums:** Air Force Space and Missile Museum, Sands Space History Center.

■ **Duke Field**, Fla. 32542. **Nearest city:** Crestview. **Phone:** 850-883-6347. **Acres:** 1,946. **Total Force:** part of Eglin AFB. **Component:** AFRC. **Unit/mission:** 919th SOW (classic associate), special operations. **History:** named for Lt. Robert L. Duke, pilot killed Dec. 29, 1943, in test flight. Also known as Eglin AFB Auxiliary Field 3.

■ **Eglin AFB**, Fla. 32542. **Nearest city:** Niceville-Valparaiso. **Phone:** 850-882-1110. **Acres:** 449,421. **Total Force:** civilian, 5,822; military, 10,535. **Active-duty USAF:** enlisted, 4,959; officer, 1,434. **Owning command:** AFMC. **Unit/mission:** 20th SPCS (USSF), space surveillance; 33rd FW (AETC), training; 53rd Wing (ACC), OT&E; 96th TW (AFMC), T&E, base support; AFRL Munitions

Directorate (AFMC), R&D; PEO-Weapons/Air Force Life Cycle Management Center Armament Directorate (AFMC), acquisition. **History:** Activated 1935. Named for Lt. Col. Frederick I. Eglin, WWI flier killed in aircraft accident Jan. 1, 1937. **Museum:** Air Force Armament Museum. **Inn:** 850-389-4943/8761. **Golf:** Eglin.

■ **Homestead ARB**, Fla. 33039. **Nearest city:** Homestead. **Phone:** 786-415-7000. **Acres:** 2,465. **Total Force:** civilian, 574; military, 2,323. **Component:** AFRC. **Unit/mission:** 367th FS (active associate), 125th FW Det. 1 (ANG), 482nd FW (AFRC), fighter operations. **Inn:** 786-415-7198.

■ **Hurlburt Field**, Fla. 32544. **Nearest city:** Fort Walton Beach. **Phone:** 850-884-1110. **Acres:** 6,341. **Total Force:** civilian, 1,725; military, 9,405. **Active-duty USAF:** enlisted, 7,578; officer, 2,366. **Owning command:** AFSOC. **Unit/mission:** 1st SOW (AFSOC), special operations; 24th SOW (AFSOC), special tactics operations; 39th IOS (AFSPC), training; 361st ISRG (ACC), ISR operations; 492nd SOW (AFSOC) training; 505th CCW (ACC), C2, ISR TTP development, test; 556th RED HORSE (AFRC), 823rd RED HORSE (ACC), bare base operations; 2nd Combat Weather Systems Squadron (ACC), OT&E, training; Hq. AFSOC, management. **History:** Activated 1943. Named for Lt. Donald W. Hurlburt, WWII pilot killed Oct. 1, 1943. **Museum:** Memorial Air Park. **Inn:** 850-884-7115. **Golf:** Gator Lakes.

■ **Jacksonville ANGB**, Jacksonville Intl. Airport, Fla. 32218. **Nearest city:** Jacksonville. **Phone:** 904-741-7030. **Acres:** 342. **Total Force:** civilian, 0; military, 1,070. **Component:** ANG. **Unit/mission:** 125th FW, fighter, ISR operations.

■ **MacDill AFB**, Fla. 33621. **Nearest city:** Tampa. **Phone:** 813-828-1110. **Acres:** 5,866. **Total Force:** civilian, 0; military, 8,762. **Active-duty USAF:** enlisted, 3,302; officer, 797. **Owning command:** AMC. **Unit/mission:** 6th ARW (AMC), 927th ARW (AFRC), air mobility operations; Hq. CENTCOM, operational leadership; Hq. SOCOM, operational leadership; Hq. Joint Communications Support Element, C4 operations, management; Joint Special Operations University (SOCOM), education. **History:** Activated April 15, 1941. Named for Col. Leslie MacDill, killed in aircraft accident Nov. 8, 1938. **Inn:** 813-828-4259. **Golf:** Bay Palms.

■ **Patrick Space Force Base**, Fla. 32925. **Nearest city:** Cocoa Beach. **Phone:** 321-494-1110. **Acres:** 2,324. **Total Force:** civilian, 1,736; military, 2,926. **Active-duty USAF and USSF:** enlisted, 1,472; officer, 515. **Owning command:** USSF. **Unit/mission:** 45th SW (USSF), space launch operations; 114th SPCS (ANG), launch range support; 920th RQW (AFRC), personnel recovery operations; Air Force Technical Applications Center (ACC), nuclear monitoring. **History:** Activated 1940. Named for Maj. Gen. Mason M. Patrick, Chief of American Expeditionary Forces' Air Service in WWI and Chief of Air Service/Air Corps, 1921-27. **Museum:** Khobar Tower Memorial. **Inn:** 321-494-5428. **Golf:** Manatee Cove.

■ **Tyndall AFB**, Fla. 32403. **Nearest city:** Panama City. **Phone:** 850-282-1110. **Acres:** 28,891. **Total Force:** civilian, 2,622; military, 2,487. **Active-duty USAF:** enlisted, 1,826; officer, 476. **Owning command:** ACC. **Unit/mission:** 53rd WEG (ACC), T&E; 101st AOG (ANG), C2 operations; 325th FW (ACC), 325th FW associate unit (ANG), training; 601st AOC (ACC/ANG), plan/direct air operations; Air Force Rescue Coordi-





Staff Sgt. Lawrence Sena

A B-52H Stratofortress from the 96th Expeditionary Squadron takes off at Andersen Air Force Base, Guam.

nation Center (ACC), plan/direct inland rescue operations; Hq, Continental U.S. NORAD Region (NORAD)/1st Air Force (Air Forces Northern) (ACC/ANG), operational leadership. **History:** Activated Dec. 7, 1941. Named for 1st Lt. Frank B. Tyndall, WWI fighter pilot killed July 15, 1930. **Inn:** 850-283-4210. **Golf:** Pelican Point.

GEORGIA

■ **Brunswick ANGS**, Brunswick Golden Isles Airport, Fla. 31525. **Nearest city:** Brunswick. **Phone:** 912-261-5604. **Acres:** 14. **Total Force:** civilian, 0; military, 160. **Component:** ANG. **Unit/mission:** 224th Joint Communications Support Squadron, combat communications.

■ **Dobbins ARB**, Ga. 30069. **Nearest city:** Marietta. **Phone:** 678-655-5000. **Acres:** 1,913. **Total Force:** civilian, 0; military, 1,688. **Component:** AFRC. **Unit/mission:** 94th AW, aeromedical evacuation, air mobility operations; Hq, 22nd Air Force, operational leadership. **History:** Activated 1943. Named for Capt. Charles Dobbins, pilot killed in WWII. **Inn:** 678-655-4745.

■ **Grand Bay Bombing and Gunnery Range**, Ala. **Phone:** 229-257-3510/2765. **Nearest city:** Lakeland. **Acres:** 5,874. **Owning command:** ACC. **Unit/mission:** tactical air and ground maneuvers, weapons training.

■ **Moody AFB**, Ga. 31699. **Nearest city:** Valdosta. **Phone:** 229-257-1110. **Acres:** 5,521. **Total Force:** civilian, 0; military, 4,853. **Active-duty USAF:** enlisted, 4,636; officer, 495. **Owning command:** ACC. **Unit/mission:** 23rd Wing (ACC), fighter, personnel recovery operations; 81st FS (AETC); 93rd AGOW (ACC), battlefield airmen operations, expeditionary force protection, support; 476th FG (AFRC), fighter operations. **History:** Activated June 1941. Named for Maj. George P. Moody, killed May 5, 1941. **Inn:** 229-257-3893. **Golf:** Quiet Pines.

■ **Robins AFB**, Ga. 31098. **Nearest city:** Warner Robins. **Phone:** 478-926-1110. **Acres:** 6,935. **Total Force:** civilian, 15,087; military, 5,846. **Active-duty USAF:** enlisted, 3,051; officer, 841. **Owning command:** AFMC. **Unit/mission:** 78th ABW (AFMC), support; 94th APS (AFRC), aerial port operations; 116th ACW (ANG), 461st ACW (ACC), C2 operations; 638th SCMG (AFMC), systems life-cycle support; 5th CCG (ACC), combat communications operations; Hq, AFRC, management; Warner Robins ALC (AFMC), weapons maintenance, repair. **History:** Activated March 1942. Named for Brig. Gen. Augustine Warner Robins, an early chief of the Air Corps'

Materiel Division, who died June 16, 1940. **Museum:** Museum of Aviation. **Inn:** 478-926-2100. **Golf:** Pine Oaks.

■ **Savannah ANGB, Savannah/Hilton Head Intl.** Airport, Ga. 31408. **Nearest city:** Garden City. **Phone:** 912-966-8290. **Acres:** 207. **Total Force:** civilian, 1; military, 1,021. **Component:** ANG. **Unit/mission:** 165th AW, air mobility, tactical communications, TACP operations, Air Dominance Center.

GUAM

■ **Andersen AFB**, Guam APO AP 96543. **Nearest city:** Yigo. **Phone:** 671-366-1110. **Acres:** 16,117. **Total Force:** civilian 0; military, 3,232. **Active-duty USAF:** enlisted, 2,101; officer, 201. **Owning command:** PACAF. **Unit/mission:** 9th Operations Group Det. 4 (ACC), RPA operations; 22nd SOPS Det. 5 (AFSPC), space operations; 36th Wing (PACAF), support; 36th CRG (PACAF), bare base operations; 44th APS (AFRC), aerial port operations; 254th ABG (ANG), support, bare base operations (254th RED HORSE); 724th ASTF (AFRC); 734th AMS (AMC), air transportation services. **History:** Activated 1945 as North Field. Renamed 1949 for Brig. Gen. James R. Andersen, lost at sea Feb. 26, 1945. Became part of Joint Region Marianas 2009. **Inn:** Navy Gateway: 671-979-5501. **Golf:** Palm Tree.

HAWAII

■ **JB Pearl Harbor-Hickam**, Hawaii 96853. **Nearest city:** Honolulu. **Phone:** 808-449-7110. **Acres:** 6,129. **Total Force:** civilian, 6,318; military, 12,625. **Active-duty Air Force:** enlisted, 4,486; officer, 1,113. **Hickam owning command:** PACAF. **Unit/mission:** 15th Wing (PACAF), 154th Wing (ANG), air mobility, fighter operations; 515th AMOW (AMC); 613th AOC (PACAF), C2 operations; 624th RSG (AFRC), bare base operations; 647th ABG (PACAF), support; Hq, PACAF, management, operational leadership. **History:** Pearl Harbor established 1908. Hickam dedicated 1935. Activated 1938. Formed as joint base under Navy lead 2010. Hickam named for Lt. Col. Horace M. Hickam, aviation pioneer killed in crash in Texas Nov. 5, 1934. **Museums:** USS Arizona Memorial, Bowfin Memorial and Museum. **Inn:** Navy Gateway: 808-800-2337. **Golf:** Mamala Bay.

■ **Air Force Maui Optical and Supercomputing Observatory**, Hawaii, 96790. **Nearest city:** Kahului. **Phone:** 719-556-7321 (Peterson SFB operator). **Owning command:** USSF. **Unit/**

mission: On the island of Maui, Detachment 15 of the Air Force Research Laboratory operates the observatory as part of Peterson-Schriever Garrison, Colo., providing space domain awareness.

■ **Ka'ena Point SFS**, Hawaii, 96791. **Nearest city:** Honolulu. **Phone:** 719-556-7321 (Peterson SFB operator). **Owning command:** USSF. **Unit/mission:** On the island of Oahu, Detachment 3 of the 21st Space Operations Squadron operates the remote tracking station of the Satellite Control Network as part of Peterson-Schriever Garrison, Colo. Personnel are responsible for tracking satellites in orbit, receiving and processing data, and enabling control of satellites by relaying commands. **History:** The station opened in 1959 to support the Corona reconnaissance program.

IDAHO

■ **Gowen Field**, Boise Air Terminal, Idaho 83705. **Nearest city:** Boise. **Phone:** 208-422-5333. **Acres:** 354. **Total Force:** civilian, 0; military, 2,105. **Component:** ANG. **Unit/mission:** 124th FW, fighter, cyber, TACP operations. **History:** Named for Lt. Paul R. Gowen, killed in B-10 crash in Panama July 11, 1938.

■ **Mountain Home AFB**, Idaho 83648. **Nearest city:** Mountain Home. **Phone:** 208-828-2111. **Acres:** 6,858. **Total Force:** civilian, 492; military, 3,605. **Active-duty USAF:** enlisted, 3,460; officer, 387. **Owning command:** ACC. **Unit/mission:** 366th FW (ACC), fighter operations, range management. **History:** Activated August 1943 as B-24 training base. Inactivated October 1945. Reactivated December 1948. Inactivated April 1950. Reactivated 1951. **Inn:** 208-828-5200. **Golf:** Silver Sage.

■ **Mountain Home Range Complex**, Idaho. **Nearest city:** Bruneau. **Phone:** 208-828-0154. **Acres:** 12,141 (Juniper Butte); 109,466 (Saylor Creek). **Owning command:** ACC (366th FW, Mountain Home AFB). **Unit/mission:** 266th Range Squadron (squadron is based at Mountain Home AFB), unit-level and composite force training with air-to-ground training ranges, no-drop target complexes, and electronic combat sites.

ILLINOIS

■ **Capital Airport ANGS**, Abraham Lincoln Capital Airport, Ill. 62707. **Nearest city:** Springfield. **Phone:** 217-757-1267. **Acres:** 78. **Total Force:** civilian, 0; military, 877. **Component:** ANG. **Unit/mission:** 183rd Wing, 183rd Centralized Repair Facility (CRF), 183rd Air Operations Group (AOG).



■ **Peoria ANGB**, Gen. Wayne A. Downing Peoria Intl. Airport, Ill. 62707. **Nearest city:** Peoria. **Acres:** 720. **Phone:** 800-942-3771. **Total Force:** civilian, 20; military, 2,014. **Component:** ANG. **Unit/mission:** 182nd AW, air mobility, combat communications, TACP operations. Group (AOG).

■ **Scott AFB**, Ill. 62225. **Nearest city:** Belleville. **Phone:** 618-256-1110. **Acres:** 3,648. **Total Force:** civilian, 4,132; military, 7,090. **Active-duty USAF:** enlisted, 4,097; enlisted, 1,252. **Owning command:** AMC. **Unit/mission:** 126th ARW (ANG), 375th AMW (AMC), air mobility operations; 618th AOC (TACC) (AMC), planning/directing worldwide air mobility operations; 635th SCOW (AFMC), global logistics support; 932nd AW (AFRC), air mobility operations; Cyberspace Capabilities Center (ACC), network integration, engineering, simulation; Hq. 18th Air Force (AMC), operational leadership; Hq. AMC, management; Hq. TRANSCOM, operational leadership. **History:** Activated June 14, 1917. Named for Cpl. Frank S. Scott, first enlisted man to die in an aircraft accident, Sept. 28, 1912. **Museum:** Heritage Air Park. **Inn:** 618-256-1844. **Golf:** Cardinal Creek.

INDIANA

■ **Fort Wayne ANGB**, Fort Wayne Int. Airport, Ind. 46809. **Nearest city:** Fort Wayne. **Phone:** 260-478-3700. **Acres:** 69. **Total Force:** civilian, 0; military, 1,329. **Component:** ANG. **Unit/mission:** 122nd FW, fighter operations.

■ **Grissom ARB**, Ind. 46971. **Nearest city:** Kokomo. **Phone:** 765-688-5211. **Acres:** 1,719. **Total Force:** civilian, 538; military, 1,721. **Component:** AFRC. **Unit/mission:** 434th ARW, air refueling operations. **History:** Activated 1942 as NAS Bunker Hill. Reactivated June 1954 as Bunker Hill AFB. Renamed May 1968 for Lt. Col. Virgil I. "Gus" Grissom, killed Jan. 27, 1967, in Apollo capsule fire. Realigned as AFRC base Oct. 1, 1994. Home to Air Force Reserve, Army Reserve, and Marine Corps Reserve units. **Inn:** 765-681-5082. **Golf:** Grissom.

■ **Hulman Field ANGB**, Ind. 47803. **Nearest city:** Terre Haute. **Phone:** 812-877-5210. **Acres:** 121. **Total Force:** civilian, 0; military, 1,022. **Component:** ANG. **Unit/mission:** 181st IW, DCGS, TACP operations.

IOWA

■ **Des Moines ANGB**, Des Moines Intl. Airport, Iowa 50321. **Nearest city:** Des Moines. **Phone:**

515-261-8290. **Acres:** 172. **Total Force:** civilian, 0; military, 1,329. **Component:** ANG. **Unit/mission:** 132nd Wing, DTOC and RPA, cyber, and ISR operations.

■ **Fort Dodge ANGS**, Iowa 50501. **Nearest city:** Fort Dodge. **Phone:** (515) 574-3208. **Acres:** 13. **Total Force:** civilian, 43; military, 232. **Component:** ANG. **Unit/mission:** 133rd Test Squadron, command and control.

■ **Sioux Gateway Airport Brigadier General "Bud" Day Field**, Iowa 51111. **Nearest city:** Sioux City. **Phone:** 712-233-0732/0809. **Acres:** 269. **Total Force:** civilian, 0; military, 1,121. **Component:** ANG. **Unit/mission:** 185th ARW, air mobility operations. **History:** Activated as Sioux City AAB in July 1942. Closed in December 1945. Reopened in September 1946 as Sioux City ARB. Returned to joint civil-military use. Named in 2002 for retired Col. George E. "Bud" Day, Vietnam POW and MOH recipient, and renamed in 2018 following Day's posthumous promotion to brigadier general.

KANSAS

■ **Forbes Field ANGB**, Kan. 66619. **Nearest city:** Topeka. **Phone:** 785-862-1234. **Acres:** 215. **Total Force:** civilian, 341; military, 1,750. **Component:** ANG. **Unit/mission:** 190th ARW, air mobility, combat weather operations. **History:** Named for Maj. Daniel H. Forbes Jr., pilot killed June 5, 1948, test-flying Northrop YB-49 "Flying Wing."

■ **McConnell AFB**, Kan. 67221. **Nearest city:** Wichita. **Phone:** 316-759-6100. **Acres:** 3,577. **Total Force:** civilian, 0; military, 4,745. **Active-Duty USAF:** enlisted, 2,827; officer, 372. **Owning command:** AMC. **Unit/mission:** 22nd ARW (AMC), air mobility operations; 184th IW (ANG), cyber, DCGS, ISR operations, space C2, TACP operations; 931st ARW (AFRC), air mobility operations. **History:** Activated June 5, 1951. Named for three Wichita natives, the McConnell brothers—Lt. Col. Edwin M. (died Sept. 1, 1997), Capt. Fred J. (died in a private airplane crash Oct. 22, 1945), and 2nd Lt. Thomas L. (killed July 10, 1943)—all WWII B-24 pilots. **Inn:** 316-759-6999.

■ **Smoky Hill Weapons Range**, Kan. 67401. **Nearest city:** Salina. **Acres:** 33,878. **Component:** ANG. **Unit/mission:** 284th Air Support Operations Squadron; bombing range, combined arms training.

KENTUCKY

■ **Louisville ANGB**, Louisville Intl. Airport, Ky. 40213. **Nearest city:** Louisville. **Phone:** 502-413-4400. **Total Force:** civilian, 0; military, 1,228. **Component:** ANG. **Unit/mission:** 123rd AW, air mobility, bare base, special tactics operations.

LOUISIANA

■ **Barksdale AFB**, La. 71110. **Nearest city:** Bossier City. **Phone:** 318-456-1110. **Acres:** 22,504. **Total Force:** civilian, 1,459; military, 6,367. **Active-duty USAF:** enlisted, 4,670; officer, 1,031. **Owning command:** AFGSC. **Unit/mission:** 2nd BW (AFGSC), bomber operations; 307th BW (AFRC), bomber operations, training; Hq. AFGSC, management; Hq. 8th Air Force (AFGSC), operational leadership. **History:** Activated Feb. 2, 1933. Named for Lt. Eugene H. Barksdale, WWI airman killed

in August 1926 crash. **Museum:** Barksdale Global Power Museum. **Inn:** 318-456-3091. **Golf:** Bomber Bayou.

■ **Claiborne Range**, La. **Nearest city:** Alexandria. **Phone:** 318-487-0378. **Acres:** 7,800. **Owning command:** AFRC. **Unit/mission:** 307th Operations Support Squadron; bombing, exercise and target training, and electronic countermeasure training.

■ **NAS JRB New Orleans, La.** 70143. **Nearest city:** New Orleans. **Phone:** 504-678-7569. **Acres:** 5,299 (ANG: 89). **Total Force:** civilian, 0; military, 3,194. **Component:** ANG. **Unit/mission:** 122nd ASOS (Pineville, La.), TACP; 159th FW, fighter operations; 214th EIS, cyber operations; 236th CBCS (Hammond, La.), combat communications.

MAINE

■ **Bangor ANGB**, Bangor Intl. Airport, Maine 04401. **Nearest city:** Bangor. **Phone:** 207-404-7700. **Acres:** 281. **Total Force:** civilian, 383; military, 1,427. **Component:** ANG. **Unit/mission:** 101st ARW, air mobility, combat communications.

■ **South Portland AGS**, Maine 04106. **Nearest city:** South Portland. **Phone:** 207-756-7904. **Acres:** 12. **Total Force:** civilian, 31; military, 432. **Component:** ANG. **Unit/mission:** 265th Combat Communications Squadron, 243rd Engineering Installation Squadron.

MARYLAND

■ **JB Andrews**, Md. 20762. **Nearest city:** Washington, D.C. **Phone:** 301-981-1110. **Acres:** 4,903. **Total Force:** civilian, 0; military, 10,583. **Active-duty USAF:** enlisted, 4,651; officer, 2,076. **Owning command:** AFDW. **Unit/mission:** 11th Wing (AFDW), helicopter operations, support; 89th AW (AMC), air mobility operations; 113th Wing (ANG), air mobility, fighter operations; 459th ARW (AFRC), air mobility operations; 844th CG (AFDW), cyber operations; Air Force Legal Operations Agency (USAF); Air Force Review Boards Agency (USAF); ANG Readiness Center (ANG), support. **History:** Activated May 1943. NAF Washington dates from 1919 at Anacostia (above); moved to Andrews 1958. Formed JB Andrews-NAF Washington under Air Force lead 2010. Andrews named for Lt. Gen. Frank M. Andrews, military air pioneer and WWII commander of the European Theater, killed in aircraft accident May 3, 1943, in Iceland. **Inn:** 301-981-4614. **Golf:** The Courses at Andrews.

■ **Warfield ANGB**, Martin State Airport, Md. 21220. **Nearest city:** Baltimore. **Phone:** 410-918-6001. **Acres:** 175. **Total Force:** civilian, 240; military, 1,250. **Component:** ANG. **Unit/mission:** 175th Wing, cyber, fighter operations.

MASSACHUSETTS

■ **Barnes ANGB**, Westfield-Barnes Regional Airport, Mass. 01085. **Nearest city:** Westfield. **Phone:** 413-568-9151. **Total Force:** civilian, 389; military, 1,159. **Component:** ANG. **Unit/mission:** 104th FW, fighter operations.

■ **Hanscom AFB**, Mass. 01731. **Nearest city:** Boston. **Phone:** 781-225-1110. **Acres:** 846. **Total Force:** civilian, 2,686; military, 1,403. **Active-duty Air Force:** enlisted, 851; officer, 746. **Owning command:** AFMC. **Unit/mission:** 66th ABG (AFMC), support; PEO-Battle Management,



Airman 1st Class Alexandra Huettner/ANG

Airmen with the 275th Cyber Operations Group at Warfield ANGB, Md.



PEO-C3I and Networks (AFMC), PEO-Nuclear Command, Control, and Communications (NC3) (AFMC) acquisition. **History:** Activated 1941. Named for Laurence G. Hanscom, a pre-WWII advocate of private aviation, killed in light plane accident 1941. **Inn:** 781-225-4444. **Golf:** Patriot.

■ **Joint Base Cape Cod, Mass.,** 02542. **Nearest city:** Buzzards Bay. **Phone:** 508-968-4000. **Total Force:** civilian, 340; military, 2,246. **Major components:** Camp Edwards, Massachusetts Army National Guard; Otis ANGB; Cape Cod AFS; Coast Guard Air Station Cape Cod.

■ **JBCC-Cape Cod AFS,** Mass. 02561. **Nearest city:** Sandwich. **Phone:** 508-968-3277. **Acres:** 101. **Total Force:** civilian, 3; military, 101. **Owning command:** USSF. **Unit/mission:** 6th SWS (USSF), missile warning. **History:** Established April 4, 1980, as Cape Cod Missile Early Warning Station. Renamed Jan. 5, 1982.

■ **JBCC-Otis ANGB,** Mass. 02542. **Nearest city:** Falmouth. **Phone:** 508-968-4003. **Acres:** 4,026. **Total Force:** part of JB Cape Cod. **Component:** ANG. **Unit/mission:** 102nd IW, C2, DCGS operations, EIG, WXF; 202nd ISRG, cyber intelligence; 253rd CEIG, combat communications, cyber. **History:** Named for 1st Lt. Frank J. Otis, Massachusetts ANG flight surgeon and pilot, killed in 1937 crash.

■ **Westover ARB,** Mass. 01022. **Nearest city:** Chicopee. **Phone:** 413-557-1110. **Acres:** 2,181. **Total Force:** civilian, 675; military, 2,975. **Component:** AFRC. **Unit/mission:** 439th AW, C-5M air mobility operations. **History:** Dedicated April 6, 1940. Named for Maj. Gen. Oscar Westover, Chief of the Air Corps, killed Sept. 21, 1938. **Inn:** 413-593-5421.

MICHIGAN

■ **Alpena CRTC,** Alpena County Regional Airport, Mich. 49707. **Nearest city:** Alpena. **Phone:** 989-354-6583. **Acres:** 657. **Total Force:** civilian, 8; military, 115. **Component:** ANG. **Unit/mission:** training support and facilities.

■ **Battle Creek ANGB,** W. K. Kellogg Airport, Mich. 49037. **Nearest city:** Battle Creek. **Phone:** 269-969-3234. **Total Force:** civilian, 0; military, 1,345. **Component:** ANG. **Unit/mission:** 110th Wing, MQ-9 Reaper, C2, cyber, agile combat support.



A 14th Flying Training Wing instructor pilot and student pilot conduct preflight checks in a T-6 Texan II Columbus Air Force Base, Miss.

■ **Selfridge ANGB,** Mich. 48045. **Nearest city:** Mount Clemens. **Phone:** 586-239-4011. **Acres:** 3,603. **Total Force:** civilian, 976; military, 2,457. **Component:** ANG. **Unit/mission:** 127th Wing, air mobility, fighter operations. **History:** Activated July 1917. Transferred to Michigan ANG July 1971. Named for 1st Lt. Thomas E. Selfridge, killed Sept. 17, 1908, at Fort Myer, Va., when airplane piloted by Orville Wright crashed. **Museum:** Selfridge Military Air Museum. **Golf:** Selfridge.

MINNESOTA

■ **Duluth ANGB,** Duluth Intl. Airport, Minn. 55811. **Nearest city:** Duluth. **Phone:** 218-788-7210. **Acres:** 174. **Total Force:** civilian, 0; military, 1,463. **Component:** ANG. **Unit/mission:** 148th FW, EOD, fighter operations.

■ **Minneapolis-St. Paul ARS,** Minneapolis-St. Paul Intl. Airport, Minn. 55450. **Nearest city:** Minneapolis. **Phone:** 612-713-1000. **Acres:** 246. **Total Force:** civilian, 0; military, 809. **Component:** ANG/AFRC. **Unit/mission:** 133rd AW (ANG), air mobility operations; 934th AW (AFRC), air mobility, cyber operations.

MISSISSIPPI

■ **Allen C. Thompson Field ANGB,** Jackson-Medgar Wiley Evers Intl. Airport, Miss. 39232. **Nearest city:** Jackson. **Phone:** 601-405-8300. **Acres:** 308. **Total Force:** civilian, 352; military, 1,205. **Component:** ANG. **Unit/mission:** 172nd AW, 183rd AS, 183rd Air Evacuation Squadron, air mobility operations.

■ **Columbus AFB,** Miss. 39710. **Nearest city:** Columbus. **Phone:** 662-434-1110. **Acres:** 4,919. **Total Force:** civilian, 601; military, 1,408. **Active-duty USAF:** enlisted, 589; officer, 962. **Owning command:** AETC. **Unit/mission:** 14th FTW (AETC), pilot training. **History:** Activated 1942 for pilot training. **Inn:** 662-434-2548.

■ **Gulfport CRTC,** Gulfport-Biloxi Intl. Airport, Miss. 39507. **Nearest city:** Gulfport. **Phone:** 228-214-6047. **Acres:** 277. **Total Force:** civilian, 784; military, 3,417. **Component:** ANG. **Unit/mission:** 209th Special Operations Civil Engineering Squadron, 255th Air Control Squadron; cross-domain training.

■ **Keesler AFB,** Miss. 39534. **Nearest city:** Biloxi. **Phone:** 228-377-1110. **Acres:** 1,670. **Total**

Force: civilian, 1,638; military, 6,719. **Active-duty USAF:** enlisted, 3,804, officer, 783. **Owning command:** AETC. **Unit/mission:** 81st TRW (AETC), training; 403rd Wing (AFRC), air mobility operations, weather reconnaissance; Hq. 2nd Air Force (AETC), operational leadership. **History:** Activated June 12, 1941. Named for 2nd Lt. Samuel R. Keesler Jr., a native of Mississippi and WWI aerial observer killed in action Oct. 9, 1918. **Inn:** 228-374-0088. **Golf:** Bay Breeze.

■ **Key Field ANGB,** Meridian Regional Airport, Miss. 39307. **Nearest city:** Meridian. **Phone:** 601-484-9000. **Acres:** 126. **Total Force:** civilian, 0; military, 1,258. **Component:** ANG. **Unit/mission:** 186th ARW, air mobility, C2, ISR, TACPOperations. **History:** Named after Fred and Al Key, air-to-air refueling pioneers and 1935 flight-endurance record holders for 27 days aloft in Ole Miss, on permanent display at the National Air and Space Museum.

MISSOURI

■ **Jefferson Barracks ANGB,** Mo. 63125. **Nearest city:** St. Louis. **Phone:** 314-527-8000. **Acres:** 135. **Total Force:** civilian, 108; military, 1,311. **Component:** ANG. **Unit/mission:** 131st MSG, support; 157th AOG, C2 operations; 239th CBCS, combat communications.

■ **Rosecrans ANGB,** Rosecrans Memorial Airport, Mo. 64503. **Nearest city:** St. Joseph. **Phone:** 816-236-3300. **Acres:** 90. **Total Force:** civilian, 0; military, 1,058. **Component:** ANG. **Unit/mission:** 139th AW (ANG), air mobility operations; Advanced Airlift Tactics Training Center (ANG/AFRC).

■ **Whiteman AFB,** Mo. 65305. **Nearest city:** Knob Noster. **Phone:** 660-687-1110. **Acres:** 5,566. **Total Force:** civilian, 1,098; military, 5,875. **Active-duty USAF:** enlisted, 3,838; officer, 558. **Owning command:** AFGSC. **Unit/mission:** 72nd Test and Evaluation Squadron (AFGSC), T&E; 131st BW (ANG), bomber operations; 325th WPS (ACC), tactics training; 442nd FW (AFRC), fighter operations; 509th BW (AFGSC), bomber operations. **History:** Activated 1942. Named for 2nd Lt. George A. Whiteman, first pilot to die in aerial combat during the attack on Pearl Harbor. **Inn:** 660-687-1844. **Golf:** Royal Oaks.

MONTANA

■ **Malmstrom AFB,** Mont. 59402. **Nearest city:** Great Falls. **Phone:** 406-731-1110. **Acres:** 3,628. **Total Force:** civilian, 628; military, 3,486. **Active-duty USAF:** enlisted, 3,124; officer, 456. **Owning command:** AFGSC. **Unit/mission:** 341st MW (AFGSC), ICBM operations; 819th RED HORSE (ACC/ANG), barebase operations. **History:** Activated Dec. 15, 1942. Named for Col. Einar A. Malmstrom, WWII fighter commander killed in air accident Aug. 21, 1954. **Inn:** 406-727-8600.

■ **Montana ANGB,** Great Falls Intl. Airport, Mont. 59404. **Nearest city:** Great Falls. **Phone:** 406-791-0159. **Acres:** 139. **Total Force:** civilian, 0; military, 792. **Component:** ANG. **Unit/mission:** 120th AW, air mobility operations, RED HORSE.

NEBRASKA

■ **Nebraska ANGB,** Lincoln Airport, Neb. 68524. **Nearest city:** Lincoln. **Phone:** 402-309-1219. **Acres:** 129. **Total Force:** civilian, 0; military,





Tech. Sgt. Emerson Nuñez

An MQ-9 Reaper taxis at Creech Air Force Base, Nev., home to most MQ-9 operations.

1,784. **Component:** ANG. **Unit/mission:** 155th ARW, air mobility operations.

■ **Offutt AFB**, Neb. 68113. **Nearest city:** Bellevue. **Phone:** 402-294-1110. **Acres:** 1,923. **Total Force:** civilian, 2,608; military, 6,933. **Active-duty USAF:** enlisted, 5,142; officer, 1,304. **Owning command:** ACC. **Unit/mission:** 55th Wing (ACC), ISR, electronic attack; Hq. STRATCOM, operational leadership; 557th Weather Wing (ACC), management; 595th C2 Group (AFGSC), operations (NC2); 170th Group (ANG), support, training. **History:** Activated 1896 as Army's Fort Crook. Used for airships from 1918 and aircraft cross-country stop from 1921. Landing field named May 10, 1924, for 1st Lt. Jarvis J. Offutt, WWI pilot who died Aug. 13, 1918. Served as bomber production facility January 1942 to September 1945. Redesignated Offutt Field June 1946. Redesignated Offutt AFB on Jan. 13, 1948, transferred to USAF. **Museum:** Zorinsky Memorial Air Park. **Inn:** 402-294-3671. **Golf:** Willow Lakes.

NEVADA

■ **Creech AFB**, Nev. 89018. **Nearest city:** Indian Springs. **Phone:** 702-652-1110. **Acres:** 2,318. **Total Force:** civilian, 93; military, 3,079. **Active-duty USAF:** enlisted, 2,246; officer, 941. **Owning command:** ACC. **Unit/mission:** 432nd WG (ACC), 726th OG (AFRC), 556th Test and Evaluation Sq. (ACC), 232nd Operations Sq. (ANG), RPA operations; 799th ABG (ACC), support. **History:** Built in 1943 as auxiliary landing field to support air-to-air gunnery and other AAF training. Called Indian Springs Airport. Closed in 1947. Reopened in 1949. Became Indian Springs AFB in 1950. Transferred to Air Research and Development Command in 1952. Redesignated Indian Springs Air Force Auxiliary Field and assigned to Nellis AFB in 1964. In 2005, renamed Creech AFB for Gen. Wilbur L. "Bill" Creech, commander, Tactical Air Command, 1978 to 1984.

■ **Nellis AFB**, Nev. 89191. **Nearest city:** Las Vegas. **Phone:** 702-652-1110. **Acres:** 14,160. **Total Force:** civilian, 1,603; military, 8,730. **Active-duty USAF:** enlisted, 7,131; officer, 1,425. **Owning command:** ACC. **Unit/mission:** 57th Wing (ACC), combat training; 99th ABW (ACC), support; 820th RED HORSE (ACC), bare base operations; 926th Wing (AFRC), associate missions at Beale, Creech, Eglin, Hurlburt, Nellis, Schriever; USAF Warfare Center (ACC), operational testing, tactics development, training; Nevada Test and Training Range (ACC), range management, operations.

History: Activated July 1941 as Las Vegas AAF with Army Air Corps Flexible Gunnery School. Closed 1947. Reopened 1948. Named for 1st Lt. William H. Nellis, WWII P-47 fighter pilot, killed Dec. 27, 1944. **Museum:** The Thunderbirds Museum. **Inn:** 702-652-2711. **Golf:** Sunrise Vista.

■ **Nevada ANGB**, Reno-Tahoe Intl. Airport, Nev. 89502. **Nearest city:** Reno. **Phone:** 775-788-4515. **Acres:** 60. **Total Force:** civilian, 0; military, 1,204. **Component:** ANG. **Unit/mission:** 152nd AW, air mobility, DCGS operations. **History:** Named for Maj. Gen. James A. May, Nevada adjutant general, 1947 to 1967.

NEW HAMPSHIRE

■ **New Boston SFS**, N.H. 03070. **Phone:** 719-567-5040 (Space Delta 6). **Acres:** 2,873. **Total Force:** civilian, 36; military, 6. **Component:** USSF. **Unit/mission:** 23rd Space Operations Squadron, satellite command and control. **History:** Began as a research-and-development facility in 1960 with van-mounted equipment, becoming part of the operational Air Force in 1987.

■ **Pease ANGB**, Portsmouth Intl. Airport at Pease, N.H. 03803. **Nearest city:** Portsmouth. **Phone:** 603-430-3577. **Acres:** 216. **Total Force:** civilian, 0; military, 1,063. **Component:** ANG. **Unit/mission:** 64th ARS (AMC) (active associate), 157th ARW (ANG), air mobility operations. **History:** Site of former Portsmouth AFB, activated June 1956. Renamed Sept. 7, 1957, for Capt. Harl Pease Jr., MOH recipient, B-17 pilot killed in WWII. Air Force base closed March 31, 1991.

NEW JERSEY

■ **Atlantic City ANGB**, Atlantic City Intl. Airport, N.J. 08234. **Nearest city:** Egg Harbor Township. **Phone:** 609-761-6000. **Acres:** 307. **Total Force:** civilian, 0; military, 1,403. **Component:** ANG. **Unit/mission:** 177th FW, fighter, TACP operations.

■ **JB McGuire-Dix-Lakehurst**, N.J. 08641. **Nearest city:** Wrightstown. **Phone:** 609-754-1100. **Acres:** 3,620 (McGuire AFB); 30,720 (Fort Dix). **Total Force:** civilian, 5,064; military, 14,268. **Active-duty USAF:** enlisted, 5,056; officer, 790. **Owning command:** AMC. **Unit/mission:** 87th ABW (AMC), support; 108th Wing (ANG), air mobility, bare base operations; 305th AMW (AMC), 514th AMW (AFRC), air mobility operations; 621st CRW (AMC), bare base operations; US Air Force

Expeditionary Center (AMC), training. **History:** McGuire activated 1941 as Fort Dix AAB. Closed after WWII. Reopened as McGuire 1948. Dix activated 1917. Navy purchased Army's Camp Kendrick in 1921 for airship station, renamed Lakehurst for city of Lakehurst, N.J. Formed as joint base under Air Force lead 2009. McGuire named for Maj. Thomas B. McGuire Jr., P-38 pilot, second leading U.S. ace of WWII, MOH recipient, killed in action Jan. 7, 1945. Dix named for Maj. Gen. John Adams Dix, War of 1812 and Civil War veteran and U.S. senator. **Museum:** Fort Dix Military Heritage Hall, Army Reserve Mobilization Museum. **Inn:** 609-754-4667; 732-323-2266 (Lakehurst). **Golf:** Fountain Green, Pine Ridge.

■ **Warren Grove Range**, N.J. **Nearest city:** Warren Grove. **Phone:** 609-754-1100. (108th Wing at JB McGuire-Dix-Lakehurst). **Acres:** 9,416. **Component:** ANG. **Unit/mission:** air and ground combat training. **History:** Began as a World War II weapons research location and became part of the New Jersey Air National Guard in the early 1960s.

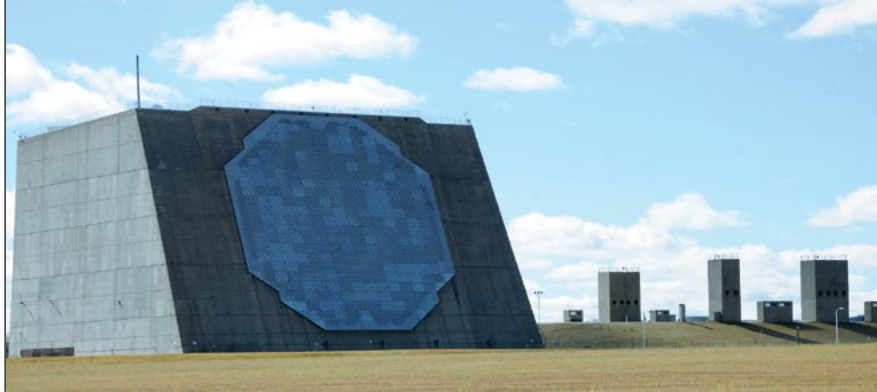
NEW MEXICO

■ **Cannon AFB**, N.M. 88103. **Nearest city:** Clovis. **Phone:** 575-784-4131. **Acres:** 4,522. **Total Force:** civilian, 0; military, 4,716. **Active-duty USAF:** enlisted, 3,830; officer, 844. **Owning command:** AFSOC. **Unit/mission:** 27th SOW (AFSOC), special operations. **History:** Activated August 1942. Named for Gen. John K. Cannon, WWII commander of all Allied air forces in the Mediterranean Theater and former commander, Tactical Air Command. **Inn:** 575-784-2918/2919. **Golf:** Whispering Winds.

■ **Holloman AFB**, N.M. 88330. **Nearest city:** Alamogordo. **Phone:** 575-572-7381. **Acres:** 57,152. **Total Force:** civilian, 839; military, 4,227. **Active-duty USAF:** enlisted, 4,432; officer, 622. **Owning command:** AETC. **Unit/mission:** 49th Wing (AETC), RPA training; 54th FG (AETC), fighter operations; 704th TG (AFMC), test; 429th ACTS (AFRC), RPA training. **History:** Activated 1941. Named for Col. George Holloman, guided-missile pioneer. **Inn:** 505-595-1905. **Golf:** Apache Mesa.

■ **Kirtland AFB**, N.M. 87117. **Nearest city:** Albuquerque. **Phone:** 505-846-0011. **Acres:** 43,842. **Total Force:** civilian, 2,789; military, 4,980. **Active-duty USAF:** enlisted, 2,606; officer,





Courtesy photo

A view of the Perimeter Acquisition Radar building located at Cavalier Space Force Station in North Dakota. The building houses the Perimeter Acquisition Radar Attack Characterization System, a key piece of the national military command system.

835. Owning command: AFGSC. **Unit/mission:** 58th SOW (AETC), 150th SOW (ANG), special operations, CSAR training; 377th ABW (AFGSC), executive agent for installation, support, nuclear operations; AFNWC (AFMC), acquisition, sustainment; Air Force Safety Center (USAF), management; AFRL Directed Energy Directorate (AFMC), R&D; PEO-Strategic Systems (AFMC), acquisition; Space Development and Test Directorate (AFSPC), test; AFRL Space Vehicles Directorate (AFMC), R&D. **History:** Activated January 1941. Named for aviation pioneer Col. Roy C. Kirtland. **Inn:** 505-846-9653. **Golf:** Tijeras Arroyo.

■ **Melrose AF Range**, N.M. **Nearest city:** Floyd. **Acres:** 79,973. **Owning command:** AFSOC. **Unit/mission:** part of 27th Special Operations Wing. **History:** Established as a bombing range in 1952.

NEW YORK

■ **Francis S. Gabreski ANGB**, Francis S. Gabreski Airport, N.Y. 11978. **Nearest city:** Westhampton Beach. **Phone:** 631-723-7470. **Acres:** 80. **Total Force:** civilian, 174; military, 1,122. **Component:** ANG. **Unit/mission:** 106th RQW, personnel recovery operations. **History:** Named for Col. Francis S. Gabreski, WWII and Korean War ace.

■ **Hancock Field ANGB**, N.Y. 13211. **Nearest city:** Syracuse. **Phone:** 1-800-982-3696. **Acres:** 322. **Total Force:** civilian, 18; military, 2,215. **Component:** ANG. **Unit/mission:** 174th ATKW, ISR, RPA, space C2, TACP operations; ISR, RPA training.

■ **Niagara Falls ARS**, Niagara Falls Intl. Airport, N.Y. 14304. **Nearest city:** Niagara Falls. **Phone:** 716-236-2000. **Acres:** 986. **Total Force:** civilian, 0; military, 2,285. **Component:** ANG/AFRC. **Unit/mission:** 107th ATKW (ANG), RPA operations; 914th ARW (AFRC), air mobility operations.

■ **Stewart ANGB, Stewart Intl. Airport**, N.Y. 12550. **Nearest city:** Newburgh. **Phone:** 845-563-2031. **Acres:** 267. **Total Force:** civilian, 290; military, 2,000. **Component:** ANG. **Unit/mission:** 105th AW, air mobility, EIS. **History:** Stewart AFB until 1969. Acquired by state of New York 1970.

■ **Stratton ANGB**, Schenectady County Airport, N.Y. 12302. **Nearest city:** Scotia. **Phone:** 518-344-2000. **Acres:** 129. **Total Force:** civilian, 207; military, 1,362. **Component:** ANG. **Unit/mission:** 109th AW, air mobility operations, Antarctic support.

NORTH CAROLINA

■ **Charlotte ANGB**, Charlotte Douglas Intl. Airport, N.C. 28208. **Nearest city:** Charlotte. **Phone:**

704-391-4100. **Acres:** 110. **Total Force:** civilian, 0; military, 1,672. **Component:** ANG. **Unit/mission:** 145th AW, aeromedical evacuation, air mobility, combat communications, TACP operations.

■ **Dare County Bombing Range**, N.C. **Nearest city:** Goldsboro. **Phone:** 919-722-1110 (Seymour Johnson AFB operator). **Acres:** 46,604. **Owning command:** ACC. **Unit/mission:** air-to-surface target training.

■ **New London ANGB**, Stanly County Airport, N.C. 28127. **Phone:** 704-391-4141 (145th AW public affairs). **Acres:** 114. **Total Force:** civilian, 32; military, 278. **Component:** ANG. **Unit/mission:** 263rd CCS, strategic emergency communications; 118th ASOS, terminal attack control of joint close air support missions; 235th ATS, air traffic control.

■ **Pope Field**, N.C. 28308. **Nearest city:** Fayetteville. **Phone:** 910-394-1110. **Acres:** N/A. **Total Force:** civilian, 240; military, 1,491. **Active-duty USAF:** enlisted, 2,017; officer, 506. **Unit/mission:** 18th ASOG (ACC), combat weather, TACP operations; 21st STS, 24th STS (AFSOC), special tactics operations; 43rd AG (AMC), air mobility operations; USAF Combat Control School (AFSOC), training. **History:** Activated 1919. Pope AFB became Pope Field, part of Fort Bragg, March 1, 2011. Named for 1st Lt. Harley H. Pope, WWI pilot, killed Jan. 7, 1919. **Museum:** Air Park. **Inn:** IHG Army Hotels, 910-396-7700.

■ **Seymour Johnson AFB**, N.C. 27531. **Nearest city:** Goldsboro. **Phone:** 919-722-1110. **Acres:** 4,129. **Total Force:** civilian, 0; military, 5,953. **Active-duty USAF:** enlisted, 4,270; officer, 565. **Owning command:** ACC. **Unit/mission:** 4th FW (ACC), 414th FG (AFRC), fighter operations; 567th RED HORSE (ACC), base operations; 916th ARW (AFRC), air mobility operations. **History:** Activated Sept. 12, 1942, and named for Navy Lt. Seymour A. Johnson, Goldsboro native, killed March 5, 1941. **Inn:** 919-722-0385.

NORTH DAKOTA

■ **Cavalier SFS**, N.D. 58220. **Nearest city:** Cavalier. **Phone:** 701-993-3292. **Acres:** 295. **Total Force:** civilian, 6; military, 30. **Owning command:** USSF. **Unit/mission:** 10th SWS (USSF), missile warning. **History:** Established 1975 as Army's Mickelsen Complex, an anti-ballistic missile facility. All but perimeter acquisition radar inactivated 1976. USAF took radar operational control 1977 and site control 2007.

■ **Grand Forks AFB**, N.D. 58205. **Nearest city:** Grand Forks. **Phone:** 701-747-3000. **Acres:** 5,420. **Total Force:** civilian, 0; military, 1,815. **Active-duty**

USAF: enlisted, 1,696; officer, 274. **Owning command:** ACC. **Unit/mission:** 319th RW (ACC), support. **History:** Activated 1956. Named after town of Grand Forks, whose citizens bought the property for the Air Force. **Inn:** 701-747-7200. **Golf:** Plainsview.

■ **Hector Field**, Hector Intl. Airport, N.D. 58102. **Nearest city:** Fargo. **Phone:** 701-451-2259. **Acres:** 255. **Total Force:** civilian, 320; military, 1,775. **Component:** ANG. **Unit/mission:** 119th Wing, 178th ATKS (MQ-9 operations), 119th ISRG (targeting).

■ **Minot AFB**, N.D. 58705. **Nearest city:** Minot. **Phone:** 701-723-7979. **Acres:** 5,615. **Total Force:** civilian, 50; military, 5,843. **Active-duty USAF:** enlisted, 5,582; officer, 721. **Owning command:** AFGSC. **Unit/mission:** 5th BW (AFGSC), bomber operations; 91st MW (AFGSC), ICBM operations. **History:** Activated January 1957. Named after city of Minot, whose citizens donated \$50,000 toward purchase of the land. **Inn:** 701-723-6161. **Golf:** Rough Rider.

OHIO

■ **Blue Ash ANGS**, Ohio 45242. **Nearest city:** Cincinnati. **Phone:** 513-936-2982. **Acres:** 12. **Total Force:** civilian, 0; military, 0 (unit deployed overseas in November 2020). **Component:** ANG. **Unit/mission:** 123rd ACS, command and control.

■ **Mansfield Lahm ANGB**, Ohio 44903. **Nearest city:** Mansfield. **Phone:** 419-520-6420. **Acres:** 2,987. **Total Force:** civilian, 0; military, 1,517. **Component:** ANG. **Unit/mission:** 179th AW, air mobility operations. **History:** Named in 1948 for nearby city and aviation pioneer Brig. Gen. Frank P. Lahm.

■ **Rickenbacker ANGB**, Rickenbacker Intl. Airport, Ohio 43217. **Nearest city:** Columbus. **Phone:** 614-492-3269. **Acres:** 169. **Total Force:** civilian, 396; military, 3,026. **Component:** ANG. **Unit/mission:** 121st ARW, air mobility operations. **History:** Activated 1942. Formerly Lockbourne AFB. Renamed May 7, 1974, for Capt. Edward V. Rickenbacker. Base transferred from Strategic Air Command to ANG April 1, 1980.

■ **Springfield-Beckley ANGB**, Springfield-Beckley Intl. Airport, Ohio 45502. **Nearest city:** Springfield. **Phone:** 800-851-4503. **Acres:** 180. **Total Force:** civilian, 0; military, 557. **Component:** ANG. **Unit/mission:** 178th Wing, cyber, ISR, space, RPA operations.

■ **Toledo Express ANGB**, Toledo Express Airport, Ohio 43558. **Nearest city:** Swanton. **Phone:** 419-868-4250. **Acres:** 135. **Total Force:** civilian, 0; military, 1,048. **Component:** ANG. **Unit/mission:** 180th FW, fighter operations.

■ **Wright-Patterson AFB**, Ohio 45433. **Nearest city:** Dayton. **Phone:** 937-257-1110. **Acres:** 7,947. **Total Force:** civilian, 15,127; military, 7,719. **Active-duty USAF:** enlisted, 3,259; officer, 3,006. **Owning command:** AFMC. **Unit/mission:** 88th ABW (AFMC), support; 445th AW (AFRC), air mobility operations; 591st SCS (AFMC), systems life cycle support; 655th ISR Wing (AFRC), intelligence; 711th HPW (AFRL) Airmen performance; Air Force Installation Contracting Agency (AFMC) operational acquisition; Air Force Institute of Technology (AETC), education; PEO-Agile Combat Support, PEO-Fighters and Bombers, PEO-ISR and SOF, PEO-Mobility, PEO-Tanker (AFMC), acquisition; Hq. Air Force Life Cycle Management Center





Senior Master Sgt. Jennifer Shirar/ANG

F-15 crew chiefs run through the preflight procedures for an F-15C Eagle in heritage colors at Kingsley Field, Ore.

(AFMC), acquisition and development; Hq. AFMC, management; Hq. AFRL (AFMC), R&D; National Air and Space Intelligence Center (USAF), foreign aerospace analysis; National Museum of the US Air Force (AFMC). **History:** Originally separate, Wright Field and Patterson Field were merged and redesignated Wright-Patterson AFB on Jan. 13, 1948. Named for aviation pioneers Orville and Wilbur Wright and for 1st Lt. Frank S. Patterson, killed June 19, 1918. **Museum:** National Museum of the US Air Force. **Inn:** 937-257-3451. **Golf:** Prairie Trace, Twin Base.

■ **Youngstown ARS**, Ohio 44473. **Nearest city:** Youngstown. **Phone:** 330-609-1000. **Acres:** 659. **Total Force:** civilian, 0; military, 1,470. **Component:** AFRC. **Unit/mission:** 910th AW, air mobility operations.

■ **Zanesville ANGB**, Zanesville Municipal Airport, Ohio 43701. **Nearest city:** Zanesville. **Phone:** 740-450-4748. **Acres:** 13. **Total Force:** civilian, 19; military, 94. **Component:** ANG. **Unit/mission:** 220th Engineering Installation Squadron.

OKLAHOMA

■ **Altus AFB**, Okla. 73523. **Nearest city:** Altus. **Phone:** 580-482-8100. **Acres:** 6,823. **Total Force:** civilian, 1,306; military, 1,402. **Active-duty USAF:** enlisted, 1,188; officer, 255. **Owning command:** AETC. **Unit/mission:** 97th AMW (AETC), training. **History:** Activated January 1943. Inactivated May 1945. Reactivated August 1953. **Inn:** 580-481-7356. **Golf:** Windy Trails.

■ **Tinker AFB**, Okla. 73145. **Nearest city:** Oklahoma City. **Phone:** 405-739-2026. **Acres:** 4,858. **Total Force:** civilian, 0; military, 7,860. **Active-duty USAF:** enlisted, 3,992; officer, 1,227. **Owning command:** AFMC. **Unit/mission:** 72nd ABW (AFMC), support; 137th ARW (ANG), air mobility, cyber, TACP operations; 448th SCMW (AFMC), supply chain management; 507th ARW (AFRC), air mobility operations; 513th ACG (AFRC), 552nd ACW (ACC), C2 operations; Hq. Air Force Sustainment Center (AFMC), weapon systems sustainment; Oklahoma City ALC (AFMC), weapon systems maintenance, repair, overhaul. **History:** Activated March 1942. Named for Maj. Gen. Clarence L. Tinker, who went down at sea June 7, 1942, leading a group of LB-30 bombers against Japan. **Museum:** Tinker AFB Museum, Charles B. Hall Air Park. **Inn:** 405-734-5095. **Golf:** Tinker.

■ **Tulsa ANGB**, Tulsa Intl. Airport, Okla. 74115. **Nearest city:** Tulsa. **Phone:** 918-833-7000. **Acres:** 145. **Total Force:** civilian, 0; military, 1,085. **Component:** ANG. **Unit/mission:** 138th FW, fighter, cyber operations, TACP training.

■ **Vance AFB**, Okla. 73705. **Nearest city:** Enid. **Phone:** 580-213-5000. **Acres:** 3,738. **Total Force:** civilian, 0; military, 1,472. **Active-duty USAF:**

enlisted, 391; officer, 892. **Owning command:** AETC. **Unit/mission:** 71st FTW (AETC), training. **History:** Activated November 1941. Named for Lt. Col. Leon R. Vance Jr., Enid native, 1939 West Point graduate, and MOH recipient, killed July 26, 1944. **Museum:** Air Park. **Inn:** 580-213-7358.

■ **Will Rogers ANGB**, Will Rogers World Airport, Okla. 73179. **Nearest city:** Oklahoma City. **Phone:** 405-686-5227. **Acres:** 135. **Total Force:** civilian, 0; military, 1,178. **Component:** ANG/AFSOC. **Unit/mission:** 137th SOW, ISR operations; 146th ASOS, TACP operations; 205th EIS, cyber operations.

OREGON

■ **Kingsley Field**, Crater Lake-Klamath Regional Airport, Ore. 97603. **Nearest city:** Klamath Falls. **Phone:** 541-885-6350. **Acres:** 776. **Total Force:** civilian, 0; military, 995. **Component:** ANG. **Unit/mission:** 173rd FW (active associate), training. **History:** Named for 2nd Lt. David R. Kingsley, MOH recipient, killed June 23, 1944, on Ploesti, Romania, oil field bombing mission.

■ **Portland ANGB**, Portland Intl. Airport, Ore. 97218. **Nearest city:** Portland. **Phone:** 503-335-4104. **Acres:** 222. **Total Force:** civilian, 0; military, 1,683. **Component:** ANG/AFRC. **Unit/mission:** 123rd WF (ANG), combat weather operations; 125th STS (ANG), special tactics operations; 142nd FW (ANG), fighter operations; 304th RQS (AFRC), personnel recovery operations.

PENNSYLVANIA

■ **Harrisburg ANGB**, Harrisburg Intl. Airport, Pa. 17057. **Nearest city:** Middletown. **Phone:** 717-948-2311. **Acres:** 42. **Total Force:** civilian, 241; military, 1,119. **Component:** ANG. **Unit/mission:** 193rd SOW, C2, combat communications, cyber, special, TACP operations.

■ **Johnstown ANG**, John Murtha Johnstown-Cambria County Airport, Okla. 15904. **Nearest city:** Johnstown. **Phone:** 814-532-5901. **Acres:** 10. **Total Force:** civilian, 0; military, 561. **Component:** ANG. **Unit/mission:** 258th ATCS, air traffic control.

■ **Pittsburgh ARS**, Pittsburgh Intl. Airport, Pa. 15108. **Nearest city:** Coraopolis. **AFRC phone:** 412-474-8511. **ANG phone:** 412-776-8010. **Acres:** 205. **Total Force:** civilian, 0; military, 1,202. **Component:** ANG/AFRC. **Unit/mission:** 171st ARW (ANG), air mobility operations; 911th AW (AFRC), aeromedical evacuation, air mobility operations.

PUERTO RICO

■ **Muñiz ANGB**, Luis Muñoz Marín Intl. Airport, Puerto Rico 00979. **Nearest city:** San Juan. **Phone:** 787-253-5108. **Acres:** 95. **Total Force:** civilian, 0; military, 811. **Component:** ANG. **Unit/**

mission: 156th AW, air mobility operations, weather reconnaissance.

RHODE ISLAND

■ **North Smithfield ANG**, R.I. 02986. **Nearest city:** Johnstown. **Phone:** 401-762-8600. **Acres:** 34. **Total Force:** civilian, 0; military, 81. **Component:** ANG. **Unit/mission:** 282nd CCS, combat communications.

■ **Quonset ANGB**, Quonset State Airport, R.I. 02852. **Nearest city:** North Kingstown. **Phone:** 401-267-3229. **Acres:** 104. **Total Force:** civilian, 278; military, 1,135. **Component:** ANG. **Unit/mission:** 143rd AW, air mobility operations, cyber.

SOUTH CAROLINA

■ **JB Charleston**, S.C. 29404. **Nearest city:** Charleston. **Phone:** 843-963-1110. **Acres:** 3,877 (Charleston AFB). **Total Force:** civilian, 1,471; military, 16,498. **Active-duty USAF:** enlisted, 3,404; officer 548. **Owning command:** AMC. **Unit/mission:** 315th AW (AFRC), 437th AW (AMC), air mobility operations; 628th ABW (AMC), support. **History:** Activated 1942. Inactivated March 1946. Reactivated August 1953. Formed joint base with Naval Weapons Station Charleston under Air Force lead 2010. Named for city of Charleston. **Museum:** Air Park. **Inn:** 843-963-8000. **Golf:** Wrenwoods.

■ **McEntire JNGB**, S.C. 29044. **Nearest city:** Columbia. **Phone:** 803-647-8200. **Acres:** 2,421. **Total Force:** civilian, 741; military, 3,044. **Component:** ANG. **Unit/mission:** 169th FW, 316th Fighter Squadron (active associate), fighter operations. **History:** Named for ANG Brig. Gen. B. B. McEntire Jr., killed in F-104 accident 1961.

■ **Poinsett Electronic Combat Range**, S.C. **Nearest city:** Wedgefield. **Phone:** 803-895-1110 (Shaw AFB operator); 803-895-2019 (20th FW public affairs). **Acres:** 12,521. **Owning command:** ACC. **Unit/mission:** air and ground training such as close air support controls and roadside bombing training in field conditions.

■ **Shaw AFB**, S.C. 29152. **Nearest city:** Sumter. **Phone:** 803-895-1110. **Acres:** 3,479. **Total Force:** civilian, 818; military, 6,112. **Active-duty USAF:** enlisted, 6,829; officer, 1,119. **Owning command:** ACC. **Unit/mission:** 20th FW (ACC), fighter operations; Hq. 9th Air Force (ACC), management (Hq. Air Forces Central in Southwest Asia, operational leadership). **History:** Activated Aug. 30, 1941. Named for 1st Lt. Ervin D. Shaw, one of the first Americans to see air action in WWI, killed in France July 9, 1918. **Inn:** 803-895-3803. **Golf:** Carolina Lakes.

SOUTH DAKOTA

■ **Ellsworth AFB**, S.D. 57706. **Nearest city:** Rap-



idCity. **Phone:** 605-385-5056. **Acres:** 6,034. **Total Force:** civilian, 615; military, 3,337. **Active-duty USAF:** enlisted, 2,988; officer, 363. **Owning command:** AFGSC. **Unit/mission:** 28th BW (AFGSC), bomber operations; Air Force Financial Services Center (AFMC). **History:** Activated January 1942 as Rapid City AAB. Renamed June 13, 1953, for Brig. Gen. Richard E. Ellsworth, killed March 18, 1953, in RB-36 crash. **Museum:** South Dakota Air and Space Museum. **Inn:** 605-593-0415. **Golf:** Prairie Ridge.

■ **Joe Foss Field**, S.D. 57104. **Nearest city:** Sioux Falls. **Phone:** 605-988-5700. **Acres:** 215. **Total Force:** civilian, 0; military, 402. **Component:** ANG. **Unit/mission:** 114th FW, fighter operations. **History:** Named for ANG Brig. Gen. Joseph J. Foss, WWII USMC ace and MOH recipient, former governor, former Air Force Association national president and board chairman, and founder of the South Dakota ANG.

TENNESSEE

■ **Arnold AFB**, Tenn. 37389. **Nearest city:** Manchester. **Phone:** 931-454-3000. **Acres:** 38,866. **Total Force:** civilian, 428; military, 66. **Owning command:** AFMC. **Unit/mission:** Arnold Engineering Development Complex (AFTC/AFMC), flight, space, and missile ground testing. **History:** Dedicated June 25, 1951. Named for General of the Air Force Henry H. "Hap" Arnold, legendary air power advocate and co-founder of the Air Force Association. **Inn:** 931-454-3051. **Golf:** Arnold.

■ **Berry Field ANGB**, Nashville Intl. Airport, Tenn. 37217. **Nearest city:** Nashville. **Phone:** 615-660-8062. **Acres:** 88. **Total Force:** civilian, 0; military, 1,344. **Component:** ANG. **Unit/mission:** 118th Wing, cyber, intel, RPA operations.

■ **McGhee Tyson ANGB**, McGhee Tyson Airport, Tenn. 37777. **Nearest city:** Knoxville. **Phone:** 865-336-3205. **Acres:** 346. **Total Force:** civilian, 86; military, 1,483. **Component:** ANG. **Unit/mission:** 134th ARW, air mobility operations; 119th CACS, space C2 operations; 228th CBCS, combat communications; I. G. Brown ANG Training and Education Center. **History:** Named for Naval aviator Lt. j.g. Charles McGhee Tyson, killed in WWI.

■ **Memphis ANGB**, Memphis Intl. Airport, Tenn. 38118. **Nearest city:** Memphis. **Phone:** 901-291-7435. **Acres:** 119. **Total Force:** civilian, 0; military, 1,269. **Component:** ANG. **Unit/mission:** 164th AW, air mobility operations.

TEXAS

■ **Dyess AFB**, Texas 79607. **Nearest city:** Abilene. **Phone:** 325-696-2863. **Acres:** 6,320. **Total Force:** civilian, 499; military, 4,990. **Active-duty USAF:** enlisted, 4,554, officer, 548. **Owning command:** AFGSC. **Unit/mission:** 7th BW (AFGSC), bomber operations; 317th AW (AMC), air mobility operations. **History:** Abilene AAB opened Dec. 18, 1942. Inactivated Jan. 31, 1946. Reopened and renamed Dec. 1, 1956, for Lt. Col. William E. Dyess, WWII pilot who escaped from a Japanese prison camp, killed in P-38 crash in December 1943. **Museum:** Dyess AFB Memorial Museum and Linear Air Park. **Inn:** 325-696-2681/1874. **Golf:** Mesquite Grove.

■ **Ellington Field**, Ellington Airport, Texas 77034. **Nearest city:** Houston. **Phone:** 281-929-2662. **Acres:** 213. **Total Force:** civilian, 0; military, 3,785. **Component:** ANG. **Unit/mission:** 147th

Attack Wing, ISR, RPA, TACP operations. **History:** Named for Lt. Eric L. Ellington, pilot killed November 1913.

■ **Goodfellow AFB**, Texas 76908. **Nearest city:** San Angelo. **Phone:** 325-654-1110. **Acres:** 1,083. **Total Force:** civilian, 674; military, 2,814. **Active-duty USAF:** enlisted, 3,284; officer, 552. **Owning command:** AETC. **Unit/mission:** 17th TRW (AETC), training. **History:** Established August 1940. Officially activated January 1941. Named for 1st Lt. John J. Goodfellow Jr., WWI observation airplane pilot killed in combat Sept. 14, 1918. **Inn:** 325-654-5870.

■ **Hensley Field AGS**, Grand Prairie Armed Forces Reserve Complex, Texas 75211. **Nearest city:** Dallas. **Phone:** 972-619-4444. **Acres:** 23. **Total Force:** 0. **Component:** ANG. **Unit/mission:** 254th CCG, combat communications.

■ **JB San Antonio**, Texas 78234 (Fort Sam Houston). **Nearest city:** San Antonio. **Phone:** 210-221-1211 (Fort Sam Houston operator). **Acres:** 2,808 (Fort Sam Houston). **Total Force:** civilian, 9,128; military, 14,219 (JBSA-Fort Sam Houston only). **Major components:** JBSA-Fort Sam Houston, JBSA-Lackland, JBSA-Randolph, JBSA-Camp Bullis. **Unit/mission:** 502nd ABW (AETC), located at Fort Sam Houston, support. **History:** Established 2009 to consolidate the installation management and support functions for the military facilities in San Antonio as part of 2005 base realignment and closure actions. **Museum:** Fort Sam Houston. **Inn:** IHG Army Hotel at JBSA-Fort Sam Houston, 210-357-2705. **Golf:** Fort Sam Houston.

■ **JBSA-Lackland**, Texas 78236. **Nearest city:** San Antonio. **Phone:** 210-671-1110. **Acres:** 2,723. **Medina Annex acres:** 4,028. **Total Force:** civilian, 5,757; military, 18,991. **Active-duty USAF:** enlisted, 10,497; officer, 2,860. **Owning command:** AETC. **Unit/mission:** 37th TRW (AETC), training; 59th MDW (AETC), ambulatory surgical, management, training; 67th CW (ACC), network defense operations; 149th FW (ANG), cyber, fighter operations; 433rd AW (AFRC), air mobility operations; 616th Operations Center (ACC), cyberspace operations; 688th Cyberspace Wing (ACC), information operations, engineering infrastructure services; 960th Cyberspace Wing (AFRC), cyberspace operations; Air Force Civil Engineer Center (AFMC), engineering services; Air Force Installation and Mission Support Center (AFMC), resourcing and combat support; Air Force Services Agency (AFMC) support; Hq. 24th Air Force (ACC), operational leadership; Hq. 25th Air Force (ACC), operational leadership; Hq. Air Force Security Forces Center (AFMC), management. **History:** Activated 1941 as part of Kelly Field, designated an independent installation July 1942 as San Antonio Aviation Cadet Center. Placed under Joint Base San Antonio installation management umbrella 2009. (See JBSA entry.) Named 1947 for Brig. Gen. Frank D. Lackland, early commandant of Kelly Field flying school, who died 1943. (Note: Several USAF agencies reside within Port San Antonio, the business development area created from the former Kelly AFB, but maintain JBSA-Lackland mailing addresses.). **Museum:** Airman Heritage Museum. **Inn:** 210-673-6930. **Golf:** Gateway Hills.

■ **JBSA-Randolph**, Texas 78150. **Nearest city:** San Antonio. **Phone:** 210-652-1110. **Acres:** 3,180. **Total Force:** civilian, 1; military, 3,233. **Active-duty USAF:** enlisted, 1,941; officer, 1,111. **Owning com-**

mand: AETC. **Unit/mission:** 12th FTW (AETC), training; 340th FTG (AFRC), training; 502 ABW (AETC), support; Air Force Personnel Center (USAF), management; Air Force Recruiting Service (AETC), management; Hq. AETC, management. **History:** Dedicated June 20, 1930. Placed under Joint Base San Antonio installation management umbrella 2009. (See JBSA) Named for Capt. William M. Randolph, died Feb. 17, 1928, on a training mission. **Inn:** 210-652-1844. **Golf:** Randolph Oaks.

■ **Laughlin AFB**, Texas 78843. **Nearest city:** Del Rio. **Phone:** 830-298-3511. **Acres:** 4,695. **Total Force:** civilian, 0; military, 1,360. **Active-duty USAF:** enlisted, 521; officer, 895. **Owning command:** AETC. **Unit/mission:** 47th FTW (AETC), training. **History:** Activated July 1942. Named for 1st Lt. Jack Thomas Laughlin, Del Rio native, B-17 pilot, killed Jan. 29, 1942. **Museum:** Laughlin Heritage Foundation. **Inn:** 830-298-5741. **Golf:** Leaning Pine.

■ **NAS JRB Fort Worth**, Texas 76127. **Nearest city:** Fort Worth. Navy-hosted switchboard: 817-782-5000. ANG Phone: 817-852-3136. **Acres:** 2,342. **Total Force:** civilian, 194; military, 7,946. **Component:** ANG/AFRC. **Unit/mission:** 136th AW (ANG), air mobility, combat communications operations; 301st FW (AFRC), fighter operations; Hq. 10th Air Force (AFRC), operational leadership. **Inn:** Navy Gateway, 817-782-5393.

■ **Sheppard AFB**, Texas 76311. **Nearest city:** Wichita Falls. **Phone:** 940-676-2732. **Acres:** 5,296. **Total Force:** civilian, 1,119; military, 5,730. **Active-duty USAF:** enlisted, 5,471; officer, 614. **Owning command:** AETC. **Unit/mission:** 80th FTW (AETC), Euro-NATO Joint Jet Pilot Training program; 82nd TRW (AETC), training. **History:** Activated June 14, 1941. Named for U.S. Sen. Morris Sheppard, who died April 9, 1941. **Museum:** Heritage Center. **Inn:** 940-676-2707/2970.

UTAH

■ **Hill AFB**, Utah 84056. **Nearest city:** Salt Lake City. **Phone:** 801-777-1110. **Acres:** 6,683. **Total Force:** civilian, 13,729; military, 5,579. **Active-duty USAF:** enlisted, 4,146; officer, 660. **Owning command:** AFMC. **Unit/mission:** 75th ABW (AFMC), support; 388th FW (ACC), fighter, Utah Test and Training Range operations; 419th FW (AFRC), fighter operations; 748th SCMG (AFMC), systems life cycle support; AFNWC ICBM Systems Directorate (AFMC), ICBM acquisition, support; Ogden ALC (AFMC), weapons maintenance, repair. **History:** Activated 1940. Named for Maj. Ployer P. Hill, killed Oct. 30, 1935, test-flying first B-17. **Museum:** Hill Aerospace Museum. **Inn:** 801-777-1844. **Golf:** Hubbard Memorial.

■ **Utah Test and Training Range**, Utah. **Acres:** 572,656 (South); 366,877 (North). **Total Force:** part of Hill AFB. **Owning command:** ACC. **Unit/mission:** training for air-to-air combat, air-to-ground inert and live practice bombing, gunnery training by aircrews, large force training exercises and large footprint weapons testing. **History:** First parcel activated in 1942 as Wendover Army Air Base; consolidated ranges redesignated UTTR in 1979.

■ **Wright ANGB**, Salt Lake City Intl. Airport, Utah 84116. **Nearest city:** Salt Lake City. **Phone:** 801-245-2200. **Acres:** 135. **Total Force:** civilian, 0; military, 1,571. **Component:** ANG. **Unit/mission:** 151st ARW, air mobility operations; 101st IOF, 130th EIS, cyber operations; 169th IS, intelligence operations.



VERMONT

■ **Burlington ANGB**, Burlington Intl. Airport, Vt. 05403. **Nearest city:** South Burlington. **Phone:** 802-660-5379 (Public Affairs). **Acres:** 248. **Total Force:** civilian, 0; military, 1,154. **Component:** ANG. **Unit/mission:** 158th FW, fighter operations; 229th COS, cyber training.

VIRGINIA

■ **JB Langley-Eustis**, Va. 23665. **Nearest city:** Hampton. **Phone:** 757-764-1110. **Acres:** 3,727 (Langley), 8,275 (Eustis). **Total Force:** civilian, 5669; military, 15,939. **Active-duty USAF:** enlisted, 6,920; officer, 1,453. **Langley owning command:** ACC. **Unit/mission:** 1st FW (ACC), 192nd FW (ANG), cyber, fighter operations; 480th ISRW (ACC), ISR operations; 633rd ABW (ACC), support; 363rd ISRW (ACC), ISR operations; Hq. ACC, management. **History:** Activated Dec. 30, 1916. Formed as joint base under Air Force lead 2010. Langley is first military base in US purchased and built specifically for military aviation. Langley named for aviation pioneer and scientist Samuel Pierpont Langley, who died 1906. Eustis named for Brevet Brig. Gen. Abraham Eustis, first commanding officer of Fort Monroe, Va. **Inn:** 757-764-4667. **Golf:** Eaglewood.

WASHINGTON

■ **Fairchild AFB**, Wash. 99011. **Nearest city:** Spokane. **Phone:** 509-247-1212. **Acres:** 6,102. **Total Force:** civilian, 877; military, 5,056. **Active-duty USAF:** enlisted, 3,359; officer, 491. **Owning command:** AMC. **Unit/mission:** 92nd ARW (AMC), 141st ARW (ANG), air mobility operations; USAF SERESchool (AETC), training. **History:** Activated January 1942. Named for Gen. Muir S. Fairchild, USAF Vice Chief of Staff at his death in 1950. **Museum:** Heritage Museum and Air Park. **Inn:** 509-247-5519.

■ **JB Lewis-McChord**, Wash. 98438. **Nearest city:** Tacoma. **Phone:** 253-967-1110. **Acres:** 86,213. **Total Force:** civilian, 705; military, 5,114. **Active-duty USAF:** enlisted, 2,980; officer, 558. **McChord Field owning command:** AMC. **Unit/mission:** 62nd AW (AMC), 446th AW (AFRC), air mobility operations; 627th ABG (AMC), support; Western Air Defense Sector (NORAD/ANG), warning and control. **History:** Fort Lewis established 1917; McChord Field activated July 3, 1940. Formed as joint base under Army lead in 2010. Lewis named for Capt. Meriwether Lewis of Lewis and Clark Expedition (1804-05). McChord named for Col. William C. McChord, died in aircraft crash, Aug. 18, 1937. **Museums:** Heritage Air Park, Lewis Army Museum, McChord AFB Museum. **Inn:** IHG Army Hotels, 253-982-5613. **Golf:** Eagles Pride, Whispering Firs.

WEST VIRGINIA

■ **McLaughlin ANGB**, Yeager Airport, W.Va. 25311. **Nearest city:** Charleston. **Phone:** 304-341-6249. **Acres:** 283. **Total Force:** civilian, 0; military, 1,371. **Component:** ANG. **Unit/mission:** 130th AW, air mobility, ISR operations. **History:** Named for Brig. Gen. Charles E. "Chuck" Yeager; and Brig. Gen. James K. McLaughlin, West Virginia ANG's first commanding officer.

■ **Shepherd Field, Eastern West Virginia Regional Airport**, W.Va. 25401. **Nearest city:** Mar-

tinsburg. **Phone:** 304-616-5100. **Acres:** 339. **Total Force:** civilian, 0; military, 1,517. **Component:** ANG. **Unit/mission:** 167th AW, air mobility operations.

WISCONSIN

■ **General Mitchell Field**, Milwaukee Mitchell Intl. Airport, Wis. 53207. **Nearest city:** Milwaukee. **Phone:** 414-944-8715. **Acres:** 67. **Total Force:** civilian, 0; military, 1,400. **Component:** ANG. **Unit/mission:** 128th ARW, air mobility operations. **History:** Named for Brig. Gen. William "Billy" Mitchell.

■ **Hardwood Range**, Wis. 54646. **Nearest city:** Necedah. **Acres:** 7,865. **Component:** ANG. **Unit/mission:** air-to-ground weapons delivery and threat awareness training for combat aircrews.

■ **Truax Field ANGB**, Dane County Regional Airport, Wis. 53704. **Nearest city:** Madison. **Phone:** 608-245-4395. **Acres:** 152. **Total Force:** civilian, 0; military, 3,178. **Component:** ANG. **Unit/mission:** 115th FW, fighter, ISR operations (active associate), WFX. **History:** Activated June 1942 as AAF base. Taken over by Wisconsin ANG April 1968. Named for Lt. T. L. Truax, killed in P-40 training accident 1941.

■ **Volk Field ANGB**, Wis. 54618. **Nearest city:** Madison. **Phone:** 608-427-1204. **Acres:** 2,385. **Total Force:** civilian, 183; military, 569. **Component:** ANG. **Unit/mission:** Combat Readiness Training Center; 128th ACS, C2 operations. **History:** Named for Lt. Jerome A. Volk, first Wisconsin ANG pilot to be killed in the Korean War.

WYOMING

■ **F.E. Warren AFB**, Wyo. 82005. **Nearest city:** Cheyenne. **Phone:** 307-773-3381. **Acres:** 6,834. **Total Force:** civilian, 1,082; military, 4,780. **Active-duty USAF:** enlisted, 2,924; officer, 513. **Owning command:** AFGSC. **Unit/mission:** 90th MW (AFGSC), ICBM operations; 153rd CACS (ANG), space C2 operations; Hq. 20th Air Force (AFGSC), operational leadership. **History:** Activated as Fort D. A. Russell July 4, 1867. Renamed in 1930 for Francis Emory Warren, Wyoming senator and first state governor. Reassigned to USAF in 1947 and received current designation in 1949. **Museum:** Warren ICBM and Heritage Museum. **Inn:** 307-773-1844. **Golf:** Warren.

■ **Wyoming ANGB**, Cheyenne Regional Airport, Wyo. 82001. **Nearest city:** Cheyenne. **Phone:** 307-772-6424. **Acres:** 719. **Total Force:** 2,017. **Component:** ANG. **Unit/mission:** 153rd AW, air mobility, MAFFS operations.

Overseas

Overseas installations owned, operated by, or housing substantial U.S. Air Force or U.S. Space Force activities. Individual listings may not include all units or agencies at every location.

BELGIUM

■ **Kleine Brogel AB**, Belgium APO AE 09719. **Nearest city:** Peer. **Phone:** 011-003-211-51-9412. **Total Force:** 134. **Owning command:** USAFE-AFAFRICA. **Unit/mission:** 701st Munitions Support Squadron, receive, store and maintain U.S. munitions for Belgium's F-16 aircraft in support of NATO. **History:** Established as an Allied airfield in 1944, expanded by the Belgian Air Force in 1951, and first joined by the U.S. support personnel in 1962. **Museum:** Kleine-Brogel Air Museum.

GERMANY

■ **Buechel AB**, Germany APO AE 09719. **Nearest city:** Cochem. **Phone:** 011-49-0267-89-5208. **Total Force:** 147. **Owning command:** USAFE-AFAFRICA. **Unit/mission:** 702nd Munitions Support Squadron, receive, store and maintain U.S. munitions for Germany's PA-200 Tornado aircraft in support of NATO.

■ **Ramstein AB**, Germany APO AE 09094. **Nearest city:** Landstuhl. **Phone:** 011-49-6371-47-1110. **Acres:** 3,094. **Active-duty USAF:** enlisted, 8,049; officer, 1,440. **Owning command:** USAFE-AFAFRICA. **Unit/mission:** 86th AW (USAFE-AFAFRICA), air mobility operations, support (including Kaiserslautern Military Community); 435th AGOW (USAFE-AFAFRICA), bare base, combat communications, combat weather, TACP operations; 521st AMOW (AMC), air transportation services; 603rd AOC (USAFE), C2 operations; Hq. 3rd AF (USAFE-AFAFRICA), operational leadership; Hq. USAFE-AFAFRICA, management, operational leadership. **History:** Originally Landstuhl AB, activated August 1952. Reactivated December 1957 as Ramstein-Landstuhl AB; later redesignated Ramstein AB. **Inn:** 011-49-6371-47-4920. **Golf:** Woodlawn.

■ **Spangdahlem AB**, Germany APO AE 09126. **Nearest city:** Bitburg. **Phone:** 011-49-6565-61-1110. **Acres:** 1,617. **Active-duty USAF:** enlisted, 3,485; officer, 525. **Owning command:** USAFE-AFAFRICA. **Unit/mission:** 52nd FW (USAFE), fighter operations, 726th AMS (AMC), air transport services. **History:** Built by French 1951 and turned over to U.S. 1952. **Museum:** Air Park. **Inn:** 011-49-06565-0500. **Golf:** Eifel Mountain.



Two USAF F-16s from the 480th Expeditionary Fighter Squadron, Spangdahlem Air Base, Germany, train with two Romanian F-16s over Romania.

Senior Airman Ali Stewart

★ USAF & USSF ALMANAC 2022 WEAPONS & PLATFORMS

By Aaron M. U. Church

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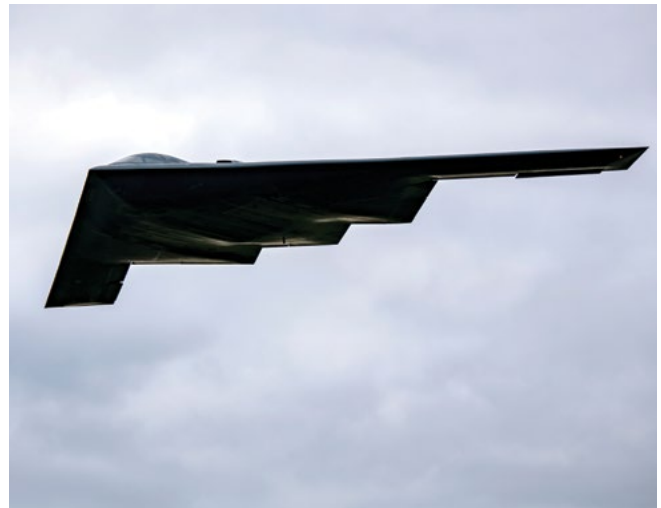


Chalk 2 for the 163rd Attack Wing

BOMBER AIRCRAFT



Senior Airman Ryan Grossklag



Senior Airman Eugene Oliver

B-1B LANCER

Long-range conventional bomber

Brief: The B-1B is a conventional, long-range, supersonic, penetrating strike aircraft derived from the canceled B-1A. The B-1A first flew on Dec. 23, 1974, and four prototypes were developed and tested before the program was canceled in 1977. The Reagan administration revived the program as the B-1B in 1981, adding 74,000 lb of usable payload, improved radar, and reduced radar cross section, while speed was reduced to Mach 1.2. Its three internal weapons bays can carry the largest payload of guided/unguided weapons in the Air Force inventory and its blended wing/body and variable-geometry wing permit long-range/loiter time. Offensive avionics include terrain following SAR and a fully integrated Sniper ATP to track and target moving vehicles. B-1B made its combat debut over Iraq during Desert Fox in 1998. The B-1B fleet completed its most comprehensive upgrade to date in September 2020. The three-part Integrated Battle Station (IBS) program begun in 2021 added an all-digital glass cockpit, Fully Integrated Data Link (FIDL) to enhance targeting/LOS/BLOS C2, and Central Integrated Test System (CITS) for real-time simplified troubleshooting. Development includes Multifunctional Information Distribution System/Joint Tactical Radio System (MIDS/JTRS) to improve situational awareness and retargeting abilities, and updated BLOS cryptography to sustain the aircraft's connectivity. The B-1B is USAF's sole Long-Range Anti-Ship Missile (LRASM) carrier and its range, speed, and payload make it a key power-projection asset in USAF's Indo-Asia Pacific strategy. USAF is expanding the B-1B's capacity to carry future weapons such as the AGM-183 ARRW hypersonic missile or 5,000 lb-class guided bombs. Recent demonstrations reconfigured the bomb bay to expand internal capacity, as well as use of the bomber's previously deactivated external pylons to carry JDAM. AFGSC retired 17 of its least serviceable airframes to free resources for sustainment in FY21 but plans to keep enough B-1Bs to maintain bomber capacity until the fleet is fully replaced by the B-21, targeted for 2032.

Contractor: Boeing (formerly Rockwell International).

First Flight: Oct. 18, 1984 (B-1B).

Delivered: June 1985-May 1988.

IOC: Oct. 1, 1986, Dyess AFB, Texas.

Production: 104.

Inventory: 45.

Operator: AFGSC, AFMC.

Aircraft Location: Dyess AFB, Texas; Edwards AFB, Calif.; Eglin AFB, Fla.; Ellsworth AFB, S.D.

Active Variant:

•B-1B. Upgraded production version of the B-1A.

Dimensions: Span 137 ft (forward sweep) to 79 ft (aft sweep), length 146 ft, height 34 ft.

Weight: Max T-O 477,000 lb.

Power Plant: Four GE Aviation F101-GE-102 augmented turbofans, each 30,780 lb thrust.

Performance: Speed 900+ mph at S-L, range approx. 7,455 miles (further with air refueling).

Ceiling: 30,000+ ft.

Armament: 84 Mk 82 (500-lb) or 24 Mk 84 (2,000-lb) general-purpose bombs; 84 Mk 62 (500-lb) or eight Mk 65 (2,000-lb) Quickstrike naval mines; 30 CBU-87/89 cluster bombs or 30 CBU-103/104/105 WCMDs; 24 GBU-31 or 15 GBU-38 JDAMs/GBU-54 JDAM; 24 AGM-158A JASSM, JASSM-ER, or LRASM.

Accommodation: Pilot, copilot, and two WSOs (offensive/defensive) on ACES II zero/zero ejection seats.

B-2 SPIRIT

Long-range heavy bomber

Brief: The B-2 is a stealthy, long-range, penetrating nuclear and conventional strike bomber. It is based on a flying wing design combining LO with high aerodynamic efficiency. The aircraft's blended fuselage/wing holds two weapons bays capable of carrying nearly 60,000 lb in various combinations. Spirit entered combat during Allied Force on March 24, 1999, striking Serbian targets. Production was completed in three blocks, and all aircraft were upgraded to Block 30 standard with AESA radar. Construction was limited to 21 aircraft due to cost and political considerations and a single B-2 was subsequently lost in a crash at Andersen on Feb. 23, 2008. Aircraft modernization is focused on safeguarding the B-2A's penetrating strike capability in high-end threat environments, though Defensive Management System upgrades to improve survivability were cut due to program delays. The B-2 fleet recently completed VLF/LF mods to assure world-wide secure, survivable C2 in the nuclear strike role. Flex Strike upgrades also added digital interface to integrate the modernized B61-12 nuclear weapon by feeding GPS guidance pre-release to thwart jamming. A notional Phase 2 would enable similar capabilities for conventional carriage. The Radar Aided Targeting System (RATS) currently in development will eventually allow the B-2 to utilize radar to guide nuclear weapons in GPS-denied environments. Further efforts are under way to increase loadout, improve hardened/buried target strike, and integrate the longer range JASSM-ER cruise missile. Ongoing upgrades include replacing the primary cockpit displays, the Adaptable Communications Suite (ACS) to provide Link 16-based jam-resistant in-flight retasking, advanced IFF, crash-survivable data recorders, and weapons integration. USAF is also working to enhance the fleet's maintainability with low-observable signature improvements to coatings, materials, and radar-absorptive structures such as the radome and engine inlets/exhausts. A B-2 was damaged in a landing accident at Whiteman on Sept. 14, 2021. USAF plans to retire the fleet once the B-21 Raider enters service in sufficient number around 2032.

Contractors: Northrop Grumman; Boeing; Vought.

First Flight: July 17, 1989.

Delivered: December 1993-December 1997.

IOC: April 1997, Whiteman AFB, Mo.

Production: 21.

Inventory: 20.

Operator: AFGSC, AFMC, ANG (associate).

Aircraft Location: Edwards AFB, Calif.; Whiteman AFB, Mo.

Active Variant:

•B-2A. Production aircraft upgraded to Block 30 standards.

Dimensions: Span 172 ft, length 69 ft, height 17 ft.

Weight: Max T-O 336,500 lb.

Power Plant: Four GE Aviation F118-GE-100 turbofans, each 17,300 lb thrust.

Performance: Speed high subsonic, range 6,900 miles (further with air refueling).

Ceiling: 50,000 ft.

Armament: Nuclear: 16 B61-7, B61-12, B83, or eight B61-11 bombs (on rotary launchers). Conventional: 80 Mk 62 (500-lb) sea mines, 80 Mk 82 (500-lb) bombs, 80 GBU-38 JDAMs, or 34 CBU-87/89 munitions (on rack assemblies); or 16 GBU-31 JDAMs, 16 Mk 84 (2,000-lb) bombs, 16 AGM-154 JSOWs, 16 AGM-158 JASSMs, or eight GBU-28 LGBs.

Accommodation: Two pilots on ACES II zero/zero ejection seats.





Staff Sgt. Zade Vadnais

B-52 STRATOFORTRESS

Long-range heavy bomber

Brief: The B-52H is a long-range nuclear/conventional bomber and USAF's primary standoff cruise missile carrier. The YB-52 prototype first flew on April 15, 1952, and Strategic Air Command declared IOC with the B-52A on June 19, 1955. Boeing produced a total of 744 B-52s culminating in the last Stratofortress variant still in service, the B-52H. Multimission capabilities include long-range precision strike, CAS, air interdiction, defense suppression, and maritime surveillance utilizing both Litening and Sniper targeting pods. The B-52 is undergoing major upgrades to replace key obsolescent systems including engines, radar, comms, and weapons interface to extend the fleet through the 2050s. Combat Network Communications Technology (CONNECT) replaces cockpit displays and comms and adds integrated mission-management, including Link 16 and machine-to-machine tasking/retargeting. CONNECT also forms the digital backbone of the B-52's Internal Weapons Bay Upgrade which transitions Conventional Rotary Launchers designed for CALCM to carry the modern AGM-158B JASSM-ER. This upgrade nearly doubles the B-52s payload of advanced weapons such as JASSM, JDAM, and MALD, while reducing drag and increasing range. CONNECT completion slipped to FY23 and ongoing associated mods include Tactical Data Link to add low-latency,

jam-resistant C2/comms, and GPS updates. Major development includes the Radar Modernization Program to replace the AN/APQ-166 with an AESA radar and the Commercial Engine Replacement Program (CERP). USAF awarded Rolls-Royce the \$2.6 billion CERP contract to re-engine the B-52 with its' more modern, efficient, and reliable F130 engine on Sept. 24, 2021. The bomber will retain its currently pylon-mounted eight-engine arrangement, and fleetwide retrofits are expected to wrap-up by 2038. AESA radar is slated for introduction in 2026, and future upgrades include VLF/LF receiver modernization, ATP color MFDs to enhance targeting and situational awareness, and AEHF SATCOM installation. Integration of the future Long-Range StandOff (LRSO) nuclear cruise missile will cement the B-52's nuclear role, complementing the B-21 Raider after retirement of the B-1 and B-2, potentially continuing to serve through the 2050s.

Contractors: Boeing (airframe/CONNECT), Rolls-Royce (CERP)/Collins Aerospace (nacelles), Raytheon (RMP).

First Flight: July 20, 1960 (B-52H).

Delivered: May 9, 1961-Oct. 26, 1962 (B-52H).

IOC: May 1961 (B-52H).

Production: 102 (B-52H).

Inventory: 76.

Operator: AFGSC, AFMC, AFRC.

Aircraft Location: Barksdale AFB, La.; Edwards AFB, Calif.; Minot AFB, N.D.

Active Variants:

•B-52H. Longer-range development of the original B-52A with more efficient turbofan engines.

Dimensions: Span 185 ft, length 159.3 ft, height 40.7 ft.

Weight: Max T-O 488,000 lb.

Power Plant: Eight Pratt & Whitney TF33-P-3 turbofans, each 17,000 lb thrust.

Performance: Speed 650 mph, range 8,800 miles (further with air refueling).

Ceiling: 50,000 ft.

Armament: Nuclear: 12 AGM-86B ALCMs externally, and eight ALCMs or gravity weapons internally. Conventional: 12 AGM-158 JASSM externally, and eight JASSM-ER/MALD/ MALD-J internally (upgraded aircraft), as well as Mk 62 sea mines, Mk 82/84 bombs, CBU-87/89 cluster bombs, CBU-103/104/105 WCMDs, GBU-31/38 JDAMs, AGM-158A JASSMs, and GBU-10/12/28 LGBs, MALD, and MALD-J jammer variant.

Accommodation: Two pilots, navigator, radar navigator, and EWO on upward/downward ejection seats.



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Andrea Jenkins/USAF



Senior Master Sgt. Vincent De Groot/ANG

AT-6 WOLVERINE

Light attack/armed reconnaissance

Brief: The AT-6E is a turboprop, light attack/armed reconnaissance aircraft developed from the T-6 primary trainer. Wolverine incorporates the A-10C's mission computer, the F-16's Hands-On-Throttle Stick, HMCS, and a digital glass cockpit with three color MFDs for integrated navigation, sensor, and weapon's management/delivery. The aircraft can carry a wide array of air-to-ground weapons on six wing pylons and can carry a centerline-mounted MX-15D EO/IR sensor for targeting and tactical ISR. The AT-6 is equipped with LINK-16/SADL data links, real-time FMV/ROVER for integration with ground forces, and tactical VHF/UHF/SATCOMS. The type was originally proposed for USAF's Light Attack/Armed Reconnaissance (LAAR) requirement which fell prey to budget cuts a decade ago. The service launched a renewed effort in 2017, kicking off the Light Attack Experiment (OA-X) which evaluated rapidly procurable off-the-shelf CAS/ISR platforms to relieve pressure on existing fleets. USAF opted to procure two AT-6 Wolverines (in addition to an equal number of AFSOC A-29 Super Tucanos) to continue experimenting with rapidly procurable light CAS/ISR platforms to develop allied capability. The AT-6s will initially aid in developing "AERONet" secure-tactical networking for U.S./partner-nation COIN applications at Nellis, while USSOCOM announced it is one of the five types under consideration to replace the U-28A. The command plans to procure upward of 75 aircraft to provide armed tactical ISR in support of special operations. Thailand became the type's first international customer ordering eight aircraft on Nov. 14, 2021, followed by Tunisia. USAF's first two aircraft arrived at Moody AFB, Ga., on Jan. 12, 2022, after nearly a year of type-certification at the manufacturer's facilities in Wichita.

Contractor: Beechcraft/Textron Aviation Defense (formerly Raytheon); Lockheed Martin (mission systems), Esterline (glass cockpit), L3/Harris (sensors).

First Flight: Sep. 10, 2009 (AT-6).

Delivered: Feb. 17, 2021-present.

IOC: N/A.

Production: Three (planned).

Inventory: Two.

Operator: ACC.

Aircraft Location: Moody AFB, Ga. Planned: Nellis AFB, Nev.

Active Variants:

•AT-6E Wolverine. Light attack/armed reconnaissance variant of the T-6A.

Dimensions: Span 33.5 ft, length 33.4 ft, height 10.7 ft.

Weight: Max T-O 10,000 lb.

Power Plant: One Pratt & Whitney Canada PT6A-68D turboprop 1,600 shp.

Performance: Speed 360 mph, range 1,700 miles (with four external tanks), mission endurance 4.5 hr (7.5 hr ferry).

Ceiling: 31,000 ft.

Armament: Wide array of laser/inertial-guided PGMs as well as laser-guided rockets (APKWS), AGM-114 Hellfire, and/or .50 cal gun on six wing-mounted hardpoints.

Accommodation: Two pilots on Martin Baker MK16LA zero/zero ejection seats.

A-10 THUNDERBOLT II

Attack, close-air support, forward air control

Brief: The A-10 "Warthog" is a specialized CAS aircraft tasked with interdiction, Forward Air Controller-Airborne (FAC-A), CSAR, and Strike Control & Reconnaissance. It combines a heavy, diverse weapons load with low-level maneuverability, a large combat radius, and long loiter time. The A-10 is capable of carrying up to 16,000 lb of ordnance in addition to its 30 mm cannon which can destroy heavy armor while the pilot is protected by a titanium-armored cockpit. The prototype YA-10A first flew on May 10, 1972, winning USAF's A-X competition for a new attack aircraft. The A-10A development aircraft first flew on Feb. 15, 1975, and A-10As were delivered

between October 1975 and March 1984. USAF declared A-10A IOC in October 1977. The fleet was modernized under the Precision Engagement Program, resulting in the A-10C which first flew at Eglin in 2005. The A-10C adds color cockpit MFDs, a Helmet Mounted Cueing System (HMCS), hands-on throttle and stick, digital stores management, improved fire-control, GPS-guided weapons, Litening/Sniper pods, advanced data links, and integrated sensors. The A-10C debuted in combat during Iraqi Freedom in 2007. With NVGs and targeting pods, the A-10C can operate under ceilings as low as 1,000-ft including at night. The Operational Flight Program (OFP) continuously updates the A-10's systems and software and OFP Suite 11 is planned for fielding in FY22. USAF plans to cut the fleet to 218 aircraft and upgrade the remaining fleet for service through 2030 or beyond. Upgrades include replacing primary cockpit instruments with a high-resolution digital glass display, adding directional audio threat cueing, modernizing ARC-210 UHF/VHF comms, adding Ethernet, and integrating Small Diameter Bomb I. Fleetwide re-winging is key to the aircraft's longevity and a total 218 aircraft are slated for retrofit through FY30. Congress denied the Air Force's request to retire A-10s in FY21 as well as a request to cut 42 aircraft in FY22.

Contractors: Fairchild Republic (Lockheed Martin); Boeing (re-wing).

First Flight: Jan. 20, 2005 (A-10C).

Delivered: 2006-2012 (A-10C).

IOC: September 2007 (A-10C).

Production: 713.

Inventory: 281.

Operator: ACC, AFMC, PACAF, ANG, AFRC.

Aircraft Location: Barksdale AFB, La.; Boise Air Terminal, Idaho; Davis-Monthan AFB, Ariz.; Eglin AFB, Fla.; Fort Wayne Arpt., Ind.; Martin State Arpt., Md.; Moody AFB, Ga.; Nellis AFB, Nev.; Osan AB, South Korea; Selfridge ANG, Mich.; Whiteman AFB, Mo.

Active Variant:

•A-10C. Upgraded version of the A-10A ground attack aircraft.

Dimensions: Span 57.5 ft, length 53.3 ft, height 14.7 ft.

Weight: Max T-O 51,000 lb.

Power Plant: Two GE Aviation TF34-GE-100 turbofans, each 9,065 lb thrust.

Performance: Speed 518 mph, range 800 miles (further with air refueling).

Ceiling: 45,000 ft.

Armament: One internally mounted 30 mm, seven-barrel GAU-8/A cannon (1,174 rd of high-explosive incendiary (HEI) or HEI/armor-piercing incendiary); four AIM-9 Sidewinders, AGM-65 Mavericks, laser-guided rockets, most free-fall or guided air-to-surface weapons in USAF inventory, as well as ECM and advanced targeting pods.

Accommodation: Pilot on ACES II zero/zero ejection seat.

F-15 EAGLE

Air superiority fighter

Brief: The F-15 Eagle has been the world's dominant, supersonic, all-weather, day/night air-superiority fighter for more than 40 years. The F-15A first flew on July 27, 1972, and F-15A/Bs were delivered between 1974 and 1979, attaining IOC in September 1975. F-15C/Ds began replacing F-15A/Bs in 1979, offering superior maneuverability, acceleration, range, weapons, and avionics. The C/D incorporates internal EW countermeasures and an added 2,000 lb of internal fuel (with provision for CFTs). The aircraft accounted for 34 of 37 USAF air-to-air kills during its combat debut in Desert Storm. The final 43 production aircraft received the F-15E's APG-70 radar, and the subsequent Multi-Stage Improvement Program (MSIP) enhanced its tactical capabilities. USAF received the first APG-63(V)3 AESA-modified F-15 in 2010, but comprehensive modernization, including Eagle Passive/Active Warning Survivability System (EPAWSS) was cut after the decision to replace the fleet with up to 144 new-build F-15EXs. USAF also reduced the number of aircraft slated for MIDS/ JTRS upgrades to add higher capacity, jam-resistant Link 16 and UHF satcom to 101, and





Staff Sgt. Benjamin Raughton

sharply trimmed SLEP efforts. Though two-thirds of the F-15C/D fleet have exceeded their design lives and suffer performance-limiting structural issues, USAF determined SLEP is not cost-effective and reduced mods to only 63 airframes through FY22. DOD European Deterrence Initiative funds continue to retain F-15C/Ds at Lakenheath, buttressing NATO's enhanced air defense posture against increased threats from Russia. USAF requested to divest 48 aircraft in FY22 ahead of fleetwide recapitalization by the F-15EX. An F-15C successfully fired an AIM-120 using IRST guidance for the first-time during tests with the Legion targeting pod at Eglin on Aug. 5, 2021.

Contractors: Boeing (previously McDonnell Douglas).
First Flight: Feb. 26, 1979 (F-15C).
Delivered: 1979-85 (F-15C/D).
IOC: 1979 (F-15C/D).
Production: 874.
Inventory: 209 (F-15C); 23 (F-15D).
Operator: ACC, AFMC, PACAF, USAF, ANG.
Aircraft Location: Barnes Arpt., Mass.; Eglin AFB, Fla.; Fresno ANGB, Calif.; Jacksonville Arpt., Fla.; Kadena AB, Japan; Klamath Falls (Kingsley Field), Ore.; NAS JRB New Orleans, La.; Portland Arpt., Ore.; RAF Lakenheath, U.K.
Active Variants:
 •F-15C. Upgraded version of the single-seat F-15A.
 •F-15D. Upgraded version of the two-seat F-15B.
Dimensions: Span 42.8 ft, length 63.8 ft, height 18.7 ft.
Weight: Max T-O 68,000 lb.
Power Plant: Two Pratt & Whitney F100-PW-220 augmented turbofans, each 23,450 lb thrust; or two P&W F100-PW-229 augmented turbofans, each 29,000 lb thrust.
Performance: Speed Mach 2.5, ferry range 2,878 miles (3,450 miles with CFTs and three external tanks; further with air refueling).
Ceiling: 60,000 ft.
Armament: One internally mounted M61A1 20 mm six-barrel cannon (940 rd); four AIM-9 Sidewinders and four AIM-120 AMRAAMs, or eight AIM-120s as well as ECM pods; in a one-time test, an Eagle successfully launched an anti-satellite missile.
Accommodation: Pilot (C); two pilots (D), on ACES II zero/zero ejection seats.



William Lewis/USAF

F-15E STRIKE EAGLE

Multitrole fighter

Brief: F-15E is an upgraded, two-seat, all-weather F-15 capable of deep interdiction/attack, tactical nuclear delivery, and air-to-air combat. Strike Eagle is capable of sustaining 9 Gs throughout the flight envelope. It first saw combat in Desert Storm in 1991. F-15E's large, varied load of precision weapons and 20 mm cannon make it potent ground-attack platform and radar-guided and IR-homing missiles give it an additional air-to-air capability. Its advanced cockpit includes a wide-field-of-view HUD and helmet mounted cockpit-cueing. The F-15E's avionics permit all-weather day/night engagement and it carries LANTIRN, Sniper, and Litening ATPs on dedicated pylons. The "Dragon's Eye" SAR pod fielded in 2009 provides all-weather surveillance/reconnaissance capability. F-15Es are equipped with Link 16 and BLOS SATCOM. The Strike Eagle is undergoing major avionics modernization, centered on the new APG-82(V)1 AESA radar.

Eagle Passive/Active Warning Survivability System (EPAWSS) is a second major effort to replace its obsolete self-defense suite. Operational Flight Program software is transitioning to an annual update cycle to more quickly integrate new mission capabilities in tandem with the F-15C/D. Ongoing upgrades include upgraded cockpit display processors to fully utilize AESA radar and EPAWSS, and MIDS/ JTRS to enable higher capacity, jam-resistant Link 16. FY22 begins AESA-compatible large-area digital displays mods for improved targeting and fratricide prevention as well as Data Transfer Module replacement to improve flight planning and debrief. Future enhancements include Mobile User Objective System (MUOS) secure, jam-resistant SATCOM and NATO-interoperable SATURN UHF, as well as IRST to discreetly engage air targets. F-15Es conducted demos more than doubling JASSM carriage to five weapons for increased strike capability and ferrying up to 15 JDAMs to forward airfields for rapid arming and launch in 2021. An F-15E also conducted the first test-drop of the GBU-72 5,000 lb Advanced 5K Penetrator as part of developmental testing over the Eglin test range, Oct. 7, 2021.

Contractors: Boeing (previously McDonnell Douglas); BAE Systems (EPAWSS); Raytheon (AESA).
First Flight: Dec. 11, 1986.
Delivered: April 1988-2004.
IOC: September 1989.
Production: 236.
Inventory: 218.
Operator: ACC, AFMC, USAF.
Aircraft Location: Eglin AFB, Fla.; Mountain Home AFB, Idaho; Nellis AFB, Nev.; RAF Lakenheath, U.K.; Seymour-Johnson AFB, N.C.
Active Variant:
 •F-15E. All-weather strike aircraft derived from the F-15C/D.
Dimensions: Span 42.8 ft, length 63.8 ft, height 18.5 ft.
Weight: Max T-O 81,000 lb.
Power Plant: Two Pratt & Whitney F100-PW-220 augmented turbofans, each 23,450 lb thrust; or two F100-PW-229 augmented turbofans, each 29,000 lb thrust.
Performance: Speed Mach 2.5, range 2,762 miles with CFTs and three external tanks (further with air refueling).
Ceiling: 50,000 ft.
Armament: One internally mounted M61A1 20 mm six-barrel cannon (500 rd); four AIM-9 Sidewinders and four AIM-120 AMRAAMs or eight AIM-120s; most air-to-surface weapons in USAF inventory (nuclear and conventional) including GBU-53 Stormbreaker and B61-12 nuclear free-fall weapon, as well as ECM, SAR, and advanced targeting pods.
Accommodation: Pilot and WSO on ACES II zero/zero ejection seats.



1st Lt. Savannah Bray

F-15EX EAGLE II

Air superiority fighter

Brief: F-15EX is the most advanced Eagle variant based on the F-15QA as a replacement for the legacy F-15C/D. The Eagle II is the first USAF F-15 to boast digital fly-by-wire flight controls, Large Area Display (LAD) glass-cockpit with touch-screen interface, and incorporate APG-82 AESA radar, Joint Helmet Mounted Cueing System (JHMCS), and EPAWSS self-defensive suite from the outset. The aircraft pioneers Open Mission System (OMS) software to enable rapid upgrades and capability enhancement, as well as the latest Suite 9.1 software in common with upgraded legacy aircraft. F-15EX promises higher speed, longer range, increased payload (including two additional weapon stations), and lower operating costs than previous variants. Due to insufficient F-22 procurement, the F-15C/D fleet has continued flying beyond its designed service life, posing a serious risk of structural failure. Similar infrastructure, support, and training requirements will permit existing F-15 units to quickly transition to the F-15EX. The F-15EX incorporates two-seats enabling future crew/mission expansion. FY22 efforts focus on integrating F-15EX-unique software into the common F-15 Operational Flight Program build, ramping up production capability, and continuing capability enhancement such as passive IRST targeting for highly contested engagements. USAF awarded Boeing a \$1.2 billion contract for the first eight of up to 144 new-build F-15EX on July 13, 2020. Both FY21



and FY22 supported procurement of 12 aircraft and Congress added an additional five aircraft for FY22. The first aircraft delivered to Eglin in Mar. 11, 2021, supports AFMC developmental testing while the second delivered April 20, 2021, was assigned to ACC for operational testing. The next six jets are slated for delivery in 2023, followed by upward of 76 over the next five years. F-15EXs flew their first operational test sortie from Nellis on Oct. 21, 2021, though the majority of flight-testing is currently developmental.

Contractors: Boeing; BAE Systems (EPAWSS); Raytheon (AESA).
First Flight: Feb. 2, 2021.
Delivered: Mar. 11, 2021-present.
IOC: 2023 (planned).
Production: 144 (planned).
Inventory: Two.
Operator: ACC, AFMC. Planned: ANG.
Aircraft Location: Eglin AFB, Fla. Planned: Klamath Falls (Kingsley Field) and Portland Arpt., Ore.
Active Variant:
 •F-15EX. Future F-15C/D replacement based on the F-15QA developed for Qatar.
Dimensions: Span 42.8 ft, length 63.8 ft, height 18.5 ft.
Weight: Max T-O 81,000 lb.
Power Plant: Two General Electric F110-GE-129 augmented turbofans, each 29,000 lb thrust.
Performance: Speed Mach 2.5, range approx. 2,762 miles (air refuelable).
Ceiling: 60,000 ft.
Armament: One internally mounted M61A1 20 mm six-barrel cannon (500 rd); combination of up to 12 AIM-9 Sidewinders or AIM-120 AMRAAMs, or combination of up to 24 air-to-ground munitions.
Accommodation: Pilot and (optional) second aircrew member on ACES 5 zero/zero ejection seats.



Senior Airman Madeline Herzog

F-16 FIGHTING FALCON

Multirole fighter

Brief: The F-16 is a lightweight, multirole fighter capable of air-to-air, CAS, SEAD, interdiction, FAC-A, tactical nuclear delivery and all-weather strike missions. The "Viper" makes up roughly half the fighter inventory, carries the majority of PGMs in service, and is one of the most maneuverable fighters ever built. The prototype YF-16 first flew Feb. 2, 1974, competing in the USAF Lightweight Fighter competition. After selection, F-16A flew on Dec. 8, 1976, followed by the two-seat F-16B on Aug. 8, 1977. Deliveries began in August 1978, and USAF declared F-16A IOC in October 1980. F-16C/D deliveries began at Block 25 in 1984, adding the APG-68 radar and AMRAAM missile as well as cockpit, airframe, and avionics improvements. Block 30/32 added the HARM missile and more powerful engines, and Block 40/42 introduced the terrain following LANTIRN pod and wide-angle HUD for high-speed night/all-weather penetration. These airframes boasted higher take-off weight and G-limits and an expanded flight envelope starting in 1988. Block 50/52 was introduced to replace the F-4G in the "Wild Weasel" SEAD-role armed with the HARM missile, longer-range radar, and even higher performance engines. The F-16 entered combat during Desert Storm in 1991 and scored its sole USAF air-to-air kill during Southern Watch on Dec. 27, 1992. The fleet is now cockpit-standardized with color MFD, modular mission computer, Helmet Mounted Integrated Targeting (HMIT), and Link 16. The Operational Flight Program (OFF) continuously updates the F-16's software and most recently added JASSM-ER and enhanced AMMRAM. Most upgrades are managed in Pre-Block (Blocks 25-32) and

Post-Block (Blocks 40-52) tranches. USAF is currently retiring Pre-Block aircraft including 47 airframes in FY22, while extending and modernizing the Post-Block fleet. A total of 450 Post-Block airframes are undergoing SLEP to stretch beyond 8,000 flying hours. Modernization centers on the new AN/APG-83 AESA radar, specifically aimed at countering cruise missile threats to the homeland, which received added congressional funding in FY22. A total of 330 Post-Block aircraft will also receive digital RWR (as part of a future, fully integrated EW suite), as well as mission computer and cockpit display upgrades through FY25. Ongoing mods include anti-jam UHF comm, MIDS/JTRS for higher capacity, jam-resistant Link 16, Mode 5 IFF, navigation improvements, and Auto Ground Collision Avoidance System (AGCAS) to prevent flight into terrain. A single F-16 assigned to the Oklahoma ANG was lost in a training accident near Fort Polk, La., on March 23, 2022.

Contractors: Lockheed Martin (previously General Dynamics); Northrop Grumman (AESA).
First Flight: June 19, 1984 (F-16C).
Delivered: July 13, 1984-2005 (F-16C/D).
IOC: 1981 (Block 25-32); 1989 (Block 40/42); 1994 (Block 50/52).
Production: 2,206.
Inventory: 780 (F-16C); 155 (F-16D).
Operator: ACC, AETC, AFMC, PACAF, USAF, ANG, AFRC.
Aircraft Location: Aviano AB, Italy; Edwards AFB, Calif.; Eglin AFB, Fla.; Eielson AFB, Alaska; Holloman AFB, N.M.; Homestead ARB, Fla.; Kunsan AB, South Korea; Luke AFB, Ariz.; Misawa AB, Japan; NAS JRB Fort Worth, Texas; Nellis AFB, Nev.; Osan AB, South Korea; Shaw AFB, S.C.; Spangdahlem AB, Germany; and ANG in Alabama, Arizona, Colorado, District of Columbia (flying from Maryland), Minnesota, New Jersey, Ohio, Oklahoma, South Carolina, South Dakota, Texas, Wisconsin. Planned: Fort Wayne Arpt., Ind.
Active Variants:
 •F-16C/D Block 30/32. Multinational Staged Improvement Program II upgraded with new engines, flown by ANG, AFRC, and test/aggressor units.
 •F-16CG Block 40/42. Optimized for night/all-weather attack.
 •F-16CJ Block 50/52. Optimized for SEAD with long-range radar, engines, and weapons.
Dimensions: Span 32.8 ft, length 49.3 ft, height 16.7 ft.
Weight: Max T-O 37,500 lb (Block 30/32); 42,300 lb (Block 40/42); 48,000 lb (Block 50/52).
Power Plant: GE Aviation F110-GE-100 augmented turbofan, 29,000 lb thrust (Block 30); Pratt & Whitney F100-PW-220 augmented turbofan, 24,000 lb thrust (Block 32/42); F110-GE-129 turbofan, 29,000 lb thrust (Block 50); F100-PW-229 augmented turbofan, 29,000 lb thrust (upgraded Block 42, Block 52).
Performance: Speed Mach 2+, ferry range 2,002+ miles.
Ceiling: 50,000 ft.
Armament: One M61A1 20 mm cannon (500 rd); up to six AIM-9 Sidewinder or AIM-120 AMRAAMs air-to-air missiles, most air-to-surface weapons in USAF inventory (nuclear and conventional) including JASSM-ER, as well as ECM and advanced targeting pods.
Accommodation: Pilot (C), two pilots (D), on ACES II zero/zero ejection seats.



Senior Airman Tiffany Emery

F-22 RAPTOR

Air superiority/multirole fighter

Brief: The F-22 is a stealthy, penetrating, air dominance, and multirole fighter built for day, night, and adverse weather, full-spectrum operations. The world's most advanced fighter, it combines stealth, supercruise, and high maneuverability. Its integrated avionics and data links permit simultaneous multitarget engagement. Advanced flight controls and thrust-vectoring, high-performance engines enable high maneuverability. Features include six LCD color cockpit displays, APG-77 AESA radar, EW system with RWR and missile launch detection, JTIDS, IFF, and INS/GPS navigation. The prototype YF-22 first flew as part of USAF's Advanced

Tactical Fighter competition on Sept. 29, 1990, followed by the flight of the first F-22 test aircraft in 1997. The Raptor flew its first operational sortie during Noble Eagle in 2006 and debuted in combat striking Islamic State ground targets during Inherent Resolve in 2014. The F-22 program uses an “agile” modernization strategy to rapidly and continuously develop, test, and field incremental improvements. The fleet recently received Increment 3.2B software which added high-resolution ground mapping SAR, threat geolocation, EA capability, and integration of SDB I, AIM-120D, and AIM-9X. Ongoing iterative software is improving radar and tactical data links. Significant efforts include the Reliability, Availability, and Maintainability Program (RAMP), Link 16 (previously TACLink-16), and next-generation targeting sensor development. RAMP is improving electrical power, replacing avionic-fiberoptics, adding more durable LO, as well as structural and wiring fixes. Link 16 will enable two-way networking with legacy aircraft via Multifunctional Information Distribution System/ Joint Tactical Radio System (MIDS/JTRS). Initial installs began in FY22 and fleet-wide upgrade is now planned for FY25. Preserving the F-22’s “first-shot, first-kill” advantage against peer threats is critical to deterrence, specifically in the Indo-Pacific region. USAF is evaluating lethality enhancements, including a next generation air-to-air targeting sensor now planned for flight demonstration, potentially this year. The service aims to leverage technology from its Next Generation Air Dominance (NGAD) program to ultimately replace the F-22 to also make the Raptor more lethal and survivable. NGAD could begin replacing the F-22 fleet as early as the 2030s. The service proposed to begin retiring early production aircraft currently used for pilot training as early as next year. An F-22 suffered a landing accident at Eglin on March 22, 2022, approximately a year after a similar F-22 mishap occurred at the base in March 2021.

Contractors: Lockheed Martin; Boeing (production partner).

First Flight: Sept. 7, 1997.

Delivered: Oct. 23, 2002-May 2, 2012.

IOC: Dec. 15, 2005.

Production: 195.

Inventory: 185.

Operator: ACC, AFMC, AFRC (associate), PACAF, ANG.

Aircraft Location: Edwards AFB, Calif.; Eglin AFB, Fla.; JB Elmendorf-Richardson, Alaska; JB Langley-Eustis, Va.; JB Pearl Harbor-Hickam, Hawaii; Nellis AFB, Nev.

Active Variant:

•F-22A. Fifth-generation air dominance fighter.

Dimensions: Span 44.5 ft, length 62 ft, height 16.6 ft.

Weight: Max T-O 83,500 lb.

Power Plant: Two Pratt & Whitney F119-PW-100 augmented turbofans, each 35,000 lb thrust.

Performance: Speed Mach 2 with supercruise capability, ferry range 1,850+ miles with two external wing fuel tanks (further with air refueling).

Ceiling: Above 50,000 ft.

Armament: One internal M61A2 20 mm gun (480 rds); two AIM-9 Sidewinders inside internal weapons bays; six AIM-120 AMRAAMs (air-to-air loadout), or two AIM-9, two AIM-120s, two GBU-32 JDAMs or eight SDBs (air-to-ground loadout) in main internal weapons bay.

Accommodation: Pilot on ACES II zero/zero ejection seat.

F-35 LIGHTNING II

Multirole fighter

Brief: The F-35 Lightning II is a multirole, stealthy, penetrating, all-weather fighter/attack family of tactical aircraft produced by the multinational Joint Strike Fighter program. USAF’s conventional F-35A is complemented by the F-35B short takeoff and vertical landing (STOVL) version for USMC, and the carrier-capable F-35C for the Navy. The X-35 demonstrator first flew on Oct. 24, 2000, winning the go-ahead for the F-35A which first flew in developmental form in 2006. Lightning II is planned to replace the A-10 and F-16, offering better penetrating capability against advanced A2/AD threats to strike heavily defended targets. USAF’s F-35A can carry up to 22,000 lb of weapons on 10 stations: two internal bays for stealth, and/or six wing and fuselage pylons for max loadout. An Israeli Air Force F-35I “Adir” drew first blood, hitting Iranian targets in Syria in May 2018, followed by USAF’s initial combat sortie during Inherent Resolve on April 30, 2019. The next Block 4 software iteration dubbed Continuous Capability Development and Delivery (C2D2) and supporting hardware mods are the core of ongoing development and modernization. Block 4 will correct deficiencies discovered in concurrent development/testing and add B61-12, developmental Stand-in Attack Weapon (SiAW), and SDB II weapons as well as improved sensors, EW, and maritime strike capability. USAF is continuing lower delivery rates until Block 4 production begins in 2023 to minimize



Senior Airman Tiffany Emery

retrofit cost, and FY22 funds procure a total of 48 airframes. The current fleet-standard Block 3F software enables full combat capability with an array of precision guided weapons across mission sets including interdiction, basic CAS, and limited SEAD. The F-35A will require a performance increase to keep pace with Block 4 capabilities, and USAF is seeking to potentially re-engine the fleet starting as early as 2027. Both GE and Pratt & Whitney are testing prototype engines that could increase efficiency and performance, offering as much as a 30 percent increase in range. Evaluation of the F-35A sim in the DOD’s Joint Simulation Environment most recently delayed completion of operational testing originally slated for 2019. Testing delays prevent a full-rate production decision and inhibit cost-saving multiyear block buys. NATO ally Germany and European partners Finland and Switzerland recently announced plans to purchase F-35s to replace their Tornado IDS and F/A-18 fleets respectively. USAF’s first F-35s arrived at Lakenheath on Dec. 15, 2021, and aircraft from Hill conducted NATO air policing for the first time deploying to Romania in response to Russia’s invasion of Ukraine in February 2022.

Contractors: Lockheed Martin; BAE Systems; Northrop Grumman; Pratt & Whitney (engine).

First Flight: Dec. 15, 2006.

Delivered: April 2011-present.

IOC: Aug. 2, 2016.

Production: Planned: 1,763 (USAF F-35As).

Inventory: 302 (USAF).

Operator: ACC, AETC, AFMC, AFRC (associate), ANG, PACAF, USAF.

Aircraft Location: Burlington ANGB, Vt.; Edwards AFB, Calif.; Eglin AFB, Fla.; Eielson AFB, Alaska; Hill AFB, Utah; Luke AFB, Ariz.; Nellis AFB, Nev.; RAF Lakenheath, U.K. Planned: Dannelly Field, Ala.; NAS JRB Fort Worth, Texas; Truax Field, Wis.; Tyndall AFB, Fla.

Active Variant:

•F-35A. Conventional takeoff and landing (CTOL) variant for the Air Force.

Dimensions: Span 35 ft, length 51.4 ft, height 14.4 ft.

Weight: Max T-O 70,000 lb.

Power Plant: F-35A: one Pratt & Whitney F135-PW-100 augmented turbofan, 40,000 lb thrust. Performance: Speed Mach 1.6 with full internal weapons load, range 1,380 miles.

Ceiling: 50,000 ft.

Armament: F-35A: one 25 mm GAU-22/A cannon; standard internal loadout: two AIM-120 AMRAAMs and two GBU-31 JDAMs.

Accommodation: Pilot on Martin Baker MK16 zero/zero ejection seat.



Capt. Jason Sanchez

F-117 NIGHTHAWK

Test and training

Brief: The F-117 was the world’s first operational stealth aircraft, designed to expand USAF’s ability to strike critical, heavily defended targets. Its small radar signature, LO technologies, and advanced targeting system allowed the aircraft to penetrate dense threat environments and deliver precision weapons against heavily defended, high-value targets with pinpoint accuracy. Primary missions included precision attack, air interdiction, SEAD, and special operations. The type was first publicly acknowledged in November 1988 and conducted its first operational deployment during Just Cause over Panama in 1989. Highly classified F-117A development and manufacture



began simultaneously in November 1978, using many parts transferred or modified from existing aircraft. The F-117As were first stationed at Tonopah Test Range in Nevada to conduct test flying before transferring operationally to Holloman in 1992. A single aircraft was shot down in combat over Serbia on March 27, 1999, and the F-117 fleet was officially retired on April 22, 2008. The remaining airframes entered climate-controlled storage at Tonopah, with several being maintained in flyable condition for the Air Force Flight Test Center. F-117s have recently reemerged, notably supporting several exercises in 2020 and operating more frequently and openly alongside Aggressor aircraft at Nellis and MCAS Miramar. USAF has acknowledged a need for more advanced, threat-representative training and recently reactivated the 65th Aggressor Squadron at Nellis with early F-35As to enhance fifth-generation combat training.

Contractor: Lockheed Martin.
First Flight: June 18, 1981.
Delivered: 1982–summer 1990.
IOC: October 1983.
Production: 59.
Inventory: N/A.
Operator: AFMC.
Aircraft Location: Tonopah Test Range, Nev.
Active Variants:

•F-117A. First-generation stealth attack aircraft.
Dimensions: span 43.3 ft, length 65.9 ft, height 12.4 ft.
Weight: max gross 52,500 lb.
Weight: Max T-O 70,000 lb.
Power Plant: two General Electric F404-GE-F1D2 nonafterburning turbojets, each 9,040 lb thrust.
Performance: Speed 0.9 Mach, mission radius unrefueled (5,000-lb weapons load) 656 miles.
Ceiling: 35,000 ft.
Armament: Full internal carriage of a variety of tactical weapons, incl laser- and GPS-guided 2,000-lb munitions.
Accommodation: Pilot on ACES II zero/zero ejection seat.

SPECIAL OPERATIONS AIRCRAFT



Sierra Nevada Corp.

A-29 SUPER TUCANO

Light attack

Brief: The A-29 Super Tucano is a turboprop light attack/armed reconnaissance aircraft designed by Embraer in Brazil and built under license by Sierra Nevada Corp. USAF has long sought a cost-effective, manned light CAS/tactical ISR platform for operations in permissive counter-insurgency type scenarios. The A-29 was initially a contender for the Air Force's Light Attack/Armed Reconnaissance (LAAR) requirement for approximately 100 aircraft which fell prey to budget cuts a decade ago. The service launched a renewed effort in 2017, kicking off the Light Attack Experiment (OA-X) to rapidly evaluate off-the-shelf CAS/ISR platforms to relieve pressure on existing, higher-cost fleets such as the A-10 and F-16. A fatal A-29 crash abruptly ended the flight segment of evaluations at Holloman on June 22, 2018. Trials, however, yielded sufficient data for USAF to opt for two AT-6Bs, and two—later increased to three—A-29s to Form the Combat Aviation Advisor and SOF-support capability. The A-29 was not selected as one of the five aircraft USSCOM is currently evaluating to replace the AFSOC-operated U-28A fleet. AETC's 81st Fighter Squadron at Moody also operates the A-29, initially training Afghan Air Force crews. The unit trained a total of 64 Nigerian Air Force pilots through September 2021, supporting the sale of 12 A-29s to Nigeria. A total of 13 countries operate the type worldwide. Sierra Nevada delivered all three aircraft to Hurlburt early this year with the third and final aircraft touching down March 31, 2021.

Contractor: Sierra Nevada Corp.
First Flight: June 2, 1999.
Delivered: Feb. 23, 2021–present.
IOC: N/A.
Production: Three.
Inventory: N/A.
Operator: AETC (AAF), AFSOC.
Aircraft Location: Hurlburt Field, Fla.; Moody AFB, Ga.
Active Variants:
 •A-29 Super Tucano. License-built version of the Embraer EMB-314 light attack aircraft.
Dimensions: Span 36.5 ft, length 37.3 ft, height 13 ft.
Weight: Max T-O 11,905 lb.
Power Plant: One Pratt & Whitney Canada PT6A-68C turboprop, 1,604 shp.
Performance: Speed 368 mph, range 1,900 miles (with wing-mounted external tanks).
Ceiling: 35,000 ft.
Armament: Two internal wing-mounted .50-caliber machine guns (200 rd each), up to 3,714 lb of external weapons on four wing and one centerline station.
Accommodation: Two aircrew on Martin Baker MK10 zero/zero ejection seats.



Capt. Renee Douglas

AC-130J GHOST RIDER

Attack

Brief: The AC-130J is the primary gunship CAS, air interdiction, and armed reconnaissance platform optimized for convoy escort, point defense, and supporting urban combat. The next-generation gunship is designed to provide ground forces a persistent direct-fire platform and is based on a highly modified MC-130J. Airframes are retrofit after delivery with a modular precision strike package, wing-mounted weapons, and gunship-specific systems. The AC-130J is replacing both the AC-130W and the now-retired AC-130U and was deployed to combat for the first time in Afghanistan in June 2019. AC-130Js are upgraded and managed in common with the HC/MC-130J, and are receiving Block 8.1 avionics upgrades along with the baseline C-130J. SOF-specific enhancements are rapidly developed and integrated in response to operational requirements. The aircraft's PSP weapons system includes a dual mission management console, robust communications suite, two EO/IR sensors, advanced fire-control equipment, PGM delivery capability, and trainable cannons. Block 20 added/retrofit a 105 mm gun, laser-guided SDB, side-facing pilot tactical HUD, and Large Aircraft Infrared Countermeasures (LAIRCM). The configuration was deemed operationally effective for most taskings in 2018. Upgrades based on initial operational testing resulted in the Block 20+/30 configuration which improved gun accuracy, hardened GPS, and added Hellfire missile and Small Glide Munition capability. The first Block 30 was delivered for testing in 2019 and fleetwide retrofit is planned by FY25. Lockheed Martin delivered the first Airborne High Energy Laser (AHEL) weapon in October 2021, to begin testing on the AC-130J. Ongoing upgrades include radio frequency countermeasures (RFCM) to detect, locate, and respond to threats, defensive systems upgrades, and HF/VHF/UHF/SATCOM suite modernization. FY22 funds delivery/conversion of four airframes and continues the multiyear contract for 23 combined AC/MC-130J airframes. AFSOC announced plans to shift AC-130J formal training from Hurlburt to Kirtland starting in FY22, and Cannon received its first AC-130J on July 19, 2021.

Contractors: Lockheed Martin, Sierra Nevada Corp. (RFCM).
First Flight: Jan. 31, 2014.
Delivered: July 29, 2015–present.



IOC: Sept. 30, 2017.

Production: 24 (38 to be converted from new-build MC-130Js, including a loss replacement for the initial aircraft).

Inventory: 24.

Operator: AFSOC; Planned: AETC.

Aircraft Location: Hurlburt Field, Fla.; Cannon AFB, N.M. Planned: Kirtland AFB, N.M.

Active Variants:

•AC-130J Ghost Rider Block 20. Production standard gunship with additional 105 mm gun.

•AC-130J Ghost Rider Block 30. Production aircraft with post operational test upgrades.

Dimensions: Span 132.6 ft, length 97.7 ft, height 39.1 ft.

Weight: Max T-O 164,000 lb.

Power Plant: Four Rolls-Royce AE 2100D3 turboprops, each 4,700 shp.

Performance: Speed 416 mph, range 3,000 miles (further with air refueling).

Ceiling: 28,000 ft.

Armament: Trainable 30 mm GAU-23/A cannon; 105 mm cannon; up to eight wing pylon-mounted GBU-39 SDB or AGM-114 Hellfire, and aft-firing GBU-69B Small Glide Munition and AGM-176 Griffin (deployed from 10 Common Launch Tubes integrated into the aircraft's ramp/door).

Accommodation: Two pilots, CSO, WSO, sensor operator, loadmaster, and three gunners.



AC-130W STINGER II

Attack, armed reconnaissance

Brief: The AC-130W is a gunship-modified C-130H optimized for CAS, interdiction, armed reconnaissance, convoy escort, strike coordination, overwatch, and point defense. AC-130Ws also provide strike coordination, nontraditional ISR, and C2. Airframes are significantly modified with improved navigation, threat detection, countermeasures, comms, and a standoff Precision Strike Package. PSP mod includes a mission management console, communications suite, and flight-deck hardware. The variant is entirely distinct from the retired AC-130H Spectre and AC-130U Spooky. The airframes were originally designated MC-130W Combat Spear and converted for SOF infiltration/exfiltration and in-flight refueling. The type was redesignated Dragon Spear with the addition of the roll on/roll off PSP in 2010 and finally rebranded AC-130W Stinger II after further enhancements in 2012. Upgrades include Enhanced Situational Awareness (ESA) for near real-time intel and data fusion including threat detection, avoidance, geolocation, and adversary-emitter identification, IR suppression, and the 105 mm gun (in common with the AC-130J). AFSOC plans to fully replace the fleet with the AC-130J by the end of FY22, and the command ended aircrew mission qualification with a final flight at Cannon on April 29, 2021.

Contractor: Lockheed Martin.

First Flight: Circa 2006 (Combat Spear).

Delivered: November 2010 (Dragon Spear).

IOC: 2010 (Dragon Spear).

Production: 12 (converted).

Inventory: Seven.

Operator: AFSOC.

Aircraft Location: Cannon AFB, N.M.

Active Variant:

•AC-130W Stinger II. Converted MC-130W armed with PSP and PGMs.

Dimensions: Span 132.6 ft, length 98.8 ft, height 38.5 ft.

Weight: Max T-O 155,000 lb.

Power Plant: Four Allison T56-A-15 turboprops, each 4,910 shp.

Performance: Speed 300 mph, range 2,875 miles.

Ceiling: 28,000 ft.

Armament: 105 mm cannon, 30 mm GAU-23/A Bushmaster II chain gun; PGMs, incl GBU-39 SDB, GBU-69B Small Glide Munition, and AGM-176A Griffin.

Accommodation: Two pilots, two CSOs, flight engineer, two special-mission aviators.



Tech. Sgt. Sam King

C-145 COMBAT COYOTE

Training and light special air mobility

Brief: The C-145 "Combat Coyote" is a STOL multipurpose utility and SOF proficiency training aircraft based on the Polish-built PZL Mielec M-28 Skytruck. The high-wing STOL aircraft features nonretractable landing gear for austere operations. USSOCOM assets are operated by AFSOC as a nonstandard fleet, initially supporting small combat teams. The aircraft first deployed in 2011 to Afghanistan. It is reconfigurable for 2,400 lb of cargo airdrop, casualty evacuation, CSAR, and humanitarian missions. C-145As later shifted to partnership capacity building Aviation Foreign Internal Defense (AvFID) missions. AFSOC now uses contract aircraft to provide partner countries with more tailored assistance and opted to cut the fleet from 16 to the current five aircraft in 2015. C-145s now provide aircrew proficiency for combat aviation advisers. USSOCOM selected the armed MC-145 Coyote as one of five aircraft it is evaluating as candidates to replace the U-28A. The MC-145 prototype completed a demonstration at Eglin as part of the Armed Overwatch Program in July 2021. The command plans to procure upward of 75 aircraft to provide armed tactical ISR in support of special operations.

Contractor: PZL Mielec (Lockheed Martin/Sikorsky subsidiary).

First Flight: July 1993 (PZL M-28).

Delivered: 2009-2013.

IOC: N/A.

Production: 16.

Inventory: Five, USSOCOM-owned.

Operator: AFSOC, AFRC (associate).

Aircraft Location: Duke Field, Fla.

Active Variant:

•C-145A. Militarized civilian M-28 Skytruck used for SOF support and training.

Dimensions: Span 72.3 ft, length 43 ft, height 16.1 ft.

Weight: Max T-O 16,534 lb.

Power Plant: Two Pratt & Whitney PT6A-65B turboprops, 1,100 shp.

Performance: Speed 256.5 mph, range 1,010 miles.

Ceiling: 25,000 ft.

Accommodation: Two pilots, one loadmaster. **Load:** 16 passengers or 10 paratroopers; up to four litters; max cargo 5,000 lb.

C-146 WOLF HOUND

Special operations mobility

Brief: The C-146 provides flexible, responsive airlift for special operations teams operating from austere and semi-prepared airfields worldwide. Wolfhound is based on the German-built Dornier 328 regional airliner and was purchased by USSOCOM, modified by Sierra Nevada Corp., and designated C-146. The aircraft are operated by AFSOC as a nonstandard fleet providing direct support to SOF teams worldwide, often from austere airstrips. Modifications include ARC-231, PRC-117, and Iridium communications suite, troop/cargo-capable cabin, casualty evacuation capability, NVG compatibility, and STOL/austere operations enhancements. The aircraft first deployed in support of USAFRICOM in 2011. Recent upgrades include navigation enhancements to permit ops in GPS-degraded environments.





Senior Airman Dylan Gentile

C-146s notably participated in the first tactical landing exercise on a US highway on Aug. 5, 2021, as well as relief operations in Haiti evacuating earthquake victims from remote landing zones in early September last year.

Contractors: Fairchild-Dornier; Sierra Nevada Corp.

First Flight: December 1991 (Dornier 328).

Delivered: 2011-2017.

IOC: Circa 2011.

Production: 20 (converted).

Inventory: 20 (USSOCOM-owned).

Operator: AFSOC.

Aircraft Location: Cannon AFB, N.M.; Duke Field, Fla.

Active Variant:

•C-146A. Preowned civil Dornier 328 modified for SOF airlift.

Dimensions: Span 69.6 ft, length 68.8 ft, height 23.8 ft.

Weight: Max T-O 30,843 lb.

Power Plant: Two Pratt & Whitney PW-119C turboprops, each 2,282 shp.

Performance: Speed 310 mph, range 1,500 miles (2,000 lb cargo).

Ceiling: 31,000 ft.

Accommodation: Two pilots, one loadmaster.

Load: 27 passengers; up to four litters; max cargo 6,000 lb.



Staff Sgt. Jeremy McCullifin

CV-22 OSPREY

Multimission lift

Brief: The CV-22 is a medium-lift, vertical takeoff and landing (VTOL) tilt-rotor, primarily used for clandestine long-range, all-weather penetration to insert, recover, and support SOF teams in hostile, denied, and politically sensitive areas. Derived from the V-22, which flew in prototype form on March 19, 1989, USAF CV-22Bs are equipped with a fully integrated precision TF/TA radar navigation, digital cockpit management system, FLIR, integrated NVG/HUD, digital map system, robust self-defense systems, and secure anti-jam comms. The CV-22 can conduct shipboard and austere forward operations. It is capable of operating in nuclear, biological, and chemical (NBC) warfare conditions. CV-22s first deployed to Africa in November 2008 and debuted in combat in Iraq in 2009. AFSOC is retrofitting the CV-22 to Block 20 standards, in common with USMC MV-22s. Mods include new cabin lighting, Color Helmet Mounted Displays, IR searchlight, lightweight ballistic armor, EW upgrades, avionics, self-defense improvements, weapons integration, and ISR and situational awareness enhancements. USSOCOM is replacing the CV-22's legacy APQ-186 radar with the Silent Knight TF/TA radar (in common with the MC-130J) under a three-year contract awarded in FY21. A CV-22 test flew the stealthier, low-altitude, night/all-weather navigation radar for the first time in 2020. Integration of a ventral-mounted 7.62 mm minigun will eventually give pilots a helmet-cued, 360-degree field of defensive fire to complement the ramp-mounted weapon.

Priority development includes improving the Osprey's rapid, long-distance self-deployment capabilities, and modifying its nacelles to improve maintainability, engine IR suppression, and reduce dust/debris ingestion. USAF is slated to receive its final airframe under the current multiyear contract in 2022.

Contractors: Boeing; Bell Helicopter Textron.

First Flight: February 2000 (CV-22).

Delivered: Sept. 19, 2005-present.

IOC: 2009.

Production: 54 (planned).

Inventory: 52.

Operator: AETC, AFSOC, ANG (associate).

Aircraft Location: Cannon AFB, N.M.; Hurlburt Field, Fla.; Kirtland AFB, N.M.; RAF Mildenhall, U.K.; Yokota AB, Japan.

Active Variant:

•CV-22B. Air Force special operations variant of the V-22 Osprey.

Dimensions: Span 84.6 ft, length 57.3 ft, height 22.1 ft, rotor diameter 38 ft.

Weight: Max vertical T-O 52,870 lb; max rolling T-O 60,500 lb.

Power Plant: Two Rolls-Royce-Allison AE1107C turboshafts, each 6,200 shp.

Performance: Cruise speed 277 mph, combat radius 575 miles with one internal auxiliary fuel tank, self-deploys 2,100 miles with one in-flight refueling.

Ceiling: 25,000 ft.

Armament: One ramp-mounted .50-caliber machine gun. Planned: One belly mounted forward firing GAU-17 (modified) 7.62 mm minigun Full-azimuth Defensive Weapon System (FDWS).

Accommodation: Two pilots, two flight engineers.

Load: 24 troops seated, 32 troops on floor, or 10,000 lb cargo.



Staff Sgt. Tony Harp

EC-130J COMMANDO SOLO/SUPER J

Psychological warfare/special operations airlift

Brief: The EC-130J is the Air Force's primary psychological warfare platform, providing military information support operations (MISO) and civil affairs broadcast. Roles include offensive counterinformation radio, television, and military communications broadcast, EA, and/or SOF mobility. Aircraft are also equipped with enhanced self-protection including Large Aircraft IR Countermeasures (LAIRCM) to counter MANPAD threats. Legacy Commando Solo variants have conducted psychological operations in almost every US contingency since 1980 and the EC-130J debuted in combat as part of Operation Enduring Freedom in 2001. With transition to the J-model, USAF added a new, secondary mission resulting in the "Super J" variant. Three heavily modified EC-130J Commando Solo served as a standard broadcasting station for psychological warfare operations while the four "Super Js" performed secondary, low-cost EA in addition to special operations. USAF began modernizing the fleet with the new Multi-Mission Platform-Heavy (MMP-H) digital broadcast system in 2018. The system includes a roll-on internal payload as well as the external podded Communication EA Surveillance and Reconnaissance (CEASAR) and Long-Range Broadcast System (LRBS). MMP-H will give Super-J full MISO/EA capabilities in common with Commando Solo while retaining a de-configured SOF mobility role. The software-defined digital system is capable of UHF/VHF and AM/FM radio, cellular, and television broadcast as well as advanced EA at a stand-off range of up to 175 miles. USAF is currently working to develop an Operational Flight Program Block upgrade cycle for the EC-130J's mission specific equipment, and the airframe is undergoing Block 8.1 upgrades in tandem with the baseline C-130J. EC-130Js are also receiving hardened GPS, defensive system upgrades, and Link 16 to fully integrate with other SOF assets. Required upgrades include MMP-H payload and associated mods for Super-J aircraft as well as fleet-wide Airborne Mission Networking (AbMN) to enhance aircrew air/ground situational awareness.

Contractors: Lockheed Martin; Raytheon; Sierra Nevada Corp. (Link 16/AbMN).

First Flight: November 2003.

Delivered: Oct. 17, 1999-2006.

IOC: 2004.

Production: Seven.

Inventory: Three (Commando Solo); four (Super J).

Operator: ANG.

Aircraft Location: Harrisburg Arpt., Pa.

Active Variants:



- EC-130J Commando Solo. Modified C-130J used for broadcast and psyops.
- EC-130J Super J. Modified C-130J used for SOF mobility and psyops.

Dimensions: Span 132.6 ft, length 97.8 ft, height 38.8 ft.
Weight: Max T-O 164,000 lb.
Power Plant: Four Rolls-Royce-Allison AE2100D3 turboprops, each 4,637 shp.
Performance: Speed 335 mph cruise, range 2,645 miles (air refuelable).
Ceiling: 28,000 ft.
Accommodation: Two pilots, flight systems officer, mission systems officer; two loadmasters, five electronic communications systems (CS) operators.



Travis Burcham/USAF

MC-12W LIBERTY

Tactical ISR

Brief: The MC-12W is a manned, medium/low-altitude tactical ISR, SIGINT, and targeting platform based on the Beechcraft King Air 350ER (Extended Range). It was hastily developed under Project Liberty to meet an urgent operational need for manned battlefield ISR and deployed to Iraq and Afghanistan in less than a year in 2009. MC-12W is capable of complete ISR collection, processing, analysis, and dissemination. The aircraft provides targeting data and tactical ISR direct to special operations ground forces. Specialized equipment includes FMV, laser designation, SIGINT, advanced BLOS connectivity, and advanced SATCOM. ACC passed 20 airframes to USSOCOM in 2015, and the Oklahoma ANG formed a dedicated SOF support mission with the remaining aircraft, deploying for the first time to Afghanistan in 2015. The unavailability of aircraft pooled within SOCOM hampered reaching full operational capability, and the ANG is working with AFSOC to ensure at least nine aircraft are available to support training and deployed operations. The fleet requires sensor modernization to meet COCOM requirements including SAR for ground-moving target tracking in poor visibility, and a second high-fidelity EO/IR/full motion video sensor in addition to a modernized tactical data link. The ANG procured five-bladed propellers to overcome performance limitations due to the aircraft's high gross weight, which are awaiting installation and flight-testing.

Contractors: Beechcraft; L3Harris (EO/IR sensors).

First Flight: April 28, 2009.

Delivered: April 2009-2012.

IOC: June 2009.

Production: 42.

Inventory: 13.

Operator: ANG.

Aircraft Location: Will Rogers ANGB, Okla.

Active Variant:

- MC-12W. Modified Beechcraft King Air 350ER equipped for battlefield ISR and targeting.

Dimensions: Span 57.9 ft, length 46.7 ft, height 14.3 ft.

Weight: Max T-O 16,500 lb.

Power Plant: Two Pratt & Whitney Canada PT6A-60A turboprops, each 1,050 shp.

Performance: Speed 359 mph, range 2,760 miles.

Ceiling: 35,000 ft.

Accommodation: Two pilots, two sensor operators.

MC-130H COMBAT TALON II

Special operations airlift/aerial refueling

Brief: The MC-130H is a special operations tanker/mobility aircraft based on the C-130H. Its primary missions are covert day, night, and adverse weather infiltration, exfiltration, and resupply of special operations forces in hostile or denied territory. MC-130H also provides air-drop resupply, rotary wing aerial refueling, and psyops. The aircraft are equipped with TF/TA radar, precision INS/GPS navigation, and electronic and IR countermeasures for self-protection. The fleet is fitted with wing-mounted external fuel tanks and drogue refueling pods to refuel HH-60 and CV-22 and can also receive fuel in-flight. Aircraft are capable of airdrop using the Joint



Staff Sgt. Rito Smith

Precision Airdrop System and operating from austere and unmarked strips. The original MC-130Es were converted in the mid-1960s, followed by the MC-130P (previously HC-130N/P), which were delivered in the mid-1980s and retired in 2017. MC-130Hs were converted from base-model C-130H to supplement the Combat Talon I and Combat Shadow fleets in the late 1980s and early 1990s. MC-130H have integrated glass cockpit and a modernized pod-based aerial refueling system but are being phased-out in favor of the new MC-130J. A final MC-130H completed programmed depot maintenance at Robins in August 2021, and two aircraft supported humanitarian evacuations from Afghanistan as part of Operation Allies Refuge through October 2021.

Contractors: Lockheed Martin (airframe); Boeing.

First Flight: 1984.

Delivered: 1991-1994.

IOC: June 30, 1993.

Production: 24.

Inventory: 10.

Operator: AFSOC.

Aircraft Location: Hurlburt Field, Fla.

Active Variant:

- MC-130H Combat Talon II. SOF support and aerial refueling tanker fielded in 1991.

Dimensions: Span 132.6 ft, height 38.5 ft, length 99.8 ft.

Weight: Max T-O 155,000 lb.

Power Plant: Four Allison T56-A-15 turboprops, each 4,910 shp.

Performance: Speed 300 mph, range 3,105 miles.

Fuel Capacity: Approx. 63,000 lb (81,120 lb with additional internal tanks) at up to 450 gpm.

Ceiling: 33,000 ft.

Accommodation: Two pilots, navigator, EWO, flight engineer, two loadmasters. Load: 77 troops, 52 paratroops, or 57 litters.



Airman 1st Class Stephen Pultar

MC-130J COMMANDO II

Special operations airlift/aerial refueling

Brief: The MC-130J is USAF's next-generation special operations tanker/mobility aircraft based on the C-130J. Designated Commando II (previously Combat Shadow II) in honor of the WWII C-47, the aircraft are tasked with covert day, night, and adverse weather infiltration, exfiltration, and resupply of special operations forces in hostile or denied territory. They also provide air-drop resupply, rotary wing aerial refueling, and psyops. MC-130J are fitted with wing-mounted external fuel tanks and drogue refueling pods to refuel HH-60 and CV-22, and can also receive fuel in-flight. Specialized systems include fully integrated INS/GPS, color cockpit LCDs, NVG lighting, HUDs, integrated defensive systems including LAIRCM, digital moving map display, EO/IR system, dual secure voice/data SATCOM, enhanced cargo handling, and extended-life wings. MC-130Js have secondary leaflet and rubber raiding craft aerial delivery roles for psyops and littoral ingress/egress. The aircrew is smaller than legacy



models, but includes CSO/auxiliary flight deck stations to handle aerial refueling (otherwise performed by the flight engineer). Loadmasters handle remaining flight engineer/comms functions. FY22 funds procure three airframes under a follow-on multiyear contract ending this fiscal year. Funds continue Radio Frequency Countermeasure (RFCM) installation to detect, locate, and respond to emerging threats, as well as Airborne Mission Networking (AbMN), which gives aircrew a common air/ground picture to better manage complex workloads. MC-130J will begin Block 8.1 software upgrades in FY22 after being pulled out of the baseline C-130J Block 7/8.1 upgrade to fund SOF-specific requirements. The fleet received Link 16 and CSO station upgrades separately from Block 8.1. Ongoing mods include HF/VHF/UHF SATCOM Communications Modernization, lightweight armor, self-defensive updates, and variable-speed drogue to refuel diverse aircraft types during a single sortie. USAF completed Silent Knight TF/TA radar developmental testing on the MC-130J in FY21. The system housed in a second radome between the nose and cockpit will give the aircraft low-level nighttime/adverse weather penetrating capability to fully replace the legacy MC-130H. AFSOC plans to equip an MC-130J with floats to conduct an amphibious demo in 2022, aimed at increasing flexibility of operations in the INDOPACOM theater.

Contractors: Lockheed Martin (airframe); Boeing; Sierra Nevada Corp. (RFCM); Raytheon (TF/TA radar).
First Flight: April 20, 2011.
Delivered: Sept. 29, 2011-present.
IOC: Dec. 7, 2012.
Production: 57 (planned).
Inventory: 46.
Operator: AETC, AFSOC.
Aircraft Location: Cannon AFB, N.M.; Kadena AB, Japan; Kirtland AFB, N.M.; RAF Mildenhall, U.K.
Active Variant:
 •MC-130J. Next-generation SOF support and aerial refueling tanker based on the C-130J.
Dimensions: Span 132.6 ft, length 97.8 ft, height 38.8 ft.
Weight: Max T-O 164,000 lb.
Power Plant: Four Rolls-Royce AE2100D3 turboprops, each 4,591 shp.
Performance: Speed 416 mph, range 3,000 miles (further with air refueling).
Fuel Capacity: 61,360 lb at 150-300 gpm (100 gpm dual, simultaneous refueling).
Ceiling: 28,000 ft with 42,000-lb payload.
Accommodation: Two pilots, CSO, two loadmasters. **Load:** 42,000 lb of cargo/personnel (see C-130J for configurations).



Senior Airman Vernon Walter III

U-28A DRACO

Tactical ISR

Brief: The U-28A is a manned, tactical ISR and targeting platform based on the Pilatus PC-12. The USSOCOM-owned aircraft are operated by AFSOC as a nonstandard fleet. Draco is employed worldwide in support of special operations ground forces, humanitarian efforts, and search and rescue. AFSOC first employed the aircraft during Enduring Freedom in Afghanistan as well as Iraqi Freedom. Mission equipment includes advanced radio-comms suite, IR suppression, missile, hostile fire, and laser warning, EO sensors, remote SIGINT, and advanced navigation systems. The primary Multispectral Targeting System includes FMV, EO-IR, IR real-time video, and co-aligned laser designator. Recent upgrades include U-28 EQ+ mods which add high-definition, FMV to EQ/PC-12 configured aircraft for extended standoff “find, fix, finish” capabilities in support of counter-ISIS ops. Additional improvements include Enhanced Ground Proximity Warning to prevent flight-into-terrain accidents, updated BLOS SATCOM connectivity, and navigation mods to enable ops in GPS-degraded environments. USSOCOM sought to replace the fleet with 75 “armed overwatch” aircraft capable of tactical ISR and light CAS but was denied congressional funds through FY23 pending study and justification. Two aircraft were lost to fatal mishaps in Djibouti in 2012 and at Cannon in 2017, and Congress authorized FY21 funds to replace an airframe lost in an

airfield attack at a forward location. AFSOC surpassed 600,000 flying hours including 328,000 in direct support of combat operations in early 2021.

Contractor: Pilatus Aircraft Ltd.
First Flight: May 31, 1991 (PC-12).
Delivered: 2006-present.
IOC: June 2006.
Production: 36.
Inventory: 30 (U-28A); five (PC-12) (USSOCOM-owned).
Operator: AFSOC, AFRC.
Aircraft Location: Cannon AFB, N.M.; Hurlburt Field, Fla.
Active Variant:
 •U-28A. Special operations tactical ISR aircraft based on the Pilatus PC-12.
 •PC-12. Converted civilian Pilatus PC-12 equipped for SOF support/training.
Dimensions: Span 53.3 ft, length 47.3 ft, height 14 ft.
Weight: Max T-O 10,935 lb.
Power Plant: Single Pratt & Whitney PT6A-67B, 1,200 shp.
Performance: Speed 253 mph, range 1,725 miles.
Ceiling: 30,000 ft.
Accommodation: Two pilots, CSO, tactical systems officer; up to nine passengers or 3,000 lb cargo (configuration dependent).

COMMAND, CONTROL, COMMUNICATION/BATTLE MANAGEMENT AIRCRAFT



Stefano Benedetto

C-143 COMBAT FLIGHT INSPECTION

Combat flight inspection

Brief: The C-143B is a modified Bombardier Challenger CL-600 long-range, executive-class jet equipped with specialized instrumentation for Combat Flight Inspection (CFIN). The three-aircraft fleet is owned by the Federal Aviation Administration and operated by FAA/USAF to certify air base NAVAIDs (Navigational Aids) such as TACAN, VOR, and ILS, as well as approach/departure procedures are safe and meet applicable standards for all-weather flight operations. USAF has lacked a fully organic CFIN capability since retiring the C-29A and handing flight inspection over to the FAA in 1991. The FAA and USAF jointly funded replacing the aging and range-limited C-29A, and USAF procured a single airframe in FY09. Due to the high-risk environment, Air Force Flight Standards Agency Det. 1 crews from Will Rogers ANGB conduct flight checks in combat theaters, as well as forward locations including Antarctica. In addition to combat ops, the fleet is tasked with inspecting CONUS, OCONUS, and dual U.S.-partner-nation facilities worldwide. USAF funds support procurement and maintenance of military-specific equipment required for CFIN, including secure anti-jam radios, IFF, Mode 4/5 transponders, and self-defensive suites for protection during forward-deployed operations. Recent upgrades include addition of Large Aircraft IR Countermeasures (LAIRCM) to two airframes to improve self-defensive capabilities against MANPADS and small arms fire.

Contractor: Canadair (Bombardier).
First Flight: Nov. 8, 1978.
Delivered: 2009.
IOC: Circa 2010.
Production: N/A.
Inventory: Three (FAA-owned).
Operator: AMC, AFRC (associate).
Aircraft Location: Will Rogers ANGB, Okla.
Active Variant:
 •C-143B. CL-600-2B16 business jet equipped with specialized systems for military flight-check.
Dimensions: Span 61.8 ft, length 68.4 ft, height 20.6 ft.
Weight: Max T-O 40,125 lb.
Power Plant: Two GE Aviation CF34 turbofans, each 9,140 lb thrust.
Performance: speed Mach 0.83, range 3,915 miles.
Ceiling: 45,000 ft.
Accommodation: Two pilots, flight inspection technician.



E-3 SENTRY

Battle management/early warning/C2

Brief: The E-3 Airborne Warning and Control System (AWACS) is a heavily modified Boeing 707-320B tasked with all-weather, air and maritime surveillance, command and control, battle management, target, threat, and emitter detection, classification, and tracking. The aircraft is capable of surveilling airspace in excess of a 250-mile radius from surface to stratosphere. AWACS coordinates theater air operations in direct subordination to joint/combined air and space operations centers. It can simultaneously conduct C2, BM, and target detection/tracking. E-3Bs were upgraded to Block 30/35 standards in 2001. Block 40/45 aircraft are redesignated E-3G. The upgrade is the most comprehensive enhancement to date and improves tracking/identification, system reliability, and life-cycle cost. Mods include open-architecture computing, operator workload reduction, new consoles, improved electronic support measures (ESM), and passive surveillance capability. DRAGON (Diminishing manufacturing sources Replacement of Avionics for Global Operations and Navigation) upgrades add a digital cockpit and next-generation CNS/GATM. Three USAF aircraft are slated for DRAGON in FY22 and mods are slated for completion fleetwide by 2027. Development includes Electronic Protection (EP) to improve radar processing for classified requirements, modernizing airborne moving target indication, and fourth-to-fifth generation connectivity (to integrate F-22 and F-35). Ongoing mods include accelerated Mode 5 IFF install (as an



Ronald Bradshaw/USAF

airspace compliance bridge to DRAGON), Communication Network Upgrade (CNU) to add high-speed jam-resistant Link 16, and high-bandwidth internet to quickly prosecute time-sensitive targets. FY22 begins AWACS Communications Integration Program (ACIP) upgrades including BLOS SATCOM/second-generation NATO UHF, and anti-jam GPS. Two airframes will begin upgrade to Block 40/45 standards and five airframes will be redelivered as E-3Gs in FY22, achieving 28 of the 31 planned upgrades. USAF aims to eventually replace AWACS with a space-based capability. Due to a lack of mature space-based solutions and difficulty sustaining the E-3, USAF requested information to possibly procure Boeing's E-7A Wedgetail as an AWACS bridge capability.

Contractors: Boeing, Northrop Grumman (radar); Lockheed Martin (computer); Collins Aerospace (DRAGON cockpit upgrade).

First Flight: Oct. 31, 1975 (full avionics).

Delivered: March 1977-1984.

IOC: 1977; July 28, 2014 (Block 40/45).

Production: 31.

Inventory: 10 (E-3B); 21 (E-3G).

Operator: ACC, PACAF, AFRC (associate).

Aircraft Location: JB Elmendorf-Richardson, Alaska; Kadena AB, Japan; Tinker AFB, Okla.

Active Variants:

•E-3B. Block 30/35 upgraded aircraft.

•E-3G. Block 40/45 upgraded aircraft.

Dimensions: Span 145.8 ft, length 152.9 ft, height 41.8 ft.

Weight: Max T-O 335,000 lb.

Power Plant: Four Pratt & Whitney TF33-PW-100A turbofans, each 21,000 lb thrust.

Performance: Speed 360 mph, range 5,000+ miles (air refuelable).

Ceiling: Above 35,000 ft.

Accommodation: Two pilots, navigator, flight engineer, 13-19 mission specialists.

E-4 NATIONAL AIRBORNE OPERATIONS CENTER

Nuclear command and control

Brief: The E-4B is a highly survivable flying C3 center enabling national leaders to direct nuclear and conventional forces, execute emergency war orders, and coordinate civil response actions in support of the National Military Command System (NMCS). It is hardened against the effects of



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nuclear detonations, including electromagnetic pulse (EMP). Comms and data processing capabilities include EHF Milstar SATCOM, six-channel International Maritime Satellite, and a triband radome houses the SHF communications antenna. All aircraft underwent Block 1 upgrades, enhancing electronic and communications infrastructure with commercial off-the-shelf (COTS) systems. Ongoing upgrades include replacing Milstar data links with AEHF-compatible FAB-T, replacing the VLF/LF transmitter, and replacing legacy SHF with Survivable Super High Frequency (SSH) enabling uninterrupted, jam-resistant nuclear C2 fleetwide by 2023. E-4B airframes are viable to approximately 2033, but phaseout of commercial 747-200s hampers continued sustainment. USAF plans to replace the E-4B with the Survivable Airborne Operations Center (SAOC) and issued a request to industry for development of up to four, potentially used, but similarly sized commercial-derivative airframes in December 2020. Changes to acquisition strategy delayed initial solicitations but the service is aiming to conclude technology maturation in FY23 and take delivery of the initial aircraft by the early 2030s.

Contractors: Boeing; Raytheon (FAB-T); L3Harris (SSH); Boeing/Collins Aerospace (Low-Frequency Transmit System).

First Flight: June 13, 1973 (E-4A); June 10, 1978 (E-4B).

Delivered: December 1974-1985.

IOC: December 1974 (E-4A); January 1980 (E-4B).

Production: Four.

Inventory: Four.

Operator: AFGSC.

Aircraft Location: Offutt AFB, Neb.

Active Variant:

•E-4B. Modified Boeing 747-200 equipped as a NAOC.

Dimensions: Span 195.7 ft, length 231.3 ft, height 63.4 ft.

Weight: Max T-O 800,000 lb.

Power Plant: Four General Electric CF6-50E2 turbofans, each 52,500 lb thrust.

Performance: Speed 602 mph, range 7,130 miles, 12-hr normal endurance, 72-hr with air refueling.

Ceiling: Above 30,000 ft.

Accommodation: Two pilots, navigator, flight engineer, up to 110 battle staff/mission crew.

E-8 JSTARS

Command and control/ISR

Brief: E-8C is a ground moving target indication (GMTI), airborne battle-field management/command and control platform. Its primary mission is providing theater commanders with ground surveillance data to support tactical operations. E-8 evolved from the Army/Air Force Joint Surveillance Target Attack Radar System (JSTARS) program. The aircraft made its first radar-equipped test flight in December 1988, and the first two aircraft deployed for Desert Storm while the system was still under development. Early airframes were eventually retrofitted to Block 20 production standards featuring more powerful computers, an internet protocol local area network, and BLOS connectivity. JSTARS is equipped with a canoe-shaped radome under the forward fuselage housing a 24-ft-long, side-looking phased array radar antenna. It can locate, classify, and track vehicles and ships at distances exceeding 124 miles, and more recent refinements added human-target tracking. Target data is transmitted via data link to ground stations or other aircraft. USAF began efforts to improve fleetwide availability starting in FY18, aiming to simultaneously have six aircraft deployable by 2022. USAF dropped plans to replace JSTARS with a modern, business-class aircraft pursuing the Advanced Battle Management System (ABMS) instead. ABMS notionally disaggregated JSTARS functions among several platforms but was drastically cut in FY21, refocusing on technology development. USAF now plans to shift future GMTI efforts to a space-based approach to overcome anti-access/area denial threats. Ongoing upgrades include Secure Common Data





Barry Bena/USAF

First Flight: June 1983 (DHC-8).
Delivered: 1988.
IOC: June 1988.
Production: Two.
Inventory: Two.
Operator: ACC.
Aircraft Location: Tyndall AFB, Fla.
Active Variant:
 •E-9A. Military surveillance version of the DHC-8 commuter airliner.
Dimensions: Span 85 ft, length 73 ft, height 24.5 ft.
Weight: Max T-O 34,500 lb.
Power Plant: Two Pratt & Whitney PW-120A turboprop engines, each 1,800 shp.
Performance: Speed 280 mph, range 1,000 miles.
Ceiling: 30,000 ft.
Accommodation: Two pilots, two mission operators.

Link (SDL) for LOS networking to Common Ground Stations and UHF/VHF SATCOM modernization. Congress approved divestiture of JSTARS starting in FY22 with the retirement of four aircraft, the first of which left Robins for storage at Davis-Monthan on Feb. 11, 2022.

Contractors: Northrop Grumman; Raytheon.
First Flight: April 1, 1988.
Delivered: March 22, 1996-March 23, 2005.
IOC: Dec. 18, 1997.
Production: 18.
Inventory: 16 (E-8C); one (TE-8).
Operator: ANG.
Aircraft Location: Robins AFB, Ga.
Active Variants:
 •E-8C. Block 20 upgraded JSTARS platform based on the Boeing 707-300.
 •TE-8A. Crew training aircraft based on the E-8.
Dimensions: Span 145.8 ft, length 152.9 ft, height 42.5 ft.
Weight: Max T-O 336,000 lb.
Power Plant: Four Pratt & Whitney TF33-102C turbojets, each 19,200 lb thrust.
Performance: Speed 584 mph (optimal orbit), range 11 hr normal endurance (longer with air refueling).
Ceiling: 42,000 ft.
Accommodation: Two pilots, navigator, flight engineer, 15 Air Force/three Army mission crew (mission dependent).



Staff Sgt. Bennie Davis III

E-9A WIDGET

Range control

Brief: The E-9A is a modified DHC-8 commuter aircraft that provides air-to-air telemetry support for weapons testing, target drone operations, and range clearance. The aircraft supports operations at the Eglin Test and Training Range over the Gulf of Mexico and provides telemetry for weapons system evaluation at Holloman and the Utah Test and Training Range. Mission modifications include AN/APS-143(V-1) airborne sea surveillance radar, UHF telemetry, and signal relay systems. The E-9 is able to track flying and surface targets. It can detect small watercraft at ranges up to 25 miles. The fleet operates in concert with three drone recovery vessels and two patrol boats to clear waterways and airspace of civil traffic before live-fire testing or hazardous military activities commence. It also provides tracking and assistance with recovering targets. The aircraft can remotely initiate destruction of damaged or malfunctioning aerial target drones. FY22 funds are limited to low-cost sustainment and development upgrades.

Contractors: Bombardier (formerly De Havilland Canada); Sierra Nevada Corp. (conversion).



Senior Airman Jacob Wrightsman

E-11A BATTLEFIELD AIRBORNE COMMUNICATIONS NODE

Communications relay

Brief: The E-11A is a modified, Bombardier Global Express 6000/BD-700-1A10 business jet equipped with specialized communications relay equipment to translate between tactical comm and data links. It provides joint range extension, BLOS C2, and internet protocol-based data transfer between dissimilar systems. E-11A was fielded to meet an urgent operational need for BLOS air-to-ground relay and enables troops to overcome comm limitations in rugged terrain. The system entered combat in Afghanistan in 2008, and a single E-11 crashed north of Kandahar Airfield, Afghanistan, on Jan. 27, 2020, killing both aircrew members. The fleet was designated E-11A after USAF purchased the first previously leased aircraft in 2011. The Battlefield Airborne Communications Node (BACN) payload was integrated on a mixed fleet of manned E-11As and unmanned EQ-4B Global Hawks. ACC retired the EQ-4B in July 2021 and began procuring six additional airframes at a rate of one aircraft per year starting in FY21. FY22 funds support procurement and modification of two aircraft. Northrop Grumman was awarded a \$3.6 billion five-year support contract in early 2021, which also includes funding for research, development and testing, as well as the integration of future payloads. Ongoing upgrades include adding military GPS to operate in higher-end threat environments, advanced navigation, and flight safety, along with reliability, performance, and self-defensive improvements. Efforts are underway to standardize and transition the fleet to a Program of Record eventually based at Robins.

Contractors: Bombardier, Northrop Grumman (integration and support).
First Flight: August 2007.
Delivered: Dec. 2008-Aug. 30, 2012.
IOC: Circa 2011.
Production: Four (nine planned).
Inventory: Three.
Operator: ACC.
Aircraft Location: Al Dhafra AB, UAE. Planned: Robins AFB, Ga.
Active Variant:
 •E-11A. Modified Bombardier BD-700 equipped with the BACN payload.
Dimensions: Span 94 ft, length 99 ft 5 in, height 25 ft 6 in.
Weight: Max T-O 99,500 lb.
Power Plant: Two Rolls-Royce BR710A2-20 turbofans, each 14,750 lb thrust.
Performance: Speed Mach 0.88, range 6,900 miles.
Ceiling: 51,000 ft.
Accommodation: Two pilots.





BAE Systems

EC-37B COMPASS CALL

Electronic warfare/electronic attack

Brief: The EC-37B is a next-generation, tactical jamming platform tasked with disruption of enemy C3, radar, and navigation. It will also offer offensive counterinformation, EA, and SEAD support. The aircraft is based on the ultra-long-range Gulfstream G550 business aircraft and adapted from the Navy's special mission configuration. USAF awarded L3 Technologies a contract on Sept. 7, 2017, to replace the EC-130H in the tactical EA role and transplant its "Compass Call" systems to a more modern aircraft. The program, originally dubbed "EC-X" will "re-host" upgraded EC-130H mission equipment directly to the EC-37 with nearly 70 percent remaining unchanged. EC-37B is faster, more economical, capable of higher altitude operations, and more survivable than the EC-130H. Upgrades will allow it to conduct standoff jamming/EA from greater distance for attacks against A2/AD targets. The first aircraft was purchased in FY17, followed by a second in FY18. Congress accelerated the program by funding two airframes in FY19, and USAF plans to procure and modify one aircraft a year through FY25. The first five aircraft are receiving the EC-130H's upgraded Baseline 3 package, including Advanced Radar Countermeasure System (ARCS) and other significant capability enhancements. EC-37 will not receive comparable low-band capability until Baseline 4 which will debut on the sixth airframe, procured in FY21 and slated for deployment in 2026. USAF postponed buying the seventh airframe in FY22 to focus on Baseline 4 development, installing equipment on the sixth airframe, and implementing technical changes. Baseline 4 will debut the System-Wide Open Reconfigurable Dynamic Architecture (SWORD-A) to enable rapid future upgrades. An EC-37B completed its first flight from Savannah-Hilton Head Airport on Aug 25, 2021. Air Combat Command plans to field the first five Baseline 3 EC-37Bs in 2023.

Contractors: Gulfstream Aerospace (airframe); BAE Systems; L3 Harris (mission equipment).

First Flight: Aug. 25, 2021.

Delivered: 2023 (planned).

IOC: 2023 (planned).

Production: 10 (planned).

Inventory: N/a.

Operator: ACC (planned).

Aircraft Location: Davis-Monthan AFB, Ariz. (planned).

Active Variant:

•EC-37B. Military Electronic Attack version of the Gulfstream G550.

Dimensions: Span 93.5 ft, length 96.4 ft, height 25.8 ft.

Weight: Max T-O 90,500 lb.

Power Plant: Two BR710C4-11 turbofans, each 15,385 lb thrust.

Performance: Speed 600 mph, range 6,300 miles.

Ceiling: 51,000 ft.

Accommodation: Two pilots; TBD.

EC-130H COMPASS CALL

Electronic warfare/ Electronic Attack

Brief: The EC-130H is a modified C-130H designed to disrupt enemy C3 and limit adversary coordination and force management. Tasks include tactical jamming/disruption of communications, radar, and navigation, offensive counterinformation, EA, and SEAD support. The fleet has been deployed near-constantly since the beginning of combat operations in Afghanistan in 2001. The aircraft was designed to be easily updated and modified. All aircraft have been retrofitted to Block 35 standards and are aerial refuelable. Mission equipment upgrades occur approximately every three years to ensure continued protection and effectiveness against evolving threats. Baseline 2 mods are ongoing, and the Baseline 3 configuration, including the Advanced Radar Countermeasure System (ARCS) and other significant capability enhancements, is slated for fielding in 2023. Baseline 4 will be fielded on the next-generation EC-37B in

2026, and some 70 percent of the EC-130H's mission equipment will be directly cross-decked to its successor platform. Funding delays required extending the EC-130H with center wing box replacement/structural mods (in common with the C-130H fleet) and upgrades include digital glass cockpits, Mode 5 IFF/airspace compliant CNS/ATM, and color weather radar. Ongoing system upgrades include counter-radar/counter satellite navigation, third-generation Special Purpose Emitter Array (SPEAR), and adaptive EA to quickly react to emerging threats. AFCENT inactivated the 41st Expeditionary Electronic Combat Squadron at Al Dhafra on Sept.



Senior Airman Alex Miller

28, 2021. The unit logged 14,753 sorties in-theater totaling 90,000 hours since initially deploying to Afghanistan in 2001. The first aircraft retired to the boneyard at Davis-Monthan on Aug. 31, 2021, followed two additional airframes on Nov. 8, 2021, and March 2, 2022.

Contractors: Lockheed Martin; BAE Systems (mission equipment); L3Harris (integration and sustainment).

First Flight: 1981.

Delivered: March 19, 1982-unk.

IOC: 1983; Block 35 from 2011.

Production: (Converted).

Inventory: Nine (EC-130H).

Operator: ACC.

Aircraft Location: Davis-Monthan AFB, Ariz.

Active Variant:

•EC-130H. Electronic attack variant of the C-130H.

Dimensions: Span 132.6 ft, length 99 ft, height 38 ft.

Weight: Max T-O 155,000 lb.

Power Plant: Four Allison T56-A-15 turboprops, each 4,910 shp.

Performance: Speed 300 mph at 20,000 ft, unrefueled range 2,295 miles, seven hr normal endurance (air refuelable).

Ceiling: 25,000 ft.

Accommodation: Two pilots, navigator, flight engineer; mission crew: two EWOs; mission crew supervisor (cryptologic), four cryptologic linguists, acquisition operator, and airborne maintenance technician.

INTELLIGENCE, SURVEILLANCE, RECONNAISSANCE AIRCRAFT



Tomas Acevedos/Vimages

P-9A PALE ALE

Maritime patrol, detection, and monitoring

Brief: The P-9A is a heavily modified Bombardier CRJ-900 (DHC-8) commuter aircraft equipped for maritime patrol as well as advanced Detection and Monitoring (D&M) missions. The three-aircraft fleet is owned by ACC and primarily tasked to USSOUTHCOM to detect and monitor narcotic and illicit trafficking from South and Central America, as well as the Caribbean. The P-9A is a Government Owned Contractor Operated (GOCO) fleet and conducts more than 7,200 flying hours per year, primarily based from



the Navy's Counterdrug Cooperative Security Location in Comalapa, El Salvador. Aircraft also conduct forward-deployed operations from airfields throughout the Caribbean as well as South and Central America, lasting approximately 730 days.

Contractors: Bombardier (formerly De Havilland Canada); Sierra Nevada Corp. (operator).

First Flight: N/A.

Delivered: N/A.

IOC: N/A.

Production: Three.

Inventory: Three (Contractor operated).

Operator: ACC.

Aircraft Location: Comalapa, El Salvador; forward operating locations across USSOUTHCOM.

Active Variant:

•P-9A. Maritime patrol, detection and monitoring aircraft converted from the Bombardier Q202 commuter airliner.

Dimensions: Span 85 ft, length 73 ft, height 24.6 ft.

Weight: Max T-O 36,300 lb.

Power Plant: Two Pratt & Whitney PW-123C/D turboprop engines, each 2,150 shp.

Performance: Speed 333 mph, range approx. 1,300 miles.

Ceiling: 25,000 ft.

Accommodation: Two pilots, unk. mission crew.



Airman 1st Class Thomas Cox

RC-26 CONDOR

Tactical ISR

Brief: The RC-26 is a modified Fairchild Metro 23 tasked with counter-narcotics, manned tactical ISR, disaster response, and civil support missions. USAF selected the C-26 to fulfill a joint ANG and Army National Guard airlift requirement in 1988, subsequently modifying the airframes to the RC-26 configuration. The aircraft is equipped with specialized digital cameras, IR video, and communications equipment to enable domestic and international anti-trafficking. The aircraft has a secondary role providing real-time video streaming to responders following hurricanes, wildfires, and other disasters. In the fire-support role, aircraft sensors can detect fires at up to 80 miles and accurately map them from up to 3 miles away. An extensive comm suite allows communications from 29 to 960 MHz including provisions for plugged-in 800 MHz handheld radio and airphones. The fleet is currently split between six Block 25R and five Block 20 configured aircraft. ANG priorities include bringing the fleet to a common standard with updated mission system/sensor management, integrated comms, and upgraded VHF/UHF/LOS SATCOM. If retained in service, the RC-26's sensor suite requires modernization with an integrated targeting/EO/IR/full-motion video sensor as well as an all-weather ground moving target sensor for border enforcement and maritime interdiction missions. Other needed upgrades would include LOS/BLOS-secure FMV downlinks and airspace compliance mods to meet FAA mandates. The ANG was barred from divesting the platform starting in FY20 unless it demonstrates the fleet's missions can be performed by other assets. RC-26s notably supported wildfire fighting efforts across the Northwestern U.S. during the 2021 fire season.

Contractors: Fairchild (airframe); Elbit Systems (avionics upgrade).

First Flight: 1990.

Delivered: March 1989-1996 (delivered as C-26A/B).

IOC: N/A.

Production: 10 (C-26A); 33 (C-26B); 11 (RC-26).

Inventory: 11.

Operator: ANG.

Aircraft Location: Des Moines Aprt., Iowa; Ellington Field, Texas; Fairchild AFB, Wash.; Fresno Yosemite Arpt., Calif.; Key Field, Miss.; Kirtland AFB, N.M.; Montgomery Regional Arpt., Ala.; Truax Field, Wis.; Tucson Arpt., Ariz.; Yeager Arpt., W.Va.

Active Variants:

•RC-26B. Surveillance version of the Fairchild C-26.

Dimensions: Span 57 ft, length 59.5 ft, height 16.6 ft. Weight: Max T-O 16,500 lb.

Power Plant: Two Garrett TPE331-12UAR-701 turboprops, each 1,100 shp.

Performance: Speed 334 mph, range 2,070 miles.

Ceiling: 25,000 ft.

Accommodation: Two pilots, navigator/mission systems operator.



Airman Jacob Skovo

RC-135S COBRA BALL

Electronic reconnaissance

Brief: The RC-135S gathers measurement and signature intelligence (MASINT) on missile-associated signatures and tracks during boost and reentry. Cobra Ball superseded Rivet Ball and Rivet Amber, receiving the current designation on Oct. 24, 1969, and collects both optical and electronic data on ballistic missile activity. A single aircraft was lost in a crash during inclement weather at Shemya AFB, Alaska, on March 15, 1981. The variant's specialized equipment includes the long-range Medium Wave Infrared Array (MIRA) EO/IR sensor suite, all-weather tracking radar, and an advanced communications suite. Reconnaissance data is used to assess missile threats, evaluate missile performance, characterize adversary missiles, and analyze weapons testing and technology. Data also supports treaty verification and theater ballistic missile nonproliferation. It can deploy anywhere in the world in 24 hours and provide on-scene EO reconnaissance. Continuous baseline upgrades are now projected to keep the fleet viable through 2050, and flexible funding permits rapid, variant-specific mods in response to emerging/evolving threats. Aircraft are currently undergoing integration and testing of Baseline 7 mods (similar to Rivet Joint Baseline 12). Baseline 7 includes integrating Rivet Joint's COMINT suite, digital electromagnetic signature direction finding, digital search, and SATCOM-aided target discrimination.

Contractors: Boeing (airframe); L3Harris, Textron Systems (mission systems).

First Flight: Circa 1969.

Delivered: Jan. 11, 1970-November 2000 (redelivery as RC-135S).

IOC: March 1972 (Cobra Ball II).

Production: Four converted.

Inventory: Three.

Operator: ACC.

Aircraft Location: Offutt AFB, Neb.

Active Variant:

•RC-135S Cobra Ball. Modified C-135 equipped for MASINT/treaty verification.

Dimensions: Span 131 ft, length 135 ft, height 42 ft.

Weight: Max T-O 297,000 lb.

Power Plant: Four CFM International F108-CF-201 turbofans, each 21,600 lb thrust.

Performance: Speed 517+ mph, range 3,900 miles (farther with air refueling).

Ceiling: 45,000 ft.

Accommodation: Two pilots, navigator, three EWOs, two airborne systems engineers, two airborne mission specialists.





Sunekuma

RC-135U COMBAT SENT

Electronic reconnaissance

Brief: The RC-135U is tasked with strategic reconnaissance and technical intelligence (TECHINT) gathering on radar/emitter systems. Three Combat Sent aircraft were converted from RC-135Cs in 1970-71 to fill a critical need for data collection on adversary radar threats and defenses. Combat Sent's distinctive chin and wingtip antenna arrays, large cheek fairings, and extended tail contain specialized sensor suites to collect data and analyze airborne, land, and naval radar/emitter systems. Each airframe incorporates a different, tailored sensor suite, and the data gathered is critical to the effective design and programming of RWR (radar warning receivers), jammers, decoys, anti-radiation missiles, and threat simulators. Combat Sent additionally enables strategic analysis for National Command Authorities and combatant forces. The aircraft utilizes radar/solid-state doppler, INS, celestial, and GPS for navigation, and is capable of both operator, automated, and blended signal gathering and analysis. Continuous baseline upgrades are now projected to keep the fleet viable through 2050, and flexible funding permits rapid variant-specific mods in response to emerging/evolving threats. FY22 focuses on sustaining Baseline 5 and completing upgrades to Baseline 6 (similar to Rivet Joint Baseline 12). Baseline 6 includes wideband SATCOM reachback, integrating Rivet Joint's COMINT suite, improving operator interface, enhancing antennas and processors, and capability upgrades for dense signal environments.

Contractors: Boeing (airframe); L3Harris, Textron (mission systems).

First Flight: N/A.

Delivered: May-December 1971 (RC-135U).

IOC: 1971.

Production: Three converted.

Inventory: Two.

Operator: ACC.

Aircraft Location: Offutt AFB, Neb.; forward operating locations: Al Udeid AB, Qatar; NSF Diego Garcia, U.K.; Eielson AFB, Alaska; Kadena AB, Japan; RAF Mildenhall, U.K.; NSA Souda Bay, Greece.

Active Variant:

•RC-135U Combat Sent. Modified C-135 equipped for radar/emitter analysis.

Dimensions: Span 135 ft, length 140 ft, height 42 ft.

Weight: Max T-O 322,500 lb.

Power Plant: Four CFM International F108-CF-201 turbofans, each 21,600 lb thrust.

Performance: Cruise speed 517 mph, range 4,140 miles, 8-hr normal endurance, 24-hr crew endurance (farther with air refueling).

Ceiling: 42,000 ft.

Accommodation: Two pilots, two navigators, three airborne systems engineers; Mission crew: 10 EW officers, six or more electronic, technical, mission-area specialists.



Courtesy photo

RC-135V/W RIVET JOINT

Electronic reconnaissance

Brief: The RC-135V/W is tasked with real-time electronic and signals intelligence-gathering, analysis, and dissemination in support of theater and strategic-level commanders. The extensively modified C-135s detect, identify, and geolocate signals throughout the electromagnetic spectrum. Rivet Joint is mostly used to exploit electronic battlefield intelligence and deliver near-real-time ISR information to tactical forces, combatant commanders, and National Command Authorities. The British Royal Air Force also operates three RC-135W Airseeker aircraft, which are co-manned

by USAF/RAF personnel. Onboard capabilities encompass rapid search, detection, measurement, identification, demodulation, geolocation, and fusion of data from potentially thousands of electronic emitters. Continuous baseline upgrades keep the fleet viable and drive standards for Combat Sent/Cobra Ball. Flexible funds permit rapid, variant-specific mods in response to emerging/evolving threats. The fleet recently underwent Baseline 11/12 upgrades, adding new direction finding COMINT, precision ELINT/SIGINT system integration, wideband SATCOMs, enhanced near real-time data dissemination, as well as new steerable beam antenna, improved weather radar, digital cockpit instruments, and compliant CNS/ATM. Baseline 12 modernized operator interface, improved dense-signal environment capabilities, increased signal bandwidth/exploitation, added operator 3D maps, and integrated RC-135 with the Distributed Common Ground Station (DCGS). FY22 efforts focus on upgrading a total of 10 Baseline 11 airframes to the next Baseline 13, enhancing Baseline 12, and upgrading the aircraft's autopilot. Development includes automated search and detection and employment of artificial intelligence and collaboration to speed collection, analysis, and distribution. USAF's most recent utility assessment projected the upgraded fleet will remain relevant through 2050, and the RAF extended its agreement with USAF to continue operating the type through at least 2035.

Contractors: Boeing (airframe); L3Harris (mission systems).

First Flight: N/A.

Delivered: Circa 1973-99 (continuous equipment updates).

IOC: Circa 1973.

Production: Converted.

Inventory: Eight (RC-135V); nine (RC-135W); three (TC-135W); one (NC-135W).

Operator: ACC, AFMC.

Aircraft Location: Offutt AFB, Neb.; Kadena AB, Japan; RAF Mildenhall, U.K.; RAF Waddington, U.K. (USAF co-manned).

Active Variants:

•RC-135V/W Rivet Joint. Standoff airborne SIGINT variant of the C-135.

•TC-135W. Training version of the operational aircraft.

•NC-135W. Rivet Joint systems integration testbed operated by AFMC.

Dimensions: Span 131 ft, length 135 ft, height 42 ft.

Weight: Max T-O 297,000 lb.

Power Plant: Four CFM International F108-CF-201 turbofans, each 21,600 lb thrust.

Performance: Speed 500+ mph, range 3,900 miles (farther with air refueling).

Ceiling: 50,000 ft.

Accommodation: Three pilots, two navigators, three EWO, 14 intelligence operators, four airborne maintenance technicians (six additional, if required).



William Lewis/USAF

U-2S DRAGON LADY

High-altitude reconnaissance

Brief: U-2S is the Air Force's only manned, strategic, high-altitude, long-endurance ISR platform and is capable of SIGINT, IMINT, and MASINT collection. The aircraft's modular payload systems allow it to carry a wide variety of advanced optical, multispectral, EO/IR, SAR, SIGINT, and other payloads simultaneously. Its open system architecture also permits rapid fielding of new sensors to counter emerging threats and requirements. The original U-2A first flew on Aug. 4, 1955. The type was further developed into the larger, more capable U-2R which first took flight on Aug. 28, 1967, and was delivered between 1967 and 1968. Current U-2s date to the 1980s when U-2R production was reopened under the designation TR-1 (later returned to U-2R designation in 1992). The TR-1A first flew on Aug. 1, 1981, and was re-engined and modernized starting in 1994, emerging as the U-2S. Current Block 20 U-2S features glass cockpits, digital autopilot, modernized EW system, and updated data links. Its major sensors are the ASARS-2A SAR, SYERS-2A multispectral EO/IR imagery system, and enhanced Airborne Signals Intelligence Payload (ASIP). Modification and upgrades are focused on sustaining U-2 capability through its currently planned retirement in FY26, while meeting current and emerging requirements. Current development and mods support Block 20.1 upgrades. Major efforts include ASARS-2B/C integration, avionics and navigation refresh, (Link-16/ IFDL, MADL) modernization, next-generation SIGINT, and quick-response capabilities to meet emergent ISR requirements. ASARS-2B/C significantly improves the U-2's high-altitude, deep-look radar ground mapping, moving target, and maritime capabilities and



moves to an open, easily upgradable architecture. ASARS-2B/C will begin flight-testing in FY22, and IOC is expected in FY23. Other ongoing efforts include GPS refresh, quick-change modular mission systems and unmanned-system interoperability, EW system upgrades, and a helmet and pressure suit refresh. The program continues to prioritize experimental sensors, systems, and software to meet emerging threats and develop networked, next-generation BM/C2.

Contractors: Lockheed Martin, Northrop Grumman (ASIP); Raytheon (ASARS); UTC Aerospace (SYERS/Optical Bar Camera).

First Flight: October 1994 (U-2S).

Delivered: September 1981-October 1989 (TR-1/U-2R).

IOC: Circa 1981 (U-2R).

Production: 35 (T/U-2S).

Inventory: 27 (U-2); four (TU-2).

Operator: ACC.

Aircraft Location: Beale AFB, Calif.; permanent forward operating locations worldwide.

Active Variants:

•U-2S. Current variant of the U-2/TR-1.

•TU-2S. A two-seat trainer aircraft originally designated U-2ST.

Dimensions: Span 105 ft, length 63 ft, height 16 ft.

Weight: Max T-O 40,000 lb.

Power Plant: GE Aviation F118-GE-101A turbofan, 17,000 lb thrust.

Performance: Speed 410 mph, range 7,000+ miles.

Ceiling: Above 70,000 ft.

Accommodation: Pilot (U-2S); two pilots (TU-2S) on RQ201 zero/zero ejection seats.



Staff Sgt. Kristen Pittman

WC-130J

Weather reconnaissance

Brief: The WC-130J "Weatherbird" is a modularly configurable C-130J equipped with specialized systems to penetrate tropical and winter storms, capture meteorological data, and aid severe weather forecasting. Early WC-130Bs entered service in 1959, followed by the WC-130E in 1962, and WC-130H in 1964. The WC-130J began replacing legacy variants in 1999, though several H models remained in service with the Puerto Rico ANG until a fatal crash resulted in the fleet's retirement in 2019. All WC-130Js are operated by AFRC's 53rd Weather Reconnaissance Squadron "Hurricane Hunters" at Keesler. Mission equipment includes a pod-mounted Stepped-Frequency Microwave Radiometer (SFMR) for monitoring surface winds and precipitation rates, parachute-deployed GPS dropsondes to gather vertical atmospheric profiles, and palletized operator stations/equipment running specialized software. WC-130Js are optionally equipped with two external wing tanks, as well as an internal auxiliary fuel tank to increase range and endurance. Crews include an added aerial weather reconnaissance officer/flight director and weather system specialist/loadmaster. Aircraft are capable of penetrating tropical cyclones from up to 10,000 ft to as low as 500 ft. The fleet primarily monitors oceanic weather over the Atlantic, Central Pacific, Caribbean, and Gulf of Mexico. Airframes are modernized alongside the baseline C-130J fleet, including Block 8.1 upgrades, airspace compliance mods, and enhanced service-life center wing sections. WC-130Js recently tested a new SATCOM that would enable continuous real-time streaming of radar and storm data from the aircraft to forecasters on the ground. The modular X-band antenna tested during the 2021 hurricane season was mounted in a dome fairing in place of the flight deck escape hatch.

Contractor: Lockheed Martin.

First Flight: April 5, 1996 (C-130J).

Delivered: Sept. 30, 1999-September 2005.

IOC: October 2006.

Production: 10.

Inventory: 10.

Operator: AFRC.

Aircraft Location: Keesler AFB, Miss.

Active Variant:

•WC-130J. Weather reconnaissance version of the C-130J.

Dimensions: Span 132.6 ft, length 97.8 ft, height 38.8 ft.

Weight: Max T-O 155,000 lb; max payload 42,000 lb.

Power Plant: Four Rolls-Royce AE2100D3 turboprops, each 4,700 shp.

Performance: Speed 417 mph; range with 35,000 lb payload 1,841 miles (3,000+ miles with external/auxiliary tanks).

Ceiling: With max payload, 26,000 ft.

Accommodation: Two pilots, aerial reconnaissance weather officer, loadmaster/dropsonde operator. Load: palletized weather systems.



Susan Romano/USAF

WC-135 CONSTANT PHOENIX

Air sampling and collection

Brief: WC-135's primary mission is nuclear test monitoring, airborne radiological sampling, and arms control treaty verification. The fleet are currently modified C-135Bs equipped with air sampling and collection equipment. The aircraft primarily support monitoring under the 1963 Limited Nuclear Test Ban Treaty. Air sampling WB-29s detected debris from the Soviet Union's first atomic test in 1949, and subsequent aircraft have monitored recent weapons tests in North Korea, as well as the Chernobyl and Fukushima nuclear disasters. The WC-135's sampling and collection suite allows mission crew to detect radioactive "clouds" in real time. The collection system uses external flow-through devices to collect particles on filter paper for later analysis. The podded particulate sampler/Radiation Monitoring and Analysis System (RMAS) detects radiation contact, and the Directional Gamma Sensor System (DGSS) guides the crew toward the plume for collection. The Whole Air Collection System (WACS) captures and stores radioactive samples from the aircraft's bleed-air system. An integrated control system permits real-time mission system interface and monitors internal and external radiation levels for safety and analysis. USAF deemed replacing the aging fleet to be more cost-effective than re-engining and modernization. Conversion of three KC-135R tankers to WC-135R standards began in 2019 utilizing the same sensor suite. The C-130J-mounted Harvester WACS/Particulate Airborne Collection Systems (PACS) augments Constant Phoenix and a modular system deployable on the KC-46 or RPA platform is under development. The sole WC-135C—serial 62-3582—retired on Nov. 16, 2020, and the remaining aircraft will be sustained until replaced by the WC-135R. The first WC-135R is slated for completion in 2022, followed by delivery of the remaining two aircraft in 2023.

Contractors: Boeing; L3 Technologies (WC-135R conversion).

First Flight: 1965.

Delivered: 1965-96; 2021 (WC-135R).

IOC: December 1965; 2022 (WC-135R) planned.

Production: Two (WC-135C/W); three (WC-135R) (planned).

Inventory: Two (WC-135R); one (WC-135W).

Operator: ACC.

Aircraft Location: Offutt AFB, Neb.

Active Variants:

•WC-135R. Modified KC-135R tankers, planned to replace the aging WC-135C/W fleet.

•WC-135W. Modified C-135B equipped for radiological monitoring and air sampling.

Dimensions: Span 130.8 ft, length 136.3 ft, height 41.7 ft.

Weight: Max T-O 300,500 lb. (WC-135C/W); 322,500 lb. (WC-135R).

Power Plant: Four Pratt & Whitney TF33-P-5 turbofans, each 16,050 lb thrust. (WC-135C/W); Four CFM International CFM56-2 turbofans, each 21,634 lb thrust (WC-135R).

Performance: Speed 403 mph, range 4,600 miles (farther with air refueling) (WC-135C/W); speed 530 mph, range approx. 3,900 miles (farther with air refueling) (WC-135R).

Ceiling: 40,000 ft. (WC-135C/W); 50,000 ft. (WC-135R).

Accommodation: Two pilots, navigator, up to 31 special equipment operators/observers as required.



TANKER AIRCRAFT



Senior Airman Jacob Stephens

HC-130J COMBAT KING II

Aerial refueling/airlift

Brief: The HC-130J is tasked with helicopter in-flight refueling support for CSAR/personnel recovery, tactical C2, and pararescue (PJ) deployment. It replaces legacy HC-130N/Ps and is based on the USMC's KC-130J tanker. It adds an enhanced service-life wing, improved cargo handling system, refueling receptacle, EO/IR sensor, flight deck CSO console, and dual SATCOM. Features include integrated INS/GPS, NVG-compatible lighting, FLIR, and integrated situational awareness. Recently added Advanced Threat Warning and RF countermeasures, as well as chaff/flares give the HC-130 the latest self-defensive capability for recovery operations in contested environments. USAF plans to standardize HC/AC/MC-130J block upgrades, and current efforts bring all HC-130Js to a common standard. Ongoing development and upgrades include avionics Block 8.1 (in common with the C-130J fleet), Lightweight Airborne Radio System (LARS), Situational Awareness Capabilities Upgrade (SACU), and radio frequency countermeasures (RFCM) to detect, locate, and respond to threats. ACC plans to complete fleetwide LARS upgrades in FY22 transitioning to the new 406 MHz distress frequency and improving timely location of aircraft, vessels, and personnel. SACU replaces the legacy data link with Link 16, blue force tracking, advanced mission planning, and new displays to enhance secure networking/comms fleetwide by 2023. USAF also expects to complete total fleet recap by 2023.

Contractor: Lockheed Martin.

First Flight: July 29, 2010.

Delivered: Sept. 24, 2010-present.

IOC: April 25, 2013.

Production: 39 (planned).

Inventory: 37.

Operator: ACC, AETC, AFRC, ANG.

Aircraft Location: Davis-Monthan AFB, Ariz.; Francis S. Gabreski Arpt., N.Y.; JB Elmendorf-Richardson, Alaska; Kirtland AFB, N.M.; Moffett Field, Calif.; Moody AFB, Ga.; Patrick SFB, Fla.

Active Variants:

•HC-130J, KC-130J modified for CSAR and aerial refueling.

Dimensions: Span 132.6 ft, length 97.8 ft, height 38.8 ft.

Weight: Max T-O 164,000 lb.

Power Plant: Four Rolls-Royce AE2100D3 turboprops, each 4,591 shp.

Performance: Speed 363.4 mph at S-L, range 4,000+ miles (farther with air refueling).

Ceiling: 33,000 ft.

Fuel Capacity: 61,360 lb at 150-300 gpm (100 gpm dual, simultaneous refueling).

Accommodation: Two pilots, CSO, two loadmasters, three PJs.

KC-10 EXTENDER

Aerial refueling/airlift

Brief: The KC-10 is a multirole tanker/transport capable of aeromedical evacuation, based on the McDonnell Douglas DC-10-30CF. The aircraft is USAF's largest air-refueling aircraft. It is simultaneously capable of tanker and cargo roles, enabling it to support worldwide fighter deployments. The aircraft employs an advanced aerial refueling boom and hose/drogue system allowing it to refuel a wide variety of U.S. and allied aircraft, including the CV-22 tilt-rotor, within the same mission. The aircraft has three large fuel tanks under the cargo floor and an air-refueling operator's station recessed into the aft fuselage. It is also refuelable by



Airman 1st Class Sean Hetz

boom-equipped tankers. Ongoing mods include modernized navigation, surveillance, and air traffic management (CNS/ATM) to bring the fleet into compliance with FAA mandates, and advanced Mode 5 IFF. The fleet amassed more than 2.3 million flying hours before the first three tankers retired in 2020. Congress prevented USAF from making drastic KC-10 cuts last year citing capacity concerns with delays to the KC-46 program, but removed limitations for FY22. AMC shed eight airframes last year and aims to accelerate to retiring 14 aircraft this year, proposing a new "roadmap" to reinvest in KC-46 and future capabilities through the planned divestiture of the fleet in 2024.

Contractors: McDonnell Douglas (now Boeing); Collins Aerospace (CNS/ATM).

First Flight: April 1980.

Delivered: March 1981-April 1990.

IOC: August 1982.

Production: 60.

Inventory: 48.

Operator: AMC, AFRC (associate).

Aircraft Location: JB McGuire-Dix-Lakehurst, N.J.; Travis AFB, Calif.

Active Variant:

•KC-10A. Modified McDonnell Douglas DC-10 designed as a multirole cargo-tanker.

Dimensions: Span 165.4 ft, length 181.6 ft, height 58 ft.

Weight: Max T-O 590,000 lb.

Power Plant: Three GE Aviation CF6-50C2 turbofans, each 52,500 lb thrust.

Performance: Speed 619 mph, range 11,500 miles, or 4,400 miles with max cargo (air refuelable).

Ceiling: 42,000 ft.

Fuel Capacity: 356,000+ lb. at 1,100 gpm (boom), 470 gpm (drogue).

Accommodation: Two pilots, flight engineer, boom operator; AE crew: two flight nurses, three medical technicians; other crew depending on mission.

Load: Up to 75 people and 17 pallets or 27 pallets up to approx. 170,000 lb.



Staff Sgt. Nathan Eckert

KC-46 PEGASUS

Aerial refueling/airlift

Brief: The KC-46A is a heavily modified Boeing 767-200ER multirole passenger/cargo-tanker equipped with flying boom and probe/drogue refueling capability using the Wing Air Refueling Pod (WARP) system. It is also equipped for aeromedical evacuation. KC-46 incorporates the 787's state-of-the-art cockpit, a fly-by-wire boom, remote boom-operator's station, advanced self-defensive suite including Large Aircraft IR Countermeasures (LAIRCM), RWR, tactical situational awareness, comms relay hosting, and nuclear/chem/bio hardening. In 2011 Boeing was awarded a contract for 179 KC-46A tankers, the first increment (KC-X), to replace about half of USAF's KC-135R fleet. Compared to the 50-year-old KC-135, the KC-46A has more fuel capacity, improved efficiency, and enhanced cargo and AE capability. Like the KC-10, it employs an advanced refueling boom and independently operating hose/drogue system. The program's provisioned 767-2C prototype (minus refueling boom) flew on Dec. 28, 2014, and received FAA type certification in December 2017. USAF accepted its first production KC-46 from Boeing on Jan. 10, 2019. The service awarded LRIP contracts for 19 aircraft in 2016, a follow-on Lot 3 contract for 15 aircraft in 2017, 18 aircraft in 2018, and 15 in 2019. USAF awarded





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the most recent Lot 6 and Lot 7 contracts for a combined 27 aircraft in January 2021, raising the quantity on-contract to 94 airframes. Full-rate production was initially planned to start at Lot 3 but has been pushed to Lot 10 due to program delays. FY22 funds support purchase of 14 tankers. Boeing delivered the first of up to six KC-46s to the Japan Air Self-Defense Force on Oct. 29, 2021, and Israel became the type's second international customer with an order for two tankers last December. The KC-46 completed developmental testing and entered operational testing in 2019, though planned IOC and full-rate production has slipped to FY24 or later due to remaining deficiencies with the boom and remote vision system (RVS). USAF is currently reviewing the proposed RVS redesign and Boeing aims to retrofit an initial 12 aircraft with RVS 2.0 starting in 2023, integrating the system into production airframes by 2024. AMC began employing KC-46 for noncombat refueling of a limited number of types starting in 2021 and expanded its "interim capability" to refuel nearly 70 percent of receiver types, accomplishing 2,500 sorties by year's end. USAF aims to deploy the first element of its Advanced Battle Management System (ABMS), a C2 pod to networking fifth-generation aircraft in high-threat environments, on the KC-46. McGuire received the first two of 24 planned aircraft on Nov. 9, 2021, and MacDill was selected as the next preferred alternative to host KC-46s the following month.

Contractor: Boeing.
First Flight: Sept. 25, 2015 (KC-46A).
Delivered: December 2018-present.
IOC: FY24 (planned).
Production: 179 (planned).
Inventory: 48 (KC-46A).
Operator: AFMC, AMC, ANG.
Aircraft Location: Altus AFB, Okla.; Edwards AFB, Calif.; JB McGuire-Dix-Lakehurst, N.J.; McConnell AFB, Kan.; Pease ANGB, N.H.; Seymour-Johnson AFB, N.C. Planned: MacDill AFB, Fla.; Travis AFB, Calif.; others TBD.
Active Variant:
 •KC-46A. Modified Boeing 767 designed as a multirole cargo tanker.
Dimensions: Span 156 ft, length 165.5 ft, height 52.8 ft.
Weight: Max T-O 415,000 lb.
Power Plant: Two Pratt & Whitney PW4062, each 62,000 lb thrust.
Performance: Speed 650 mph, range 7,350 miles (farther with air refueling).
Ceiling: 43,000 ft.
Fuel Capacity: 212,299 lb., max transfer load 207,672 lb at 1,200 gpm (boom), 400 gpm (drogue).
Accommodation: Two pilots, boom operator, and up to 12 additional crew; 15 crew seats, incl AE crew. Passenger Load: 58 or up to 114 for contingency operations. AE load: 58 patients (24 litters and 34 ambulatory).
Cargo Load: 18 pallet positions, max 65,000 lb.



Airman 1st Class Megan Estrada

KC-135 STRATOTANKER

Aerial refueling/airlift

Brief: The KC-135 is an aerial tanker capable of simultaneous cargo and AE missions and has been the mainstay of the USAF tanker fleet for more than 60 years. The C-135 family is similar in appearance to the commercial 707 but designed to unique military specifications and first flew on Aug. 31, 1956. The KC-135A fleet was delivered between June 1957 and January 1965, reaching IOC at Castle AFB, Calif., in 1957. KC-135s were re-engined under two separate but concurrent programs and redelivered as the KC-135E and finally the current KC-135R beginning in July 1984. Twenty KC-135Rs received Multipoint Refueling System (MPRS) hose/drogue pods on each wing to simultaneously refuel two NATO or Navy aircraft. (Standard KC-135s can use a single drogue adapter attached to the boom). A small number of McConnell-based aircraft are also receiver-capable, incorporating a forward-fuselage receptacle. KC-135s can be equipped with a podded Large-Aircraft IR Countermeasures (LAIRCM) system to track/jam IR missiles for high-threat missions. Modern features include a digital flight deck, Global Air Traffic Management upgrades completed in 2011, and Link 16 on a limited number of upgraded aircraft. Significant ongoing modernization includes Block 45 cockpit upgrades, Aero-I SATCOM replacement, and rudder position indicator retrofit. Block 45 cockpit mods enhance the modernized PACER CRAG flight deck with

an additional glass cockpit display for engine instrumentation, a radar altimeter, advanced autopilot, and modern flight director. The obsolete Aero-I long-distance oceanic satellite tracking/C2 will be replaced with a commercially available Iridium SATCOM fleetwide by 2026, while adding a rudder indicator aims to prevent accidents like the fatal 2013 crash in Kyrgyzstan. Congress barred KC-135 retirements last year due to capacity shortfall caused by KC-46 delays but will permit retiring 18 aircraft in FY22 to make room for KC-46 beddown. USAF plans to retain the fleet to at least 2050, but announced plans to possibly pursue a "bridge tanker" to augment KC-46 until a notional Advanced Air Refueling Tanker emerges.

Contractors: Boeing; Collins Aerospace (Block 45/Iridium SATCOM).
First Flight: Aug. 4, 1982 (KC-135R).
Delivered: July 1984-June 9, 2005 (KC-135R).
IOC: June 1957.
Production: 732 (420 converted to KC-135R).
Inventory: 340 (KC-135R); 54 (KC-135T).
Operator: AETC, AFMC, AMC, PACAF, USAF, ANG, AFRC.
Aircraft Location: Altus AFB, Okla.; Beale AFB, Calif.; Fairchild AFB, Wash.; Grissom ARB, Ind.; JB Andrews, Md.; Kadena AB, Japan; MacDill AFB, Fla.; March ARB, Calif.; McConnell AFB, Kan.; RAF Mildenhall, U.K.; Seymour-Johnson AFB, N.C.; Tinker AFB, Okla.; and ANG in Alabama, Alaska, Arizona, Hawaii, Illinois, Iowa, Kansas, Maine, Michigan, Mississippi, Nebraska, New Jersey, New York, Ohio, Pennsylvania, Tennessee, Utah, Washington, Wisconsin. Planned: Eielson AFB, Alaska (Active duty).
Active Variants:
 •KC-135R. Re-engined KC-135A fitted with CFM turbofan engines.
 •KC-135T. Reengined former KC-135Qs, able to carry different fuels in wing and fuselage tanks.
Dimensions: Span 130.8 ft, length 136.3 ft, height 41.7 ft.
Weight: Max T-O 322,500 lb.
Power Plant: Four CFM International CFM56-2 (USAF designation F108) turbofans, each 21,634 lb thrust.
Performance: Speed 530 mph at 30,000 ft, range 1,500 miles with 150,000 lb transfer fuel, up to 11,015 miles for ferry missions.
Ceiling: 50,000 ft.
Fuel Capacity: Max transfer load 200,000 lb at 1,100 gpm (boom), 450 gpm (MPRS pods).
Accommodation: Two pilots, navigator, boom operator, AE crew: two flight nurses, three medical technicians (adjusted as needed).
Load: 37 passengers, six cargo pallets, max 83,000 lb.

AIRLIFT AIRCRAFT

C-5 GALAXY

Strategic airlift

Brief: The C-5 is USAF's largest airlifter and one of the world's largest aircraft, capable of lifting unusually large/heavy cargo over intercontinental ranges. It is also able to take off and land in relatively short distances, and taxi on substandard surfaces if required. The Galaxy's front and rear cargo doors permit simultaneous drive-through loading/unloading. The aircraft's unique upper deck is split between the flight deck with galley and crew rest area forward of the wing and a troop compartment seating 75 passengers and a second gallery/lavatory aft of the wing. The C-5A first flew on June 30, 1968, and a total of 81 were delivered between 1969 and 1973 reaching IOC in September 1970. C-5As underwent major wing modifications to extend their service lives and all but one (converted to C-5M) are now retired. The C-5B first flew in 1985 and was delivered between 1986 and 1989. C-5Bs incorporated all C-5A improvements including strengthened wings, uprated turbofans, color weather radar, triple INS, and defensive systems (on some aircraft). Two C-5As were modified for outsize space cargo and redelivered as C-5Cs in 1989 and



W.C. Pope/USAF



1990. The combined Avionics Modernization Program (AMP) and Reliability Enhancement and Re-engining Program (RERP) resulted in the C-5M Super Galaxy. Upgraded aircraft incorporate new engines with 20 percent increase in thrust, as well as avionics, structural, and reliability fixes. A total of 49 B models, two C models, and a single C-5A were converted. Ongoing mods include CNS/ATM upgrades, new mission computers and off-the-shelf color weather radar, Large Aircraft IR Countermeasures (LAIRCM) improvements, and a lavatory redesign to address corrosion. USAF is also replacing key, nose landing gear components and is limiting "kneeling" to reduce wear following a spate of malfunctions.

Contractors: Lockheed Martin; Collins Aerospace and Honeywell (CNS/ATM, weather radar/mission computer).

First Flight: June 6, 2006 (C-5M).

Delivered: Feb. 9, 2009-Aug. 2, 2018 (C-5M).

IOC: Feb. 21, 2014 (C-5M).

Production: 131 (52 converted to C-5M).

Inventory: 50 (C-5M); two (C-5M-SCM).

Operator: AMC, AFRC.

Aircraft Location: Dover AFB, Del.; JBSA-Lackland, Texas; Travis AFB, Calif.; Westover ARB, Mass.

Active Variants:

- C-5M. Super Galaxy converted from C-5A/B, incorporating AMP and RERP.
- C-5M-SCM. Super Galaxy converted from C-5C to carry large NASA/ space cargo.

Dimensions: Span 222.8 ft, length 247.8 ft, height 65.1 ft.

Weight: Max T-O 840,000 lb.

Power Plant: Four GE Aviation F138-GE-100 (CF6-80C2) turbofans, each 50,580 lb thrust.

Performance: Speed 518 mph, range 5,524 miles with 120,000 lb of cargo.

Ceiling: 45,000 ft.

Accommodation: Two pilots, two flight engineers, three loadmasters.

Load: 81 troops and 36 standard pallets, max 285,000 lb; incl seven MRAP vehicles, six AH-64 Apache helicopters, four M2 Bradley fighting vehicles, or two M1 Abrams main battle tanks.

Operator: AFMC, PACAF.

Aircraft Location: Edwards AFB, Calif.; Holloman AFB, N.M. (J); JB Elmendorf-Richardson, Alaska; Yokota AB, Japan (J); various U.S. embassies.

Active Variants:

- C-12C. C-12As retrofit with PT6A-41 engines.
- C-12D. C-12 with an enlarged cargo door and strengthened wings.
- C-12F. C-12 with uprated PT6A-42 engines, eight-passenger seating, and AE capability.
- C-12J. Military version of the Beechcraft Model 1900C commuter airliner.

Dimensions: Span 54.5 ft, length 43.8 ft, height 15 ft (C/D/F); span 54.5 ft, length 57 ft, height 15 ft (J).

Weight: Max T-O 15,000 lb (F); 16,710 lb (J).

Power Plant: Pratt & Whitney Canada PT6A-41 (C/D) or PT6A-42 (F) turboprops, each 850 shp; PT6A-65B turboprops, each 1,173 shp (J).

Performance: Speed 300 mph (C/D) 336 mph (F) range 2,271 miles; 284 mph, range 1,669 miles (J).

Ceiling: 31,000 ft (C/D); 35,000 ft (F); 25,000 ft (J).

Accommodation: Two pilots.

Load: eight passengers (C/D/F), 19 passengers or 3,500 lb cargo (C-12J).



Tech. Sgt. Paul Duquette

C-17 GLOBEMASTER III

Tactical/strategic airlift

Brief: C-17 is a heavy-lift, strategic transport capable of direct tactical delivery of all classes of military cargo. It is the U.S. military's core airlift asset, capable of operating on small, austere airfields (3,500 ft by 90 ft) previously limited to C-130s. It is the only aircraft able to directly deliver or airdrop outsize cargo into a tactical environment and it is the first military transport to feature fully digital, fly-by-wire control. Boeing delivered the 223rd and final USAF aircraft on Sept. 12, 2013, and the final international aircraft on Nov. 29, 2015. Block 16 avionics and weather radar mods were completed in 2015. Block 20 upgrades included some 60 programs to bring early production aircraft to a common configuration, and Block 21 including Mode 5 IFF and airspace compliance were completed fleetwide in 2020. FY22 continues fleetwide HUD replacement through FY28, and funds enhanced high-bandwidth BLOS voice/data SATCOMS. Ongoing upgrades also include next-generation Large Aircraft Infrared Countermeasures (LAIRCM) to combat man-portable air defenses, as well as safety and sustainment mods. A roll-on/roll-off C2 capsule to replace the "Silver Bullet" for in-flight conferencing is currently finishing development and testing. The C-17 fleet was heavily tasked evacuating U.S. and allied personnel from Afghanistan during Operation Allies Refuge in August 2021, including carrying a record-breaking 823 passengers on a single flight on Aug. 15, 2021.

Contractor: Boeing (previously McDonnell Douglas).

First Flight: Sept. 15, 1991.

Delivered: June 1993-September 2013.

IOC: Jan. 17, 1995.

Production: 257.

Inventory: 222.

Operator: AETC, AMC, PACAF, ANG, AFRC.

Aircraft Location: Altus AFB, Okla.; Dover AFB, Del.; JB Charleston, S.C.; JB Elmendorf-Richardson, Alaska; JB Lewis-McChord, Wash.; JB McGuire-Dix- Lakehurst, N.J.; JB Pearl Harbor-Hickam, Hawaii; March ARB, Calif.; Pittsburgh Arpt., Pa.; Travis AFB, Calif.; Wright-Patterson AFB, Ohio; and ANG in Hawaii (associate), Mississippi, North Carolina, West Virginia, and New York.

Active Variant:

- C-17A. Long-range tactical/strategic airlifter.

Dimensions: Span 169.8 ft, length 174 ft, height 55.1 ft.

Weight: Max T-O 585,000 lb.

Power Plant: Four Pratt & Whitney F117-PW-100 turbofans, each 40,440 lb thrust.



Lance Cpl. Krysten Houk/USMC

C-12 HURON

Light airlift

Brief: C-12 is tasked with multimission passenger and priority light-cargo airlift, medevac, as well as diplomatic and flight-test support. The family of aircraft includes military versions of the Beechcraft King Air and 1900C (C-12J). Flight decks and cabins are pressurized for high-altitude flight. The C-12D incorporates a cargo door with an integral airstair, high-flotation landing gear, structural improvements, and optional external wingtip tanks. Both C-12C and C-12D are deployed to U.S. embassies worldwide and incorporate earlier three-bladed propellers. The C-12F incorporated uprated engines, four-bladed propellers, and an increased service ceiling. The C-12J is a completely different aircraft based on the Beechcraft 1900C commuter airliner with a large, aft cargo door. C-12Js are operated by AFMC for testing and PACAF in support of U.S. Forces Japan with provision for two litters or 10 ambulatory patients in the AE role. C-12Js incorporate extensive avionics upgrades, including three MFDs, integrated GPS, flight management systems, autopilot, VHF/UHF radios, and weather radar.

Contractor: Beechcraft.

First Flight: Oct. 27, 1972 (Super King Air 200), March 1, 1990 (1900C).

Delivered: 1974-mid 1990s.

IOC: Circa 1974.

Production: 30 (C-12A/C); six (C-12D); 46 (C-12F); four (C-12J).

Inventory: 16 (C-12C); six (C-12D); three (C-12F); four (C-12J).



Performance: Speed 518 mph at 25,000 ft, range 2,760 miles with 169,000 lb payload (farther with air refueling).

Ceiling: 45,000 ft.

Accommodation: Two pilots, loadmaster; AE crew: Two flight nurses, three medical technicians (mission dependent).

Load: 102 troops/paratroopers; 36 litter and 54 ambulatory patients; 18 pallets up to max payload 170,900 lb.



1st Lt. Sam Eckholm

C-21

Light airlift

Brief: The C-21 is a militarized Learjet 35 used for passenger and priority light-cargo airlift and aeromedical transport. It is equipped with color weather radar, TACAN, and HF/VHF/UHF radios. It provides medium-range operational support for time-sensitive movement of people and cargo throughout the U.S. and the European theater, including AE missions if required. Recent efforts include the C-21 Avionics Upgrade Program (AUP), which added a modern glass cockpit, digital weather radar, GPS, flight management system, satellite-updating real-time flight information, digital black boxes, and ADS-B/Mode 5 transponder. USAF added BLOS comms concurrently with AUP to save costs. The fleet was also retrofitted with enlarged aft-fuselage "delta fins" to improve low-speed stability and control, eliminating previous approach/landing flight restrictions. Bombardier ended Learjet production in 2021 but plans to continue supporting in-service aircraft.

Contractor: Bombardier (previously Gates Learjet).

First Flight: January 1973.

Delivered: April 1984–October 1985.

IOC: April 1984.

Production: 84.

Inventory: 19.

Operator: AMC, USAFE.

Aircraft Location: Ramstein AB, Germany; Scott AFB, Ill.

Active Variant:

•C-21A. Military version of the Learjet 35A.

Dimensions: Span 39.5 ft, length 48.6 ft, height 12.2 ft.

Weight: Max T-O 18,300 lb.

Power Plant: Two AlliedSignal TFE731-2 turbofans, each 3,500 lb thrust.

Performance: Speed 530 mph at 41,000 ft, range 2,306 miles.

Ceiling: 45,000 ft.

Accommodation: Two pilots; AE crew: Flight nurse, two medical technicians (mission dependent).

Load: eight passengers, 3,153 lb cargo; one litter or five ambulatory patients (AE role).

C-32

VIP transport

Brief: The C-32A provides dedicated vice presidential and DV airlift while the C-32B is tasked with politically sensitive crisis-mobility. Both types were acquired as commercial Boeing 757s. Aircraft assigned to the 89th Airlift Wing at Andrews fly under the call sign "Air Force Two" during vice presidential missions, but additionally serve the First Lady, Congress, and Cabinet officials. The cabin is divided into sections, including a worldwide clear and secure voice and data communications suite, first-class cabin, two business-class cabins, center galley, lavatories, fully enclosed stateroom, and a conference and staff area. The C-32B provides DOD discreet, global airlift in support of government crisis response efforts. The C-32's modern flight deck is designed to be easily upgraded. The C-32A fleet recently underwent a full cabin refurbishment to match the VC-25 as well as installation of fully reclining crew rest seats to enable long endurance missions without pre-positioned relief crews. FY22 launches Senior Leader Communication Modernization across the executive fleets including Wideband SATCOM, secure air-to-air/ground comms, commercial WiFi, in-flight information, and enhanced airborne executive phones. DOD completed analysis to replace the C-32, E-4B, and Navy E-6B Mercury



Tech. Sgt. Benjamin Mota

with a common airframe but opted to retain the fleet potentially through 2040, shifting funds to explore future supersonic transport technology.

Contractor: Boeing.

First Flight: Feb. 11, 1998 (C-32A).

Delivered: June–December 1998.

IOC: 1998.

Production: Six.

Inventory: Four (C-32A); two (C-32B).

Operator: AMC, ANG.

Aircraft Location: JB Andrews, Md. (A); JB McGuire-Dix-Lakehurst, N.J. (B).

Active Variants:

•C-32A. Presidential support-configured commercial Boeing 757-200 airliner.

•C-32B. Commercial Boeing 757-200 tasked with global crisis response airlift.

Dimensions: Span 124.6 ft, length 155.2 ft, height 44.5 ft.

Weight: Max T-O 255,000 lb.

Power Plant: Two Pratt & Whitney PW2040 turbofans, each 41,700 lb thrust.

Performance: Speed 530 mph, range 6,325 miles.

Ceiling: 42,000 ft.

Accommodation: Two pilots, up to 14 cabin and maintenance crew (varies with mission).

Load: Up to 45 passengers.



Airman 1st Class Emily Farnsworth

C-37

VIP transport

Brief: The C-37 family provides worldwide special air mission and DV support, consisting of military versions of the ultra-long-range Gulfstream business aircraft. The C-37A is based on the Gulfstream V and is equipped with separate VIP and passenger areas, secure global voice and data communications suites, enhanced weather radar, autopilot, and advanced HUD. The C-37B, first delivered in 2004, is based on the G550 and adds directional IR countermeasures for self-defense and the advanced Honeywell Plane-View flight deck. Ongoing mods include commercial wideband SATCOM, to ensure senior leaders' access to secure data and voice networks, and FAA-required CNS/ATM updates. FY22 begins wideband SATCOM upgrades as part the Senior Leader Communication Modernization effort across USAF's executive fleets. A total of 15 aircraft will be modified to ensure redundant, survivable and secure/top-secret voice, data, and video conferencing for uninterrupted worldwide C2. Existing aircraft will receive modernized enroute air traffic SATCOMS which will be standard on future airframes. USAF aims to expand the fleet by as many as 40 additional aircraft to backfill the now-retired C-20, leading to delivery of a fourth and fifth C-37B in 2019 and 2020 respectively. The service awarded Gulfstream a \$127.4 million fleet expansion contract for another two aircraft, the first of which was delivered to Andrews Nov. 3, 2021.

Contractor: Gulfstream Aerospace.



First Flight: October 1998 (C-37A).
Delivered: Oct. 14, 1998-present.
IOC: Dec. 9, 1998.
Production: 16 (planned).
Inventory: Nine (C-37A); seven (C-37B).
Operator: AMC, PACAF, USAF.
Aircraft Location: JB Andrews, Md.; JB Pearl Harbor- Hickam, Hawaii; Ramstein AB, Germany.
Active Variants:
 •C-37A. Military version of the Gulfstream V.
 •C-37B. Military version of the Gulfstream G550.
Dimensions: Span 93.5 ft, length 96.4 ft, height 25.8 ft.
Weight: Max T-O 90,500 lb. (A); 91,000 lb. (B).
Power Plant: Two BMW/Rolls-Royce BR710A14-10 turbofans, each 14,750 lb thrust (A); two BMW/Rolls-Royce BR710C4-11 turbofans, each 15,385 lb thrust (B).
Performance: Speed 600 mph (cruise 345 mph); range 6,300 miles (A), 6,700 miles (B).
Ceiling: 51,000 ft.
Accommodation: Two pilots, flight attendant, crew chief.
Load: Up to 12 passengers (A); 14 passengers (B).



Maj. Stanley Paregien

C-40 CLIPPER

VIP transport

Brief: The C-40 is a medium-range DV airlift aircraft based on the commercial Boeing 737-700. It is used to transport senior military commanders, Cabinet officials, and members of Congress, as well as performing other support missions. C-40Bs are equipped with an office-in-the-sky arrangement, including clear and secure voice/data communication and broadband data/video. C-40Cs lack the advanced communications suite, are VIP configured with sleep accommodations, and are reconfigurable to carry 42 to 111 passengers. Both versions have modern avionics, integrated GPS and flight-management system/electronic flight instrument system, and HUD. Each aircraft has auxiliary fuel tanks and managed passenger communications. Recent mods add fully reclining crew rest seats to enable long endurance missions without pre-positioned relief crews. FY22 launches Senior Leader Communication Modernization across the executive fleets including Wideband SATCOM, secure air-to-air/ground comms, commercial WiFi, in-flight information, and enhanced airborne executive phones. Updates will ensure redundant, survivable and secure/top-secret voice, data, and video conferencing for uninterrupted worldwide C2.

Contractors: Boeing, L3Harris (Wideband SATCOM).

First Flight: April 14, 1999 (C-40A).

Delivered: 2002-2007.

IOC: Feb. 28, 2003.

Production: 11.

Inventory: Six (C-40B); seven (C-40C).

Operator: AMC, ANG, AFRC.

Aircraft Location: JB Andrews, Md.; Scott AFB, Ill.

Active Variants:

•C-40B. VIP military-configured Boeing 737-700 with advanced comms.

•C-40C. Passenger-configured Boeing 737-700, lacking advanced comms.

Dimensions: Span 117.4 ft, length 110.3 ft, height 41.2 ft.

Weight: Max T-O 171,000 lb.

Power Plant: Two GE Aviation CFM56-7 turbofans, each 27,000 lb thrust.

Performance: Speed 530 mph, range 5,750 miles.

Ceiling: 41,000 ft.

Accommodation: Two pilots, up to eight cabin and maintenance crew (varies by model/mission). Load: Up to 89 passengers (B); up to 111 passengers (C).



Master Sgt. Joe Harwood/ANG

C-130H HERCULES

Tactical airlift

Brief: The C-130H is an all-purpose theater transport that performs diverse roles, including tactical and inter-theater airlift and airdrop, AE, aerial spraying, aerial firefighting, and humanitarian support. The developmental YC-130A first flew in August 1954 with the C-130A entering USAF service in 1956. The H model improved on the later C-130E and was delivered starting in 1965, with delivery of the current, more advanced models starting in 1974. Improvements included uprated engines, redesigned outer wing, improved pneumatic systems, new avionics, improved radar, and NVG lighting. USAF intends to partially recapitalize the C-130H fleet with the C-130J and modernize the remaining fleet with new avionics, safety, and performance improvements. Ongoing upgrades include critical center wing box replacement, electronic propeller controls/engine efficiency mods, NP2000 propellers, and the C-130H Avionics Modernization Program (previously Viability and Airspace Access Program). A total of 16 aircraft including Modular Airborne Fire Fighting Systems (MAFFS)-equipped airframes have been retrofit with NP2000 propellers to enhance performance and safety. USAF has 83 aircraft currently on-contract for NP2000 installs with the goal of eventually retrofitting the entire fleet. AMP increment 1 was completed fleetwide in April 2021, adding new CNS/ATM and bringing legacy C-130s into compliance with international airspace rules. Increment 2 will add terrain awareness and warning, new flight management, and modern glass cockpit displays starting in FY22. The service is also evaluating future replacement options for the C-130H's Station Keeping Equipment (SKE) used for tactical formation flight. The Kentucky ANG's 123rd AW officially transitioned to the C-130J, transferring its last C-130H to the Delaware ANG on Sept. 24, 2021. USAF plans to retire 13 C-130Hs in FY22, and Congress barred the service from cutting the total tactical airlift fleet below 279 aircraft.

Contractors: Lockheed Martin (airframe); L3Harris (AMP Increment 2); Collins Aerospace (NP2000).

First Flight: 1965 (C-130H).

Delivered: March 1965 onward (C-130H1); April 1975-96 (current C-130H2/H3).

IOC: Circa 1974.

Production: 1,202 (C-130H).

Inventory: 141.

Operator: ANG, AFRC.

Aircraft Location: Dobbins ARB, Ga.; Little Rock AFB, Ark.; Maxwell AFB, Ala.; Minneapolis-St. Paul Arpt./ARS, Minn.; Peterson SFB, Colo. (MAFFS); Youngstown ARS, Ohio (Aerial Spray); and ANG in Arkansas, Connecticut, Delaware, Georgia, Illinois, Minnesota, Missouri, Montana, Nevada (MAFFS), Ohio, Texas, West Virginia, Wyoming (MAFFS).

Active Variant:

•C-130H Hercules. Updated late-production version of the legacy C-130.

Dimensions: Span 132.6 ft, length 97.8 ft, height 38.8 ft.

Weight: Max T-O 155,000 lb; max payload 42,000 lb.

Power Plant: Four Allison T56-A-15, or Rolls-Royce T56 3.5 turboprops, each 4,591 shp.

Performance: Speed 366 mph; range with 35,000 lb payload 1,496 miles.

Ceiling: With max payload, 23,000 ft.

Accommodation: Two pilots, navigator, flight engineer, loadmaster.

Load: Up to 92 combat troops or 64 paratroopers or 74 litters or six cargo pallets or 16 Container Delivery System (CDS) bundles or any combination of these up to max weight.

C-130J SUPER HERCULES

Tactical airlift

Brief: The C-130J is the redesigned, current production version of the C-130 all-purpose theater transport. Missions include tactical and inter-theater airlift, airdrop, AE, wildfire suppression using the Modular Airborne Fire Fighting System (MAFFS), and humanitarian relief. The aircraft first deployed to combat in Southwest Asia in 2004. The Super Hercules





Senior Airman Laura Weaver

features three-crew flight operations, more powerful engines, composite six-blade propellers, and digital avionics and mission computers. The C-130J can fly faster, higher, and farther than the C-130H. The C-130J-30 variant features a 15-foot longer “stretched” fuselage. The combined fleet is sustained via block upgrades. USAF combined Block 7/8.1 upgrades to reduce modification downtime. Block 7 includes Link 16, new flight management systems, civil GPS, and a special mission processor. Ongoing Block 8.1 upgrades add improved LOS data link and BLOS comms, improved precision navigational aids, enhanced covert lighting, replaces UHF comms with SATCOMS, and updates mission planning systems. Block 8.1’s Mode 5 IFF and air traffic management upgrades were successfully fielded ahead of cycle to meet FAA and global airspace requirements. Airframes delivered since 2009 incorporate enhanced service life center wings, and two of the 23 early production airframes programmed will be retrofitted in 2022. Major development focuses on modernized secure, jam-resistant HF/UHF/SATCOM voice and data as well as data links to keep pace with newer satellites and networking. USAF is procuring a total of 24 C-130J variants under a third multiyear contract option for a mix of HC/MC-130Js scheduled for delivery through 2025. ANG units in Texas, Kentucky, and West Virginia received their first C-130Js and beginning transition from the C-130H in 2021. Georgia is slated to receive J models as they become available and Congress added funds for an additional 20 C-130Js including 16 ANG and four AFRC aircraft in the FY22 defense budget.

Contractor: Lockheed Martin.

First Flight: April 5, 1996.

Delivered: February 1999-present.

IOC: October 2006.

Production: 2,600+ worldwide, 141 (USAF).

Inventory: 144.

Operator: AETC, AMC, PACAF, USAF, ANG, AFRC.

Aircraft Location: Dyess AFB, Texas; Keesler AFB, Miss.; Little Rock AFB, Ark.; Ramstein AB, Germany; Yokota AB, Japan; and ANG in California, Kentucky, Rhode Island, Texas, and West Virginia. Planned: ANG in Georgia.

Active Variants:

- C-130J Super Hercules. Current production version.
- C-130J-30 Super Hercules. Stretched version capable of accommodating larger loads.

Dimensions: Span 132.6 ft, length 97.8 ft, height 38.8 ft.; (J-30 length) 112.8 ft.

Weight: Max T-O 155,000 lb (J), 164,000 lb (J-30); max payload 42,000 lb (J), 44,000 lb (J-30).

Power Plant: Four Rolls-Royce AE2100D3 turboprops, each 4,700 shp.

Performance: Speed 417 mph (J), 410 mph (J-30); range with 35,000 lb payload 1,841 miles (J), 2,417 miles (J-30).

Ceiling: With max payload, 26,000 ft (J), 28,000 ft (J-30).

Accommodation: Two pilots, loadmaster.

Load: Up to 92 combat troops or 64 paratroopers or 74 litters or six cargo pallets or 16 Container Delivery System (CDS) bundles or any combination of these up to max weight (J); 128 combat troops or 92 paratroopers or 97 litters or eight pallets or 24 CDS bundles or any combination of these up to max weight (J-30).

LC-130H SKIBIRD

Arctic support/tactical airlift

Brief: The LC-130H is a ski-equipped, Arctic-support derivative of the C-130H. It is capable of direct resupply of Antarctic research stations and high-arctic radar sites utilizing ice and snowpack runways. The LC-130H fleet supports the National Science Foundation’s (NSF) Antarctic research, ferrying much of the material, provisions, and personnel between Christchurch, New Zealand, and McMurdo Station, Antarctica. The aircraft also provide ongoing support to the remote Amundsen-Scott South Pole Station. USAF began augmenting the Navy’s “Operation Deep Freeze” with the C-124 in 1956. C-130s began Antarctic support in 1959, operating without skis until the initial ski-borne deployment of the C-130D in January 1960. By 1975, the New York ANG’s 109th AW operated USAF’s only ski-equipped LC-130 supporting Distant Early Warning sites



Mej. David Price/ANG

in the high-Arctic. The unit began augmenting Navy LC-130s during Deep Freeze in 1988, before taking over primary responsibility in 1999. Three aircraft were converted from ex-Navy LC-130Rs, and the NSF funded an additional three new-build aircraft in 1995-96. LC-130s have been upgraded with eight-bladed NP-2000 propellers to increase take-off performance, digital cockpit displays and flight management systems, multifunction radar, modernized comms, and a single air data computer. LC-130s are upgraded along with the baseline C-130H fleet, including center wing box replacement, Mode 5 IFF, as well as the C-130H Avionics Modernization Program which enters Increment 2 in FY22. Ice Pod experiments utilizing an aft, externally mounted sensor suite to record ice composition and density began in 2015. The pod includes radar, laser, and optical sensors. Required upgrades include NVG-compatible flight deck, secure BLOS data link, and increased reliability commercial SATCOM. The fleet also currently lacks self-defensive/missile warning capability, and engine upgrades to maximize performance in conjunction with the eight-bladed propellers. Strict pandemic quarantine requirements greatly curtailed Antarctic support in FY21 but LC-130s flew an extended season in Greenland airlifting a combined 2 million pounds of cargo, 32,000 gallons of fuel, and 1,058 personnel in support of NSF research. Congress is pressing USAF to recapitalize the LC-130 (likely with C-130J) in line with its other special-mission C-130 fleets.

Contractor: Lockheed Martin.

First Flight: 1957 (ski-equipped C-130D).

Delivered: 1974-96.

IOC: Circa October 1984.

Production: 10.

Inventory: 10.

Operator: ANG.

Aircraft Location: Stratton ANGB, N.Y.

Active Variants:

- LC-130H Skibird. Arctic support variant with wheel-ski gear and eight-bladed propellers.

Dimensions: Span 132.6 ft, length 97.8 ft, height 38.8 ft.; Nose Ski 10 ft by six ft wide, main gear skis 12 ft by six ft wide.

Weight: Max T-O 155,000 lb; max payload 45,000 lb.

Power Plant: Four Rolls-Royce T56 3.5 turboprops, each 4,591 shp.

Performance: Speed 366 mph; range with 35,000 lb payload 1,636 miles (with engine upgrades).

Ceiling: With max payload, 23,000 ft.

Accommodation: Two pilots, navigator, flight engineer, loadmaster.

Load: Up to 92 passengers or 74 litters; six cargo pallets, 16 Container Delivery System (CDS) bundles, or any combination up to max weight.



Adam Schultz/White House

VC-25 AIR FORCE ONE

Presidential airlift

Brief: The VC-25 is a specially configured Boeing 747-200B equipped for airlifting the President and his entourage. VC-25s operate under the call sign “Air Force One” when the President is aboard, and SAM (Special Air Mission) during non-presidential flights. Aircraft are equipped with staff work areas, a conference room, a general seating area, and an executive office. Communications capability includes worldwide secure and clear



communications and a full suite of strategic C2 comm/data links. The aircraft also has a full self-defensive suite. The fleet is operated by the Presidential Airlift Group of the 89th Airlift Wing at JB Andrews. Congress directed retirement of the VC-25A by the end of 2025 and FY20 funded the fleet's final block upgrade, which included protected satcom, weather radar, digital voice/data comms, and networking. The modifications are aimed at keeping the fleet viable until replaced by the VC-25B (based on Boeing's modernized 747-8 Intercontinental). FY22 funds wideband SATCOM upgrades as part of AMC's Senior Leader Communication Modernization effort across the executive fleets. USAF issued Boeing a \$3.9 billion presidential aircraft replacement contract to modify two undelivered commercial 747-8s to VC-25B standards on Feb. 20, 2018. Work underway to modify the airframes though the anticipated delivery date has slipped a year to 2025 due to manufacturing delays. Specifications exclude aerial refueling capability to reduce program cost.

Contractor: Boeing.
First Flight: Sept. 6, 1990 (VC-25A).
Delivered: August-December 1990.
IOC: Dec. 8, 1990; planned 2025 (VC-25B).
Production: Two VC-25A; two VC-25B (undergoing modification).
Inventory: Two (VC-25A); two (VC-25B).
Operator: AMC.
Aircraft Location: JB Andrews, Md.

Active Variants:
 •VC-25A. Specially configured presidential support version of the Boeing 747-200B.
 •VC-25B. Next-generation presidential aircraft based on the Boeing 747-8 Intercontinental.
Dimensions: Span 195.8 ft, length 231.8 ft, height 63.4 ft (A); span 224.5 ft, length 250.2 ft, height 63.4 ft (B).
Weight: Max T-O 833,000 lb (A); max T-O 987,000 lb (B).
Power Plant: Four GE Aviation CF6-80C2B1 turbofans, each 56,700 lb thrust (A); four GE Aviation GEnx-2B turbofans, each 66,500 lb thrust (B).
Performance: Speed 630 mph, range 7,800 miles (farther with air refueling) (A); speed 660 mph, range 8,900 miles (B).
Ceiling: 45,100 ft.
Accommodation: Two pilots, navigator, flight engineer, up to 22 cabin and maintenance crew; Load: Up to 102 passengers (A); TBD (B).

HELICOPTERS



Senior Airman Hayden Legg

HH-60 PAVE HAWK

Personnel recovery/medium lift

Brief: The HH-60G Pave Hawk is an armed, all-weather day/night CSAR helicopter derived from the UH-60 Blackhawk. Additional missions include casualty/medical evacuation, disaster and humanitarian response, firefighting, and combat/utility support. The HH-60G is equipped with advanced INS/GPS/Doppler navigation systems, SATCOM, and secure/anti-jam communications, and personnel locating system (PLS) that aids location of a survivor's radio. It includes automatic flight control, NVG lighting, FLIR, an engine/rotor blade anti-ice system, in-flight refueling probe, additional fuel tanks, and an integral rescue hoist. Combat enhancements include a full, self-defensive suite and two miniguns (or .50-caliber guns). Major upgrades include Block 162 which encompasses Avionics Communications Suite Upgrade and replaces obsolete systems with color weather radar, improved TACAN, new RWR, auto direction finding, and digital intercoms. HH-60U are modified UH-60Ms operated by AFMC for testing and support. USAF initially pursued new-build UH-60Ms as loss replacements for the HH-60G before opting to modify Army surplus UH-60Ls instead. Delivery of the last of 21 UH-60L combat-loss replacements was expected in FY22. Ongoing mods include color cockpit displays, Mode 5 IFF, loss-replacement mission systems, and defensive system upgrades. Congress restored FY22 funds for canceled Degraded Visual Environment (DVE)/Terrain Awareness and Warning System (TAWS). USAF retired the first 34 airframes last year and intends to completely recapitalize the fleet with

the HH-60W by FY26. Moody retired its final HH-60G on Sept. 29, 2021.

Contractor: Lockheed Martin Sikorsky.
First Flight: October 1974.
Delivered: 1982-1998 (HH-60G).
IOC: 1982.
Production: 112 (HH-60G); three (HH-60U).
Inventory: 82 (HH-60G); three (HH-60U).
Operator: ACC, AETC, AFMC (HH-60U), PACAF, USAFE, ANG, AFRC.
Aircraft Location: Aviano AB, Italy; Davis-Monthan AFB, Ariz.; Eglin AFB, Fla.; Francis S. Gabreski Arpt., N.Y.; JB Elmendorf-Richardson, Alaska; Kadena AB, Japan; Kirtland AFB, N.M.; Moffett Field, Calif.; Nellis AFB, Nev.; Patrick SFB, Fla.
Active Variants:
 •HH-60G. Modified UH-60 helicopter equipped for CSAR.
 •HH-60U. Modified UH-60M helicopters utilized by AFMC for utility and test support.
Dimensions: Rotor diameter 53.6 ft, overall length 64.7 ft, height 16.7 ft.
Weight: Max T-O 22,000 lb.
Power Plant: Two GE Aviation T700-GE-700/701C turboshafts, each 1,560-1,940 shp.
Performance: Speed 184 mph; range 580 miles (farther with air refueling).
Ceiling: 14,000 ft.
Armament: Two 7.62 mm miniguns or two .50-caliber machine guns.
Accommodation: Two pilots, flight engineer, gunner.
Load: Up to three PJs and four non-ambulatory patients.



Airman 1st Class Karissa Dick

HH-60 JOLLY GREEN II

Personnel recovery/medium lift

Brief: The HH-60W is an armed, all-weather day/night CSAR helicopter fielded to replace the HH-60G. The type is derived from the UH-60M Black Hawk and dubbed "Jolly Green II" in honor of the Vietnam-era HH-3 and HH-53. Additional missions include casualty/medical evacuation, disaster and humanitarian response, firefighting, and combat/utility support. The HH-60W features a fully digital glass cockpit, improved hot weather/high-altitude performance, onboard self-defenses capable of defeating higher-end threats, an enlarged cabin, and double the internal fuel capacity of the HH-60G. Features include digital RWR, laser/missile/hostile fire warning, integrated chaff/flares, cabin and cockpit armor, externally mounted 7.62 mm and .50 cal weapons, LINK 16, SADL, integrated cockpit/cabin displays, advanced comms, ADSB, tactical moving map displays, upturned IR-masking exhausts, and efficient wide-chord rotor blades. USAF awarded Sikorsky Aircraft the \$1.28 billion Combat Rescue Helicopter contract to replace the HH-60G on June 26, 2014. USAF revised its accelerated procurement plans and now aims to procure a total of 105 HH-60Ws over six lots (decreased from a planned 113 aircraft). A total of 55 LRIP helicopters will now be procured in four lots from FY19-FY22, with the final two lots procured through 2024—two years earlier than originally planned. FY22 funds procure 14 aircraft, bringing the total order to 65 aircraft with a full-rate production decision expected by 2023. Nine HH-60Ws support developmental testing at Eglin/Duke, and a tenth airframe was added for upgrade testing. Planned improvements include adding Distributed Aperture Infrared Counter Measure (DAIRCM), jam-resistant GPS, Degraded Visual Environment (DVE) system, Video Data Link (VDL), improved Blue Force Tracker, integrated system diagnostics, wideband-UHF and narrowband satcoms, and airspace compliance updates. HH-60Ws completed developmental testing at Eglin on April 13, 2021, paving the way of operational testing at Nellis in 2022. USAF accepted the first production aircraft from Sikorsky on May 18, 2021. Moody received its first two aircraft Nov. 5, 2020, followed by Kirtland Dec. 17, 2020. Both bases are receiving four initial aircraft for maintenance training and initial operational employment.

Contractor: Lockheed Martin Sikorsky.
First Flight: May 17, 2019.
Delivered: 2019-present.



IOC: 2022 (planned).
Production: 105 (planned).
Inventory: 13 (HH-60W).

Operator: ACC, AETC, AFMC. Planned: PACAF, USAFE, ANG, AFRC.
Aircraft Location: Duke Field, Fla.; Kirtland AFB, N.M.; Moody AFB, Ga. Planned: Aviano AB, Italy; Davis-Monthan AFB, Ariz.; Francis S. Gabreski Arpt., N.Y.; JB Elmendorf-Richardson, Alaska; Kadena AB, Japan; Moffett Field, Calif.; Nellis AFB, Nev.; Patrick SFB, Fla.

Active Variants:

•HH-60W. Developmental next-generation Combat Rescue Helicopter based on the UH-60M.

Dimensions: Rotor diameter 53.6 ft, overall length 64.7 ft, height 16.7 ft.

Weight: Max T-O 22,500 lb.

Power Plant: Two GE Aviation T700-GE-701D turboshafts, each 1,857 shp.

Performance: Speed 176 mph; range 690 miles (air refuelable).

Ceiling: 20,000 ft.

Armament: Two 7.62 mm miniguns or two .50-caliber machine guns.

Accommodation: Crew: two pilots, flight engineer, gunner.

Load: TBD.



Airman 1st Class Bridgitte Taylor

MH-139 GREY WOLF

Missile field security/light lift

Brief: The MH-139 is based on the Leonardo AW139 and is modified with mission-specific equipment, systems, and armament by prime contractor Boeing. Features include an open-architecture glass cockpit, weather radar, enhanced ground proximity warning, radar altimeter, engine IR signature reduction, and military UHF/satcoms. The helicopter also features defensive systems such as chaff/flares and missile warning, cockpit and cabin ballistic protection, and crashworthy, self-sealing fuel tanks. AFGSC aircraft will be optionally armed with cabin-mounted 7.62 mm M240 machine guns. USAF awarded Boeing the \$2.4 billion UH-1N replacement contract on Sept. 24, 2018, following cancellation of the earlier Common Vertical Lift Support Program (CVLSP). Requirements were driven by the MH-139's primary ICBM-field security and support role, but it will eventually replace UH-1Ns in the DV lift and aircrew survival training roles as well. The service plans to procure up to 84 MH-139s through FY27, basing 30 at Andrews, 11 each at F. E. Warren, Maxwell (schoolhouse), Malmstrom, Minot, and four each at Fairchild and Yokota, retaining two for integration work at Eglin. Since the commercial AW139 is a mature system, developmental testing will be streamlined and tests will focus largely on ability to meet mission requirements. A total of six engineering development airframes have been delivered to support contractor-led developmental flight and ground testing. Test flights at Duke Field starting in February 2020 uncovered performance-limiting deficiencies in crosswinds, degraded visual conditions, and austere operating conditions which have delayed FAA certification. USAF planned to procure eight aircraft per year starting in FY21 but requested no funding in FY22 pending type certification. The program pushed a planned full-rate production decision from September 2021 to at least January 2023, delaying ramp-up to delivery of the planned 15 aircraft per year. Malmstrom will be the helicopter's first operational location.

Contractors: Boeing (prime contractor); Leonardo (formerly Agusta-Westland) (airframe); Honeywell (avionics).

First Flight: 2019.

Delivered: Dec. 19, 2019-present.

IOC: 2023 (planned).

Production: 84 (planned).

Inventory: Six (contractor operated test assets).

Operator: AFMC. Planned: AETC, Air Force District of Washington, AFGSC.
Aircraft Location: Duke Field, Fla. Planned: Fairchild AFB, Wash.; F. E. Warren AFB, Wyo.; JB Andrews, Md.; Malmstrom AFB, Mont.; Maxwell AFB, Ala.; Minot AFB, N.D.

Active Variants:

•MH-139A. Military version of the Agusta-Westland AW139 for utility support and light lift.

Dimensions: Rotor diameter 45.2 ft, length 54.7 ft, height 16.3 ft.

Weight: Max gross 14,110 lb.

Power Plant: Two Pratt & Whitney PT6C-67C turboshaft, each 1,100 shp.

Performance: Speed 167 mph, range 890 miles.

Ceiling: 20,000 ft.

Armament: Two M240 7.62 mm machine guns (mission dependent).

Accommodation: Two pilots, flight engineer.

Load: 15 passengers (depending on fuel, equipment, and atmospheric conditions) or up to four litters and five medical personnel.



Airman Allison Martin

UH-1 HUEY/IROQUOIS

Light lift/training

Brief: The UH-1N aircraft initially provided search and rescue capabilities before replacing earlier Huey variants in the ICBM field security and support role. UH-1Ns also provide administrative/DV lift to U.S. National Capital Region at JB Andrews and U.S. Forces-Japan at Yokota, as well as supporting aircrew survival training at Fairchild. The TH-1H fleet provides Air Force helicopter pilot training at Fort Rucker. USAF converted all single-engine UH-1H models to TH-1H variants, extending their service lives' by at least 20 years. USAF awarded Boeing the \$2.4 billion UH-1N replacement contract for up to 84 MH-139s in 2018, but contract delays pushed initial fielding to 2023 or beyond. The fleet recently received NVG-compatible cockpits, upgraded sensors, and safety and sustainment improvements. The ongoing SLEP of up to 63 airframes aims to bridge the gap until the MH-139A is fielded. USAF plans to begin retiring the fleet in 2022 with full retirement by 2032. The UH-1N is the only DOD aircraft fleet to consistently achieve its target mission capable rate over the past decade.

Contractors: Bell Helicopter; Lockheed Martin (TH-1H prime).

First Flight: April 1969 (UH-1N).

Delivered: September 1970-1974; November 2005-2013 (TH-1H).

IOC: October 1970 (UH-1N); circa 2009 (TH-1H).

Production: 28 (TH-1H); 79 (USAF UH-1Ns).

Inventory: 28 (TH-1H); 63 (UH-1N).

Operator: AETC, Air Force District of Washington, AFGSC, AFMC, PACAF.

Aircraft Location: Eglin AFB, Fla.; Fairchild AFB, Wash.; F. E. Warren AFB, Wyo.; Fort Rucker, Ala.; JB Andrews, Md.; Kirtland AFB, N.M.; Malmstrom AFB, Mont.; Minot AFB, N.D.; Yokota AB, Japan.

Active Variants:

•TH-1H. Modified twin-engine version of UH-1H used for flight training.

•UH-1N. Military version of the Bell 212 used for utility support and light lift.

Dimensions: Rotor diameter 48 ft, length 57 ft, height 13 ft. (TH-1H); rotor diameter 48 ft, length 57.1 ft, height 12.8 ft. (UH-1N).

Weight: Max gross 10,500 lb.

Power Plant: One Honeywell T53-L-703 turboshaft, 1,800 shp (TH-1H); two Pratt & Whitney Canada T400-CP-400 turboshafts, 1,290 shp (UH-1N).

Performance: Speed 149 mph, range 300+ miles (UH-1N).

Ceiling: 15,000 ft (10,000 ft with 10,000+ lb).

Armament: (Optional) two General Electric 7.62 mm miniguns or two 40 mm grenade launchers; two seven-tube 2.75-in rocket launchers.

Accommodation: Two pilots, flight engineer.

Load: Six to 13 passengers (depending on fuel, equipment, and atmospheric conditions) or up to six litters or, without seats, bulky, oversize cargo (UH-1N).



TRAINER AIRCRAFT



Senior Airman Davis Donaldson

T-1 JAYHAWK

Advanced trainer

Brief: The T-1A is a military version of the Beechcraft 400A business jet used in the advanced phase of JSUPT for tanker/transport pilot and CSO training pipelines. The cockpit seats an instructor and two students. Mods include UHF/VHF radios, INS, TACAN, airborne direction finder, increased bird-strike resistance, and an additional fuselage fuel tank. CSO training aircraft also incorporate GPS-driven SAR and simulated RWR, as well as a second student and instructor station. Upgrade efforts are focused on avionics modernization and include new MFD and terrain collision avoidance systems. USAF awarded a \$156 million Avionics Modernization Program (AMP) contract to replace the type's obsolescent flight deck with a commercial glass cockpit in 2018, and the first modified aircraft flew in March 2019. A total of 55 aircraft (including all CSO-training aircraft) were upgraded through October 2021. USAF announced plans to divest the majority of the fleet starting in FY23 citing cost-prohibitive obsolescence issues. The service plans to retain only the 21 CSO-configured trainers at Pensacola.

Contractors: Beechcraft (airframe); Field Aerospace/Collins Aerospace (AMP).

Operator: AETC.

First Flight: July 5, 1991.

Delivered: Jan. 17, 1992-July 1997.

IOC: January 1993.

Production: 180.

Inventory: 177.

Aircraft Location: Columbus AFB, Miss.; Laughlin AFB and JBSA-Randolph, Texas; Vance AFB, Okla.; NAS Pensacola, Fla.

Active Variant:

•T-1A. Military trainer version of Beechcraft 400A.

Dimensions: Span 43.5 ft, length 48.4 ft, height 13.9 ft.

Weight: Max T-O 16,100 lb.

Power Plant: Two Pratt & Whitney Canada JT15D-5B turboprops, each 2,900 lb thrust.

Performance: Speed 538 mph, range 2,555 miles.

Ceiling: 41,000 ft.

Accommodation: Three pilots (two students side-by-side, instructor in jump-seat); one pilot, one CSO trainee side-by side, instructor in jump-seat, one radar/system student and one instructor at aft-consoles (CSO-training configured aircraft).



Senior Airman David Phaff

T-6 TEXAN II

Primary trainer

Brief: The T-6 is a joint Air Force/Navy undergraduate pilot trainer developed under the Joint Primary Aircraft Training System program. The aircraft is based on the Swiss Pilatus PC-9 and the Navy version is designated T-6B. Mods include a strengthened fuselage, zero/zero

ejection seats, upgraded engine, increased fuel capacity, pressurized cockpit, bird-resistant canopy, and digital avionics with sunlight-readable LCDs. The tandem student and instructor positions are interchangeable, including single-pilot operation from either seat. The T-6 is fully aerobatic and features an anti-G system. USAF production was completed in 2010, with an expected service life of 21 years. Ongoing mods include a crash-survivable flight data recorder, updated training aids and Next-Generation Onboard Oxygen Generation System (OBOGS) to combat the hypoxia-like incidents. Improved maintenance and inspections will mitigate hypoxia risks until fleetwide retrofit is complete. Future development includes controlled flight into terrain avoidance.

Contractor: Beechcraft/Textron Aviation Defense (formerly Raytheon).

First Flight: July 15, 1998.

Delivered: May 2000-May 2010.

IOC: May 2000.

Production: 452 (USAF); 328 (USN).

Inventory: 442 (USAF).

Operator: AETC, USN.

Aircraft Location: USAF: Columbus AFB, Miss.; Laughlin AFB, JBSA-Randolph, and Sheppard AFB, Texas; Vance AFB, Okla.; NAS Pensacola, Fla.

Active Variants:

•T-6A. Joint service primary training aircraft, based on the Pilatus PC-9.

Dimensions: Span 33.5 ft, length 33.4 ft, height 10.7 ft.

Weight: Max T-O 8,300 lb (T-6).

Power Plant: One Pratt & Whitney Canada PT6A-68 turboprop, 1,100 shp.

Performance: Speed 320 mph, range 1,035 miles.

Ceiling: 31,000 ft.

Accommodation: Two pilots on Martin Baker MK16LA zero/zero ejection seats.



Boeing

T-7A RED HAWK

Advanced trainer

Brief: The T-7A Red Hawk is the Air Force's developmental next-generation, supersonic advanced jet trainer. The service selected the joint-venture Boeing-SAAB aircraft as the winner of the \$9.2 billion "T-X" competition to replace the T-38 on Sept. 20, 2018. The Air Force dubbed the type "Red Hawk" in honor of the WWII Tuskegee Airman. The T-7A was rapidly developed in less than three years using digital design techniques earning USAF's initial "e" prefix designating it part of the "Digital Century Series" to quickly field new, low-cost designs. eT-7A was designed from the outset to replicate the systems and performance of advanced fourth and fifth-generation aircraft including high-G/high angle of attack performance and a blend of synthetic and onboard systems including simulated radar, defensive systems, data links, and smart weapons. It incorporates fly-by-wire controls, a fully digital glass cockpit, "stadium seating" to improve backseat visibility, next-gen ACES 5 ejection seats, modular systems architecture, and maintainer-friendly design to cut downtime and lifecycle cost. T-7A is being developed in tandem with the Ground-Based Training System simulator and courseware to provide AETC with a seamless, comprehensive flight training program. The first of two "production ready" airframes first flew from Boeing's facility at Saint Louis on Dec. 21, 2016. The first two aircraft launched initial flight testing and five additional airframes will support Engineering and Manufacturing Development testing at Edwards beginning flight-envelope expansion. USAF reduced funding in FY22 due to supply chain delays and additional testing required to assess instability at high angles of attack discovered in early trials. USAF plans to procure an initial 351 aircraft, delivering the



first production T-7A to Randolph in 2023.

Contractors: Boeing-SAAB, General Electric (engine); Collins Aerospace (cockpit/ejection seats).

First Flight: Dec. 20, 2016 (T-X).

Delivered: 2023 onward (planned).

IOC: 2024 (planned).

Production: 351 (planned).

Inventory: Three (contractor-owned test airframes).

Operator: Boeing, AFMC; Planned: AETC.

Aircraft Location: Edwards AFB, Calif. Planned: Columbus AFB, Miss.; Laughlin AFB, JBSA-Randolph, and Sheppard AFB, Texas; Vance AFB, Okla.

Active Variants:

•eT-7A. Developmental next-generation advanced trainer.

Dimensions: Span 30.6 ft, length 46.9 ft, height 13.5 ft.

Weight: Max T-O 12,125 lb.

Power Plant: General Electric F404-GE-103 augmented turbofan, 17,200 lb thrust.

Performance: Speed Mach 1+, range approx. 1,140 miles.

Ceiling: 50,000 ft+.

Accommodation: Two pilots on ACES 5 zero/zero ejection seats.



Senior Airman Cameron Schultz

T-38 TALON

Advanced trainer

Brief: The T-38 was the first supersonic trainer aircraft and primarily serves AETC's advanced JSUPT fighter/bomber tracks and Introduction to Fighter Fundamentals. The aircraft is used to teach supersonic techniques, aerobatics, formation, night and instrument flying, and cross-country/low-level navigation. The T-38 is also used by the USAF Test Pilot School to train test pilots and flight-test engineers and by ACC and AFGSC as a companion trainer to maintain pilot proficiency. ACC uses regenerated T-38s as dedicated Aggressor aircraft for F-22 training and companion trainers for the B-2 and U-2 programs. T-38Bs are equipped with a gun-sight and centerline station for mounting external stores including ECM pod/practice bomb dispensers. Aircraft were redesignated T-38Cs after avionics modernization that added a glass cockpit and HUD, color MFDs, mission computer, integrated INS/GPS, and reshaped engine inlets. T-38s were designed for 7,000 flying hours but many have surpassed 20,000 hours, requiring life-extension to bridge the gap to replacement by the T-7A. Pacer Classic III is the type's third structural renewal effort and the most intensive in its history. It replaces major longerons, bulkheads/formers, intakes, internal skins, and structural floors on 180 high-risk T-38Cs. The first airframe was redelivered in 2015 and a total of 20 aircraft will complete upgrades in FY22. An additional 159 T-38s will receive selected structural improvements to address longeron and wing root fatigue due to extended use. Other key efforts also include new forward canopy to improve bird-strike survivability, digital avionics, and airspace compliance. Four T-38s were involved in significant mishaps in 2021 including a gear-up landing at Sacramento-Mather Airport, and fatal crashes at Dannelly Field on Feb. 19, 2021 and Laughlin on Nov. 9, 2021.

Contractors: Northrop Grumman; Boeing (sustainment); CPI Aerostructures (Pacer Classic III kits).

First Flight: April 1959 (T-38A); July 8, 1998 (T-38C).

Delivered: 1961-72 (T-38A); 2002-07 (T-38C).

IOC: March 1961.

Production: 1,187.

Inventory: 53 (T-38A); six (AT-38B); 439 (T-38C).

Operator: ACC, AETC, AFGSC, AFMC.

Aircraft Location: Beale AFB and Edwards AFB, Calif.; Columbus AFB,

Miss.; Holloman AFB, N.M.; JB Langley-Eustis, Va.; JBSA-Randolph and Sheppard AFB, Texas; JB Langley-Eustis, Va.; Eglin AFB and Tyndall AFB, Fla., Vance AFB, Okla.; Whiteman AFB, Mo.

Active Variants:

•T-38A. Upgraded version with Pacer Classic I and II mods.

•AT-38B. Armed weapons training version.

•T-38C. Modernized airframes incorporating glass cockpits and upgraded engines.

Dimensions: Span 25.3 ft, length 46.3 ft, height 12.8 ft.

Weight: Max T-O 12,093 lb.

Power Plant: Two General Electric J85-GE-5 augmented turbojets, each 2,900 lb thrust.

Performance: Speed 812 mph, range 1,093 miles.

Ceiling: 55,000 ft+.

Accommodation: Two pilots on Martin Baker MK16T zero/zero ejection seats.

EXPERIMENTAL AND TEST VEHICLES



U.S. Air Force courtesy photo

X-37B ORBITAL TEST VEHICLE

Orbital test

Brief: X-37B is an unmanned experimental Orbital Test Vehicle (OTV) aimed at developing and maturing a reusable space-launch capability and conducting classified, extended, on-orbit missions/experiments and/or launching small satellites. NASA launched the X-37 program in 1999, with the intention of building two demonstrators to validate technologies for both launch/on-orbit flight, and reentry/landing. Only the Approach and Landing Test Vehicle (ALTV) was built before NASA handed over the program to DARPA, which completed ALTV captive-carry/drop testing with the subscale X-40A in 2006. The X-37B is based on NASA's notional OTV and is boosted into low-Earth orbit atop a standard Atlas V or SpaceX Falcon 9 launch vehicle for long-endurance space missions. The vehicle autonomously re-enters the atmosphere upon command from a ground control station, and it recovers conventionally to the runway. X-37 launches from Cape Canaveral and lands at either Cape Canaveral or Vandenberg. Development includes advanced guidance, navigation and controls, avionics, thermal-resistant materials, propulsion, and autonomous control systems. The program's two test vehicles have successfully completed five orbital missions. The first mission (OTV-1) launched in 2010 and remained on orbit 224 days. The OTV-2 and OTV-3 missions launched in 2011 and 2012, and remained on orbit 468 days and 674 days, respectively. The OTV-4 mission remained aloft for 718 days and landed at Cape Canaveral for the first time on March 25, 2017. The OTV-5 mission marked the type's first launch atop a SpaceX Falcon 9 on Sept. 7, 2017, setting a new record of 780 days on orbit when it touched down at Cape Canaveral on Oct. 27, 2019. USSF launched its inaugural X-37B mission, OTV-6 (USSF-7), on May 17, 2020, surpassing 600 days on orbit on Jan. 7, 2022.

Contractor: Boeing.

Operator: USSF.

First Launch: April 22, 2010.

IOC: N/A.

Launch Vehicle: Atlas V, Falcon 9.

Production: Two.

Inventory: Two.

Operational Location: Cape Canaveral SFS, Fla. (launch/landing); Vandenberg SFB, Calif. (landing).

Active Variant:



•X-37B. DARPA/USAF-developed Orbital Test Vehicles.
Dimensions: Span 14 ft, length 29.25 ft, height 9.5 ft. Weight: 11,000 lb at launch.
Propulsion: Single liquid-propellant rocket motor.
Endurance: 780+ days on orbit.
Orbit Altitude: Low-Earth orbit (LEO) at 110-500 miles.
Power: Gallium arsenide solar cells with lithium-ion batteries.



Alex Lloyd/USAF

X-62 VARIABLE-STABILITY IN-FLIGHT TEST AIRCRAFT

In-Flight simulator

Brief: The X-62 Variable-stability In-flight Simulator Test Aircraft (VISTA) is a highly modified F-16D Block 30 capable of replicating the flight characteristics of a wide array of aircraft. VISTA was initially modified to support the Multi-Axis Thrust-Vectoring (MATV) program which tested the combat potential of high-angle of attack maneuver starting in July 1993. VISTA completed 95 test flights with the Axisymmetric Vectoring Exhaust Nozzle (AVEN) and General Electric F110-GE-100 engine before the program terminated in 1994. The aircraft subsequently became a mainstay of the USAF Test Pilot School's program training test pilots and flight test engineers to evaluate unstable or unpredictable aircraft with relative safety. The VISTA aircraft recently aided in the development and testing of Automatic Integrated Collision Avoidance Systems (ICAS), enhancing the safety of the F-16 and other fighter fleets. Originally designated NF-16D, the aircraft has a second, center-control stick that is paired with the VISTA Simulation System (VSS) computers to generate differing flight dynamics for the pilot. The aircraft also incorporates a nonstandard, enlarged dorsal spine and drag-chute in common with some export variants of the F-16. The NF-16D recently completed service-life extension mods, and ongoing upgrades include replacing VSS with a modernized system and installing the new System for Autonomous Control of Simulation (SACS). SACS will enable the aircraft to support paired, autonomous aircraft testing including Air Force Research Laboratory's Skyborg program. These extensive modification and modernization efforts prompted USAF to redesignate the aircraft X-62 on June 14, 2021. The X-62 is operated in partnership with Calspan Aviation and will continue to support the AFTPS syllabus in addition to conducting AFRL testing.

Contractors: Lockheed Martin (previously General Dynamics); Calspan (VISTA program).

First Flight: 1992 (NF-16D VISTA).

Delivered: January 1995.

IOC: 1992.

Production: One.

Inventory: One.

Operator: AFMC (Calspan).

Aircraft Location: Edwards AFB, Calif.

Active Variants:

•X-62A. Highly modified F-16D Variable stability In-Flight Simulator Aircraft (VISTA).

Dimensions: Span 32.8 ft, length 49.3 ft, height 16.7 ft.

Weight: Max T-O 37,500 lb (Block 30).

Power Plant: F100-PW-229 augmented turbofan, 29,000 lb thrust.

Performance: Speed Mach 2+, ferry range 2,002+ miles.

Ceiling: 50,000 ft.

Accommodation: Two pilots on ACES II zero/zero ejection seats.

UNMANNED AIRCRAFT SYSTEMS



Sara Vidoni/USAF

BMQ-167 SUBSCALE AERIAL TARGET

Full-scale aerial target

Brief: BQM-167A is a subscale, unmanned aerial target and threat simulator serving missile/weapons development, testing, validation, and training over the Eglin Test and Training Range. The 82nd Aerial Targets Squadron employs the cheaper subscale targets to complement its QF-16 full scale aerial target fleet operating from Tyndall. The BQM-167 is boosted to flying speed from a launch rail via a solid-fuel Rocket-Assisted Take Off (RATO) motor which is then jettisoned. BQM-167 is capable of representing air targets maneuvering at up to 9 Gs at speeds up to Mach 0.91 and altitudes between 50 and 50,000 feet. The drone is constructed of durable, lightweight composites, equipped with a recovery parachute, and depending on its condition capable of being refurbished and reused. BQM-167s incorporate a scoring system and a range of threat-simulating systems/stores including IFF, EA pods, IR/radar countermeasures as well as IR/radar signature augmentation to simulate a variety of threats. The Air Force competitively awarded the first BQM-167 production contract in 2002 and most recently awarded a \$338 million contract for Lot 17 through 21 covering 79 targets in September 2021. FY22 funds support Lot 18 production of 10 subscale targets.

Contractors: Kratos Unmanned Aerial Systems.

First Flight: Dec. 8 2004.

Delivered: 2004-present.

IOC: 2008.

Production: 800+ (planned).

Inventory: Approx. 37.

Operator: ACC.

Aircraft Location: Tyndall AFB, Fla.

Active Variants:

•BQM-167A. Subscale aerial target.

Dimensions: Span 10.5 ft, length 20 ft, height 4 ft.

Weight: Max T-O 2,050 lb.

Power Plant: MicroTurbo (Safran) Tri 60-5 turbofan, 1,000 lb thrust.

Performance: Speed Mach 0.91, range unk.

Ceiling: 50,000 ft.

Defensive Systems: Chaff/flares, EA pods, IR/RF wing pods (augmentation).

Accommodation: Preprogramed, unmanned.

MQ-9 REAPER

Attack/armed reconnaissance

Brief: The MQ-9B is a medium-to high-altitude, long-endurance hunter-killer RPA, primarily tasked with eliminating time-critical and high-value targets in permissive environments. Additional roles include CAS, CSAR, precision strike, armed overwatch, target development/designation, and terminal weapon guidance. The MQ-9 fulfills a secondary tactical ISR role utilizing its Multispectral Targeting System-B (MTS-B), Lynx SAR, and/or Gorgon Stare wide-area surveillance (fielded on seven modified aircraft). MTS-B integrates EO/IR, color/monochrome daylight TV, image-intensified TV, and a laser designator/illuminator. MTS-B provides FMV as separate video streams or fused together. The MQ-9 employs SAR for JDAM targeting





Tech Sgt. Emerson Nuñez

and dismounted target tracking. A Reaper system comprises three aircraft, GCS, LOS/BLOS satellite and terrestrial data links, support equipment/personnel, and crews for deployed 24-hour operations. MQ-9B debuted in combat in Afghanistan in 2007. MQ-9 fleet is evenly split between earlier Block 1 and later Block 5 aircraft which are flexibly retrofitted to meet operational demand resulting in a number of different configurations and capabilities. USAF is upgrading a total of 113 Block 1, and 136 Block 5 aircraft to Extended-Range standards. ER mods add external fuel tanks, a four-bladed propeller, engine alcohol/water injection, heavyweight landing gear, longer wings and tail surfaces, and other enhancements. USAF plans to begin transitioning the fleet from counterinsurgency to future roles in or near contested airspace. The future MQ-9 Multi-Domain Operations (M2DO) configuration will enhance data link and control robustness, enable plug-and-play system integration, and double power output to integrate future advanced sensors, systems, and algorithms. M2DO enhancements include anti-jam GPS, Link 16, internet-protocol and modular mission system architecture, enhanced C2 resiliency, and greater flight autonomy/automation. An initial 71 airframes will be upgraded to M2DO standards. FY22 funds GCS Block 30, ER conversions, DAS-4 high-definition EO/IR sensor, data link, GPS, and Gorgon Stare improvements, reliability mods, and capability enhancements. USAF plans to retire the fleet by 2035 and is seeking to replace Reaper with a more survivable, flexible, and advanced platform as early as 2031. Congress, however, added funds to buy four additional MQ-9s in the FY22 defense budget.

Contractors: General Atomics Aeronautical Systems; L3Harris; Raytheon (sensors).

First Flight: February 2001.

Delivered: November 2003-present.

IOC: October 2007; 2015 (ER).

Production: 337 (planned).

Inventory: 323.

Operator: ACC, AFMC, AFRC (associate), AFSOC, ANG.

Aircraft Location: Cannon AFB, N.M.; Creech AFB, Nev.; Eglin AFB, Fla.; Ellington Field, Texas; Fort Drum, N.Y.; Fort Huachuca, Ariz.; Hancock Field, N.Y.; Hector Arpt., N.D.; Holloman AFB, N.M.; March ARB, Calif.; Nellis AFB, Nev., and deployed locations worldwide. Planned: Tyndall AFB, Fla.; Whiteman AFB, Mo.

GSC Location: Cannon AFB, N.M.; Creech AFB, Nev.; Battle Creek ANGB, Mich.; Davis-Monthan AFB, Ariz.; Des Moines Arpt., Iowa; Ellington Field, Texas; Ellsworth AFB, S.D.; Fort Smith Arpt., Ark.; Hancock Field, N.Y.; Hector Arpt., N.D.; Holloman AFB, N.M.; Horsham AGS, Pa.; Hurlburt Field, Fla.; March ARB, Calif.; Springfield-Beckley Arpt., Ohio. Planned: Niagara Falls Arpt., N.Y.; Shaw AFB, S.C.; Tyndall AFB, Fla.; Whiteman AFB, Mo.

Active Variants:

- MQ-9B Reaper Block 1. Air Force version of the General Atomics Predator B.
- MQ-9B Reaper Block 5. Improved, current production Reaper.
- MQ-9B Reaper ER. Extended-range MQ-9 with external fuel tanks, longer wings, and other enhancements.

Dimensions: Span 66 ft (79 ft, ER), length 36 ft, height 12.5 ft.

Weight: Max T-O 10,500 lb.

Power Plant: One Honeywell TPE331-10GD turboprop, max 900 shp.

Performance: Cruise speed 230 mph, range 1,150 miles, endurance 27 hr; 34 hr (ER).

Ceiling: 50,000 ft.

Armament: Combination of AGM-114 Hellfire (up to eight), GBU-12/49 Paveway II, and GBU-38 JDAMs.

Accommodation: Pilot, sensor operator (operating from GCS).



Airman 1st Class Emily Kenney

QF-16 FULL-SCALE AERIAL TARGET

Full-scale aerial target

Brief: QF-16 is a manned/unmanned aerial target and threat simulator serving missile/weapon development, testing, validation, and training. QF-16s began replacing the dwindling and obsolescent QF-4 Full-Scale Aerial Target (FSAT) starting in 2015, through the type's retirement in December 2017. QF-16s are capable of manned or "not under live local operator" (NULLO) control operations. The first of 13 LRIP QF-16s was delivered to Tyndall in early 2015. Boeing is under contract to deliver 121 converted airframes in five production lots through April 2021. FY22 funds will procure 12 conversions under a follow-on sixth lot contract. Recent upgrades include EA pod and software modernization to more accurately replicate adversary capabilities and tactics, ground-control modernization, and threat realism/countermeasure improvements. Boeing and USAF opened a second QF-16 conversion line at Davis-Monthan to augment production at Cecil Field in Jacksonville, Fla., which delivered its first airframe in mid-2020.

Contractors: Lockheed Martin; Boeing (drone conversion).

First Flight: May 4, 2012.

Delivered: February 2015-present.

IOC: Sept. 23, 2016.

Production: 126 (planned).

Inventory: 17 (QF-16A); 49 (QF-16C).

Operator: ACC.

Aircraft Location: Holloman AFB, N.M., Tyndall AFB, Fla.

Active Variants:

- QF-16A. Converted from retired F-16A Block 15.
- QF-16C. Converted from retired F-16C Block 25 and Block 30.

Dimensions: Span 32.8 ft, length 49.3 ft, height 16.7 ft.

Weight: Max T-O 37,500 lb.

Power Plant: Pratt & Whitney F100-PW-200 augmented turbofan, 23,830 lb thrust (Block 15); Pratt & Whitney F100-PW-220 augmented turbofan, 23,830 lb thrust (Block 25); GE Aviation F110-GE-100 augmented turbofan, 29,000 lb thrust (Block 30).

Performance: Speed Mach 2, ferry range 2,000+ miles.

Ceiling: 50,000 ft.

Defensive Systems/stores: Chaff/flares; EA pods: ALQ-188, ALQ-167; Towed Aerial Target Gunnery System.

Accommodation: Safety pilot (optional) on ACES II zero/zero ejection seat.

RQ-4 GLOBAL HAWK

High-altitude reconnaissance

Brief: The Global Hawk is a strategic, long-endurance, high-altitude "deep look" ISR platform complementing satellite and manned ISR. It is capable of imagery, SIGINT, and ground moving target indication (GMTI), depending on variant. The system consists of the aircraft and sensors, launch and recovery element (LRE), mission control element (MCE), and comms/mission planning cell. The preproduction Block 10 debuted in combat in 2001 and retired in 2011. Block 20 was initially equipped with the Enhanced Integrated Sensor Suite (EISS) for imagery intelligence (IMINT). Five were converted as EQ-4B Battlefield Airborne Communications Node (BACN) relays, and four remained active following a loss replacement in 2018. Block 30 is a multi-intelligence platform equipped with EO/IR, SAR, and SIGINT sensors. It is also equipped with a universal payload adapter that enables (previously) U-2-unique payloads including the MS-117 and SYERS II EO sensors, and a wet-film Optical Bar Camera to be carried. The Airborne Signals Intelligence Payload (ASIP) was only installed on three of the 11 planned airframes, subsequently designated Block 30M. Block 40 is a ground-moving target surveillance platform equipped with





Staff Sgt. Ramon Adelan

the Multiplatform Radar Technology Insertion Program (MP-RTIP). Its AESA and SAR simultaneously conduct moving target and cruise missile tracking, as well as stationary imagery collection. Block 30 foreign military customers include South Korea and Japan, while NATO operates a pooled fleet of RQ-4Ds based on the Block 40. Northrop Grumman test flew the first of three Block 30i for Japan and NATO declared initial operating capability with the Allied Ground Surveillance fleet in 2021. USAF began retiring the EQ-4B Block 20 in FY21 and RQ-4B Block 30 in FY22 retaining only the Block 40 to free funding for future penetrating ISR capabilities. FY22 funds support Block 40 sustainment and the Ground Station Modernization Program which is in operational testing ahead of fielding in FY23. A single RQ-4 Block 40 was destroyed in a crash near Grand Forks on Aug. 6, 2021.

Contractors: Northrop Grumman, Raytheon, L3Harris.
First Flight: Feb. 28, 1998.
Delivered: August 2003-present.
IOC: August 2011 (Block 30); August 2016 (Block 40).
Production: 45 (USAF).
Inventory: 31 (including 10 Block 40s).
Operator: ACC, AFMC.
Aircraft Location: Beale AFB, Calif. (Block 30); Edwards AFB, Calif.; Grand Forks AFB, N.D. (Block 20/40); forward operating locations: Andersen AFB, Guam; NAS Sigonella, Italy; Yokota AB, Japan.
Active Variants:
 •EQ-4B Block 20. Battlefield Airborne Communications Node (BACN) comm relay platform.
 •RQ-4B Block 30. Multi-intelligence platform equipped with EO/IR and SAR sensors.
 •RQ-4B Block 40. AESA and SAR equipped ground moving target indication (GMTI) and battlefield ISR platform.
Dimensions: Span 130.9 ft, length 47.6 ft, height 15.3 ft.
Weight: Max T-O 32,250 lb; max payload 3,000 lb.
Power Plant: One Rolls-Royce North American F137-RR-100 turbofan, 7,600 lb thrust.
Performance: Speed 356.5 mph, range 14,150 miles, endurance 32+ hrs (24 hrs on-station loiter at 1,200 miles).
Ceiling: 60,000 ft.
Accommodation: LRE Pilot, MCE pilot, MCE sensor operator (operating from LRE/MCE).



USAF

RQ-170 SENTINEL

Unmanned surveillance and reconnaissance

Brief: RQ-170 is an unmanned, stealthy, penetrating, day/night tactical ISR platform. Although the RQ-170 was still under development and test, USAF employed it in Southwest Asia during Enduring Freedom. The RPA was developed in response to DOD's call for additional RPA support for combatant commanders. USAF publicly acknowledged the aircraft after photos appeared in foreign news media of operations over Afghanistan in 2009. The type is operated by the 432nd Wing at Creech and the 30th

Reconnaissance Squadron at Tonopah Test Range. In 2011, an RQ-170 was captured almost intact by Iranian forces. Iran allegedly reverse-engineered a copy of the aircraft, which the Israeli Air Force reported shooting down during an engagement inside Israeli territory on Feb. 10, 2018. The RQ-170 took part in a joint-exercise at Nellis in August 2020, testing its ability to accompany a B-2 on penetrating operations aided by SEAD F-35s.

Contractor: Lockheed Martin.
Operator: ACC.
GCS Location: Creech AFB, Nev.; Tonopah Test Range, Nev.
Aircraft Location: Tonopah Test Range, Nev.; deployed worldwide.
Known Active Variant:
 •RQ-170. No data available.
Dimensions: Span 65.6 ft, length 14.75 ft.

STRATEGIC WEAPONS



Airman 1st Class Jacob Wrightsman

AGM-86 AIR-LAUNCHED CRUISE MISSILE (ALCM)

Strategic air-to-surface cruise missile

Brief: The AGM-86 is a low-level, penetrating nuclear strike weapon for use against strategic surface targets. ALCM's small radar signature and low-level flight capability enhance the missile's effectiveness. The nuclear AGM-86B was the first production version with a total of 1,715 delivered through 1986. USAF plans to cut the inventory from its current level to an eventual 528 ALCM. Some ALCMs were modified for conventional use with INS/GPS-guidance and a blast fragmentation warhead and redelivered in 1987 as the AGM-86C CALCM. CALCM was operationally employed for the first time in Desert Storm and widely used in subsequent operations. CALCM was capable of adverse weather, day/night, air-to-surface, accurate, standoff strike capability at ranges greater than 500 miles. The AGM-86D was CALCM's Block II penetrator version with AUP-3(M) warhead used for standoff strikes on hardened, deeply buried targets in Afghanistan. CALCM was retired in early 2019 and the remaining AGM-186C/D were sent to Barksdale for storage awaiting disposal. ALCM is undergoing SLEP/component remanufacture to stretch its service life to 2030, pending replacement by the Long-Range Standoff (LRSO) missile. USAF awarded technology-maturation and risk-reduction contracts for the LRSO in 2017, resulting in the selection and continued development of Raytheon's AGM-181 Long-Range Standoff Weapon in April 2020. Plans call for fielding the nuclear AGM-181 by the late 2020s, possibly followed by a conventional derivative thereafter.

Contractor: Boeing.
First Flight: June 1979 (full-scale development).
Delivered: 1981-1986.
IOC: December 1982 (B); January 1991 (C); November 2001 (D).
Production: 1,715.
Inventory: Approx. 536 (B).
Operator: AFGSC.
Unit Location: Barksdale AFB, La.; Minot AFB, N.D.
Active Variants:
 •AGM-86B. Nuclear ALCM variant.
Dimensions: Span 12 ft, length 20.8 ft, body diameter 2 ft.
Weight: 3,150 lb.
Power Plant: Williams/Teledyne CAE F107-WR-10 turbofan, 600 lb thrust.
Performance: Speed 550 mph, range 1,500+ miles (B).
Guidance: Inertial plus Terrain Contour Matching (B). Warhead: W80-1 nuclear warhead (B).
Estimated Yield: W80-1 warhead: five-150 kilotons (preselectable).
Integration: B-52H.





Giancarlo Casem/USAF

AGM-183 AIR-LAUNCHED RAPID RESPONSE WEAPON (ARRW)

Hypersonic air-to-surface weapon

Brief: The AGM-183A is a developmental boost-glide hypersonic missile to provide future, nonnuclear strike against time-sensitive, heavily defended, high-value targets from standoff range. The missile is designed to accelerate to speeds well in excess of Mach 5 before releasing a non-powered glide vehicle which maneuvers to the intended target. USAF completed a series of seven captive flight-tests utilizing an instrumented test article on a B-52H at Edwards, culminating in an aborted boost-test in December 2020. An attempted boost test over the Point Mugu Test Range on April 5, 2021, failed to leave the aircraft. A third attempt on July 28, 2021, proved safe separation and targeting acquisition but the booster failed to ignite. The tests aim to eventually achieve safe separation, booster ignition, and deployment of a dummy glide vehicle. FY22 funds to procure 12 prototype AGM-183s to support testing and potential transition to an early operational capability were cut due to setbacks in testing. AFGSC aims to operationally deploy the weapon on the B-52 and B-1 previously targeting as early as 2022, with possible, later integration on the F-15E/EX.

Contractor: Lockheed Martin.

First Flight: N/A.

Delivered: N/A.

IOC: 2022 (planned).

Production: 12 (planned).

Inventory: N/A.

Operator: AFMC, Planned: AFGSC.

Unit Location: Edwards AFB, Calif.

Active Variants:

-AGM-183A. Developmental prototype hypersonic boost-glide weapon.

Dimensions: Unk.

Weight: Unk.

Propulsion: Solid fuel rocket.

Performance: Mach 5+, range approx. 1,000 miles.

Guidance: Unk.

Warhead: Boost-glide vehicle

Integration: Planned: B-1B, B-52H, F-15E, F-15EX.



B61 THERMONUCLEAR BOMB

Air-to-surface thermonuclear bomb

Brief: B61 is an air-dropped battlefield/tactical nuclear weapon equipping the F-16 and F-15E in the forward-deployed, allied extended deterrent role. It is also the B-2's primary strategic weapon. B61 was first delivered in 1966, and the B61 Mod 11 introduced in 1997 adds a ground-penetrating capability, enhancing its effect against buried and hardened targets. The weapon incorporates several preselectable yield options tailored to mission requirements. Work is underway on the B61 Mod 12 Life Extension Program (LEP) begun in 2016 to consolidate the B61-3, -4, -7, and -10 into a single, standardized configuration. The LEP refurbishes the warhead to improve the safety, security, and reliability through 2040. B61-12 also adds a guided tail kit, making it the first precision guided weapon of its type, thus permitting higher effectiveness at lower yields. USAF and the National Nuclear Security Administration finished B61-12 qualification flight-testing on June 9, 2018. The 31 inert test drops greatly exceeded

National Nuclear Security Administration

performance requirements, validating nonnuclear components such as arming/fire control, guidance, spin-rocket motors, and software. B61-12 was approved for production and completed operational flight-testing on the F-15E and B-2A in 2019. Operational testing included 15 drops, certifying the F-15E as the first aircraft capable of delivering the B61-12 on June 8, 2020. The Department of Energy conducted nine additional drops, culminating in a full-weapon system demo on the B-2A in July 2020. The F-35A dropped an inert B61-12 for the first time in 2020 and completed the final full weapon system drops required toward certification on Sept. 21, 2021. Delivery of the first production example has been delayed two years to 2022 due to technical issues. Future integration is planned on the F-16 and F-35A.

Contractors: Los Alamos National Laboratory (weapon); Boeing (B61-12 tail kit).

Delivered: 1966.

IOC: 1968.

Production: N/A.

Inventory: Approx. 500.

Operator: AFMC, USAFE.

Deployed locations: Aviano AB, Italy; Büchel AB, Germany; Ghedi AB, Italy; Incirlik AB, Turkey; Kleine Brogel AB, Belgium; Volkel AB, Netherlands.

Active Variant:

-B61. Supersonic-droppable free-fall thermonuclear weapon.

Dimensions: Length 11 ft 8 in., diameter 1 ft 1 in.

Weight: 700 lb; 825 lb (B61-12).

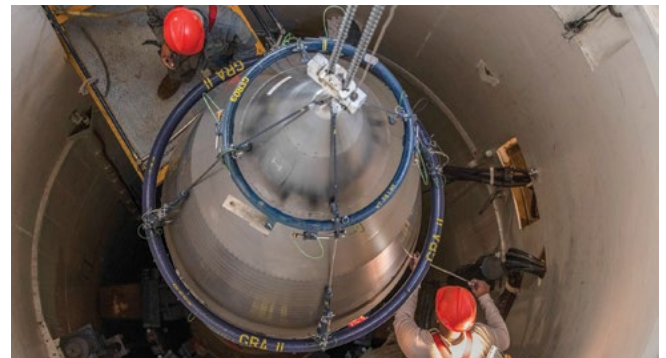
Performance: N/A.

Guidance: None (B61 Mod 1 to 11); unk, likely INS (B61 Mod 12).

Warhead: One B61 -3, -4, -7, -10, or -11.

Estimated Yield: 0.3 kilotons, 1.5 kilotons, 10 kilotons, 50 kilotons (pre-selectable).

Integration: B-2A, F-15E, and F-16C/D; NATO: F-16A/B Mid-Life Upgrade (MLU), and Panavia Tornado IDS. Planned: B-21, F-35A.



Senior Airman Abbigayle Williams

LGM-30 MINUTEMAN III

Strategic surface-to-surface ballistic missile

Brief: Minuteman is a three-stage, solid-propellant nuclear deterrent ICBM housed in a survivable underground silo. Minuteman III became operational in 1970, providing improved range, rapid retargeting, and the capability to place up to three reentry vehicles on three targets with high accuracy. It is the sole remaining U.S. land-based ICBM. AFGSC initially deployed 550 missiles, later reducing that number to 400 based at Malmstrom, Minot, and F.E. Warren. AFGSC reduced deployed ICBMs to a single-warhead configuration in 2014 under limits imposed by the New START agreement. Minuteman III is already more than 40 years beyond its initially planned service life and USAF expects the system will begin falling below readiness standards as early as 2026 if not replaced. USAF awarded Boeing and Northrop Grumman technology maturation and risk-reduction contracts to replace Minuteman with a future Ground-Based Strategic Deterrent (GBSD) in 2017. Boeing declined to bid on full development in 2019, leaving Northrop Grumman to develop GBSD. As such, current efforts are focused on sustaining the Minuteman III's operational capability through fielding of the GBSD. Upgrades to guidance and propulsion as well as modernized reentry vehicles extend key system to 2030 and flight-testing of a replacement fuse will culminate with the last of four test launches in 2024. FY22 funds support more the 20 sustainment efforts including Launch Control Center Block Upgrade (LCCBU), emergency comms, cryptography updates, and arm/disarm switch replacement. LCCBU replaces key hardware, software, comms, and environmental control systems in the crew capsule, as well as starting new missile site security and video situational awareness upgrades.



GBSD fielding is targeted for 2027 with full operational capability by 2036.

Contractors: Boeing; General Electric; Lockheed Martin; Northrop Grumman (formerly Orbital ATK).

First Flight: February 1961.

Delivered: 1962-1978.

IOC: December 1962, Malmstrom AFB, Mont.

Production: 1,800.

Inventory: 397 deployed; 261 non-deployed.

Operator: AFGSC.

Unit Location: F. E. Warren AFB, Wyo.; Malmstrom AFB, Mont.; Minot AFB, N.D.; Vandenberg SFB, Calif. (test location).

Active Variant:

•LGM-30G. Current Minuteman III variant.

Dimensions: Length 59.9 ft, diameter 5.5 ft.

Weight: 79,432 lb.

Propulsion: Stage 1: Orbital ATK refurbished M55 solid-propellant motor, 202,600 lb thrust; stage 2: Orbital ATK refurbished SR19 solid-propellant motor, 60,721 lb thrust; stage 3: Orbital ATK refurbished SR73 solid-propellant motor, 34,400 lb thrust.

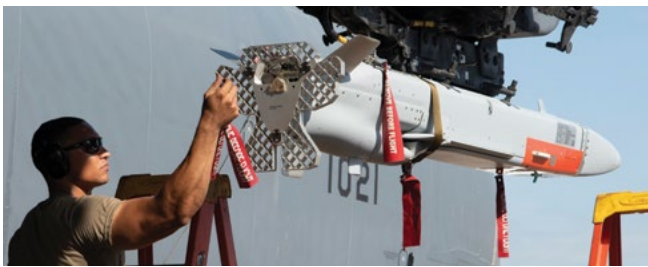
Performance: Speed at burnout approx 15,000 mph, range 6,000+ miles.

Guidance: Inertial guidance system.

Re-entry Vehicle: One Mk 21 RV; one to three Mk 12/12A MIRVs.

Warhead: One W87 or up to three W78 enriched uranium thermonuclear warheads.

LONG-RANGE STANDOFF WEAPONS



Airmen 1st Class Celeste Zuniga

ADM-160 MINIATURE AIR LAUNCHED DECOY (MALD)

Aircraft decoy; Close-in radar jammer

Brief: MALD is a programmable, low-cost, modular, autonomous flight vehicle that mimics U.S. or allied aircraft to confuse enemy Integrated Air Defense Systems (IADS). MALD-J adds radar jamming capability to the basic decoy platform and can operate alone or in concert with other EW platforms. The jammer version is designed as an expendable, close-in jammer to degrade and deny an early warning or acquisition radar's ability to establish a track on strike aircraft. It also maintains the ability to fulfill the basic decoy mission. F-16 or B-52 are lead employment aircraft for MALD. USAF capped procurement in FY12, converting Lot 4 to the MALD-J variant. Plans call for 3,000, of which 2,400 are the jammer version. USAF demonstrated in-flight retargeting capabilities and is integrating GPS-Aided Inertial Navigation System (GAINS II) to improve navigational accuracy in GPS-denied environments. An upgraded Jammer variant dubbed "MALD-X" successfully demonstrated future, low-level flight capabilities, improved EW payloads, and enhanced data links in 2018. MALD-X aims to establish USAF's future baseline and serves as the basis of the Navy's developmental MALD-N variant. USAF awarded a MALD-J contract option for Lot 10 production in 2016 and a follow-on Lot 11 contract for 250 weapons in 2018. A B-52 conducted a rare MALD live-launch in support of tactics development during a Combat Hammer assessment from Barksdale in 2021.

Contractor: Raytheon.

First Flight: 1999 (MALD); 2009 (MALD-J).

Delivered: Sept. 6, 2012 (MALD-J).

IOC: 2015 (MALD-J).

Active Variants:

•ADM-160B. MALD base decoy variant.

•ADM-160C. MALD-J jammer/decoy variant.

Dimensions: Span 5.6 ft (extended), length 9.3 ft. Weight: Less than 300 lb.

Power Plant: Hamilton Sundstrand TJ-150 turbojet, 337 lb thrust.

Performance: Range up to 575 miles, endurance 90 minutes (50 minutes on-station loiter).

Guidance: GPS/INS.

Integration: B-52H, F-16C. Planned: B-1B.



USAF

AGM-154 JOINT STANDOFF WEAPON (JSOW)

Guided air-to-surface glide bomb

Brief: JSOW is a joint USAF-Navy family of medium-range, GPS/INS guided, standoff air-to-ground glide weapons. It is used to attack a variety of soft and armored area targets during day and night and adverse weather conditions. The baseline BLU-97 CEM variant is used against soft and area targets. The BLU-108 variant provides anti-armor capability. The AGM-154C incorporates an additional imaging IR seeker and is intended for use against hardened, stationary targets. The new AGM-154C-1 variant adds moving, maritime strike capability to the baseline C variant, which reached IOC with the Navy in 2016. The weapon completed operational flight-testing on the F-35C in 2019, clearing the way for ongoing internal integration and testing on the F-35A.

Contractor: Raytheon.

First Flight: December 1994.

Delivered: 2000-2005 (USAF).

IOC: 2000.

Active Variants:

•AGM-154A. Baseline BLU-97 CEM variant for soft/area targets.

•AGM-154B. The BLU-108 submunition variant for anti-armor.

•AGM-154C. Imaging IR-guided variant for hardened tactical targets.

Dimensions: Length 13.3 ft, diameter 13 in.

Performance: Range 13.8 miles low-altitude, 73 miles high-altitude.

Guidance: GPS/INS.

Warhead: See variants above.

Integration: B-1, B-2, B-52, F-15E, and F-16. Planned: F-35A.



USAF

AGM-158 JOINT AIR-TO-SURFACE STANDOFF MISSILE (JASSM)

Air-to-surface cruise missile

Brief: JASSM is a joint USAF-Navy autonomous, precision cruise missile for use against heavily defended or high-value targets at standoff range. It can attack fixed, relocatable, and moderately hardened/buried targets. The base variant is a stealthy, low-cost airframe equipped with GPS/INS guidance and imaging IR terminal seeker. The JASSM-Extended Range (JASSM-ER) version uses the same baseline body but a new engine and fuel system that increases range to more than 500 miles. The ER was cleared for combat on the B-1B in 2015, reached full operational capability on the F-15E in 2018, and is planned for use on all fighter/bomber platforms. Full-rate production began in 2018 and production shifted to ER-only in FY16. Further development has resulted in the improved AGM-158B-2 and the "extreme range" JASSM-XR. Lockheed Martin is also developing the Long-Range Anti-Ship Missile (LRASM) which reached early operational capability on the B-1B in December 2018 and is planned for additional fielding on the B-52. USAF conducted a proof-of-concept employing palletized JASSM deployed from mobility aircraft in 2020 demonstrating



the potential for massed standoff attack. JASSM and LRASM are key to USAF's strategy to confront near-peer adversaries in highly contested environments and the service is upping total procurement of both weapons. FY22 funds support maximum-rate procurement 525 JASSM-ER including 210 improved AGM-158B-2s and 35 extreme-range variants. JASSM-ER is slated for integration on the B-2A by FY22. No LRASM were requested due to short-term supply chain limitations.

Contractors: Lockheed Martin; Raytheon; Honeywell.
First Flight: April 8, 1999.
Delivered: 2001-present.
IOC: September 2003; December 2014 (ER variant); 2018 (LRASM).
Production: 10,000 JASSM (planned); 400 LRASM (planned).
Active Variants:
 •AGM-158A JASSM. Base-variant.
 •AGM-158B JASSM-ER. Extended-Range variant.
 •AGM-158C LRASM. Long-Range Anti-Ship Missile, based on JASSM.
 •AGM-158D JASSM-XR. Future extreme-range variant of JASSM-ER.
Dimensions: Length 14 ft., diameter approx. 2 ft., wingspan 7.8 ft.
Power Plant: Teledyne Technologies J402 turbojet (JASSM); Williams Intl. F107-WR-105 turbofan (JASSM-ER).
Performance: Speed subsonic, range 200+ miles (baseline), 500+ miles (ER), approx. 1000 miles (XR).
Guidance: GPS/INS and imaging IR terminal seeker.
Warhead: 1,000-lb class penetrator (JASSM); 1,000-lb blast fragmentation (LRASM).
Integration: B-1B, B-2, B-52H, F-15E, and F-16 Block 40-52; planned: F-35A (JASSM), B-1B, B-2A, B-52H, F-15E F-16; planned: F-35A (JASSM-ER) B-2A. Planned: B-52 (LRASM).

AIR-TO-AIR MISSILES



2nd Lt. Kayla Fitzgerald

AIM-9 SIDEWINDER

Air-to-air missile

Brief: Sidewinder is an IR-guided short-range, supersonic air-to-air missile. It was developed by the Navy for fleet air defense and adapted for USAF fighters. Early versions were used extensively in the Vietnam War. The AIM-9M is a joint Navy-USAF, all-altitude, all-aspect intercept missile. It has improved defense against IR countermeasures, background discrimination, and reduced-smoke rocket motor. AIM-9X is the newest jointly funded variant. It employs passive IR tracking, jet-vane steering for increased maneuverability and Joint Helmet-Mounted Cueing System (JHMCS) compatibility for high-angle, off-boresight targeting. The enhanced AIM-9X Block II was cleared for full-rate production in September 2015 and adds improved lock-after-launch and maneuverability, new data link for beyond-visual range engagement, enhanced anti-countermeasures, a new fuse, and safer ground-handling characteristics. AIM-9X production includes 67 converted AIM-9Ms, 1,289 Block I, and planned joint-service procurement of 11,635 Block II/II-plus (nearly double the number originally planned). FY22 funds procure slightly fewer than FY21 for a combined 243 AIM-9X Block II/II+ missiles.

Contractor: Raytheon; Northrop Grumman (propulsion).
First Flight: September 1953; July 1999 (AIM-9X); 2016 (AIM-9X Block II).
Delivered: AIM-9M 1983; AIM-9X from 2002-2011 (Block I); 2011-present

(Block II); 2017-present (Block II+).
IOC: Circa 1983 (9M); November 2003 (9X); September 2016 (9X Block II).
Production: 1,289 (Block I); 11,635 (Block II/Block II+) (planned).
Active Variants:
 •AIM-9M. Early variant.
 •AIM-9M-9. Expanded anti-countermeasure capability variant.
 •AIM-9X. Newest, highly maneuverable, JHMCS compatible variant.
Dimensions: Span 2.1 ft (M), 1.4 ft (X), length 9.4 ft (M); 9.9 ft (X); diameter 5 in.
Propulsion: Mk 36 Mod 11 (9M); Orbital ATK Mk 139 solid-propellant rocket motor (9X).
Performance: Speed Mach 2+, range 10+ miles.
Guidance: Passive IR homing guidance.
Warhead: HE annular blast fragmentation.
Integration: F-15C/D/E, F-16C/D, F-22A (AIM-9X). Planned: F-35A.



Samuel King Jr./USAF

AIM-120 ADVANCED MEDIUM-RANGE AIR-TO-AIR MISSILE (AMRAAM)

Air-to-air guided missile

Brief: AMRAAM is an active, radar-guided, medium-range, supersonic air-to-air missile. It is a joint USAF-Navy follow-on to the AIM-7 Sparrow with launch-and-maneuver capability. The AIM-120B is an upgraded, reprogrammable variant of the original missile. The AIM-120C incorporates smaller control surfaces for internal carriage on F-22 and F-35 and a high-angle off-boresight (HOBS) launch capability. AIM-120D offers improved range, GPS-assisted guidance, updated data links, and jam resistance, in addition to greater lethality. Ongoing upgrades will further enhance weapon performance and electronic protection. The second phase of the AIM-120D System Improvement Program (SIP II) completed operational testing and was fielded in 2020. SIP III entered operational testing in 2021 and is planned for fielding in 2022 to keep pace with emerging threats. Ongoing development also includes Form, Fit, and Function (F3R) mods and replacing obsolete electronic elements. In 2019, USAF announced it is developing the AIM-260 Joint Air Tactical Missile (JATM) with the Navy to replace AMRAAM with a longer-range, more capable weapon to counter high-end threats. An AIM-120 successfully using passive infrared search and track (IRST) in-lieu of radar to hit an airborne target, Aug. 5, 2021. FY22 funds procure 168 AIM-120D missiles.

Contractors: Raytheon; Northrop Grumman; Nammo Group (propulsion).
First Flight: December 1984.
Delivered: 1988-present.
IOC: September 1991; July 2015 (120D).
Active Variants:
 •AIM-120B. Upgraded, reprogrammable variant of AIM-120A.
 •AIM-120C. Production variant optimized for the F-22/F-35.
 •AIM-120D. Latest variant with GPS guidance, improved range, lethality, and jam-resistance.
Dimensions: Span 1.7 ft (A/B), 1.5 ft (C/D); length 12 ft; diameter 7 in.
Propulsion: Boost-sustain solid-propellant rocket motor.
Performance: Supersonic, range 20+ miles.
Guidance: Active radar terminal/inertial midcourse.
Warhead: HE blast-fragmentation.
Integration: F-15C/D/E, F-16C/D, F-22A, F-35A.

AIR-TO-GROUND MISSILES/ ROCKETS

AGR-20 ADVANCED PRECISION KILL WEAPON SYSTEM (APKWS)

Air-to-surface guided rocket

Brief: APKWS is a low-cost, semi-active laser-guidance system sized to fit the 2.75-in aerial rocket. It is optimized for precision, low-collateral-damage strike against moving or stationary light vehicle and personal



Samuel King/Courtesy illustration

targets. Illuminating and white phosphorous rounds are used for target marking by Forward Air Control aircraft. USAF acquired the system as an urgent operational requirement and an F-16 employed it in combat for the first time in June 2016. The weapon employs a mid-body guidance package to convert the standard rocket into a guided weapon. APKWS was already in service with the three other services and initial weapons were procured from Navy stocks. The rockets are launched from multi-round reusable pods. FY22 SOCOM funds procured 80 APKWS guidance kits. An F-16 successfully destroyed an airborne target using APKWS as part of an anti-cruise missile demo in 2019. BAE introduced a block upgrade capable of increasing APKWS' range up as much as 30 percent which is slated to begin production in 2021.

Contractor: BAE Systems.
First Flight: May 2013 (USAF).
Delivered: October 2012-present.
IOC: N/A.

Active Variant:
 •AGM-65A. Semi-active, laser-guided 2.75-in rocket, adapted for fixed-wing use.
Dimensions: Span 9.5 in, length 6.25 ft, diameter 2.75 in.
Propulsion: Solid-propellant rocket motor.
Performance: Subsonic, range 1.2 to 6.8 miles.
Guidance: Semi-active laser.
Warhead: HE, white phosphorous, or illuminating round.
Integration: AT-6, A-10, A-29, F-16.



Tech. Sgt. Michael Ammons

AGM-65 MAVERICK

Air-to-surface guided missile

Brief: Maverick is a TV, imaging IR, or laser-guided standoff air-to-surface missile employed by fighter/attack aircraft against tanks, vehicles, and air defenses. It was first employed during the Vietnam War and was used extensively in Desert Storm and Iraqi Freedom. AGM-65B is a launch-and-leave, EO/TV guided missile, equipped with "scene magnification" allowing acquisition of small/distant targets. Fielded in 1986, AGM-65D employs an imaging IR seeker for all-weather day/night use. The AGM-65E is laser guided with a heavyweight penetrator warhead. The AGM-65G fielded in 1989 combines an imaging IR seeker, software to track larger targets, with a heavyweight penetrator warhead, digital autopilot, and a pneumatic actuation system. The AGM-65H is an upgraded B variant that recently completed tracker upgrades. The AGM-65K is a modified G variant that replaces IR guidance with EO TV and is also undergoing a tracker upgrade. The AGM-65L is the newest EO TV/semiaactive-laser

seeker equipped "Laser Maverick" designed to strike high-speed moving targets. USAF is gradually modifying legacy missiles to Laser Maverick standards but the FY22 budget does not include additional procurement.

Contractors: Raytheon (missile body); Northrop Grumman (propulsion).
First Flight: August 1969.
Delivered: August 1972.
IOC: February 1973.
Active Variants:
 •AGM-65B. A launch-and-leave EO TV seeker variant.
 •AGM-65D. Adverse weather B variant.
 •AGM-65E. Laser guided version heavyweight penetrator variant.
 •AGM-65G. Imaging IR seeker heavyweight penetrator variant.
 •AGM-65H. Upgraded B variant.
 •AGM-65K. Modified EO TV seeker G variant.
 •AGM-65L. Laser guided EO TV seeker variant for fast moving targets.
Dimensions: Span 2.3 ft, length 8.2 ft, diameter 12 in.
Propulsion: Two-stage, solid-propellant rocket motor.
Performance: Supersonic, range 20 miles.
Guidance: EO TV guidance system (B/H/K); Imaging IR seeker (D/G); laser seeker (E).
Warhead: 125-lb cone-shaped (B/D/H); 300-lb delayed-fuse penetrator (E/G/K).
Integration: A-10C, F-15E, F-16C/D.



Senior Master Sgt. Edward Snyder

AGM-88 HIGH-SPEED ANTI-RADIATION MISSILE (HARM)

Air-to-surface anti-radiation missile

Brief: HARM is an anti-radiation, air-to-surface missile highly effective against enemy ground radar. AGM-88 is a joint USAF-Navy weapon carried by SEAD-dedicated F-16CJs. AGM-88B is equipped with erasable and electronically programmable read-only memory, permitting in-field changes to missile memory. The AGM-88C is the current production model with a more lethal warhead. Raytheon began a HARM Control Section Mod (HCSM) in 2013 to convert current models to more precise AGM-88Fs with improved GPS/INS guidance, anti-countermeasure performance, and reduced risk of collateral damage. The Navy is further retrofitting its missiles with advanced networking, digital homing, and terminal millimeter-wave radar seeker resulting in the AGM-88E Advanced Anti-Radiation Guided Missile (AARGM). USAF dropped sole-source plans to pursue the extended-range AGM-88G AARGM-ER as the basis for its next-generation Stand-in Attack Weapon (SiAW) issuing a request to industry in March 2021 for proposals instead. SiAW aims to enable the F-35 to strike advanced threats including theater ballistic missile and land attack/anti-ship missile sites, GPS jammers, and anti-satellite systems. USAF will continue Navy-led AARGM-ER integration to give the F-35A an interim SEAD capability until SiAW enters service. A Navy F-18F successfully test-fired the first AARGM-ER over the Point Mugu test range on July 19, 2021.

Contractors: Raytheon (HARM); Northrop Grumman (AARGM).
First Flight: April 1979 (HARM); July 19, 2021 (AARGM-ER).
Delivered: 1982-98.
IOC: Circa 1984.

Active Variants:

- AGM-88B. Early production variant.
- AGM-88C. Current production variant.
- AGM-88E. Next-generation Advanced Anti-Radiation Guided Missile.
- AGM-88F. Upgraded variant with greater accuracy and precision.
- AGM-88G. Next-generation Advanced Anti-Radiation Guided Missile Extended-Range variant.

Dimensions: Span 3.7 ft, length 13.7 ft, diameter 10 in.

Propulsion: Thiokol dual-thrust, solid-propellant rocket motor.

Performance: Mach 2+, range 30+ miles.

Guidance: Proportional passive RF broadband via fixed antenna and seeker head in missile nose.

Warhead: HE fragmentation.

Integration: F-16CJ (Block 50); planned: B-21, F-35A (SiAW).



Staff Sgt. Brian Ferguson

AGM-114 HELLFIRE

Air-to-surface guided missile

Brief: Hellfire is a low-collateral damage, precision air-to-ground missile with semi-active laser guidance for use against light armor and personnel. Missiles are used on the MQ-9 Reaper. AFSOC dropped previous plans to integrate the weapons onto its AC-130W gunships in favor of the Small Glide Munition. Hellfire is procured through the Army and numerous variants are utilized based on overseas contingency demands. An MQ-1 Predator employed Hellfire in combat for the first time in Afghanistan on Oct. 7, 2001. The latest AGM-114R replaces several types with a single, multitarget weapon and USAF is also buying variable Height-of-Burst (HOB) kits to enhance lethality. The next-generation Joint Air-to-Ground Missile (JAGM) is also procured via the Army and adds a new multimode guidance section to the AGM-114R. JAGM is used against high-value moving or stationary targets in all weather. FY22 funds 1,176 Hellfire/JAGM via a common production contract despite prioritizing weapons to confront higher-end future threats. Recent AC-130J block upgrades integrated wing-pylon mounted Hellfire to the next generation gunship's arsenal.

Contractors: Lockheed Martin (missile body); Northrop Grumman (propulsion).

First Flight: Feb. 16, 2000 (USAF).

Delivered: March 2016-present.

IOC: N/A.

Active Variants:

- AGM-114. Numerous subvariants, depending on target and mission requirements.
- AGM-169. JAGM, incorporating a multimode seeker on the advanced AGM-114R.

Dimensions: Span 28 in, length 5.33 ft, diameter 17 in.

Propulsion: Solid-propellant rocket motor.

Performance: Subsonic, range 5+ miles.

Guidance: EO TV guidance system (B/H/K); IIR seeker (D/G); laser seeker (E).

Warhead: Shaped charge and blast fragmentation.

Integration: AC-130J, MQ-9.

AGM-176 GRIFFIN

Air-to-surface guided missile

Brief: Griffin is a light, low-cost, multiservice air-launched weapon with GPS-aided inertial guidance and semi-active laser seeker. The weapon is used for high-precision, low-collateral damage attack against light surface targets. The AGM-176A forms part of the PSP employed on AFSOC's AC-130W Stinger II and AC-130J Ghosthunter gunships. Both aircraft employ the aft-firing weapon from ramp-mounted common-launch tubes. The forward-firing AGB-176B is employable on RPAs. USAF issued Raytheon



Raytheon

a \$105.2 million contract modification to supply additional Griffin missiles in 2018. FY21 SOCOM-wide funds supported production of 226 AGM-176, including data links. FY22 does not fund additional procurement as USSOCOM shifts funds to confront future threats by developing small, Stand-Off Precision Guided Munitions (SOPGM) for use in contested environments.

Contractor: Raytheon.

First Flight: Feb. 16, 2000 (USAF).

Delivered: September 2001.

IOC: N/A.

Active Variants:

- AGM-176A. Aft-ejecting missile employed as part of the PSP.
- AGM-176B. Forward-firing variant optimized for light aircraft/RPAs.

Dimensions: Length 43 in, diameter 5.5 in.

Propulsion: Solid-propellant rocket motor.

Performance: Subsonic, range 12 + miles.

Guidance: GPS/INS/semi-active laser.

Warhead: Blast fragmentation.

Integration: AC-130J (A), AC-130W (A); MQ-9 (B).



Textron Systems

AREA WEAPONS

CBU-105 SENSOR FUZED WEAPON (SFW)

Wide-area munition

Brief: SFW is a tactical area weapon for use against massed stationary or moving armor and ground vehicles. The munitions dispenser contains a payload of 10 BLU-108 submunitions each containing four skeet-shaped copper disks totaling 40 lethal, target-seeking projectiles. The skeet's active laser and passive IR sensors can detect a vehicle's shape and IR signature. If no target is detected, the warhead instead detonates at a preset time. Primary targets are massed tanks, armored personnel carriers, and other self-propelled targets. SFW can be delivered from high-altitude and in adverse weather. It debuted in combat in Iraq in 2003. DOD ceased cluster munition procurement in 2007 and has only employed the weapons in combat once since 2003. CBU-105 was the only standard USAF cluster munition that met the less-than-one-percent failure rate previously mandated by DOD for use beyond 2018. DOD has since reversed course, retaining existing weapons for deterrence on the Korean Peninsula. USAF is now testing the 2,000 lb-class Next Generation Area



Attack Weapons (NGAAW) which replaces explosive submunitions with a high-fragmentation warhead reducing the risk of unexploded munitions injuring noncombatants.

Contractor: Textron Systems.

First Flight: Circa 1990.

IOC: 1997.

Active Variants:

•CBU-105. CBU-97 casing with Wind-Corrected Munitions Dispenser (WCMD) tail kit.

Dimensions: Length 7.7 ft, diameter 15 in.

Performance: Delivers 40 lethal projectiles over an area of about 500 ft x 1,200 ft.

Guidance: IR targeting in each warhead; INS (via WCMD tail kit pre-dispersal) and GPS-data (via aircraft, prerelease).

Warhead: Shaped charge and blast fragmentation.

Integration: A-10C, B-1B, B-52H, F-15E; F-16C/D, (tested on MQ-9).



Tech Sgt. Marvin Lynchard

CBU-107 PASSIVE ATTACK WEAPON

Wide-area munition

Brief: Passive Attack Weapon is a nonexplosive, kinetic penetrating area weapon for use against sensitive targets. The CBU-107's penetrator rods limit collateral damage and do not scatter potentially contaminating debris when used against enemy WMD stockpiles. The weapon glides toward its target after release. Before impact, its inner chamber begins to rotate, and projectiles are ejected in rapid succession by centrifugal force, penetrating targets within a 200-ft radius. The weapon contains various-sized penetrating projectiles, but no explosive. Full production was completed in six months. The weapon was used during Iraqi Freedom.

Contractors: General Dynamics (kinetic energy penetrator payload and canister); Lockheed Martin (WCMD); Textron (tactical munition dispenser kit).

First Flight: 2002.

IOC: December 2002.

Active Variant:

•CBU-107A. Centrifugally dispersed, armor-penetrating weapon with Wind-Corrected Munitions Dispenser (WCMD) tail kit.

Dimensions: Length 7.7 ft, diameter 15 in.

Performance: Delivers a high-speed volley of nearly 4,000 metal projectiles in three sizes from a single canister; projectiles: 15-inch rods (350), 7-inch rods (1,000), and small-nail size (2,400).

Guidance: INS (via WCMD tail kit) and GPS-data (via aircraft) pre-release.

Warhead: Non-explosive projectiles.

Integration: B-52, F-15E, F-16C/D.

NEXT GENERATION AREA ATTACK WEAPON (NGAAW)

Wide-area munition

Brief: Next Generation Area Attack Weapon (NGAAW) is a blast-fragmentation area weapon designed as an alternative to cluster bomb munitions banned by DOD mandate beyond 2018. DOD ceased cluster munition procurement in 2007 and implemented a less-than-one-percent failure rate mandate on area weapons to prevent civilian casualties from unexploded

ordnance. USAF awarded the \$60 million NGAAW procurement contract for a compliant family of weapons in 2019. NGAAW is being developed in two increments, the 500-lb Improved Lethality Warhead (ILW) anti-personnel/materiel weapon based on the BLU-134B, followed by the more potent 2,000-lb high-fragmentation warhead. An F-16 conducted initial live-developmental test drops of the 2,000-lb class BLU-136 at the Nellis range in July 2020. The 10-weapon series proved the effectiveness of the weapon against light vehicles, structures, and personnel in excess of a 225 ft radius. The 2,000-lb weapon is externally similar to the standard JDAM when fitted with the precision-guided tail kit requiring little adaptation to existing platforms for operational use. The NGAAW family of weapons will primarily be aimed at replacing the remaining CBU-105/107 stockpile, with potential to replace additional area weapons.

Contractors: Major Tool & Machine; Faxon Machining.

First Flight: 2020.

IOC: N/A.

Active Variant:

•NGAAW Increment I. Optionally GPS/INS-guided Improved Lethality Warhead area weapon based on the 500-lb class BLU-134/B.

•NGAAW Increment II. Optionally GPS/INS-guided 2,000-lb area weapon, based on the BLU-136/B.

Dimensions: Length approx. 12 ft (2,000-lb class with tail kit), diameter approx. 14.5 in.; length approx. 7.8 ft, diameter approx. 10.7 in. (500-lb class with tail kit).

Performance: Range up to 15 miles (based on JDAM guidance/ BLU-136 mass and form factor), 225+ ft effective radius (based on initial testing).

Guidance: GPS/INS.

Warhead: 2,000 lb high-fragmentation area-attack warhead with height-of-burst sensor (BLU-136/B); 500-lb fragmentation area-attack warhead (BLU-134/B).

Integration: N/A.

PRECISION GUIDED WEAPONS



Airman 1st Class Jessi Monte

GBU-10/12/49 PAVEWAY II

Air-to-surface guided munition

Brief: Paveway II is a laser-guided, free-fall bomb for use against surface targets at short to standoff range. The kit is a folding-wing version of the earlier fixed-wing Paveway I with seeker and reliability improvements. The recent Paveway II Plus adds a modernized, more precise guidance package. GBU-10 is the Paveway II seeker and tail kit mounted on a 2,000-lb general-purpose bomb and primarily used against nonhardened targets. It is, however, capable of penetration. The GBU-12 uses a 500-lb bomb body



and is primarily used against stationary armored targets. GBU-49 is also a 500-lb body but adds GPS guidance for all-weather precision delivery from 2,500 ft up to 40,000 ft. GBU-49 currently provides the F-35A an interim moving target capability until its Block 3F software is fully fielded. An F-35 dropped the weapon for the first time in a test at Eglin on Nov. 7, 2018, and operational testing was conducted at Nellis.

Contractors: Lockheed Martin; Raytheon.

First Flight: Early 1970s.

IOC: 1976.

Active Variants:

- GBU-10. Laser/GPS guided 2,000-lb bomb.
- GBU-12. Laser guided 500-lb bomb.
- GBU-16. Laser guided 1,000-lb bomb.
- GBU-49. Laser/GPS guided 500-lb bomb.

Dimensions: Span 5.5 ft, length approx. 14.8 ft, diameter 18 in (GBU-10); span 4.4 ft, length 10.8 ft, diameter 11-18 in (GBU-12/49).

Performance: CEP 29.7 ft, range 9.2 miles (GBU-10); CEP 29.7 ft, range about six miles (GBU-12/49).

Guidance: Semi-active laser.

Warhead: Mk 84 bomb 2,000 lb (GBU-10); Mk 82 500-lb blast/fragmentation bomb (GBU-12/49).

Integration: A-10, B-1B, B-52, F-15E, F-16C/D, F-35 (GBU-49), MQ-9.



Master Sgt. Carl Clegg

GBU-24/28 PAVEWAY III

Air-to-surface penetrating glide bomb

Brief: Paveway III is a laser guided free-fall bomb for use against surface targets from medium standoff range. The third-generation laser guided seeker/tail kit package enables greater precision over Paveway II, and its high-lift airframe enables longer glide slopes for greater standoff employment. It can be dropped from low, medium, or high altitude and is effective against a broad range of high-value targets. GBU-24 is fitted to a 2,000-lb bomb body with a BLU-109 penetrating warhead. GBU-28 variants are large 5,000-lb class air-to-ground penetrators initially developed for use against Iraq's deeply buried, hardened C2 facilities. The GBU-28B adds GPS/INS guidance to the existing laser seeker for all-weather targeting. It entered production in 1999. The GBU-28C adds a more powerful penetrating BLU-122 warhead in addition to the enhanced guidance package. It entered production in 2005 and quantities are purchased as needed to replenish and maintain stockpiles. GBU-28 will eventually be replaced by the JDAM-based GBU-72 "A5K" penetrator currently under development.

Contractor: Raytheon.

First Flight: Early-1980s (GBU-24); Feb. 24, 1991 (GBU-28).

IOC: 1986 (GBU-24); 1991 (GBU-28).

Active Variants:

- GBU-24. Laser guided 2,000-lb penetrating bomb.
- GBU-28B/B. Laser/GPS/INS guided 5,000-lb penetrating bomb.
- GBU-28C/B. Laser/GPS/INS guided 5,000-lb improved penetrating bomb.

Dimensions: Span 6.7 ft, length 14.4 ft, diameter 18 in (GBU-24); length approx. 20 ft, diameter 15 in (GBU-28).

Performance: Range more than 11 miles (GBU-24); range more than 5.75 miles (GBU-28).

Guidance: Semi-active laser.

Warhead: BLU-109 2,000-lb bomb (GBU-24); BLU-113 or BLU-122 5,000-lb bombs (GBU-28).

Integration: B-52, F-15E, F-16C/D (GBU-24); B-2A, B-52, F-15E (GBU-28).



Airman Colleen Coulthard

GBU-31/32/38 JOINT DIRECT ATTACK MUNITION (JDAM)

Air-to-surface guided bomb

Brief: JDAM is a GPS/INS-guided, autonomous, all-weather surface attack weapon. The joint USAF-Navy program upgrades the existing inventory of general-purpose bombs by adding a GPS/INS guidance kit for accurate all-weather attack from medium/high altitudes. The weapons acquire targeting information from the aircraft's avionics. After release, an inertial guidance kit directs the weapon aided by periodic GPS updates. JDAM seeker/tail kits can be mounted on general-purpose or penetrating warheads in each weight class. JDAM can also utilize the 500-lb carbon fiber-cased Very Low Collateral Damage Weapon (VLCDW) for sensitive targets. A JDAM kit is under development for the 5,000-lb BLU-113 penetrating weapon slated for integration and flight-testing on the F-15E. The Advanced 2,000-lb (A2K) BLU-137/B weapon is also being developed for integration onto the F-15E and B-2A. A2K will improve both precision and penetration to strike a wider variety of targets, eventually replacing the BLU-109 bunker buster. JDAM-class weapons are the most frequent air-to-ground munition expended in combat. USAF is procuring an upgraded tail kit with anti-jam receiver for use in GPS degraded conditions under an Urgent Operational Requirement. The service is also seeking to develop a lighter-weight successor class of weapons incorporating IR/GPS guidance, maneuvering wings, stealth, and EW capabilities. Testers are currently working to integrate the GBU-38 for operational use on the F-35. USAF tapered combat stockpile replenishment effort from 16,800 JDAMs enacted in FY21 to 1,919 weapons in FY22 reflecting a shift to advanced weapon procurement to confront future threats.

Contractors: Boeing; Textron; Honeywell.

First Flight: Oct. 22, 1996.

IOC: 1998.

Active Variants:

- GBU-31. GPS/INS guided 2,000-lb GP, or BLU-109 penetrating weapon.
- GBU-32. GPS/INS guided 1,000-lb GP, or BLU-110 penetrating weapon.
- GBU-38. GPS/INS guided 500-lb GP, or BLU-111 penetrating weapon.

Dimensions: Span 25 in (GBU-31), 19.6 in (GBU-32), 14 in (GBU-38); length (with JDAM and warhead) approx 12 ft (GBU-31), 10 ft (GBU-32), 7.8 ft (GBU-38).

Performance: Range up to 15 miles, CEP with GPS 16.4 ft, CEP with INS only 98 ft.

Guidance: GPS/INS.

Warhead: 2,000-lb Mk 84/BLU-109 (GBU-31); 1,000-lb Mk 83/BLU-110 (GBU-32); 500-lb Mk 82/BLU-111 (GBU-38).

Integration: A-10C, B-52H, B-2A, B-1B, F-15E, F-16, F-22A, F-35A (GBU-31/32), and MQ-9.

GBU-39 SMALL DIAMETER BOMB I

Guided air-to-surface glide bomb

Brief: SDB is a low-yield, all-weather precision guided munition designed to limit collateral damage and strike targets from up to 46 miles away. Experimentation began in 2001 in response to an ACC requirement for a miniaturized precision weapon. Boeing was selected to fully develop and produce the weapon in 2003 and low-rate initial production began in 2005. Its size allows it to be carried in fighter or bomber internal weapons bays or to increase overall loadout for more independent strikes per sortie. SDB I employs advanced anti-jam GPS/INS, and target coordinates are loaded on the ground or received from the aircraft before release. Several SDBs can be simultaneously released against multiple targets. The





Staff Sgt. Jordan Martin

weapon was first employed by an F-15E over Iraq in 2006. The Focused Lethality Munition (FLM) is a low collateral version employing a carbon fiber case to limit damage to structures. Laser SDB is capable of self-targeting as well as GPS-only modes and is equipped with a selectable height-of-burst fuse to tailor kinetic effects. Current production versions incorporate Strategic Anti-Jam Beam-forming Receiver (SABR-Y) for use in GPS-denied/degraded environments. USAF tapered combat stockpile replenishment from over 2,000 weapons in FY21 to a total of 988 weapons in FY22 reflecting a shift to advanced stand-off weapons to confront future threats.

Contractor: Boeing.
First Flight: May 23, 2003.
IOC: Oct. 2, 2006.
Production: 24,000 (planned).
Active Variant:

- GBU-39/B SDB I. GPS/INS guided 250-lb low-yield bomb.
 - GBU-39A/B SDB I. GPS/INS guided Lethality Munition.
 - GBU-39B/B SDB I. Semiactive laser/GPS guided 250-lb low-yield bomb.
- Dimensions:** Length 6 ft, width 7.5 in; BRU-61/A carriage (four bombs) length 12 ft, width 16 in, height 16 in.
Performance: Near-precision capability at standoff range up to 46 miles.
Guidance: GPS/INS.
Warhead: 250-lb class penetrating and blast fragmentation munition.
Integration: AC-130J, AC-130W, F-15E, F-16, F-22, F-35A. Planned: A-10, B-1, B-52, B-21, MQ-9.



Raytheon Missile and Defense

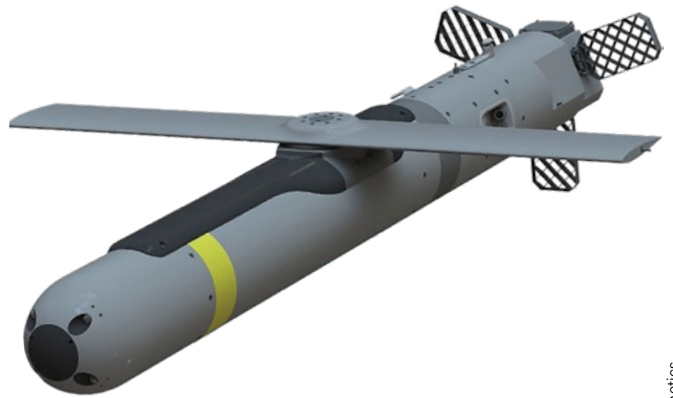
GBU-53 STORMBREAKER (SMALL DIAMETER BOMB II)

Guided air-to-surface glide bomb

Brief: StormBreaker (formerly SDB II) is a joint USAF-Navy program to develop as a low-yield, precision guided munition capable of striking moving targets in all-weather from up to 46 miles away. Its size allows it to be carried in fighter or bomber internal weapons bays or to increase overall loadout to enable more independent strikes per sortie. Several StormBreakers can be simultaneously released against multiple targets. SDB II adds a millimeter-wave radar, imaging IR, and semi-active laser packaged into a tri-mode seeker. The bomb is retargetable after release. Improvements over SDB-I include reduced susceptibility to countermeasures and network-enablement through Link 16/UHF data links. LRIP production began in 2015 and USAF awarded the current production Lot 7 on 30 April 2021. SDB II began operational testing in June 2018 and achieved initial fielding on the F-15E Sept. 23, 2020. The fielding decision paves the way for IOC and testing is underway for follow-on fielding on

the F-35 and Navy F-18E/F Super Hornet. FY22 funding supports production of up to 985 SDB IIs.

Contractor: Raytheon.
First Flight: 2012.
IOC: 2019 (planned).
Production: 12,000 (planned).
Active Variant:
 •GBU-53/B SDB II. Tri-mode guided 250-lb low-yield bomb.
Dimensions: Bomb: length 5.75 ft, wingspan 5.6 ft, diameter 7 in.
Performance: Near-precision capability at standoff range up to 46 miles.
Guidance: Tri-mode seeker millimeter-wave radar, uncooled IIR, and digital semi-active laser.
Warhead: 250-lb class penetrating blast fragmentation munition.
Integration: F-15E. Planned: A-10, AC-130W/J, B-1, B-2, B-52, F-16, F-22, F-35, MQ-9.



Dynetics

GBU-69 SMALL GLIDE MUNITION

Guided air-to-surface glide bomb

Brief: Small Glide Munition is a standoff precision guided munition specifically tailored to SOF mission requirements. Internally carried GBU-69/B were integrated onto the next-generation AC-103J gunship as part of Block 20+ upgrades following initial operational testing. USSOCOM is currently working to integrate the weapon onto RPA platforms including the MQ-9. The weapon is deployable from the AC-130J's ramp-mounted Common Launch Tubes or dropped conventionally. It is capable of quietly reaching targets from standoff range using its deployable wings to minimize risk to delivery platforms. The weapon utilizes semi-active laser and lattice-type control fins (similar to the GBU-57) for guidance and terminal stability, and is capable of receiving in-flight targeting updates via two-way data link. The weapon was jointly developed between Dynetics and USSOCOM. The company was awarded two contracts in FY18 totaling \$104 million for delivery of approximately 1,000 weapons through 2022. Procurement beyond FY21 decreased to align with future priorities such as Stand-Off Precision Guided Munitions (SOPGM) for use in contested environments.

Contractors: Dynetics.
First Flight: Feb. 16, 2000 (USAF).
Delivered: 2020-present.
IOC: N/A.

Active Variants:
 •GBU-69. Semi-active laser guided 36-lb low-yield bomb.
Dimensions: Span 28 in, length 3.5 ft, diameter 4.5 in.
Propulsion: None.
Performance: Near-precision capability at standoff range of 20+ miles.
Guidance: Semi-active laser.
Warhead: 36-lb blast fragmentation.
Integration: AC-130J; planned: MQ-9.

GBU-72 ADVANCED 5,000-POUND PENETRATOR

Massive PGM

Brief: A5K is a GPS/INS-guided next-generation penetrating weapon for striking high-priority hardened and deeply buried targets. The GBU-72 comprises the BLU-138 5,000 lb-class weapon paired with a modified JDAM tail kit. The weapon is being developed as a more survivable, lethal,





Samuel King Jr./USAF

and affordable replacement to the current Paveway-III-based GBU-38. A5K's successful ground detonation test was the largest open-air "Arena" test ever conducted at Eglin and an F-15E successfully completed the first weapon release over the Eglin range July 23, 2021. The drop was the first of a three-flight test series and demonstrated both safe-separation from the aircraft and the JDAM tail kit's ability to guide the weapon. The developmental weapon will continue JDAM integration test flights and proceed to operational testing in 2022.

Contractor: Air Force Armament Directorate.

First Flight: Jul. 23, 2021.

Delivered: N/A.

IOC: N/A.

Active Variants:

•GBU-72. GPS/INS guided 5,000-lb BLU-138 penetrating weapon.

Dimensions: N/A.

Propulsion: None.

Performance: N/A.

Guidance: Semi-active laser.

Warhead: N/A.

Integration: Planned: F-15E.



USAF

GBU-43 MASSIVE ORDNANCE AIR BLAST (MOAB) BOMB

Massive guided bomb

Brief: MOAB is the largest satellite-guided, air-delivered weapon ever employed. It is designed for use against large area targets, deeply buried targets, or targets in tunnels or caves. The conventional HE bomb is GPS guided, with fins and inertial gyro for pitch and roll. It was developed by the Air Force Research Laboratory Munitions Directorate at Eglin in only nine weeks to be available for the 2003 Iraq campaign. The weapon was designated Massive Ordnance Air Blast (MOAB) but is unofficially known as "Mother of All Bombs." The weapon is designed for deployment from the ramp of an MC-130 without a parachute. A total of 18,700 lb of the weapon's 21,000-lb weight is attributed to BLU-120/B warhead. It was used operationally for the first time in April 2017 against an ISIS-occupied cave complex in Afghanistan.

Contractors: AFRL; Dynetics.

First Flight: March 11, 2003.

IOC: April 2003.

Active Variant:

•GBU-43/B. GPS guided 21,000-lb bomb.

Guidance: GPS/INS.

Warhead: BLU-120/B 18,700-lb HE.

Dimensions: Length 30 ft, diameter 3.3 ft.

Integration: MC-130H.



Senior Airman Krista Rose

GBU-54 LASER JOINT DIRECT ATTACK MUNITION (LJDAM)

Air-to-surface guided bomb

Brief: LJDAM is a GPS/INS guided, autonomous, all-weather attack weapon for use against fixed as well as moving ground and maritime targets. It is a joint USAF-Navy development that combines a laser guidance kit with the GPS/INS-based navigation of the existing GBU-38 JDAM. Laser JDAM made its combat debut in Iraq in August 2008. The current LJDAM is a dual-mode, 500-lb guided weapon capable of attacking moving targets with precision. It was developed as an urgent operational need, and testing was completed in less than 17 months. It was first delivered in May 2008 and deployed in combat in Iraq three months later. Boeing has also nearly completed development of the GBU-56 (2,000-lb) variant. The F-35 is currently undergoing tri-service testing to integrate the GBU-38/54 for operational use.

Contractor: Boeing.

First Flight: 2005.

IOC: 2008.

Active Variant:

•GBU-54 Laser JDAM. Laser/GPS/INS guided 500-lb GP, or BLU-111 penetrating weapon.

•GBU-56 Laser JDAM. Laser/GPS/INS guided 2,000-lb GP, or BLU-109 penetrating weapon.

Dimensions: Length 7.7 ft, diameter 17 in. (GBU-54); length 12.6 ft, diameter 25.3 in (GBU-56).

Performance: Range up to 15 miles (40 + miles with JDAM ER wing set).

Guidance: GPS/INS with laser.

Warhead: Mk 82/BLU-111/BLU-126/BLU-129 500-lb munition (GBU-54); Mk 84/BLU-117/BLU-109/BLU-116 2,000-lb munition (GBU-56).

Integration: F-15E, F-16. Planned: F-35, B-1B (GBU-56).

GBU-57 MASSIVE ORDNANCE PENETRATOR

Massive PGM

Brief: MOP is a GPS-guided, earth-penetrating strike weapon for use against hardened and deeply buried targets. It was developed and tested through a USAF and Defense Threat Reduction Agency partnership in 2004 and is now managed by AFGSC. Flight-testing was conducted from 2008 to 2010 when the program transitioned to USAF. A B-2 successfully test-dropped the GBU-57 in 2014, 2015, and 2016. Several B-2s completed a total of four test drops at White Sands Missile Range, N.M., in 2017 validating the effectiveness of mods made under the Enhanced Threat Response IV upgrade. MOP proved effective, clearing the way for potential early fielding, though the Air Force's recommendation was classified. The service is currently testing the Large Penetrator Smart Fuse (LPSF) to increase precision and lethality, though delays constructing representative





59th Bomb Wing

test targets have pushed potential fielding of the upgrade to FY25 or beyond. A B-2 employed an LPSF-equipped weapon against a tunnel test target in 2020 to validate the design, followed by a performance test drop in August 2021. FY22 funds

jam-resistant GPS for operations against advanced A2/AD targets as well as an undisclosed number of additional MOP.

Contractor: Boeing.
First Flight: Classified.
IOC: 2011.

Operator: AFGSC.

Active Variant:

•GBU-57B. GPS-guided 30,000-lb penetrating weapon.

Guidance: GPS.

Warhead: 5,740-lb HE.

Dimensions: Length 20.5 ft, diameter 31.5 in.

Integration: B-2A (tests also conducted on the B-52).

SATELLITE SYSTEMS



USAF

ADVANCED EXTREMELY HIGH FREQUENCY (AEHF) SATELLITE SYSTEM

Communications

Brief: AEHF provides global, secure, protected, and jam-resistant military communications. It enhances the previous Milstar satellites and operates at a much higher capacity and data rate. It offers secure, anti-jam tactical and strategic communications around the world. AEHF uses cross-linked satellites, eliminating the need for ground relay stations. The program is a collaboration with Australia, Canada, the Netherlands, and the United Kingdom. Launch of SV-4 was originally slated for Oct. 17, 2017, but an issue with the system's power regulator prompted USAF to delay launch a year to enable a hardware fix. SV-4 launched on Oct. 17, 2018, paving the way for full operational capability declared when the vehicle joined the constellation operationally on May 3, 2019. SV-5 launched Aug. 8, 2019, after a several-month delay due to its launch vehicle, and SV-6 launched from Cape Canaveral on March 26, 2020, marking the newly formed USSF's first launch. SV-6 became operational after completing on-orbit checks on Aug. 22, 2020, completing the constellation. USSF completed the fourth of five planned incremental software upgrades to the mission planning element in May 2021. The final increment is planned for late 2022. USSF plans to begin replacing AEHF with the next-generation Evolved Strategic SATCOM (ESS) starting in the early 2030s.

Contractors: Lockheed Martin; Northrop Grumman.
Operator/Location: USSF SpOC; Schriever SFB, Colo.
First Launch: August 2010.
IOC: 2015.

Design Life: 14 yrs. Launch Vehicle: Atlas V.

Launch Vehicle: Atlas V.

Constellation: Six.

Active Satellites:

- AEHF SV-1. Launched in 2010, on orbit and operational.
- AEHF SV-2. Launched in 2012, on orbit and operational.
- AEHF SV-3. Launched in 2013, on orbit and operational.
- AEHF SV-4. Launched in 2018, on orbit and operational.

•AEHF SV-5. Launched in 2019, on orbit and operational.

•AEHF SV-6. Launched in 2020, on orbit and operational.

Dimensions: Length 31 ft, width 98 ft (with full solar array extension).

Weight: 13,400 lb.

Performance: 24-hr low, medium, and extended data rate connectivity from 65 north to 65 south-latitude worldwide.

Orbit Altitude: Geosynchronous at 22,000+ miles.

Power: Solar arrays generating 20,000 watts.



USAF

DEFENSE METEOROLOGICAL SATELLITE PROGRAM (DMSP)

Space and Earth environmental data collection

Brief: DMSP is tasked with environmental data collection for worldwide, military weather forecasting. It provides timely and high-quality weather information to strategic and tactical combat units worldwide. DMSP uses an operational line scan sensor to image cloud cover in visible and thermal IR and analyze cloud patterns. It is equipped with microwave imagers and sounders and a suite of space environment sensors that provide critical land, sea, and space environment data. Block 5D-3 improved spacecraft bus and sensors for longer and more capable missions. Six operational DMSP satellites now survey the entire Earth four times a day. The oldest operational satellite, DMSP-13, suffered an apparent electrical short and exploded, creating a cloud of debris in space in 2015. DMSP-19 most recently launched in 2014. The vehicle subsequently suffered a power failure in early 2016, rendering it uncontrollable. Data from the craft remains usable until its orbit decays. Congress canceled the DMSP program before the final spacecraft (DMSP-20) could be launched. DMSP-20 was stored, awaiting a launch decision to replace DMSP-19. DMSP-17 ultimately assumed the failed satellite's coverage, and DMSP-20 went on permanent display at Los Angeles AFB, Calif. DMSP-14, the last operational Block 5D-2 satellite, was decommissioned Feb. 11, 2020, after 22 years of service. USAF awarded Ball Aerospace a \$255.4 million development contract for the Weather System Follow-On-Microwave (WSF-M) in November 2018, to partially replace DMSP starting in FY24. WSF-M will measure oceanic winds and precipitation and space weather, while a notional second constellation with optical/IR sensors would augment to monitor cloud cover and other conditions. USSF estimates the constellation will reach the end of its useful life between 2023 and 2026.

Contractors: Lockheed Martin; Northrop Grumman.

Operator/Location: National Oceanic and Atmospheric Administration; NOAA Operations Facility, Suitland, Md.

First Launch: May 23, 1962.

IOC: 1965.

Design Life: Five yrs (Block 5D-3).

Launch Vehicle: Delta IV; Atlas V.

Constellation: Four low-Earth orbit (LEO).

Active Satellites:

•Block 5D-3. Improved spacecraft bus and sensors for longer, more capable missions.

Dimensions: Length 25 ft (with array deployed), width 4 ft.

Weight: 2,545 lb, incl 772-lb sensor; 2,270 lb with 592-lb sensor payload.
Performance: Polar orbits; covers Earth in about 6 hr; primary sensor scans 1,800-mile-wide area.

Orbit Altitude: Approx 527 miles.

Power: Solar arrays generating 1,200-1,300 watts.

DEFENSE SATELLITE COMMUNICATIONS SYSTEM (DSCS)

Communications

Brief: DSCS provides high-priority wartime and strategic SHF communications between high-level leadership and deployed forces and ships worldwide. Satellites enable high-data rate, secure, nuclear-hardened, jam-resistant military comms. In addition to joint service command and control, interagency users include the National Command Authority, White





USAF

House Communications Agency, and Diplomatic Telecommunications Service. The last of 14 DSCS IIIs launched in 2003. AFSPC inactivated its two oldest DSCS satellites, B-12 in July 2014 and DSCS-10 in June 2015, B-12 having exceeded its designed life span by 12 years. The final four DSCS satellites received SLEP before launch, providing higher-power amplifiers, more sensitive receivers, and increased antenna connection options. The satellites also carry a single channel transponder to disseminate emergency action and force direction messages to nuclear-capable forces. WGS began augmenting DSCS in 2007 and will gradually replace the constellation.

Contractor: Lockheed Martin.
Operator/Location: USSF SpOC; Schriever SFB, Colo.
First Launch: DSCS II 1971; DSCS III 1982; DSCS III/SLEP 2000.
IOC: Dec. 13, 1978 (DSCS II).
Design Life: 10 yr (III).
Launch Vehicle: Atlas II, NSSL, Space Shuttle Atlantis (two satellites, 1985).
Constellation: Six (III); 14 deployed/six operational.
Active Satellites:
 •DSCS III. Current base on-orbit variant.
 •DSCS III. SLEP. Upgrade configuration of last four satellites launched.
Dimensions: Rectangular body 6 x 6 x 7 ft, 38-ft span with solar arrays deployed.
Weight: 2,580 lb; 2,716 lb (SLEP).
Performance: Employs six independent SHF transponder channels for secure voice and high-rate data communications.
Orbit Altitude: 22,000+ miles in geosynchronous orbit.
Power: Solar arrays generating 1,269 watts, decreasing to 980 watts after 10 yr; 1,500 watts (SLEP).



DOD

DEFENSE SUPPORT PROGRAM (DSP)

Strategic and tactical launch detection

Brief: DSP provides ballistic missile early warning and is a key part of North American and theater early warning systems. It is capable of detecting missile launches and nuclear detonations and was initially meant to watch the Soviet military. It was used extensively in the 1991 Gulf War to detect Iraqi theater missile launches against coalition forces and allies in the region. The 23rd and final DSP satellite launched in December 2007 but malfunctioned and began drifting outside its intended orbit in 2008. Block 5 is the latest variant and is more survivable than predecessors. It includes a medium wavelength IR sensor for more mission utility and accommodates 6,000 detectors. Nine Block 5 satellites were deployed between 1989 and 2007. Control of the constellation was consolidated to the new Block 10 Mission Control Station at Buckley in early 2016. SBIRS is integrated with DSP, augments its role, and is designed to eventually

replace the constellation on orbit. The constellations jointly enabled early detection of ballistic missiles launched by Iran against U.S. forces at Al Asad AB, Iraq, on Jan. 7, 2020, minimizing casualties.

Contractors: Northrop Grumman (formerly TRW); Aerojet.
Operator/Location: USSF SpOC; Buckley SFB, Colo.
First Launch: November 1970.
IOC: Circa 1972.
Design Life: Three-year requirement and five-year goal.
Launch Vehicle: Titan IV with inertial upper stage; Delta IV Heavy NSSL.
Constellation: 23 deployed/five operational.
Active Satellites:
 •DSP-18. Launched in 1997, on orbit and operational.
 •DSP-19. Launched in 1999, on orbit and operational.
 •DSP-20. Launched in 2000, on orbit and operational.
 •DSP-21. Launched in 2001, on orbit and operational.
 •DSP-22. Launched in 2004, on orbit and operational.
 •DSP-23. Launched in 2007, on orbit and non-operational.
Dimensions: Diameter 22 ft, height 32.8 ft, with paddles deployed.
Weight: Approx 5,200 lb.
Performance: Uses IR sensors to sense heat from missile and booster plumes against Earth's background.
Orbit Altitude: Geosynchronous at 22,000+ miles.
Power: Solar arrays generating 1,485 watts.



USAF

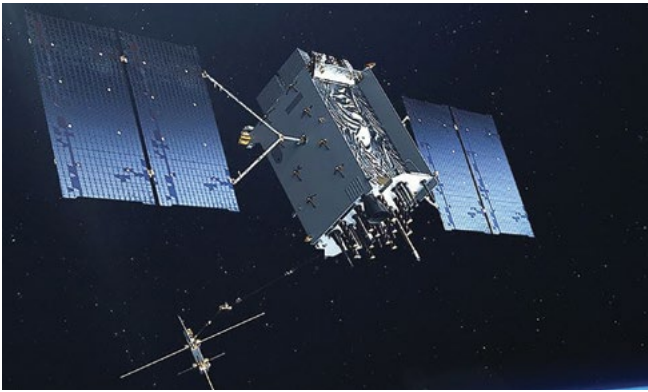
GEOSYNCHRONOUS SPACE SITUATIONAL AWARENESS PROGRAM (GSSAP)

Situational awareness/orbital tracking

Brief: GSSAP supplies space-based tracking and characterization of manmade objects in geosynchronous orbit, aiding safety and enabling avoidance. They are the "neighborhood watch" satellites augmenting the legacy Space Based Space Surveillance (SBSS) system. SBSS tracks and classifies manmade objects in low-Earth orbit and GSSAP extends this coverage to geosynchronous orbit. The satellites themselves operate in near-geosynchronous orbit to effectively monitor objects and aid in preventing collisions in space. GSSAP carries EO/IR sensors and are able to maneuver to observe objects at close range. They can track objects without the weather and atmospheric disruptions that affect ground-based systems. Two GSSAP satellites were launched in 2014 and attained IOC in 2015. Two more replenishment satellites launched Aug. 19, 2016, and became operational Sept. 12, 2017. USSF completed a significant overhaul and upgrade of the GSSAP ground system software to enhance the reliability, speed, and security of the system in February 2020. The upgrades also pave the way for future expansion of the constellation. The fifth and sixth sensors successfully launched aboard the USSF-8 mission from Cape Canaveral on Jan. 21, 2022.

Contractor: Northrop Grumman Space Systems (formerly Orbital ATK).
Operator/Location: USSF SpOC; Schriever SFB, Colo.
First Launch: July 28, 2014.
IOC: Sept. 29, 2015.
Launch Vehicle: Delta IV, Atlas V (USSF-8).
Constellation: Four spacecraft.
Active Satellites:
 •GSSAP 1. Launched in 2014; on orbit, active.
 •GSSAP 2. Launched in 2014, on orbit, active.
 •GSSAP 3. Launched in 2016, on orbit, active.
 •GSSAP 4. Launched in 2016, on orbit, active.
 •GSSAP 5. Launched in 2022, on orbit, active.
 •GSSAP 6. Launched in 2022, on orbit, active.
Orbit Altitude: 22,300 miles, above geosynchronous.
Power: Solar panels.





Courtesy



USAF

channels, allowing larger data to be passed more quickly. Interoperable terminals allow third-party land/sea-based units to upload data in real time to cruise missiles or other compatible weapons. Milstar provides continuous coverage between 65 degrees north and 65 degrees south latitude. The systems utilize multiple-redundant command and control for high survivability. The last of six satellites launched in 2003 and was augmented by the sixth and final AEHF satellite in 2020. AEHF now supplants Milstar as DOD's primary system in the combined, fully back-compatible AEHF-Milstar constellation.

Contractors: Lockheed Martin; Boeing; Northrop Grumman (formerly TRW).
Operator/Location: USSF SpOC; Schriever SFB, Colo.
First Launch: Feb. 7, 1994.
IOC: July 1997 (Milstar I).
Design Life: 10 yr.
Launch Vehicle: Titan IV/Centaur.
Constellation: Five: two Milstar I; three Milstar II.
Active Satellites:
 •Block I. Milstar I satellites launched 1994-95.
 •Block II. Milstar II satellites launched 1999-2003.
Dimensions: Length 51 ft, width 116 ft with full solar array extension.
Weight: 10,000 lb.
Performance: Milstar I low data rate (LDR) payload transmitting 75 to 2,500 bps of data over 192 channels of EHF; Milstar II LDR and medium data rate (MDR) payloads, transmitting 4,800 bps to 1.5 Mbps over 32 channels.
Orbit Altitude: Geosynchronous at 22,000+ miles.
Power: Solar arrays generating 8,000 watts.



Lockheed Martin

SPACE BASED INFRARED SYSTEM (SBIRS)
 Space-based surveillance/missile warning

Brief: SBIRS provides advanced space surveillance and missile warning, battlespace characterization, and technical intelligence gathering. It is the follow-on to the Defense Support Program satellite. The system includes IR sensor payloads on host satellites in highly elliptical orbit (HEO), two IR sensors each on dedicated satellites in geosynchronous Earth orbit (GEO), and ground assets. The HEO sensor detects launch of submarine-launched ballistic missiles (SLBMs) from the North Pole region and can be tasked for other IR detection missions. GEO scanning IR sensor performs the strategic missile warning mission, global technical intelligence, and initial phase for the strategic missile defense mission, providing two times the revisit rate and three times the sensitivity of DSP. USAF announced plans to allow civil use of SBIRS data to aid weather prediction, Arctic ice monitoring, and wildfire tracking. GEO-3 launched into orbit Jan. 20, 2017, after delays to validate the performance of its liquid apogee engine. GEO-4 launched on Jan. 19, 2018. GEO-5 and GEO-6 are based on a modernized spacecraft and will replace the oldest two on orbit. They will also begin migrating ground control to the next-generation Enterprise Ground

GLOBAL POSITIONING SYSTEM (GPS)

Worldwide navigation, timing, and velocity data

Brief: GPS supplies space-based military and civil radio-positioning for geolocation, navigation, and timing. It is a fundamental enabler of precision bombing, CSAR, mapping, and rendezvous. It provides accurate and uninterrupted 3D (latitude, longitude, and altitude) position, velocity, and time data. The last of the GPS Block IIA satellites, launched between 1990 and 1997 was decommissioned in 2020. GPS Block IIR and IIR-M (modernized) included 21 vehicles launched between 2005 and 2009. Modernization upgrades included two new signals, enhanced encryption, anti-jamming capabilities, and a second civil signal. GPS Block IIF is a follow-on to IIR-M. Upgrades include extended design life, faster processors, and improved anti-jam and accuracy, a new military signal, and a second and third dedicated civil signal. The GPS Block IIIA, first launched on Dec. 23, 2018, has improved accuracy, availability, integrity, and incorporates a steerable, high-power, anti-jam capability. Lockheed Martin is under contract to build the final Block IIIA vehicles (nine and 10) for launch in 2022 and was awarded a follow-on for two Block IIIF vehicles (11 and 12) as well as up to 22 additional vehicles in 2018. Block IIIF adds a hosted search and rescue payload, as well as geographically targetable high-power military signal. FY22 funds procurement of two IIIF vehicles. The third IIIA launched in 2020, was the first boosted by a SpaceX Falcon 9, and a fifth launched June 17, 2021, was the first National Security Space Launch to recycle a previously used booster. GPS III vehicles six through eight are awaiting launch, and the first IIIF is slated to be launch-ready by 2026.

Contractors: Boeing (IIF); Lockheed Martin (IIR, IIR-M, III/IIIF).
Operator/Location: USSF SpOC; Schriever SFB, Colo.
First Launch: Feb. 22, 1978.
IOC: Dec. 9, 1993.
Design Life: 7.5 yr (IIR/IIR-M); 12 yr (IIF); 15 yr (IIIA).
Launch Vehicle: Delta II, Delta IV, Falcon 9.
Constellation: 30 spacecraft (not including decommissioned or on-orbit spares).
Active Satellites:
 •GPS Block IIR. Launched 1997 to 2004; seven active.
 •GPS Block IIR-M. Launched in 2005 to 2009; seven active.
 •GPS Block IIF. Launched in 2010 to 2016; 12 active.
 •GPS Block IIIA/IIIF. New generation launched in 2018; four active.
Dimensions: (IIR/IIR-M) 5 x 6.3 x 6.25 ft, span incl solar panels 38 ft; (IIF) 9.6 x 6.5 x 12.9 ft, span incl solar panels 43.1 ft.
Weight: On orbit, 2,370 lb (IIR/IIR-M); 3,439 lb (IIF).
Performance: Orbits the Earth every 12 hr, emitting continuous signals, providing time to within one-millionth of a second, velocity within a fraction of a mile per hour, and location to within a few feet.
Orbit Altitude: 10,988 miles.
Power: Solar panels generating 1,136 watts (IIR/IIR-M); up to 2,900 watts (IIF).

MILSTAR SATELLITE COMMUNICATIONS SYSTEM (MILSTAR)

Communications

Brief: Milstar is the joint-service backbone of strategic/tactical DOD communications. It provides encrypted, secure, anti-jam communications around the world and uses cross-linked satellites, eliminating the need for ground relay stations. Block I satellites incorporate a low data rate payload capable of transmitting 75 to 2,400 bps over 192 EHF channels. Block II satellites carry both the low data rate payload and a medium data rate payload capable of transmitting 4,800 bps to 1.5 Mbps over 32



Service (EGS) aimed at consolidating control of multiple satellite systems. USSF also awarded Raytheon a \$197 million contract in 2020 to modernize ground data processing. USAF canceled the final two GEO satellites and shifted funds to develop the Next-Generation Overhead Persistent Infrared (OPIR) system. USAF awarded Lockheed Martin an initial design contract in 2018, and the constellation will comprise three GEO satellites and two polar HEO sensors. The company was awarded a \$4.8 billion follow-on contract for the GEO satellites on Jan. 4, 2021. Delivery of the first OPIR GEO satellite is slated for FY25 followed by the first HEO sensor in FY28. The fifth SBIRS GEO satellite (GEO-5) successfully blasted off from Cape Canaveral on May 18, 2021, and GEO-6 is awaiting launch targeted for the first half of 2022.

Contractors: Lockheed Martin (prime contractor); Northrop Grumman (payload); Raytheon (data processing modernization).

Operator/Location: USSF SpOC; Buckley SFB, Colo.

First Launch: GEO 1, May 2011.

IOC: HEO 1, Dec. 5, 2008. (Increment 1, Dec. 8, 2001).

Launch Vehicle: Atlas V (GEO). Planned: Delta, Falcon 9.

Constellation: Five GEO sats, two HEO sensors and two HEO on-orbit reserve (hosted).

Active Satellites/Payloads:

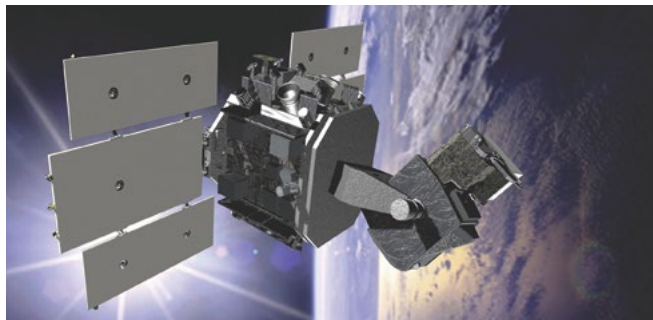
- SBIRS HEO-1. Payload operational in 2008; on-orbit reserve.
- SBIRS HEO-2. Payload operational in 2009; on-orbit reserve.
- SBIRS HEO-3. Payload operational in 2015; active.
- SBIRS HEO-4. Payload operational in 2017; active.
- SBIRS GEO-1. Launched in 2011; active.
- SBIRS GEO-2. Launched in 2013; active.
- SBIRS GEO-3. Launched in 2017; active.
- SBIRS GEO-4. Launched in 2018; active.
- SBIRS GEO-5. Launched in 2021; active.

Dimensions: 49 x 22 x 20 ft (GEO on orbit); 7 x 4 x 3 ft (HEO sensor).

Weight: 5,525 lb (GEO on orbit).

Orbit Altitude: Geosynchronous (GEO satellites) and highly elliptical (HEO sensors).

Power: Solar array, 2,435 watts (GEO), batteries.



Boeing

SPACE BASED SPACE SURVEILLANCE (SBSS)

Orbital surveillance and object identification

Brief: SBSS is designed to track, characterize, measure, and collect optical signatures of Earth-orbiting objects, including space vehicles and debris. The Missile Defense Agency originally launched SBSS as a technology demonstrator to classify and track ballistic missiles in mid-course flight, before handing it over to AFSPC in 2011. SBSS primarily uses a trainable, ground-controlled Space-Based Visible Sensor to track targets without repositioning. Potential high-end and even kinetic space threats from China and Russia have pushed orbital domain awareness to the top of AFSPC's priority list. AFSPC worked to extend SBSS service life and tasked one of its experimental Operationally Responsive Space satellites to cover a four-year gap in coverage until the newly established Space Force can launch a follow-on spacecraft now targeted for 2022. ORS-5 launched Aug. 26, 2017, and is equipped with an optical sensor to provide rapid, continuous scanning to detect movement in geosynchronous orbit. The Space Force is seeking funds for a follow-on satellite to ORS-5 to enhance surveillance. SBSS works in concert with an array of networked, ground-based sensors including the Space Fence wide-area search and surveillance system recently commissioned on Kwajalein Atoll in the Marshall Islands. SBSS collision-warning data was made openly available to the public in 2020 to improve domain awareness and orbital safety, and USSF is considering handing-off operations to a contracted service provider.

Contractors: Boeing (system integration, ground segment, operations,

and sustainment); Ball Aerospace (satellite); Orbital ATK (ORS-5).

Operator/Location: USSF SpOC; Schriever SFB, Colo.

First Launch: Sept. 25, 2010.

IOC: Aug. 17, 2012 (SBSS); May 31, 2018 (ORS-5).

Design Life: Seven yr.

Launch Vehicle: Minotaur IV.

Constellation: One LEO satellite; one LEO augmentation satellite.

Active Satellites:

- SBSS Block 10. Launched in 2010; active.
- ORS-5. Experimental satellite launched in 2017 to augment SBSS; active.

Dimensions: Height approx 49 ft; 22ft x 20 ft (SBSS on-orbit); 5 ft x 2.5 ft (ORS-5).

Weight: Approx 5,525 lb (SBSS on orbit); approx 250 lbs (ORS-5).

Orbit Altitude: 390 miles, sun-synchronous orbit (SBSS); 372 miles, geosynchronous orbit (ORS-5).

Power: Solar arrays and batteries generating 750 watts (SBSS); solar array and batteries (ORS-5).

WIDEBAND GLOBAL SATCOM (WGS) SATELLITE

Communications



Courtesy

Brief: WGS provides worldwide, high-capacity communications for deployed air, land, and sea forces. The system is designed to augment and then replace DSCS X-band frequency service. It also augments the one-way Global Broadcast Service Joint Program Ka-band frequency capabilities and provides a new high-capacity, two-way Ka-band frequency service. Block I includes: SV-1 (Pacific region), SV-2 (Middle East), and SV-3 (Europe and Africa). Block II satellites are modified to better support the airborne ISR mission and include: SV-4 (Indian Ocean) and SV-5 and SV-6, purchased by Australia in 2013. The U.S. is partnering with Canada, Denmark, Luxembourg, the Netherlands, and New Zealand on Block II follow-on satellites SV-7 to SV-10. The Space and Missile Systems

center recently conducted tests to field anti-jamming capability for SV-1 through SV-10 starting in 2022. Congress added funds beyond USAF's FY18 request to procure the 11th and 12th satellites, but USSF opted for the single, modernized WGS-11+ platform. USSF issued Boeing a \$20.6 million contract modification for the design and launch of WGS-11+ on June 21, 2021. The satellite will offer roughly twice the capability, in addition to stronger, more reliable coverage and is tentatively slated for completion in 2024. USSF is seeking to develop and field a WGS follow-on system and potentially lease commercial SATCOM in the interim.

Contractor: Boeing.

Operator/Location: USSF SpOC; Schriever SFB, Colo.

First Launch: October 2007.

IOC: April 16, 2008.

Design Life: 14 yr.

Launch Vehicle: Atlas V, Delta IV.

Constellation: 10 satellites.

Active Satellites:

- SV-1. Block I, launched in 2007; active.
- SV-2. Block I, launched in 2009; active.
- SV-3. Block I, launched in 2009; active.
- SV-4. Block II, launched in 2009; active.
- SV-5. Block II, launched in 2013; active.
- SV-6. Block II, launched in 2013; active.
- SV-7. Block II follow-on, launched in 2015; active.
- SV-8. Block II follow-on, launched in 2016; active.
- SV-9. Block II follow-on, launched in 2017; active.
- SV-10. Block II follow-on, launched in 2019; active.

Dimensions: Based on Boeing 702 Bus.

Weight: 13,000 lb at launch.

Performance: Approx 10 times the capability of a DSCS satellite.

Orbit Altitude: Geosynchronous at 22,000+ miles.

Power: Solar arrays generating 9,934 watts.

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GLOSSARY OF ACRONYMS & ABBREVIATIONS

A non-exhaustive list of acronyms and abbreviations found in the 2022 Almanac.

A2/AD	Anti-access, area-denial	AMOW	Air Mobility Operations Wing	CC	combat communications
AA	Active associate: ANG/AFRC-owned aircraft	AMRAAM	Advanced Medium-Range Air-to-Air Missile	CCG	Combat Communications Group
AAB	Army Air Base	AMS	Air Mobility Squadron	CCW	Command and Control Wing
AAF	Army Airfield	AMW	Air Mobility Wing	CEF	civil engineering flight
AATTC	Advanced Airlift Tactics Training Center	ANG	Air National Guard	CEM	combat effects munition
AB	Air Base	ANGB	Air National Guard Base	CEP	circular error probable
ABG	Air Base Group	ANGS	Air National Guard Station	CENTCOM	U.S. Central Command
ABW	Air Base Wing	APO AP	Army/Air Force Post Office Pacific	CFIN	combat flight inspection
ABMS	Advanced Battle Management System	APO AE	Army/Air Force Post Office Europe	CFAC	combined force air component commander
ACC	Air Combat Command	AOC/G/S	Air and Space Operations Center/Group/Squadron	CFT	conformal fuel tank
ACG	Air Control Group	APS	Aerial Port Squadron	CG	Communications Group
ACS	Air Control Squadron	ARB	Air Reserve Base	CNS/ATM	Communications, navigation, surveillance/air traffic management
ACTS	Air Combat Training Squadron	ARG	Air Refueling Group	COMINT	Communications intelligence
ACW	Air Control Wing	Arpt.	Airport	CSO	combat systems officer
ADS-B	Automatic Dependent Surveillance-Broadcast	ARS	1) Air Refueling Squadron 2) Reserve Station	CONUS	Continental U.S.
AE	aeromedical evacuation	ARW	Air Refueling Wing	COS	Cyberspace Operations Squadron
AEHF	Advanced Extremely High Frequency	AS	1) Air Station 2) Airlift Squadron	CRF	Centralized repair facility
AESA	active electronically scanned array	ASIP	Airborne Signals Intelligence Payload	CRG	Contingency Response Group
AETC	Air Education and Training Command	ASOS/G	Air Support Operations Squadron/Group	CRTC	Combat Readiness Training Center
AFB	Air Force Base	ASTF	Aeromedical Staging Flight	CRW	Contingency Response Wing
AFDW	Air Force District of Washington	ATCS	Air Traffic Control Squadron	CSAR	combat search and rescue
AFGSC	Air Force Global Strike Command	ATKW	Attack Wing	CTOL	Conventional Takeoff and Landing
AFLCMC	Air Force Life Cycle Management Center	ATP	advanced targeting pod	CTS	Combat Training Squadron
AFMC	Air Force Materiel Command	AW	Airlift Wing	CW	1) Cyberspace Wing 2) Combat Weather
AFNWC	Air Force Nuclear Weapons Center	AWACS	Airborne Warning and Control System	DAF	Department of the Air Force
AFRC	Air Force Reserve Command	BACN	Battlefield Airborne Communications Node	DCGS	Distributed Common Ground System
AFRL	Air Force Research Laboratory	BLOS	beyond line of sight	DMOC	Distributed Mission Operations Center
AFS	Air Force Station	BLU	Bomb Live Unit	DMSP	Defense Meteorological Satellite Program
AFSC	Air Force Specialty Code	BM	battle management	DOD	Department of Defense
AFSOC	Air Force Special Operations Command	BMEWS	Ballistic Missile Early Warning System	DSCS	Defense Satellite Communications System
AFSMO	Air Force Spectrum Management Office	BW	Bomb Wing	DSP	Defense Support Program
AFSPC	Air Force Space Command	C2	command and control	DSRP	Defense Space Reconnaissance Program
AFTC	Air Force Test Center	C3	command, control, and communications	DTOC	Distributed Training Operations Center
AG	Airlift Group	C3I	command, control, communications and intelligence	DV	distinguished visitors
AGM	air-to-ground missile	C4	command, control, communications, and computers	EA	electronic attack
AGOW	Air Ground Operations Wing	CACS	Command and Control Squadron (Space)	ECG	Electronic Combat Group
AGS	Air Guard Station	CALCM	Conventional Air-Launched Cruise Missile	ECM	Electronic countermeasures
AGS	Alliance Ground Surveillance	CAS	close air support	EELV	Evolved Expendable Launch Vehicle
AIM	Air intercept missile	CBCS	Combat Communications Squadron	EHF	extremely high frequency
ALC	Air Logistics Complex	CBU	cluster bomb unit	EIS(G)	Engineering Installation Squadron/Group
ALCM	Air-Launched Cruise Missile			EISS	Enhanced Integrated Sensor Suite
ALCF	Airlift Control Flight			ELINT	Electronic intelligence
ALTV	Approach and Landing Test Vehicle			ENG	Engineering/Engineer
AMC	Air Mobility Command			EO	electro optical
AMOG	Air Mobility Operations Group				

EOD explosive ordnance disposal
ER extended range
EW electronic warfare
EWO electronic warfare officer
FAB-T Family of Advanced Beyond Line-of-Sight Terminals
FAC-A forward air controller airborne
FG Fighter Group
FLIR forward-looking infrared
FLTS Flight Test Squadron
FMV full-motion video
FTG Flying Training Group
FTU Formal Training Unit
FTW Flying Training Wing
FW Fighter Wing
FY fiscal year
GA Guardian Angel (pararescuemen, combat rescue officers, and survival, evasion, resistance, and escape specialists)
GATM Global Air Traffic Management
GBU Guided Bomb Unit
GCS ground control station
GEODSS Ground-based Electro-Optical Deep Space Surveillance System
GPS Global Positioning System
GSSAP Geosynchronous Space Situational Awareness Program
HARM High-speed Anti-Radiation Missile
HE high explosive
HUD head-up display
Helo helicopter
IADS integrated air defense system
IBS Integrated Battle Station
ICBM Intercontinental ballistic missile
IFF identification, friend or foe
IIR imaging infrared
INS inertial navigation system
IOC initial operational capability
IOF/S Information Operations Flight/Squadron
IOW Information Operations Wing
IR infrared
IS Intelligence Squadron
ISR/G/W Intelligence, Surveillance, and Reconnaissance Group/Wing
IW Intelligence Wing
IWS Information Warfare Squadron
JADC2 Joint All-Domain Command and Control
JASSM Joint Air-to-Surface Standoff Missile
JB Joint Base
JBSA Joint Base San Antonio
JDAM Joint Direct Attack Munition
JMS Joint Mission System
JNGB Joint National Guard Base
JRB Joint Reserve Base
JROTC Junior Reserve Officers' Training Corps
JSOW Joint Standoff Weapon
JSpOC Joint Space Operations Center
JSTARS Joint Surveillance Target Attack Radar System
JSUPT Joint Specialized Undergraduate Pilot Training
JTIDS Joint Tactical Information Distribution System
LAAR Light Attack/Armed Reconnaissance

LANTIRN Low-Altitude Navigation and Targeting Infrared for Night
LCD liquid crystal display
LDM Loadmaster
LGB laser-guided bomb
LJDAM Laser Joint Direct Attack Munition
LO low observable
LOS line of sight
LRASM Long-Range Anti-Ship Missile
MAFFS Modular Airborne Firefighting System
MALD Miniature Air-Launched Decoy
MASINT Measurement and signature intelligence
MCB Marine Corps Base
MCE mission control element
MDG Medical Group
MDW Medical Wing
MFD Multifunction display
MILSATCOM Military Satellite Communications
MISS Mission/s
MOH Medal of Honor
MSG Mission Support Group
MW Missile Wing
N/A not available
NAF Naval Air Facility
NAS Naval Air Station
NAOC National Airborne Operations Center
NAV Navigation/Navigator
NGAAW Next Generation Area Attack Weapons
NORTHCOM U.S. Northern Command
NOSS network operations security squadron
NSSL National Security Space Launch
NVG night vision goggles
O&M Operations and Maintenance
OPS Operations/Operators
OT&E operational test and evaluation
PACAF Pacific Air Forces
PACOM U.S. Indo-Pacific Command
PAR Presidential Aircraft Replacement
PARCS Perimeter Acquisition Radar Attack Characterization System
PEO Program Executive Officer
PGM precision guided munition
PSP Precision Strike Package
RAMP Reliability, Availability, and Maintainability Program
RAOC Regional Air Operations Center
RATO Rocket-Assisted Take Off
R&D research and development
RDT&E research, development, test, and evaluation
RED HORSE Rapid Engineer Deployable Heavy Operational Repair Squadron Engineers
RG Reconnaissance Group
RPA remotely piloted aircraft
RQG Rescue Group
RQS Rescue Squadron
RQW Rescue Wing
ROTC Reserve Officer's Training Corps
ROVER Remotely Operated Video Enhanced Receiver
RS Reconnaissance Squadron
RSC Resource/s
RSG Regional Support Group
RW Reconnaissance Wing

RWR radar warning receiver
SACU Situational Awareness Capabilities Upgrade
SAR synthetic aperture radar
SATCOM satellite communications
SBIRS Space-Based Infrared System
SCMS Supply Chain Management Squadron
SCMG Supply Chain Management Group
SCMW Supply Chain Management Wing
SCOW Supply Chain Operations Wing
SDB Small Diameter Bomb
SEAD suppression of enemy air defenses
SERE survival, evasion, resistance, and escape
SHF superhigh frequency
shp shaft horsepower
SIAW Stand-in Attack Weapon
SIGINT signals intelligence
S-L sea level
SLEP Service Life Extension Program
SMC Space and Missile Systems Center
SOCOM U.S. Special Operations Command
SOF Special Operations Forces
SOG Special Operations Group
SOPS Space Operations Squadron
SOW Special Operations Wing
SPADOC Space Defense Operations Center
SPC Specialist
SPCS Space Control Squadron
START Strategic Arms Reduction Treaty
STOL short takeoff and landing
STRATCOM U.S. Strategic Command
STS Special Tactics Squadron
SUPT Superintendent
SW Space Wing
SWS Space Warning Squadron
SYS System/s
T&E test and evaluation
TACAN tactical air navigation
TACC Tanker Airlift Control Center
TACP tactical air control party
TAI total active inventory
TBD to be determined
TF/TA terrain-following/terrain-avoidance
TG Test Group
T-O takeoff
TRANSCOM U.S. Transportation Command
TRG Training Group
TRW Training Wing
TTP tactics, techniques, and procedures
TW Test Wing
UAV unmanned aerial vehicle
UHF ultra-high frequency
USAFA U.S. Air Force Academy
USAFE U.S. Air Forces in Europe
USAG U.S. Army Garrison
VHF very high frequency
VLF very low frequency
WCMD Wind-Corrected Munitions Dispenser
WEG Weapons Evaluation Group
WGS Wideband Global SATCOM
WF Weather Flight
WPS Weapons Squadron
WSO weapon systems officer
WXF Weather Forecast/Weather Flight





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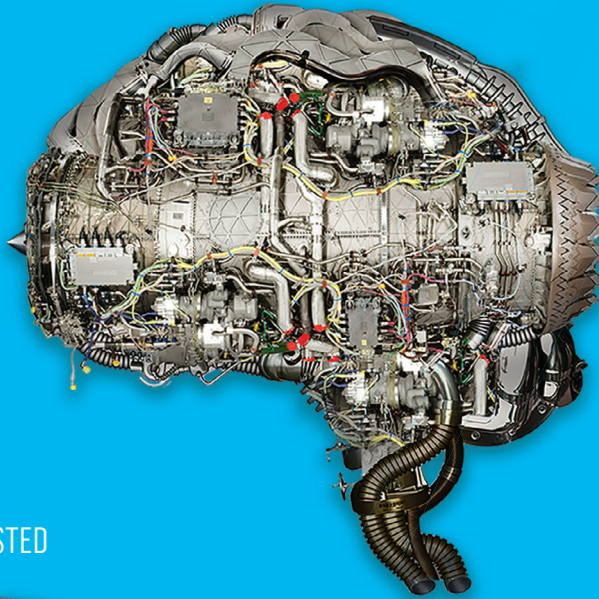
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