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Cover Illustration: The ballpoint pen drawing, "The X-Plane Eagle" by Don Stewart, depicts an eagle composed of experimental aircraft. See dsart.com for more information. *Air Force Magazine* will publish a "spotter's guide" identifying the aircraft in this drawing in its July issue.



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Opsec and Glossophobia

A handful of specific emails and letters arrive after we publish the June *Air Force Magazine* USAF Almanac every year. The writers express concern the almanac provides too much information.

Air Force Magazine does not print classified information. Everything in its pages is publicly releasable, and most almanac information comes from USAF or the Defense Department.

The Air Force itself is in the midst of a major re-evaluation of what to say publicly, through an operational security (opsec) and public affairs “reset.” This covers interviews, base visits, public speaking engagements, and even official responses to queries.

The reset began in March after several incidents where USAF “just skirted the edge” of acceptable disclosure, Chief of Staff Gen. David L. Goldfein told reporters. It “just got to the point where [Air Force Secretary Heather Wilson] and I were uncomfortable with the kind of operational details we were talking about,” he explained March 29 to Washington, D.C., defense journalists.

Three articles stood out to USAF leadership, according to service documents posted on an unofficial but widely read Air Force Facebook page:

- A December 2017 Fox News report detailed how one of the two B-1 bombers in a planned two-ship flight from Guam to South Korea had to abort the mission because of a maintenance problem.

- A January article in *The Guardian* gave an overview of airmen tracking terrorists remotely, from Kansas. The article discussed civilian casualties, how airmen have to decide when to shoot, and the psychological toll this can take.

- A February *Colorado Springs Gazette* article about a new space operations center in Colorado described how the center analyzes threats against space assets, with USAF and intelligence community officials working side-by-side.

Each article discussed an important topic, and the subject matter was similar to other news stories that have appeared in *Air Force Magazine* and other publications for more than a decade. The three articles were seemingly unexceptional.

According to Goldfein, today’s relaxed view of security has become a problem. Information that was previously OK to release is no longer OK in the context of rising threats from Russia and China. “Coming out of 17 years of conflict where we really haven’t been in the great power competition game ... we’ve been a little looser on the things we talk about,” Goldfein said. However, “I remember as a young officer getting a fairly significant amount” of operational security training.

In March, USAF shut down most interviews and base visits, putting a huge damper on the amount of information flowing to the public. It is now retraining all public affairs officials and commanders before resuming normal public engagement.

The Air Force must tread very carefully here. Stories describing targeting plans, exploitable equipment weaknesses, or locations of vulnerable forces can cause long lasting damage. These must be avoided, as enemies are paying attention to what is said in public. But, culturally, USAF has long struggled to tell its story and often seems to prefer not to.

Every reporter who covers the Air Force can tell stories of



Sen. Lindsey Graham (at podium), Rep. Joe Wilson (l), and USAF Chief of Staff Gen. David Goldfein at McEntire JNGB, S.C.

questions gone unanswered or of interview requests still pending long after a story was written. Public support of the Air Force and even recruiting require people to know what the service is doing in defense of the nation.

USAF also suffers from a strained relationship with Congress. Support from lawmakers hinges on awareness, especially in areas such as readiness, modernization, and force structure. What is going well, what’s a struggle, and what’s needed for the future?

The Air Force leadership emphasizes the importance of frequent, open communication. But below the four-star level, many airmen would clearly prefer not to engage with the public. For

The Air Force doesn’t want to say too much in public, for good reasons and no reason at all.

someone who didn’t want to talk in the first place, opsec may become a crutch—a justification to not talk at all.

Unless clear parameters are laid out, new opsec guidance could prevent even basic information from reaching the public. For example, “details of number, location, and capabilities of operational assets,” is listed as an operational security risk. This is certainly true for a unit at a forward base in Syria—but taken literally, it would also prevent USAF from discussing F-16s stationed at McEntire JNGB S.C.

It is sometimes necessary to restrict information for security reasons, but as AFA Chairman of the Board and former Air Force Secretary F. Whitten Peters said, “This should be the exception and not the rule.”

Two important changes can come out of the ongoing public engagement reset. To avoid giving away advantages to the Russians and Chinese, USAF must clearly define what’s off-limits. Then, just as importantly, it should train and incentivize airmen to get out and talk about everything else.

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Classy Space

The development of the Falcon series of launch vehicles has just been the most exciting progress made in the spacecraft era in decades [see "Rocket Science," April/May, p. 46]. Elon Musk has gone from a launch vehicle that could put 400 pounds (2006) in orbit to a Falcon Heavy (February 2018) that can put 141,000 pounds in orbit. The plan for his BFR [Big Falcon Rocket] is to put 330,000 pounds in orbit and possibly make an attempt at getting to Mars and back by 2024. You can't accuse this guy of thinking small.

I spent 30 years in the spacecraft business on satellites. In my opinion, the launch vehicle business was run by the "reliability mafia." Believe me, I understand where they are coming from. There are a million things that can go wrong with a launch vehicle that will cause its loss and the loss of the payload. Thus, the watchword was, "if it works, don't change anything." But the flip side to this is that you don't make much progress by "not changing anything." Well, Musk changes everything all the time. And that means much more rapid progress.

Let me point out a few significant steps forward: (1) He lands his first stage. (2) The Falcon Heavy launch vehicle was successful with 27 engines. The obvious advantage of landing a first stage is that it can be used again. If refurbishment is minimal, just one reuse would nearly cut the launch cost in half. Reusing a first stage 10 times might reduce the launch cost to nearly 10 percent of a similar throwaway launch. Wow! What this means is that getting into space could be relatively cheap. The

Delta IV Heavy puts up 63,000 pounds at \$350 million. Falcon Heavy can put up 141,000 pounds at \$90 million. Just running the numbers says that the cost of putting one pound in orbit via Delta IV Heavy is \$5,555 vs. \$638 for Falcon Heavy. That is just about a factor of 10 in cost reduction. SpaceX estimates suggest that the BFR could put 330,000 pounds in LEO [Low Earth Orbit] for \$7 million or \$21 per pound. Projections/estimates are one thing and actual performance is another, but the Musk trend for reducing the cost of putting something in orbit is clearly there. It is time for USAF and the space world to change its paradigm from "watch the weight, watch the weight" to "what can we do with all this weight in orbit?" We can make satellites cheaper because we don't have to watch the weight so carefully. We can even save money on the most costly reliability features because we can put a replacement vehicle up pretty inexpensively. We can think big, really big.

I want to mention one aspect of the Falcon Heavy launch that I think most people missed. Musk did this launch with 27 engines. Few probably remember that the Soviets tried to launch their N-1 (or L-1) with 30 engines and failed four straight times because of engine problems. The N-1 was the Soviet answer to the Saturn. Musk did what the Soviets couldn't do, and nearly everyone has shied away from a launch vehicle with many engines. The Saturn had five. Delta IV Heavy has three. Musk's 27 engine launch is some pretty classy technology.

I'm retired, but I wish I wasn't. I would like to design a 330,000 pound satellite for USAF.

William Thayer
San Diego

Back to the Future Bombers

The April/May issue had a short blurb about the prospect of re-engineing the BUFF ["Bombers in 2050," p. 16]. Back in the early '80s, the Defense Science Board listed re-engineing as a top priority. Back then, I was assigned to Strategic Research, Development, and Acquisition in the Pentagon. We found that modern engines (we looked at the CFM-56 then being installed

on KC-135s and B-1Bs) would save enormous amounts of fuel, increase mission capability rates, and dramatically reduce the need for air refueling. For example, we determined that B-52s could conduct the Operation Bright Star mission (US to Egypt to US) with no tankers.

We also had industry step forward with interesting proposals. Rolls Royce offered to lease engines to USAF and warrant them against failure for 20 years! However, we explored using four modern engines rather than the eight mentioned in the *Air Force Magazine* article.

Additionally, we looked at replacing the B-52's tip tanks with drogue air refueling pods (the RAF was using pods that were similar in size and weight). That modification would have allowed tactically armed B-52s to patrol vast areas of the Pacific Ocean with its own fighter escort thus denying adversaries (re: Red China) the sanctuary they still enjoy today.

Unfortunately, at that time, acquisition of the B-1B sucked all money away from other worthy programs. The remaining B-52s are being extended through the year 2050. Re-engineing would pay for itself in fuel savings alone.

Lt. Col. Terry Van Keuren,
USAF (Ret.)
Castle Rock, Colo.

I see that revised plans will retire the higher performance, but more expensive-to-operate, B-1 and B-2 bombers when the B-21 comes online. The plan is based on using the more economical- to- operate re-engined B-52 as the Long- Range Standoff cruise missile carrier. Several years ago, when pressing for more B-2s, I coined the nickname for the B-52 as "your grandfather's bomber," but it now is apparent that "the centenarian bomber" is a better moniker. I may not live long enough to see how the B-21 turns out, but based on the missed cost goals on all the new technology aircraft—the B-2, the F-22, and F-35—I expect the B-1 and B-2 will be kept to the earlier projected life expectancies when higher costs reduce the number of B-21's purchased, and "the cente-

WRITE TO US

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—The Editors

narian bomber" will be flying into its second century.

Lt. Col. Morris Betry,
USAFR (Ret.)
Dayton, Ohio

Aviation Cadets and Retirees

There was a pilot-navigator shortage in the early 1950s ["Air Force World: Tackling the Pilot Shortage Problem," April/May, p. 10]. General LeMay needed them for the rapidly expanding SAC bomber-refueler fleet. So the Air Force decided that the Aviation Cadet program had to be expanded, i.e., those of us with high school diplomas who could pass the physical and various other tests. So I enlisted in 1952, graduated from pilot training in 1954, eventually received a regular Air Force commission, earned a B.S. in Political Science, and retired as a lieutenant colonel with 27-plus years of service.

Why can't the Air Force do that now? We were needed, and we did the job then. Is there a stigma to being an AVCAD [aviation cadet]? The Air Force didn't seem to think so during my career based on my assignments.

Yes, there may have to be some equipment/attitude changes to fully incorporate women into the force. But, in my post USAF career with FlightSafety International as eventual director-training at the Gulfstream Center in Savannah, Ga., I soon found that some female pilots could easily outfly their male counterparts.

I believe that it is time that the Air Force resurrect a proven program.

Lt. Col. Roger D. Haneline,
USAF (Ret.)
Savannah, Ga.

During my 27 years of Active Duty and the 30-plus years since, I have followed with great interest the Air Force struggle maintaining pilot staffing. During my Active Duty days I flew on military air piloted by limited duty officers and warrant officers (Navy) and senior enlisted pilots (Marines). The common mechanics with these positions was they all flew nontactical aircraft and were not required to have a four-year college degree to qualify for the training. I do not know if these programs have been continued, but it is my opinion that the Air Force is passing up a great in-house resource that could solve a large part of the shortage and diversity issues. I realize there is a built-in cultural bias against moving enlisted personnel into pilot,

navigator, or EWO crew positions, but since the establishment of enlisted RPA positions, why not extend the concept to nontactical pilot requirements?

CMSgt. Roy Varner,
USAF (Ret.)
Tucson, Ariz.

A Personal Militia

This refers to the letter in the March 2018 issue under the head "Murders in Texas" [p. 8].

In his letter, Steven E. Zalesch of New Haven, Conn., states, "While I fully endorse the Second Amendment right of states to have militias," etc. The Second Amendment is about the individual right of the people to keep and bear arms. In the Second Amendment, the people and the militia are the same thing.

Maj. Kenneth F. Barnes,
USAF (Ret.),
Barboursville, Va.

Dress Code

I realize we're living in the age of casual dress, but it seems like this is now being taken too far. In the April/May issue of *Air Force Magazine* is a photo of a 4-star general, wearing an airman battle uniform while speaking at a university [see "Speeding Up Space," p. 13]. I daresay that a high-ranking civilian in an equal setting would most likely be wearing a suit and tie, so I'd be interested to know (rhetorically speaking) why military service members feel like such casual attire is appropriate under circumstances of this nature.

Furthermore, I have personally witnessed military personnel attending such events as religious functions, wearing combat uniforms, while the civilian attendees were dressed in more formal attire, consisting of at least dress shirts and ties for men and dresses or skirts for women.

Juris Bergs
Yona, Guam

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Whither AWACS?

I read with familiar dismay the sad story of fifth gen fighters, the F-22 in particular, still with limited to no capability to be a full participant in the digital Link 16 airpower information grid [see "5th Generation Comms," March, p. 34].

Their limitations stem from the short-sighted vision of USAF requirements generals who could not see the need nor the requirement for them to share the wealth of information they might glean with their sensors. I understand the emissions concerns, however, tell me how relevant that has been in the limited roles the F-22 has participated in. Reminiscent of the same kind of thinking that led to an incomplete F-15 Link 16 suite—(they don't need to do no data link with AWACS)!

And speaking of the E-3 AWACS, where was it in this article? I helped develop the black hole offensive air campaign plan and led the AWACS team, along with flying as mission crew commander on key sorties. In this conflict, AWACS was the glue and conduit between fighters, C2, and other participants. From your article, I guess, this will now be done by tankers and other non-C2 support aircraft? You have to be kidding me.

Lt. Col. Bertram H. Pryor, Jr.,
USAF (Ret.)
Norman, Okla.

Imagine There's No Europe

Thanks again for yet another great issue of *Air Force Magazine*. As I neared the end of the article by John A. Tirpak, ["Aperture: America First," March, p. 9] and read what our President said about NATO, I was again dismayed at the rhetoric, "... we can no longer be taken advantage of or enter into a one-sided deal where the United States gets nothing in return." Does the President not remember 9/11, when for the first time in history Article 5 was invoked—and for our country's sake? Does anyone remember when NATO sent AWACS aircraft to Tinker AFB, Okla., to fly cover over these United States while our AWACS were scattered around the globe? I certainly do! I will be the first to agree that our NATO partners should pay their fair share, but can you imagine what Europe would look like today if it were not for the strong NATO partnership that kept the Soviets at bay? Without NATO we really would be on our own in this big world, and that is simply not an acceptable strategy.

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

Survivor Lessons

This letter is in reference to "Namesakes: Travis, The Rocket," p. 64 in the April/May issue. Specifically, to illustration No. 2. I am sure that space and the distinguished career of General Travis precluded further information of the actual crash, but I think you might be interested in a few details provided by one of the survivors.

I worked for Lieutenant Colonel Lee in 1954. At the time of the accident, he was a master sergeant and crew chief and sitting directly behind the pilot and copilot in the cockpit—which as you can see in the picture had separated and slid forward. The only injury he received was a deep cut on his chin. According to him they all simply walked out of the cockpit. He indicated that Travis died of a heart attack and not injuries on the way to the hospital.

He described the proximity of the base trailer court and the fire in the cabin. He was exceedingly impressed with the civilian firefighters who knew that there was a sizable quantity of explosives in the hull but continued to fight the fire because of the location.

In 1954, Lee was commander of the 90th SRW A&E Squadron and notable in his own right. He had been recalled in his former grade soon after the start of the Korean War. We were starting a new B-47 wing with all the people but no aircraft. Upon my arrival I was greeted with a voice that could be heard in all parts of the hanger. "Just what I need another G--D--- second lieutenant." He was also the one that quietly advised me to wear an old khaki shirt (one that you could see where my sergeant stripes had been) when I was introduced to my section chiefs.

I continue to pretty much read the magazine from cover to cover.

Maj. Carl J. Larrabee,
USAF (Ret.)
Ocala, Fla.

JFK and the Bear

Your article in the April/May issue brought back memories of my 317th FIS tour in Alaska flying F-102s from '60 to '63. ["Intercepting the Bear," p. 52]

In particular, the mission in 1961. It was a bit more than was depicted in the article. I think they flew out of King Salmon instead of Galena but that may be because that was the Russians most used route at the time. The pilots were Harold "Mac" McWhorter and Curt Lynch. The scramble was so late they wound up chasing the Russian. They couldn't use the afterburner to

increase their speed because of fuel so the overtake was slow. Eventually, they caught up and locked onto the target and waited for the clearance to either shoot it down or abort. They reached the 20-second-to-fire mark, and the steering circles started to collapse when they were ordered to "abort, abort, abort." They broke off the intercept but were so low on fuel they had to recover at Nome, where there was no equipment to turn them around. Alaskan Air Command had to ship what was needed, and it took considerable assets to get the birds back to their home base.

That resulted in F-106s from the 318th at then-McChord AFB, Wash., sent on temporary duty over a period of several years. The F-106 had twice the range and speed of the F-102. They pulled alert at Galena and King Salmon on a week on/week off rotation along with the F-102s.

My next assignment was with the 94th FIS at Selfridge [ANGB, Mich.], from '63 to '68. We began, with other units, to rotate to Alaska in the F-106 for either a six- or eight-week tour on a regular basis until 1968. The 317th converted to the F-4 in '69 as the 49th FS.

Many years later "Mac" McWhorter was instrumental in helping to found the Georgia Air Museum, and they held an opening banquet with Dean Rusk as the primary speaker. He and Mac were talking when he brought up the mission and Rusk's response was: "You were one of those crazy fighter pilots that almost started WW III! Do you know that President Kennedy personally canceled your mission?" That was a shock to Mac, but it emphasized the importance of our mission in Alaska.

Lt. Col. Ray Janes,
USAF (Ret.)
Denton, Texas

In August 1994 I was pleased to lead a team of multiservice Russian linguists from the On-Site Inspection Agency to Barksdale AFB, La., for a Bear Bomber (Tu-95, tail no. 38, and aerial tanker, tail no. 34) visit. Our mission was to assist the base with translation so the visiting Russian team could learn about us and we about them. Hundreds of base personnel were allowed onto both aircraft and took pictures with their crew. From my perspective the visit was a huge success for base personnel, even though it was August in Louisiana and the Russians were not used to the climate. I believe they also had a good visit. As always, our linguists did an outstanding job ensuring

participants were well-understood during a very demanding schedule.

Maj. William R. Intihar Jr.,
USAF (Ret.)
Cape Coral, Fla.

I was the base civil engineer at Galena Air Force Station in the fall of 1970 when the F-4s first arrived there. We had been without aircraft since January of that year when the F-106s were taken out, and it was great to have the F-4s there. Everyone knew when the F-4s took off for an intercept with our friends to the west. However, we seldom learned about the actual missions or their success or lack thereof.

Fast forward to 1993. At that time I was the Executive Director of the Alaska Miners Association and glasnost and perestroika [openness and restructuring] were upon us. We organized a mining tour to the Russian Far East and were some of the first outsiders to visit that gold mining region, which was credited with raising the foreign exchange that allowed Russia to meddle all around the world. One of our stops was the Sinagoria Reservoir and hydroelectric power plant. That reservoir on the Kolyma River (which was center of the gulag) is 115 kilometers long and the plant has five 220 megawatt generators.

As the "ranking" member of our delegation, I led our toasts at a lavish dinner provided for us. My Russian counterpart that night was the director of the sports facilities and [he] insisted that we go to the Olympic-size swimming pool that night. By 1 a.m., our dinner had settled sufficiently to safely go swimming and the director, one other visitor, and I went swimming. After a few dives from the 10-meter diving platform we got dressed, and the director noticed my t-shirt which commemorated 50 years since "Alaska at War." I [said] that I had been stationed at Galena and he gave me a double take. I noticed, and asked, "Do you know Galena?" After a few seconds of contemplation he said, "Yes, we heard everything you said." It turns out that in the 1970s he was a KGB English language specialist who was monitoring us.

Steve Borell
Anchorage, Alaska

Once Bitten, Never Shy

If Maj. R. V. Thompson (Ret.) is writing tongue-in-cheek, then I bite [see "Letters: No Comeback, Either," March, p. 5].

The F-84F used 9,500 feet on a 10,000-foot runway to get airborne—with a small drop tank and a couple of blue boy simulated bombs. During LABs [Low-Al-

titude Bombing Systems], dive bomb or over-the-shoulder delivery techniques, nursing the aircraft to 40,000 feet was about it. Assuming 60,000 to 70,000 feet is a typo—once it got going it would climb through 6,000 feet to 7,000 feet very well.

Speaking of loss rates—Class 57E at Luke AFB, Ariz., lost an F-84F every Friday until the aircraft was finally grounded. Base commander Gen. Robert Scott lost his job over inaction on this matter.

Cases in point:

- Lead blew up next to me on a pre-take-off runup.
- Lead blew up under me as I broke, 360 degrees overhead, above Luke runway for return to base (RTB) landing.
- Two aircraft blew up after takeoff while being filmed by Dave Garoways "Wide World of Sports" program at Luke to film jet fighter pilot students in training story. I might add, no student pilots got within 300 yards of an F-84F for this event. Fortunately, no wing weenies were killed.
- One A/C disappeared over the Superstition Mountains—only to be found 20 years later at the bottom of a mountain lake, student remains still in the cockpit.
- One descending inbound to Luke RTB lost the entire stabilator assembly and came apart tumbling thereto.
- One aircraft student ejected into the canopy rail when same didn't leave the

overhead area in sequence.

■ I experienced two G-suit blowups, as did others. These were G suits, not CHAPS, and it tends to strengthen one out in the cockpit. Able to stab suit bladders with switchblade knife for relief and landing.

■ Hydraulic failures occurred daily with one of the first electrically activated, hydraulically operated systems. Fortunately, Republic's emergency gear blowdown system worked every time.

■ General Scott did finally cancel flying training on Fridays. Oddly enough, the exception to this order was the cadres of Italian MDAP students, most of whom had no business being in US airspace to begin with. Italians preferred to speak in Italian; didn't care which end of Luke's runway they used, and considered landing pattern altitude between 2,000 and 6,000 feet to be close enough.

I had experience in the Active Air Force—Tactical Command—and the Air Guard—Air Defense Command. Aircraft flown—F-84F, F-100A and C, F-89J, F-102B, and F-106A. In deference to Major Thompson, if any service could get an F-84F to 60,000-70,000 feet, or fly 1,680 miles, or lift an 18-foot-long 450-gallon fuel tank, it would be the Air Guard.

Lt. Col. Gordon L. Cammack,
USAF (Ret.)
Chelan, Wash.

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INTEGRATING MAJOR TOM

AL UDEID AB, QATAR —

In the early 2000s, airmen working in the military space domain focused mainly on making sure combat forces understood the capabilities and limitations of space systems.

"We weren't really focused on effects as we were focused on being a service provider," explained Col. Dee Morgan, director of space forces here.

But as space doctrine has evolved, space professionals have become more integrated into air operations centers around the world and have shifted away from the service provider model "and more toward tailored space effects in support of theater operations. So, instead of just providing satcomms or providing GPS, it [is] more tailored to what was happening in the air, on the ground, at sea," Morgan said.

Now, in US Central Command, there is an effort to fully integrate space effects into multidomain theater operations, Morgan said. There is also a move to "normalize theater employment of space capabilities so that it's easier for people to understand what's available to them, and then, how do they get some of that."

In order to integrate space effects, Morgan stressed, "You've got to integrate space people. And so what's important is that we get the right people with the right skills in the right places, and probably the most important thing is once we get them to the right places, that they're plugged into the right spaces."

"I can send a space guy to an organization, but if they take that space guy and turn him into a battle director instead of an operational planner, then it doesn't matter that he's with the land component. He will have no idea what's actually happening with the ground scheme of maneuver," Morgan said.

Here at the Combined Air Operations Center, Capt. Jake Thomas, deputy chief of the nonkinetic operations cell in combat plans, is an example of one of those people plugged into the right places and spaces.

A few years ago, Thomas' position as a space weapons officer was in combat operations in the space cell, separate from combat planning. Now, he is integrated into the planning team, and he doesn't just plan space—his cell also plans cyber and air electronic warfare.

"We have space people who are multirole in their employment here at the CAOC, not just stovepiped into focusing on space, which is a change from how it was," Thomas said. "I'm not restricted to pick from one domain. I can use multidomain solutions and every arrow that's in my quiver, essentially." It is "awesome to have that kind of capability."

But even with that domain flexibility, Thomas pointed out that space assets are being used every day to support the operations in Iraq, Syria, and Afghanistan—from the remotely piloted aircraft overhead to the troops on the ground.

GPS supports precision guided munitions, which have been integral to Operation Inherent Resolve and have recently been used in Afghanistan as well. However, GPS is also critical for unmanned assets, said Thomas, because there isn't anyone in the cockpit to look out and see where the aircraft is at any given moment.

Additionally, "the guys on the ground carry GPS receivers to make sure that we know where they are," Thomas said.



SrA. Ethan Dietz tightens the nose extender on a GBU-36 JDAM at Kandhar Airfield, Afghanistan. GPS-guided munitions are being used in Iraq, Syria, and Afghanistan.

"From a Western culture, you understand that there's fiber everywhere. So, fiber is how I get on the Internet, it's how I check my email. But out here, they don't have that kind of infrastructure, so space carries a lot of the mission—not just for the CAOC, but out in the field for the Internet access itself, as well as the Navy and their ships out at sea," Thomas explained.

The CAOC also uses OPIR—overhead persistent infrared—for battlespace awareness, Thomas said, "to warn and protect our forces of significant events that are happening around the AOR."

"Having that level of tactical awareness of what's going on in the battle space is really critical for our operations here. Without these satellites and their ever-evolving capabilities, that is something that we would lose in a big way," Thomas added.

Morgan noted that OPIR—which was designed as a missile warning system to support the nuclear mission—is just one example of taking systems designed for strategic-level effects "and employing tactics that allow them to produce tactical effects for the soldier on the battlefield."

Still, space systems are being used as enabling capabilities, Morgan stressed.

"In and of themselves, there's not a space system out there that's going to win this war for us," he said.

There has been a lot of talk recently about space as a fighting domain and building a fighting mindset in space, he noted, "but at the end of the day, the reason you're doing that is so you can create effects in the air, on the ground, at sea, and that's really what we focus on here." ★

Jennifer Hlad is a freelance journalist based in the Middle East and a former *Air Force Magazine* senior editor.

I CAN'T DRIVE 55

The Air Force sits at 55 fighter squadrons, insufficient for the numerous tasks set before the service. To cope with a resurgent and aggressive Russia and rising China, ongoing wars in the Middle East and Afghanistan, countering North Korea and deterring Iran, there's just not enough Air Force to go around.

The service knows this and bears some of the responsibility. Chief of Staff Gen. David L. Goldfein and Air Combat Command chief Gen. James M. Holmes in recent months have publicly lamented the Combat Air Forces downsizing of 2010—known as the “CAF Redux”—which traded away 25 percent of the fighter fleet and its attending personnel in order to fund overdue modernization programs that could be put off no longer. These decisions were made before Russia's land-grabs in Europe, China's island-building campaign, the anti-ISIS war, or the indefinite extension of the war in Afghanistan.

The Air Force must grow, and in mid-March a senior USAF official explained how much.

“We think we need 70” fighter squadrons, Lt. Gen. Jerry D. Harris, Jr., deputy chief of staff for strategic plans and requirements, told attendees at a McAleese/Credit Suisse defense conference in Washington, D.C. An Active Duty fighter squadron is generally one-to-two dozen aircraft.

Though the goal is to have 70 squadrons, Defense Department policy is to first improve readiness; to get existing force structure up to full strength, with all the people, equipment, spare parts, and munitions necessary to do the mission. In recent years, mission capable rates for Air Force combat aircraft have dipped below 50 percent in many units.

“We'll fix the 55 first,” Harris said, without saying how long it might take to get to 70 fully capable fighter squadrons.

It won't happen fast. The Air Force is buying new, fifth generation F-35As, but only at a rate of about 48 per year—56 were ordered for Fiscal 2018 after Congress added to USAF's request. That four-dozen annual level will be held until about “the end of the FYDP,” or Future Years Defense Program, which occurs in Fiscal 2023, when USAF will step up purchases to 54 F-35As a year, Harris said. In the next FYDP, he anticipates the rate advancing only to between “75 and 100” F-35As annually.

As recently as 2014, plans had called for USAF to buy 110 F-35s a year by now.

Holmes, speaking at the Air Force Association's Air Warfare Symposium in February, said it would take about 80 F-35s a year for a decade to reduce the average age of the fighter fleet—which is now hovering at about 27 years—to 20 years. At 100 a year, the average age and capability would be something “we'd be happier with,” he said.

Only by the late 2020s “do we get to a 50-50 fleet” of fighters, divided evenly between fourth generation F-15s, F-16s, A-10s, and fifth generation F-35s, Harris noted.

F-35 BUILDING BLOCKS

Buying 48 F-35s a year adds two squadrons annually, while 76 adds three and 100 four. Assuming Harris' forecast about buy rates comes true, and that USAF doesn't retire any fourth



An F-35A Lightning II performing aerial maneuvers. USAF only expects to be able to purchase 48 F-35As a year for the foreseeable future.

generation aircraft until it reaches 70 squadrons, it couldn't achieve that force structure until about 2025.

It's not clear whether the Air Force considers its 300 or so remotely piloted MQ-9 Reapers, which it classifies as “attack” aircraft, as part of its fighter force, or whether it considers those

aircraft individually or in groups of four (necessary to maintain a 24-hour orbit) as equivalent to one fighter.

It's also unclear whether USAF would count a proposed new "light attack aircraft"—likely to be a turboprop intended for counterinsurgency where there are minimal or no air defenses—as a full-up fighter to be counted in the mix.

Air Force Undersecretary Matthew P. Donovan, speaking at an AFA Mitchell Institute event in February, noted that USAF is "still buying F-35s, and we're not retiring anything else ... so that is increasing our capacity."

Despite Congress blocking the Air Force from retiring its old fighters—specifically, plans to phase out the A-10—Harris said science marches on, and F-35s will eventually replace the F-15, F-16, and A-10. Once the Air Force begins buying the next generation of fighters—Harris called it "sixth gen"—"then we'll stop buying fifth gen," he said.

A continuing battle, though, is the cost of sustaining the F-35. Joint Program Office director Vice Adm. Mathias W. Winter, speaking with reporters in March said, "we will be unaffordable" if sustainment costs don't come down substantially on the jet, and the services may not be able to buy all the planned fighters. The early jets are the problem actors, available for duty less than half the time, he said, while later lot aircraft are turning in availability rates of 70-75 percent, near to where the services expect the F-35 to be at full maturity. Winter said efforts are underway to bring costs down, chiefly in process improvements with vendors.

Holmes, at the AWS symposium, said the Air Force may not try to bring all of its F-35s up to a common configuration, thus saving the retrofit costs of earlier aircraft, but reducing the capability of the overall force.

THE MISSING FORCE-SIZING CONSTRUCT

The new National Defense Strategy, released in January, was praised for its brevity and frank recognition that the US is again facing a world of "great power competition." What it didn't offer, though, was a "force-sizing construct" explaining how big the US military ought to be—in numbers of ships, planes, brigades, etc.—to compete in that world. Vice Chairman of the Joint Chiefs of Staff, USAF Gen. Paul J. Selva, said in March that this omission was deliberate, and the size of the force will be driven by something other than a slogan.

Selva also said he's officially retiring phrases such as "anti-access" and "area denial" as challenges to overcome, except in pursuit of a broader strategic goal.

Force-sizing constructs became the norm after the Cold War. Each "Quadrennial Defense Review" of US military strategy offered up pithy summaries explaining the strategic objective the US military should be sized to carry out. The first of these rubrics called for maintaining a military capable of prevailing in two-and-a-half "nearly simultaneous" major theater wars.

Later versions shifted to two MTWs "in close succession."

Later still it became "win-hold-win," wherein US forces would be sized to fight two opponents at once, holding the second foe at bay until the first, greater threat, could be defeated. Eventually, it became variations of "1+2," for one war plus two large "missions" of varying scope.

Selva, speaking at the McAleese/Credit Suisse defense conference, said he considers force-sizing constructs "a little trite." He counted off the previous catchphrases—"we're going to fight two wars, whether they're simultaneous, divided by 30 days, separated by 15 days ... win one, deter one." He wryly pointed out, "Nobody ever said 'win one, lose one.'"

Those previous Quadrennial Defense Reviews, Selva said, "were conducted absent any real consideration of who might threaten the nation" and so they were rather nebulous. Moreover, "all of them were budget-driven—my opinion—rather than budget-informed."

The problem with such rubrics, is that once laid out, they "become law" and limit how the military is "allowed to think about the organization and the institution." In that regard, history has "failed us," Selva asserted.

The force-sizing constructs weren't helpful, he said, merely picking who among the services "gets to win" doing a particular piece of the strategy, but not all of it.

Instead, the new strategy talks about "dynamic force employment," which Selva explained recognizes the fact that threats are "not static" and "a force-sizing construct that we define today will not serve us a decade from now."

Force-sizing constructs don't really get specific about "where are you going to use" the force, "against what threats? To accomplish what tasks?" Selva said he's "parted company" with "a substantial piece of the department that wants to talk about threats as if they are monolithic."

Donovan, speaking at the Mitchell Institute event, said Defense Secretary Jim Mattis and the Joint Staff are "both working through the force-sizing construct," and how it comes out will depend in part on "which scenarios they're going to go against."

PACE YOURSELF

The goal for the military is "guaranteed ... [or] assured force projection," Selva said. The US must be able to project power anywhere on Earth that it feels it must go without being halted by an enemy, he insisted, meaning the military must have the capabilities and tools "to get inside the threats that are posed by our potential adversaries."

China and Russia are the "two big pacing threats" now faced by the US. That's why "it will be a rare day from this point forward that you hear me talk about 'anti-access' ... or 'area denial' ever again," Selva said. "Because those are the threats put in the way of our force projection," and merely puncturing those defenses is not a strategy or an end unto itself.

Previous force-sizing constructs were focused on the big fights, without any capability overage available for the small ones. Selva weighed in on this, saying, "not that everything is a 'lesser included case,' but if you're able to dynamically employ your force against those two threats, you'll be able to take care of a lot of the rest of the problems in the world."

Force-sizing constructs "locked us into an argument over the validity of the construct, and they didn't open up the space to have a clear-eyed debate about the capability and capacity to address the threats that were right there in front of us," Selva explained.

In a separate setting in January, Selva told defense writers that the new National Defense Strategy recognizes that the challenges posed by China's and Russia's militaries are "unique, ... and the elements are overlapping but not the same." The force has to be designed to address both threats "inside a capability and capacity model affordable with our ... budgets." He also said the Pentagon will no longer fudge on how risky the size and capability of the force is.

"If it's not affordable, then we will express the risk to the Secretary [of Defense], to the President, to the American people," Selva said. "What we have done for the last two decades is bury the risk, because we said we'll just 'adjust.'"

■ Thunderbirds Pilot Killed in Crash

Maj. Stephen Del Bagno, pilot of the No. 4 Thunderbirds jet, died April 4 when his F-16 Fighting Falcon crashed in Nevada.

Del Bagno was the "slot pilot," which flies in the middle of the Air Demonstration Squadron's diamond formation. He previously served as an F-35A evaluator pilot and chief of standardization and evaluation for the 58th Fighter Squadron at Eglin AFB, Fla., and had logged more than 3,500 total flight hours in more than 30 different aircraft. The California native was in his first season with the team.

"We are mourning the loss of Major Del Bagno," said Brig. Gen. Jeannie Leavitt, 57th Wing commander. "He was an integral part of our team and our hearts are heavy with his loss."



Maj. Stephen Del Bagno

■ USAF Hopes to Retire Three JSTARS in FY19

The Air Force hopes to retire three JSTARS in Fiscal 2019 and one more in Fiscal 2021, as it moves to a new open-architecture system based on a family of systems rather than a specific aircraft.

The remaining 12 JSTARS are projected to continue flying until the mid-2020s, wrote Lt. Gen. Jerry D. Harris, USAF deputy chief of staff for strategic plans and requirements, and Susan J. Thornton, USAF director of information dominance programs, in prepared testimony before the House Armed Services Tactical Air and Land Forces Subcommittee.



L-r: Secretary of Defense Jim Mattis, Vice President Mike Pence, and President Donald Trump at a press conference announcing the signing of the \$1.3 trillion spending bill on March 23.

■ Trump Signs Budget Bill, Pointing to National Security

President Trump March 23 signed a \$1.3 trillion omnibus budget bill, preventing a potential third government shutdown this year and ending the struggle over funding the federal government through Sept. 30.

The bill includes \$654.6 billion for the Pentagon and funds an additional 20 F-35 strike fighters, including 10 F-35As for the Air Force, at \$2.9 billion above the requested amount. It also includes \$510 million for three additional KC-46A tankers, \$480 million for six additional C-130Js for the Air National Guard, \$130 million for two C-37Bs used for transporting high-ranking government and DOD officials, \$100 million for an additional HC-130J aircraft, and \$35 million for Compass Call modification. The service's \$10.8 billion Fiscal 2018 unfunded requirements list sought an additional 14 F-35As, three more KC-46s, and 12 more MC-130Js.

Trump said he signed the omnibus "as a matter of national security" because for eight years "deep defense cuts have undermined our national security."



■ USAF's Predator Set to End Its Era at Creech

The iconic MQ-1B Predator, which ushered in the age of drone warfare in the mid-1990s, retired on March 9 during a ceremony at Creech AFB, Nev.

The retirement officially marks the end of the Predator's reign in the air, however, the complete transition from the MQ-1 to a predominantly MQ-9 fleet won't be complete until the end of the year. Part of the "transition work" is deciding what will happen to the remaining aircraft, according to Air Combat Command.

The ceremony at Creech was a chance to "honor the airmen who maintained and operated this platform as well as our teamwork with industry and coalition partners," an ACC spokeswoman said.

Many MQ-1s have been crated and prepared for shipping, but others still need to be demilitarized. The Air Force doesn't expect the aircraft to be available to be sold to allied nations or private companies. Some have already gone to museums.



A KC-46 Pegasus over Altus AFB, Okla., in March.

■ Wilson Slams Boeing Over KC-46 Program

Boeing has been "overly optimistic in all of their schedule reports" on the KC-46 tanker, Air Force Secretary Heather Wilson told a House Armed Services Committee hearing March 20.

Wilson said she expects the company to be late with deliveries of the plane. "We have asked them to put their A-team on this to get the problems fixed and get the aircraft to the Air Force," she said.

She also said that in this case, one of the frustrations with Boeing "is that they're much more focused on their commercial activity than they are on getting this right for the Air Force and getting these airplanes to the Air Force."

Boeing said in a statement, "There is no greater priority at The Boeing Company right now than the delivery of the KC-46. Boeing has continued to demonstrate its commitment to deliver the tankers as soon as possible and believes in our partnership with the US Air Force."



An F-35 on maneuvers during an air show in March.

■ F-35 Fleet Facing Low Availability, Logistics Limitations

The bulk of the Air Force's F-35A fleet is on an older software suite and is mission-capable less than half the time, as the service works to catch up on its maintenance and sustainment, a senior USAF official told Congress March 7.

Of the Air Force's 130 F-35As, 100 are on the older Block 2B software suite and have a mission-capable rate in the "low 40" percent, Lt. Gen. Jerry Harris, the deputy chief of staff for strategic plans, programs, and requirements told a House Armed Services subcommittee hearing. The rest are in the upgraded Block 3I and 3F software suites, with these running a mission capable rate in the "60 to 70" percentage range, Harris said.



A MiG-31 carries a Kinzhal hypersonic missile during tests in Russia.

■ Missile Defense Review Expected This Spring Will Include Threat from Hypersonics

The Pentagon's in-depth review of its missile defense posture will be released this spring and will include a revamped look beyond just ballistic missiles with a focus on hypersonics and cruise missile threats, Defense Department leaders said March 22.

The Missile Defense Review will come "in the next couple of months," following the release of the Nuclear Posture Review. It was originally expected by the end of last year.

Undersecretary of Defense for Policy John C. Rood told the Senate Armed Services Strategic Forces Subcommittee the review will address a "number of challenges in the threat environment," and that the military needs "to stay ahead of that threat."

When it was initially announced, the project was called the Ballistic Missile Defense Review. However, "ballistic" was dropped as the military is facing increasing threats from hypersonics and cruise missiles, so "it was important to see a connection there."

One of the "real challenges" that needs to be addressed, Rood said, is how to target a missile in the boost phase, when it is most vulnerable.

■ White House Reaches Deal for Next Air Force One

The White House on Feb. 27 announced a deal with Boeing for the next Air Force One, buying two 747-8s for \$3.9 billion. The reported deal is a \$1.4 billion drop from an unofficial estimate from the White House of \$5 billion for two aircraft and support costs, according to Fox News. President Trump first objected to the cost of the program in late 2016 when the cost estimate was about \$4 billion, Tweeting that costs were out of control and that he wanted to cancel the order.



Two Raptors above Syria on a mission for Operation Inherent Resolve.

■ Pace of Air Strikes in Afghanistan Surpasses that of Anti-ISIS Fight

US air strikes in Afghanistan have surpassed the airstrikes against ISIS in Iraq and Syria for the first time since the early days of Operation Inherent Resolve in 2014, according to statistics released April 18 by Air Forces Central Command. The numbers of weapons released in both theaters during the month of March declined significantly from the month before.

US manned and unmanned aircraft released 339 weapons against the Taliban and IS-K in Afghanistan in March, down from 469 in February.

In comparison, in March US and coalition manned and unmanned aircraft released 294 weapons against ISIS-related targets as part of Operation Inherent Resolve, down from 747 strikes the month before. This was by far the lowest total since the first month of the operation.

So far this year, US aircraft have flown 1,236 intelligence, surveillance, and reconnaissance sorties in Afghanistan along with 831 tanker sorties. Overall, this continues to lag far behind the 1,964 ISR sorties and 2,163 tanker sorties flown as part of Inherent Resolve this year.



An F-16 assigned to operations for Operation Inherent Resolve on the flight line.

■ Coalition: Additional Civilians Killed in Anti-ISIS Air Strikes

Combined Joint Task Force-Operation Inherent Resolve in February determined 14 more civilians were killed as a result of coalition air strikes in Iraq and Syria, bringing the total number of civilians killed in the war against ISIS to at least 855.

The latest total comes from a monthly report from the coalition on its investigations into allegations of civilian casualties, which usually stem from media or nongovernmental organization reports.

As of the end of February, the coalition had conducted 29,225 strikes on ISIS targets, according to a Central Command release. In February, the coalition concluded 84 total claims of civilian casualties, with 78 deemed to be noncredible. Six were determined to be credible, with the total of 14 civilians killed in those incidents. There are 522 open investigations, according to CENTCOM.



Maj. Tyler Schultz (l) and Capt. Samantha Harvey at Davis-Monthan AFB, Ariz.

■ Davis-Monthan A-10 Pilots Awarded Distinguished Flying Crosses for Syria Mission

Two A-10 pilots at Davis-Monthan AFB, Ariz., received Distinguished Flying Crosses for a May 2017 mission supporting US forces that were surrounded inside Syria.

Maj. Tyler Schultz and Capt. Samantha Harvey, pilots with the 354th Fighter Squadron, were deployed as part of Operation Inherent Resolve when they flew a close air support mission as US Army forces were in contact with ISIS fighters near al-Shaddadi. A US joint terminal attack controller called in the A-10s at night as they were under direct fire.

"Talking with the JTAC—I learned what fear sounds like," Harvey said in an Air Force release. "All that mattered was he needed us at that moment."

The A-10s flew four strafe runs "directly onto the enemy threat," the release states, saving more than 50 US personnel with no casualties. "It was dark, but I had a job to do," said Harvey.

■ The War on Terrorism

US Central Command Operations: Freedom's Sentinel and Inherent Resolve

Casualties

As of April 18, a total of 49 Americans had died in Operation Freedom's Sentinel in Afghanistan, and 62 Americans had died in Operation Inherent Resolve in Iraq and Syria.

The total includes 107 troops and four Department of Defense civilians. Of these deaths, 47 were killed in action with the enemy while 65 died in noncombat incidents.

There have been 268 troops wounded in action during OFS and 64 troops in OIR.



USAF Gen. John Hyten, commander of STRATCOM, testifies before the Senate.

■ **STRATCOM: Space Force Will Happen Someday, But Now Isn't the Time**

There will be a new military service in the US focused on space, but now is not the time for that change, the head of US Strategic Command said March 20.

USAF Gen. John E. Hyten predicted a new service will be creat-

ed, taking space away from the Air Force, but he emphasized that cannot happen now. The discussions that began with language in last year's National Defense Authorization Act are laying the groundwork to talk about when "would be the right time, what elements would be in place," he told the Senate Armed Services Committee.



Pilots are back in the air, despite disturbing physical incident reports.

■ **More T-6 Pilots Report Physiological Incidents Even as Fleet Returns to Flight**

All of the Air Force's T-6 training fleet has returned to flight, but pilots are still reporting hypoxia-like physiological incidents.

Air Force engineers had determined that parts of the jet's onboard oxygen generating system were "failing at a much higher rate than anticipated," USAF Chief of Staff Gen. David L. Goldfein told lawmakers in March. Air Education and Training Command replaced those parts and as of mid-April all 444 T-6s were cleared to return to flight.

However, there have been 12 physiological incidents involving the T-6 since March 1, but as of mid-April there were "currently no plans for a stand down," AETC spokeswoman 1st Lt. Geneva Croxton said in an email to *Air Force Magazine*. T-6 pilots continue to fly without any restrictions to flight parameters or training profiles.



The Air Force is not asking for more iron right now.

■ **USAF Isn't Seeking Additional Aircraft in Its \$1.44 Billion Unfunded Priorities List**

The Air Force submitted a \$1.44 billion unfunded priorities list to Congress, including \$800 million in classified programs, \$351.4 million for space, and \$289.3 million for nuclear and multidomain command and control requirements.

Interestingly, the service did not say it needed additional F-35s—or any other known aircraft—if it were to receive additional funds in Fiscal 2019. That's a significant departure from the \$10.7 billion Fiscal 2018 unfunded priorities list, which sought money for 14 additional F-35A strike fighters, three more KC-46 tankers, and 12 more MC-130Js.

Photos: E.J. Hersom/DOD; AIC Anne McCready; David Ijff

Seven Airmen Die in Iraq Pave Hawk Crash

Seven airmen were killed March 15 when their HH-60G Pave Hawk crashed near the city of Al-Qa'im in western Iraq. The Air Force said the crash "did not appear to be a result of enemy activity," though it remains under investigation.

—Amy McCullough

Four of the seven airmen were assigned to the New York Air National Guard's 106th Rescue Wing. They are:

- Capt. Christopher Zanetis, 37, an HH-60G pilot
- Capt. Andreas O'Keefe, 37, a Pave Hawk pilot
- MSgt. Christopher Raguso, 39, an HH-60G special missions aviation flight engineer; and,
- SSgt. Dashan Briggs, 30, also an HH-60G special missions aviation flight engineer

Two of the airmen were Air Force Reserve pararescuemen from the 308th Rescue Squadron at Patrick AFB, Fla. They were:

- MSgt. William Posch, 36; and
- SSgt. Carl Enis, 31

One airman was a combat rescue officer deployed from the 38th Rescue Squadron at Moody AFB, Ga. He was:

- Capt. Mark Weber, 29

"Within minutes of the crash, our coalition partners were overhead to provide protective air support as a quick reaction force of coalition members and Iraqi Security Forces secured the scene," said Air Forces Central Command boss **Lt. Gen. Jeff D. Harrigan** in a Facebook update. "This tragedy reminds us all of the tremendous sacrifice that comes with service to our nation in the fight to defeat ISIS."

AFCENT held a memorial service at an undisclosed location to honor the seven airmen killed on March 15 in Iraq.



Capt. Christopher Zanetis, a member of the New York City Fire Department who recently joined a New York City law firm, was assigned to the 101st Rescue Squadron where he has served since 2008. He previously deployed to both Iraq and Afghanistan.



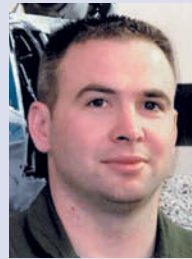
MSgt. Christopher Raguso, also a New York City fireman, previously deployed to Iraq as a fire protection specialist with the 106th Civil Engineering Squadron. He previously deployed twice to Afghanistan, and once to the Horn of Africa and to Texas and the Caribbean following Hurricanes Harvey and Irma.



MSgt. William Posch, who had 18 years of service, was one of the Air Force's 12 Outstanding Airmen of the Year in 2014 for leading a crisis evacuation of more than 126 Americans from the US Embassy in South Sudan. In 2017, he helped rescue two German sailors whose sailboat caught fire and sunk, and also assisted with Hurricane Harvey relief efforts.



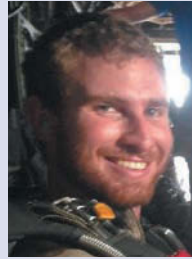
Capt. Andreas O'Keefe, also a member of the 101st RQS, previously deployed to Iraq three times, as well as Afghanistan and the Horn of Africa. He joined the 106th RW in 2013, after serving as an armament systems specialist with the District of Columbia ANG's 113th Wing and as a RC-26 pilot with the 174th Attack Wing at Hancock Field ANGB, N.Y.



SSgt. Dashan Briggs, a full-time military member with the 106th RQW, previously deployed to Afghanistan as a munitions system specialist and to Texas and the Caribbean following the recent hurricanes.



SSgt. Carl Enis, who enlisted in the Air Force eight years ago, had been nominated for Airman of the Year for both the 920th Rescue Wing and Air Force Reserve Command. He'd earned the Air Reserve Forces Meritorious Service Medal with bronze oak leaf cluster, National Defense Service Medal, and Global War on Terrorism Expeditionary Medal.



Capt. Mark Weber, Weber, 29, of Colorado Springs, Colo, was assigned to the 38th Rescue Squadron at Moody AFB, Ga. He "graduated from the [US] Air Force Academy in 2011 as a contracting officer, but felt a strong calling to do more," so he made the transition to combat rescue officer, according to an Air Force release. He was on his first deployment at the time of the crash.



Photos: SRA Zachary Kee; USAF; Eric Durr; Courtesy/NYANG (4, 5, 6); courtesy (7, 8); USAF



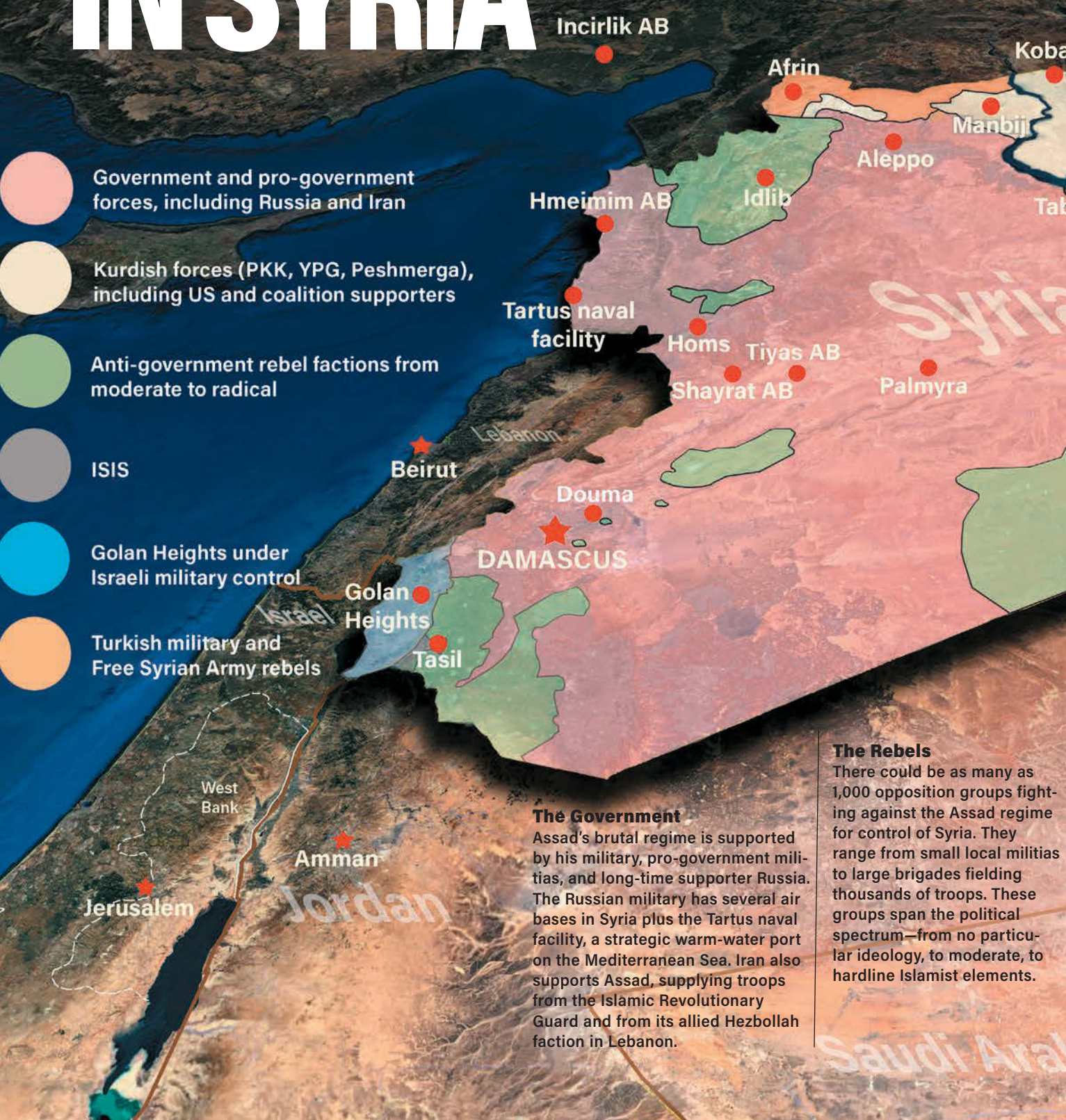
04.13.2018

United States, United Kingdom, and French aircraft on April 14 fired 105 weapons at Syrian President Bashar Assad's chemical weapons infrastructure in Syria. Two B-1B Lancers launched from Al Udeid AB, Qatar, and delivered 19 Joint Air-to-Surface Standoff Munitions on the Barzeh Research and Development Center near Damascus. The US Navy also launched 57 Tomahawks at the facility. The operation marked the first time any variant of the JASSM was used in combat. Here, airmen prepare a B-1B deployed from Ellsworth AFB, S.D., for the strike.



SHIFTING LINES IN SYRIA

-  Government and pro-government forces, including Russia and Iran
-  Kurdish forces (PKK, YPG, Peshmerga), including US and coalition supporters
-  Anti-government rebel factions from moderate to radical
-  ISIS
-  Golan Heights under Israeli military control
-  Turkish military and Free Syrian Army rebels



The Government

Assad's brutal regime is supported by his military, pro-government militias, and long-time supporter Russia. The Russian military has several air bases in Syria plus the Tartus naval facility, a strategic warm-water port on the Mediterranean Sea. Iran also supports Assad, supplying troops from the Islamic Revolutionary Guard and from its allied Hezbollah faction in Lebanon.

The Rebels

There could be as many as 1,000 opposition groups fighting against the Assad regime for control of Syria. They range from small local militias to large brigades fielding thousands of troops. These groups span the political spectrum—from no particular ideology, to moderate, to hardline Islamist elements.

The seven-year civil war in Syria involves many factions battling for or against President Bashar Assad's Syrian government (and each other) for control of part (or all) of the nation.



Islamic State

ISIS is almost universally hated and under attack throughout Syria. Taking advantage of government weakness, in 2014 it swept through much of the country, committing numerous atrocities. ISIS was stopped and rolled back by a sustained US-led air campaign and a Kurdish-led ground war. A few small pockets of ISIS control still exist close to the Iraqi border and near the Golan Heights.

Kurds

Supported by US and coalition airpower, in 2017 the Kurds captured much of the northern Syrian territory previously held by ISIS. Turkey, however, views the Kurds as a national security threat and—along with Syrian rebel allies—it has attacked Kurdish positions in northern Syria. The US trains and supplies the Kurds. It is also a NATO ally with Turkey and has a key air base at Incirlik

Turkey

Turkey is supporting the rebel movement against Assad and the destruction of the Islamic State. It also supports The Free Syrian Army, a loosely organized collection of brigades, militias, and rebel groups. Turkey is also attempting to stop or reverse Kurdish territorial gains to prevent the creation of an autonomous region along its border with Syria.

Israel

Israel wishes to keep various combatants away from the occupied Golan Heights and Israeli territory. Israel captured Syria's Golan, a strategic high ground, in the 1967 Six-Day War. It annexed the territory in 1981—a move not recognized by the United States or United Nations. Syrian, rebel, and ISIS fighting continues to rage in neighboring areas.

—AS OF APRIL 15, 2018

THE PILOT SHORTAGE QUANDARY

USAF needs to produce and retain more pilots.

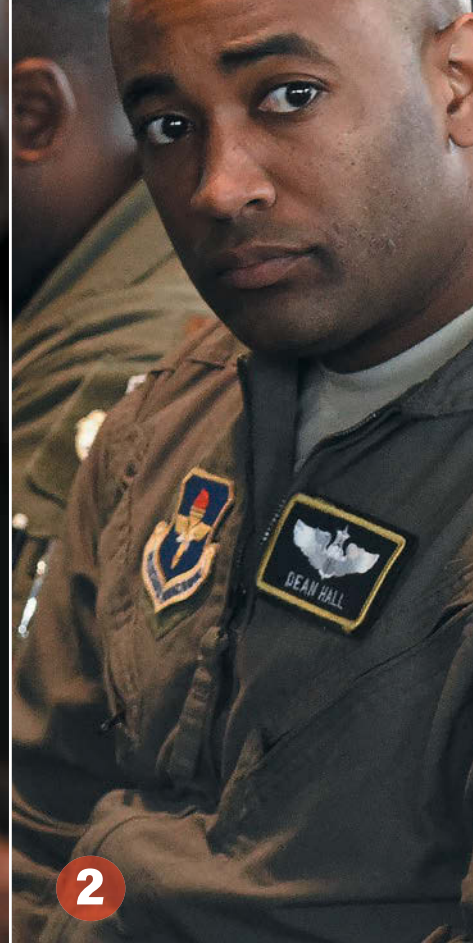
By Amy McCullough, News Editor

The Air Force is short roughly 2,000 pilots, and the service is working 66 different initiatives it hopes will bring on larger numbers of new pilots and retain more the of the pilots it does have. Changes include financial incentives, quality of life improvements, and more flying time, Chief of Staff Gen. David L. Goldfein told House appropriators in March.



A pilot parks a T-38C
Talon at Vance AFB, Okla.

Photo: S/A. Corey Pettis



The service initially stood up a Fighter Enterprise Tiger Team in March 2016 to tackle the problem, but the effort eventually expanded to all rated personnel and the tiger team was renamed the Aircrew Crisis Task Force, with a one-star general leading the charge.

“As we’ve dug into the details and analyzed the issues, it really comes down to two areas that we are investing in and focused on,” said Goldfein. “One is how many pilots we produce; and then, two, how many pilots we retain, because you have to get both of those right.”

Air Education and Training Command produced 1,100 pilots in 2016 and 1,200 in 2017. In Fiscal 2018 the service was expected to put 1,235 students through undergraduate pilot training, but the recent month-long grounding of the T-6 Texan II, USAF’s primary trainer (due to hypoxia-like symptoms), means the service will miss its goal by about 200 student pilots, Goldfein told House appropriators. But because of the existing shortage, even 1,200 pilots will not get USAF’s force back in balance.

USAF hopes to reach that level in Fiscal 2019, Air Force Secretary Heather Wilson said at the same hearing. However, many programs, such as one under discussion that would push some students directly to the T-1 Jayhawk trainer, are still being worked. Undergraduate pilot trainees begin in the T-6 and then split off into either the T-38 Talon fighter/bomber track or the T-1 cargo/tanker/transport track.

USAF needs to produce at least 1,245 pilots per year in order to “steadily close the pilot shortage gap by the mid-2020s,” said Maj. Kenyatta Ruffin, the lead action officer in the Air Force’s Aircrew Crisis Task Force.

Ruffin’s comment came at an Air Force Association-sponsored summit in March on the future of the Air Force pilot force. Members of the US military, from second lieutenants





1/ Chief of Staff Gen. David Goldfein responds to a presentation at the Air Force Association pilot summit in early March. 2/ Attendees listen to Goldfein at the AFA summit. 3/ TSgt. Mike, MSgt. Alex, and MSgt. Mike next to a T-6A Texan II parked on the west flight line at JBSA-Randolph, Texas. They are the first enlisted airmen to train as pilots since World War II. (Only first names were given because the Air Force limits disclosure of identifying information to first names for pilots and sensor operators for some aircraft, including RPAs.) 4/ Capt. Michelle Curran prepares for launch in an F-16.

Photos: Mike Tsukamoto/AFA (1,2); TSgt. Ave Young, SSgt. Samantha Mathison



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all the way to the Chief of Staff of the Air Force, along with representatives from academia and industry, got together to discuss new ways to attract, recruit, develop, and retain pilots.

One of the challenges discussed is the ability of the service to absorb the increased number of students moving through the pipeline.

It can take up to a year from the time a pilot graduates SUPT to being qualified in their fighter, Ruffin said. The remotely piloted aircraft community has a similar issue, he said, noting the RPA pipeline is a four-month program, but it's currently taking about 18 months to complete because of the backlog.

In an effort to address "absorption limitations," USAF is sending some inexperienced pilots to Naval Air Station Whidbey Island to fly E/A-18 Growlers for the US Navy. The move assists "the Navy with fighter pilot production pipeline issues and enhances tactical joint collaboration between the Navy and the Air Force," according to a recent Government Accountability Office report. USAF also is working to get its newer fighter pilots more experience by sending them to its aggressor squadrons, where they play the bad guy against US and partner nations at major exercises like Red Flag and against student pilots at the US Air Force Weapons School, according to the report.

Retention is another major issue. Goldfein and Wilson have said the service has no problem recruiting new pilots. The problems lie in training them, absorbing them, and getting them to stay past the midway point in their careers.

Commercial airlines offer more money and less time away from their families. They hire about 4,500 pilots a year, and because regional airlines require at least 1,500 flying hours, experienced Air Force pilots represent a fertile recruiting ground.

Meanwhile, many female pilots also feel they must choose between flying fighters or having a family. Often the latter wins out.

During the AFA summit, Lt. Gen. Jacqueline D. Van Ovost, director of the Air Staff, said the Defense Department is looking at how it can give female pilots some time off when they have children. One possibility is to allow them access to the base, have them maintain proficiency through simulators, and roll back their "year group" so they remain competitive for assignments and promotions when they return to full-time service. The key to such a reset would be ensuring the women "actually go on and get command slots" when they come back to regular duty, said Van Ovost, a command pilot with 4,200 hours in both transport and fighter aircraft.

In October 2017, Air Combat Command adjusted its exercise plan enabling eight fighter wings to execute a one-to-five deploy-to-dwell ratio, "increasing time at home station for fighter pilots by 25-50 percent," according to the GAO.

The service also has reduced many 365-day deployments to 179 days, limiting year-long fighter pilot deployments to those in command or Joint Staff assignments.

Last year, the Air Force also announced a Second Assignment In-Place Pilot Program, which allows a limited number of Active Duty, late-career fighter pilots and weapon system officers to remain at the same base for a second tour. The goal is to improve quality of life and potentially retain aviators with more than 20 years of experience, according to an Air Force press release. A similar program, dubbed Senior Pilot Transition Program, looks to transition experienced fighter pilot instructors to the F-35 community. Those selected for the program must agree to a three-year service commitment, but they don't have to deploy.

"There is no silver bullet. It's been death by a thousand cuts, so we have a thousand Band-Aids," said Ruffin. "We have no shortage of ideas ... it's just coming up with prioritization, and resources, and the courage to take risk and do what we need to do."

The Air Force will be "back above the floor when we can demonstrate to ourselves and the nation that we can produce 1,200 pilots per year for two years in a row," he added. ✪



1/ 2nd Lt. Hunter Corpus, a student pilot, studies at Columbus AFB, Miss. 2/ Cadet Aislinn Fitzgerald (I) takes a briefing before strapping into a TG-15A sailplane for a training sortie at the US Air Force Academy in Colorado Springs, Colo. 3/ T-38 Talons fly in formation over Texas during a sortie for the 87th Flying Training Squadron's centennial flight celebration in August 2017. 4/ Capt. Kristin Wolfe, an F-35A pilot, adjusts her mask before takeoff from Kadena AB, Japan, during a six-month deployment for the area's theater security program. 5/ A pilot prepares for takeoff in a T-1A Jayhawk at Vance AFB, Okla. The T-1 is used to train students selected to fly airlift, cargo, or tanker aircraft.



Photos: A1C Keith Holcomb; Jason Gutierrez/USAF; SRA, Keifer Bowes; Naoto Anazawa/USAF; SRA, Corey Pettis



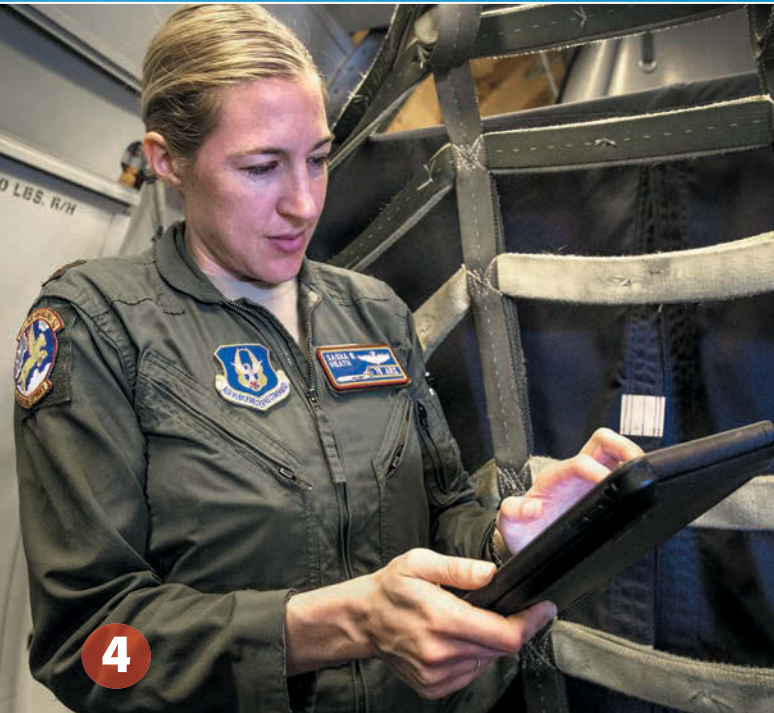
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1/ Pilots fly T-6A Texan IIs in formation over Laughlin AFB, Texas. 2/ Pilots 1st Lt. Benjamin Martin (l) and Capt. Christopher Lacroix complete flight plans prior to a morning sortie during the joint exercise Sentry Aloha 18-01 at JB Pearl Harbor-Hickam, Hawaii. 3/ 2nd Lt. Brandon Murphy (l), a student pilot, and Maj. Christopher Bridges, an instructor pilot, walk the flight line at Vance AFB, Okla. 4/ Maj. Sasha Heath, a KC-10 pilot, reviews checklists before takeoff from JB Pearl Harbor-Hickam. 5/ 1st Lt. Kevin Yoo, an instructor pilot, preflights an aircraft before takeoff at Vance Air Force Base.



Photos: SRA, James Crow; SMSgt, Chris Drudge/ANG; A1C Taylor Crul (3, 5); MSGt, Mark Olsen



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1/ Capt. Maggie Linn performs a preflight check on a C-17 at JB McGuire-Dix-Lakehurst, N.J. 2/ Two F-35s on a training sortie over the Utah Test and Training Range. 3/ Capt. Karen Miller, an instructor pilot, goes over flying fundamentals with student pilot 2nd Lt. Al Vitacco at Columbus AFB, Miss. 4/ An F-22 Raptor pilot puts on his helmet before taking off from JB Langley-Eustis, Va., on a training mission practicing counterair operations. 5/ Capt. Brittany Trimble, an F-16 pilot, steps from her jet during the exercise Vigilant Ace at Osan AB, South Korea. 6/ 1st Lt. Edward Galloway, an aggressor pilot, after an air combat training mission during exercise Atlantic Trident at Langley. 7/ Maj. Cullen Vetter, an instructor pilot, checks over a T-1A Jayhawk before at flight from Vance Air Force Base.

Photos: MSgt. Mark Olsen; SSgt. Andrew Lee; A1C Beaux Hebert; MSgt. Benjamin Wilson; SSgt. Deana Heitzman; SSgt. Natasha Stannard; S/A, Corey Pettis

How Do You Really Feel?

"I believe that the Iranian supreme leader makes Hitler look good. Hitler didn't do what the supreme leader is trying to do. Hitler tried to conquer Europe. This is bad, but the supreme leader is trying to conquer the world. He believes he owns the world. They are both evil guys. He is the Hitler of the Middle East. In the 1920s and 1930s, no one saw Hitler as a danger—only a few people—until it happened. We don't want to see what happened in Europe happen in the Middle East."—**Mohammed bin Salman, Crown Prince of Saudi Arabia, referring to Ayatollah Sayyid Ali Hosseini Khamenei, *The Atlantic*, April 2.**

Syria, Take 1

"We're knocking the hell out of ISIS. We will be coming out of Syria, like, very soon. Let the other people take care of it now. ... We're going to be coming out of there real soon. We're going to get back to our country, where we belong, where we want to be."—**President Donald J. Trump, speech in Richfield, Ohio, March 29.**

Syria, Take 2

"This is a disaster in the making. All of [President Trump's] military advisors have said, 'We need to leave troops in Syria.' ... If we withdrew our troops anytime soon, ISIS would come back. ... It would be the single worst decision the president could make."—**Sen. Lindsay O. Graham (R-S.C.), Senate Armed Services Committee, remarks on Fox News Sunday, April 1.**

Sympathy for the Adviser

"I heard you are actually the devil incarnate, and I wanted to meet you."—**Secretary of Defense Jim Mattis, on the occasion of his first-ever meeting with National Security Adviser designate John Bolton, at the Pentagon, March 29.**

Enlisted Pilots?

"We have enlisted airmen in our Guard and Reserve component who have private pilot licenses and fly for the airlines. So it's not a matter of, Can they do it? ... It's just a matter of us, as an Air Force, deciding that that's a route that we want to take. ... If there's an enlisted airman that's going to be flying and employing weapons, it requires certain authorities we would have to get by. That's just part of our age-old doctrine,

that the employment of weapons, that the authority and responsibility lies with officers."—**Chief Master Sergeant of the Air Force Kaleth O. Wright, interview with *military.com*, March 31.**

No Cuts—Period

"We are going to be buying these aircraft [F-35As] for a number of years. ... It's just not true that there's any intent on our part to go one aircraft below the current [1,763-fighter] program of record, because that is what we require today to actually accomplish the strategy as it's currently written."—**Gen. David L. Goldfein, USAF Chief of Staff, when asked whether USAF might cut the F-35 program, Defense Writers Group, March 29.**

Last Days of Iran Deal?

"The President has been pretty clear since January ... what he thinks of the [2015 US-Europe-Iran nuclear] deal. He thinks it is one of the worst agreements the United States has ever made internationally. He is insistent on changes both at the Congressional level, working with Congress, and also with our European partners. If changes aren't made, the president is prepared to—potentially—withdraw from the agreement."—**White House spokesman Raj Shah, press briefing, March 27.**

"Does Not Align?" Really?

"The Secretary of Defense should require the military services to tailor their marketing to reflect the most salient reasons women join, in order to inspire more women toward military service. ... Women were more likely than men to be motivated by travel, education, and helping others and their communities. ... Although a marketing strategy focused on patriotism may have been successful at recruiting men in the past, current data indicate that that strategy does not align with the motivations of prospective female military members."—**From the annual report of the Defense Advisory Committee on Women in the Services, released March 1.**

Bobbing and Weaving

"I don't feel like, overall, Congress has learned a lesson [from the Iraq War], and I think most people would just rather keep their head down and not have a vote [on war]. ... There is an understanding on both sides of the aisle that Congress is

failing. [US troops] keep redeploying and redeploying and redeploying. Now they're in Afghanistan, now they're in Iraq, now they're in Africa, now they're in Syria. They keep showing up and we are not doing our jobs. We're too afraid to have this discussion, and [we are] turning it all over to the executive branch. We did it under President [Barack] Obama and we're doing it under the present administration."—**Sen. Tammy Duckworth (D-Ill.), wounded Army veteran, news conference, March 20.**

Enough is Enough

"Russia sanctions will be coming down. [Treasury] Secretary [Steven] Mnuchin will be announcing those ... and they will be going directly to any sort of companies that were dealing with equipment related to [Syrian leader Bashar] Assad and chemical weapons."—**US Ambassador to the UN Nikki Haley, remarks on CBS News' "Face the Nation," April 15.**

Not so Fast

"She got ahead of the curve ... there might have been some momentary confusion about that."—**White House economic advisor Larry Kudlow, referencing Haley's comments of impending Russia sanctions, press briefing, April 17.**

Let's Make Something Clear

"With all due respect, I don't get confused."—**Haley, to Fox News, April 17. Kudlow later apologized.**

"Dear Israeli Pilot ..."

"1. You are being sent today to participate in a mission of supreme importance to the state of Israel and the Jewish people. 2. The mission is to destroy the target and to disengage with no fallen aircraft, and to do so through as much 'low signature' as possible. 3. The intention is for this action not to be connected, at least in the first stage, to the state of Israel and to minimize the potential for broader war. 4. The action is top secret before and after its implementation, until a clear decision directs otherwise. 5. Counting on you. Believe in you and am convinced of your success. 6. Good luck."—**Personal note from Maj. Gen. Eliezer Shkedy, Commander of Israeli Air Force, to mission pilots just before Sept. 5-6, 2007 strike on Syria's plutonium reactor. Declassified and released on March 21.**

THE POWER FOR TODAY'S DEFENSE. THE TECHNOLOGY FOR TOMORROW'S.



F-35 Lightning IIs have flown thousands of sorties powered by the F135 propulsion system, developed from the highly successful fifth-generation engine for the F-22 Raptor. Pratt & Whitney partners with customers around the world to provide sustainment solutions that keep the F-35 Lightning II dependable and affordable. We are proud to power today's most advanced fighter aircraft. Now, we are advancing engine technology to provide the next generation of fighter engines for tomorrow's defense needs.

[Learn more at pw.utc.com](http://pw.utc.com)



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USAF ALMANAC 2018

On the following pages appears a variety of information and statistical material about the US Air Force—its people, organization, equipment, funding, activities, bases, and heroes. This Almanac was compiled by Brendan McGarry (prior to his employment with the Congressional Research Service) and the staff of *Air Force Magazine* under the direction of Gideon Grudo. 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 Air Force in Facts & Figures

2018 USAF Almanac



Secretary of the Air Force Heather Wilson, center, tours the 5th Bomb Wing and 91st Missile Wing at Minot AFB, N.D.

Structure of the Force

There is considerable variation in how the major commands and subordinate units of the Air Force are organized. This overview describes the Air Force's primary organizational structures.

■ **DEPARTMENT OF DEFENSE (DOD)** A Cabinet agency headed by the Secretary of Defense. It comprises three military departments—Air Force, Army, and Navy—each with a civilian Secretary.

■ **JOINT CHIEFS OF STAFF** DOD's corporate military leadership. The Chairman and vice chairman serve full time in their positions, while the service chiefs also serve as the military heads of their respective services.

Current Air Force Leaders

■ **SECRETARY OF THE AIR FORCE**

Heather Wilson: May 16, 2017

■ **AIR FORCE CHIEF OF STAFF**

Gen. David L. Goldfein: July 1, 2016

■ **CHIEF MASTER SERGEANT**

OF THE AIR FORCE

CMSAF Kaleth O. Wright: Feb. 17, 2017

■ **DEPARTMENT OF THE AIR FORCE** Headed by the Secretary of the Air Force. Supporting the SECAF are the Secretariat Staff and the Chief of Staff of the Air Force, who oversees the Air Staff, among other duties. The heads of the major commands report to the CSAF.

■ **MAJOR COMMAND** Most Air Force units fall under a majcom, having broad functional responsibilities. Majcoms are organized under a unit-oriented scheme, with one or more numbered air forces, or a major non-unit scheme, with one or more centers.

■ **WING** The predominant command entity within USAF. The typical Air Force base is built around a wing.

■ **GROUP** Four groups make up a standard wing, covering operations (operates primary mission equipment and

includes such functions as intelligence); maintenance (provides weapon system maintenance); mission support (provides base support and services, including civil engineer, logistics readiness, and security forces); and medical.

■ **SQUADRON** The basic organizational building block of the Air Force. Squadrons generally work under one of the four groups to provide either mission or functional support.

■ **FLIGHTS** Several flights may exist within squadrons.

■ **FOAs, DRUs, AUXILIARY** The Air Force organization also includes field operating agencies (FOAs), carrying out specialized activities; direct reporting units (DRUs), performing specific missions not covered by majcoms; and an auxiliary.

USAF TOTAL FORCE

(As of Sept. 30, 2017)

Estimate

	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18
Air Force Active Duty										
Officers	65,496	66,201	65,487	64,932	64,806	62,349	61,004	60,961	61,597	62,451
Enlisted	263,351	263,437	263,542	263,964	261,976	250,104	246,322	252,762	256,983	258,649
Cadets	4,561	4,558	4,341	4,022	3,912	3,879	4,031	4,160	4,207	4,000
Total Air Force Active Duty	333,408	334,196	333,370	332,918	330,694	316,332	311,357	317,883	322,787	325,100
Civilian Personnel										
Direct Hire (excluding technicians)	123,106	134,183	145,407	142,047	141,496	129,120	129,985	131,965	140,116	139,888
Air National Guard Technicians	22,391	22,657	22,139	22,859	22,568	22,225	23,448	23,044	22,542	22,179
Air Force Reserve Command Technicians	9,147	10,068	9,397	10,366	9,277	10,429	8,501	8,384	7,872	9,833
Total Direct Hire	154,644	166,908	176,943	175,272	173,341	161,774	161,934	163,393	170,530	171,900
Indirect Hire	6,346	6,564	6,776	6,714	6,501	4,823	4,090	3,704	4,570	4,633
Total Civilian Personnel	160,990	173,472	183,719	181,986	179,842	166,597	166,024	167,097	175,100	176,533
Air National Guard										
Selected Reserve Officers	14,326	14,389	14,418	14,598	14,731	15,024	15,084	14,593	15,257	14,699
Selected Reserve Enlisted	94,870	93,287	91,267	90,791	90,977	91,356	90,644	90,907	90,413	91,901
Total ANG	109,196	107,676	105,685	105,389	105,708	106,380	105,728	105,500	105,670	106,600
Air Force Reserve Command										
Selected Reserve Officers	14,753	14,560	14,535	14,303	14,060	13,817	13,937	14,896	13,672	14,719
Selected Reserve Enlisted	53,233	55,559	56,786	57,125	56,853	55,967	54,557	54,304	55,126	55,081
Total AFRC Selected Reserve	67,986	70,119	71,321	71,428	70,913	69,784	68,494	69,200	68,798	69,800
Individual Ready Reserve Officers	12,833	11,692	11,692	11,222	11,222	11,222	7,302	7,492	7,492	7,492
IRR Enlisted	30,349	28,863	28,863	24,271	24,271	24,271	29,449	29,359	29,359	29,359
Total AFRC IRR	43,182	40,555	40,555	35,493	35,493	35,493	36,751	36,851	36,851	36,851
Total AFRC	111,168	110,674	111,876	106,921	106,406	105,277	105,245	106,051	105,649	106,651
Total Ready Reserve	220,364	218,350	217,561	212,310	212,114	211,657	210,973	211,551	211,319	213,251

ARMED FORCES MANPOWER TRENDS, END STRENGTH (IN THOUSANDS)

(As of Sept. 30, 2017)

	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18
Active Duty Military										
Air Force	333	334	333	333	331	316	311	317	323	325
Army	553	566	566	550	532	508	491	475	476	476
Marine Corps	203	202	201	198	196	188	184	182	185	185
Navy	329	328	325	318	324	326	328	327	324	328
Total	1,418	1,430	1,425	1,399	1,383	1,338	1,314	1,301	1,308	1,314
Guard and Reserve (selected reserve)										
Air National Guard	109	108	107	105	106	106	106	106	106	107
Air Force Reserve	68	70	71	71	71	70	68	69	69	70
Army National Guard	358	362	358	358	358	354	350	342	344	343
Army Reserve	205	205	205	201	198	195	199	198	199	200
Marine Corps Reserve	39	39	40	40	40	40	39	39	39	39
Naval Reserve	67	65	66	65	62	59	57	57	58	59
Total	846	849	847	840	835	824	819	811	802	818
Direct-hire Civilian (full-time equivalents)										
Air Force	155	167	177	175	173	162	162	166	166	172
Army	247	260	269	250	242	195	194	190	185	183
Navy/Marine Corps	186	195	201	201	197	182	186	191	192	198
Defense Agencies	115	120	125	133	127	185	183	191	190	189
Total	703	742	772	759	739	724	725	738	733	742



SSgt. Miguel Rodriguez with the 379th Expeditionary Aero-medical Evacuation Squadron, inputs data during a mission in Afghanistan. There are over 14,000 airmen stationed in Africa, the Mideast, and South Asia.

ACTIVE DUTY AIRMEN BY RANK

(As of Sept. 30, 2017)

Officers	Men	Women	Total
General	11	2	13
Lieutenant General	36	5	41
Major General	83	8	91
Brigadier General	145	8	153
Colonel	2,836	477	3,313
Lieutenant Colonel	8,223	1,528	9,751
Major	10,631	2,661	13,292
Captain	16,099	4,869	20,968
First Lieutenant	5,003	1,648	6,651
Second Lieutenant	5,609	1,715	7,324
Total	48,676	12,921	61,597

Enlisted	Men	Women	Total
Chief Master Sergeant	2,187	399	2,586
Senior Master Sergeant	3,977	1,034	5,011
Master Sergeant	19,670	5,106	24,776
Technical Sergeant	32,190	7,384	39,574
Staff Sergeant	50,669	11,253	61,922
Senior Airman	43,314	9,789	53,103
Airman First Class	40,188	11,087	51,275
Airman First Class	6,327	1,814	8,141
Airman Basic	8,374	2,221	10,595
Total	206,896	50,087	256,983

Academy Cadets	Men	Women	Total
Total Personnel	3,103	1,104	4,207

Total Personnel 258,675 64,112 322,787

NUMBER AND PERCENTAGE OF ACTIVE DUTY AIRMEN BY GENDER

(As of Sept. 30, 2016)

	1950	1960	1970	1980	1990	2000	2010	2017
Officers								
Male	55,474	126,014	125,136	89,156	86,714	57,204	53,838	48,676
Percentage	97.3%	97.2%	96.4%	91.3%	86.7%	82.9%	81.3%	79.0%
Female	1,532	3,675	4,667	8,493	13,331	11,819	12,363	12,921
Percentage	2.7%	2.8%	3.6%	8.7%	13.3%	17.1%	18.7%	21.0%
Total Officers	57,006	129,689	129,803	97,649	100,045	69,023	66,201	61,597
Enlisted								
Male	350,489	679,412	652,559	399,517	374,385	231,620	212,491	206,896
Percentage	98.9%	99.2%	98.6%	86.8%	86.0%	80.8%	80.7%	80.5%
Female	3,782	5,651	8,987	60,803	60,803	55,011	50,946	50,087
Percentage	1.1%	0.8%	1.4%	13.2%	14.0%	19.2%	19.3%	19.5%
Total Enlisted	354,271	685,063	661,546	460,320	435,188	286,631	263,437	256,983
Cadets								
Male	0	1,949	4,144	3,907	3,817	3,617	3,592	3,103
Percentage	0.0%	100.0%	100.0%	88.6%	87.3%	84.6%	78.8%	73.8%
Female	0	0	0	504	553	658	966	1,104
Percentage	0.0%	0.0%	0.0%	11.4%	12.7%	15.4%	21.2%	26.2%
Total Cadets	0	1,949	4,144	4,411	4,370	4,275	4,558	4,207

ACTIVE DUTY AIRMEN BY REGION

(As of Sept. 30, 2017)

REGIONS	1950	1960	1970	1980	1990	2000	2010	2017
US and its Territories	342,437	633,327	565,098	445,886	418,027	291,260	277,123	253,741
Europe	24,531	104,899	72,937	76,788	69,296	32,901	30,963	27,073
East Asia, Pacific	36,412	50,679	139,666	32,263	33,558	22,030	12,649	19,748
Africa, Mideast, S. Asia	1,491	11,160	608	674	376	8,972	891	14,417
Western Hemisphere	6,266	14,106	5,348	2,211	2,356	345	339	337
Other	140	581	7,692	147	11,620	146	12,231	7,471
Total	411,277	814,752	791,349	557,969	535,233	355,654	334,196	322,787

These are permanently assigned airmen. Those deployed for operations in Afghanistan, Syria, and Iraq are included in US (transients) and Other totals.



Maj. Kristen Hobbs, left, Cyber Blue Book liaison, Air Force Operational Test and Evaluation Center, speaks with Lt. Col. Michele Boyko in front of an MC-130J Commando II at Kirtland AFB, N.M.

ACTIVE DUTY PERSONNEL STRENGTH

(As of Sept. 30, 2017)

YEAR	NUMBER	YEAR	NUMBER
1907	3	1963	869,431
1908	13	1964	856,798
1909	27	1965	824,662
1910	11	1966	887,353
1911	23	1967	897,494
1912	51	1968	904,850
1913	114	1969	862,353
1914	122	1970	791,349
1915	208	1971	755,300
1916	311	1972	725,838
1917	1,218	1973	691,182
1918	195,023	1974	643,970
1919	25,603	1975	612,751
1920	9,050	1976	585,416
1921	11,649	1977	570,695
1922	9,642	1978	569,712
1923	9,441	1979	559,455
1924	10,547	1980	557,969
1925	9,670	1981	570,302
1926	9,674	1982	582,845
1927	10,078	1983	592,044
1928	10,549	1984	597,125
1929	12,131	1985	601,515
1930	13,531	1986	608,199
1931	14,780	1987	607,035
1932	15,028	1988	576,446
1933	15,099	1989	570,880
1934	15,861	1990	535,233
1935	16,247	1991	510,432
1936	17,233	1992	470,315
1937	19,147	1993	444,351
1938	21,089	1994	426,327
1939	23,455	1995	400,409
1940	51,165	1996	389,001
1941	152,125	1997	377,385
1942	764,415	1998	367,470
1943	2,197,114	1999	360,590
1944	2,372,292	2000	355,654
1945	2,282,259	2001	353,571
1946	455,515	2002	368,251
1947	305,827	2003	375,062
1948	387,730	2004	376,616
1949	419,347	2005	353,696
1950	411,277	2006	348,953
1951	788,381	2007	333,495
1952	983,261	2008	327,379
1953	977,593	2009	333,408
1954	947,918	2010	334,196
1955	959,946	2011	333,370
1956	909,958	2012	332,918
1957	919,835	2013	330,694
1958	871,156	2014	316,332
1959	840,435	2015	311,357
1960	814,752	2016	317,883
1961	821,151	2017	322,787
1962	884,025	2018	325,100

2018 number is an estimate.

PERSONNEL STRENGTH BY COMMANDS, FOAs, & DRUs

(As of Sept. 30, 2017)

	MILITARY	CIVILIAN	TOTAL
Active Duty Major Commands			
Air Combat Command	76,304	10,748	87,052
Air Education and Training Command	55,758	14,317	70,075
Air Force Global Strike Command	27,875	3,991	31,866
Air Force Materiel Command	17,239	61,652	78,891
Air Force Space Command	13,277	6,904	20,181
Air Force Special Operations Command	14,694	1,735	16,429
Air Mobility Command	40,247	7,723	47,970
Pacific Air Forces	28,139	3,151	31,290
US Air Forces in Europe	22,640	1,552	24,192
Total Major Commands	296,173	111,773	407,946
Field Operating Agencies (FOAs)			
Air Force Agency for Modeling and Simulation	6	15	21
Air Force Audit Agency	0	566	566
Air Force Cost Analysis Agency	11	81	92
Air Force Flight Standards Agency	115	59	174
Air Force Historical Research Agency	0	35	35
Air Force Inspection Agency	97	24	121
Air Force Legal Operations Agency	570	248	818
Air Force Manpower Analysis Agency	125	146	271
Air Force Medical Operations Agency	171	192	363
Air Force Medical Support Agency	176	71	247
Air Force Mortuary Affairs Operations	20	33	53
Air Force Office of Special Investigations	1,453	829	2,282
Air Force Operations Group	35	9	44
Air Force Personnel Center	661	1,438	2,099
Air Force Public Affairs Agency	211	32	243
Air Force Review Boards Agency	15	80	95
Air Force Safety Center	41	64	105
Total FOAs	3,707	3,922	7,629
Direct Reporting Units (DRUs)			
Air Force District of Washington	3,451	994	4,445
Air Force Operational Test and Evaluation Center	354	245	599
US Air Force Academy	1,993	1,280	3,273
Total DRUs	5,798	2,519	8,317
Other			
Hq. USAF	1,701	1,972	3,673
Other	11,201	50,445	61,646
Academy Cadets	4,207	0	4,207
Total Other	17,109	52,417	69,526
Total Strength	322,787	170,631	493,418

MONTHLY MILITARY BASIC RATES OF PAY

(Effective Jan. 1, 2018)

		YEARS OF SERVICE														
		< 2	2	3	4	6	8	10	12	14	16	18	20	22	24	26
COMMISSIONED OFFICERS		Pay Grade														
	O-10 ^a												\$15,800	\$15,800	\$15,800	\$15,800
	O-9 ^a												14,696	14,909	15,215	15,748
	O-8 ^a	10,399	10,739	10,966	11,029	11,311	11,782	11,891	12,399	12,467	12,853	13,411	13,925	14,268	14,268	14,268
	O-7 ^a	8,641	9,042	9,228	9,375	9,643	9,907	10,212	10,517	10,822	11,782	12,592	12,592	12,592	12,592	12,656
	O-6 ^a	6,552	7,199	7,671	7,671	7,700	8,030	8,074	8,074	8,533	9,344	9,820	10,296	10,576	10,841	11,372
	O-5	5,462	6,154	6,579	6,659	6,926	7,084	7,434	7,691	8,022	8,530	8,771	9,009	9,280	9,280	9,280
	O-4	4,713	5,456	5,820	5,901	6,239	6,601	7,503	7,404	7,648	7,788	7,869	7,869	7,869	7,869	7,869
	O-3	4,144	4,697	5,070	5,528	5,793	6,083	6,271	6,580	6,742	6,742	6,742	6,742	6,742	6,742	6,742
	O-2	3,581	4,078	4,696	4,855	4,955	4,955	4,955	4,955	4,955	4,955	4,955	4,955	4,955	4,955	4,955
	O-1	3,108	3,235	3,910	3,910	3,910	3,910	3,910	3,910	3,910	3,910	3,910	3,910	3,910	3,910	3,910
	O-3E ^b				5,528	5,793	6,083	6,271	6,580	6,841	6,991	7,195	7,195	7,195	7,195	7,195
	O-2E ^b				4,855	4,955	5,113	5,379	5,585	5,738	5,738	5,738	5,738	5,738	5,738	5,738
	O-1E ^b				3,910	4,175	4,330	4,488	4,643	4,855	4,855	4,855	4,855	4,855	4,855	4,855
ENLISTED MEMBERS																
	E-9 ^c							5,174	5,291	5,439	5,612	5,788	6,069	6,307	6,556	6,939
	E-8						4,235	4,423	4,539	4,677	4,828	5,100	5,237	5,472	5,602	5,922
	E-7	2,944	3,213	3,337	3,499	3,627	3,845	3,968	4,187	4,369	4,493	4,625	4,676	4,848	4,940	5,291
	E-6	2,546	2,802	2,926	3,046	3,172	3,454	3,564	3,777	3,842	3,889	3,944	3,944	3,944	3,944	3,944
	E-5	2,333	2,490	2,610	2,733	2,925	3,126	3,291	3,311	3,311	3,311	3,311	3,311	3,311	3,311	3,311
	E-4	2,139	2,249	2,370	2,491	2,597	2,597	2,597	2,597	2,597	2,597	2,597	2,597	2,597	2,597	2,597
	E-3	1,931	2,052	2,177	2,177	2,177	2,177	2,177	2,177	2,177	2,177	2,177	2,177	2,177	2,177	2,177
	E-2	1,836	1,836	1,836	1,836	1,836	1,836	1,836	1,836	1,836	1,836	1,836	1,836	1,836	1,836	1,836
	E-1	1,638	1,638	1,638	1,638	1,638	1,638	1,638	1,638	1,638	1,638	1,638	1,638	1,638	1,638	1,638

Amounts have been rounded to the nearest dollar.

^aBasic pay for pay grades O-7 through O-10 is limited to \$15,800.10. Basic pay for O-6 and below is limited to \$12,816.60.

^bApplicable to O-1 to O-3 with at least four years and one day of Active Duty or more than 1,460 points as an enlisted member.

^cBasic pay for the Chief Master Sergeant of the Air Force is \$8,361.

AVIATION INCENTIVE PAY

(Effective Jan. 1, 2018)

Monthly Rate	Years of Service as an Aviation Officer
\$150	Two or fewer
250	More than two
800	More than six
1,000	More than 10
700	More than 22
450	More than 24

Provided to qualified rated officers. Continuous pay ends following the 25th year of service.



386th Expeditionary Security Force Fly-Away Security Team (FAST) members wait outside of a C-17 Globemaster III prior to takeoff.

HAZARDOUS DUTY PAY

(Effective Jan. 1, 2018)

Pay Grade	Monthly Rate
O-10	\$150
O-9	150
O-8	150
O-7	150
O-6	250
O-5	250
O-4	250
O-3	175
O-2	150
O-1	150
E-9	\$240
E-8	240
E-7	240
E-6	215
E-5	190
E-4	165
E-3	150
E-2	150
E-1	150

HOUSING ALLOWANCE

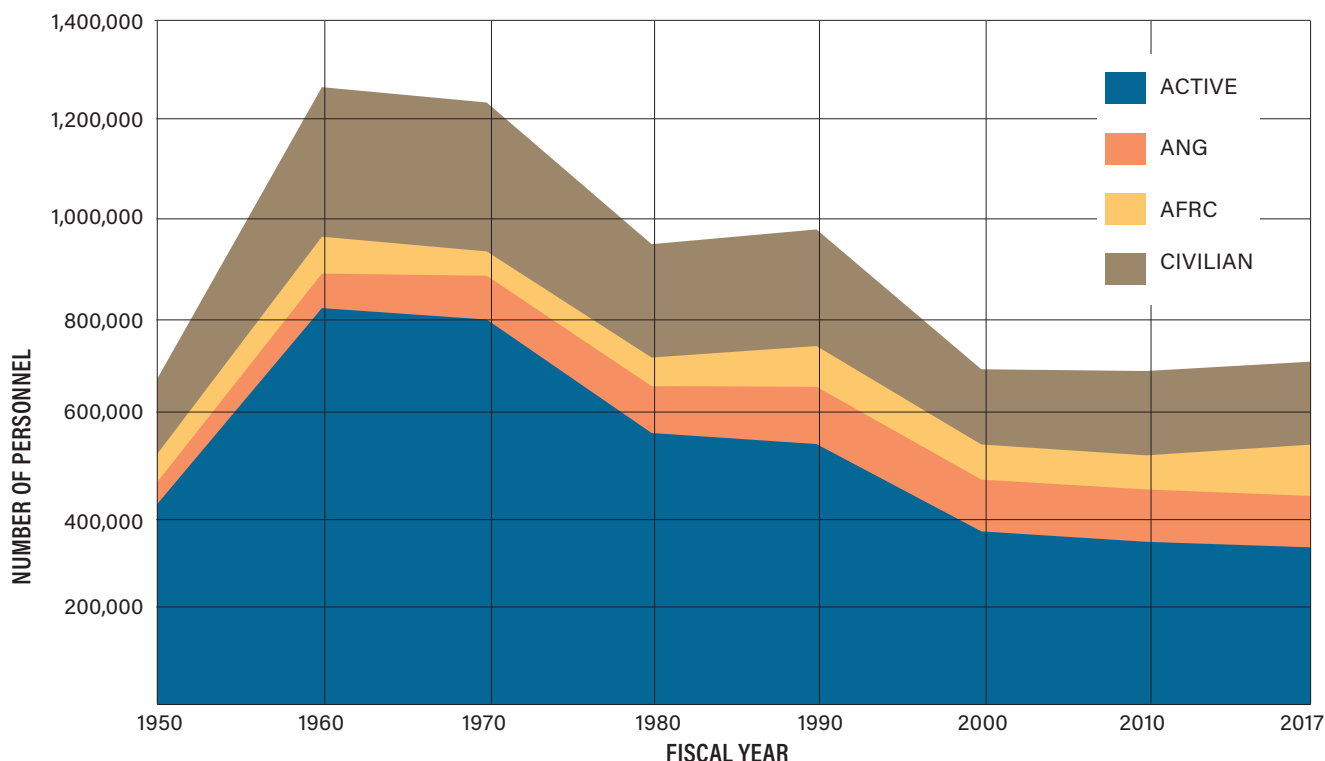
(Effective Jan. 1, 2018)

Pay Grade	Without Dependents	With Dependents
O-10	\$1,667.10	\$2,050.80
O-9	1,667.10	2,050.80
O-8	1,667.10	2,050.80
O-7	1,667.10	2,050.80
O-6	1,528.50	1,845.90
O-5	1,471.80	1,779.60
O-4	1,363.80	1,568.40
O-3	1,093.50	1,297.80
O-2	866.40	1,107.60
O-1	743.70	991.20
O-3b	1,180.20	1,395.00
O-2b	1,003.80	1,258.80
O-1b	873.00	1,163.40
E-9	\$1,010.10	1,332.30
E-8	928.50	1,228.80
E-7	855.60	1,140.30
E-6	790.50	1,053.60
E-5	711.30	948.30
E-4	618.60	824.10
E-3	575.10	766.20
E-2	548.40	730.50
E-1	548.40	730.50

The Basic Allowance for Housing Reserve Component/Transit (BAH RC/T) is a nonlocality housing allowance for members in particular circumstances, such as reservists on Active Duty for 30 or fewer days or an Active Duty member in transit from overseas.

TOTAL FORCE OVER TIME

(As of Sept. 30, 2017)



Source: Air Force Magazine's USAF Almanac; US Census Bureau; "Statistical Abstract of the United States"; "Department of Defense Selected Manpower Statistics," various years.

ANNUAL PAY FOR FEDERAL CIVILIANS

(Effective Jan. 1, 2018)

GENERAL SCHEDULE										
Grade	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8	Step 9	Step 10
GS-1	\$18,785	\$19,414	\$20,039	\$20,660	\$21,285	\$21,650	\$22,267	\$22,891	\$22,915	\$23,502
GS-2	21,121	21,624	22,323	22,915	23,175	23,857	24,539	25,221	25,903	26,585
GS-3	23,045	23,813	24,581	25,349	26,117	26,885	27,653	28,421	29,189	29,957
GS-4	25,871	26,733	27,595	28,457	29,319	30,181	31,043	31,905	32,767	33,629
GS-5	28,945	29,910	30,875	31,840	32,805	33,770	34,735	35,700	36,665	37,630
GS-6	32,264	33,339	34,414	35,489	36,564	37,639	38,714	39,789	40,864	41,939
GS-7	35,854	37,049	38,244	39,439	40,634	41,829	43,024	44,219	45,414	46,609
GS-8	39,707	41,031	42,355	43,679	45,003	46,327	47,651	48,975	50,299	51,623
GS-9	43,857	45,319	46,781	48,243	49,705	51,167	52,629	54,091	55,553	57,015
GS-10	48,297	49,970	51,517	53,127	54,737	56,347	57,957	59,567	61,177	62,787
GS-11	53,062	54,831	56,600	58,369	60,138	61,907	63,676	65,445	67,214	68,983
GS-12	63,600	65,720	67,840	69,960	72,080	74,200	76,320	78,440	80,560	82,680
GS-13	75,628	78,149	80,670	83,191	85,712	88,233	90,754	93,275	95,796	98,317
GS-14	89,370	92,349	95,328	98,307	101,286	104,265	107,244	110,223	113,202	116,181
GS-15	105,123	108,627	112,131	115,635	119,139	122,643	126,147	129,651	133,155	136,659

SENIOR EXECUTIVE SERVICE

(Effective Jan. 1, 2018)

SES Pay System Structure	Minimum	Maximum
Certified SES performance appraisal system	\$126,148	\$189,600
Noncertified SES performance appraisal system	\$126,148	\$174,500

SUBSISTENCE ALLOWANCE

(Effective Jan. 1, 2018)

Officers	Enlisted Members
\$254/month	\$369/month

The pay scale does not include locality pay.



The Air Force's Fiscal 2019 budget request would kill the E-8C JSTARS recapitalization program.

Funding levels can be expressed in several ways. **Budget authority** is the value of new obligations the federal government is authorized to incur, including some obligations to be met in later years. Figures can also be expressed in **outlays** (actual expenditures, some of which are covered by amounts previously authorized).

Another difference concerns the value of money. When funding is in **current** or then-year dollars, it is not adjusted for inflation. This is the actual amount of dollars that has been or is to be spent, budgeted, or forecast. When funding is expressed in **constant dollars**, or real dollars, the effect of inflation has been taken into account to make direct comparisons between budget years possible. A specific year, often the present one, is chosen as a baseline for constant dollars.

Normally, Congress first authorizes payment, then appropriates it. **Authorization** establishes or continues a federal

program or agency and sets forth guidelines to which it must adhere. **Appropriation** enables federal agencies to spend money for specific purposes.

About the FY18 Budget

President Donald Trump in March released a Fiscal 2019 budget blueprint of \$686 billion for the Defense Department, including \$597 billion for the base budget and \$89 billion for Overseas Contingency Operations. However, as of mid-April, the Pentagon hadn't released its official budget request for the fiscal year beginning Oct. 1. As a result, this year's edition of the almanac uses figures from last year's defense budget (adjusted for inflation), except where the Pentagon's or the Air Force's budget requests provide more current data.

Acronyms and Abbreviations

AEHF	Advanced Extremely High Frequency
AGS	Alliance Ground Surveillance
AMRAAM	Advanced Medium-Range Air-to-Air Missile
AWACS	Airborne Warning and Control System
BM	battle management
C3	command, control, and communications
DCGS	Distributed Common Ground System
DSRP	Defense Space Reconnaissance Program
EELV	Evolved Expendable Launch Vehicle

GPS	Global Positioning System
helo	helicopter
ICBM	intercontinental ballistic missile
ISR	intelligence, surveillance, and reconnaissance
JASSM	Joint Air-to-Surface Standoff Missile
JDAM	Joint Direct Attack Munition
JSTARS	Joint Surveillance Target Attack Radar System
MilSatCom	Military Satellite Communications

NAOC	National Airborne Operations Center
O&M	operation and maintenance
PAR	Presidential Aircraft Replacement
RDT&E	research, development, test, and evaluation
SATCOM	satellite communications
SBIRS	Space Based Infrared System
SDB	Small Diameter Bomb
Sigint	signals intelligence
SOF	Special operations forces
UAV	unmanned aerial vehicle

Budget Sources

Congressional Budget Office	cbo.gov
■ Topics >> Budget	
Defense Department Comptroller	comptroller.defense.gov
■ Budget materials by fiscal year	
■ Links to budget pages for each service	
Office of Management and Budget	whitehouse.gov/omb
■ Budget	
■ Links to past budgets, including appendices and historical tables (via GPO)	

AIR FORCE BUDGET—A 10-YEAR PERSPECTIVE

(Budget authority in millions of current and constant FY19 dollars; excludes war funding)

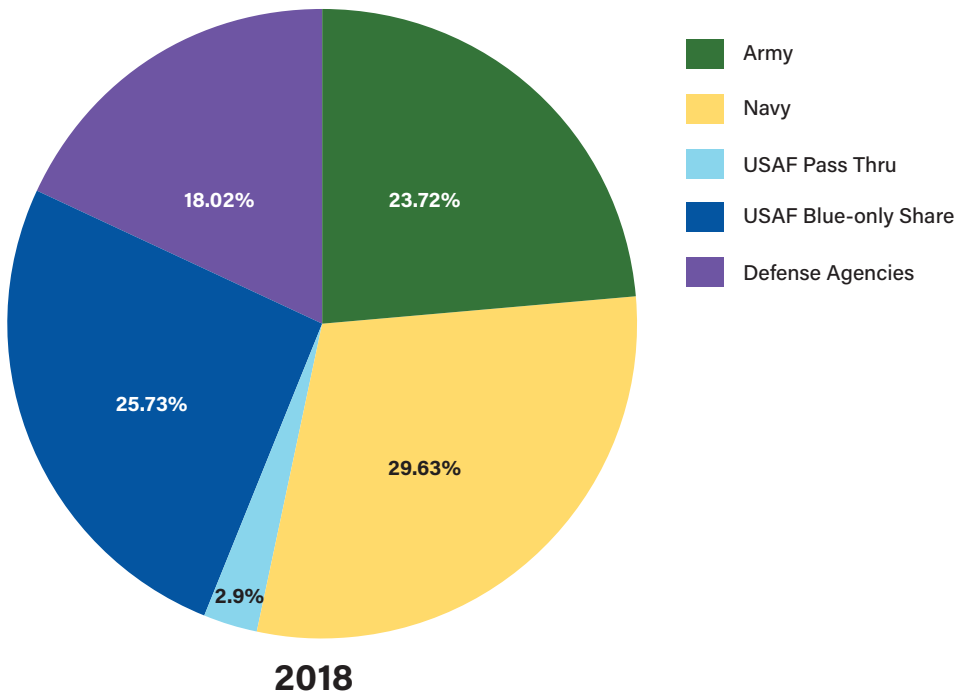
CURRENT DOLLARS	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18
Military Personnel	\$31,847	\$33,614	\$34,235	\$35,131	\$34,704	\$35,103	\$33,617	\$34,026	\$33,931	\$34,697
O&M	44,353	42,267	45,820	47,007	42,550	43,196	44,596	44,442	44,028	50,189
Procurement	35,938	35,830	36,277	36,020	30,341	31,259	33,914	40,939	41,023	41,736
RDT&E	26,305	27,700	26,982	26,113	22,766	23,655	23,568	24,458	25,147	28,954
Military Construction	2,591	2,317	1,416	1,468	482	1,291	1,045	1,654	1,989	2,181
Family Housing	990	569	591	490	520	465	328	492	336	336
Revolving Funds	61	64	67	65	45	150	67	63	18	67
Total	\$142,086	\$142,360	\$145,386	\$146,295	\$131,408	\$135,120	\$137,134	\$146,074	\$146,472	\$158,160

CONSTANT DOLLARS	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18
Military Personnel	\$37,484	\$39,026	\$38,651	\$38,925	\$37,931	\$37,806	\$36,172	\$36,170	\$35,458	\$35,530
O&M	52,203	49,072	51,731	52,084	46,507	46,522	47,985	47,242	46,009	51,394
Procurement	42,299	41,599	40,957	39,910	33,163	33,666	36,491	43,518	42,869	42,738
RDT&E	30,961	32,160	30,463	28,933	24,883	25,476	25,359	25,999	26,279	29,649
Military Construction	3,050	2,690	1,599	1,627	527	1,390	1,124	1,758	2,079	2,233
Family Housing	1,165	661	667	543	568	501	353	523	351	344
Revolving Funds	72	74	76	72	49	162	72	67	19	68
Total	\$167,235	\$165,280	\$164,141	\$162,095	\$143,629	\$145,524	\$147,556	\$155,277	\$153,063	\$161,955

PERCENTAGE CHANGE	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18
Military Personnel	4.2%	4.1%	-1.0%	0.7%	-2.6%	-0.3%	-4.3%	-0.0%	-2.0%	0.2%
O&M	8.7%	-6.0%	5.4%	0.7%	-10.7%	0.0%	3.1%	-1.5%	-2.6%	11.7%
Procurement	2.6%	-1.7%	-1.5%	-2.6%	-16.9%	1.5%	8.4%	19.3%	-1.5%	-0.3%
RDT&E	0.5%	3.9%	-5.3%	-5.0%	-14.0%	2.4%	-0.5%	2.5%	1.1%	12.8%
Military Construction	3.7%	-11.8%	-40.6%	1.7%	-67.6%	163.9%	-19.1%	56.4%	18.2%	7.4%
Family Housing	-0.8%	-43.3%	1.0%	-18.6%	4.7%	-11.9%	-29.5%	48.2%	-32.9%	-2.0%
Revolving Funds	2.0%	3.5%	1.8%	-4.8%	-31.7%	228.5%	-55.4%	-71%	-71.9%	262.0%
Total	4.4%	-1.2%	-0.7%	-1.2%	-11.4%	1.3%	1.4%	5.2%	-1.4%	5.8%

Numbers do not add due to rounding.

TRACKING USAF'S BLUE-ONLY SHARE AS PERCENTAGE OF BASE DOD BUDGET



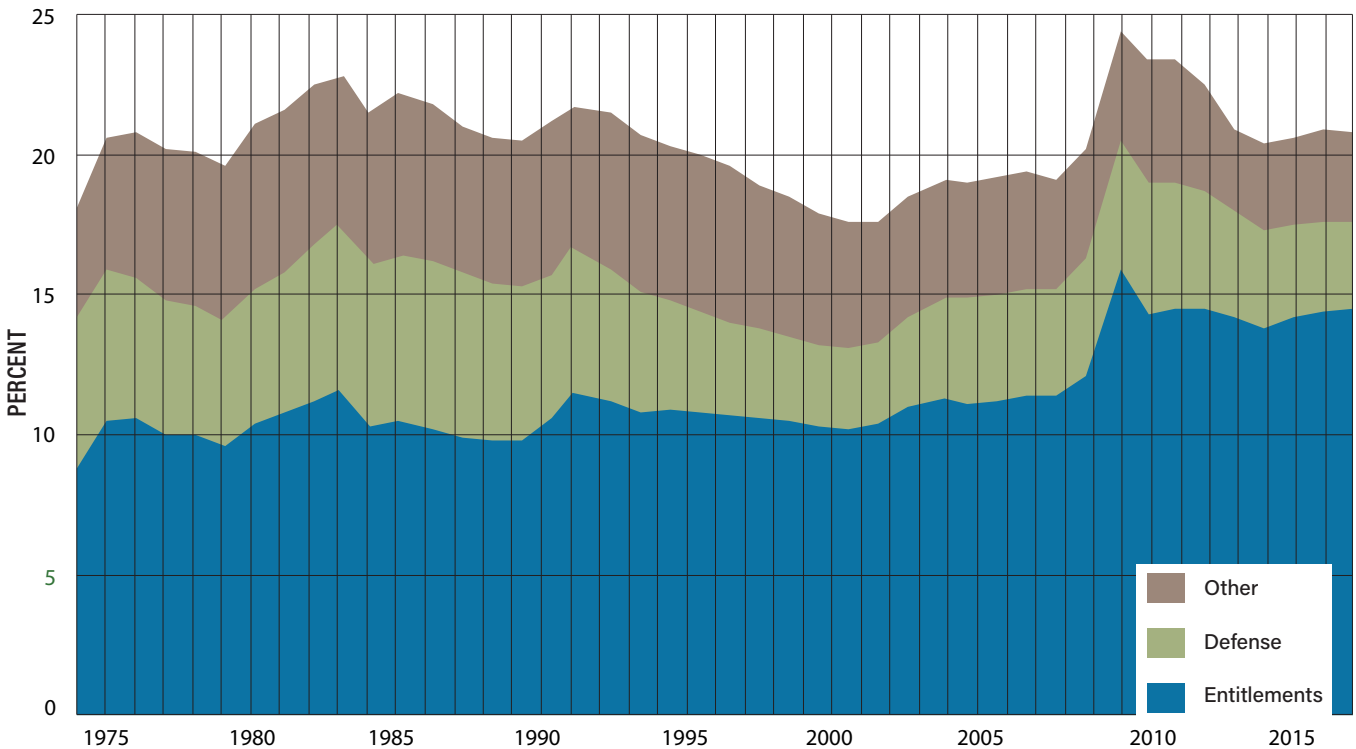
The Air Force budget includes Blue dollars, money for USAF programs, and non-Blue dollars, money (such as some intelligence- and space-related funding) USAF does not manage but that simply passes through Air Force accounts.

FEDERAL BUDGET OUTLAY CATEGORIES AS PERCENTAGE OF GDP

YEAR	TOTAL OUTLAYS	DEFICIT/SURPLUS	ENTITLEMENTS	DEFENSE	YEAR	TOTAL OUTLAYS	DEFICIT/SURPLUS	ENTITLEMENTS	DEFENSE
1974	18.1	-0.5	8.8	5.4	1996	19.6	-2.2	10.7	3.3
1975	20.6	-3.4	10.5	5.4	1997	18.9	-1.2	10.6	3.2
1976	20.8	-3.9	10.6	5.0	1998	18.5	-0.3	10.5	3.0
1977	20.2	-2.5	10.0	4.8	1999	17.9	-0.0	10.3	2.9
1978	20.1	-2.4	10.0	4.6	2000	17.6	+0.9	10.2	2.9
1979	19.6	-1.5	9.6	4.5	2001	17.6	-0.3	10.4	2.9
1980	21.1	-2.6	10.4	4.8	2002	18.5	-2.9	11.0	3.2
1981	21.6	-2.4	10.8	5.0	2003	19.1	-4.8	11.3	3.6
1982	22.5	-3.6	11.2	5.6	2004	19.0	-4.7	11.1	3.8
1983	22.8	-5.9	11.6	5.9	2005	19.2	-3.8	11.2	3.8
1984	21.5	-4.7	10.3	5.8	2006	19.4	-3.2	11.4	3.8
1985	22.2	-5.2	10.5	5.9	2007	19.1	-2.4	11.4	3.8
1986	21.8	-5.2	10.2	6.0	2008	20.2	-4.4	12.1	4.2
1987	21.0	-3.5	9.9	5.9	2009	24.4	-10.8	15.9	4.6
1988	20.6	-3.7	9.8	5.6	2010	23.4	-9.3	14.3	4.7
1989	20.5	-3.7	9.8	5.5	2011	23.4	-8.9	14.5	4.5
1990	21.2	-4.7	10.6	5.1	2012	22.1	-7.2	14.1	4.2
1991	21.7	-5.3	11.5	5.2	2013	20.9	-4.4	14.2	3.8
1992	21.5	-5.3	11.2	4.7	2014	20.4	-3.0	13.8	3.5
1993	20.7	-4.4	10.8	4.3	2015	20.6	-2.6	14.2	3.3
1994	20.3	-3.6	10.9	3.9	2016	20.9	-3.4	14.4	3.1
1995	20.0	-3.0	10.8	3.6	2017	20.8	-3.7	14.5	3.1

This data is based on figures from the the White House Office of Management and Budget.

FEDERAL BUDGET OUTLAY CATEGORIES AS PERCENTAGE OF GDP



Source: "The Budget and Economic Outlook: 2018 to 2028," Congressional Budget Office, January 2018.

DEFENSE BUDGET AUTHORITY

(In billions)

	Actual 2015	Enacted 2016	Planned 2017	2018	2019	2020	2021
No War Costs, Current Dollars	\$497.3	\$521.7	\$549.6	\$556.7	\$564.8	\$570.4	\$585.2
No War Costs, Constant FY19 Dollars	535.1	554.6	574.3	570.1	564.8	555.6	554.8
With War Costs, Current Dollars	560.4	580.3	619.2	626.4*	634.5*	640.1*	654.9*
With War Costs, Constant FY19 Dollars	603.0	616.9	647.1	641.4*	634.5*	623.5*	620.8*

*Includes placeholder value of \$67.9 billion in war funding.

CUTTING THE PIE: WHO GETS WHAT

(Budget authority in billions of constant FY19 dollars)

	2015	2016	2017	2018	2019	2020	2021
Military Personnel	\$145.2	\$143.8	\$142.4	\$141.2	\$140.1	\$139.7	\$139.1
O&M	211.2	209.9	228.8	224.3	224.9	223.3	221.5
Procurement	101	117.7	121.3	118.1	116.1	115.5	117.7
RDT&E	68.3	73.1	76.8	77	75	69.4	68.3
Military Construction	5.8	7.3	7.3	8.1	7.1	6	6.7
Family Housing	1.2	1.4	1.3	1.4	1.5	1.4	1.4
Revolving Funds	2.4	1.3	2.4	0.1	0.1	0.1	0.2
Total	\$535.1	\$554.5	\$574.3	\$570.2	\$564.8	\$555.4	\$554.9

SERVICE AND AGENCY SHARES OF BASE DOD BUDGET

(Budget authority in billions of constant FY19 dollars)

Planned

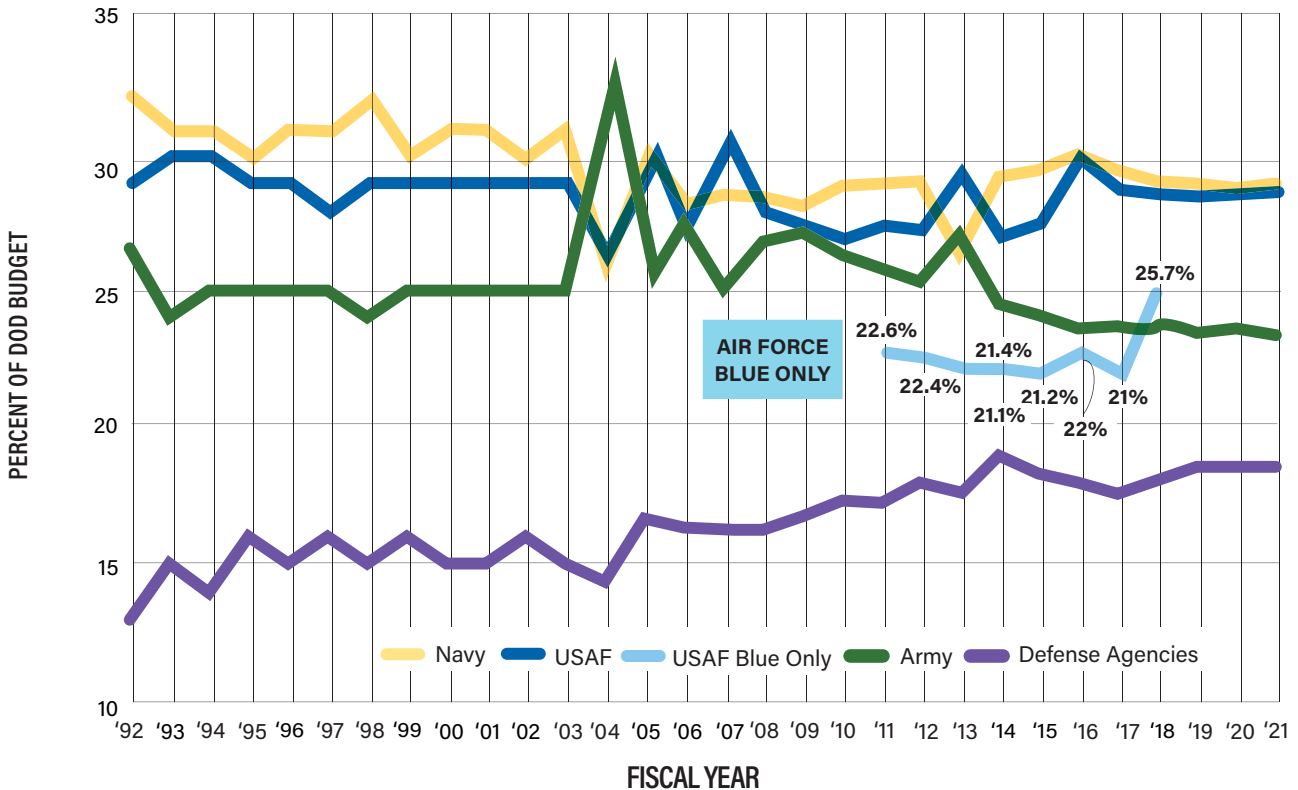
	2015	2016	2017	2018	2019	2020	2021
Constant Dollars							
Air Force	\$147.6	\$154.9	\$165.3	\$163.0	\$161.0	\$158.8	\$159.0
Army	129.2	131.0	136.2	135.2	132.8	131.0	129.7
Navy/Marine Corps	160.8	169.4	172.1	168.9	166.5	162.8	163.4
Defense Agencies	97.6	99.3	100.7	102.8	104.5	103.0	102.7
Total	\$535.1	\$554.5	\$574.3	\$570.1	\$564.8	\$555.5	\$554.8
Percentages							
Air Force	27.6%	27.9%	28.8%	28.6%	28.5%	28.6%	28.7%
Army	24.1%	23.6%	23.7%	23.7%	23.5%	23.6%	23.4%
Navy/Marine Corps	30.0%	30.5%	30.0%	29.6%	29.5%	29.3%	29.5%
Defense Agencies	18.2%	17.9%	17.5%	18.0%	18.5%	18.5%	18.5%

USAF shares above include non-Blue funding. Outyears estimates based on FY19 shares.

USAF's Blue-only Share

Dollars	\$113.2	\$121.9	\$120.4	\$146.5
Percentages	21.20%	22.0%	21.00%	25.70%

SERVICE AND AGENCY PERCENTAGE OF BASE DOD BUDGET





Above: The F-35A Lightning II has \$618.5 million budgeted for RDT&E in 2019. Right: Airmen prepare GBU-31 JDAMs at Davis-Monthan AFB, Ariz. GPS-guided bombs have \$15.8 million RDT&E budgeted.



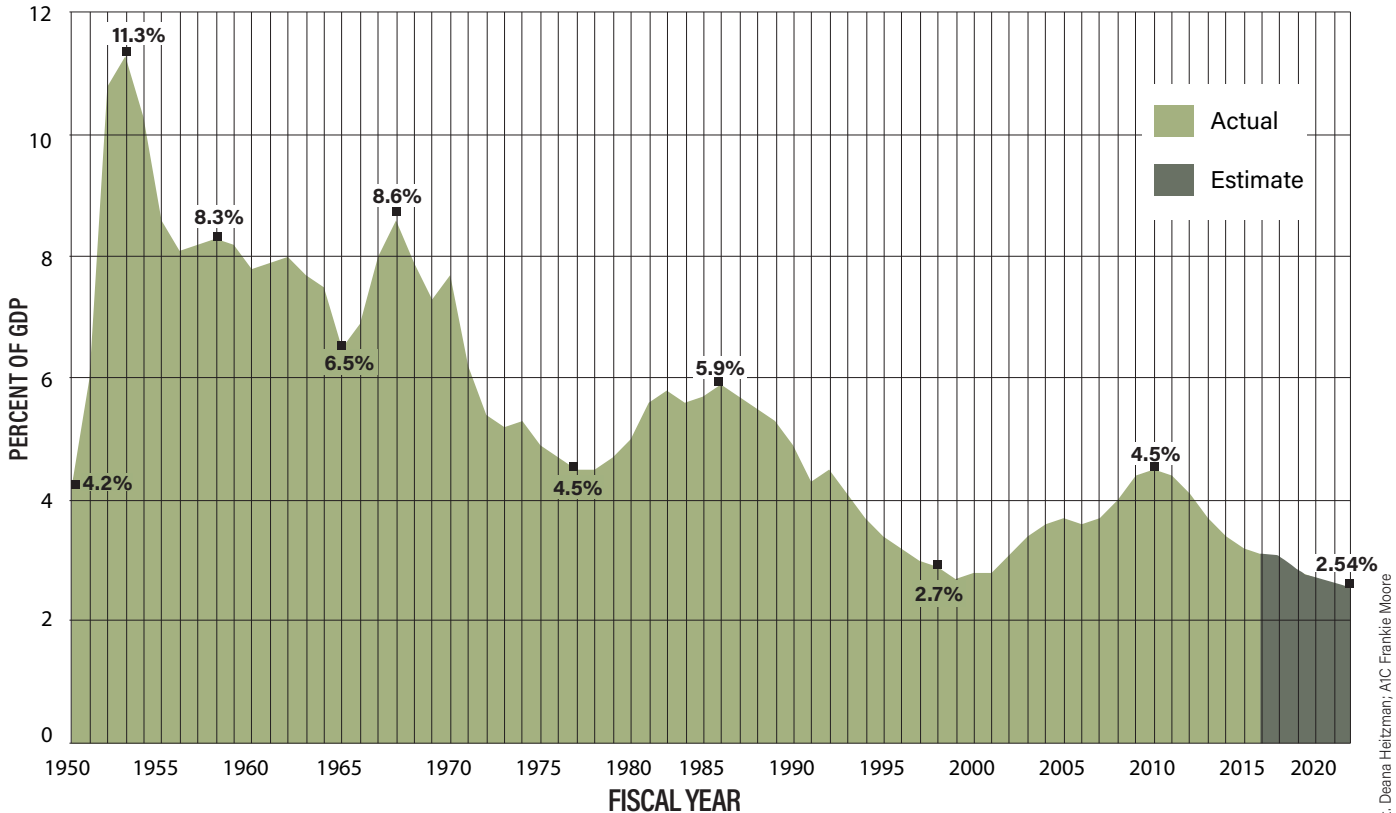
DEFENSE OUTLAYS

(In billions)

	2015	2016	2017	Planned			
	2015	2016	2017	2018	2019	2020	2021
Current Dollars	\$562.5	\$576.3	\$586.8	\$568.6	\$569.9	\$575.3	\$582.0
Constant FY19 Dollars	\$605.3	\$612.6	\$613.2	\$582.2	\$569.9	\$560.3	\$551.7

This data is based on figures from the the White House Office of Management and Budget.

DEFENSE OUTLAYS AS A SHARE OF GROSS DOMESTIC PRODUCT



This data is based on figures from the the White House Office of Management and Budget.

MAJOR USAF PROGRAMS RDT&E

(Current million dollars)

Enacted

PROGRAM		2017	2018	2019
BOMBER	B-1B Lancer	\$4.6	\$62.5	\$76.0
	B-2A Spirit	401.1	387.7	367.3
	B-21 Raider	1,290.3	2,003.6	2,314.2
	B-52H Stratofortress	74.6	111.9	280.4
FIGHTER/ ATTACK	A-10C Thunderbolt II	11.4	17.5	27.7
	F-15C/D/E Eagle/Strike Eagle	585.7	530.1	330.0
	F-16C/D Fighting Falcon	132.1	246.6	191.6
	F-22A Raptor	432.4	624.5	603.6
	F-35A Lightning II	507.8	627.5	618.5
HELO	HH-60G/U Pave Hawk	263.3	354.5	457.7
	UH-1N Iroquois	86.9	108.6	288.0
ICBM	Minuteman III	446.6	400.6	389.2
ISR/IM/C3	Air & Space Ops Center	51.0	146.7	106.1
	Airborne Recon Systems	34.4	18.7	189.6
	Airborne Sigint Enterprise	95.3	121.9	106.9
	DCGS	42.0	53.9	80.6
	E-3B/C/G Sentry (AWACS)	85.7	151.7	120.7
	E-4B NAOC	25.1	43.3	67.5
	E-8C JSTARS	113.3	417.2	14.9
	EC-130H/J Compass Call/Commando Solo	13.7	14.0	13.9
	Endurance UAV	50.0	0.0	0.0
	MQ-1B Predator	0.0	0.0	0.0
	MQ-9A Reaper	167.2	201.4	119.8
	NATO AGS	38.9	44.7	51.5
	RC-135S/U/V/W	0.0	0.0	0.0
	RQ-4B Global Hawk	244.8	214.8	221.7
U-2S Dragon Lady	37.2	34.5	70.6	
MOBILITY	C-5A/B/C/M Galaxy	65.1	22.8	25.1
	C-17A Globemaster III	12.0	34.3	48.3
	C-130H Hercules	15.6	10.2	106.0
	C-130J Super Hercules	16.2	26.8	15.4
	KC-10A Extender	3.5	7.9	6.6
	KC-46A Pegasus	211.5	93.8	88.2
	PAR	311.3	434.1	673.0
MUNITION	AGM-158A JASSM	23.1	29.9	60.1
	AIM-9X Sidewinder	51.5	35.0	37.2
	AIM-120 AMRAAM	53.3	61.3	61.4
	GBU-31/32/38 JDAM	9.9	0.0	15.8
	GBU-39 SDB	37.6	39.0	73.2
	AGM-114 Hellfire	0.0	0.0	0.0
SOF	AC-130H/J/U/W	0.0	0.0	0.0
	CV-22B Osprey	27.7	22.5	18.5
	HC/MC-130H/J/P	8.7	38.6	32.6
	Tactical Air Control Party Modifications	11.4	10.6	6.1
SPACE	AEHF	221.6	145.6	151.5
	Counterspace Systems	32.6	66.4	20.7
	Cyberspace	295.5	454.7	534.7
	DSRP	0.0	0.0	0.0
	EELV	381.4	297.6	245.4
	GPS	674.6	774.9	808.8
	Joint Space Ops Center	76.5	99.5	72.3
	MilSatCom	44.3	96.7	410.5
	SBIRS	162.0	382.9	703.7
	Space Control Technology	8.5	15.6	92.1
	Space Fence	162.5	35.9	20.2
	Space Situation Awareness	92.5	158.5	200.7
	Spacelift Range System	21.1	10.5	10.6
	Wideband Global SATCOM	73.9	14.3	4.0
GRAND TOTAL	\$8,341.10	\$10,358.30	\$11,650.50	

MAJOR USAF PROGRAMS PROCUREMENT

(Current million dollars)

Enacted

PROGRAM		2017	2018	2019
BOMBER		\$150.3	\$155.6	\$55.3
		39.1	97.2	62.1
		0.0	0.0	0.0
		137.1	109.5	118.3
FIGHTER/ ATTACK		82.8	6.0	109.1
		148.4	439.7	698.3
		277.7	221.9	336.0
		194.5	331.2	265.2
		5,602.7	6,173.6	5,320.3
HELO		94.1	76	96
		18.3	0	0
ICBM		68.7	80.1	129.2
ISR/IM/C3		15.3	25.5	40.1
		0.0	0.0	0.0
		0.0	0.0	0.0
		237.5	187.6	450.3
		334.6	354.6	191.7
		53.3	30.5	67.9
		28.9	16.2	22.9
		315.7	223.3	1194.4
		0.0	0.0	0.0
		0.0	0.0	0.0
		715.2	709.4	749.0
		0.0	0.0	0.0
		306.7	350.5	762.0
		38.6	130.7	64.4
	36.1	34.4	56.7	
MOBILITY		24.2	43.4	77.8
		101.3	164.4	112.2
		230.2	66.3	22.1
		468.1	350.1	178.7
		4.6	4.2	11.1
		2,567.2	2,551.9	2,568.5
		0.0	0.0	0.0
MUNITION		431.6	441.4	492.3
		127.4	125.4	121.3
		325.9	304.3	340.5
		682.1	710.1	972.6
		266.7	371.0	346.6
		175.3	329.3	368.8
SOF		0.0	0.0	0.0
		160.4	65.5	60.4
		1,008.3	858.6	1,561.3
		0.0	0.0	0.0
SPACE		645.6	57.0	29.8
		46.9	28.8	1.1
		127.6	160.8	102.8
		128.7	0.0	0.0
		1,253.4	1,563.9	1,704.5
		45.9	88.1	71.6
		0.0	0.0	0.0
		41.8	35.3	11.3
		355.1	1,245.8	138.4
		0.0	0.0	0.0
		0.0	0.0	51.4
		0.0	0.0	0.0
		120.8	113.9	117.6
		48.0	80.8	61.6
GRAND TOTAL	\$18,154.80	\$19,495.80	\$19,313.50	

AIRCRAFT TOTAL ACTIVE INVENTORY (TAI)

(As of Sept. 30, 2017)

	ACTIVE	ANG	AFRC	TOTAL FORCE
Bomber				
B-1B Lancer	62	0	0	62
B-2A Spirit	20	0	0	20
B-52H Stratofortress	57	0	18	75
Total	139	0	18	157
Fighter/Attack				
A-10C Thunderbolt II	141	85	55	281
F-15C Eagle	89	123	0	212
F-15D Eagle	9	14	0	23
F-15E Strike Eagle	218	0	0	218
F-16C Fighting Falcon	446	288	52	786
F-16D Fighting Falcon	108	45	2	155
F-22A Raptor	167	20	0	187
F-35A Lightning II	119	0	0	119
Total	1,297	575	109	1,981
Special Operations Forces				
AC-130J Ghosthunter	8	0	0	8
AC-130U Spooky	16	0	0	16
AC-130W Stinger II	10	0	0	10
CV-22B Osprey	50	0	0	50
MC-130H Combat Talon II	17	0	0	17
MC-130J Commando II	37	0	0	37
MC-130P Combat Shadow	0	4	0	4
Total	138	4	0	142
ISR/BM/C3				
E-3B Sentry (AWACS)	11	0	0	11
E-3C Sentry (AWACS)	3	0	0	3
E-3G Sentry (AWACS)	17	0	0	17
E-4B NAOC	4	0	0	4
E-8C JSTARS	0	16	0	16
TE-8A JSTARS (trainer)	0	1	0	1
E-9A Widget	2	0	0	2
E-11A BACN	4	0	0	4
EC-130H Compass Call	15	0	0	15
EC-130J Commando Solo	0	7	0	7
MQ-1B Predator	90	31	0	121
MQ-9A Reaper	198	20	0	218
NC-135W (test bed)	1	0	0	1
OC-135B Open Skies	2	0	0	2
RC-26B Condor	0	11	0	11
RC-135S Cobra Ball	3	0	0	3
RC-135U Combat Sent	2	0	0	2
RC-135V Rivet Joint	8	0	0	8
RC-135W Rivet Joint	12	0	0	12
RQ-4B Global Hawk	33	0	0	33
TC-135W (trainer)	3	0	0	3
TU-2S Dragon Lady (trainer)	4	0	0	4
U-2S Dragon Lady	27	0	0	27
WC-130H Hercules	0	7	0	7
WC-130J Hercules	0	0	10	10
WC-135C Constant Phoenix	1	0	0	1
WC-135W Constant Phoenix	1	0	0	1
Total	441	93	10	544

	ACTIVE	ANG	AFRC	TOTAL FORCE
Tanker				
HC-130J Combat King II	19	1	0	20
HC-130N King	1	6	0	7
HC-130P King	0	3	0	3
KC-10A Extender	59	0	0	59
KC-135R Stratotanker	125	147	72	344
KC-135T Stratotanker	30	24	0	54
Total	234	181	72	487
Transport				
C-5C Galaxy	1	0	0	1
C-5M Super Galaxy	40	0	11	51
C-12C Huron	16	0	0	16
C-12D Huron	6	0	0	6
C-12F Huron	3	0	0	3
C-12J Huron	4	0	0	4
C-17A Globemaster III	162	42	18	222
C-21A Learjet	20	2	0	22
C-32A Air Force Two	4	0	0	4
C-32B Air Force Two	0	2	0	2
C-37A Gulfstream V	9	0	0	9
C-37B Gulfstream V	3	0	0	3
C-40B Clipper	4	0	0	4
C-40C Clipper	0	3	4	7
C-130H Hercules	5	135	48	188
C-130J Super Hercules	84	16	10	110
LC-130H Hercules	0	10	0	10
VC-25A Air Force One	2	0	0	2
Total	363	210	91	664
Helicopter				
HH-60G Pave Hawk	65	17	15	97
HH-60U Pave Hawk	3	0	0	3
TH-1H Iroquois (trainer)	28	0	0	28
UH-1N Iroquois	63	0	0	63
Total	159	17	15	191
Trainer				
T-1A Jayhawk	178	0	0	178
T-6A Texan II	444	0	0	444
T-38A Talon	53	0	0	53
(A)T-38B Talon	6	0	0	6
T-38C Talon	444	0	0	444
T-41D Mescalero	4	0	0	4
T-51A Cessna	3	0	0	3
T-53A Kadet II	24	0	0	24
UV-18B Twin Otter	3	0	0	3
Gliders	24	0	0	24
Total	1,183	0	0	1,183
GRAND TOTAL	3,954	1,080	315	5,349

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.

TOTAL NUMBER OF AIRCRAFT IN SERVICE OVER TIME

(As of Sept. 30, 2017)

TYPE OF AIRCRAFT—ACTIVE	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17
Bomber	153	154	150	144	144	141	141	140	140	139
Fighter/Attack	1,496	1,468	1,256	1,287	1,289	1,287	1,273	1,312	1,282	1,297
Special Ops Forces	94	89	98	105	117	122	124	144	132	138
ISR/BM/C3	292	320	362	381	413	394	444	437	434	441
Tanker	262	260	263	247	246	243	244	239	236	234
Transport	449	452	458	429	425	413	410	381	384	363
Helicopter	170	159	160	151	170	138	137	157	160	131
Trainer	1,074	1,114	1,000	1,190	1,213	1,189	1,195	1,187	1,194	1,211
Total Active Duty	3,990	4,016	3,747	3,934	4,017	3,927	3,968	3,997	3,962	3,954

TYPE OF AIRCRAFT—ANG	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17
Bomber	0	0	0	0	0	0	0	0	0	0
Fighter/Attack	687	664	614	639	635	630	585	611	577	575
Special Ops Forces	4	4	4	4	4	4	4	4	4	4
ISR/BM/C3	45	45	80	80	87	86	88	91	89	93
Tanker	215	182	179	189	189	187	185	184	181	181
Transport	244	241	240	242	232	223	207	207	212	210
Helicopter	18	17	17	17	17	17	17	17	17	17
Total ANG	1,213	1,153	1,134	1,171	1,164	1,147	1,086	1,114	1,080	1,080

TYPE OF AIRCRAFT—AFRC	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17
Bomber	9	9	9	18	18	18	18	18	18	18
Fighter/Attack	103	108	97	100	101	95	104	111	111	109
Special Ops Forces	14	14	10	10	5	4	0	0	0	0
ISR/BM/C3	11	11	14	12	11	11	10	10	10	10
Tanker	69	69	69	72	72	71	68	68	72	72
Transport	149	149	149	152	148	147	145	139	101	91
Helicopter	15	15	15	15	15	15	15	15	15	15
Total AFRC	370	375	363	379	370	361	360	361	327	315

TOTAL FORCE	5,573	5,544	5,244	5,484	5,551	5,435	5,414	5,472	5,369	5,349
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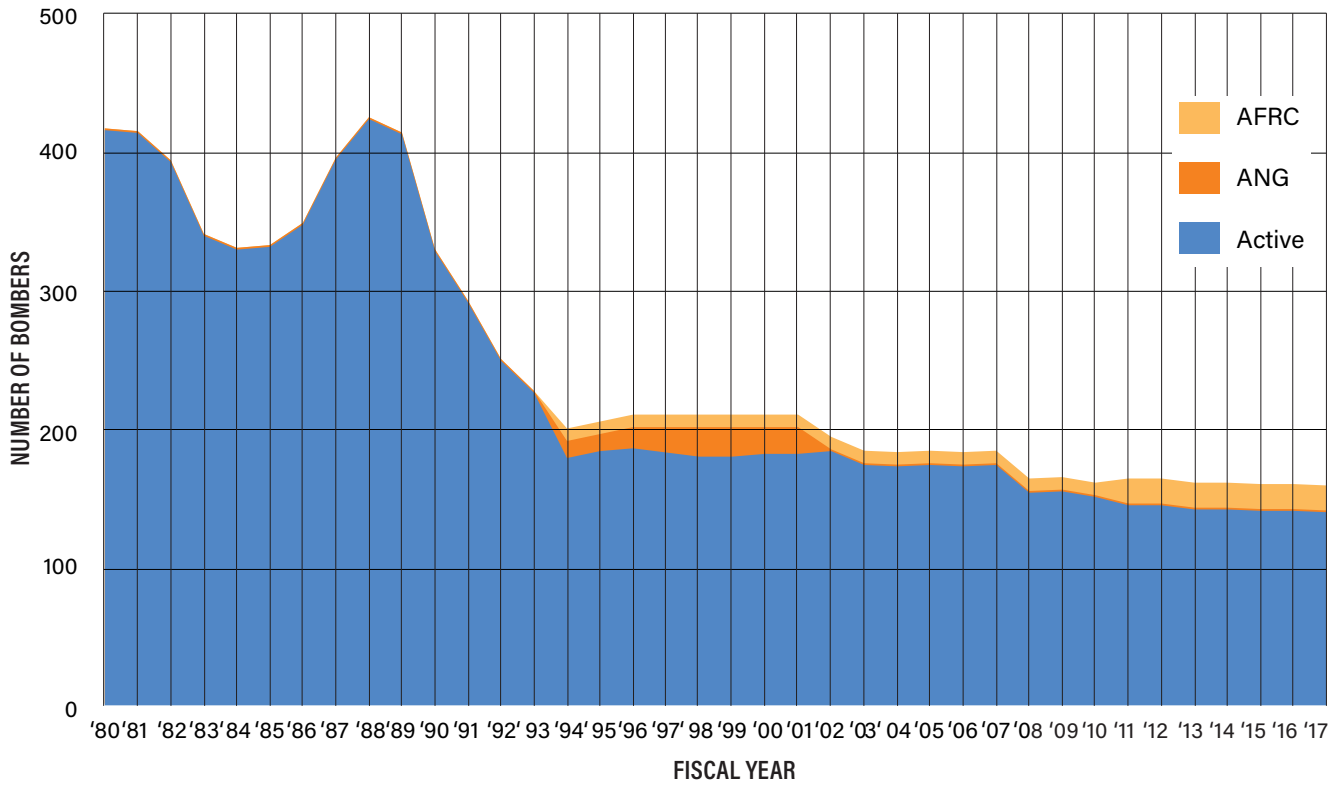
ICBMs AND SPACECRAFT IN SERVICE OVER TIME

(As of Sept. 30, 2017)

TYPE OF SYSTEM	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17
Minuteman III	450	450	450	450	450	450	450	450	406	400
Total ICBMs	450	450	450	450	450	450	450	450	406	400
AEHF	0	0	1	1	2	2	3	3	3	3
ATRR	0	0	0	0	1	1	0	0	0	1
DMSP	6	6	6	6	4	4	6	6	6	5
DSCS	9	9	8	8	8	8	7	6	6	6
DSP (classified)										
GPS	30	30	36	34	30	31	38	41	37	35
GSSAP	0	0	0	0	0	0	2	2	4	4
Milstar	5	5	5	5	5	5	5	5	5	5
SBIRS				1	1	2	2	2	2	3
SBSS	0	0	1	1	1	1	1	1	1	1
WGS	0	2	3	3	3	4	6	7	7	9
Total Satellites	50	52	60	59	55	58	70	73	71	72

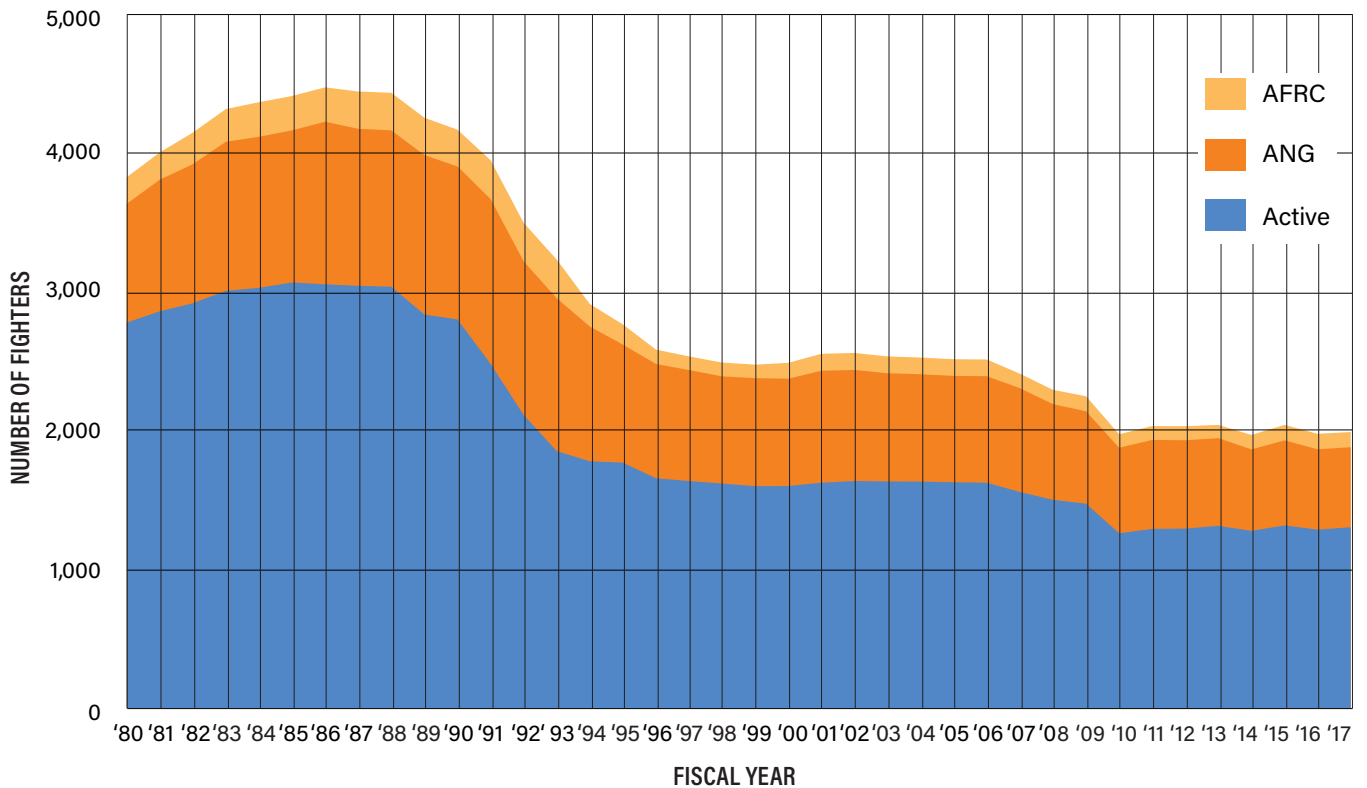
AEHF: Advanced Extremely High Frequency; **ATRR:** Advanced Technology Risk Reduction; **DMSP:** Defense Meteorological Satellite Program; **DSCS:** Defense Satellite Communications System; **DSP:** Defense Support Program; **GPS:** Global Positioning System; **GSSAP:** Geosynchronous Space Situational Awareness Program; **SBIRS:** Space Based Infrared System; **SBSS:** Space Based Surveillance System; **WGS:** Wideband Global SATCOM.

BOMBERS OVER TIME



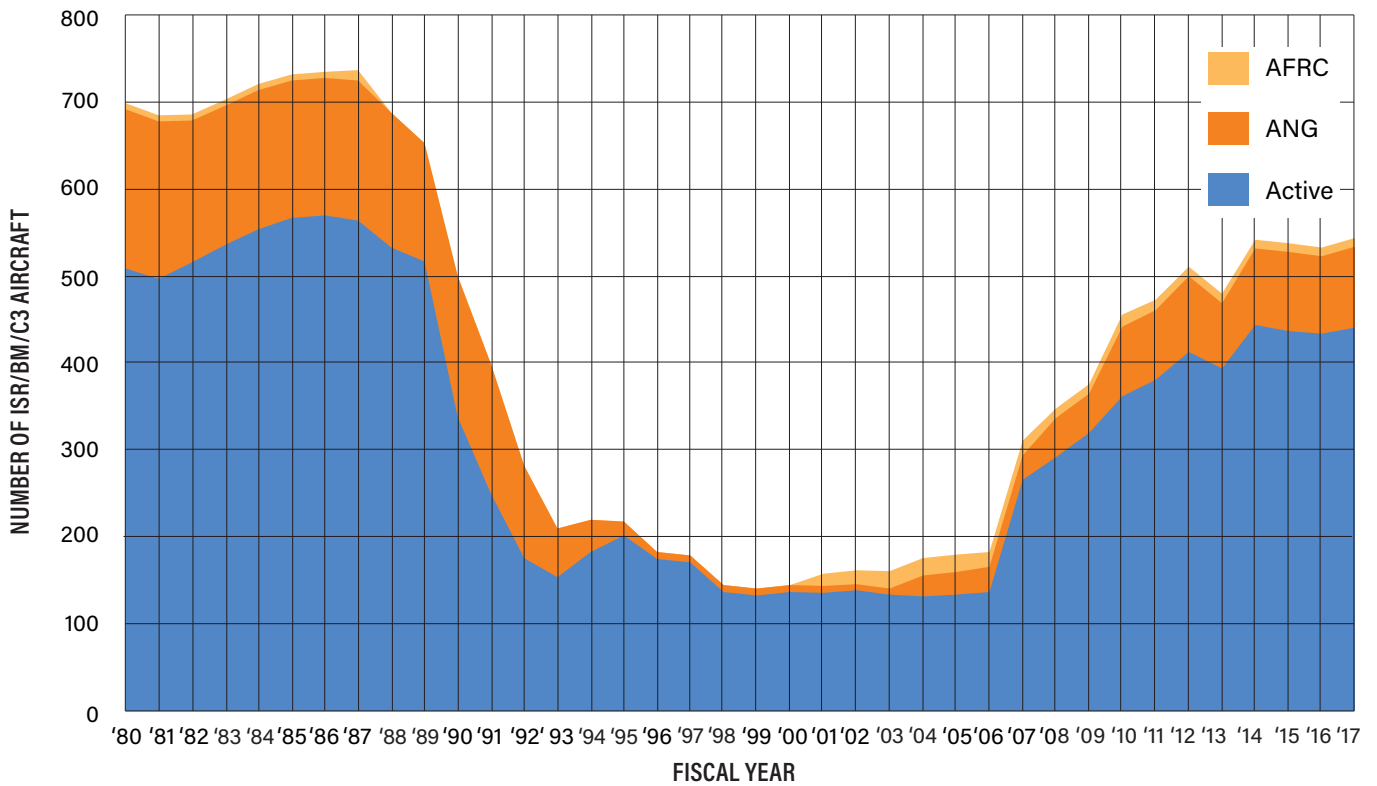
Source for historical data (1980-2000): "Arsenal of Airpower: USAF Aircraft Inventory, 1950-2009," Mitchell Institute Press, November 2010.

FIGHTERS OVER TIME



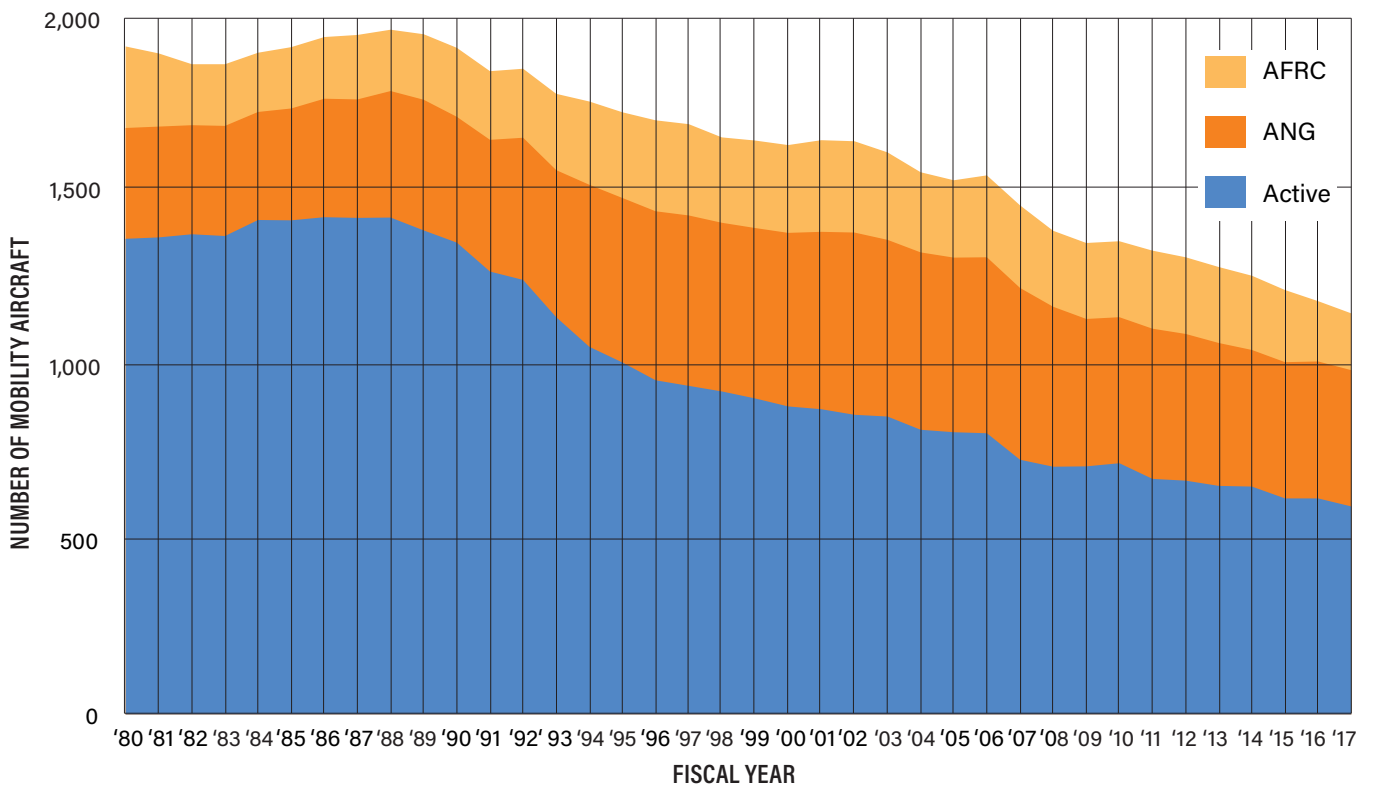
Source for historical data (1980-2000): "Arsenal of Airpower: USAF Aircraft Inventory, 1950-2009," Mitchell Institute Press, November 2010.

ISR/BM/C3 AIRCRAFT



Source for historical data (1980-2000): "Arsenal of Airpower: USAF Aircraft Inventory, 1950-2009," Mitchell Institute Press, November 2010.

MOBILITY AIRCRAFT OVER TIME



Source for historical data (1980-2000): "Arsenal of Airpower: USAF Aircraft Inventory, 1950-2009," Mitchell Institute Press, November 2010.

TOTAL FORCE AIRCRAFT AGE

(As of Sept. 30, 2017)

	TOTAL FORCE TAI	AVERAGE AGE
Bomber		
B-1B Lancer	62	30.1
B-2A Spirit	20	23.2
B-52H Stratofortress	75	55.8
Total	157	41.6
Fighter/Attack		
A-10C Thunderbolt II	281	36.4
F-15C Eagle	212	33.4
F-15D Eagle	23	32.9
F-15E Strike Eagle	218	25.4
F-16C Fighting Falcon	786	26.7
F-16D Fighting Falcon	155	27.4
F-22A Raptor	187	10.0
F-35A Lightning II	119	2.6
Total	1,981	25.8
Special Operations Forces		
AC-130J Ghosthunter	8	2.0
AC-130U Spooky	16	26.7
AC-130W Stinger II	10	28.2
CV-22B Osprey	50	5.6
MC-130H Combat Talon II	17	29.2
MC-130J Commando II	37	3.5
MC-130P Combat Shadow	4	50.9
Total	142	12.9
ISR/BM/C3		
E-3B Sentry (AWACS)	11	39.6
E-3C Sentry (AWACS)	3	34.5
E-3G Sentry (AWACS)	17	37.5
E-4B NAOC	4	43.4
TE-8A JSTARS	1	26.7
E-8C JSTARS	16	16.8
E-9A Widget	2	25.0
E-11A BACN	4	5.7
EC-130H Compass Call	15	44.3
EC-130J Commando Solo	7	17.3
MQ-1B Predator	121	10.4
MQ-9A Reaper	218	4.4
NC-135W (test bed)	1	55.5
OC-135B Open Skies	2	55.4
RC-26B Condor	11	23.4
RC-135S Cobra Ball	3	55.5
RC-135U Combat Sent	2	52.7
RC-135V Rivet Joint	8	52.9
RC-135W Rivet Joint	12	54.7
RQ-4B Global Hawk	33	6.6
TC-135W (trainer)	3	55.3
TU-2S Dragon Lady (trainer)	4	32.9
U-2S Dragon Lady	27	34.7
WC-130H Hercules	7	51.7
WC-130J Hercules (Hurricane Hunter)	10	16.5
WC-135C Constant Phoenix	1	53.3
WC-135W Constant Phoenix	1	55.4
Total	544	15.8

	TOTAL FORCE TAI	AVERAGE AGE
Tanker		
HC-130J Combat King II	20	3.7
HC-130N King	7	27.1
HC-130P King	3	51.4
KC-10A Extender	59	32.7
KC-135R Stratotanker	344	55.9
KC-135T Stratotanker	54	57.6
Total	487	50.7
Transport		
C-5C Galaxy	1	47.2
C-5M Super Galaxy	51	30.4
C-12C Huron	16	41.2
C-12D Huron	6	33.4
C-12F Huron	3	32.6
C-12J Huron	4	29.7
C-17A Globemaster III	222	14.0
C-21A Learjet	22	32.3
C-32A Air Force Two	4	19.0
C-32B Air Force Two	2	14.3
C-37A Gulfstream V	9	16.7
C-37B Gulfstream V	3	7.7
C-40B Clipper	4	13.7
C-40C Clipper	7	11.4
C-130H Hercules	188	27.9
C-130J Hercules	110	8.8
LC-130H Hercules	10	32.1
VC-25A Air Force One	2	27.0
Total	664	20.3
Helicopter		
HH-60G Pave Hawk	97	27.0
HH-60U Pave Hawk	3	6.4
TH-1H Iroquois	28	35.5
UH-1N Iroquois	63	44.7
Total	191	28.4
Trainer		
T-1A Jayhawk	178	22.9
T-6A Texan II	444	12.0
T-38A Talon	53	50.9
(A)T-38B Talon	6	54.1
T-38C Talon	444	50.2
T-41D Mescalero	4	48.1
T-51A	3	12.2
T-53A	24	5.7
UV-18B Twin Otter	3	33.5
Gliders	24	7.4
Total	1,183	29.9
GRAND TOTAL	5,349	28.2

Average age for category totals and grand total are weighted by quantity of aircraft.

TACTICAL AIRCRAFT FLYING HOURS PER CREW PER MONTH

(As of Sept. 30, 2017)

Estimate

	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17
Active Duty	14.4	17.0	19.4	17.7	13.5	14.8	13.2	13.2	13.2	12.9
ANG	9.0	9.0	8.5	7.8	7.1	9.6	9.3	10.9	9.6	n/a
AFRC	14.4	14.1	14.9	16.5	15.8	12.3	12.0	12.6	11.9	16.4

OPERATIONAL TRAINING RATES

Estimate

Estimate

	1990	2000	FY10	FY17	FY18	FY19
Air Force						
Flying hours per crew per month, fighter/attack aircraft	19.5	17.2	19.4	12.9	14.1	14.1
Army						
Flying hours per tactical crew per month	14.2	12.7	12.0	8.3	10.6	10.8
Navy						
Flying hours per tactical crew per month	23.9	20.9	16.6	18.9	17.1	19.7

USAF Aircraft Tail Codes



C-130Js displaying the YJ tail code from Yokota AB, Japan.

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 AFB, Colo.
CT 103rd AW (ANG), Bradley ANGB, Conn.
D 100th ARW (USAFE), RAF Mildenhall, UK
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 AFB, Fla.
FM 482nd FW (AFRC), Homestead ARB, Fla.
FS 188th Wing (ANG), Fort Smith Arpt., Ark.
FT 23rd Wing (ACC), Moody AFB, Ga.
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
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, UK
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
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 AFB, Texas
RS 86th AW (USAFE), Ramstein AB, Germany
SA 149th FW (ANG), JBSA-Lackland AFB, 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 RW (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

USAF Grades and Insignia

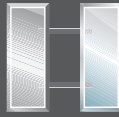
Officer



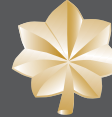
Second Lieutenant
(O-1)



First Lieutenant
(O-2)



Captain
(O-3)



Major
(O-4)



Lieutenant Colonel
(O-5)



Colonel
(O-6)



Brigadier General
(O-7)



Major General
(O-8)



Lieutenant General
(O-9)



General
(O-10)



Enlisted

Airman Basic
(E-1)
No insignia



Airman
(E-2)



Airman First Class
(E-3)



Senior Airman
(E-4)



Staff Sergeant
(E-5)



Technical
Sergeant
(E-6)



Master
Sergeant
(E-7)



Senior Master
Sergeant
(E-8)



Chief Master
Sergeant
(E-9)



First Sergeant
The diamond device, shown here on senior master sergeant stripes, denotes an E-7 through E-9 who advises and assists a squadron commander in managing unit activities.



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 advisor.



Chief Master Sergeant of the Air Force

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

Awards and Decorations, Continued



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

Devices



Bronze Star

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



Silver Star

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



Silver and Bronze Stars

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



Bronze Oak Leaf Cluster

For second and subsequent awards.



Silver Oak Leaf Cluster

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



Silver and Bronze OLCs

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



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.



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.



Combat Device

Denotes meritorious service or achievement performed under combat conditions.



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



Hourglass Device

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



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.



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.



Nuclear Device

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



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.



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



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Major Commands and

2018 USAF Almanac



A KC-10, F-22, E-3, RQ-4, and U-2 on the ramp at Al Dhafra AB, UAE.

Organization

■ **MAJOR COMMANDS** As significant subdivisions of the Air Force, majcoms conduct a considerable part of the service's mission and are directly subordinate to Headquarters, USAF.

Major commands are organized on a functional basis in the US 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.

Majcoms, in general, include the following organizational levels: numbered air force (NAF), wing, group, squadron, and flight. 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

The Air Force has 10 major commands and two Air Reserve Components. (Air Force Reserve Command is both a majcom and an ARC.)

without the burden of additional support staff functions.

There are two basic organizational schemes for Air Force major commands: unit-oriented organizations and major nonunit organizations. The standard unit-oriented scheme comprises majcom, NAF, wing, group, squadron, and flight levels. Alternatively, a majcom may oversee a center, directorate, division, branch, and section levels, or a combination thereof.

USAF has two types of major commands: lead majcom and component majcom (C-majcom). Some major commands are both lead majcoms and C-majcoms.

■ **COMPONENT MAJCOM** A C-majcom is the USAF component to a unified combatant command. The commander of a C-majcom is the commander of air force forces (COM-AFFOR) and may function as a theater joint force air and space component commander (JFACC) when required. A C-majcom has

one or more component NAFs (C-NAFs) through which it presents its forces to the combatant commander.

■ **NUMBERED AIR FORCE** A numbered air force, that level of command directly below a major command, provides operational leadership and supervision to its subordinate units: wings, groups, and squadrons. A C-NAF supports the commander of air forces at the operational and tactical level. USAF has designated some C-NAFs, rather than a majcom, as the Air Force component to a unified combatant command. In that role, the C-NAF functions at the strategic level as well as the operational and tactical levels and has a broader staff. (On the following pages, NAFs with "Air Forces" designations, such as Air Forces Southern, are C-NAFs.)

Personnel data on the following pages are as of Sept. 30, 2017.

Reserve Components



SSgt. Cotton Elliott

Acronyms

AA	active associate: ANG/AFRC own aircraft	CRF	centralized repair facility		rescue officers, and survival, evasion, resistance, and escape specialists)	NAS	Naval Air Station
AATTC	Advanced Airlift Tactics Training Center	CRG	contingency response group	GEODSS	Ground-based Electro- Optical Deep Space Surveillance system	NOSS	network operations security squadron
AEHF	Advanced Extremely High Frequency	CRTC	Combat Readiness Training Center	GPS	Global Positioning System	PARCS	Perimeter Acquisition Radar Attack Characterization System
ALCF	airlift control flight	CSDC	Consolidated Storage and Deployment Center (medical)	GSSAP	Geosynchronous Space Situational Awareness Program	RAOC	regional air operations center
AOC/G/S	air and space operations center/group/squadron	CSO	combat systems officer	ISR	intelligence, surveillance, and reconnaissance	RCC	rescue coordination center
ARB	Air Reserve Base	CW	combat weather	JB	Joint Base	ROTC	Reserve Officer Training Corps
ATCS	air traffic control squadron	DCGS	Distributed Common Ground Station	JBSA	Joint Base San Antonio	SBIRS	Space Based Infrared System
BM	battle management	DMSP	Defense Meteorological Satellite Program	JMS	Joint Space Operations Center (JSpOC) Mission System	SCMS	supply chain management squadron
BMEWS	Ballistic Missile Early Warning System	DSCS	Defense Satellite Communications System	JRB	Joint Reserve Base	SBSS	Space Based Surveillance System
C2	command and control	DSP	Defense Support Program	JROTC	Junior Reserve Officer Training Corps	SOS	special operations squadron
C3	command, control, and communications	DTOC	Distributed Training Operations Center	MAFFS	Modular Airborne Firefighting System	SOW	special operations wing
CACS	command and control squadron (space)	EIS(G)	engineering installation squadron (group)	MCE	mission control element	SPADOC	Space Defense Operations Center
CC	combat communications	EOD	explosive ordnance disposal	MGS	mobile ground station (space)	TACP	tactical air control party
CEF	civil engineering flight	FTU	formal training unit			TAI	total active inventory
CFACC	combined force air component commander	GA	Guardian Angel (pararescuemen, combat			WGS	Wideband Global Satcom
						WXF	Weather Flight

Ten Major Commands

Air Combat Command
 Air Education and Training Command
 Air Force Global Strike Command
 Air Force Materiel Command
 Air Force Reserve Command
 Air Force Space Command
 Air Force Special Operations Command
 Air Mobility Command
 Pacific Air Forces
 US Air Forces in Europe

Two Air Reserve Commands

Air Force Reserve Command
 Air National Guard

ACC



Air Combat Command

Headquarters: JB Langley-Eustis, Va.

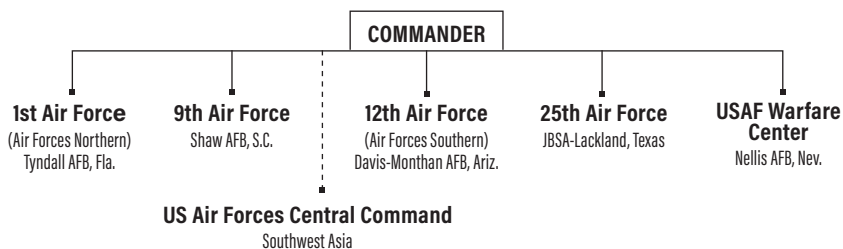
Date of current designation: June 1, 1992

Commander: Gen. James M. "Mike" Holmes

Primary Mission

Primary force provider of combat airpower—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		
Active Duty	Civilian	Total
76,304	10,748	87,052

EQUIPMENT (TAI)	
Fighter/Attack	637
Helicopter	39
ISR/BM/C3	368
Tanker	16
Trainer	45

WINGS/CENTERS	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
49th Wing	Holloman AFB, N.M.	MQ-9, QF-16
53rd Wing	Eglin AFB, Fla.	A-10C, B-1B, B-52H, E-9A, F-15C/D/E, F-16C/D, F-22A, F-35A, HC-130J, HH-60G, MQ-1, MQ-9, QF-16, RQ-4
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
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 support
325th FW	Tyndall AFB, Fla.	F-22A
355th FW	Davis-Monthan AFB, Ariz.	A-10C, 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 & Space Operations Center	Tyndall AFB, Fla.	Plan and direct air operations
633rd ABW	JB Langley-Eustis, Va.	Joint base facilities support
Air Force Rescue Coordination Center	Tyndall AFB, Fla.	National search and rescue coordination
Air Force Technical Applications Center	Patrick AFB, Fla.	Nuclear treaty monitoring, nuclear event detection



F-35s at Hill AFB, Utah, before a deployment to Japan.
R. Nial Bradshaw/USAF

AETC



Air Education and Training Command

Headquarters: JBSA-Randolph, Texas

Date of current designation: July 1, 1993

Commander: Lt. Gen. Steven L. Kwast

Primary Mission

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

AETC Structure



PERSONNEL		
Active Duty	Civilian	Total
55,758	14,317	70,075

EQUIPMENT (TAI)	
Fighter/Attack	203
Helicopter	50
Special Operations Forces	13
Tanker	22
Trainer	1,109
Transport	32

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
56th FW	Luke AFB, Ariz.	F-16, F-35
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 Center
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
314th Airlift Wing	Little Rock AFB, Ark.	C-130J
502nd ABW	JBSA-Fort Sam Houston, Texas	JBSA facilities support
Air Force Center for Arms Profession of Excellence	JBSA-Randolph, Texas	Professional training
Air Force 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 Professional Dev.	Maxwell AFB, Ala.	Professional and technical continuing education
Jeanne M. Holm Center for Officer Accessions	Maxwell AFB, Ala.	Officer training, ROTC and JROTC oversight and Citizen Development
Muir S. Fairchild Research Information Center	Maxwell AFB, Ala.	Information resources
Thomas N. Barnes Center for Enlisted Education	Maxwell AFB, Ala.	Enlisted PME



Amn. Tyana Haylock, an apprentice student with the 363rd Training Squadron, inspects the munitions systems of an F-15 Eagle during a training session at Sheppard AFB, Texas.

Liz Colunga/USAF

AFGSC



Air Force Global Strike Command

Headquarters: Barksdale AFB, La.

Date of current designation: Aug. 7, 2009

Commander: Gen. Robin Rand

Primary Mission

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

AFGSC Structure



PERSONNEL		
Active Duty	Civilian	Total
27,875	3,991	31,866

EQUIPMENT (TAI)	
Bomber	134
Helicopter	25
ICBM	400
ISR/BM/C3	4
Trainer	14

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
595th Command and Control Group	Offutt, Neb.	Command and control, E-4B

A B-2 stealth bomber prepares for takeoff from Whiteman AFB, Mo.

SrA. Jazmin Smith



AFMC



Air Force Materiel Command

Headquarters: Wright-Patterson AFB, Ohio

Date of current designation: July 1, 1992

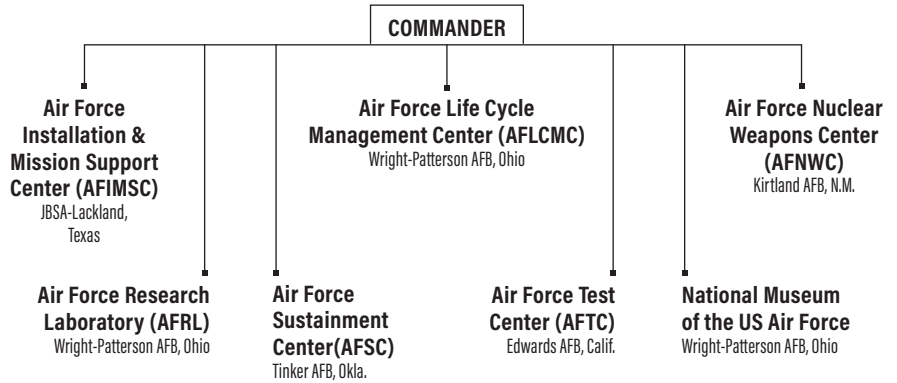
Commander: Gen. Ellen M. Pawlikowski

Primary Mission

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

PERSONNEL		
Active Duty	Civilian	Total
17,239	61,652	78,891
EQUIPMENT (TAI)		
Bomber		5
Fighter/Attack		47
Helicopter		5
ISR/BM/C3		24
Tanker		2
Trainer		15
Transport		30

AFMC Structure



	MAJOR UNITS	LOCATION	AIRCRAFT/MISSION/WEAPON
AFIMSC	Air Force Civil Engineer Center	JBSA-Lackland, Texas	Installation support (civil engineering)
	Air Force Financial Management Center of Expertise	Buckley AFB, Colo.	Installation support (financial analysis)
	Air Force Financial Services Center	Ellsworth AFB, S.D.	Installation support (payment processing)
	Air Force Installation Contracting Agency	Wright-Patterson AFB, Ohio	Enterprise contracting support
	Air Force Security Forces Center	JBSA-Lackland, Texas	Installation support (security forces programs)
	Air Force Services Activity	JBSA-Lackland, Texas	Installation support (lodging, recreation)
AFLCMC	Air Force Program Executive Officer-Agile Combat Support	Wright-Patterson AFB, Ohio	Systems acquisition
	AFPEO-Armament	Eglin AFB, Fla.	Systems acquisition
	AFPEO-Battle Management	Hanscom AFB, Mass.	Systems acquisition
	AFPEO-Business and Enterprise Systems	Maxwell AFB-Gunter Annex, Ala.	Systems acquisition
	AFPEO-C3I and Networks	Hanscom AFB, Mass.	Systems acquisition
	AFPEO-Fighters and Bombers	Wright-Patterson AFB, Ohio	Systems acquisition
	AFPEO-ISR and Special Operations Forces	Wright-Patterson AFB, Ohio	Systems acquisition
	AFPEO-Mobility	Wright-Patterson AFB, Ohio	Systems acquisition
	AFPEO-Presidential Aircraft Recapitalization	Wright-Patterson AFB, Ohio	Systems acquisition
	AFPEO-Tanker	Wright-Patterson AFB, Ohio	Systems acquisition
AFNWC	88th Air Base Wing (ABW)	Wright-Patterson AFB, Ohio	Base support
	AFPEO-Nuclear Command, Control, and Communications	Hanscom AFB, Mass.	Systems acquisition
AFRL	AFPEO-Strategic Systems	Kirtland AFB, N.M.	Systems acquisition
	Aerospace Systems	Wright-Patterson AFB, Ohio	Research and development (R&D)
	Air Force Office of Scientific Research	Arlington, Va.	Research
	Air Force 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	Airmen performance research and education
	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
	448th Supply Chain Management Wing	Tinker AFB, Okla.	Depot line repairables and consumables
	635th Supply Chain Operations Wing	Scott AFB, Ill.	Global sustainment support
AFTC	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

AFRC



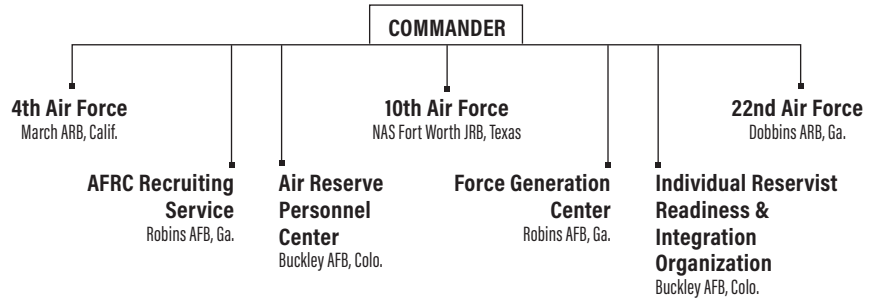
Air Force Reserve Command

Headquarters: Robins AFB, Ga.
Date of current designation: Feb. 17, 1997
Commander: Lt. Gen. Maryanne Miller

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.

AFRC Structure



PERSONNEL			
Total (Selected reserve)	Active Duty	Civilian (Includes technicians)	Total
69,000	392	12,519	81,911

EQUIPMENT (TAI)	
Bomber	18
Fighter/Attack	109
Helicopter	15
ISR/BM/C3	10
Tanker	72
Transport	91

WINGS/CENTERS	LOCATION	AIRCRAFT/MISSION/WEAPON
94th Airlift Wing (AW)	Dobbins ARB, Ga.	C-130H
301st Fighter Wing (FW)	NAS Fort Worth, JRB, Texas	F-16 (Texas) F-22, T-38 (Tyndall AFB, Fla.)
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
440th AW	Pope Field, N.C.	C-130H
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
908th AW	Maxwell AFB, Ala.	C-130H
910th AW	Youngstown ARS, Ohio	C-130H
911th AW	Pittsburgh Arpt., Pa.	Converting from C-130 to C-17
914th ARW	Niagara Falls ARS, N.Y.	KC-135R
916th ARW	Seymour Johnson AFB, N.C.	KC-135R
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 AFB, Fla.	HC-130N/P, HH-60G
926th Wing (classic associate)	Nellis AFB, Nev.	F-15C, F-15E, F-16, F-22A, F-35A, MQ-1 and MQ-9 (Creech AFB, Nev.), RQ-4 (Beale AFB, Calif.)
927th ARW (classic associate)	MacDill AFB, Fla.	KC-135R
932nd AW	Scott AFB, Ill.	C-40C
934th AW	Minneapolis-St. Paul Arpt., Minn.	C-130H
940th Air Refueling Wing	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.)

Classic associate: Active Duty unit owns aircraft.

AFSPC



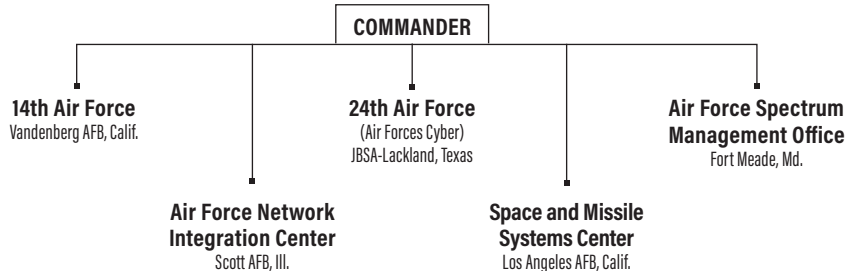
Air Force Space Command

Headquarters: Peterson AFB, Colo.
Date of current designation: Sept. 1, 1982
Commander: Gen. John W. "Jay" Raymond

Primary Mission

Organize, train, equip, maintain, and provide space and cyberspace operations forces. Develop, procure, and test space systems. Sustain national space launch facilities.

AFSPC Structure



PERSONNEL		
Active Duty	Civilian	Total
13,277	6,904	20,181

EQUIPMENT					
Air Force Satellite Control Network, BMEWS, Cyber Weapon Systems, GEODSS, JMS, Launch/test ranges, Pave Phased Array Warning System, PARCS, SPADOC, Space surveillance radars.					

Satellite systems (on orbit):

AEHF	3	DSP	Classified	SBIRS	3
ATRR	1	GPS	35	SBSS	1
DMSP	5	GSSAP	4	WGS	9
DSCS	6	Milstar	5		

WINGS/CENTERS	LOCATION	AIRCRAFT/MISSION/WEAPON
21st Space Wing (SW)	Peterson AFB, Colo.	Space control/warning
30th SW	Vandenberg AFB, Calif.	Space launch, ICBM test, launch range operations
45th SW	Patrick AFB, Fla.	Space launch, launch range operations
50th SW	Schriever AFB, Colo.	C2 space operations
67th Cyberspace Wing	JBSA-Lackland, Texas	Cyberspace operations
460th SW	Buckley AFB, Colo.	Space surveillance/warning
614th Air & Space Operations Center	Vandenberg AFB, Calif.	Theater and global space operations
624th Operations Center	JBSA-Lackland, Texas	Plan/direct cyber operations
688th Informations Operations Wing	JBSA-Lackland, Texas	Information operations, engineering installation



A ULA Atlas V rocket carrying a national reconnaissance payload lifts off from Vandenberg AFB, Calif.

Jeff Spotts/ULA

Unclassified Cyber Weapon Systems include Air Force Intranet Control (AFINC), Cyberspace Security and Control System (CSCS), Air Force Cyberspace Defense (ACD), Cyberspace Defense Analysis (CDA), and Cyberspace Vulnerability Assessment/Hunter (CVA/H).

AFSOC



Air Force Special Operations Command

Headquarters: Hurlburt Field, Fla.

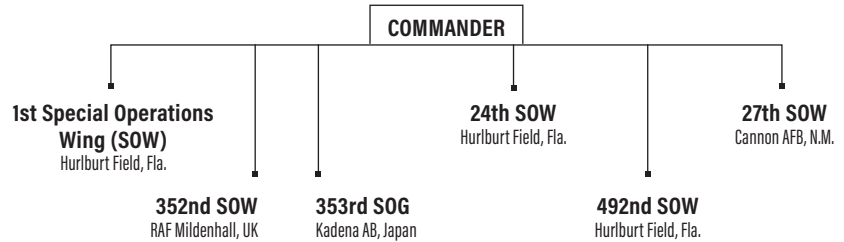
Date of current designation: May 22, 1990

Commander: Lt. Gen. Marshall B. "Brad" Webb

Primary Mission

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

AFSOC Structure



PERSONNEL		
Active Duty	Civilian	Total
14,694	1,735	16,429

EQUIPMENT (TAI)	
ISR/BM/C3	37
Special Operations Forces	125

MAJOR UNITS	LOCATION	AIRCRAFT/MISSION/WEAPON
1st Special Operations Group (SOG)	Hurlburt Field, Fla.	AC-130U, CV-22, MC-130H/P, U-28A
27th SOG	Cannon AFB, N.M.	AC-130W, C-146A, CV-22B, MC-130J, MQ-1, MQ-9, U-28A
551st SOS	Cannon AFB, N.M.	AC-130H/W, CV-22, MC-130J, MQ-9
720th Special Tactics Group (STG)	Hurlburt Field, Fla.	Special tactics operations
724th STG	Pope Field, N.C.	Special tactics operations
752nd SOG	RAF Mildenhall, UK	CV-22, MC-130J



A CV-22 Osprey runs exfiltration and infiltration exercises at an Eglin AFB, Fla., range.

A1C Joseph Pick

AMC



Air Mobility Command

Headquarters: Scott AFB, Ill.

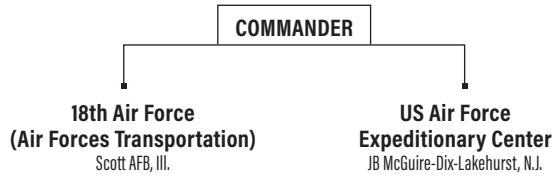
Date of current designation: June 1, 1992

Commander: Gen. Carlton D. Everhart II

Primary Mission

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

AMC Structure



PERSONNEL		
Active Duty	Civilian	Total
40,247	7,723	47,970

EQUIPMENT (TAI)	
Tanker	161
Transport	258

WINGS/CENTERS	LOCATION	AIRCRAFT/MISSION/WEAPON
6th Air Mobility Wing (AMW)	MacDill AFB, Fla.	C-37, KC-135R
19th Airlift Wing (AW)	Little Rock AFB, Ark.	C-130H/J
22nd Air Refueling Wing (ARW)	McConnell AFB, Kan.	KC-135R
60th 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
319th ABW	Grand Forks AFB, N.D.	Base support
375th AMW	Scott AFB, Ill.	C-21, C-40 (AA), KC-135R (AA), NC-21
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 AOC (Tanker Airlift Control 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



A1C Jesse Marquez, 92nd Air Refueling Wing, works on a KC-135 refueling boom at Fairchild AFB, Wash.

SrA. Janelle Patiño

PACAF



Pacific Air Forces

Headquarters: JB Pearl Harbor-Hickam, Hawaii

Date of current designation: July 1, 1957

Commander: Gen. Terrence J. O'Shaughnessy

Primary Mission

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

PACAF Structure



PERSONNEL		
Active Duty	Civilian	Total
28,139	3,151	31,290

EQUIPMENT (TAI)	
Fighter/Attack	260
Helicopter	13
ISR/BM/C3	4
Tanker	18
Transport	20

WINGS/CENTERS	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
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 & Space 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



F-15 Eagles from the 18th Wing prepare for takeoff at Kadena AB, Japan.

Naoto Anazawa/USAF

USAFE



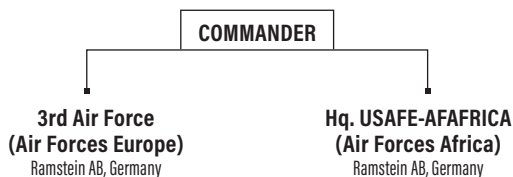
US Air Forces in Europe - Air Forces Africa

Headquarters: Ramstein AB, Germany
Date of current designation: April 20, 2012
Commander: Gen. Tod D. Wolters

Primary Mission

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

USAFE Structure



PERSONNEL		
Active Duty	Civilian	Total
22,640	1,552	24,192

EQUIPMENT (TAI)	
Fighter/Attack	152
Helicopter	5
Tanker	15
Transport	23

WINGS/CENTERS	LOCATION	AIRCRAFT/MISSION/WEAPON
31st Fighter Wing (FW)	Aviano AB, Italy	F-16C/D
39th Air Base Wing	Incirlik AB, Turkey	Operational location for deployed US and NATO forces
48th FW	RAF Lakenheath, UK	F-15C/D, F-15E, HH-60G
52nd FW	Spangdahlem AB, Germany	F-16C/D
86th Airlift Wing	Ramstein AB, Germany	C-20H, C-21, C-37A, C-40B, C-130J
100th Air Refueling Wing	RAF Mildenhall, UK	CV-22, KC-135R, MC-130J, RC-135V/W
435th Air Ground Operations Wing	Ramstein AB, Germany	Battlefield airmen support and operations
501st Combat Support Wing	RAF Alconbury, UK	Facilitates support for seven geographically separated units
603rd Air & Space Operations Center	Ramstein AB, Germany	Plan and direct air operations



An F-16 from the 31st Fighter Wing, Aviano AB, Italy, flies over Souda Bay, Greece.

SSgt. Austin Harvill

ANG



Air National Guard

Headquarters: Washington, D.C.

Date of current designation: Sept. 18, 1947

Director: Lt. Gen. L. Scott Rice

Primary Mission

Provide combat capability to the Active Duty force and security for the homeland. Support US domestic and foreign humanitarian and disaster relief.

PERSONNEL			
Total (Selected reserve)	Active Duty	Civilian (Includes technicians)	Total
105,700	27	23,591	129,318

EQUIPMENT (TAI)			
Fighter/Attack	575	Special Operations Forces	4
Helicopter	17	Tanker	181
ISR/BM/C3	93	Transport	210

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 AW (N.Y.)	MQ-9
108th Wing (N.J.)	KC-135R, C-32B, intel, SOS
109th AW (N.Y.)	LC-130
110th Attack 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-130H, 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.)	MC-130P, HH-60G, GA
130th AW (W.Va.)	C-130H, RC-26B
131st Bomb Wing (Mo.)	B-2 (CA)
132nd Wing (Iowa)	MQ-9, RC-26B, cyber, ISR
133rd AW (Minn.)	C-130H, 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, AATTTC (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, RC-26B, WXF
145th AW (N.C.)	C-130H, CEF, MAFFS
146th AW (Calif.)	C-130J, ALCF, MAFFS, WXF
147th Reconnaissance Wing (Texas)	MQ-1B, RC-26, TACP, EIS, WXF
148th FW (Minn.)	F-16C/D

WING (STATE)	SYSTEM/MISSION
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
158th FW (Vt.)	F-16C, 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, CRTC, AOS
166th AW (Del.)	C-130H, cyber
167th AW (W.Va.)	C-17A
168th ARW (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-1, cyber, MCE, ISR
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 FW (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 FW (Va.)	F-22 (CA), cyber, DCGS
193rd SOW (Pa.)	EC-130J, AOS, CC, cyber, TACP
194th Regional Support Wing (Wash.)	CC, CW
195th Wing (Calif.)	DCGS, intel

FOAs, DRUs, and Auxiliary

2018 USAF Almanac



Air Force Agency for Modeling and Simulation

Headquarters: Orlando, Fla.

Date of Current Designation: June 3, 1996

Type: Field Operating Agency (FOA)

Mission: Oversee air, space, and cyberspace modeling and simulation requirements and provide joint interoperability standards within live, virtual, and constructive (LVC) domains.

Total Personnel: 21



Air Force Historical Research Agency

Headquarters: Maxwell AFB, Ala.

Date of Current Designation: Sept. 1, 1991

Type: FOA

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.

Total Personnel: 35



Air Force Inspection Agency

Headquarters: Kirtland AFB, N.M.

Date of Current Designation: Aug. 1, 1991

Type: FOA

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.

Total Personnel: 121



Air Force Legal Operations Agency

Headquarters: JB Andrews, Md.

Date of Current Designation: Sept. 1, 1991

Type: FOA

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.

Total Personnel: 818



Air Force Manpower Analysis Agency

Headquarters: JBSA-Randolph, Texas

Date of Current Designation: June 1, 2015

Type: FOA

Mission: Measure and document Air Force manpower requirements.

Total Personnel: 271



Air Force Medical Operations Agency

Headquarters: JBSA-Lackland, Texas

Date of Current Designation: July 1, 1992

Type: FOA

Mission: Oversee execution of surgeon general policies; provide leadership for medical personnel and medical treatment facilities; promote a cost-effective, modern, and prevention-based health care continuum.

Total Personnel: 363



Air Force Audit Agency

Headquarters: Pentagon

Date of Current Designation: Dec. 31, 1971

Type: FOA

Mission: Provide independent, objective, and quality internal audit service.

Total Personnel: 566



Air Force Cost Analysis Agency

Headquarters: Arlington, Va.

Date of Current Designation: Aug. 1, 1991

Type: FOA

Mission: Perform independent cost and risk analyses and provide special studies to aid long-range planning.

Total Personnel: 92



Air Force District of Washington

Headquarters: JB Andrews, Md.

Date of Current Designation: July 7, 2005

Type: Direct Reporting Unit (DRU)

Mission: Orchestrate support for National Capital Region activities; train, equip, and provide forces for contingency, homeland, and ceremonial support operations.

Total Personnel: 4,445



Air Force Flight Standards Agency

Headquarters: Oklahoma City

Date of Current Designation: Oct. 1, 1991

Type: FOA

Mission: Develop, standardize, evaluate, and certify policy, procedures, and equipment for flight operations and centrally manage air traffic control and landing systems.

Total Personnel: 174



Air Force Medical Support Agency

Headquarters: Falls Church, Va.

Date of Current Designation: July 1, 1992

Type: FOA

Mission: Develop surgeon general plans and programs; provide medical expeditionary capabilities and national security strategy; define and execute health care policy.

Total Personnel: 247



Air Force Mortuary Affairs Operations

Headquarters: Dover AFB, Del.

Date of Current Designation: Jan. 6, 2009

Type: FOA

Mission: Ensure respectful handling, dignity, and honor of the fallen; provide care, service, and support to family of the fallen; transfer remains.

Total Personnel: 53



Air Force Office of Special Investigations

Headquarters: Quantico, Va.

Date of Current Designation: Dec. 20, 1971

Type: FOA

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.

Total Personnel: 2,282



Air Force Operational Test and Evaluation Center

Headquarters: Kirtland AFB, N.M.

Date of Current Designation: April 4, 1983

Type: DRU

Mission: Test and evaluate new weapon systems.

Total Personnel: 599



Air Force Operations Group

Headquarters: Pentagon

Date of Current Designation: April 1, 1995

Type: FOA

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.

Total Personnel: 44



Air Force Personnel Center

Headquarters: JBSA-Randolph, Texas

Date of Current Designation: Oct. 1, 1995

Type: FOA

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.

Total Personnel: 2,099



Air Force Public Affairs Agency

Headquarters: JBSA-Lackland, Texas

Date of Current Designation: Oct. 1, 2008

Type: FOA

Mission: Develop and sustain public affairs products; provide combat camera and graphics support; test emerging technologies; manage public affairs personnel deployments.

Total Personnel: 243



Air Force Review Boards Agency

Headquarters: JB Andrews, Md.

Date of Current Designation: Aug. 1, 1991

Type: FOA

Mission: Manage military and civilian appellate processes; serve as lead agent for DOD Physical Disability Board of Review.

Total Personnel: 95



Air Force Safety Center

Headquarters: Kirtland AFB, N.M.

Date of Current Designation: Jan. 1, 1996

Type: FOA

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.

Total Personnel: 105



Air National Guard Readiness Center

Headquarters: JB Andrews, Md.

Date of Current Designation: June 1, 1992

Type: FOA

Mission: Ensure field units have resources to train and equip forces for state and federal missions; sustain airmen and help shape leadership capability.

Total Personnel: 805



Civil Air Patrol

Headquarters: Maxwell AFB, Ala.

Date of Current Designation: Dec. 1, 1941

Type: Auxiliary

Mission: Provide operational capabilities to support search and rescue, disaster relief, a nationwide communications network, and counterdrug and homeland security missions; conduct leadership training, and career and technical education for CAP Cadet Program; promote aerospace education.

Total Personnel: 56,000



US Air Force Academy

Headquarters: Colorado Springs, Colo.

Date of Current Designation: April 1, 1954

Type: DRU

Mission: Develop, educate, and inspire young men and women to become USAF officers with knowledge, character, and discipline.

Total Personnel: 3,273

Guide to Installations Worldwide

2018 USAF Almanac



An F-16 takes off from Aviano AB, Italy

SrA. Cory Bush

Active Duty Installations

This section includes Air Force-owned and -operated facilities around the world. (It also lists former USAF bases now under other service leadership as joint bases.) The section does not list all units or agencies at each base. Many USAF installations also host numerous tenants, including other USAF major command units and civil, DOD, federal, and other service entities.

Altus AFB, Okla. 73523. **Nearest city:** Altus. **Phone:** 580-482-8100. **Owning command:** AETC. **Unit/mission:** 97th AMW (AETC), training. **History:** activated January 1943. Inactivated May 1945. Reactivated August 1953.

Andersen AFB, Guam APO AP 96543. **Nearest city:** Yigo. **Phone:** 671-366-1110. **Owning command:** PACAF. **Unit/mission:** 9th Operations Group Det. 3 (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.

Arnold AFB, Tenn. 37389. **Nearest city:** Manchester. **Phone:** 931-454-3000. **Owning com-**

mand: AFMC. **Unit/mission:** Arnold Engineering Development Complex (AFTC/AFMC), flight, space, and missile ground testing. **History:** dedicated June 25, 1951. Named for Gen. of the Air Force Henry H. "Hap" Arnold.

Aviano AB, Italy APO AE 09604. **Nearest city:** Aviano. **Phone:** 011-39-0434-30-1110. **Owning command:** USAFE. **Unit/mission:** 31st FW (US-AFE), fighter operations; 724th AMS (AMC), air transportation services. **History:** dates from 1911 as Italian air base. USAF began operations 1954.

Barksdale AFB, La. 71110. **Nearest city:** Bossier City. **Phone:** 318-456-1110. **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.

Beale AFB, Calif. 95903. **Nearest city:** Marysville. **Phone:** 530-634-3000. **Owning command:** ACC. **Unit/mission:** 7th SWS (AFSPC), 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.

Buckley AFB, Colo. 80011. **Nearest city:** Denver. **Phone:** 720-847-9431. **Owning command:** AFSPC. **Unit/mission:** 140th Wing (ANG), air mobility, fighter operations, mobile missile warning; 460th SW (AFSPC), space surveillance, missile warning; 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. Named for 1st Lt. John H. Buckley, WWI flier, killed Sept. 17, 1918.

Cannon AFB, N.M. 88103. **Nearest city:** Clovis. **Phone:** 575-784-4131. **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.

Cape Canaveral AFS, Fla. 32925. **Nearest city:** Cocoa Beach. **Phone:** 321-853-1110. **Owning command:** AFSPC. **Unit/mission:** 45th Space Wing (AFSPC), 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.

Cape Cod AFS, Mass. 02561. **Nearest city:** Sandwich. **Phone:** 508-968-3283. **Owning command:** AFSPC. **Unit/mission:** 6th SWS (AFSPC), missile warning. **History:** established April 4, 1980, as Cape Cod Missile Early Warning Station. Renamed Jan. 5, 1982.

Cavalier AFS, N.D. 58220. **Nearest city:** Cavalier. **Phone:** 701-993-3292. **Owning command:** AFSPC. **Unit/mission:** 10th SWS (AFSPC), 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.

Cheyenne Mountain AFS, Colo. 80914. **Nearest city:** Colorado Springs. **Phone:** N/A. **Owning command:** AFSPC. **Unit/mission:** 721st MSG (AFSPC), support; NORAD/NORTHCOM Alternate Command Center, Integrated Tactical Warning and Attack Assessment operations, training. **History:** operational April 20, 1966.

Clear AFS, Alaska 99704. **Nearest city:** Fairbanks. **Phone:** 907-585-6384. **Owning command:** AFSPC. **Unit/mission:** 13th SWS (AFSPC), 213th SWS (ANG), missile warning. **History:** dates from 1961.

Columbus AFB, Miss. 39710. **Nearest city:** Columbus. **Phone (automated):** 662-434-1110. **Owning command:** AETC. **Unit/mission:** 14th FTW (AETC), pilot training. **History:** activated 1942 for pilot training.

Creech AFB, Nev. 89191. **Nearest city:** Indian Springs. **Phone:** 702-404-1110. **Owning command:** ACC. **Unit/mission:** 432nd WG (ACC), 726th OG (AFRC), 556th Test and Evaluation Sq. (ACC), 232nd Operations Sq. (ANG), RPA operations; 799 ABG (ACC), support. **History:** built in 1943 as auxiliary landing field to support air-to-air gunnery and other AAF training. Called Indian Springs Arpt. 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.

Davis-Monthan AFB, Ariz. 85707. **Nearest city:** Tucson. **Phone:** 520-228-3900. **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 FW (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.

Dover AFB, Del. 19902. **Nearest city:** Dover. **Phone:** 302-677-3000. **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.

Dyess AFB, Texas 79607. **Nearest city:** Abilene. **Phone:** 325-696-4820. **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.

Edwards AFB, Calif. 93524. **Nearest city:** Rosamond. **Phone:** 661-277-1110. **Owning command:** AFMC. **Unit/mission:** 412th TW (AFMC), T&E, base support; Hq. Air Force Test Center (AFMC), T&E management; US 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."

Eglin AFB, Fla. 32542. **Nearest city:** Niceville-Valparaiso. **Phone:** 850-882-1110. **Owning command:** AFMC. **Unit/mission:** 20th SPCS (AFSPC), space surveillance; 33rd FW (AETC), training; 53rd Wing (ACC), OT&E; 96th TW (AFMC), T&E, base support; Air Force Armament Museum (AFMC); 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 flyer killed in aircraft accident Jan. 1, 1937.

Eielson AFB, Alaska 99702. **Nearest city:** Fairbanks. **Phone:** 907-377-2116. **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 November 1929.

Ellsworth AFB, S.D. 57706. **Nearest city:** Rapid City. **Phone:** 605-385-5056. **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.

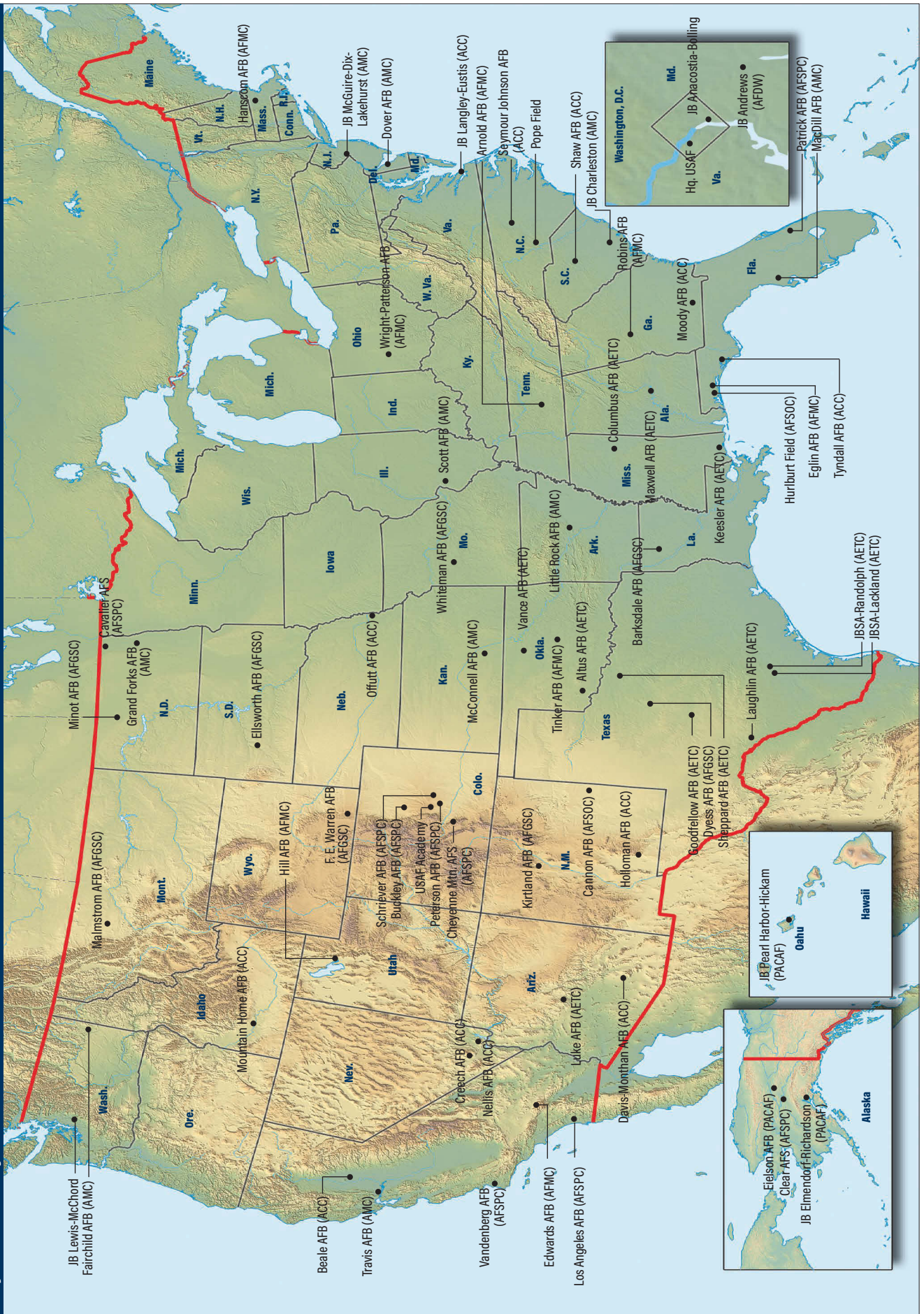
Fairchild AFB, Wash. 99011. **Nearest city:** Spokane. **Phone:** 509-247-1212. **Owning command:** AMC. **Unit/mission:** 92nd ARW (AMC), 141st ARW (ANG), air mobility operations; USAF SERE School (AETC), training. **History:** activated January 1942. Named for Gen. Muir S. Fairchild, USAF vice chief of staff at his death in 1950.

F. E. Warren AFB, Wyo. 82005. **Nearest city:** Cheyenne. **Phone:** 307-773-1110. **Owning command:** AFGSC. **Unit/mission:** 90th MW (AFGSC), ICBM operations; 153rd CACS (ANG), space C2 operations; Hq. 20th Air Force (AFGSC), operational leadership; Warren ICBM and Heritage Museum. **History:** activated as Fort D. A. Russell July 4, 1867. Renamed 1930 for Francis Emory Warren, Wyoming senator and first state governor. Reassigned to USAF in 1947 and received current designation in 1949.

Acronyms and Abbreviations

AAB	Army Air Base
AAF	Army Airfield
AB	Air Base
ABG	Air Base Group
ABW	Air Base Wing
ACC	Air Combat Command
ACG	Air Control Group
ACS	Air Control Squadron
ACTS	Air Combat Training Squadron
ACW	Air Control Wing
AETC	Air Education and Training Command
AFB	Air Force Base
AFDW	Air Force District of Washington
AFGSC	Air Force Global Strike Command
AFMC	Air Force Materiel Command
AFNWC	Air Force Nuclear Weapons Center
AFRC	Air Force Reserve Command
AFRL	Air Force Research Laboratory
AFS	Air Force Station
AFSOC	Air Force Special Operations Command
AFSPC	Air Force Space Command
AFTC	Air Force Test Center
AG	Airlift Group
AGOW	Air Ground Operations Wing
AGS	Air Guard Station
ALC	Air Logistics Complex
AMC	Air Mobility Command
AMOG	Air Mobility Operations Group
AMOW	Air Mobility Operations Wing
AMS	Air Mobility Squadron
AMW	Air Mobility Wing
ANG	Air National Guard
ANGB	Air National Guard Base
ANGS	Air National Guard Station
APO AP	Army/Air Force Post Office Pacific
APO AE	Army/Air Force Post Office Europe
AOC	Air and Space Operations Center
AOG	Air and Space Operations Group
APS	Aerial Port Squadron
ARB	Air Reserve Base
ARG	Air Refueling Group
Arpt.	Airport
ARS	Air Refueling Squadron or Air Reserve Station
ARW	Air Refueling Wing
AS	Air Station or Airlift Squadron
ASOG	Air Support Operations Group
ASOS	Air Support Operations Squadron
ASTF	Aeromedical Staging Flight
ATKW	Attack Wing
AW	Airlift Wing
BW	Bomb Wing
C2	command and control
C3I	command, control, communications, and intelligence
C4	command, control, communications, and computers
CACS	Command and Control Squadron
CBCS	Combat Communications Squadron
CCG	Combat Communications Group
CCW	Command and Control Wing
CENTCOM	US Central Command
CG	Communications Group
CRF	Centralized Repair Facility
CONUS	continental US
COS	Cyberspace Operations
CRG	Contingency Response Group
CRW	Contingency Response Wing
CSAR	combat search and rescue
CTS	Combat Training Squadron
CW	Cyberspace Wing
DCGS	Distributed Common Ground Station
DMOC	Distributed Mission Operations Center
DTOC	Distributed Training Operations Center
ECG	Electronic Combat Group
EIS(G)	Engineering Installation Squadron/Group

Major Active Duty Air Force Bases in the US



Goodfellow AFB, Texas 76908. Nearest city: San Angelo. **Phone:** 325-654-1110. **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.

Grand Forks AFB, N.D. 58205. Nearest city: Grand Forks. **Phone:** 701-747-1110. **Owning command:** AMC. **Unit/mission:** 69th RG (ACC), RPA operations; 319th ABW (AMC), support. **History:** activated 1956. Named after town of Grand Forks, whose citizens bought the property for the Air Force.

Hanscom AFB, Mass. 01731. Nearest city: Boston. **Phone:** 781-225-1110. **Owning command:** AFMC. **Unit/mission:** 66th ABG (AFMC), support; PEO-Battle Management, 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 lightplane accident 1941.

Hill AFB, Utah 84056. Nearest city: Salt Lake City. **Phone:** 801-777-4681. **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; Hill Aerospace Museum (AFMC); Ogden ALC (AFMC), weapons maintenance, repair. **History:** activated 1940. Named for Maj. Ployer P. Hill, killed Oct. 30, 1935, test flying first B-17.

Holloman AFB, N.M. 88330. Nearest city: Alamogordo. **Phone:** 575-572-1110. **Owning command:** ACC. **Unit/mission:** 49th Wing (ACC), 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.

Hurlburt Field, Fla. 32544. Nearest city: Fort Walton Beach. **Phone:** 850-884-7190. **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.

Incirlik AB, Turkey APO AE 09824. Nearest city: Adana. **Phone:** (commercial, from CONUS) 011-90-322-316-1110. **Owning command:** USAFE. **Unit/mission:** 39th ABW (USAFE), support; 728th AMS (AMC), air transportation services. **History:** activated 1954. Named Adana AB Feb. 21, 1955. Renamed Incirlik AB Feb. 28, 1958.

JB Anacostia-Bolling, D.C. 20032. Nearest city: Washington, D.C. **Phone:** 703-545-6700. **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.

JB Andrews, Md. 20762. Nearest city: Washington, D.C. **Phone:** 301-981-1110. **Owning command:** AFDW. **Unit/mission:** 11th Wing (AFDW), helicopter operations, support; 79th MDW (AFDW); 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.

JB Charleston, S.C. 29404. Nearest city: Charleston. **Phone:** 843-963-1110. **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.

JB Elmendorf-Richardson, Alaska 99506. Nearest city: Anchorage. **Phone:** 907-552-1110. **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 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.

JB Langley-Eustis, Va. 23665. Nearest city: Hampton. **Phone:** 757-764-1110. **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.

JB Lewis-McChord, Wash. 98438. Nearest city: Tacoma. **Phone:** 253-982-1110. **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 2010. Lewis named for Capt. Meriwether Lewis of Lewis and Clark

Acronyms and Abbreviations

EOD	explosive ordnance disposal
FG	Fighter Group
FLTS	Flight Test Squadron
FTG	Flying Training Group
FTU	Formal Training Unit
FTW	Flying Training Wing
FW	Fighter Wing
IOF	Information Operations Flight
IOS	Information Operations Squadron
IOW	Information Operations Wing
IS	Intelligence Squadron
ISR	intelligence, surveillance, and reconnaissance
ISRG	ISR Group
ISRW	ISR Wing
IW	Intelligence Wing
IWS	Information Warfare Squadron
JB	Joint Base
JBSA	Joint Base San Antonio
JNGB	Joint National Guard Base
JRB	Joint Reserve Base
MAFFS	Modular Airborne Firefighting System
MDG	Medical Group
MDW	Medical Wing
MOH	Medal of Honor
MSG	Mission Support Group
MW	Missile Wing
NAF	Naval Air Facility
NAS	Naval Air Station
NORTHCOM	US Northern Command
OT&E	operational test and evaluation
PACAF	Pacific Air Forces
PACOM	US Pacific Command
PEO	Program Executive Officer
R&D	research and development
RED HORSE	Rapid Engineer Deployable Heavy Operational Repair Squadron, Engineers
RG	Reconnaissance Group
RPA	remotely piloted aircraft
ROG	Rescue Group
RQS	Rescue Squadron
RQW	Rescue Wing
RS	Reconnaissance Squadron
RSG	Regional Support Group
RW	Reconnaissance Wing
SCMG	Supply Chain Management Group
SCMW	Supply Chain Management Wing
SCOW	Supply Chain Operations Wing
SERE	survival, evasion, resistance, and escape
SMC	Space and Missile Systems Center
SOCOM	US Special Operations Command
SOF	Special Operations Forces
SOG	Special Operations Group
SOPS	Space Operations Squadron
SOW	Special Operations Wing
SPCS	Space Control Squadron
STRATCOM	US Strategic Command
STS	Special Tactics Squadron
SW	Space Wing
SWS	Space Warning Squadron
T&E	Test and Evaluation
TACC	Tanker Airlift Control Center
TACP	tactical air control party
TG	Test Group
TRANSCOM	US Transportation Command
TRG	Training Group
TRW	Training Wing
TTP	tactics, techniques, and procedures
TW	Test Wing
USAFE	US Air Forces in Europe
WEG	Weapons Evaluation Group
WF	Weather Flight
WXF	Weather Forecast
WPS	Weapons Squadron

Major Active Duty Air Force Bases Overseas



All bases on this map are USAFE bases.



Expedition (1804-05). McCord named for Col. William C. McCord, died in aircraft crash, Aug. 18, 1937.

JB McGuire-Dix-Lakehurst, N.J. 08641. **Nearest city:** Wrightstown. **Phone:** 609-754-1100. **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



All bases on this map are PACAF bases.



T-38s fly near Laughlin AFB, Texas

SrA. Keifer Bowes

joint base under Air Force lead 2009. McGuire named for Maj. Thomas B. McGuire Jr., P-38 pilot, second leading US 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 US Senator.

JB Pearl Harbor-Hickam, Hawaii 96853. **Nearest city:** Honolulu. **Phone:** 808-449-7110. **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.

JB San Antonio, Texas 78234. **Nearest city:** San Antonio. **Phone:** 210-221-1211 (JBSA-Fort Sam Houston operator). **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.

JBSA-Lackland, Texas 78236. **Nearest city:** San Antonio. **Phone:** 210-671-1110. **Owning command:** AETC. **Unit/mission:** 37th TRW (AETC), training; 59th MDW (AETC), ambulatory surgical, management, training; 67th CW (AFSPC), network defense operations; 149th FW (ANG), cyber, fighter operations; 433rd AW (AFRC), air mobility operations; 688th IOW (AFSPC), information operations, engineering infrastructure services; Air Force Civil Engineer Center (AFMC), engineering services; Air Force Installation and Mission Support Center (AFMC), resourcing and combat support; Air Force Services Activity (AFMC) support; Hq. 24th Air Force (AFSPC), 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 independent instal-

lation 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.)

JBSA-Randolph, Texas 78150. **Nearest city:** San Antonio. **Phone:** 210-652-1110. **Owning command:** 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.

Kadena AB, Japan APO AP 96368. **Nearest city:** Naha. **Phone:** (commercial, from CONUS) 011-81-98-961-1110. **Owning command:** PACAF. **Unit/mission:** 18th Wing (PACAF), air mobility, fighter, ISR, personnel recovery operations; 82nd RS (ACC), reconnaissance; 353rd SOG (AFSOC), special operations; 390th IS (ACC), intelligence; 733rd AMS (AMC), air transportation services. **History:** occupied by US forces April 1945. Named for city of Kadena on island of Okinawa.

Keesler AFB, Miss. 39534. **Nearest city:** Biloxi. **Phone:** 228-377-1110. **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.

Kirtland AFB, N.M. 87117. **Nearest city:** Albuquerque. **Phone:** 505-846-1110. **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 Col. Roy C. Kirtland, aviation pioneer who died May 2, 1941.

Kunsan AB, South Korea APO AP 96264. **Nearest city:** Gunsan City. **Phone:** 011-82-63-470-1110. **Owning command:** PACAF. **Unit/mission:** 8th FW (PACAF), fighter operations. **History:** built by the Japanese in 1938. US operations began in April 1951.

Lajes Field, Azores, Portugal APO AE 09720. **Nearest city:** Praia de Vitoria. **Phone:** 011-351-295-57-6161. **Owning command:** USAFE. **Unit/mission:** 65th ABG, support; 729th AMS (AMC), air transportation services. **History:** US operations began 1943.

Laughlin AFB, Texas 78843. **Nearest city:** Del Rio. **Phone:** 830-298-3511. **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.

Little Rock AFB, Ark. 72099. **Nearest city:** Jacksonville. **Phone:** 501-987-1110. **Owning command:** AMC. **Unit/mission:** 19th AW (AMC), air mobility operations; 913th AG (AFRC), 189th AW (ANG), air mobility operations, training; 314th AW (AETC), training. **History:** base opened Oct. 9, 1955.

Los Angeles AFB, Calif. 90245. **Nearest city:** El Segundo. **Phone:** 310-653-1110. **Owning command:** AFSPC. **Unit/mission:** 61st ABG (AFSPC), support; Hq. Space and Missile Systems Center (AFSPC), 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.

Luke AFB, Ariz. 85309. **Nearest city:** Phoenix. **Phone:** 623-856-6011. **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.

MacDill AFB, Fla. 33621. Nearest city: Tampa. **Phone:** 813-828-1110. **Owning command:** AMC. **Unit/mission:** 6th AMW (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.

Malmstrom AFB, Mont. 59402. Nearest city: Great Falls. **Phone:** 406-731-1110. **Owning command:** AFGSC. **Unit/mission:** 341st MW (AFGSC), ICBM operations; 819th RED HORSE (ACC/ANG), bare base operations. **History:** activated Dec. 15, 1942. Named for Col. Einar A. Malmstrom, WWII fighter commander killed in air accident Aug. 21, 1954.

Maxwell AFB, Ala. 36112. Nearest city: Montgomery. **Phone:** 334-953-1110. **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.

McConnell AFB, Kan. 67221. Nearest city: Wichita. **Phone:** 316-759-6100. **Owning command:** AMC. **Unit/mission:** 22nd ARW (AMC), air mobility operations; 184th IW (ANG), cyber, DCGS, ISR operations, space C2, TACP operations; 931st ARG (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.

Minot AFB, N.D. 58705. Nearest city: Minot. **Phone:** 701-723-1110. **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.

Misawa AB, Japan, APO AP 96319. Nearest city: Misawa. **Phone:** 011-81-176-53-5181, ext. 226-3075. **Owning command:** PACAF. **Unit/mission:** 35th FW (PACAF), fighter operations. **History:** occupied by US forces September 1945.

Moody AFB, Ga. 31699. Nearest city: Valdosta. **Phone:** 229-257-1110. **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.

Mountain Home AFB, Idaho 83648. Nearest city: Mountain Home. **Phone:** 208-828-2111. **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.

Nellis AFB, Nev. 89191. Nearest city: Las Vegas. **Phone:** 702-652-1110. **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.

Offutt AFB, Neb. 68113. Nearest city: Bellevue. **Phone:** 402-294-1110. **Owning command:** ACC. **Unit/mission:** 55th Wing (ACC), ISR, electronic attack; Hq. STRATCOM, operational leadership; 577th 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.

Osan AB, South Korea APO AP 96278. Nearest city: Pyeongtaek. **Phone:** 011-82-505-784-1110. **Owning command:** PACAF. **Unit/mission:** 5th RS (ACC), reconnaissance operations; 51st FW (PACAF), fighter operations; 694th ISRG (ACC), DCGS operations; 731st AMS (AMC), air transportation services; Hq. 7th Air Force (PACAF), operational leadership. **History:** originally designated K-55. Runway opened December 1952. Renamed Osan AB 1956 for nearby town that was the scene of first fighting in July 1950 between US and North Korean forces.

Patrick AFB, Fla. 32925. Nearest city: Cocoa Beach. **Phone:** 321-494-1110. **Owning command:** AFSPC. **Unit/mission:** 45th SW (AFSPC), 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.

Peterson AFB, Colo. 80914. Nearest city: Colorado Springs. **Phone:** 719-556-7321. **Owning command:** AFSPC. **Unit/mission:** 21st SW (AFSPC), missile warning, space operations, support; 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. **History:** activated 1942. Named for 1st Lt. Edward J. Peterson, killed Aug. 8, 1942.

Pope Field, N.C. 28308. Nearest city: Fayetteville. **Phone:** 910-394-1110. **Unit/mission:** 18th ASOG (ACC), combat weather, TACP operations; 21st STS, 24th STS (AFSOC), special tactics operations; 43rd AG (AMC), air mobility operations; 440th AW (AFRC) 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.

RAF Lakenheath, UK APO AE 09461. Nearest city: Cambridge. **Phone:** 011-44-1638-52-1110. **Owning command:** USAFE. **Unit/mission:** 48th FW (USAFE), fighter, personnel recovery operations. **History:** began as Royal Air Force decoy field in 1930s. Activated as RAF airfield November 1941. USAF bombers arrived August 1948. USAF took administrative control May 1951. Named after nearby village.

RAF Mildenhall, UK APO AE 09459. Nearest city: Cambridge. **Phone:** 011-44-1638-54-1110. **Owning command:** USAFE. **Unit/mission:** 95th RS (ACC), reconnaissance operations; 100th ARW (USAFE), air mobility operations; 352nd SOW (AFSOC), special operations; 488th IS (ACC), intelligence operations; 727th AMS (AMC), air transportation services. **History:** activated as RAF bomber base October 1934. Named after nearby town. US bomber operations began July 1950. Strategic Air Command had control from October 1951 to September 1959, when USAFE took over.

Ramstein AB, Germany APO AE 09094. Nearest city: Landstuhl. **Phone:** 011-49-6371-47-1110. **Owning command:** USAFE. **Unit/mission:** 86th AW (USAFE), air mobility operations, support (including Kaiserslautern Military Community); 435th AGOW (USAFE), bare base, combat communications, combat weather, TACP operations; 521st AMOW (AMC), air transportation services; 603rd AOC (USAFE), C2 operations; Hq. 3rd AF (USAFE), operational leadership; Hq. USAFE, management, operational leadership. **History:** originally Landstuhl AB, activated August 1952. Reactivated December 1957 as Ramstein-Landstuhl AB; later redesignated Ramstein AB.

Robins AFB, Ga. 31098. Nearest city: Warner Robins. **Phone:** 478-926-1110. **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, manage-



A C-17 at the Nevada Test and Training Range, Nellis AFB, Nev. SR A. Joshua Kleinholz

ment; 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.

Schriever AFB, Colo. 80912. **Nearest city:** Colorado Springs. **Phone:** 719-567-1110. **Owning command:** AFSPC. **Unit/mission:** 50th SW (AFSPC), 310th SW (AFRC), space operations; US Air Force Warfare Center-Space (ACC/AFSPC), R&D. **History:** activated as Falcon AFS Sept. 26, 1985. Redesignated AFB June 13, 1988. Renamed for Gen. Bernard A. Schriever June 5, 1998.

Scott AFB, Ill. 62225. **Nearest city:** Belleville. **Phone:** 618-256-1110. **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; Air Force Network Integration Center (AFSPC), 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.

Seymour Johnson AFB, N.C. 27531. **Nearest city:** Goldsboro. **Phone:** 919-722-1110. **Owning command:** ACC. **Unit/mission:** 4th FW (ACC), 414th FG (AFRC), fighter operations; 567th RED HORSE (ACC), bare base operations; 916th ARW (AFRC), air mobility operations. **History:** activated Sept. 12, 1942. Named for Navy Lt. Seymour A. Johnson, Goldsboro native, killed March 5, 1941.

Shaw AFB, S.C. 29152. **Nearest city:** Sumter. **Phone:** 803-895-1110. **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.

Sheppard AFB, Texas 76311. **Nearest city:** Wichita Falls. **Phone:** 940-676-2732. **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 US Sen. Morris Sheppard, who died April 9, 1941.

Spangdahlem AB, Germany APO AE 09126. **Nearest city:** Bitburg. **Phone:** 011-49-6565-61-1110. **Owning command:** USAFE. **Unit/mission:** 52nd FW (USAFE), fighter operations, 726th AMS (AMC), air transport services. **History:** built by French 1951 and turned over to US 1952.

Thule AB, Greenland APO AE 09074. **Nearest city:** Qaanaaq. **Phone:** (through Cheyenne Mountain AFS operator) 719-474-3840. **Owning command:** AFSPC. **Unit/mission:** 12th SWS (AFSPC), missile warning; 821st ABG (AFSPC), support. **History:** dates from 1946 as a Danish-American radio and weather station. USAF Ballistic Missile Early Warning System radar began operations 1961.

Tinker AFB, Okla. 73145. **Nearest city:** Oklahoma City. **Phone:** 405-739-2026. **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.

Travis AFB, Calif. 94535. **Nearest city:** Fairfield. **Phone:** 707-424-1110. **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.

Tyndall AFB, Fla. 32403. **Nearest city:** Panama City. **Phone:** 850-283-1113. **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 Coordination Center (ACC), plan/direct inland rescue operations; Hq. Continental US 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.

US Air Force Academy, Colo. 80840. **Nearest city:** Colorado Springs. **Phone:** 719-333-1110. **Next Higher Echelon of Command:** HQ Air Force. **Unit/mission:** Air Force Academy (US-AFA), 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.

Vance AFB, Okla. 73705. **Nearest city:** Enid. **Phone:** 580-213-5000. **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.

Vandenberg AFB, Calif. 93437. **Nearest city:** Lompoc. **Phone:** 805-606-1110. **Owning command:** AFSPC. **Unit/mission:** 30th SW (AFSPC), space and launch range operations, host unit; 381st TRG (AETC), training; 576th FLTS (AFSPC), test; 21st SOPS (AFSPC), space operations; Hq. 14th Air Force (AFSPC), 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.

Whiteman AFB, Mo. 65305. **Nearest city:** Knob Noster. **Phone:** 660-687-1110. **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.

Wright-Patterson AFB, Ohio 45433. **Nearest city:** Dayton. **Phone:** 937-257-1110. **Owning command:** AFMC. **Unit/mission:** 88th ABW (AFMC), support; 445th AW (AFRC), air mobility operations; 591st SCMG (AFMC), systems life cycle support; 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 (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 Jan. 13, 1948. Named for aviation pioneers Orville and Wilbur Wright and for 1st Lt. Frank S. Patterson, killed June 19, 1918.

Yokota AB, Japan, APO AP 96328. **Nearest city:** Tokyo. **Phone:** 011-81-311-755-1110. **Owning command:** PACAF. **Unit/mission:** 374th AW (PACAF), air mobility, personnel recovery operations; 515th AMOG (AMC), air transportation services; Hq. 5th Air Force (PACAF), Hq. US Forces Japan (PACOM), operational leadership. **History:** opened as Tama AAF by Japan 1939. Turned over to US forces and renamed Yokota AB Sept. 6, 1945.



An F-15E at Seymour Johnson AFB, N.C.

AIC Miranda Loera



A C-130 at Bradley ANGB, Conn.

A1C Sadie Hewes

ANG and AFRC Installations

This section consolidates Air National Guard and Air Force Reserve Command facilities, listing them by base names or according to the airport facilities they share. Some ANG and AFRC units are located on USAF bases and are included under those bases in the Active Duty Installations section. In addition, some Air Force Reserve Individual Mobilization Augmentees serve with various USAF and DOD commands and agencies.

Abraham Lincoln Capital Arpt., Ill. 62707. **Nearest city:** Springfield. **Phone:** 217-757-1267. **Component:** ANG. **Unit/mission:** 183rd Wing, 183rd Centralized Repair Facility (CRF), 183rd Air Operations Group (AOG).

Allen C. Thompson Field/Jackson-Evers Arpt., Miss. 39232. **Nearest city:** Jackson. **Phone:** 601-405-8300. **Component:** ANG. **Unit/mission:** 172nd AW, 183rd AS, 183rd Aeromedical Evacuation Squadron, air mobility operations.

Alpena County Regional Arpt., Mich. 49707. **Nearest city:** Alpena. **Phone:** 989-354-6210. **Component:** ANG. **Unit/mission:** Alpena Combat Readiness Training Center.

Atlantic City Arpt., N.J. 08234. **Nearest city:** Egg Harbor Township. **Phone:** 609-645-6000. **Component:** ANG. **Unit/mission:** 177th FW, fighter, TACP operations.

Bangor Arpt., Maine 04401. **Nearest city:** Bangor. **Phone:** 866-359-2264. **Component:** ANG. **Unit/mission:** 101st ARW, air mobility, combat communications.

Barnes Arpt., Mass. 01085. **Nearest city:** Westfield. **Phone:** 413-568-9151. **Component:** ANG. **Unit/mission:** 104th FW, fighter operations.

Battle Creek ANGB/W. K. Kellogg Arpt., Mich. 49037. **Nearest city:** Battle Creek. **Phone:** 269-969-3502. **Component:** ANG. **Unit/mission:** 110th ATKW, MQ-9 Reaper, C2, cyber, agile combat support.

Berry Field ANGB/Nashville Intl. Arpt., Tenn. 37217. **Nearest city:** Nashville. **Phone:** 615-660-

8000. **Component:** ANG. **Unit/mission:** 118th Wing, cyber, intel, RPA operations.

Birmingham-Shuttlesworth Arpt., Ala. 35217. **Nearest city:** Birmingham. **Phone:** 205-714-2000. **Component:** ANG. **Unit/mission:** 99th ARS (AMC) (active associate), air mobility operations; 117th ARW, air mobility, intelligence operations.

Boise Air Terminal (Gowen Field), Idaho 83705. **Nearest city:** Boise. **Phone:** 208-422-5322. **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.

Bradley ANGB, Conn. 06026. **Nearest cities:** Hartford, Conn., and Springfield, Mass. **Phone:** 860-292-2310. **Component:** ANG. **Unit/mission:** 103rd AW, air mobility operations. **History:** named for Lt. Eugene M. Bradley, killed in P-40 crash August 1941.

Burlington Intl. Arpt., Vt. 05403. **Nearest city:** South Burlington. **Phone:** 802-660-5379 (Public Affairs). **Component:** ANG. **Unit/mission:** 158th FW, fighter operations; 229th COS, cyber training.

Channel Islands ANGS, Calif. 93041. **Nearest city:** Oxnard. **Phone:** 805-986-8000. **Component:** ANG. **Unit/mission:** 146th AW, air mobility, MAFFS operations.

Charlotte/Douglas Arpt., N.C. 28208. **Nearest city:** Charlotte. **Phone:** 704-391-4100. **Component:** ANG. **Unit/mission:** 145th AW, aeromedical evacuation, air mobility, combat communications, TACP operations.

Cheyenne Arpt., Wyo. 82009. **Nearest city:** Cheyenne. **Phone:** 307-772-6110. **Component:** ANG. **Unit/mission:** 153rd AW, air mobility, MAFFS operations.

Des Moines Arpt., Iowa 50321. **Nearest city:** Des Moines. **Phone:** 515-261-8210. **Component:** ANG. **Unit/mission:** 132nd Wing, DTOC and RPA, cyber, and ISR operations.

Dobbins ARB, Ga. 30069. **Nearest city:** Atlanta. **Phone:** 678-655-5000. **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.

Duke Field, Fla. 32542. **Nearest city:** Crestview. **Phone:** 850-883-6347. **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.

Duluth Arpt., Minn. 55811. **Nearest city:** Duluth. **Phone:** 218-788-7210. **Component:** ANG. **Unit/mission:** 148th FW, EOD, fighter operations.

Eastern West Virginia Arpt. (Shepherd Field), W.Va. 25405. **Nearest city:** Martinsburg. **Phone:** 304-616-5100. **Component:** ANG. **Unit/mission:** 167th AW, air mobility operations.

Ellington Field, Texas 77034. **Nearest city:** Houston. **Phone:** 281-929-2337. **Component:** ANG. **Unit/mission:** 147th RW, ISR, RPA, TACP operations. **History:** named for Lt. Eric L. Ellington, pilot killed November 1913.

Forbes Field, Kan. 66619. **Nearest city:** Topeka. **Phone:** 785-862-1234. **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."

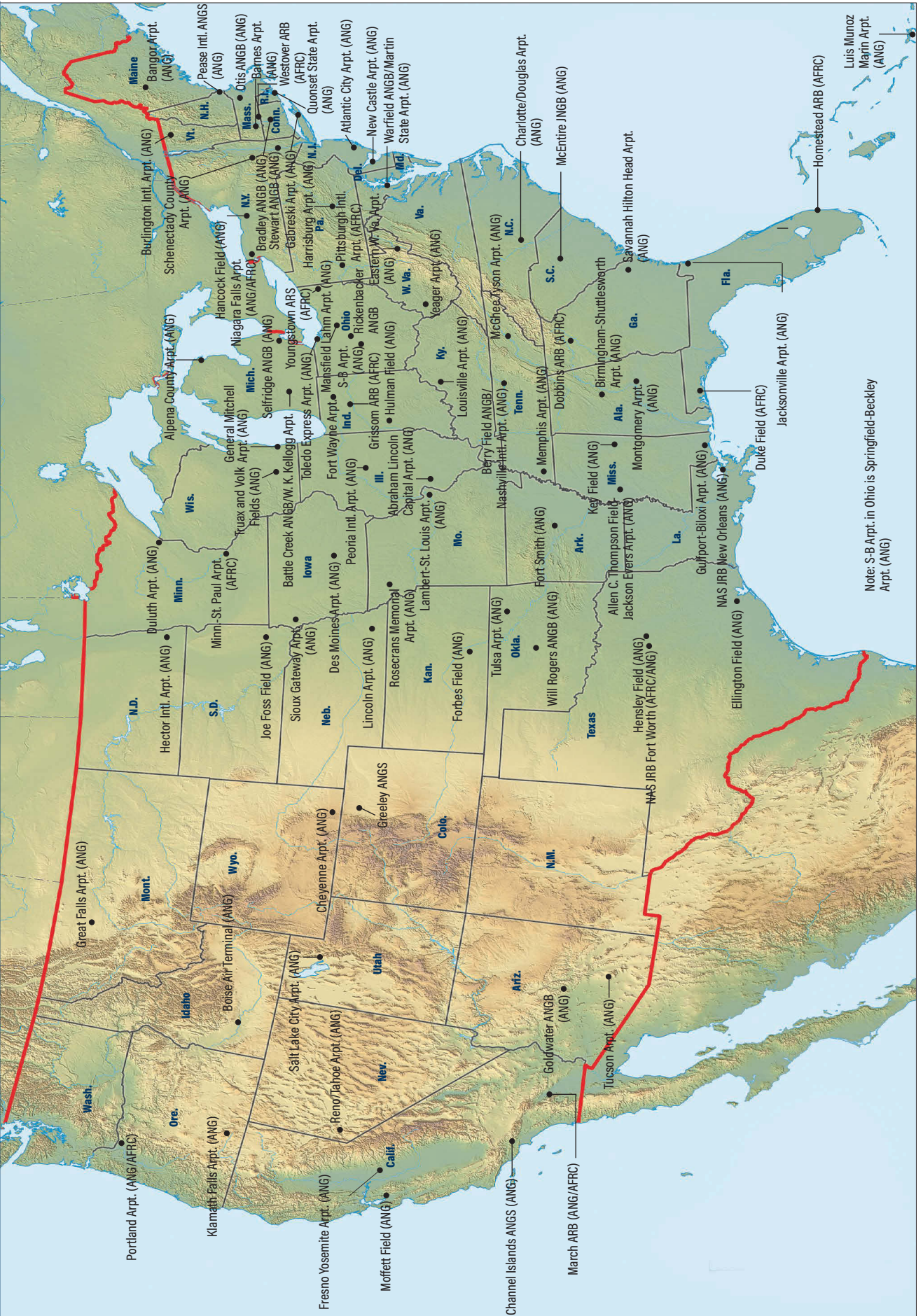
Fort Smith Arpt., Ark. 72903. **Nearest city:** Fort Smith. **Phone:** 479-573-5100. **Component:** ANG. **Unit/mission:** 188th Wing, RPA, ISR.

Fort Wayne Arpt., Ind. 46809. **Nearest city:** Fort Wayne. **Phone:** 260-478-3210. **Component:** ANG. **Unit/mission:** 122nd FW, fighter operations.

Francis S. Gabreski Arpt., N.Y. 11978. **Nearest city:** Westhampton Beach. **Phone:** 631-723-7400. **Component:** ANG. **Unit/mission:** 106th RQW, personnel recovery operations. **History:** named for Col. Francis S. Gabreski, WWII and Korean War ace.

Fresno Yosemite Arpt., Calif. 93727. **Nearest city:** Fresno. **Phone:** 559-454-5100. **Compo-**

Air Reserve Component Bases in the US



Note: S-B Arpt. in Ohio is Springfield-Beckley Arpt. (ANG)

Unit/mission: ANG. **Unit/mission:** 144th FW, fighter, ISR operations.

General Mitchell Arpt., Wis. 53207. Nearest city: Milwaukee. **Phone:** 414-944-8410. **Component:** ANG. **Unit/mission:** 128th ARW, air mobility operations. **History:** named for Brig. Gen. William "Billy" Mitchell.

Goldwater ANGB, Ariz. 85034. Nearest city: Phoenix. **Phone:** 602-302-9000. **Component:** ANG. **Unit/mission:** 161st ARW, air mobility operations.

Great Falls Arpt., Mont. 59404. Nearest city: Great Falls. **Phone:** 406-791-0159. **Component:** ANG. **Unit/mission:** 120th AW, air mobility operations, RED HORSE.

Greeley ANG, Colo. 80631. Nearest city: Greeley. **Phone:** 720-259-5001. **Component:** ANG. **Unit/mission:** 137th SWS, mobile missile warning. **History:** activated January 1996.

Grissom ARB, Ind. 46971. Nearest city: Kokomo. **Phone:** 765-688-5211. **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.

Gulfport-Biloxi Arpt., Miss. 39507. Nearest city: Gulfport. **Phone:** 228-214-6002. **Component:** ANG. **Unit/mission:** Trent Lott Combat Readiness Training Center.

Hancock Field, N.Y. 13211. Nearest city: Syracuse. **Phone:** 1-800-982-3696. **Component:** ANG. **Unit/mission:** 174th ATKW, ISR, RPA, space C2, TACP operations; ISR, RPA training.

Harrisburg Arpt., Pa. 17057. Nearest city: Middletown. **Phone:** 717-948-2231. **Component:** ANG. **Unit/mission:** 193rd SOW, C2, combat communications, cyber, special, TACP operations.

Hector Intl. Arpt., N.D. 58102. Nearest city: Fargo. **Phone:** 701-451-2259. **Component:** ANG. **Unit/mission:** 119th Wing, 178th ATKS (MQ-9 operations), 119th ISRG (Targeting).

Hensley Field AGS, Texas 75211. Nearest city: Dallas. **Phone:** 972-619-4444. **Component:** ANG. **Unit/mission:** 254th CCG, combat communications.

Homestead ARB, Fla. 33039. Nearest city: Homestead. **Phone:** 786-415-7000. **Component:** AFRC. **Unit/mission:** 20th Operations Group Det. 2 (ACC) (active associate), 125th FW Det. 1 (ANG), 482nd FW (AFRC), fighter operations.

Hulman Field, Ind. 47803. Nearest city: Terre Haute. **Phone:** 812-877-5311. **Component:** ANG. **Unit/mission:** 181st IW, DCGS, TACP operations.

Jacksonville Arpt., Fla. 32218. Nearest city: Jacksonville. **Phone:** 904-741-7100. **Component:** ANG. **Unit/mission:** 125th FW, fighter, ISR operations.



A C-130H is inspected at Mansfield Lahm Arpt., Ohio.

1st Lt. Paul Stennett/ANG

Joe Foss Field, S.D. 57104. Nearest city: Sioux Falls. **Phone:** 605-988-5700. **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.

Key Field, Miss. 39307. Nearest city: Meridian. **Phone:** 601-484-9000. **Component:** ANG. **Unit/mission:** 186th ARW, air mobility, C2, ISR, TACP operations. **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.

Klamath Falls Arpt./Kingsley Field, Ore. 97603. Nearest city: Klamath Falls. **Phone:** 800-864-6264. **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.

Lambert-St. Louis Arpt., Mo. 63044. Nearest city: St. Louis. **Phone:** 314-527-7000. **Component:** ANG. **Unit/mission:** 131st MSG, support; Jefferson Barracks: 157th AOG, C2 operations; 239th CBCS, combat communications.

Lincoln Arpt., Neb. 68524. Nearest city: Lincoln. **Phone:** 402-458-1234. **Component:** ANG. **Unit/mission:** 155th ARW, air mobility operations.

Louisville Arpt./AGS (Standiford Field), Ky. 40213. Nearest city: Louisville. **Phone:** 502-413-4400. **Component:** ANG. **Unit/mission:** 123rd AW, air mobility, bare base, special tactics operations.

Luis Muñoz Marin Arpt., Puerto Rico 00979. Nearest city: San Juan. **Phone:** 787-253-5101. **Component:** ANG. **Unit/mission:** 156th AW, air mobility operations, weather reconnaissance.

Mansfield Lahm Arpt., Ohio 44903. Nearest city: Mansfield. **Phone:** 419-520-6100. **Component:** ANG. **Unit/mission:** 179th AW, air mobility operations. **History:** named in 1948 for nearby city and aviation pioneer Brig. Gen. Frank P. Lahm.

March ARB, Calif. 92518. Nearest city: Moreno Valley/Riverside. **Phone:** 951-655-4138. **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.

McEntire JNGB, S.C. 29044. Nearest city: Columbia. **Phone:** 803-647-8300. **Component:** ANG. **Unit/mission:** 169th FW, 495th FG, Det. 157 (active associate), fighter operations. **History:** named for ANG Brig. Gen. B. B. McEntire Jr., killed in F-104 accident 1961.

McGhee Tyson Arpt., Tenn. 37777. Nearest city: Knoxville. **Phone:** 865-336-3205. **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 Arpt., Tenn. 38118. Nearest city: Memphis. **Phone:** 901-291-7111. **Component:** ANG. **Unit/mission:** 164th AW, air mobility operations.

Minneapolis-St. Paul Arpt./ARS, Minn. 55450. Nearest city: Minneapolis. **Phone:** 612-713-1000. **Component:** ANG/AFRC. **Unit/mission:** 133rd AW (ANG), air mobility operations; 934th AW (AFRC), air mobility, cyber operations.

Moffett ANGB, Calif. 94035. Nearest city: Mountain View. **Phone:** 650-603-9129. **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.

Montgomery Regional Arpt., Ala. 36108. Nearest city: Montgomery. **Phone:** 334-394-7200. **Component:** ANG. **Unit/mission:** 187th FW, fighter, ISR operations. **History:** originally named for Ens. Clarence Dannelly, Navy pilot killed in WWII.

NAS Fort Worth JRB, Texas 76127. Nearest city: Fort Worth. **Navy-hosted switchboard:** 817-782-5000. **ANG Phone:** 817-852-3136. **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.

NAS JRB New Orleans, La. 70143. Nearest city: New Orleans. **Phone:** 504-391-8600. **Component:** ANG. **Unit/mission:** 122nd ASOS (Pineville, La.), TACP; 159th FW, fighter opera-



An F-16 at Toledo Express Arpt., Ohio

Amn. Hope Geiger/ANG

tions; 214th EIS, cyber operations; 236th CBCS (Hammond, La.), combat communications.

New Castle County Arpt., Del. 19720. **Nearest city:** Wilmington. **Phone:** 302-323-3300. **Component:** ANG. **Unit/mission:** 166th AW, air mobility, cyber operations.

Niagara Falls Arpt./ARS, N.Y. 14304. **Nearest city:** Niagara Falls. **Phone:** 716-236-2000. **Component:** ANG/AFRC. **Unit/mission:** 107th ATKW (ANG), RPA operations; 914th ARW (AFRC), air mobility operations.

Otis ANGB, Mass. 02542. **Nearest city:** Falmouth. **Phone:** 508-968-4003. **Component:** ANG. **Unit/mission:** 102nd IW, C2, DCGS operations, ELG, WXF; 202nd ISRG, cyber intelligence; 253rd CCG, combat communications. **History:** named for 1st Lt. Frank J. Otis, Massachusetts ANG flight surgeon and pilot killed in 1937 crash.

Pease Intl. Tradeport ANGS, N.H. 03803. **Nearest city:** Portsmouth. **Phone:** 603-430-3577. **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.

Peoria Intl. Arpt., Ill. 61607. **Nearest city:** Peoria. **Phone:** 800-942-3771. **Component:** ANG. **Unit/mission:** 182nd AW, air mobility, combat communications, TACP operations.

Pittsburgh Intl. Arpt./ARS, Pa. 15108. **Nearest city:** Coraopolis. **AFRC phone:** 412-474-8511. **ANG phone:** 412-776-8010. **Component:** ANG/AFRC. **Unit/mission:** 171st ARW (ANG), air mobility operations; 911th AW (AFRC), aeromedical evacuation, air mobility operations.

Portland Arpt., Ore. 97218. **Nearest city:** Portland. **Phone:** 503-335-4000. **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.

Quonset State Arpt. (Quonset ANGB), R.I. 02852. **Nearest city:** North Kingstown. **Phone:** 401-886-1200. **Component:** ANG. **Unit/mission:** 102nd IWS, cyber operations; 143rd AW, air mobility operations, cyber.

Reno/Tahoe Arpt. (May Field), Nev. 89502. **Nearest city:** Reno. **Phone:** 775-788-4500. **Component:** ANG. **Unit/mission:** 152nd AW,

air mobility, DCGS operations. **History:** named for Maj. Gen. James A. May, Nevada adjutant general, 1947 to 1967.

Rickenbacker ANGB, Ohio 43217. **Nearest city:** Columbus. **Phone:** 614-492-3408. **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.

Rosecrans Memorial Arpt., Mo. 64503. **Nearest city:** St. Joseph. **Phone:** 816-236-3300. **Component:** ANG. **Unit/mission:** 139th AW (ANG), air mobility operations; Advanced Airlift Tactics Training Center (ANG/AFRC).

Salt Lake City Arpt., Utah 84116. **Nearest city:** Salt Lake City. **Phone:** 801-245-2200. **Component:** ANG. **Unit/mission:** 151st ARW, air mobility operations; 101st IOF, 130th EIS, cyber operations; 169th IS, intelligence operations.

Savannah Hilton Head Arpt., Ga. 31408. **Nearest city:** Garden City. **Phone:** 912-966-8223. **Component:** ANG. **Unit/mission:** 165th AW, air mobility, tactical communications, TACP operations, Air Dominance Center.

Schenectady County Arpt. (Stratton ANGB), N.Y. 12302. **Nearest city:** Scotia. **Phone:** 518-344-2300. **Component:** ANG. **Unit/mission:** 109th AW, air mobility operations, Antarctic support.

Selfridge ANGB, Mich. 48045. **Nearest city:** Mount Clemens. **Phone:** 586-239-5576. **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.

Sioux Gateway Arpt./Col. Bud Day Field, Iowa 51111. **Nearest city:** Sioux City. **Phone:** 712-233-0200. **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.

Springfield-Beckley Arpt., Ohio 45502. **Nearest city:** Springfield. **Phone:** 800-851-4503. **Component:** ANG. **Unit/mission:** 178th Wing, cyber, ISR, space, RPA operations.

Stewart ANGB, N.Y. 12550. **Nearest city:** Newburgh. **Phone:** 845-563-2000. **Component:** ANG.

Unit/mission: 105th AW, air mobility, EIS, WXF. **History:** Stewart AFB until 1969. Acquired by state of New York 1970.

Toledo Express Arpt., Ohio 43558. **Nearest city:** Swanton. **Phone:** 419-868-4250. **Component:** ANG. **Unit/mission:** 180th FW, fighter operations.

Truax Field, Wis. 53704. **Nearest city:** Madison. **Phone:** 608-245-4395. **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.

Tucson Arpt., Ariz. 85706. **Nearest city:** Tucson. **Phone:** 520-295-6192. **Component:** ANG. **Unit/mission:** 162nd Wing, fighter, ISR, RPA (at Davis-Monthan AFB, Ariz.) operations, training.

Tulsa Arpt., Okla. 74115. **Nearest city:** Tulsa. **Phone:** 918-833-7000. **Component:** ANG. **Unit/mission:** 138th FW, fighter, cyber operations, TACP training.

Volk Field ANGB, Wis. 54618. **Nearest city:** Madison. **Phone:** 608-427-1210. **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.

Warfield ANGB/Martin State Arpt., Md. 21220. **Nearest city:** Baltimore. **Phone:** 410-918-6001. **Component:** ANG. **Unit/mission:** 175th Wing, cyber, fighter operations.

Westover ARB, Mass. 01022. **Nearest city:** Chicopee. **Phone:** 413-557-1110. **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.

Will Rogers ANGB, Okla. 73179. **Nearest city:** Oklahoma City. **Phone:** 405-686-5227. **Component:** ANG/AFSOC. **Unit/mission:** 137th SOW, ISR operations; 146th ASOS, TACP operations; 205th EIS, cyber operations.

Yeager Arpt., W.Va. 25311. **Nearest city:** Charleston. **Phone:** 304-341-6249. **Component:** ANG. **Unit/mission:** 130th AW, air mobility, ISR operations. **History:** named for Brig. Gen. Charles E. "Chuck" Yeager.

Youngstown ARS, Ohio 44473. **Nearest city:** Youngstown. **Phone:** 330-609-1000. **Component:** AFRC. **Unit/mission:** 910th AW, air mobility operations.

Gallery of Weapons

By Aaron M. U. Church

2018 USAF Almanac



B-1 Lancer

A1C Gerald Willis

BOMBER AIRCRAFT

■ B-1 LANCER

Mission brief: Conventional, long-range, supersonic penetrating strike.

COMMENTARY

The B-1A was initially proposed as a replacement for the B-52, and four prototypes were developed and tested before program cancellation in 1977. The program was revived in 1981 as the B-1B. The vastly upgraded aircraft added 74,000 lb of usable payload, improved radar, and reduced radar cross section, but cut speed to Mach 1.2. B-1B saw first combat in Iraq during Desert Fox in 1998. Its three internal weapons bays hold a substantial payload, allowing different weapons in each bay. The bomber's blended wing/body configuration, variable-geometry design, and turbofan engines provide long range and loiter time. Offensive avionics include SAR for terrain-following, as well as tracking and targeting moving vehicles. Sniper pod was added in 2008. The ongoing integrated battle station (IBS) modification is the most comprehensive refresh in the bomber's history. The three-part upgrade includes the Vertical Situation Display (VSD), which adds a digital cockpit, Fully Integrated Data Link (FIDL) to enhance targeting, command and control, and the Central Integrated Test System (CITS), which gives aircrew real-time aircraft diagnostics and simplifies maintenance and troubleshooting. FIDL includes Link 16 and Joint Range Extension data link, enabling permanent secure LOS/BLOS/C2. It also adds Ethernet to enable rapid airborne retargeting. Ongoing efforts will stretch the B-1's service life to 2040. The first Sustain-

ment Block 16 (IBS) airframe was completed in May 2016, and 29 airframes were complete as of mid-2017. Fleetwide upgrade will be complete by 2020. Higher powered Military Code (M-Code) jam-resistant GPS interface is in development. Future upgrades include replacing the laptop interface with Fully Integrated Targeting Pod (FITP), Mode 5 IFF, Multifunctional Information Distribution System/Joint Tactical Radio System (MIDS/JTRS), airspace-compliant CNS/ATM, updated BLOS comm-cryptography, and bomb rack payload and safety improvements.

EXTANT VARIANT(S)

- B-1B. Upgraded production version of the canceled B-1A.

Function: Long-range conventional bomber.

Operator: AFGSC, AFMC.

First Flight: Dec. 23, 1974 (B-1A); Oct. 18, 1984 (B-1B).

Delivered: June 1985-May 1988.

IOC: Oct. 1, 1986, Dyess AFB, Texas (B-1B).

Production: 104.

Inventory: 62.

Aircraft Location: Dyess AFB, Texas; Edwards AFB, Calif.; Eglin AFB, Fla.; Ellsworth AFB, S.D.

Contractor: Boeing (formerly Rockwell), Harris Corp.

Power Plant: Four General Electric F101-GE-102 turbofans, each 30,780 lb thrust.

Accommodation: Pilot, copilot, and two WSOs (offensive and defensive), on ACES II zero/zero ejection seats.

Dimensions: Span 137 ft (spread forward) to 79 ft (swept aft), length 146 ft, height 34 ft.

Weight: Max T-O 477,000 lb.

Ceiling: More than 30,000 ft.

Performance: Speed 900+ mph at S-L, range intercontinental.

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) Quick Strike 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 or JASSM-ER.

■ B-2 SPIRIT

Mission brief: Stealthy, long-range penetrating nuclear and conventional strike against high-value targets.

COMMENTARY

The B-2 is a flying wing that combines LO stealth design with high aerodynamic efficiency. Spirit entered combat against Serb targets during Allied Force on March 24, 1999. B-2 production was completed in three successive blocks and all aircraft were upgraded to Block 30 standards with AESA radar. AESA paves the way for future advanced weapons integration—B61-12 bomb. The aircraft's smoothly blended "fuselage" holds two weapons bays capable of carrying nearly 60,000 lb of weapons in various combinations. Fleetwide comm upgrades include an EHF satcom, high-speed computer, which is part of the Defensive Management System-Modernization (DMS-M), as well as upgrading BLOS voice/data reliability to preserve current capabilities. FY18 funds continue VLF receive-only capability to

All inventory numbers are total active inventory figures as of Sept. 30, 2017.



B-2 Spirit

TSgt. Andy Kin

provide redundancy and upgradable nuclear C2, and continues Adaptable Communications Suite (ACS) mods to provide time-sensitive mission data, targeting, intelligence, and C2 updates. AEHF comms will provide two-way, survivable communications for nuclear missions in A2/AD environments. Weapons integration includes the improved B61-12 nuclear free-fall bomb, JASSM-ER, GBU-57 Massive Ordnance Penetrator, and future weapons such as GBU-53 SDB II, GBU-56 Laser JDAM, and JDAM-5000. Flexible Strike Package mods will feed GPS data to the weapons bays, allowing prerelease guidance to thwart jamming and are required for B61-12 integration. Phase 2 will allow nuclear and conventional weapons to be carried simultaneously to increase flexibility. USAF plans to add wideband nuclear C2 under the FAB-T program. Efforts are underway to increase fleet availability, shorten depot-level maintenance, and increase intervals between overhauls. New FY18 efforts include airspace-compliant CNS/

ATM, crash-survivable flight-data memory, and advanced MOP/B61 integration. Service life is planned through 2032.

EXTANT VARIANT(S)

• B-2A. Production aircraft upgraded to Block 30 standards.

Function: Long-range heavy bomber.

Operator: AFGSC, AFMC, ANG (associate).

First Flight: July 17, 1989.

Delivered: December 1993–December 1997. (Test asset redelivered as combat capable, July 2000.)

IOC: April 1997, Whiteman AFB, Mo.

Production: 21.

Inventory: 20.

Aircraft Location: Edwards AFB, Calif.; Whiteman AFB, Mo.

Contractor: Northrop Grumman, Boeing, Vought.

Power Plant: Four General Electric F118-GE-100 turbofans, each 17,300 lb thrust.

Accommodation: Two pilots, on ACES II zero/zero ejection seats.

Dimensions: Span 172 ft, length 69 ft, height 17 ft.

Weight: Max T-O 336,500 lb.

Ceiling: 50,000 ft.

Performance: Speed high subsonic, estimated unrefueled range 5,000 miles.

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.

■ B-52 STRATOFORTRESS

Mission brief: Long-range strike with nuclear and/or conventional freefall weapons or standoff cruise missiles.

COMMENTARY

The B-52H is the last serving variant of the Stratofortress and USAF's only nuclear cruise missile carrier. Multimission capabilities include long-range precision strike, CAS, air interdiction, defense suppression, and maritime surveillance. Litening and Sniper targeting pods have been added. The overall B-52 System Improvements project is replacing key obsolescent components. The Combat Network Communications Technology (CONNECT) program is replacing cockpit displays and comms and enabling machine-to-machine tasking/retargeting. The first CONNECT airframe was redelivered in 2014. CNS/ATM replaces the B-52's analog systems with digital systems. The Internal Weapons Bay Upgrade enables internal smart weapon carriage. The Conventional Rotary Launcher roughly doubles smart weapon payloads, while reducing drag and increasing range. The upgrade

Acronyms and Abbreviations

AE	aeromedical evacuation	CSAR	combat search and rescue	IIR	imaging infrared	PGM	precision guided munition
AEHF	Advanced Extremely High Frequency	CSO	combat systems officer	INS	inertial navigation system	PSP	Precision Strike Package
AESA	active electronically scanned array	DV	distinguished visitors	IOC	initial operational capability	ROVER	Remotely Operated Video Enhanced Receiver
AGM	air-to-ground missile	EA	electronic attack	IR	infrared	RPA	remotely piloted aircraft
AIM	air intercept missile	ECM	electronic countermeasures	ISR	intelligence, surveillance, and reconnaissance	RWR	radar warning receiver
ALCM	Air Launched Cruise Missile	EELV	Evolved Expendable Launch Vehicle	JASSM	Joint Air-to-Surface Standoff Missile	SAR	synthetic aperture radar
AMRAAM	Advanced Medium-Range Air-to-Air Missile	EHF	extremely high frequency	JDAM	Joint Direct Attack Munition	satcom	satellite communications
ASIP	Airborne Signals Intelligence Payload	Elint	electronic intelligence	JSOW	Joint Standoff Weapon	SDB	Small Diameter Bomb
ATP	advanced targeting pod	EO	electro optical	JSUPT	Joint Specialized Undergraduate Pilot Training	SEAD	suppression of enemy air defenses
BLOS	beyond line of sight	ER	extended range	JTIDS	Joint Tactical Information Distribution System	SHF	super high frequency
BLU	bomb live unit	EW	electronic warfare	LANTIRN	Low-Altitude Navigation and Targeting Infrared for Night	shp	shaft horsepower
BM	battle management	EWO	electronic warfare officer	LCD	liquid crystal display	Sigint	signals intelligence
C2	command and control	FAB-T	Family of Advanced Beyond Line of Sight Terminals	LGB	laser guided bomb	S-L	sea level
C3	command, control, and communications	FAC-A	forward air control airborne	LJDAM	Laser Joint Direct Attack Munition	SLEP	service life extension program
CALCM	Conventional Air Launched Cruise Missile	FLIR	forward-looking infrared	LO	low observable	SOF	special operations forces
CAS	close air support	FMV	full-motion video	LOS	line of sight	START	Strategic Arms Reduction Treaty
CBU	cluster bomb unit	FY	Fiscal Year	LRASM	Long-Range Anti-Ship Missile	STOL	short takeoff and landing
CEM	combat effects munition	GATM	Global Air Traffic Management	MALD	Miniature Air Launched Decoy	TACAN	tactical air navigation
CEP	circular error probable	GBU	guided bomb unit	Masint	measurement and signature intelligence	TBD	to be determined
CFIN	combat flight inspection	GCS	ground control station	MFD	multifunction display	TF/TA	terrain-following/terrain-avoidance
CFT	conformal fuel tank	HARM	High-speed Anti-Radiation Missile	N/A	not available	T-O	takeoff
CNS/ATM	communications, navigation, surveillance/air traffic management	HE	high-explosive	NVG	night vision goggles	UHF	ultra high frequency
Comint	communications intelligence	HUD	head-up display			USAFA	US Air Force Academy
CONUS	continental US	IADS	integrated air defense system			VHF	very high frequency
		IBS	integrated battle station			VLF	very low frequency
		IFF	identification, friend or foe			WCMD	Wind-Corrected Munitions Dispenser
						WSO	weapon systems officer



B-52 Stratofortress

SSgt. Michael Battles

was deployed to combat for the first time in Afghanistan in 2017 and supports transition from CALCM to the AGM-158B JASSM-ER long-range cruise missile. Both CONECT and Weapons Bay Upgrades are slated for completion fleetwide by 2020. Future weapons include the GBU-54 Laser JDAM. Thirty B-52s are undergoing conventional weapon-only modifications to comply with the New START nuclear arms reduction agreement. Ongoing development efforts include replacing obsolescent radar with a reliable, modern, off-the-shelf system, adding low-latency, jam-resistant C2/comms, and upgrading BLOS voice/data capability to preserve current capabilities. New development adds additional airspace compliance mods and begins analysis to potentially replace the TF33 with a more reliable, efficient, and powerful engine. USAF projects service life to the 2050s with new engines.

EXTANT VARIANT(S)

- B-52H. Longer-range development of the original B-52A, with more efficient turbofan engines.

Function: Long-range heavy bomber.
Operator: AFGSC, AFMC, AFRC.
First Flight: April 15, 1952 (YB-52 prototype); 1960 (B-52H).
Delivered: May 1961–October 1962 (B-52H).
IOC: May 1961 (B-52H).
Production: 744 (incl 102 B-52H).
Inventory: 75.
Aircraft Location: Barksdale AFB, La.; Edwards AFB, Calif.; Minot AFB, N.D.
Contractor: Boeing, Harris.
Power Plant: Eight Pratt & Whitney TF33-P-3 turbofans, each 17,000 lb thrust.
Accommodation: Two pilots, side by side, plus navigator, radar navigator, and EWO on upward/downward ejection seats.
Dimensions: Span 185 ft, length 159.3 ft, height 40.7 ft.
Weight: Max T-O 488,000 lb.
Ceiling: 50,000 ft.
Performance: Speed 650 mph, range 10,000+ miles.
Armament: Nuclear: 12 AGM-86B ALCMs externally, and eight ALCMs or gravity weapons internally. Conventional: AGM-86C/D CALCMs, 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.

armored surface/maritime targets, interdiction, Forward Air Controller-Airborne (FAC-A), CSAR, and Strike Control & Reconnaissance.

COMMENTARY

The A-10C is an A-10A with precision engagement modifications, including color cockpit MFDs, hands-on throttle and stick, digital stores management, improved fire-control system, GPS-guided weapons, Litening/Sniper pods, advanced data links, and integrated sensors. A-10C deployed to combat for the first time in 2007. It combines a large, diverse weapons payload, long loiter times, austere airfield capability, maneuverability, and wide combat radius. Using night vision and targeting pods, it is capable of operating under 1,000-ft ceilings in darkness. The aircraft has 11 hardpoints for up to 16,000 lb of ordnance. Its 30 mm gun can destroy heavy armor, and its titanium cockpit tub protects the pilot. Current upgrades include advanced IFF and open architecture software to allow quick integration of future weapons and sensors. Software is continuously updated in response to emerging operational requirements, including advanced weapons integration, situational awareness, targeting, navigation, comm, and cockpit upgrades under the A-10 Operational Flight Program (OFP). The last of 278 aircraft were upgraded with Helmet Mounted Cueing System (HMCS) in 2015, and USAF is pursuing wing replacement beyond the initial 173 aircraft program, originally slated for completion in FY16. Integration of the Advanced Precision Kill Weapon System (APKWS) recently added carriage of 98 low-collateral damage, laser guided rockets, immediately arming A-10s in combat over Iraq and Syria. USAF reversed early retirement plans in favor of retaining the A-10 in service until 2030. Ongoing Lightweight Airborne Recovery System/Combat Survivor Evader Locator (LARS/CSEL) upgrades enhance the A-10's ability to locate and aid recovery of downed aircrew. FY18 begins FAA airspace compliance upgrades required by 2020.

EXTANT VARIANT(S)

- A-10C. Upgraded version of the A-10A ground attack aircraft.

Function: Attack.
Operator: ACC, AFMC, PACAF, ANG, AFRC.
First Flight: Feb. 15, 1975 (preproduction).
Delivered: October 1975–March 1984.
IOC: October 1977 (A-10A); 2007 (A-10C).
Production: 713.
Inventory: 283.
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 ANGB, Mich.; Whiteman AFB, Mo.
Contractor: Fairchild Republic (Lockheed Martin).
Power Plant: Two General Electric TF34-GE-100 turbofans, each 9,065 lb thrust.
Accommodation: Pilot on ACES II zero/zero ejection seat.
Dimensions: Span 57.5 ft, length 53.3 ft, height 14.7 ft.
Weight: Max T-O 51,000 lb.
Ceiling: 45,000 ft.
Performance: Speed 518 mph, range 800 miles.
Armament: One 30 mm, seven-barrel GAU-8/A Gatling gun (1,174 rd), straight high-explosive incendiary (HEI), or anti-armor HE/armor-piercing incendiary (API). Combat mix incl various types of free-fall or guided bombs such as Mk 82, Mk 84, GBU-10/12/38, CBU-87, laser guided rockets, various WCMDs, illumination rockets/flares, AGM-65 Mavericks, and AIM-9 Sidewinders.

F-15 EAGLE

Mission brief: Supersonic, all-weather, day/night, air-superiority.

COMMENTARY

The F-15 was the world's dominant air superiority fighter for more than 30 years. F-15C/Ds began replacing F-15A/Bs in 1979 and offered superior maneuverability and acceleration, range, weapons, and avionics. It incorporates internal

FIGHTER & ATTACK AIRCRAFT

A-10 THUNDERBOLT II

Mission brief: CAS against a wide range of



A-10 Thunderbolt II

SR.A. Trevor McBride



F-15E Strike Eagle

TSgt. Mathew Plew

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 Multistage Improvement Program enhanced tactical capabilities. The F-15C/D is undergoing vital improvements, including new AESA radar and self defenses, needed to survive and fight in future, contested airspace. The first APG-63(V)3 AESA-modified F-15 was delivered in 2010, and the Eagle Passive/Active Warning Survivability System (EPAWSS) engineering development contract was awarded in 2016. EPAWSS initially replaces the current, obsolete system. A second phase will add a towed decoy/angled countermeasure capability. A total of 214 aircraft will be upgraded to augment the limited F-22 fleet. FY18 launches infrared search and track (IRST), advanced data links to enhance interoperability with fifth generation aircraft, safety-critical forward fuselage longeron replacements, and Multifunctional Information Distribution System/ Joint Tactical Radio System (MIDS/JTRS). USAF plans to procure 100 IRST pods to discreetly detect, track, and engage air targets, while MIDS/JTRS will enable higher capacity, jam-resistant Link 16 networking. Additional upgrades include jam-resistant Mode 5-compliant IFF and new digital cockpit displays to fully exploit AESA capabilities (common with the F-15E).

EXTANT VARIANT(S)

- F-15C/D. Upgraded version of the original F-15A/B.

Function: Air superiority fighter.

Operator: ACC, AFMC, PACAF, USAF, ANG.

First Flight: July 27, 1972 (F-15A); Feb. 26, 1979 (F-15C).

Delivered: 1974-79 (F-15A/B); 1979-85 (F-15C/D).

IOC: September 1975 (F-15A/B); 1979 (F-15C/D).

Production: 874.

Inventory: 212 (F-15C); 23 (F-15D).

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, UK.

Contractor: McDonnell Douglas (now Boeing), BAE Systems (EPAWSS), Raytheon (AESA), Rockwell Collins (MIDS/JTRS).

Power Plant: Two Pratt & Whitney F100-PW-220 turbofan engines, each 23,450 lb thrust; or two P&W F100-PW-229 turbofan engines with afterburners, each 29,000 lb thrust.

Accommodation: Pilot (C); two pilots (D) on ACES II zero/zero ejection seats.

Dimensions: Span 42.8 ft, length 63.8 ft, height 18.7 ft.

Weight: Max T-O 68,000 lb.

Ceiling: 60,000 ft.

Performance: F-15C: speed Mach 2.5, ferry range 2,878 miles (3,450 miles with CFTs and three external tanks).

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, carried externally.

■ F-15E STRIKE EAGLE

Mission brief: All-weather deep interdiction/attack, tactical nuclear delivery, and air-to-air combat.

COMMENTARY

F-15E is an upgraded two-seat heavyweight, multirole F-15 capable of sustaining nine Gs throughout the flight envelope. It entered combat during Desert Storm in 1991. F-15E's large, varied load of precision weapons and 20 mm cannon gives it potent ground attack capability. Radar-guided and IR-homing missiles give it an additional air-to-air capability. Its advanced cockpit controls and displays include a wide-field-of-view HUD and helmet mounted cockpit-cueing, and its avionics permit all-weather day/night engagement. The F-15E carries LANTIRN, Sniper, and Litening ATPs on dedicated pylons. A SAR pod provides surveillance/reconnaissance capability. The aircraft are equipped with Link 16 and ARC-210 BLOS satcom. Ongoing upgrades include new APG-82(V)1 AESA radar and Eagle Passive/Active Warning Survivability System (EPAWSS) to replace its obsolete self-defense suite. The combined EPAWSS engineering development contract for all F-15 variants was awarded in 2016. Ongoing developments include AESA integration, EPAWSS, a new central computer and cockpit displays (in common with the F-15C/D), jam-resistant Link 16, Mode 5 IFF, ATP improvements, and airspace compliance mods. FY18 launches MIDS/JTRS to enable higher capacity, jam-resistant Link 16 networking, and Joint Helmet Mounted Cueing System (JHMCS) upgrades. Future weapons include SDB II. Fatigue testing is underway to determine SLEP requirements to reach 2035 or beyond.

EXTANT VARIANT(S)

- F-15E. Fighter aircraft derived from the F-15.

Function: Multirole fighter.

Operator: ACC, AFMC, USAF.

First Flight: Dec. 11, 1986.

Delivered: April 1988-2004.

IOC: September 1989.

Production: 236.

Inventory: 218.

Aircraft Location: Eglin AFB, Fla.; Mountain

F-16 Fighting Falcon

Home AFB, Idaho; Nellis AFB, Nev.; RAF Lakenheath, UK; Seymour Johnson AFB, N.C.

Contractor: McDonnell Douglas (now Boeing), BAE Systems (EPAWSS), Raytheon (AESA).

Power Plant: Two Pratt & Whitney F100-PW-220, each 23,450 lb thrust; or two F100-PW-229 turbofans with afterburners, each 29,000 lb thrust.

Accommodation: Pilot and WSO on ACES II zero/zero ejection seats.

Dimensions: Span 42.8 ft, length 63.8 ft, height 18.5 ft.

Weight: Max T-O 81,000 lb.

Ceiling: 50,000 ft.

Performance: Speed Mach 2.5, ferry range 2,400 miles with CFTs and three external tanks.

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) and ECM pods.

■ F-16 FIGHTING FALCON

Mission brief: Multirole air-to-air and surface attack, CAS, SEAD, interdiction, FAC-A, tactical nuclear delivery, and all-weather precision strike.

COMMENTARY

The F-16 comprises 50 percent of USAF's fighter fleet and is among the most maneuverable fighters ever built. The F-16 is capable of carrying the majority of PGMs in the inventory and is USAF's primary SEAD platform. The F-16 entered combat during the 1991 Gulf War. The F-16C/D was introduced in 1984, at Block 25. It featured cockpit, airframe, and core avionics upgrades and added the increased-range APG-68 radar and AMRAAM. Block 30/32 added next stage improvements, new engines, and weapons including HARM. Block 40/42 delivered in 1988 introduced the LANTIRN pod, enabling automatic terrain following and high-speed night/all-weather penetration. It also introduced wide-angle HUD, increased takeoff weight, expanded flight envelope, and higher G limits. Block 50/52 delivered in 1991 is optimized for SEAD, employing HARM and a longer range radar. It added the uprated F101-GE-129 and F100-PW-229 engines, upgradable cockpit, Sniper/Litening ATPs, and ROVER to coordinate with strike controllers. Most upgrades are managed in Pre-Block (Block 25/30/32) and Post-Block (Blocks 40/42/50/52) tranches. The fleet has recently been cockpit-standardized with a new color MFD, modular mission computer, Helmet Mounted Integrated Targeting (HMIT), and Link 16. Automatic Ground Collision Avoidance System (A-GCAS) was added in 2014, and future efforts include adding air collision avoidance and merging the two systems. Development of



TSgt. Gregory Brook



SSgt. Edward Eagerton

the similar Hybrid Flight Control Computer/A-GCAS for Pre-Block aircraft equipped with analog flight-control systems will conclude in 2018, paving the way for A-GCAS installation fleetwide by 2022. Ongoing upgrades include SLEP, AESA radar retrofits, MIDS/JTRS to enable higher capacity, jam-resistant Link 16 networking, Aggressor capability improvements, and low-cost mods. Depot-level SLEP extending fatigue life to 10,000 hours or beyond will start in 2019. AESA radar upgrades NORAD alert aircraft to counter cruise missile threats and includes additional capability improvements. Development includes mission computer, sensor, radar, and self-defensive suite capability enhancements, and fourth/fifth gen fighter network capabilities. JASSM-ER integration is slated for completion in 2018. New starts include HFLCC/A-GCAS, mandated airspace compliance mods, comm modernization, and digital RWR. FY18 funds add two F-16 training squadrons to address pilot shortage.

EXTANT VARIANT(S)

- F-16C/D Block 30/32. Multinational Staged Improvement Program II upgraded with new engines, flown by ANG, AFRC, and test and aggressor units.
- F-16CG Block 40/42. Aircraft optimized for night and all-weather attack.
- F-16CJ Block 50/52. Aircraft optimized for SEAD with new long-range radar, engines, and weapons.

Function: Multirole fighter.

Operator: ACC, AETC, AFMC, PACAF, USAFE, ANG, AFRC.

F-22 Raptor

First Flight: Dec. 8, 1976 (full-scale development); June 19, 1984 (F-16C).

Delivered: January 1979 (F-16A); July 13, 1984-2005 (F-16C/D).

IOC: 1980, (F-16A); 1981 (Block 25-32); 1989 (Block 40/42); 1994 (Block 50/52).

Production: 2,206.

Inventory: 786 (F-16C); 155 (F-16D).

Aircraft Location: Aviano AB, Italy; Edwards AFB, Calif.; Eglin AFB, Fla.; Eielson AFB, Alaska; Hill AFB, Utah; 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 out of Maryland), Minnesota, New Jersey, Ohio, Oklahoma, South Carolina, South Dakota, Texas, Vermont, Wisconsin.

Contractor: General Dynamics (now Lockheed Martin), Northrop Grumman (radar).

Power Plant: Block 40: one General Electric F110-GE-100 (29,000 lb thrust); Block 42: one Pratt & Whitney F100-PW-220 (24,000 lb thrust); Block 50: one F110-GE-129 (29,000 lb thrust); Block 52: one F100-PW-229 (29,000 lb thrust).

Accommodation: Pilot (C); two pilots (D) on ACES II zero/zero ejection seats.

Dimensions: Span 32.8 ft, length 49.3 ft, height 16.7 ft.

Weight: F-16C: empty (F100-PW-229) 18,591 lb, (F110-GE-129) 18,917 lb; gross, with external load (Block 40/42) 42,000 lb.

Ceiling: 50,000 ft.

Performance: Speed Mach 2, ferry range 2,002+ miles.

Armament: One M61A120 mm cannon (500 rd); up to six air-to-air missiles, AGMs, and ECM pods externally.

■ F-22 RAPTOR

Mission brief: Stealthy, penetrating air dominance, multirole attack.

COMMENTARY

The F-22 is built for day, night, and adverse weather full-spectrum operations. The world's most advanced fighter, it combines stealth, supercruise, high maneuverability, and integrated avionics. Its integrated avionics and data links permit simultaneous multitarget engagement. Advanced flight controls and thrust vectoring high-performance engines lend great maneuverability. Features include six LCD color cockpit displays, APG-77 radar, EW system with RWR and missile launch detector, JTIDS, IFF system, laser gyroscope inertial reference, and GPS. The Raptor flew its first operational sortie during Noble Eagle in 2006 and debuted in combat during Inherent Resolve over Iraq and Syria in 2014. Four aircraft successfully employed 1,000-lb JDAMs against ISIS ground targets during the aircraft's first combat sortie. Ongoing upgrades include the Reliability, Availability, and Maintainability Maturation Program (RAMMP), software Increment 3.1, and tactical capability improvements. These collectively retrofit combat-coded F-22s with enhanced ground attack, air-to-air engagement, and networking. RAMMP is adding AIM-9X-capable launch rails, urgent needs such as the Automatic Back-Up Oxygen System (ABOS), and reliability enhancements. The 3.2B software package will add high resolution ground mapping SAR, threat geolocation, EA capability, and integration of SDB I, AIM-120D, and AIM-9X. Five test aircraft are modified to 3.2 standards to begin operational testing in FY18 followed by fleetwide concurrent mods. Additional upgrades include engine safety, performance and maintainability mods, phase two structural mods to extend fleet life, improved ISR and comms, and harmonizing training airframes to combat-coded specifications. FY18 launches TACLink-16 development to enable data link transmit capability between F-22 and legacy aircraft.

EXTANT VARIANT(S)

- F-22A. Fifth generation air dominance fighter.

Function: Multirole fighter.

Operator: ACC, AFMC, AFRC (associate), PACAF, ANG.

First Flight: Sept. 7, 1997.

Delivered: April 9, 1997 (prototype); Oct. 23, 2002 (first production representative aircraft)-May 2, 2012.



F-35A Lightning II

SSgt. Kate Thornton

IOC: Dec. 15, 2005.

Production: 195.

Inventory: 187.

Aircraft Location: Edwards AFB, Calif.; JB Elmendorf-Richardson, Alaska; JB Langley-Eustis, Va.; JB Pearl Harbor-Hickam, Hawaii; Nellis AFB, Nev.; Tyndall AFB, Fla.

Contractor: Lockheed Martin, Boeing.

Power Plant: Two Pratt & Whitney F119-PW-100 turbofans, each 35,000 lb thrust.

Accommodation: Pilot on ACES II zero/zero ejection seat.

Dimensions: Span 44.5 ft, length 62 ft, height 16.6 ft.

Weight: Max T-O 83,500 lb.

Ceiling: Above 50,000 ft.

Performance: Speed Mach 2 with supercruise capability, ferry range 1,850+ miles with two external wing fuel tanks.

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-120s and two GBU-32 JDAMs (air-to-ground loadout) in main internal weapons bay.

■ F-35 LIGHTNING II

Mission brief: Stealthy, multirole, all-weather air-to-air and surface attack including direct attack on the most heavily defended ground targets.

COMMENTARY

The F-35 is a joint and multinational program aimed at fielding an affordable, highly common family of strike fighters. USAF's F-35A will replace F-16 and A-10 fleets with a stealthy, multirole fighter capable of penetrating advanced enemy air defenses and striking targets at will. The F-35A carries up to 18,000 lb of weapons on 10 stations, including four internal bays (for maximum stealth) and six additional wing- and fuselage- (or centerline) mounted pylons. USAF received its first production aircraft—AF-7—in 2008. FY18 funding supports procurement of 46 F-35As, and long-lead items for 48 aircraft in FY19. Full-rate production is planned for April 2019. The Marine Corps declared F-35 IOC in 2015. USAF reached IOC at Hill on Aug. 2, 2016, with the first aircraft upgraded with Block 31 software. Block 31 improves the baseline Block 2B software, adding 89 percent of the code needed for full-combat capability. The Block 3F software, expected in 2018, will enable full combat capability, adding a range of precision guided munitions. Block 4 development will eventually add new weapons and sensors, improve the F-35's EW capabilities, and integrate nuclear weapons beyond 2020. Current combat capabilities include interdiction, basic CAS, and limited SEAD. The start of full-initial operational testing is being delayed due to software immaturity and other issues, until late 2018 or early 2019. Oxygen system retrofits will be added fleetwide following a series of pilot-reported hypoxic incidents in 2017. Ongoing retrofits correct deficiencies including structural issues discovered during early concurrent production/testing. F-35As deployed for the first time to both Europe and the Pacific in 2017 and conducted their first live-fire air-to-air weapons shot employing the AIM-120.

EXTANT VARIANT(S)

- F-35A. Conventional takeoff and landing (CTOL) variant for the Air Force.
- F-35B. Short takeoff and vertical landing (STOVL) variant for USMC.
- F-35C. Carrier-capable variant for Navy.



AC-130J Ghostrider

SrA. Ryan Conroy

Function: Multirole fighter.

Operator: ACC, AETC, AFMC, AFRC. Planned: PACAF, USAF, ANG.

First Flight: Dec. 15, 2006 (F-35A prototype).

Delivered: April 2011 (first production aircraft)—present.

IOC: Aug. 2, 2016.

Production: Planned: 1,763 USAF (F-35A); 680 Navy and Marine Corps (F-35B/C); unspecified number to development partners and foreign military sales customers.

Inventory: 119 (USAF).

Aircraft Location: Edwards AFB, Calif.; Eglin AFB, Fla.; Hill AFB, Utah; Luke AFB, Ariz.; Nellis AFB, Nev.; future locations include Burlington Arpt., Vt.; Dannelly Field, Ala.; Eielson AFB, Alaska; RAF Lakenheath, UK; Truax Field, Wis.; others TBD.

Contractor: Lockheed Martin, BAE Systems, Northrop Grumman, Pratt & Whitney.

Power Plant: F-35A: one Pratt & Whitney F135-PW-100, 40,000 lb thrust.

Accommodation: Pilot on Martin Baker MK16 zero/zero ejection seat.

Dimensions: Span 35 ft, length 51.4 ft, height 14.4 ft.

Weight: Max T-O 70,000 lb.

Ceiling: 50,000 ft.

Performance: Speed Mach 1.6 with full internal weapons load, range 1,380 miles.

Armament: F-35A: one 25 mm GAU-22/A cannon; standard internal loadout: two AIM-120 AMRAAMs and two GBU-31 JDAMs.

SPECIAL OPERATIONS AIRCRAFT

■ AC-130J GHOSTRIDER

Mission brief: CAS, air interdiction, and armed reconnaissance for troops in contact, convoy escort, point defense, and urban operations.

COMMENTARY

The AC-130J is a next generation gunship based on a significantly modified MC-130J, fitted with a modular precision strike package, and wing-mounted weapon racks. The AC-130J is designed to provide ground forces with a persistent direct-fire platform for urban operations. PSP includes a mission management console, robust communications suite, two EO/IR sensors, advanced fire-control equipment, PGM delivery capability, and trainable cannons. Initial Block 10 aircraft include fully integrated digital avionics cockpit, GPS/INS, integrated defensive systems, color weather radar, and PSP. Block 20 configuration adds a 105 mm gun, laser guided SDB (tested for the first time in 2016), a side-mounted pilot tactical display, and Large Aircraft Infrared Countermeasures

(LAIRCM). Airframes are delivered as MC-130Js for subsequent modification as gunships. The prototype flew its first post-conversion flight in 2014, but was declared a loss after departing controlled flight during developmental testing at Eglin. The first Block 20 was delivered to Hurlburt for operational testing in July 2016 and achieved IOC Sept. 30, 2017. AFSOC dropped early deployment due to integration problems discovered in operational testing. Block 20 upgrades will address the shortcomings. A total of nine MC-130Js have been or are currently undergoing conversion and FY18 funds convert five more. Future upgrades include a high-energy laser weapon planned for initial integration in 2021, air-launched RPAs to provide below-the-cloud targeting data for all-weather strike, and integration of laser guided Hellfire missiles. FY18 funds procure initial radio frequency countermeasures kits to detect, locate, and respond to threats as well as PSP improvements.

EXTANT VARIANT(S)

- AC-130J Ghostrider Block 10. Prototype gunship based on the MC-130J.
- AC-130J Ghostrider Block 20. Production standard gunship with additional 105 mm gun.

Function: Attack.

Operator: AFSOC.

First Flight: Jan. 31, 2014.

Delivered: July 29, 2015—present.

IOC: Sept. 30, 2017.

Production: Eight (37 to be converted from new-build MC-130Js).

Inventory: Eight.

Aircraft Location: Hurlburt Field, Fla.

Contractor: Lockheed Martin.

Power Plant: Four Rolls Royce AE 2100D3 turboprops, each 4,700 shp.

Accommodation: Two pilots, two CSOs, three gunners (four, with inclusion of 105 mm gun).

Dimensions: Span 132.6 ft, length 97.7 ft, height 39.1 ft.

Weight: Max T-O 164,000 lb.

Ceiling: 28,000 ft., 42,000 lb payload.

Performance: Speed 416 mph, range 3,000 miles.

Armament: Trainable 30 mm GAU-23/A cannon; 105 mm cannon; PGMs including pylon-mounted GBU-39 SDB, AGM-114 Hellfire, and ramp-mounted AGM-176 Griffin.

■ AC-130U SPOOKY

Mission brief: CAS, air interdiction, and armed reconnaissance for troops in contact, convoy escort, strike coordination, overwatch, and point defense.

COMMENTARY

AC-130U is a gunship-configured C-130H

modified with gun systems, electronic and EO sensors, fire-control systems, enhanced navigation, sophisticated comms, defensive systems, and in-flight refueling capability. All AC-130U weapons can be subordinated to the APQ-180 digital fire-control radar, FLIR, or all-light-level television (ALLTV) for adverse weather attack operations. Rockwell converted the initial 13 AC-130Us between 1994 and 95, and Boeing more recently converted four more, all dubbed "Spooky" in reference to the early AC-47D gunship. The command retired a single nonstandard AC-130U in 2015, before halting phaseout. AFSOC is retaining 16 legacy AC-130Us and accelerating center wing box replacements to extend serviceability and meet high operational demands until replaced by AC-130Js. Recent upgrades include Enhanced Situational Awareness (ESA) program mods to provide near real-time intel and data fusion of threat detection, avoidance, geolocation, and adversary-emitter identification, and replacing obsolescent mission computers and EO/IR sensors with a new high-definition suite; GPS updates are ongoing. AC-130Us are undergoing center wing box replacement/structural mods in common with the C-130H fleet. AC-130U is the only DOD platform equipped with the obsolete and increasingly rare 40 mm weapons. The service plans to remanufacture some 80,000 40 mm rounds with a safer, more reliable fuze. All AC-130Us serve with the 1st Special Operations Wing at Hurlburt.

EXTANT VARIANT(S)

- AC-130U Spooky II. Third generation gunship based on C-130H.

Function: Attack.

Operator: AFSOC.

First Flight: 1967.

Delivered: 1968-present.

IOC: 1996.

Production: 43, incl four more recent conversions.

Inventory: 16 (AC-130U).

Aircraft Location: Hurlburt Field, Fla.

Contractor: Lockheed Martin (airframe), Boeing (formerly Rockwell).

Power Plant: Four Allison T56-A-15 turboprops, each 4,910 shp.

Accommodation: Two pilots, navigator, fire-control officer, EWO; flight engineer, TV operator, IR detection set operator, loadmaster, four aerial gunners.

Dimensions: Span 132.6 ft, length 97.8 ft, height 38.5 ft.

Weight: Gross 155,000 lb.

Ceiling: 25,000 ft.

Performance: Speed 300 mph, range 1,300 miles (further with air refueling).

Armament: One 25 mm Gatling gun, plus one 40 mm and one 105 mm cannon.

■ AC-130W STINGER II

Mission brief: CAS, air interdiction, and armed reconnaissance for troops in contact, convoy escort, strike coordination, overwatch, and point defense.

COMMENTARY

The AC-130W is a C-130H significantly modified with improved navigation, threat detection, countermeasures, comms, and a standoff Precision Strike Package. The aircraft performs armed overwatch, CAS, and reconnaissance over friendly positions for threat prevention. AC-130Ws also provide strike coordination, nontraditional ISR, and C2. PSP mod includes a mission management console, communications suite, and flight deck hardware. The airframes were originally converted as MC-130W Combat Spear for SOF infiltration/exfiltration and in-flight refueling. Aircraft were redesignated Dragon Spear with the addition of the roll on/roll off PSP to fill a need for more gunships in 2010. The aircraft was redesignated AC-130W Stinger II after further enhancements in 2012. New AC-130Js will eventually replace the AC-130Ws, which average more than 24 years old. Ongoing upgrades include Enhanced Situational Awareness (ESA) program mods to provide near real-time intel and data fusion capability, including threat detection, avoidance, geolocation, and adversary-emitter identification. SDB was added in 2012, and the service has begun retrofitting the aircraft with a 105 mm gun in common with the AC-130U/J fleets. Ongoing weapons integration includes Hellfire and Laser Guided SDB (LSDB). Recent enhancements include IR suppression to reduce engine heat signatures and other low-cost mods. A single aircraft will be modified with a high-energy laser (in place of the 30 mm gun) to develop future AC-130J armament.

EXTANT VARIANT(S)

- AC-130W Stinger II. Converted MC-130W armed with PSP and PGMs.

Function: Attack, armed reconnaissance.

Operator: AFSOC.

First Flight: Circa 2006 (Combat Spear).

Delivered: November 2010 (Dragon Spear).

IOC: 2010 (Dragon Spear).

Production: 12 (converted).

Inventory: 12.

Aircraft Location: Cannon AFB, N.M.

Contractor: Lockheed Martin.

Power Plant: Four Allison T56-A-15 turboprops, each 4,910 shp.

Accommodation: Two pilots, two CSOs, flight engineer, two special mission aviators.

Dimensions: Span 132.6 ft, length 98.8 ft, height 38.5 ft.

Weight: Max T-O 155,000 lb.

Ceiling: 28,000 ft.

Performance: Speed 300 mph, range 2,875 miles.

Armament: 30 mm GAU-23/A Bushmaster II chain gun; PGMs, incl GBU-39 SDB and AGM-176A Griffin, 105 mm cannon (planned).

■ C-145 SKYTRUCK

Mission Brief: STOL multipurpose utility and SOF proficiency training.

COMMENTARY

The C-145 is a version of the Polish-built PZL Mielec M-28 Skytruck high-wing STOL aircraft with 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, supplying surplus aircraft to several partners including NATO ally Estonia. C-145s now provide aircrew proficiency for combat aviation advisors.

EXTANT VARIANT(S)

- C-145A. Militarized civilian M-28 Skytruck used for SOF support and training.

Function: Foreign training and light mobility.

Operator: AFSOC, AFRC (associate).

First Flight: July 1993 (PZL M-28).

Delivered: 2009-2013.

IOC: N/A.

Production: 16.

Inventory: Five, USSOCOM-owned.

Aircraft Location: Duke Field, Fla.

Contractor: PZL Mielec (Sikorsky subsidiary).

Power Plant: Two Pratt & Whitney PT6A-65B turboprops, 1,100 shp.

Accommodation: Crew: two pilots, one loadmaster. Load: 16 passengers or 10 paratroopers; up to four litters; max cargo 5,000 lb.

Dimensions: Span 72.3 ft, length 43 ft, height 16.1 ft.

Weight: Max T-O 16,534 lb.

Ceiling: 25,000 ft.

Performance: Speed 256.5 mph, range 1,161.5 miles.

■ C-146 WOLFHOUND

Mission brief: Flexible, responsive operational movement of special operations teams and supplies into prepared, and semiprepared airfields worldwide.

COMMENTARY

The German-built Dornier 328 regional airliner 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



C-146 Skytruck

Samuel King/USAF



MC-130H Combat Talon II

A1C Joseph Pick



E-3 Sentry

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 operations in 2011. FY18 funds support navigation enhancements to permit ops in GPS-degraded environments.

EXTANT VARIANT(S)

• C-146A. Preowned civil Dornier 328 modified for SOF airlift.

Function: Multimission mobility.

Operator: AFSOC.

First Flight: December 1991 (Do 328).

Delivered: 2011-2017.

IOC: N/A.

Production: 20 (converted).

Inventory: 20, USSOCOM-owned.

Aircraft Location: Cannon AFB, N.M.; Duke Field, Fla.

Contractor: Fairchild-Dornier, Sierra Nevada Corp.

Power Plant: Two Pratt & Whitney 119C turbo-props, 2,150 shp.

Accommodation: Crew: two pilots, one loadmaster. Load: 27 passengers; up to four litters; max cargo 6,000 lb.

Dimensions: Span 69.6 ft, length 68.8 ft, height 23.8 ft.

Weight: Max T-O 30,843 lb.

Ceiling: 31,000 ft.

Performance: Speed 335 mph, range 2,070 miles (2,000 lb cargo).

■ CV-22 OSPREY

Mission brief: Long-range, high-speed infiltration, exfiltration, and resupply of special operations in hostile, denied, and politically sensitive areas.

COMMENTARY

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. 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. CV-22 can conduct shipboard and austere forward operations. It is capable of operating in nuclear, biological, and chemical (NBC) warfare conditions. It deployed to Africa in November 2008 and first saw 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, self-defensive improvements, weapons integration, and ISR and situational awareness

enhancements. The Silent Knight TF/TA radar will replace the current radar with a stealthier, low-altitude night/all-weather navigation radar. Europe-based CV-22s will shift to Spangdahlem, with the planned closure of Mildenhall. USAF is standing-up a Pacific-based presence at Yokota. An additional airframe ordered in 2016 will complete CV-22 deliveries by Feb. 2020.

EXTANT VARIANT(S)

• CV-22B. Air Force special operations variant of the V-22 Osprey.

Function: Multimission lift.

Operator: AETC, AFSOC, ANG (associate).

First Flight: March 19, 1989 (V-22).

Delivered: January 2007-present.

IOC: 2009.

Production: 51 planned (CV-22; incl three replacements).

Inventory: 50.

Aircraft Location: Cannon AFB, N.M.; Hurlburt Field, Fla.; Kirtland AFB, N.M.; RAF Mildenhall, UK. Planned: Spangdahlem AB, Germany; Yokota AB, Japan.

Contractor: Boeing, Bell Helicopter Textron.

Power Plant: Two Rolls Royce-Allison AE1107C turboshafts, each 6,200 shp.

Accommodation: Crew: two pilots; two flight engineers. Load: 24 troops seated, 32 troops on floor, or 10,000 lb cargo.

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.

Ceiling: 25,000 ft.

Performance: Cruise speed 277 mph, combat radius 575 miles with one internal auxiliary fuel tank, self-deploy 2,100 miles with one in-flight refueling.

Armament: One ramp-mounted .50-caliber machine gun.

■ MC-130P/H COMBAT SHADOW/COMBAT TALON II

Mission brief: Covert day, night, and adverse weather infiltration, exfiltration, and resupply of special operations forces in hostile or denied territory, air-drop resupply, rotary wing aerial refueling, and psyops.

COMMENTARY

The MC-130 is a special operations mobility aircraft, primarily used to conduct infiltration, resupply, and exfiltration of SOF. MC-130Hs are equipped with TF/TA radars, precision navigation systems using INS/GPS, and electronic and IR countermeasures for self-protection. All models are capable of aerial refueling as a receiver and supplier. Aircraft are capable of airdrop, using Joint Precision Airdrop System, and operating from austere and unmarked strips. The original MC-130E were converted from C-130E airframes in the mid-1960s. The retiring MC-130Ps (previously HC-130N/P) are a specialized aerial refueling version designed to support SOF and were delivered in the mid-1980s. MC-130Hs were converted from base-model C-130H to supplement the existing Combat Talon I and Combat Shadow fleets in the late 1980s and early 1990s. MC-130Hs have integrated glass cockpit and a modernized pod-based aerial refueling system. Ongoing MC-130H mods include center wing replacement, new mission computers, GPS upgrades, permanent Sigint installation, threat warning upgrades, and new lightweight armor. The MC-130P was fully replaced by the MC-130J, with the last California ANG airframes retiring in 2017. MC-130Hs from Kirtland consolidated



CV-22 Osprey

A1C Keifer Bowes



SSgt. Michael Battles



E-4B

SSgt. Nicole Leidholm

to Hurlburt in 2016; Kadena is retaining several H models only until its MC-130Js achieve TF/TA capability.

EXTANT VARIANT(S)

- MC-130P Combat Shadow. SOF support and aerial refueling tanker fielded in 1986.
- MC-130H Combat Talon II. SOF support and aerial refueling tanker fielded in 1991.

Function: Special operations airlift/aerial refueling.

Operator: AFSOC, ANG.

First Flight: Circa 1965 MC-130E; 1984 MC-130H.

Delivered: Initially 1966.

IOC: 1986 (MC-130N/P); June 30, 1993 (MC-130H).

Production: 24 new-build MC-130Hs.

Inventory: 17 (MC-130H); four (MC-130P).

Aircraft Location: Hurlburt Field, Fla.; Kadena AB, Japan; Moffett Field, Calif. (MC-130P).

Contractor: Lockheed Martin (airframe), Boeing.

Power Plant: Four Allison T56-A-15 turboprops, each 4,910 shp.

Accommodation: MC-130H crew: two pilots, navigator, EWO; flight engineer, two loadmasters. MC-130H load: 77 troops, 52 paratroops, or 57 litters.

Fuel Capacity: 63,000 lb (81,120 lb with additional internal tanks) at 310 gpm; 80-160 gpm (MC-130N/P).

Dimensions: Span 132.6 ft, height 38.5 ft, length 99.8 ft.

Weight: Max T-O 155,000 lb.

Ceiling: 33,000 ft.

Performance: Speed 290 mph, range 4,000+ miles (MC-130P); speed 300 mph, range 3,105 miles (MC-130H).

■ MC-130J COMMANDO II

Mission brief: Covert day, night, and adverse weather infiltration, exfiltration, and resupply of special operations forces in hostile or denied territory, air-drop resupply, rotary wing aerial refueling, and psyops.

COMMENTARY

MC-130J is a specialized tanker variant of the C-130J, for clandestine intrusion into hostile areas to provide air refueling of SOF helicopters and CV-22s. MC-130J enables infiltration, exfiltration, and resupply. Mods include fully integrated INS/GPS, color cockpit LCDs, NVG lighting, HUDs, integrated defensive systems, 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. Crew 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. The aircraft was redesignated from Combat Shadow II to Commando II in March 2012 and is replacing the MC-130P. European-based MC-130Js will move from Mildenhall to Spangdahlem as part of overall force structure adjustments. FY18 funding supports procurement of five airframes and installation of an initial two Radio Frequency Countermeasure (RFCM) EW kits to detect, locate, and respond to emerging threats. The MC-130J currently lacks terrain-following/terrain-avoidance (TF/TA) capability. Development and integration of the Silent Knight TF/TA radar will enable low-level nighttime and adverse weather flight with low probability of detection to fully replace legacy platforms. IOC is slated for 2021, and FY18 funds support installation of two TF/TA radars for flight testing.

EXTANT VARIANT(S)

- MC-130J. New-build aircraft based on the standard-length fuselage C-130J.

Function: Special operations airlift/aerial refueling.

Operator: AETC, AFSOC.

First Flight: April 20, 2011.

Delivered: Sept. 29, 2011-present.

IOC: 2011.

Production: 57 (planned).

Inventory: 37.

Aircraft Location: Cannon AFB, N.M.; Kadena AB, Japan; Kirtland AFB, N.M.; RAF Mildenhall, UK. Planned: Spangdahlem AB, Germany.

Contractor: Lockheed Martin (airframe), Boeing.

Power Plant: Four Rolls Royce AE2100D3 turboprops, each 4,591 shp.

Accommodation: Crew: two pilots, CSO; two loadmasters. Load: N/A.

Fuel Capacity: 61,360 lb at 150-300 gpm (100 gpm dual, simultaneous refueling).

Dimensions: Span 132.6 ft, length 97.8 ft, height 38.8 ft.

Weight: Max T-O 164,000 lb.

Ceiling: 28,000 ft with 42,000-lb payload.

Performance: Speed 416 mph, range 3,000 miles.

■ U-28A

Mission brief: Manned, fixed-wing tactical ISR and targeting in support of special operations.

COMMENTARY

The U-28A is a modified Pilatus PC-12 employed on worldwide special operations missions. Mods include advanced radio-communications suite, aircraft survivability equipment, EO sensors, and advanced navigation systems. The USSOCOM-owned aircraft are operated by AFSOC as a nonstandard fleet. AFSOC first employed the

aircraft during Enduring Freedom in Afghanistan and Iraqi Freedom. Ongoing upgrades include sensor, self-defense, and navigation mods to enable ops in GPS-degraded environments and compliance with FAA mandates. Multispectral Targeting System installation includes FMV, EO-IR, IR real-time video, and laser designator installation on an additional two aircraft in FY18. New Advanced Threat Warning (ATW) includes missile, hostile fire, and laser warning. Urgent infrared suppression mods are ongoing. U-28 EQ+ mods enable deployment of two additional high-definition FMV-equipped aircraft for extended stand-off "find, fix, finish" capabilities in support of ops in Iraq and Syria.

EXTANT VARIANT(S)

- U-28A. Special operations variant of the civilian Pilatus PC-12.

Function: Tactical reconnaissance.

Operator: AFSOC, AFRC.

First Flight: Circa 1994 (PC-12).

Delivered: From 2006.

IOC: N/A.

Production: 36 (converted).

Inventory: 28 (USSOCOM-owned).

Aircraft Location: Cannon AFB, N.M.; Hurlburt Field, Fla.

Contractor: Pilatus Aircraft Ltd.

Power Plant: Single Pratt & Whitney PT6A-67B, 1,200 shp.

Accommodation: Two pilots, one CSO, one tactical systems officer.

Dimensions: Span 53.3 ft, length 47.3 ft, height 14 ft.

Weight: Max T-O 10,935 lb.

Ceiling: 30,000 ft.

Performance: Speed 253 mph, range 1,725 miles.

ISR/BM/C3 AIRCRAFT

■ CHALLENGER CL-600 COMBAT FLIGHT INSPECTION

Mission brief: Flight inspection of forward air base navigation aids and terminal procedures to enable combat flying operations.

COMMENTARY

The Challenger is long-range, twin-engine executive jet built by Canadair (now Bombardier), equipped with specialized instrumentation for the Combat Flight Inspection (CFIN) role. The three-aircraft fleet is owned by the Federal Aviation Administration and operated by USAF to certify that airbase NAVAIDs such as TACAN, VOR, and ILS, as well as approach/departure procedures, are safe and meet applicable standards before all-weather combat flight operations can begin. USAF has lacked a fully organic CFIN capability since retiring



Greg Davis/USAF

E-8 JSTARS

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 conduct flight check in combat theaters, as well as forward locations including Antarctica. In addition to combat ops, the fleet is tasked with inspecting US, allied, and partner-nation facilities overseas. FY18 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.

EXTANT VARIANT(S)

- CL-600-2B16. CL-600 with uprated turbofans and winglets, equipped for the CFIN role.

Function: Combat Flight Inspection.

Operator: AMC, AFRC (associate).

First Flight: Nov. 8, 1978.

Delivered: 2009 (USAF procured airframe).

IOC: Circa 2010.

Production: N/A.

Inventory: Three, FAA-owned.

Aircraft Location: Will Rogers ANGB, Okla.; various locations overseas.

Contractor: Canadair (Bombardier).

Power Plant: Two General Electric CF34 turbofans, each 9,140 lb thrust.

Accommodation: Two pilots and one flight inspection technician.

Dimensions: Span 61.8 ft, length 68.4 ft, height 20.6 ft.

Weight: Max T-O 40,125 lb.

Ceiling: 45,000 ft.

Performance: speed Mach 0.83, range 3,915 miles.

■ E-3 SENTRY

Mission brief: All-weather air and maritime surveillance, command and control, battle management, target, threat, and emitter detection, classification, and tracking.

COMMENTARY

The Sentry airborne warning and control system (AWACS) is a heavily modified Boeing 707-320B capable of surveilling airspace in excess of 200 miles 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. USAF is equipping the aircraft with interim IFF to keep it airspace-compliant until Block 40/45 upgrade or divestiture. Block 40/45 aircraft are redesignated E-3G. The upgrade is the most comprehensive AWACS 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. Recent evaluations revealed shortcomings in the E-3G's ability to fuse on and off-board data, cyber security vulnerabilities, and diminished maritime surveillance capabilities compared to previous versions, delaying operational certification by approximately two years. DRAGON (Diminishing Manufacturing Sources Replacement of Avionics for Global Operations and Navigation) upgrades add a digital cockpit and next-generation CNS/GATM. The first of 24 upgraded airframes was delivered to Tinker on Jan. 9, 2017. Ongoing upgrades include Internet protocols to enable shortened, digitized kill-chains to hit time-sensitive targets, and low-cost structural and flight control mods. Future upgrades include the Multifunctional Information Distribution System/Joint Tactical Radio System (MIDS/JTRS). Six airframes are undergoing Block 40/45 modification under LRIP, and the first was redelivered in 2014. USAF is upgrading 18 more under full-rate production. Seven AWACS slated for divestiture will be retained to FY19 due to operational demand. FY18 new starts include radar mods to improve processing in response to a critical, classified requirement.

EXTANT VARIANT(S)

- E-3B. Block 30/35 upgraded aircraft.
- E-3C. Block 30/35 upgraded aircraft with additional advanced capabilities.
- E-3G. Block 40/45 upgraded aircraft.

Function: Battle management/early warning/C2.

Operator: ACC, PACAF, AFRC (associate).

First Flight: Oct. 31, 1975 (full avionics).

Delivered: March 1977-84.

IOC: 1977.

Production: 31.

Inventory: 11 (E-3B); three (E-3C); 17 (E-3G).

Aircraft Location: JB Elmendorf-Richardson, Alaska; Kadena AB, Japan; Tinker AFB, Okla.

Contractor: Boeing, Northrop Grumman (radar), Lockheed Martin (computer), Rockwell Collins (DRAGON cockpit upgrade).

Power Plant: Four Pratt & Whitney TF33-PW-100A turbofans, each 21,000 lb thrust.

Accommodation: Four flight crew, 13-19 mis-

sion specialists.

Dimensions: Span 145.8 ft, length 152.9 ft, height 41.8 ft.

Weight: Max T-O 335,000 lb.

Ceiling: Above 35,000 ft.

Performance: Speed 360 mph, range 5,000+ miles.

■ E-4 NATIONAL AIRBORNE OPERATIONS CENTER

Mission brief: Survivable, worldwide, enduring nuclear and operational C3 in support of the National Military Command System (NMCS).

COMMENTARY

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. It is hardened against the effects of nuclear explosions, including electromagnetic pulse (EMP). Comm and data processing capabilities include EHF Milstar satellite, 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 development includes replacing Milstar data links with AEHF-compatible FAB-T, which will enter full production in 2018. Other developments include replacing the VLF/LF transmitter and upgrading CNS/ATM with civil compliant systems. USAF is drafting requirements to replace E-4B with a more modern platform, while DOD is exploring the possibility of combining both the Navy's E-6B Mercury and USAF E-4B into a single, commonly configured nuclear C2 fleet. Airframes are viable to 2039, but phaseout of commercial 747-200s hampers sustainment beyond 2020. Two airframes were badly damaged by a tornado at Offutt, and Boeing is under contract to return them to operational use by the end of 2018.

EXTANT VARIANT(S)

- E-4B. Modified Boeing 747-200 equipped as a NAOC.

Function: Nuclear command and control.

Operator: AFGSC.

First Flight: June 13, 1973 (E-4A); June 10, 1978 (E-4B).

Delivered: December 1974-85.

IOC: December 1974 E-4A; January 1980 E-4B.

Production: Four.

Inventory: Four.

Aircraft Location: Offutt AFB, Neb.
Contractor: Boeing, Rockwell, Raytheon (FAB-T).
Power Plant: Four General Electric CF6-50E2 turbofans, each 52,500 lb thrust.
Accommodation: Up to 112 flight crew and mission crew.
Dimensions: Span 195.7 ft, length 231.3 ft, height 63.4 ft.
Weight: Max T-O 800,000 lb.
Ceiling: Above 30,000 ft.
Performance: Speed 602 mph, range 7,130 miles 12hr normal endurance, 72 hr with air refueling.

■ E-8 JSTARS

Mission brief: Ground moving target indication, (GMTI), airborne battlefield management/command and control.

COMMENTARY

E-8C primarily provides theater commanders ground surveillance data to support tactical operations. E-8 evolved from the Army/Air Force Joint Surveillance Target Attack Radar System program. The first two aircraft deployed for Desert Storm while still under development, and 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 at distances exceeding 124 miles, and more recent refinements enable human-target tracking. Target data is transmitted via data link to ground stations or other aircraft. USAF halted modernization funds and retired the program's testbed aircraft in 2015. Ongoing mods include networking for classified information sharing between CENTCOM coalition partners (CENTRIX), and new Emergency Locating Transmitters. FY18 funds support CENTRIX fleetwide, with four mods in 2018. The service issued a request for proposals to replace the E-8 with a more affordable business-class airframe with an anticipated IOC of FY24. New plans call for upgrading JSTARS through the mid-2020s until a new platform, or several disaggregated platforms are identified.

EXTANT VARIANT(S)

- E-8C. Block 20 upgraded JSTARS platform based on the Boeing 707-300.
- TE-8A. Crew training aircraft based on the E-8.

Function: C2/ISR.
Operator: ANG.
First Flight: December 1988.
Delivered: May 1996-2005.
IOC: Dec. 18, 1997.
Production: 18.
Inventory: 16 (E-8C); one (TE-8).
Aircraft Location: Robins AFB, Ga.
Contractor: Northrop Grumman, Raytheon.
Power Plant: Four Pratt & Whitney TF33-102C turbojets, each 19,200 lb thrust.
Accommodation: Flight crew: four; mission crew: 15 Air Force and three Army operators (can be augmented according to mission).
Dimensions: Span 145.8 ft, length 152.9 ft, height 42.5 ft.
Weight: Max T-O 336,000 lb.
Ceiling: 42,000 ft.
Performance: Speed 584 mph (optimal orbit), range nine hr normal endurance, longer with air refueling.

■ E-9A WIDGET

Mission brief: Airborne surveillance and telemetry-relay in support of testing and range clearance.

COMMENTARY

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 for the vast Eglin Test and Training Range over the Gulf of Mexico. Upgrades 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, as well as tracking and recovering targets. The aircraft can also remotely initiate destruction of damaged or malfunctioning aerial target drones.

EXTANT VARIANT(S)

- E-9A. Military surveillance version of the DHC-8

commuter airliner.
Function: Range control.
Operator: ACC.
First Flight: June 1983 (De Havilland Canada Dash 8).
Delivered: 1988.
IOC: June 1988.
Production: Two.
Inventory: Two.
Aircraft Location: Tyndall AFB, Fla.
Contractor: De Havilland Canada, now Bombardier (airframe), Sierra Nevada Corp (conversion).
Power Plant: Two Pratt & Whitney PW-120A turboprop engines, each 1,800 shp.
Accommodation: Crew: two pilots; two mission operators.
Dimensions: Span 39.5 ft, length 48.6 ft, height 12.2 ft.
Weight: Max T-O 34,500 lb.
Ceiling: 30,000 ft.
Performance: Speed 280 mph, range 1,000 miles.

■ E-11A BATTLEFIELD AIRBORNE COMMUNICATIONS NODE

Mission brief: Tactical communications and data relay.

COMMENTARY

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 data links, provide joint range extension, BLOS C2, and Internet protocol-based data transfer between dissimilar systems. It was fielded to meet an urgent operational need for BLOS communications relay capability between ground troops and other airborne platforms. The system entered combat in Afghanistan in 2008 and enables troops to overcome the limitations of LOS comms in rugged terrain. The fleet was designated E-11A after USAF purchased the first previously leased aircraft in 2011. The Battlefield Airborne Communications Node (BACN) payload is integrated on a mixed fleet of manned E-11As and unmanned EQ-4B Global Hawks. The combined BACN fleet has provided near-constant coverage in theater. The service is seeking to extend operations and possibly acquire the E-11A as a long-term program, as well as adding an additional EQ-4B. The current support contract awarded in July 2017 funds continued ops through January 2019.

EXTANT VARIANT(S)

- E-11A. Modified Bombardier BD-700 equipped with the BACN payload.

Function: Communications relay.
Operator: ACC.
First Flight: Oct. 6, 2003 (BD-700).
Delivered: Dec. 2008-Aug. 30, 2012.
IOC: Circa 2011.
Production: Four.
Inventory: Four.
Aircraft Location: Kandahar Airfield, Afghanistan.
Contractor: Northrop Grumman, Bombardier.
Power Plant: Two Rolls Royce BR710A2-20 turbofans, each 14,750 lb thrust.
Accommodation: Flight crew: two; mission crew: N/A.
Dimensions: Span 94 ft, length 99 ft 5 in, height 25 ft 6 in.
Weight: Max T-O 99,500 lb.
Ceiling: 51,000 ft.
Performance: Speed Mach 0.88, range 6,900 miles.



E-11A Battlefield Airborne Communications Node

Capt. Keenan Kunst

EC-130J Commando Solo

SrA. Rachel Loftis/ANG



■ EC-130H COMPASS CALL

Mission brief: Tactical jamming/disruption of enemy C2, communications, radar, and navigation; offensive counterinformation, EA, and SEAD support.

COMMENTARY

The EC-130H is a modified C-130H designed to disrupt enemy C3 and limit adversary coordination essential for force management. 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 will continue through mid-2018, and the Baseline 3 configuration including the Advanced Radar Countermeasure System (ARCS) and other significant capability enhancements is slated for fielding in 2020. Delays fielding a replacement airframe due to funding instability require extending the EC-130H fleet. EC-130Hs are undergoing center wing box replacement/structural mods (in common with the C-130H fleet). Ongoing development includes counter-radar/countersatellite navigation, and ongoing upgrades include installation of digital glass cockpits, Mode 5-compliant IFF, CNS/ATM for congested airspace, and adaptive EA to enable quick reaction to emerging threats. Ten primary mission aircraft are supplemented by two backups, two attrition reserves, and one systems integration test bed. USAF awarded L3 Technologies a contract to rehost the EC-130H's systems on a more modern and survivable aircraft on Sept. 7, 2017. Dubbed EC-X, the fleet will be based on the Gulfstream G550 Airborne Early Warning platform, also recently selected by the Navy for range support.

EXTANT VARIANT(S)

• EC-130H. Electronic attack variant of the C-130H.

Function: EW.

Operator: ACC.

First Flight: 1981.

Delivered: 1982.

IOC: 1983; Block 35 from 2011.

Production: (Converted).

Inventory: 15 (EC-130H).

Aircraft Location: Davis-Monthan AFB, Ariz.

Contractor: Lockheed Martin, BAE Systems, L3 Technologies.

Power Plant: Four Allison T56-A-15 turboprops, each 4,910 shp.

Accommodation: Two pilots, navigator, two EWOs; flight engineer, mission crew supervi-

sor (cryptologic experienced), four cryptologic linguists, acquisition operator, and airborne maintenance technician.

Dimensions: Span 132.6 ft, length 99 ft, height 38 ft.

Weight: Max T-O 155,000 lb.

Ceiling: 25,000 ft.

Performance: Speed 300 mph at 20,000 ft, unrefueled range 2,295 miles seven hr normal endurance, longer with air refueling.

■ EC-130J COMMANDO SOLO/SUPER J

Mission brief: Offensive counterinformation broadcast on radio, television, and military communications bands, electronic attack, or SOF mobility, depending on variant.

COMMENTARY

The EC-130J is the Air Force's primary psychological warfare platform, providing military information support operations (MISO) and civil affairs broadcast. Commando Solo aircraft conducted psychological operations in almost every US war or contingency operation since 1980. The EC-130J Commando Solo is equipped with radio and color television broadcast equipment for psychological warfare, enhanced navigation, self-protection, and an aerial refueling receptacle. With transition to the EC-130J, USAF added a new, secondary mission resulting in a second variant. Three heavily modified EC-130J Commando Solo aircraft serve as a standard broadcasting station for psychological warfare operations. Four EC-130Js, dubbed Super J, perform secondary, low-cost EA role on top of their special operations mobility (SOFFLEX) mission. SOFFLEX includes personnel and cargo airdrop, combat offload, and infiltration/exfiltration. FY18 funding supports updates to three legacy aircraft to make them multimission capable, and procurement of all but the last seven Removable Airborne MISO Systems (RAMS). RAMS is based on the Army's Fly Away Broadcast System and will allow the Super J to supplement Commando Solo. All variants are operated by the ANG's 193rd Special Operations Wing. Development of digital broadcast capability and RF countermeasures are ongoing. Low-cost mods include safety, reliability, obsolescence, and smaller capability improvements.

EXTANT VARIANT(S)

• 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.

Function: Psychological warfare/special operations airlift.

Operator: ANG.

First Flight: April 5, 1996 (C-130J).

RC-26 Condor



Delivered: 2003.

IOC: 2004.

Production: Seven.

Inventory: Three (Commando Solo); four (Super J).

Aircraft Location: Harrisburg Arpt., Pa.

Contractor: Lockheed Martin, Raytheon.

Power Plant: Four Rolls Royce-Allison AE2100D3 turboprops, each 4,637 shp.

Accommodation: Two pilots, flight systems officer, mission systems officer; two loadmasters, five electronic communications systems (CS) operators.

Dimensions: Span 132.6 ft, length 97.8 ft, height 38.8 ft.

Weight: Max T-O 164,000 lb.

Ceiling: 28,000 ft.

Performance: Speed 335 mph cruise, range 2,645 miles.

■ MC-12W LIBERTY

Mission brief: Tactical medium/low-altitude ISR in direct support of special operations ground forces.

COMMENTARY

The MC-12W is a manned tactical ISR, Sigint, and targeting platform based on the Beechcraft King Air 350. The MC-12W is capable of complete ISR collection, processing, analysis, and dissemination. The aircraft provides ground forces with targeting data and other tactical ISR. Specialized equipment includes FMV, laser designation, various sensors, BLOS connectivity, and satcom. An initial seven King Air 350s were modified with FMV, a ROVER compatible LOS satcom data link, limited Sigint, and basic BLOS connectivity. An additional 30 extended-range King Air 350s were modified, adding enhanced FMV with laser designator, improved Sigint, and increased bandwidth BLOS. The sensor-equipped C-12s were acquired to augment RPA systems operating in Southwest Asia and entered combat in both Iraq and Afghanistan in 2009. ACC divested its 33-strong MC-12 fleet in 2015, and ex-USAF aircraft operated by USSOCOM are designated MC-12W/Javaman III. The Oklahoma ANG acquired 13 airframes to form a dedicated SOF support mission, deploying for the first time to Afghanistan in 2016. FY18 funds support navigation enhancements to permit ops in GPS-degraded environments.

EXTANT VARIANT(S)

• MC-12W. Modified Beechcraft King Air equipped for battlefield ISR and targeting.

Function: Tactical reconnaissance.

Operator: ANG.

First Flight: April 2009.

Delivered: From April 2009.



SrA. Sean Campbell



RC-135 V/W Rivet Joint

SSgt. Michael Battles

IOC: June 2009.
Production: 42.
Inventory: 13.
Aircraft Location: Will Rogers ANGB, Okla.
Contractor: Beechcraft, L3 Technologies.
Power Plant: Two Pratt & Whitney Canada PT6A-60A turboprops, each 1,050 shp.
Accommodation: Two pilots and two sensor operators.
Dimensions: Span 57.9 ft, length 46.7 ft, height 14.3 ft.
Weight: Max T-O 15,000 lb (350) and 16,500 lb (350ER).
Ceiling: 35,000 ft.
Performance: Speed 359 mph, range 1,725 miles (350) and 2,760 miles (350ER).

■ OC-135 OPEN SKIES

Mission brief: Observation and imagery gathering in support of international arms control treaty compliance verification.

COMMENTARY

The OC-135 is a modified WC-135B used for arms control treaty observation and imagery collection over nations party to the 1992 Open Skies Treaty. Specialized mission equipment includes side-looking synthetic aperture radar, infrared line scanning devices, video camera, and framing and panoramic optical cameras installed in the rear of the aircraft. The two oblique KS-87E framing cameras permit photography from approximately 3,000-ft altitude, and one KA-91C panoramic allows for wide sweep photography from approximately 35,000 ft. USAF is acquiring and certifying a digital camera suite to replace obsolete and difficult to maintain wet-film cameras. The upgrade aligns capabilities to a presidential directive and initial installation is planned for 2019. Planned upgrades include FAA-compliant CNS/ATM. USAF is currently vetting requirements for an eventual replacement aircraft.

EXTANT VARIANT(S)

- OC-135B. Modified C-135 equipped for photo reconnaissance/treaty verification.

Function: Observation.
Operator: ACC.
First Flight: 1993.
Delivered: 1993-96.
IOC: October 1993.
Production: Three.
Inventory: Two.
Aircraft Location: Offutt AFB, Neb.
Contractor: Boeing.
Power Plant: Four Pratt & Whitney TF33-P-5 turboprops, each 16,050 lb thrust.
Accommodation: Flight crew: three pilots, two navigators, and three sensor maintenance

technicians; Defense Threat Reduction Agency mission crew: mission commander, deputy, four sensor operator/translators, and one flight follower; total seating: 35, incl space for foreign country representatives.

Dimensions: Span 131 ft, length 135 ft, height 42 ft.
Weight: Max T-O 297,000 lb.
Ceiling: 50,000 ft (basic C-135).
Performance: Speed 500+ mph, range 3,900 miles.

■ RC-26 CONDOR

Mission brief: Counternarcotics, manned tactical ISR, disaster response, civil support.

COMMENTARY

The RC-26 is a modified Fairchild Metro 23 with specialized digital cameras, IR video, and communications equipment, primarily used for domestic and international anti-trafficking operations. The aircraft has a secondary role providing real-time video streaming to disaster relief personnel following hurricanes, wildfires, and other disasters. In the fire-support role, aircraft sensors are able to detect and accurately identify fires from up to three miles away. An extensive communications suite allows communications from 29 to 960 MHz, including provisions for plugging in 800 MHz handheld radios, and air phone capabilities. The Air Force originally planned to divest the fleet in FY15, but FY18 funds support adding several airframes and reinstating RC-26 as a permanent program of record. The fleet is currently split between three different configurations including six Block 25R, five Block 20, and two non-mission equipped C-26As. RC-26 aircraft assisted with wildfire support in the northwestern US and damage assessment after Hurricane Harvey in 2017.

EXTANT VARIANT(S)

- C-26A. Non-missionized general utility aircraft.
- RC-26B. Surveillance version of Fairchild C-26.

Function: Tactical ISR.
Operator: ANG.
First Flight: 1990.
Delivered: C-26 first delivered 1989.
IOC: N/A.
Production: 11.
Inventory: 11.
Aircraft Location: Des Moines Aprt., Iowa; Ellington Field, Texas; Fairchild AFB, Wash.; Fresno Yosemite Aprt., Calif.; Hancock Field, N.Y.; Jacksonville Aprt., Fla.; Key Field, Miss.; Kirtland AFB, N.M.; Montgomery Regional Aprt., Ala.; Trux Field, Wis.; Tucson Aprt., Ariz.; Yeager Aprt., W.Va.
Contractor: Fairchild (airframe).
Power Plant: Two Garrett TPE331-12UAR-701 turboprops, each 1,100 shp.

Accommodation: Two pilots, one navigator-mission systems operator.

Dimensions: Span 57 ft, length 59.5 ft, height 16.6 ft.

Weight: Max T-O 16,500 lb.

Ceiling: 25,000 ft.

Performance: Speed 334 mph, range 2,070 miles.

■ RC-135S COBRA BALL

Mission brief: Measurement and signature intelligence (Masint) gathering on ballistic missile flights.

COMMENTARY

The RC-135S monitors missile-associated signatures and tracks missiles during boost and re-entry phases. Cobra Ball superseded Rivet Ball and Rivet Amber in 1969 and collects both optical and electronic data on ballistic missile activity. Its specialized equipment includes wide-area IR sensors, long-range optical cameras, 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 levels. 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 keep the fleet viable through 2040, and aircraft are currently undergoing Baseline 5 mods (similar to Rivet Joint Baseline 12). Flexible funding permits rapid, variant-specific mods in response to emerging/evolving threats. Ongoing upgrades include Wideband Global Satellite reachback connectivity, new airborne tracking system, improved operator interface, liquid cooling system, Rivet Joint Comint suite integration, and capabilities enhancements for operations in dense signal environments.

EXTANT VARIANT(S)

- RC-135S Cobra Ball. Modified C-135 equipped for Masint/treaty verification.

Function: Electronic reconnaissance.
Operator: ACC.
First Flight: N/A.
Delivered: October 1969-November 2000.
IOC: Circa 1972.
Production: Converted.
Inventory: Three.
Aircraft Location: Offutt AFB, Neb.
Contractor: Boeing (original airframe), L3 Technologies.
Power Plant: Four CFM International F108-CF-201 turboprops, each 21,600 lb thrust.
Accommodation: Flight crew: two pilots, navigator. Mission crew: three EWOs; two airborne systems engineers, two airborne mission specialists.

Dimensions: Span 131 ft, length 135 ft, height 42 ft.
Weight: Max T-O 297,000 lb.
Ceiling: 45,000 ft.
Performance: Speed 517+ mph, range 3,900 miles, farther with air refueling.

■ RC-135U COMBAT SENT

Mission brief: Strategic reconnaissance of adversary air defense and technical intelligence (Techint) gathering on radar/emitter systems.

COMMENTARY

The RC-135U collects and examines data on airborne, land, and naval radar systems, providing strategic analysis for National Command Authorities and combatant forces. Combat Sent was fielded in 1970 to fill a critical need for scientific and technical data collection on adversary radar threats and defenses. Its distinctive antennae arrays on the chin and wing tips, large cheek fairings, and extended tail contain specialized Sigint suites to collect scientific and technical Elint data against air-, land-, and sea-based emitter systems. Each airframe has unique reconnaissance equipment. Combat Sent is critical to effective design, programming, and reprogramming of RWRs, as well as jammers, decoys, and anti-radiation missiles, and to the development of effective threat simulators. Continuous baseline upgrades keep the fleet viable through 2040, and aircraft are currently undergoing Baseline 5 mods (similar to Rivet Joint Baseline 12). Flexible funding permits rapid, variant-specific mods, in response to emerging/evolving threats. Ongoing upgrades include wideband satcom reachback connectivity, integration of Rivet Joint's Comint suite, improved operator interface, new intercom, and capability enhancement for dense signal environments.

EXTANT VARIANT(S)

- RC-135U Combat Sent. Modified C-135 equipped for radar emissions analysis.
Function: Electronic reconnaissance.
Operator: ACC.
First Flight: N/A.
Delivered: 1971-74.
IOC: April 17, 1970.
Production: Converted.
Inventory: Two.
Aircraft Location: Offutt AFB, Neb.; forward operating locations: Al Udeid AB, Qatar; NSF Diego Garcia, UK; Eielson AFB, Alaska; Kadena AB, Japan; RAF Mildenhall, UK; NSA Souda Bay, Greece.
Contractor: Boeing (original airframe), L3 Technologies, Textron.
Power Plant: Four CFM International F108-



RC-135U Combat Sent

Airwolfhound photo

- CF-201 turbofans, each 21,600 lb thrust.
Accommodation: Flight crew: two pilots, two navigators, three airborne systems engineers; mission crew: 10 EW officers, six or more electronic, technical, mission area specialists.
Dimensions: Span 135 ft, length 140 ft, height 42 ft.
Weight: Max T-O 322,500 lb.
Ceiling: 42,000 ft.
Performance: Cruise speed 517 mph, range 4,140 miles 8 hr normal endurance, 24 hr crew endurance with air refueling.

■ RC-135V/W RIVET JOINT

Mission brief: Real-time electronic and signals intelligence gathering, analysis, and dissemination in support of theater and strategic-level commanders.

COMMENTARY

The RC-135V/W is an extensively modified C-135 performing worldwide reconnaissance missions to 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. 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 through 2040 and drive standards for Combat Sent/Cobra Ball. Flexible funds permit rapid, variant-specific mods in response to emerging/evolving threats. Ongoing Baseline 11/12 upgrades include new direction finding Comint, precision Elint/Sigint system integration, wideband satcoms, enhanced near real-time data dissemination, new steerable beam antenna, improved weather radar, digital cockpit instruments, and compliant CNS/ATM. Recent efforts include modernized operator interface, improved dense signal environment capabilities, increased signal bandwidth/exploitation, and operator station 3-D maps. FY18 funds integrate RC-135 into the Air Force's Distributed Common Ground Station (DCGS). Britain received the last of three RC-135W to fill an urgent capability gap under the Airseeker program on June 7, 2017. USAF/RAF personnel co-crew the combined 20-aircraft operational fleet on missions of common interest.

EXTANT VARIANT(S)

- RC-135V/W Rivet Joint. Self-contained standoff airborne Sigint variant of the C-135.
- TC-135W. Training version of the operational aircraft.



U-2 Dragon Lady

- NC-135W. Rivet Joint systems integration testbed operated by AFMC.
Function: Electronic reconnaissance.
Operator: ACC, AFMC.
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).
Aircraft Location: Offutt AFB, Neb.; Kadena AB, Japan; RAF Mildenhall, UK; RAF Waddington, UK (USAF co-manned).
Contractor: Boeing (original airframe), L3 Technologies (systems integrator).
Power Plant: Four CFM International F108-CF-201 turbofans, each 21,600 lb thrust.
Accommodation: Flight crew: three pilots, two navigators; mission crew: three EW officers, 14 intelligence operators, four airborne maintenance technicians, and up to six more, depending on mission.
Dimensions: Span 131 ft, length 135 ft, height 42 ft.
Weight: Max T-O 297,000 lb.
Ceiling: 50,000 ft.
Performance: Speed 500+ mph, range 3,900 miles, further with air refueling.

■ U-2 DRAGON LADY

Mission brief: Strategic and tactical high-altitude/long endurance Sigint, Imint, and Masint collection.

COMMENTARY

The U-2 is the Air Force's manned high-altitude ISR platform, capable of carrying multiple, simultaneous intelligence sensors. U-2 can carry a variety of advanced optical, multispectral EO/IR, SAR, Sigint, and other payloads. U-2 was initially designed in the 1950s and further developed as the U-2R in the late 1960s. Current U-2s date to the 1980s when production was reopened to produce the larger and more capable TR-1. S model conversions began in 1994, and all current aircraft are Block 20 configured, featuring a glass cockpit, digital autopilot, modernized EW system, and updated data links. Sensor upgrades include the ASARS-2A SAR sensor, SYERS-2A multispectral EO/IR imagery system, and enhanced Airborne Signals Intelligence Payload (ASIP). The legacy optical bar camera is still in use, providing broad-area synoptic imagery coverage. U-2's modular payload and open system architecture allow new sensors to be rapidly fielded to meet emerging needs. USAF planned to start retiring the fleet in FY16 due to budget constraints. Congress stipulated the RQ-4 Block 30 achieve sensor parity with



MSgt. John Gordinier

the U-2 before the fleet is phased out, initially delaying retirement to FY19. U-2s are heavily tasked meeting operational demands, and retirement would reduce high altitude ISR capacity by 50 percent, prompting USAF to delay retirement to 2022 or beyond. Future funds were limited to flight safety and sustainment, unless critical to national security. Ongoing upgrades now include ASARS development, integration, and testing, as well as multi-spectral sensor, EW system, Optical Bar Camera, and Sigint package upgrades. Additional improvements include defensive systems, data links, and avionics, as well as flight safety and airspace compliance mods.

EXTANT VARIANT(S)

- U-2S. Current variant of the U-2/TR-1.
- TU-2S. A two-seat trainer aircraft originally designated U-2ST.

Function: High-altitude reconnaissance.

Operator: ACC.

First Flight: Aug. 4, 1955 (U-2); October 1994 (U-2S).

Delivered: 1955–October 1989.

IOC: Circa 1956.

Production: 35 (T/U-2S).

Inventory: 27 (U-2); four (TU-2 trainers).

Aircraft Location: Beale AFB, Calif.; permanent forward operating locations worldwide.

Contractor: Lockheed Martin, Northrop Grumman (ASIP), Raytheon (ASARS), UTC Aerospace (SYERS/Optical Bar Camera).

Power Plant: General Electric F118-GE-101 turbojet.

Accommodation: Pilot (U-2S); two pilots (TU-2S) on RQ201 zero/zero ejection seats.

Dimensions: Span 105 ft, length 63 ft, height 16 ft.

Weight: Max T-O 40,000 lb.

Ceiling: Above 70,000 ft.

Performance: Speed 410 mph, range 7,000+ miles.

■ WC-135 CONSTANT PHOENIX

Mission brief: Nuclear test monitoring, airborne radiological sampling, and arms control treaty verification.

COMMENTARY

The WC-135 is either a modified C-135B or EC-135C Looking Glass 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 weapons tests, including recent North Korean activity as well as nuclear disasters including Chernobyl and Fukushima. 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.

EXTANT VARIANT(S)

- WC-135C. Modified EC-135C equipped for radiological monitoring and air sampling.

- WC-135W. Modified C-135B equipped for radiological monitoring and air sampling.

Function: Air sampling and collection.

Operator: ACC.

First Flight: 1965.

Delivered: 1965-96.

IOC: December 1965.

Production: Converted.

Inventory: One (WC-135C); one (WC-135W).

Aircraft Location: Offutt AFB, Neb.

Contractor: Boeing.

Power Plant: Four Pratt & Whitney TF33-P-5 turbofans, each 16,050 lb thrust.

Accommodation: Seating for 33, incl cockpit crew.

Dimensions: Span 131 ft, length 140 ft, height 42 ft.

Weight: Max T-O 300,500 lb.

Ceiling: 40,000 ft.

Performance: Speed 403 mph, range 4,600 miles, further with air refueling.

TANKER AIRCRAFT

■ HC-130J COMBAT KING II

Mission brief: Helicopter in-flight refueling support for CSAR/ personnel recovery ops, tactical C2, and pararescue (PJ) deployment.

COMMENTARY

The HC-130J aircraft 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, radar/missile warning receivers, and chaff/flare dispensers. Plans call for continuous common block upgrades for the combined HC/AC/MC-130J fleet, and current efforts bring all HC-130Js to a common standard. Block 8.1 upgrades, which include Link 16, civil GPS and data link, flight management mods, advanced IFF, special mission interface, and

satellite-updating real-time flight information are undergoing development and integration. Block tw8.1 is expected to enter operational testing in 2018 (see C-130J for details). Mode 5 IFF and CNS/ATM upgrades will be fielded ahead of cycle to meet FAA compliance deadlines, in line with the baseline C-130J. Urgent operational upgrades improve situational awareness adding SADL, blue-force tracker, modernized tactical comms, and add Joint Precision Aerial Delivery System (JPADS). FY18 starts advanced threat warning upgrades and roll-on/roll-off RF countermeasures for combat-deployed aircraft. Both the HC-130J and legacy fleet are receiving variable-speed drogue mods to refuel diverse aircraft types during a single sortie. FY18 funding supports production of two aircraft, and USAF expects to complete fleet recap by 2023. Alaska received the first ANG HC-130J, handed over to the 176th Wing at Elmendorf on June 1, 2017.

EXTANT VARIANT(S)

- HC-130J. C-130J modified for CSAR and aerial refueling.

Function: Aerial refueling/airlift.

Operator: ACC, AETC, ANG. Planned: AFRC.

First Flight: July 29, 2010.

Delivered: Sept. 24, 2010–present.

IOC: 2013.

Production: 37 (planned).

Inventory: 20.

Aircraft Location: Davis-Monthan AFB, Ariz.; JB Elmendorf-Richardson, Alaska; Kirtland AFB, N.M.; Moody AFB, Ga. Planned: Francis S. Gabreski Arpt., N.Y.; Patrick AFB, Fla.

Contractor: Lockheed Martin.

Power Plant: Four Rolls Royce AE2100D3 turboprops, each 4,591 shp.

Accommodation: Flight crew: two pilots, CSO, two loadmasters.

Fuel Capacity: 61,360 lb at 150-300 gpm (100 gpm dual, simultaneous refueling).

Dimensions: Span 132.6 ft, length 97.8 ft, height 38.8 ft.

Weight: Max T-O 164,000 lb.

Ceiling: 33,000 ft.

Performance: Speed 363.4 mph at S-L, range 4,000+ miles, further with air refueling.

■ HC-130N/P KING

Mission brief: Helicopter in-flight refueling support for CSAR/ personnel recovery ops, tactical C2, and pararescue (PJ) deployment.

COMMENTARY

The HC-130N/P conducts operations to austere airfields and denied territory for expeditionary, all-weather personnel recovery operations including airdrop, helicopter air-to-air refueling, and forward area refueling point missions. Secondary roles include humanitarian assistance, disaster response, security cooperation/aviation



An HC-130J Combat King II refuels two HH-60Pave Hawks

SrA. Kevin Tanenbaum



HC-130N King

SSgt. Edward Eagerton/ANG

advisory, emergency medical evacuation, non-combatant evacuation, and spaceflight support for NASA. Features include integrated GPS/INS navigation package, NVG lighting, FLIR, radar/missile warning receivers, chaff/flare dispensers, and data-burst communications. Both models suffer airworthiness, maintainability, and operational limitations and are being replaced by HC-130J. Corrosion issues forced early retirement of a significant part of the remaining fleet. Serviceable HC-130Ns were diverted from storage to replace increasingly unserviceable HC-130Ps at Patrick. The base's final HC-130P retired in August 2017, and conversion to the HC-130J is slated for late 2019. Ongoing efforts focus on center wing box replacement/structural mods (in common with the C-130H fleet) and variable-speed drogue to enable refueling of differing aircraft types during a single sortie. The last Active Duty HC-130N/P retired in 2016, and the Alaska ANG retired its final legacy aircraft in 2017, re-equipping with the HC-130J.

EXTANT VARIANT(S)

- HC-130N. C-130H model modified with C-130E radome, new center wing, and aerial refueling capability.
- HC-130P. C-130H modified for CSAR and aerial refueling.

Function: Aerial refueling/airlift.
Operator: ANG, AFRC.
First Flight: Dec. 8, 1964 (as HC-130H).
Delivered: 1965-circa 1993.
IOC: 1986.
Production: 33 converted N/P models.
Inventory: Seven (HC-130N); three (HC-130P).
Aircraft Location: Francis S. Gabreski Arpt., N.Y., Patrick AFB, Fla.
Contractor: Lockheed Martin.
Power Plant: Four Allison T56-A-15 turboprops, each 4,910 shp.
Accommodation: Two pilots, navigator; flight engineer, airborne comm specialist, two loadmasters, three PJs.
Fuel Capacity: 73,000 lb at 160 gpm (80 gpm dual, simultaneous refueling).
Dimensions: Span 132.6 ft, length 98.8 ft, height 38.5 ft.
Weight: Max T-O 155,000 lb.
Ceiling: 33,000 ft.
Performance: Speed 289 mph at S-L, range 4,000+ miles.

■ KC-10 EXTENDER

Mission brief: Aerial refueling, cargo/passenger airlift, or aeromedical transport.

COMMENTARY

The KC-10 is a modified McDonnell Douglas

DC-10-30CF and 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 and drogue system, allowing it to refuel a wide variety of US and allied aircraft, including the CV-22 tiltrotor, within the same mission. It is refuelable by boom-equipped tankers. The aircraft has three large fuel tanks under the cargo floor, an air refueling operator's station, aerial refueling boom and integral hose reel/drogue unit, a receiver refueling receptacle, and military avionics. Ongoing mods include modernized navigation, surveillance, and air traffic management (CNS/ATM). Advanced Mode 5 IFF integration is ongoing. Modifications extend service life through 2045.

EXTANT VARIANT(S)

- KC-10A. Modified McDonnell Douglas DC-10 designed as a multirole cargo-tanker.

Function: Aerial refueling/airlift.
Operator: AMC, AFRC (associate).
First Flight: April 1980.
Delivered: March 1981-April 1990.
IOC: August 1982.
Production: 60.
Inventory: 59.
Aircraft Location: JB McGuire-Dix-Lakehurst, N.J.; Travis AFB, Calif.
Contractor: McDonnell Douglas (now Boeing).
Power Plant: Three General Electric CF6-50C2 turbofans, each 52,500 lb thrust.
Accommodation: Crew: two pilots, flight engineer, boom operator; AE crew: two flight nurses, three medical technicians; other crew depending



KC-10 Extender

MSgt. Mark Olsen

KC-135 Stratotanker

on mission. Load: up to 75 people and 17 pallets or 27 pallets—a total of nearly 170,000 lb.

Fuel Capacity: 356,000+ lb. at 1,100 gpm (boom), 470 gpm (drogue).

Dimensions: Span 165.4 ft, length 181.6 ft, height 58 ft.

Weight: Max T-O 590,000 lb.

Ceiling: 42,000 ft.

Performance: Speed 619 mph, range 11,500 miles, or 4,400 miles with max cargo.

■ KC-46 PEGASUS

Mission brief: All weather boom/drogue aerial refueling, cargo/passenger airlift, and aeromedical evacuation in support of tactical and strategic ops.

COMMENTARY

The KC-46A is a heavily modified Boeing 767-200ER multirole cargo-tanker equipped with flying boom and probe-and-drogue refueling capability. KC-46 incorporates the 787's state-of-the-art cockpit, fly-by-wire boom, remote boom-operator's station, advanced self-defensive suite including Large Aircraft IR Countermeasures (LAIRCM), RWR, tactical situational awareness, comm relay hosting, and nuclear/chem/bio hardening. In 2011 Boeing was awarded a contract for 179 KC-46A tankers, the first increment (KC-X) toward replacing USAF's KC-135R fleet. Compared to the 50-year-old KC-135, the KC-46A will have enhanced capabilities, including more fuel capacity, improved efficiency, and enhanced cargo and AE capability. Like the KC-10, it will employ both an advanced refueling boom and independently operating hose and drogue system. The program's provisioned 767-2C prototype (without refueling boom) flew



Maj. Jon Quinlan



Marian Lockhart/Boeing

in late 2014, receiving FAA type-certification in December 2017. The full-up KC-46A flew for the first time from Everett, Wash., Sept. 25, 2015. Boeing flew the first KC-46 slated for delivery to USAF on Dec. 5, 2017. Operational testing is scheduled to begin in 2018. Higher than expected stress loads encountered during C-17 refueling-compatibility trials forced a limited boom redesign before clearance for LRIP. The service awarded LRIP contracts for 19 aircraft in 2016, and a follow-on Lot 3 contract for 15 tankers in 2017. FY18 funds support Lot 4 purchase of 15 tankers. Eighteen airframes are slated for delivery ahead of planned IOC, which has slipped due to boom problems and electrostatic compatibility issues.

EXTANT VARIANT(S)

- KC-46A. Modified Boeing 767 designed as a multirole cargo-tanker.

Function: Aerial refueling/airlift.

Operator: AFMC; AMC (planned); Boeing.

First Flight: Dec. 28, 2014 (provisioned 767-2C prototype); Sept. 25, 2015 (KC-46A).

Delivered: TBD.

IOC: TBD.

Production: 179 (planned).

Inventory: Five (KC-46A); two (provisioned 767-2C).

Aircraft Location: Edwards AFB, Calif.; Paine Field, Wash. Planned: Altus AFB, Okla.; JB McGuire-Dix-Lakehurst, N.J.; McConnell AFB, Kan.; Pease ANGB, N.H.; Seymour Johnson AFB, N.C.; Travis AFB, Calif.; others TBD.

Contractor: Boeing.

Power Plant: Two Pratt & Whitney 4062, each 62,000 lb thrust.

Accommodation: 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.

Fuel Capacity: 212,299 lb., max transfer load 207,672 lb at 1,200 gpm (boom), 400 gpm (drogue).

Dimensions: Span 156 ft, length 165.5 ft, height 52.8 ft.

Weight: Max T-O 415,000 lb.

Ceiling: 43,000 ft (767).

Performance: (767) cruise speed 530 mph, range 6,500 miles.

■ KC-135 STRATOTANKER

Mission brief: Medium-range tanker aircraft capable of cargo and AE support.

COMMENTARY

The KC-135 has been the mainstay of the USAF tanker fleet for some 50 years. It is similar in size and appearance to commercial 707 aircraft

KC-46 Pegasus

but designed to military specifications. The current KC-135R variant first flew in October 1982 and deliveries began in July 1984. Twenty were modified with the Multipoint Refueling System (MPRS), allowing the use of hose-and-drogue pods on each wing to simultaneously refuel two NATO or US Navy aircraft. Non-MPRS modified KC-135s use a single drogue adapter attached to the boom. Upgrades include a modernized digital flight deck. New Global Air Traffic Management upgrades were completed in 2011. Link 16 capability was also added to a limited number of aircraft. KC-135Ts are upgraded and sustained alongside the KC-135R fleet under common programs. USAF plans to modify 395 aircraft with Block 45 upgrades through 2026. These include additional glass cockpit display for engine instrumentation, a radar altimeter, advanced autopilot, and flight director to replace obsolescent systems. Fleet service life is projected out to 2040. Ongoing development includes a modular, Large-Aircraft IR Countermeasures (LAIRCM) pod to track and jam IR missiles, fittable for high-threat missions. LAIRCM IOC is slated for FY19.

EXTANT VARIANT(S)

- KC-135R. Re-engined KC-135A/Es fitted with CFM turbofan engines.

- KC-135T. Former KC-135Qs, able to carry different fuels in wing and fuselage tanks.

Function: Aerial refueling/airlift.

Operator: AETC, AFMC, AMC, PACAF, USAFE, ANG, AFRC.

First Flight: August 1956.

Delivered: January 1957-65.

IOC: June 1957, Castle AFB, Calif.

Production: 732.

Inventory: 344 (KC-135R); 54 (KC-135T).

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, UK; Seymour Johnson AFB, N.C.; Tinker AFB, Okla.; and ANG in Alabama, Alaska, Arizona, Hawaii, Illinois, Iowa, Kansas, Maine, Michigan, Mississippi, Nebraska, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Tennessee, Utah, Washington, Wisconsin. Planned: Ramstein AB, Germany.

Contractor: Boeing, Rockwell Collins (Block 45).

Power Plant: Four CFM International CFM56-2 (USAF designation F108) turbofans, each 21,634 lb thrust.

Accommodation: Flight crew: two pilots, boom operator, plus navigator, depending on mission; AE crew: two flight nurses, three medical technicians (adjusted for patient needs). Load: 37 passengers, six cargo pallets, max 83,000 lb.

Fuel Capacity: Max transfer load 200,000 lb at 1,100 gpm (boom), 450 gpm (MPRS pods).

Dimensions: Span 130.8 ft, length 136.3 ft, height 41.7 ft.

Weight: Max T-O 322,500 lb.

Ceiling: 50,000 ft.

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 mission.

AIRLIFT AIRCRAFT

■ C-5 GALAXY

Mission brief: Long-range strategic airlift and outsized cargo transport.

COMMENTARY

The C-5 is USAF's largest airlifter and one of the world's largest aircraft. It can carry unusually heavy cargo over intercontinental ranges. It can 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. A total of 81 C-5As were delivered and underwent major wing modifications to extend their service lives. All but one C-5A (converted to C-5M) have now been retired. The C-5B first flew in 1985 and embodies all C-5A improvements, including improved turbofans, color weather radar, and triple INS. The first C-5B was delivered in January 1986, and some were equipped with defensive systems before eventual conversion to C-5M standards. Two C-5As were modified to carry outsize space cargo and redesignated C-5C. USAF was upgrading the C-5 fleet through a combination of the Avionics Modernization Program (AMP)—completed in 2011—and Reliability Enhancement and Re-engining Program (RERP), which is ongoing. Upgraded aircraft are designated C-5M Super Galaxy and incorporate new GE CF6-80C2 (F138-GE-100) turbofans, with 200 percent increased thrust, along with avionics and structural reliability fixes. USAF plans to modernize 52 C-5s to C-5M standards, including 49 B models, two C models, and the single C-5A. FY18 funds support CNS/ATM upgrades aided by a new core mission computer and weather radar. Other mods include modernized large aircraft IR countermeasures (LAIRCM) and lavatory redesign to address leaking/corrosion issues. Aircraft at Dover AFB, Del., were briefly grounded in July 2017, following a series of nose landing-gear malfunctions. AMC is replacing key mechanical components and limiting aircraft "kneeling" to reduce component wear. Two backup aircraft will be restored to the primary fleet to meet current demand.

EXTANT VARIANT(S)

- C-5A. Basic model delivered between 1969 and 1973.
- C-5B. Improved aircraft with strengthened wings and improved engines and avionics.
- C-5C. Modified C-5As capable of carrying outside NASA space cargo.
- C-5M. Super Galaxy, including AMP and RERP modified legacy C-5s.
- C-5M-SCM. Super Galaxy converted from C-5C to carry large NASA cargo.

Function: Strategic airlift.

Operator: AFMC, AMC, AFRC.

First Flight: June 30, 1968 (C-5A); June 6, 2006 (C-5M).

Delivered: 1969-1987 (C-5A); 1986-89 (C-5B); 1989-91 (C-5C); 2009-present (C-5M).

IOC: September 1970 (C-5A); February 2014 (C-5M).

Production: 131.

Inventory: One (C-5C); 50 (C-5M); one (C-5M-SCM).

Aircraft Location: Dover AFB, Del.; JBSA-Lackland, Texas; Travis AFB, Calif.; Westover ARB, Mass.

Contractor: Lockheed Martin.

Power Plant: Four General Electric TF39-GE-1C turbofans, each 43,000 lb thrust; (A/B/C) four General Electric F138-GE-100 turbofans, each 50,580 lb thrust.

Accommodation: Crew: two pilots, two flight engineers, three loadmasters. Load: 81 troops and 36 standard pallets, max 270,000 lb. (A/B/C); 285,000 lb (M); incl seven MRAP vehicles, six AH-64 Apache helicopters, four M2 Bradley fighting vehicles, or two M1 Abrams main battle tanks.

Dimensions: Span 222.8 ft, length 247.8 ft, height 65.1 ft.

Weight: Max T-O 840,000 lb.

Ceiling: 45,000 ft.

Performance: Speed 518 mph, range 2,473 miles with max payload (plus additional 575 miles after offload) (A/B/C); 5,524 miles with 120,000 lb of cargo (M).

■ C-12 HURON

Mission brief: Multimission passenger and priority light-cargo airlift, medevac, embassy and test support.

COMMENTARY

The C-12 family includes a series of military versions based on the Beechcraft King Air B200 and 1900C aircraft (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 US 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 PACAF in support of US Forces Japan and can transport 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. Current updates encompass basic safety, reliability, and maintainability mods.

EXTANT VARIANT(S)

- 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 capacity, and AE litter accommodation.
- C-12J. Military version of the Beechcraft Model 1900C commuter airliner.

Function: Light airlift.

Operator: AFMC, PACAF.

First Flight: Oct. 27, 1972 (Super King Air 200), March 1, 1990 (1900C).

Delivered: 1974-late 1980s.

IOC: Circa 1974.

Production: 88 (incl all variants).

Inventory: 16 (C-12C); six (C-12D); three (C-12F); four (C-12J).

Aircraft Location: Edwards AFB, Calif.; Holloman AFB, N.M.; JB Elmendorf-Richardson, Alaska; Yokota AB, Japan (J); various US embassies.

Contractor: Beechcraft.

Power Plant: Pratt & Whitney Canada PT6A-41 (C/D) or PT6A-42 (F) turboprops, each 850 shp; PT6A-65B turboprops, each 1,173 shp.

Accommodation: Crew: two pilots, eight passengers (C/D/F); load: up to 19 passengers or 3,500 lb cargo (C-12J).

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).

Ceiling: 31,000 ft (C/D); 35,000 ft (F); 25,000 ft (J).

Performance: Speed 300 mph (C/D) 336 mph (F) range 2,271 miles; 284 mph, range 1,669 miles (J).

■ C-17 GLOBEMASTER III

Mission brief: Heavy-lift strategic airlift and direct tactical delivery of all classes of military cargo.

COMMENTARY

C-17 is the US military's core airlifter. It is able to operate 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 air-drop outside cargo into a tactical environment and is the first military transport to feature full 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. Fleetwide Block 16 avionics and weather radar mods were completed in 2015, and all aircraft



C-17 Globemaster III

will be upgraded to the final Block 20 production standard through regular programmed depot maintenance cycles. Block 20 retrofits include some 60 programs to bring early production aircraft to a common configuration. Ongoing mods include next generation Large Aircraft Infrared Countermeasures (LAIRCM) to combat the proliferation of man portable air defenses, next generation CNS/GATM, Mode 5 IFF, dynamic retasking, and structural, safety, and sustainment mods. Priority upgrades include HUD replacement, BLOS comms, and inert gas generation system efficiency and safety upgrades. Additional FY18 starts include Fixed Installation Satellite Antenna (FISA) and roll-on/roll-off C2 capsule to enable in-flight DOD and government agency conferencing, as well as real time in cockpit (RTIC) air-to-ground comms for increased SA during airdrop and tactical ops. FISA enables high-bandwidth BLOS data/comms, and a total of 23 aircraft are already equipped. Funds support 84 additional mods.

EXTANT VARIANT(S)

- C-17A. Long-range airlifter.

Function: Tactical/strategic airlift.

Operator: AETC, AMC, PACAF, ANG, AFRC.

First Flight: Sept. 15, 1991.

Delivered: June 1993-September 2013.

IOC: Jan. 17, 1995.

Production: 223.

Inventory: 222.

Aircraft Location: Allen C. Thompson Field-Jackson-Evers Arpt., Miss.; Altus AFB, Okla.; Dover AFB, Del.; Eastern West Virginia Arpt., W.Va.; 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.; Stewart ANGB, N.Y.; Travis AFB, Calif.; Wright-Patterson AFB, Ohio. Planned: Pittsburgh Arpt., Pa.

Contractor: Boeing.

Power Plant: Four Pratt & Whitney F117-PW-100 turbofans, each 40,440 lb thrust.

Accommodation: Flight crew: two pilots, loadmaster; AE crew: two flight nurses, three medical technicians (altered as required). Load: 102 troops/paratroops; 36 litter and 54 ambulatory patients; 18 pallet positions; max payload 170,900 lb.

Dimensions: Span 169.8 ft, length 174 ft, height 55.1 ft.

Weight: Max T-O 585,000 lb.

Ceiling: 45,000 ft.



C-5M Super Galaxy

SrA. Zachary Cacia



TSgt. Jodi Martinez

Performance: Speed 518 mph at 25,000 ft, range 2,760 miles with 169,000 lb payload.

■ C-21 LEARJET

Mission brief: Passenger and priority light-cargo airlift and aeromedical transport.

COMMENTARY

The C-21 is a militarized Learjet 35 equipped with color weather radar, TACAN, and HF/VHF/UHF radios. It provides operational support for time-sensitive movement of people and cargo throughout the US and the European Theater, including AE missions if required. USAF awarded a \$32.2 million contract for CNS/ATM upgrades in May 2017. Ongoing upgrades support modifying 19 aircraft with modern digital systems including new weather radar, GPS, flight management system, Mode 5 transponder, and satellite-updating real-time flight information to comply with FAA standards.

EXTANT VARIANT(S)

- C-21A. Military version of the Learjet 35A.

Function: Light airlift.

Operator: AMC, USAF, ANG.

First Flight: January 1973.

Delivered: April 1984–October 1985.

IOC: April 1984.

Production: 84.

Inventories: 22.

Aircraft Location: JB Andrews, Md.; Peterson AFB, Colo.; Ramstein AB, Germany; Scott AFB, Ill.

Contractor: Bombardier (previously Gates Learjet), Global Aviation Technologies (CNS/ATM upgrade).

Power Plant: Two AlliedSignal TFE731-2 turbofans, each 3,500 lb thrust.

Accommodation: Crew: two pilots; AE crew: flight nurse, two medical technicians (adjusted as required). Load: eight passengers and 3,153 lb cargo; one litter or five ambulatory patients.

Dimensions: Span 39.5 ft, length 48.6 ft, height 12.2 ft.

Weight: Max T-O 18,300 lb.

Ceiling: 45,000 ft.

Performance: Speed 530 mph at 41,000 ft, range 2,306 miles.

■ C32A "AIR FORCE TWO"/C-32B

Mission brief: Dedicated vice presidential and distinguished visitor (DV) airlift, or politically sensitive crisis-mobility, depending on variant.



SSgt. Tony Harp/ANG

C-32 "Air Force Two"

COMMENTARY

The C-32A was acquired as a commercial Boeing 757 and primarily provides vice presidential airlift under the call sign Air Force Two. Aircraft assigned to the 89th Airlift Wing at Andrews, 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 discrete, rapid, global airlift in support of government crisis response efforts. The C-32's modern flight deck avionics are upgradable, and new developments include nitrogen fuel-tank inerting and commercial wideband satcom mods. FY18 funds support commercial WGS integration as well as CNS/ATM upgrades to meet future airspace standards. FY18 launches an analysis of alternatives to eventually replace the type with a aircraft better equipped to backup the VC-25 fleet, including better range and capacity, as well as more capable C2/comms.

EXTANT VARIANT(S)

- C-32A. Presidential support-configured commercial Boeing 757-200 airliner.

- C-32B. Commercial Boeing 757-200 tasked with global crisis response airlift.

Function: VIP transport.

Operator: AMC, ANG.

First Flight: Feb. 11, 1998 (C-32A).

Delivered: June–December 1998.

IOC: 1998.

Production: Six.

Inventories: Four (C-32A); two (C-32B).

Aircraft Location: JB Andrews, Md.; JB McGuire-Dix-Lakehurst, N.J.

Contractor: Boeing.

Power Plant: Two Pratt & Whitney PW2040 turbofans, each 41,700 lb thrust.

Accommodation: Crew: 16 (varies with mission). Load: up to 45 passengers.

Dimensions: Span 124.6 ft, length 155.2 ft, height 44.5 ft.

Weight: Max T-O 255,000 lb.

Ceiling: 42,000 ft.

Performance: Speed 530 mph, range 6,325 miles.

■ C-37 GULFSTREAM V

Mission brief: Worldwide special air missions and DV support.

COMMENTARY

The C-37 family consists of military versions of ultra-long-range Gulfstream business aircraft. The C-37A is based on the Gulfstream V and equipped with separate VIP and passenger areas, secure global voice and data communications suites, enhanced weather radar, autopilot, and advanced HUD. The C-37B 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. The service is seeking to procure three additional C-37Bs to fill the shortfall left following retirement of the C-20 fleet.

EXTANT VARIANT(S)

- C-37A. Military version of the Gulfstream V.

- C-37B. Military version of the Gulfstream G550.

Function: VIP transport.

Operator: AMC, PACAF, USAF.

First Flight: USAF October 1998.

Delivered: October 1998.

IOC: Dec. 9, 1998.

Production: 12.

Inventories: Nine (C-37A); three (C-37B).

Aircraft Location: Chièvres, Belgium; JB Andrews, Md.; JB Pearl Harbor-Hickam, Hawaii; MacDill AFB, Fla.; Ramstein AB, Germany.



C-12 Huron

USAF



C-130H Hercules

SMSGt. Charles Delano/ANG

Contractor: Gulfstream Aerospace.
Power Plant: Two BMW/Rolls Royce BR710A1-10 turbofans, each 14,750 lb thrust (A); two BR710C4-11 turbofans, each 15,385 lb thrust (B).
Accommodation: Crew: five; up to 12 passengers (A); 14 passengers (B).
Dimensions: Span 93.5 ft, length 96.4 ft, height 25.8 ft.
Weight: Max T-O 90,500 lb.
Ceiling: 51,000 ft.
Performance: Speed 600 mph, range 6,300 miles.

■ C-40 CLIPPER

Mission brief: Medium-range DV airlift, operational support.

COMMENTARY

The C-40 is based on the commercial Boeing 737-700 and is used to transport senior military commanders, Cabinet officials, and members of Congress, as well as performing other operational 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. Ongoing mods include nitrogen fuel tank inerting for the C-40C and commercial wideband satcom for the C-40B, to ensure leader's secure top-secret voice, data, and video links. Additional mods include navigation, and air traffic management compliance, and low-cost sustainment upgrades. The fleet is designed for a 30-year service life, with 23 years remaining. FY18 adds new crew rest seats.

EXTANT VARIANT(S)

- C-40B. Military version of the Boeing 737-700 with added winglets.
- C-40C. VIP configured Boeing 737-700 with added winglets, but lacking advanced comms.

Function: VIP transport.
Operator: AMC, PACAF, USAF, ANG, AFRC.
First Flight: April 14, 1999 (USN C-40A).
Delivered: 2002-2007.
IOC: Feb. 28, 2003.
Production: 11.

Inventory: Four (C-40B); seven (C-40C).
Aircraft Location: JB Andrews, Md.; JB Pearl Harbor-Hickam, Hawaii; Ramstein AB, Germany; Scott AFB, Ill.
Contractor: Boeing.
Power Plant: Two General Electric CFM56-7 turbofans, each 27,000 lb thrust.

Accommodation: Crew: 10 (varies by model/mission). Load: up to 89 passengers (B); up to 111 (C).
Dimensions: Span 117.4 ft, length 110.3 ft, height 41.2 ft.
Weight: Max T-O 171,000 lb.
Ceiling: 41,000 ft.
Performance: Speed 530 mph, range 5,750 miles.

■ C-130H HERCULES

Mission brief: Medium-range tactical airlift, polar support, airborne firefighting, aerial spray, humanitarian relief, and medevac.

COMMENTARY

The C-130H is an all-purpose theater transport that performs diverse roles, including tactical and intertheater airlift and airdrop support, Arctic resupply, AE, aerial spraying, aerial firefighting, and humanitarian missions. The H model improved on the C-130E and was delivered starting in 1965, with the current, more advanced models delivered starting in 1974. Improvements included upgraded engines, redesigned outer wing, improved pneumatic systems, new avionics, improved radar, and NVG lighting. C-130Hs are being replaced by the C-130J. The New York ANG operates the small fleet of LC-130H for Polar support. The LC-130H had been upgraded with eight-bladed propellers, digital displays and flight management systems, multifunction radar, modernized comms, and a single air data computer. USAF is seeking to upgrade ANG Modular Airborne Fire Fighting systems (MAFFS) equipped with C-130Hs with the same eight-bladed propellers and engine upgrades to enhance performance and safety. The first modified airframe was redelivered to the Wyoming ANG in January 2018. WC-130Hs

VC-25 Air Force One

are operated by the Puerto Rico ANG and are equipped with palletized mission equipment for tropical storm data collection. Ongoing upgrades include critical center wing box replacement, Mode 5 IFF, as well as the C-130H Avionics Modernization Program (previously Viability and Airspace Access Program). Increment 1 will add new CNS/ATM to bring a minimum of 170 C-130H and six LC-130H in compliance with US and international airspace rules. Increment 2 will add terrain awareness and warning, new flight management, and modern MFDs. C-130H concluded Active Duty service with the last two aircraft departing Yokota on Oct. 26, 2017.

EXTANT VARIANT(S)

- C-130H Hercules. Updated legacy C-130 version.
- LC-130H Skibird. Arctic support variant with wheel-ski gear.
- WC-130H. Weather reconnaissance version of C-130H.

Function: Tactical airlift.

Operator: ANG, AFRC.

First Flight: August 1954 (C-130A).

Delivered: 1974-96.

IOC: Circa 1974.

Production: 1,202 (C-130H).

Inventory: 188 (C-130H); 10 (LC-130H); seven (WC-130H).

Aircraft Location: Dobbins ARB, Ga.; Little Rock AFB, Ark.; Maxwell AFB, Ala.; Minneapolis-St. Paul Arpt./ARS, Minn.; Peterson AFB, Colo.; Pittsburgh Arpt., Pa.; Youngstown ARS, Ohio; and ANG in Arkansas, Connecticut, Delaware, Georgia, Illinois, Kentucky, Minnesota, Missouri, Montana, Nevada, New York (LC-130), North Carolina, Ohio, Puerto Rico (WC-130), Texas, West Virginia, Wyoming.



C-37 Gulfstream V

SrA. Neshia Humes



Yasuo Osakabe/USAF



Maj. Marnee Losurdo

C-130J Super Hercules

Contractor: Lockheed Martin.

Power Plant: Four Allison T56-A-15 turboprops, each 4,591 shp.

Accommodation: Crew: 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 for each version.

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; max payload 42,000 lb.

Ceiling: With max payload, 23,000 ft.

Performance: Speed 366 mph; range with 35,000 lb payload 1,496 miles.

■ C-130J SUPER HERCULES

Mission brief: Medium-range tactical airlift, precision airdrop, airborne firefighting, weather reconnaissance, humanitarian relief, and medevac.

COMMENTARY

The C-130J is the upgraded, current production version of the C-130 all-purpose theater transport. Missions include tactical and intertheater airlift, airdrop, AE, weather reconnaissance, wildfire suppression using the Modular Airborne Fire Fighting System (MAFFS), and humanitarian relief. The aircraft first deployed in combat in Southwest Asia in 2004. AFRC's "Hurricane Hunters" at Keesler operate the only WC-130Js, which are equipped with palletized equipment to measure tropical and winter storms. The Super Hercules features a three-crew flight operations system, more powerful engines, composite six-blade propeller system, and digital avionics and mission computers. The C-130J can fly faster, higher, and farther than earlier C-130s. The C-130J-30 variant features a 15-foot longer "stretched" fuselage. The combined fleet is sustained via block upgrades. USAF is combining the future Block 7/8.1 upgrades to reduce modification down time. Block 7 includes Link 16, new flight management systems, civil GPS, and a special mission processor. Block 8.1 adds 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 is slated to begin operational testing in 2018. Mode 5 IFF and air traffic management upgrades will be fielded ahead of cycle to meet FAA compliance deadlines. Airframes delivered since 2009 incorporate enhanced service life center wings, and FY18 funds retrofit two early airframes to the same standard. The current multiyear contract ending in FY18 includes 29 USAF C-130Js. The first PACAF-assigned C-130J arrived at Yokota on March 6, 2017.

EXTANT VARIANT(S)

- C-130J Super Hercules. Current production version.
- C-130J-30 Super Hercules. Stretched version capable of larger payloads.
- WC-130J. Weather reconnaissance version of C-130J.

Function: Tactical airlift.

Operator: AETC, AMC, PACAF, USAFE, ANG, AFRC.

First Flight: April 5, 1996.

Delivered: February 1999-present.

IOC: October 2006.

Production: 330+.

Inventory: 110 (C-130J); 10 (WC-130J).

Aircraft Location: Dyess AFB, Texas; Keesler AFB, Miss. (WC-130J); Little Rock AFB, Ark.; Ramstein AB, Germany; Yokota AB, Japan; and ANG in California, Kentucky, Rhode Island. Planned: Maryland.

Contractor: Lockheed Martin.

Power Plant: Four Rolls Royce AE2100D3 turboprops, each 4,700 shp.

Accommodation: Crew: 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).

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).

Ceiling: With max payload, 26,000 ft (J), 28,000 (J-30).

Performance: Speed 417 mph (J), 410 mph (J-30); range with 35,000 lb payload 1,841 miles (J), 2,417 miles (J-30).

■ VC-25 AIR FORCE ONE

Mission brief: Presidential air transport, executive C2.

COMMENTARY

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, data links, and a full self-defensive suite. The fleet is operated by the Presidential Airlift Group of the 89th Airlift Wing at Andrews. Ongoing mods include nitrogen fuel tank inerting, commercial

wideband satcom, and service life extension. USAF plans to replace VC-25s with a modified version of Boeing's latest 747-8 Intercontinental. The fleet has five years' estimated service life remaining and requires a life extension/block upgrade to remain viable until replacement aircraft are fielded. Block mods including protected satcom, chillers, nitrogen generation system, weather radar, digital/voice data, and network upgrades slated for completion by mid-2020. SLEP is accomplished during regular depot maintenance. Flightdeck upgrades include digital avionics, compliant CNS/ATM, Mode 5 IFF, Advisory Vertical Navigation, and other pilot situational awareness aids. USAF announced plans to acquire and modify two unpurchased 747-8s, stored by Boeing in new condition. The company is conducting initial design and risk reduction work to modify the aircraft, originally planned for delivery starting in 2024. The current plan excludes aerial refueling capability on cost grounds. It is unclear whether purchasing existing aircraft will speed delivery.

EXTANT VARIANT(S)

• VC-25A. Specially configured presidential support version of the Boeing 747-200B.

Function: Presidential airlift.

Operator: AMC.

First Flight: Sept. 6, 1990 (as Air Force One).

Delivered: August-December 1990.

IOC: Dec. 8, 1990.

Production: Two.

Inventory: Two.

Aircraft Location: JB Andrews, Md.

Contractor: Boeing.

Power Plant: Four General Electric CF6-80C2B1 turbofans, each 56,700 lb thrust.

Accommodation: Crew: 26; load: up to 76 passengers.

Dimensions: Span 195.7 ft, length 231.8 ft, height 63.4 ft.

Weight: Max T-O 833,000 lb.

Ceiling: 45,100 ft.

Performance: Speed 630 mph, range 7,800 miles, further with air refueling.

HELICOPTERS

■ HH-60 PAVE HAWK

Mission brief: Armed all-weather day/night CSAR, casualty/medical evacuation, disaster and humanitarian response, firefighting, and combat/utility support.

COMMENTARY

The HH-60G Pave Hawk is a highly modified Black Hawk helicopter equipped with advanced INS/GPS/Doppler navigation systems, satcom,



HH-60 Pave Hawk

SSgt. Benjamin Gonsier

and secure/anti-jam communications. It is fitted with a personnel locating system (PLS) that aids location of survivor's radio. It includes automatic flight control, NVG lighting, FLIR, 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. Ongoing Block 162 upgrades include Avionics Communications Suite Upgrade as well as replacing obsolete systems and standardizing HH-60G and loss-replacement aircraft configurations. Obsolescence mods include color weather radar, improved TACAN, new RWR, auto direction finding, and digital intercoms. ACSU upgrades will wrap up in 2020, followed by fleetwide standardization in 2024. FY18 funds procure initial FLIR/Laser Radar turret to enhance situational awareness in low visibility condition, and added mods include over-the-horizon comms for long-range ops in remote areas, and a rotor brake for shipboard operations. USAF plans to replace the HH-60G with the new HH-60W Combat Rescue Helicopter (CRH). The more powerful helicopter will improve hot weather/high-altitude performance and feature an enlarged cabin and longer range. Nine HH-60Ws will begin developmental testing at Eglin in 2018, and the first of 112 new-build helicopters is planned for delivery in 2019. HH-60s assigned to Lakenheath began relocating to Aviano to better support contingencies in Africa and Europe.

EXTANT VARIANT(S)

- HH-60G. Modified UH-60 helicopter equipped for CSAR.
- HH-60U. Converted surplus UH-60L.
- HH-60W. Developmental next generation Combat Rescue Helicopter.

Function: Personnel recovery/medium lift.

Operator: ACC, AETC, AFMC, PACAF, USAF, ANG, AFRC.

First Flight: October 1974.

Delivered: 1982-present.

IOC: 1982.

Production: 115.

Inventory: 97 (HH-60G); three (HH-60U).

Aircraft Location: 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.; Moody AFB, Ga.; Nellis AFB, Nev.; Patrick AFB, Fla.; RAF Lakenheath, UK. Planned: Aviano AB, Italy.

Contractor: Sikorsky (Lockheed Martin).

Power Plant: Two General Electric T700-GE-700/701C turboshafts, each 1,560-1,940 shp.

Accommodation: Crew: two pilots, flight engineer, gunner. Load: mission dependent.

Dimensions: Rotor diameter 53.6 ft, overall length 64.7 ft, height 16.7 ft.

Weight: Max T-O 22,000 lb.

Ceiling: 14,000 ft.

Performance: Speed 184 mph; range 580 miles.

Armament: Two 7.62 mm miniguns or two .50-caliber machine guns.

■ UH-1 HUEY/IROQUOIS

Mission Brief: Utility helicopter for missile field security, pilot training, and executive airlift.

COMMENTARY

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 provide administrative lift to US National Capital Region and PACAF officials from Andrews and Yokota respectively, and support 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. With termination of the earlier Common Vertical Lift Support Program (CVLSP), AFGSC is modifying its UH-1N with NVG-compatible cockpit, upgraded sensors, and safety and sustainment improvements to bridge the gap to a replacement helicopter. Ongoing TH-1H upgrades include FAA-compliant CNS/ATM. USAF launched the UH-1N Replacement Program in 2016 to recapitalize the fleet with up to 84 off-the-shelf helicopters suitable for mission-specific modification. Competitive contract award is planned for 2018, with operational testing beginning as early as FY19. Procurement delays have pushed initial fielding to 2021 or later.

EXTANT VARIANT(S)

- 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.

Function: Light lift/training.

Operator: AETC, Air Force District of Washington, AFGSC, AFMC, PACAF.

First Flight: April 1969 (UH-1N).

Delivered: September 1970-1974 (UH-1N, incl ex-USN airframes).

IOC: October 1970.

Production: 28 (TH-1H); 79 (USAF UH-1Ns).

Inventory: 28 (TH-1H); 63 (UH-1N).

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.

Contractor: Bell Helicopter, Lockheed Martin (TH-1H prime).

Power Plant: TH-1H: one Honeywell T53-L-703 turboshaft, 1,800 shp. UH-1N: two Pratt & Whitney Canada T400-CP-400 turboshafts, 1,290 shp.

Accommodation: Crew: two pilots, flight engineer; load: 6 to 13 passengers (depending on fuel, equipment, and atmospheric conditions) or up to six litters or, without seats, bulky, oversize cargo (N).

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.

Ceiling: 15,000 ft (10,000 ft with 10,000+ lb).

Performance: (UH-1N) speed 149 mph, range 300+ miles.

Armament: (Optional) two General Electric 7.62 mm miniguns or two 40 mm grenade launchers; two seven-tube 2.75-in rocket launchers.

TRAINER AIRCRAFT

■ T-1 JAYHAWK

Mission Brief: Multi-engine advanced jet pilot/navigator training and CSO training support.

COMMENTARY

The T-1A is a military version of the Beechcraft 400A used in the advanced phase of JSUPT for students selected to fly tanker or transport aircraft, as well as CSOs. The cockpit seats an instructor and two students. Mods include UHF/VHF radios, INS, TACAN, airborne detection 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. FY18 funds support modern avionics proof-of-concept mods to 15 initial aircraft. USAF expects to return the last of 39 aircraft severely damaged in a hailstorm at Laughlin AFB to flying status by September 2018. The fleet's estimated 18,000 flying-hour service life keeps it structurally airworthy to 2032.

EXTANT VARIANT(S)

- T-1A. Military trainer version of Beechcraft 400A.

Function: Advanced trainer.

Operator: AETC.

First Flight: Sept. 22, 1989 (Beechcraft 400A).

Delivered: Jan. 17, 1992-July 1997.

IOC: January 1993.

Production: 180.

Inventory: 178.

Aircraft Location: Columbus AFB, Miss.; Laughlin AFB and JBSA-Randolph, Texas; Vance AFB, Okla.; NAS Pensacola, Fla.

Contractor: Beechcraft.

Power Plant: Two Pratt & Whitney Canada JT15D-5B turboprops, each 2,900 lb thrust.

Accommodation: Three pilots, two side by side, one to the rear.

Dimensions: Span 43.5 ft, length 48.4 ft, height 13.9 ft.

Weight: Max T-O 16,100 lb.

Ceiling: 41,000 ft.

Performance: Speed 538 mph, range 2,555 miles.

■ T-6 TEXAN II

Mission Brief: Lead-in pilot training.

COMMENTARY

The T-6 is a joint Air Force/Navy trainer developed under the Joint Primary Aircraft Training System program, based on Swiss Pilatus PC-9. 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 completed in 2010, with an expected service life of 21 years. Ongoing mods include airspace compliant avionics, improved canopy fracture initiation system, replacement of unavailable components, and updated training aids. AETC suspended all T-6 flights in February 2018 following a series of hypoxia-like incidents, preliminarily linked to the aircraft's oxygen generating system. USAF evaluated an armed version of the aircraft alongside several other types as part of the OA-X light attack experiment at Holloman in 2017. The AT-6 Wolverine will participate in a follow-on evaluation alongside the A-29 Super Tucano at Holloman in 2018, aimed at possible rapid acquisition of a highly interoperable, light CAS/ISR platform.

EXTANT VARIANT(S)

- T-6A. Joint service primary training aircraft, based on the Pilatus PC-9.



T-1A Jayhawk

Lt. Col. Russell Hopkinson



T-6 Texan II

A1C James Crow

- T-6B. Navy-only variant.

• AT-6 Wolverine. Experimental light attack/armed reconnaissance variant.

Function: Primary trainer.

Operator: AETC, USN.

First Flight: July 15, 1998.

Delivered: May 2000-May 2010.

Production: Planned: 452 (USAF); 328 (USN).

Inventory: 444 (USAF).

Aircraft Location: USAF: Columbus AFB, Miss.; Laughlin AFB, JBSA-Randolph, and Sheppard AFB, Texas; Vance AFB, Okla.

Contractor: Beechcraft/Textron Aviation Defense (formerly Raytheon).

Power Plant: One Pratt & Whitney Canada PT6A-68 turboprop, 1,100 shp.

Accommodation: Two pilots, in tandem, on Martin Baker MK16LA zero/zero ejection seats.

Dimensions: Span 33.5 ft, length 33.4 ft, height 10.7 ft.

Weight: Basic 6,500 lb.

Ceiling: 31,000 ft.

Performance: Speed 320 mph, range 1,035 miles.

■ T-38 TALON

Mission brief: Supersonic, advanced jet training, adversary support, pilot proficiency training.

COMMENTARY

The T-38 was the first supersonic trainer aircraft and is primarily used by AETC for 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. T-38Bs are equipped with a gunsight and centerline hardpoint 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 air intakes. Sustainment measures include replacement of major engine components to improve reliability and maintainability. USAF aims to field the next generation T-X aircraft with initial capability in 2024. Full fleet replacement is not projected until 2034, and USAF is extending aircraft. The Pacer Classic III structural renewal effort is the most intensive in the T-38's history, replacing major longerons, bulkheads/formers, intakes, internal skins, and structural floors on 180 high-risk T-38Cs. The first airframe was redelivered in 2015. Additional upgrades include wingset replacement, digital avionics upgrades, replacement HUD, VHF nav/comms, airspace compliance, and safety mods.

EXTANT VARIANT(S)

- 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.

Function: Advanced trainer.

Operator: ACC, AETC, AFGSC, AFMC.

First Flight: April 1959.

Delivered: 1961-72 (T-38A); 2002-07 (T-38C).

IOC: March 1961.

Production: 1,187.

Inventory: 53 (T-38A); six (AT-38B); 444 (T-38C).

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; Tyndall AFB, Fla.; Vance AFB, Okla.; Whiteman AFB, Mo.

Contractor: Northrop Grumman.

Power Plant: Two General Electric J85-GE-5 turbojets, each 2,900 lb thrust with afterburning.

Accommodation: Two pilots, in tandem, on Martin Baker MK16T zero/zero ejection seats.

Dimensions: Span 25.3 ft, length 46.3 ft, height 12.8 ft.

Weight: Max T-O 12,093 lb.

Ceiling: Above 55,000 ft.

Performance: Speed 812 mph, range 1,093 miles.

■ T-53 KADET II

Mission brief: Cadet initial flight training, sport/competition aviation.

COMMENTARY

The T-53 is the military designated civilian Cirrus SR20, primarily used by USAFA's Powered



T-38 Talon

SSgt. Carlin Leslie

Flight Program, which conducts some 12,600 training and competition-flying hours annually. The aircraft is dubbed "Kadet" in reference to the Boeing/Stearman PT-17, which was the USAAF's mainstay primary training aircraft during WWII. It is an all-composite monoplane with advanced avionics and safety features that include GPS, Cirrus Airframe Parachute System, integrated fuselage roll cage, cuffed wing design, and other active and passive safety systems standard on Cirrus aircraft. T-53s are designed for 12,000 flying hours. Upgrades are limited to FAA-mandated airworthiness compliance mods and simulator updates.

EXTANT VARIANT(S)

- T-53A. Military designated Cirrus SR20.

Function: Trainer.

Operator: AETC.

Delivered: 2012.

Inventory: 24.

Aircraft Location: USAFA, Colo.

Contractor: Cirrus.

Power Plant: One Continental IO-360-ES six-cylinder, fuel-injected, air-cooled engine, 200 hp.

Accommodation: Two, side by side, plus three passengers.

Dimensions: Span 38.3 ft, length 26 ft, height 8.9 ft.

Weight: Max T-O 3,050 lb.

Ceiling: 17,500 ft.

Performance: Speed 178 mph, range 690 miles.

■ UV-18 TWIN OTTER

Mission brief: Utility, cadet parachute jump training.

COMMENTARY

The UV-18 is a military variant of the civilian De Havilland DHC-6 Twin Otter. It is used at USAFA to support various parachuting activities and perform general utility missions. Special use includes supporting the Air Force Academy parachute team, Wings of Blue. Upgrades are limited to FAA-mandated airworthiness compliance mods.

EXTANT VARIANT(S)

- UV-18B. Military variant of the DHC-6 Twin Otter.

Function: Utility.

Operator: AETC.

First Flight: May 1965 (commercial version).

Delivered: 1977 (two); 1982 (one).

IOC: 1977.

Production: Three.

Inventory: Three.

Aircraft Location: USAFA, Colo.

Contractor: De Havilland Canada.

Power Plant: Two Pratt & Whitney Canada PT6A-27 turboprops, each 620 shp.

Accommodation: Crew: two pilots; load: up to 20 passengers.

Dimensions: Span 65 ft, length 51.9 ft, height 18.7 ft.

Weight: Max T-O 12,500 lb.

Ceiling: 25,000 ft.

Performance: Speed 210 mph, range 806 miles.

REMOTELY PILOTED AIRCRAFT

■ MQ-1 PREDATOR

Mission brief: Medium-altitude, long-endurance ISR and limited strike.

COMMENTARY

The MQ-1 is a multimission weaponized RPA with near real-time FMV and multispectral targeting with combined laser designator/illuminator and EO/IR sensors. The fully operational system comprises four air vehicles, GCS, satellite link, and about 55 personnel for 24-hour operations. RQ-1 became a fully USAF system in 1996, and the designation was changed to MQ-1 (denoting multimission capability) when it was armed with the Hellfire missile in 2002. USAF forward deploys launch and recovery element (LRE) systems and support personnel for takeoff and landing operations, while the CONUS-based GCSs conduct the mission via extended BLOS/satcom data link. USAF received its last MQ-1B in March 2011. The MQ-1 is being replaced by the MQ-9 due to its limited payload, speed, and sensors.

EXTANT VARIANT(S)

- MQ-1B. Armed version of the General Atomics Predator.

Function: Armed reconnaissance/target acquisition.

Operator: ACC, AFMC, AFSOC, ANG.

MQ-9 Reaper

First Flight: July 1994.

Delivered: July 1994 (USAF 1996-March 2011).

IOC: 2005.

Production: 268.

Inventory: 121.

GCS Location: Cannon AFB, N.M.; Creech AFB, Nev.; Hector Arpt., N.D.; Nellis AFB, Nev.; Whiteman AFB, Mo.

Aircraft Location: Cannon AFB, N.M.; Creech AFB, Nev.; Fort Polk Airfield, La.; Hector Arpt., N.D.; Whiteman AFB, Mo., and deployed locations worldwide.

Contractor: General Atomics Aeronautical Systems.

Power Plant: One Rotax 914F turbo engine.

Accommodation: Offboard GCS: pilot, sensor operator.

Dimensions: Span 55 ft, length 27 ft, height 6.9 ft.

Weight: Max T-O 2,250 lb.

Ceiling: 25,000 ft.

Performance: Speed 84-135 mph, range 770 miles, max endurance 40 hr.

Armament: Two AGM-114 Hellfire missiles.

■ MQ-9 REAPER

Mission brief: Medium- to high-altitude unmanned, tactical ISR and light attack.

COMMENTARY

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 a permissive combat environment. The MQ-9 fulfills a secondary tactical ISR role utilizing its Multispectral Targeting System-B (MTS-B). The system 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, and the MQ-9 employs SAR



T-53 Kadet II

Mike Kaplan/USAF



Ilka Cole/USAF



AIC Donald Hudson

for GBU-38 JDAM targeting. Additional roles include CAS, CSAR, precision strike, armed overwatch, target development/designation, and terminal weapon guidance. MQ-9B debuted in combat in Afghanistan in 2007. The Reaper system comprises three aircraft, GCS, LOS/BLOS satellite and terrestrial data links, support equipment/personnel, and crews for deployed 24-hour operations. Development is underway to incorporate automatic takeoff and landing capability, Counter-Improvised Explosive Device (C-IED), Dismount Detection Radar (DDR), Gorgon Stare wide-area surveillance, missile defense, and other sensor upgrades, weapons integration, and reliability enhancements. MQ-9 is retrofitted under a flexible acquisition structure, which can rapidly change to meet emerging demands. Current efforts include the new DAS-4 high-definition EO/IR sensor to improve targeting accuracy, fuselage checks to improve system cooling, bandwidth-efficient data links, enhanced JDAM targeting, and more modular weapons interface software. Long-term fixed programs include Block 5 aircraft/Block 30 GCS, and Extended Range Reaper which entered combat in 2015. Reaper ER adds 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 upgrade the entire fleet to ER standards, comprising 165 Block 1 and 136 Block 5 aircraft. FY18 funding supports Block 5, Lynx SAR, reliability and maintainability mods, ER kits, and capability upgrades, as well as procuring 16 new-build MQ-9s.

EXTANT VARIANT(S)

- 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.

Function: Attack/armed reconnaissance.

Operator: ACC, AFMC, AFSOC, ANG.

First Flight: February 2001.

Delivered: November 2003-present.

IOC: October 2007; 2015 (ER).

Production: 346 (planned).

Inventory: 218.

GCS Location: Cannon AFB, N.M.; Creech AFB, Nev.; 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.; March ARB, Calif.; Springfield-Beckley Arpt., Ohio; Planned: Niagara Falls Arpt., N.Y.; Shaw AFB, S.C.; Tyndall AFB, Fla.; Whiteman AFB, Mo.

Aircraft Location: Cannon AFB, N.M.; Creech

RQ-4 Global Hawk

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.

Contractor: General Atomics Aeronautical Systems, L3 Technologies, Raytheon.

Power Plant: One Honeywell TPE331-10GD turboprop, max 900 shp.

Accommodation: Offboard GCS: pilot, sensor operator.

Dimensions: Span 66 ft, length 36 ft, height 12.5 ft.

Weight: Max T-O 10,500 lb.

Ceiling: 50,000 ft.

Performance: Cruise speed 230 mph, range 1,150 miles, endurance 27 hr; 34 hr (ER).

Armament: Combination of AGM-114 Hellfires, GBU-12/49 Paveway IIs, and GBU-38 JDAMs.

■ RQ-4 GLOBAL HAWK

Mission brief: High-altitude, strategic ISR, SIGINT, and ground moving target indication (GMTI), depending on variant.

COMMENTARY

The Global Hawk is primarily a long-endurance, high-altitude, "deep look" ISR platform to complement satellite and manned strategic ISR. The weapon system consists of an aircraft with an integrated sensor suite, launch and recovery element (LRE), mission control element (MCE), and communications and mission planning equipment. The Block 10 debuted in combat in 2001 before delivery of the first production aircraft and was retired in 2011. Block 20 aircraft were initially delivered as an imagery intelligence (Imint) platform incorporating the Enhanced Integrated Sensor Suite (EISS). Four airframes were subsequently converted to EQ-4B communications relay platforms with the Battlefield Airborne Communications Node (BACN), and three remain active. The Block 30 variant is a multi-intelligence platform equipped with EO/IR, SAR, as well as Sigint sensors and has supported combat operations worldwide. The Block 40 ground surveillance platform is equipped with the Multiplatform Radar Technology Insertion Program (MP-RTIP) sensor suite that incorporates AESA and SAR to simultaneously gather stationary target imagery and detect and track moving ground targets as well as cruise missiles. A universal payload adapter enables carriage of several U-2-unique sensors, including the MS-177 electro-optical sensor and wet-film Optical Bar Camera. MS-177 was installed on two Block 30s to support operational testing, which revealed significant electromagnetic

interference issues. A weather-avoidance radar is also undergoing tests, and efforts are underway to address integration issues with both systems. Initial operational capability with the MS-177 is planned for FY18. Development includes an anti-icing system for all-weather operations, Airborne Signals Intelligence Payload (ASIP) increment I Sigint improvement, reliability improvements, airspace compatibility mods, and sense and avoid technology. Northrop Grumman is also building four RQ-4s for South Korea, three for Japan, and five for the NATO's Allied Ground Surveillance program in addition to USAF/Navy production. A total of 43 USAF RQ-4s have been delivered, including 21 Block 30s. The last two aircraft are scheduled for delivery by the end of 2018.

EXTANT VARIANT(S)

- 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.

Function: High-altitude reconnaissance.

Operator: ACC, AFMC.

First Flight: Feb. 28, 1998.

Delivered: August 2003-present.

IOC: August 2011 (Block 30); August 2016 (Block 40).

Production: 45 USAF; four USN (68 planned); five (NATO).

Inventory: Three (Block 20); 19 (Block 30); 11 (Block 40).

Aircraft Location: Beale AFB, Calif. (Block 30); Edwards AFB, Calif.; Grand Forks AFB, N.D. (Block 20/40); forward operating locations: Ali Al Salem AB, Kuwait (EQ-4B); Andersen AFB, Guam; Misawa AB, Japan; NAS Sigonella, Italy; Yokota AB, Japan.

Contractor: Northrop Grumman, Raytheon, L3 Technologies.

Power Plant: One Rolls Royce-North American F137-RR-100 turboprop, 7,600 lb thrust.

Accommodation: Offboard one LRE pilot, one MCE pilot, one MCE sensor operator.

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.

Ceiling: 60,000 ft.

Performance: Speed 356.5 mph, range 10,000 miles, endurance 32+ hr (24 hr on-station loiter at 1,200 miles).

■ RQ-170 SENTINEL

Mission brief: Stealthy, penetrating day/night tactical ISR.

COMMENTARY

Although the RQ-170 was still under development and test, USAF employed it in Southwest Asia for 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. An RQ-170 strayed into Iranian airspace, crashed, and was captured during a mission in 2011.

EXTANT VARIANT(S)

- RQ-170. No data available.

Function: Unmanned surveillance and reconnaissance.

Operator: ACC.

GCS Location: Creech AFB, Nev.; Tonopah Test Range, Nev.

Aircraft Location: Tonopah Test Range, Nev.; deployed worldwide.

Contractor: Lockheed Martin.

Dimensions: Span 65.6 ft, length 14.75 ft.

FULL-SCALE AERIAL TARGETS

■ QF-16 FULL-SCALE AERIAL TARGET

Mission brief: Manned/unmanned aerial target and threat simulator in support of missile/weapon development, testing, validation, and training.

COMMENTARY

The QF-16 began replacing the dwindling and obsolescent QF-4 Full-Scale Aerial Target (FSAT) starting in 2015, through the type's retirement in December 2017. Aircraft will primarily support missile and weapon systems development, testing, and evaluation. 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. FY18 funds procure 18 conversions. ACC declared IOC with 15 operational aircraft in 2016, and ongoing operational testing includes a comprehensive cyber security evaluation. Recent efforts include developing new EA pods and software to more accurately replicate adversary capabilities and tactics, ground control improvements, preliminary development of two-seat trainer, and future F-16 block conversions. Holloman launched its first operational QF-16 sortie on Feb. 10, 2017.

EXTANT VARIANT(S)

- QF-16A/B. Converted from retired F-16A/B Block 15.
- QF-16C/D. Converted from retired F-16C/D Block 25 and Block 30.

Function: Full-scale aerial target.

Operator: ACC.

First Flight: May 4, 2012.

Delivered: February 2015-present.

IOC: Sept. 23, 2016.

Production: 126 (planned).

Inventory: Seven (QF-16A); 16 (QF-16C).

Aircraft Location: Tyndall AFB, Fla., Holloman AFB, N.M.

Contractor: Lockheed Martin (previously General Dynamics), Boeing.

Power Plant: Block 15: one Pratt & Whitney F100-PW-200 turbofan, 23,830 lb thrust. Block 25: one Pratt & Whitney F100-PW-220 turbofan, 23,830 lb thrust. Block 30: one General



QF-16 Aerial Target

SrA. Solomon Cook

Electric F110-GE-100 turbofan, 28,984 lb thrust.

Accommodation: Safety pilot (optional) on ACES II zero/zero ejection seat.

Dimensions: Span 32.8 ft, length 49.3 ft, height 16.7 ft.

Weight: F-16A: empty (F100-PW-200) 16,285 lb; F-16C: empty (F110-GE-100) 18,238 lb.

Ceiling: 50,000 ft.

Performance: Speed Mach 2, ferry range 2,000+ miles.

STRATEGIC WEAPONS

■ AGM-86 AIR LAUNCHED CRUISE MISSILE (ALCM)

Mission brief: Low-level, penetrating nuclear or conventional strike against surface targets.

COMMENTARY

ALCM is programmed to conduct strategic attack—nuclear or conventional—on surface targets. Its small radar signature and low-level flight capability enhance the missile's effectiveness. The nuclear AGM-86B was the first production version. A total of 1,715 were delivered through 1986. USAF is to cut inventory to 528. The conventional AGM-86C, called CALCM, was first delivered in 1987, and few remain in the inventory. It was operationally employed for the first time in Desert Storm and widely used in subsequent operations. CALCM is capable of adverse weather, day/night, air-to-surface, accurate, standoff strike capability at ranges greater than 500 miles. Block 1A enhancements offer improved accuracy and increased immunity to electronic jamming. The AGM-86D is CALCM's Block II penetrator version with AUP-3(M) warhead. It provides standoff capability against hardened, deeply buried targets and was successfully used in Afghanistan. ALCM is undergoing a SLEP to stretch its in-service life to 2030 to allow for planned replacement by the Long-Range Standoff (LRSO) missile. USAF awarded Lockheed Martin and Raytheon technology maturation and risk-reduction contracts for the LRSO in 2017 and plans to field the nuclear missile by the late 2020s, possibly followed by a conventional derivative thereafter.

EXTANT VARIANT(S)

- AGM-86B. Nuclear ALCM variant.
 - AGM-86C. Conventional CALCM variant.
 - AGM-86D. Penetrating CALCM Block II variant.
- Function:** Strategic air-to-surface cruise missile.
- Operator:** AFGSC.
- First Flight:** June 1979 (full-scale development).
- Delivered:** 1981-1986.
- IOC:** December 1982(B); January 1991 (C); No-

vember 2001 (D).

Production: 1,715.

Inventory: 1,142.

Unit Location: Andersen AFB, Guam (conventional only); Barksdale AFB, La.; Minot AFB, N.D.

Contractor: Boeing.

Power Plant: Williams/Teledyne CAE F107-WR-10 turbofan, 600 lb thrust.

Guidance: Inertial plus Terrain Contour Matching (B); inertial plus GPS (C/D).

Warhead: W80-1 nuclear (B), blast/fragmentation conventional (C), hard target penetrating warhead (D).

Dimensions: Span 12 ft, length 20.8 ft, body diameter 2 ft.

Weight: 3,150 lb.

Performance: Speed 550 mph (B), high subsonic (C/D); range 1,500+ miles (B), 690 miles (C/D).

■ B61 THERMONUCLEAR BOMB

Mission brief: Extended nuclear deterrence, tactical/battlefield nuclear attack.

COMMENTARY

B61 is the primary strategic nuclear weapon for the B-2 bomber and equips both the F-16 and F-15E, providing forward deployed, extended deterrence to allies. The weapon was first delivered in 1966, and the most recent B61 Mod 11 introduced in 1997 adds a ground-penetrating capability, enhancing its destructive effect to destroy 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). The LEP aims to improve the safety, security, and reliability of the weapon through 2040, adding a new guided tail kit in addition to warhead upgrade/refurbishment. The resulting weapon will be more accurate, allowing reduced yield. Production engineering work began in 2016. B61-12 will consolidate the B61-3, -4, -7, and -10 weapons into a single, standardized configuration. Qualification flight testing is ongoing, and USAF conducted the first of 23 inert test drops utilizing the F-15E and F-16C in 2017. These drops validate nonnuclear components such as arming/fire control, guidance and spin-rocket motors, and software. The first production example is scheduled for delivery in 2020, and integration work is planned on the B-2, F-15E, F-16, and the F-35A starting in 2018.

EXTANT VARIANT(S)

- B61. Supersonic-droppable free-fall thermonuclear weapon.
- Function:** Air-to-surface thermonuclear bomb.
- Delivered:** 1966.
- IOC:** 1968.
- Production:** N/A.

Inventory: Approx 500.

Deployed locations: Aviano AB, Italy; Büchel AB, Germany; Ghedi AB, Italy; Incirlik AB, Turkey; Kleine Brogel AB, Belgium; Volkel AB, Netherlands.

Contractor: Los Alamos National Laboratory (weapon), Boeing (B61-12 tail kit).

Guidance: None (B61 Mod 1 to 11); N/A (B61 Mod 12).

Warhead: One B61 -3, -4, -7, -10, or -11.

Dimensions: Length 11 ft 8 in., diameter 1 ft 1 in.

Weight: 700 lb; 825 lb (B61-12).

Performance: N/A.

■ LGM-30 MINUTEMAN

Mission brief: Survivable, intercontinental, strategic nuclear deterrence.

COMMENTARY

Minuteman is a three-stage, solid-propellant ICBM housed in an underground silo. Minuteman III became operational in 1970, providing improved range, rapid retargeting, and the capability to place up to three re-entry vehicles on three targets with a high accuracy. It is the sole remaining US land-based ICBM. Ongoing mods include updated warhead fuzes, networking, and cryptography upgrades. FY18 begins the Launch Control Center Block Upgrade (LCCBU), which 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. Guidance and propulsion upgrades and modernized re-entry vehicles extend service life to 2030. New efforts include developing a replacement to the current, obsolete airborne launch system fielded aboard the Navy's E-6B Mercury aircraft. AFGSC initially deployed 550 missiles, later reducing to 400 based at Malmstrom, Minot, and F. E. Warren. AFGSC completed reducing its deployed ICBMs to a single-warhead configuration in 2014, under limits imposed by the New START agreement. USAF awarded Boeing and Northrop Grumman technology maturation and risk-reduction contracts on Aug. 21, 2017, to begin replacing Minuteman with a future Ground-Based Strategic Deterrent (GBSD).

EXTANT VARIANT(S)

• LGM-30G. Current Minuteman III variant.

Function: Strategic surface-to-surface ballistic missile.

Operator: AFGSC.

First Flight: February 1961.

Delivered: 1962-1978.

IOC: December 1962, Malmstrom AFB, Mont.

Production: 1,800.

Inventory: 400.

Unit Location: F. E. Warren AFB, Wyo.; Malmstrom AFB, Mont.; Minot AFB, N.D.

Contractor: Boeing, BAE Systems, General Electric, Lockheed Martin, Orbital ATK.

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.

Guidance: Inertial guidance system.

Re-entry Vehicle: One Mk 21 RV; one to three Mk 12/12A MIRVs.

Warhead: One (currently) to three 300 kiloton W87 enriched uranium thermonuclear weapons.

Dimensions: Length 59.9 ft, diameter 5.5 ft.

Weight: 79,432 lb.



LGM-30 Minuteman III

SrA. Ian Dudley

Performance: Speed at burnout approx 15,000 mph, range 6,000+ miles.

LONG-RANGE STANDOFF WEAPONS

■ ADM-160 MINIATURE AIR LAUNCHED DECOY (MALD)

Mission brief: Air launched programmable electronic warfare to thwart integrated enemy air defense systems (IADS).

COMMENTARY

MALD is a low-cost, modular, autonomous flight vehicle that mimics US or allied aircraft to enemy 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.

EXTANT VARIANT(S)

• ADM-160B. MALD base decoy variant.

• ADM-160C. MALD-J jammer/decoy variant.

Function: Aircraft decoy; close-in radar jammer.

First Flight: 1999 (MALD); 2009 (MALD-J).

Delivered: September 2012 (MALD-J).

IOC: N/A.

Contractor: Raytheon.

Guidance: GPS/INS.

Dimensions: Span 5.6 ft (extended), length 9.3 ft.

Weight: Less than 300 lb.

Performance: Range up to 575 miles, endurance 90 minutes (50 minutes on-station loiter).

Integration: B-52H, F-16C.

■ AGM-154 JOINT STANDOFF WEAPON (JSOW)

Mission brief: Low-cost, guided glide-missile for precision attack against light/area targets.

COMMENTARY

JSOW is a joint USAF-Navy family of medium-range, GPS/INS guided, standoff air-to-ground weapons. They are 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. JSOW is integrated onto the B-1, B-2, B-52, F-15E, and F-16, and an F-35C conducted the strike fighter's first drop during integration testing on March 23, 2016. The new AGM-154C-1 variant that adds moving, maritime strike capability to the baseline C variant reached IOC with the Navy in 2016 and will eventually equip the F-35A/C.

EXTANT VARIANT(S)

• 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.

Function: Air-to-surface guided missile.

First Flight: December 1994.

Delivered: 2000-05 (USAF).

IOC: 2000 (USAF).

Contractor: Raytheon.

Guidance: GPS/INS.

Warhead: See variants above.

Dimensions: length 13.3 ft, diameter 13 in.

Performance: range 13.8 miles low altitude, 73 miles high altitude.

■ AGM-158 JOINT AIR-TO-SURFACE STANDOFF MISSILE (JASSM)

Mission brief: Precision attack against heavily defended or high-value targets at extended, standoff range.

COMMENTARY

JASSM is a joint USAF-Navy autonomous precision strike weapon. It can attack both fixed and relocatable targets, including moderately hardened buried targets. The base variant is a stealthy low-cost airframe equipped with GPS/INS guidance and imaging IR terminal seeker. The base variant is integrated on most fighter and bomber types and is planned for the F-35A. The JASSM-Extended Range (JASSM-ER) version uses same baseline body but a new engine and fuel system that increases range to more than 500 miles. The ER variant was cleared for combat use on the B-1B in 2015 and planned for use on all fighter/bomber platforms. Full-rate production of the ER began the same year and JASSM production shifted to ER-only in FY16. Total planned production includes 2,034 JASSM and 2,866 JASSM-ER. Lockheed Martin is developing a new anti-shipping variant, dubbed



AGM-158 JASSM

SrA. Kedesha Pennant

Long-Range Anti-Ship Missile (LRASM), for both the Air Force and Navy. LRASM will be fielded on the B-1B in 2018. FY18 funds support procurement of 360 JASSM-ER and 15 LRASM.

EXTANT VARIANT(S)

- AGM-158A JASSM. Base variant.
- AGM-158B JASSM-ER. Extended-range variant.
- AGM-158C LRASM. Long-Range Anti-Ship Missile based on JASSM.

Function: Air-to-surface guided weapon.

First Flight: April 8, 1999.

Delivered: Through FY19 (planned).

IOC: September 2003; December 2014 (ER variant); 2018 (planned, LRASM).

Contractor: Lockheed Martin, Raytheon, Honeywell.

Power Plant: Teledyne Technologies J402 turbojet (JASSM); Williams Intl. F107-WR-105 turbofan (JASSM-ER).

Guidance: GPS/INS and imaging IR terminal seeker.

Warhead: 1,000-lb class penetrator.

Dimensions: Length 14 ft.

Performance: 1,000-lb dual mode penetrator/blast-fragmentation warheads; range 200+ miles (baseline), 500+ miles (ER).

Integration: (JASSM) B-1B, B-2, B-52H, F-15E, and F-16 Block 40-52; planned: F-35A. (JASSM-ER) B-1B; planned: B-2A, B-52H, F-15E, F-16, and F-35A; (LRASM) B-1B.

AIR-TO-AIR MISSILES

■ AIM-9 SIDEWINDER

Mission brief: IR-guided short-range, supersonic engagement of air-to-air targets.

COMMENTARY

Sidewinder was developed by the Navy for fleet air defense and adapted by USAF for fighter aircraft use. 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. The current production AIM-9X Block 2 was cleared for full rate production in September 2015, and an F-35A conducted its first live-fire with the weapon in early 2016. Ongoing development includes control actuation, IR counter-countermeasures, improved lock-after-launch, added partial/degraded cue capability, and improved small target acquisition and surface attack capability.

ity. AIM-9X production includes 67 converted AIM-9Ms, 1,093 Block 1, and a planned 2,859 Block II (including the newly developed Block II-plus, incorporating enhanced survivability features). FY18 funds procure a combined 310 AIM-9X Block II/II-plus.

EXTANT VARIANT(S)

- AIM-9M. Early variant.
- AIM-9M-9. Expanded anti-countermeasure capability variant.
- AIM-9X. Newest, highly maneuverable, JHMCS compatible variant.

Function: Air-to-air missile.

First Flight: September 1953.

Delivered: AIM-9M 1983; AIM-9X from 2002-2011 (Block I); 2011 to present (Block II); 2017-present (Block II-plus).

IOC: Circa 1983 (9M); 2003 (9X).

Contractor: Raytheon, Orbital ATK (propulsion), Propulsion: Mk 36 Mod 11 (9M); Orbital ATK Mk 139 solid-propellant rocket motor (9X).

Guidance: Passive IR homing guidance.

Warhead: HE annular blast fragmentation.

Dimensions: Span 2.1 ft, length 9.4 ft, diameter 5 in.

Performance: Speed Mach 2+, range 10+ miles.

Integration: F-15C/D/E, F-16C/D, F-22A (AIM-9X). Planned: F-35A.

■ AIM-120 ADVANCED MEDIUM-RANGE AIR-TO-AIR MISSILE (AMRAAM)

Mission brief: Active radar-guided, medium-range, supersonic engagement of air-to-air targets.

COMMENTARY

AMRAAM 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 (HOBBS) launch capability. AIM-120D completed operational testing in 2014 and was fielded in 2015. The latest variant offers improved range, GPS-assisted guidance, updated data links, and jam resistance, in addition to greater lethality. Ongoing upgrades undergoing operational testing will further enhance weapon performance and electronic protection. FY18 funds procure 205 AIM-120D missiles.

EXTANT VARIANT(S)

- 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,

AIM-9X Sidewinder

improved range, lethality, and jam-resistance.

Function: Air-to-air guided missile.

First Flight: December 1984.

Delivered: 1988.

IOC: September 1991; July 2015 (120D).

Contractor: Raytheon, Orbital ATK and Nammo Group (propulsion).

Propulsion: Boost-sustain solid-propellant rocket motor.

Guidance: Active radar terminal/inertial mid-course.

Warhead: HE blast fragmentation.

Dimensions: Span 1.7 ft, length 12 ft, diameter 7 in.

Performance: Supersonic, range 20+ miles.

Integration: F-15C/D/E, F-16C/D, F-22A; planned: F-35A.

AIR-TO-GROUND WEAPONS

■ AGM-65 MAVERICK

Mission brief: TV-, imaging IR-, or laser guided standoff air-to-surface attack.

COMMENTARY

Maverick was first employed during the Vietnam War and was used extensively in Desert Storm and Iraqi Freedom. It is employed by fighter/attack aircraft against tanks, vehicles, and air defenses. AGM-65B is a launch-and-leave, EO/TV guided missile, equipped with "scene magnification" TV 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, replacing IR guidance with EO TV guidance and is also undergoing a tracker upgrade. The AGM-65L is the newest EO TV/semiactive-laser seeker equipped "Laser Maverick" designed to strike high-speed moving targets. FY18 funds modify 91 legacy missiles to Laser Maverick standards and replenish weapons expended in ongoing combat.

EXTANT VARIANT(S)

- 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.



SrA. John Linzmeier



SrA. Cheyenne Powers

- 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.

Function: Air-to-surface guided missile.

First Flight: August 1969.

Delivered: August 1972.

IOC: February 1973.

Contractor: Raytheon, Orbital ATK (propulsion).

Propulsion: Two-stage solid-propellant rocket motor.

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).

Dimensions: Span 2.3 ft, length 8.2 ft, diameter 12 in.

Performance: Supersonic, range 20 miles.

Integration: A-10C, F-15E, F-16C/D.

■ AGM-88 HIGH-SPEED ANTI-RADIATION MISSILE (HARM)

Mission brief: Tactical anti-radar air-to-surface attack.

COMMENTARY

HARM is a joint USAF-Navy weapon, highly effective against enemy ground radar, and carried by USAF F-16CJs dedicated to the SEAD mission. 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 incorporating improved GPS/INS guidance, anti-countermeasure performance, and reduced risk of collateral damage.

EXTANT VARIANT(S)

- AGM-88B. Early production variant.
- AGM-88C. Current production variant.
- AGM-88F. Upgraded variant with greater accuracy and precision.

Function: Air-to-surface anti-radiation missile.

First Flight: April 1979.

Delivered: 1982-98.

IOC: Circa 1984.

Contractor: Raytheon.

Propulsion: Thiokol dual-thrust, solid-propellant rocket motor.

Guidance: Proportional with fixed antenna and seeker head in missile nose.

Warhead: HE fragmentation.

Dimensions: Span 3.7 ft, length 13.7 ft, diameter 10 in.

Performance: Supersonic, range 30+ miles.

AGM-65 Maverick

■ AGM-114 HELLFIRE

Mission brief: Low-collateral damage air-to-ground attack against armor and personnel targets.

COMMENTARY

Hellfire is a precision missile utilizing semi-active laser guidance. Missiles are used on the MQ-9 Reaper, and AFSOC aims to integrate the weapons onto its AC-130W gunships. Hellfire is procured through the Army, and numerous variants are utilized based on overseas contingency demands. An MQ-1 Predator successfully fired an AGM-114 for the first time in February 2000. The combo was employed in combat for the first time in Afghanistan on Oct. 7, 2001. USAF is working to integrate the latest AGM-114R, which replaces several types with a single, multitarget weapon, onto the MQ-9.

EXTANT VARIANT(S)

- AGM-114. Numerous subvariants, depending on target and mission requirements.

Function: Air-to-surface guided missile.

First Flight: Feb. 16, 2000 (USAF).

Delivered: September 2001-present.

IOC: N/A.

Contractor: Lockheed Martin, Orbital ATK (propulsion).

Propulsion: Solid-propellant rocket motor.

Guidance: EO TV guidance system (B/H/K); IIR seeker (D/G); laser seeker (E).

Warhead: Shaped charge and blast fragmentation.

Dimensions: Span 28 in, length 5.33 ft, diameter 17 in.

Performance: Subsonic, range 5+ miles.

Integration: MQ-1, MQ-9; planned: AC-130W/J.

■ AGM-176 GRIFFIN

Mission brief: High-precision, low-collateral attack against light surface targets.

COMMENTARY

Griffin is a light, low cost, multiservice air-launched weapon with GPS-aided inertial guidance and semi-active laser seeker. The AGM-176A forms part of the PSP employed on AFSOC's AC-130W Stinger II, and AC-130J Ghost rider 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 a \$105.2 million contract modification to supply additional Griffin missiles on Jan. 31, 2018.

EXTANT VARIANT(S)

- AGM-176A. Aft-ejecting missile employed as part of the PSP.
- AGM-176B. Forward-firing variant optimized

for light aircraft/RPAs.

Function: Air-to-surface guided missile.

First Flight: Feb. 16, 2000 (USAF).

Delivered: September 2001.

IOC: N/A.

Contractor: Raytheon.

Propulsion: Solid-propellant rocket motor.

Guidance: GPS/INS/semi-active laser.

Warhead: Blast fragmentation.

Dimensions: Length 43 in, diameter 5.5 in.

Performance: Subsonic, range 12 + miles.

Integration: AC-130W (A); MQ-1, MQ-9 (B); planned: AC-130J (A).

■ CBU-105 SENSOR FUZED WEAPON (SFW)

Mission brief: Anti-armor attack against multiple moving and stationary land combat vehicles per pass.

COMMENTARY

SFW is a tactical munitions dispenser with a payload of 10 BLU-108 submunitions, each containing four skeet projectiles, 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 detonates at a preset time. Primary targets are massed tanks, armored personnel carriers, and other self-propelled targets. It can be delivered from high altitude and in adverse weather. It debuted in combat in Iraq in 2003. CBU-105 is the only standard USAF cluster munition that meets the less-than-one-percent failure rate mandated by DOD for use beyond 2018.

EXTANT VARIANT(S)

- CBU-105. CBU-97 with WCMD tail kit.

Function: Wide-area munition.

First Flight: Circa 1990.

IOC: 1997.

Contractor: Textron Systems.

Guidance: IR sensors in each warhead.

Dimensions: Length 7.7 ft, diameter 15 in.

Performance: Delivers 40 lethal projectiles over an area of about 500 ft x 1,200 ft.

■ CBU-107 PASSIVE ATTACK WEAPON

Mission brief: Minimized collateral damage attack against nonhardened area targets.

COMMENTARY

Passive Attack 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-size, penetrating projectiles but no explosive. Full production was completed in six months. The weapon was used during Iraqi Freedom.

EXTANT VARIANT(S)

- CBU-107A. Centrifugally dispersed, armor-penetrating weapon.

Function: Wide-area munition.

First Flight: 2002.

IOC: December 2002.

Contractor: General Dynamics (kinetic energy penetrator payload and canister), Lockheed Martin (WCMD), Textron (tactical munition dispenser kit).

Guidance: Via WCMD.

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).

■ GBU-10/12/49 PAVEWAY II

Mission brief: Laser guided free-fall attack against surface targets at short standoff range.

COMMENTARY

The Paveway II kit is a folding wing version of the earlier, fixed wing Paveway I, with seeker and reliability improvements. 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. The weapons can be employed from 2,500 ft up to 40,000 ft.

EXTANT VARIANT(S)

- GBU-10. Laser/GPS guided 2,000-lb bomb.
- GBU-12. Laser guided 500-lb bomb.
- GBU-49. Laser/GPS guided 500-lb bomb.

Function: Air-to-surface guided munition.

First Flight: Early 1970s.

IOC: 1976.

Contractor: Lockheed Martin, Raytheon.

Guidance: Semi-active laser.

Warhead: Mk 84 bomb 2,000 lb (GBU-10); Mk 82 500-lb blast/fragmentation bomb (GBU-12/49).

Dimensions: Span 5.5 ft, length approx 14.8 ft,



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A CBU-105 Sensor Fuzed Weapon deploys BLU-108 submunitions against armored targets.

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).

■ GBU-24/28 PAVEWAY III

Mission brief: Laser guided, free-fall attack against high-value targets from medium standoff range and any altitude.

COMMENTARY

Paveway III is the third generation laser guided seeker/tail kit package. Its advanced guidance 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 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 and entered production in 1999. The GBU-28C adds a more powerful penetrating BLU-122 warhead in addition to the enhanced guidance package and entered production in 2005.

EXTANT VARIANT(S)

- 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.

Function: Air-to-surface penetrating glide bomb.

First Flight: GBU-24 in service May 1985.

IOC: 1986 (GBU-24); 1991 (GBU-28).

Contractor: Raytheon.

Guidance: Semi-active laser.

Warhead: BLU-109 2,000-lb bomb (GBU-24); BLU-113 or BLU-122 5,000-lb bombs (GBU-28).

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).

■ GBU-31/32/38 JOINT DIRECT ATTACK MUNITION (JDAM)

Mission brief: GPS/INS guided highly accurate, autonomous, all-weather conventional attack against surface targets.

COMMENTARY

JDAM is a joint USAF-Navy program that upgrades the existing inventory of general-purpose bombs by integrating them with a GPS/INS guidance kit to provide accurate all-weather attack from medium/high altitudes. The weapons acquire targeting information from the aircraft's avionics system. 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. 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.



GBU-38 Joint Direct Attack Munition

SrA. J. T. Armstrong

FY18 funds maximize production capacity to replenish stocks depleted in combat over Iraq and Syria.

EXTANT VARIANT(S)

- 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.

Function: Air-to-surface guided bomb.

First Flight: Oct. 22, 1996.

IOC: 1998.

Contractor: Boeing, Textron, Honeywell.

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).

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.

■ GBU-39 SMALL DIAMETER BOMB I

Mission brief: Standoff precision guided munition.

COMMENTARY

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 fighters' and bombers' internal weapons bays or to increase overall loadout to enable more independent strikes per sortie. SDB I employs an 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 weapon was first employed by an F-15E over Iraq in 2006. SDB I is a major procurement priority and FY18 funds support maximizing SDB I production capacity to replenish stocks depleted in combat over Iraq and Syria.

EXTANT VARIANT(S)

- GBU-39/B SDB I. GPS/INS guided 250-lb low-yield bomb.

First Flight: May 23, 2003.

IOC: Oct. 2, 2006.

Production: 24,000 (planned).

Contractor: Boeing.

Guidance: GPS/INS.

Warhead: 250-lb class penetrating blast fragmentation munition.

Dimensions: Bomb: 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.

Integration: AC-130W, B-1B, B-2A, F-15E, F-16, F-22; planned: F-35A, MQ-9.

■ GBU-39 SMALL DIAMETER BOMB II

Mission brief: Standoff precision guided munition.

COMMENTARY:

SDB is a low-yield, all-weather precision guided munition designed to limit collateral damage and



GBU-24 Paveway III

USAF

strike targets from up to 46 miles away. Its size allows it to be carried in fighters' and bombers' internal weapons bays or to increase overall loadout to enable more independent strikes per sortie. Several SDBs can be simultaneously released against multiple targets. SDB II is a joint USAF-Navy program to attack moving targets from standoff range in all weather. 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 include reduced susceptibility to countermeasures and network-enablement through Link 16/UHF data links. Low-rate initial production began in 2015. SDB II is in operational testing, and initial integration onto the F-15E is planned for the end of 2018. Follow-on integration is planned for the F-35A. FY18 funds support production of 406 SDB IIs to expand combat capabilities.

EXTANT VARIANT(S)

- GBU-53/B SDB II. Tri-mode guided 250-lb low-yield bomb.

First Flight: 2012.

IOC: 2019 (planned).

Production: 12,000 (planned).

Contractor: Raytheon.

Guidance: Tri-mode seeker millimeter-wave radar, uncooled IIR, and digital semi-active laser.

Warhead: 250-lb class penetrating blast fragmentation munition.

Dimensions: Bomb: length 5.75 ft, wingspan 5.6 ft, diameter 7 in.

Performance: Near-precision capability at standoff range up to 46 miles.

Integration: Planned: A-10, AC-130W/J, B-1, B-2, B-52, F-15E, F-16, F-22, F-35.

GBU-43 MASSIVE ORDNANCE AIRBLAST (MOAB) BOMB

Mission brief: Destruction of large area or deeply buried targets.

COMMENTARY

MOAB is the largest satellite guided, air-delivered weapon ever employed. The conventional HE bomb is GPS guided, with fins and inertial gyro for pitch and roll. It was developed in only nine weeks to be available for the 2003 Iraq campaign and given the name Massive Ordnance Air Blast (MOAB) but was unofficially

known as "Mother of All Bombs." The weapon is designed for deployment from the ramp of an MC-130 without a parachute. It provides the power to attack large area targets or enemy hidden in tunnels or caves. 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 ISIS-occupied cave complex in Afghanistan.

EXTANT VARIANT(S)

- GBU-43/B. GPS guided 21,000-lb bomb.

Function: Massive guided bomb.

Guidance: GPS/INS.

Warhead: BLU-120/B 18,700-lb HE.

Dimensions: Length 30 ft, diameter 3.3 ft.

Integration: MC-130H.

■ GBU-54 LASER JOINT DIRECT ATTACK MUNITION (LJDAM)

Mission brief: Laser and GPS/INS guided, highly accurate, autonomous, all-weather conventional attack against fixed and moving targets.

COMMENTARY

LJDAM is a joint USAF-Navy development that combines a laser guidance kit with the GPS/INS-based navigation of the existing GBU-38 JDAM. 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 is also developing GBU-31 and GBU-32 variants.

EXTANT VARIANT(S)

- GBU-54 Laser JDAM. Laser/GPS/INS guided 500-lb bomb.

Function: Air-to-surface guided bomb.

First Flight: 2005.

IOC: 2008.

Contractor: Boeing.

Guidance: GPS/INS with laser.

Warhead: Mk 82 500-lb munition.

Dimensions: Length (with JDAM and warhead) approx 8 ft.

Performance: Range up to 15 miles.

■ GBU-57 MASSIVE ORDNANCE PENETRATOR

Mission brief: Massive, GPS-guided, earth-



TSgt. Robert Cloys

GBU-54 Laser JDAM

penetrating strike against hard and deeply buried targets.

COMMENTARY

MOP was developed and tested through a USAF and Defense Threat Reduction Agency partnership in 2004. 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 is classified.

EXTANT VARIANT(S)

- GBU-57B. GPS guided 30,000-lb penetrating weapon.

Function: Massive PGM.

Guidance: GPS.

Warhead: 5,300-lb HE.

Dimensions: length 20.5 ft, diameter 31.5 in.

SATELLITE SYSTEMS

■ ADVANCED EXTREMELY HIGH FREQUENCY (AEHF) SATELLITE SYSTEM

Mission brief: Global, secure, protected, and jam-resistant military communication.

COMMENTARY

AEHF is replacing existing 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 Canada, the Netherlands, and the United Kingdom. The AEHF system achieved IOC in 2015. Launch of SV-4 was slated for Oct. 17, 2017, but an issue with the system's power regulator prompted USAF to delay launch to 2018 to enable a hardware fix. Launch of SV-4 will pave the way for full operational capability.

EXTANT SYSTEMS

- 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. Planned for launch in 2018.

Function: Communications.

Operator: AFSPC.

First Launch: August 2010.

IOC: 2017 (planned).

Constellation: Four.

Design Life: 14 yr.

Launch Vehicle: Atlas V.

Operational Location: Schriever AFB, Colo.

Orbit Altitude: Geosynchronous at 22,000+ miles.

Contractor: Lockheed Martin, Northrop Grumman.

Power: Solar arrays generating 20,000 watts.

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.

■ DEFENSE METEOROLOGICAL SATELLITE PROGRAM (DMSP)

Mission brief: Environmental data collection for worldwide, military weather forecasting.

COMMENTARY

DMSP provides timely and high-quality weather information to strategic and tactical combat units worldwide. It uses operational linescan 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. USAF is considering requirements for a follow-on system.

EXTANT VARIANT(S)

- Block 5D-2. Launched 1982 to 1997; one active (DMSP-14).

- Block 5D-3. Improved spacecraft bus and sensors for longer, more capable missions.

Function: Space and Earth environmental data collection.

Operator: National Oceanic and Atmospheric Administration (NOAA).

First Launch: May 23, 1962.

IOC: 1965.

Constellation: Six low Earth orbit (LEO).

Design Life: Five yr (Block 5D-3).

Launch Vehicle: Delta IV; Atlas V.

Operational Location: NOAA Satellite Operations Facility, Suitland, Md.

Orbit Altitude: Approx 527 miles.

Contractor: Lockheed Martin, Northrop Grumman.

Power: Solar arrays generating 1,200-1,300 watts.
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.

■ DEFENSE SATELLITE COMMUNICATIONS SYSTEM (DSCS)

Mission brief: Long-haul, high-data rate, secure, nuclear-hardened, jam-resistant military communication.

COMMENTARY

DSCS provides high-priority wartime and strategic SHF communications between high-level leadership and deployed forces and ships worldwide. In addition to joint service command and control, interagency users include the National Command Authority, White 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 exceeded its designed lifespan 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.

EXTANT VARIANT(S)

- DSCS III. Current base on orbit variant.

- DSCS III. SLEP. Upgrade configuration of last four satellites launched.

Function: Communications.

Operator: AFSPC.

First Launch: DSCS II 1971; DSCS III 1982; DSCS III/SLEP 2000.

IOC: Dec. 13, 1978 (DSCS II).

Constellation: Five (III); 14 deployed/seven operational.

Design Life: 10 yr (III).

Launch Vehicle: Atlas II and EELV.

Operational Location: Schriever AFB, Colo.

Orbit Altitude: 22,000+ miles in geosynchronous orbit.

Contractor: Lockheed Martin.

Power: Solar arrays generating 1,269 watts, decreasing to 980 watts after 10 yr; 1,500 watts (SLEP).

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.

■ DEFENSE SUPPORT PROGRAM (DSP)

Mission brief: Ballistic missile early warning.

COMMENTARY

DSP is a key part of North American and theater early warning systems. It is capable of detecting missile launches and nuclear detonations and was originally aimed at 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. 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.

EXTANT VARIANT(S)

• Block 5. Most current on-orbit version.

Function: Strategic and tactical launch detection.

Operator: AFSPC.

First Launch: November 1970.

IOC: Circa 1972.

Constellation: Classified.

Design Life: Three-year requirement and five-year goal.

Launch Vehicle: Titan IV with inertial upper stage; Delta IV Heavy EELV.

Operational Location: Buckley AFB, Colo.

Orbit Altitude: Geosynchronous at 22,000+ miles.

Contractor: Northrop Grumman (formerly TRW), Aerojet.

Power: Solar arrays generating 1,485 watts.

Dimensions: Diameter 22 ft, height 32.8 ft, with solar paddles deployed.

Weight: Approx 5,200 lb.

Performance: Uses IR sensors to sense heat from missile and booster plumes against Earth's background.

■ GEOSYNCHRONOUS SPACE SITUATIONAL AWARENESS PROGRAM (GSSAP)

Mission brief: Space-based tracking and characterization of manmade objects in geosynchronous orbit to aid safety and avoidance.

COMMENTARY

GSSAPs are "neighborhood watch" satellites that augment 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. 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. Construction of a fifth and sixth satellite is underway for future launch. The satellites operate in near-geosynchronous orbit to effectively monitor objects and aid in preventing collisions in space. GSSAP carry EO/IR sensors

and are able to maneuver to observe objects at close range and can track objects without the weather and atmospheric disruptions affecting ground systems.

EXTANT VARIANT(S)

- 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.

Operator: AFSPC.

First Launch: July 28, 2014.

IOC: Sept. 29, 2015.

Constellation: Four spacecraft.

Launch Vehicle: Delta IV.

Operational Location: Schriever AFB, Colo.

Orbit Altitude: 22,300 miles, above geosynchronous.

Contractor: Orbital ATK.

Power: Solar panels.

■ GLOBAL POSITIONING SYSTEM (GPS)

Mission brief: Space-based radio-positioning for geolocation, navigation, and timing.

COMMENTARY

GPS is a fundamental contribution to precision bombing, CSAR, mapping, and rendezvous. It provides accurate and uninterrupted 3-D (latitude, longitude, and altitude) position, velocity, and time data. GPS is a military system, but provides service to civil users as well. GPS Block IIA first launched in 1990. The Air Force decommissioned the final Block IIA, launched to replace original GPS Block I series in 2016. 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, with a new military signal and a second and third dedicated civil signal. The last of 12 GPS IIF satellites deployed since 2010 launched from Cape Canaveral on Feb. 5, 2016. The next generation GPS Block IIIA currently in production is expected to improve accuracy, availability, integrity, and resistance to jamming. The newest satellites will add capabilities including nuclear detonation detection and search and rescue. The first launch was pushed back from 2014 to a tentative 2018 target. SpaceX was awarded its first National Security Space contract to launch the second GPS IIIA on its Falcon 9 booster in May 2018. USAF recently contracted Lockheed

Martin to build GPS IIIA vehicles nine and 10 for expected launch in 2022. USAF awarded three companies production readiness contracts for vehicle 11 and is looking to competitively award a 22-satellite production contract (with added capability) to a single bidder.

EXTANT VARIANT(S)

• GPS Block IIR. Launched 1997 to 2004; 12 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. Future generation expected to launch in 2018.

Function: Worldwide navigation, timing, and velocity data.

Operator: AFSPC.

First Launch: Feb. 22, 1978.

IOC: Dec. 9, 1993.

Constellation: 31 spacecraft (not including decommissioned or on-orbit spares).

Design Life: 7.5 yr (II/IIA); 7.5 yr (IIR/IIR-M); 12 yr (IIF); 15 yr (IIIA).

Launch Vehicle: Delta II, Delta IV, Falcon 9 (planned).

Operational Location: Schriever AFB, Colo.

Orbit Altitude: 10,988 miles.

Contractor: Boeing (II, IIA, IIF), Lockheed Martin (IIR, IIR-M, IIIA).

Power: Solar panels generating 700 watts (II/IIA); 1,136 watts (IIR/IIR-M); up to 2,900 watts (IIF).

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).

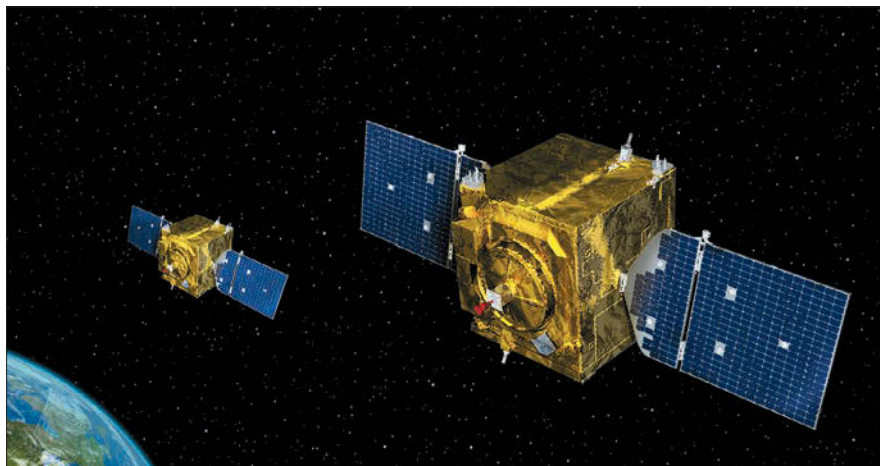
Performance: Orbits the Earth every 12 hr, emitting continuous signals, providing time to within one-millionth of a second, velocity within a fraction of a mile per hour, and location to within a few feet.

■ MILSTAR SATELLITE COMMUNICATIONS SYSTEM (MILSTAR)

Mission brief: Global, satellite-based secure, protected, and jam-resistant military communications.

COMMENTARY

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 75-2,400 bps over 192 EHF channels. Block II satellites carry both the low data rate payload and a medium



Geosynchronous Space Situational Awareness Program

USAF illustration

data rate payload capable of transmitting 4,800 bps to 1.5 Mbps over 32 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 utilizes multiple-redundant command and control for highly survivable capability. The last of six satellites launched in 2003. AEHF will eventually replace Milstar as DOD's primary satcom and is fully back-compatible with Milstar.

EXTANT VARIANT(S)

- Block I. Milstar I satellites launched 1994-95.
- Block II. Milstar II satellites launched 1999-2003.

Function: Communications.

Operator: AFSPC.

First Launch: Feb. 7, 1994.

IOC: July 1997 (Milstar I).

Constellation: Five: two Milstar I; three Milstar II.

Design Life: 10 yr.

Launch Vehicle: Titan IV/Centaur.

Operational Location: Schriever AFB, Colo.

Orbit Altitude: Geosynchronous at 22,000+ miles.

Contractor: Lockheed Martin, Boeing, Northrop Grumman (formerly TRW).

Power: Solar arrays generating 8,000 watts.

Dimensions: Length 51 ft, width 116 ft with full solar array extension.

Weight: 10,000 lb.

Performance: Milstar I sats have low data rate (LDR) payload, transmitting 75 to 2,500 bps of data over 192 channels in EHF range; Milstar II sats have both LDR and medium data rate (MDR) payloads, transmitting 4,800 bps to 1.5 Mbps over 32 channels.

■ SPACE BASED INFRARED SYSTEM (SBIRS)

Mission brief: Advanced space surveillance and missile warning, battlespace characterization, and technical intelligence gathering.

COMMENTARY

SBIRS 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. 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. The next two GEO satellites are under contract and will eventually replace the oldest two on orbit. USAF announced plans to shift funding from SBIRS to developing the Evolved Space Based Infrared Systems (E-SBIRS) after the launch of both vehicles.

EXTANT SYSTEM(S)

- SBIRS HEO-1. Payload operational in 2008; active.

- SBIRS HEO-2. Payload operational in 2009; active.

- SBIRS HEO-3. Payload operational in 2015; 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.

Function: Space surveillance.

Operator: AFSPC.

First Launch: GEO 1, May 2011.

IOC: HEO 1, Dec. 5, 2008. (Increment 1, Dec. 8, 2001).

Constellation: Four GEO sats, three HEO sensors (hosted).

Design Life: N/A.

Launch Vehicle: GEO, Atlas V.

Operational Location: Buckley AFB, Colo.

Orbit Altitude: Geosynchronous and high elliptical.

Contractor: Lockheed Martin, Northrop Grumman.

Power: Solar array, 2,435 watts (GEO).

Dimensions: GEO 7 x 6.3 x 19.7 ft.

Weight: 5,603 lb (GEO on orbit).

■ SPACE BASED SPACE SURVEILLANCE (SBSS)

Mission brief: Space-based tracking, characterization, and measurement of orbital vehicles and debris.

COMMENTARY

SBSS is designed to track and collect optical signatures of Earth-orbiting objects, including space debris, from a space-based platform. 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 is working to extend SBSS service life and task one of its experimental Operationally Responsive Space satellites to cover a four-year gap in coverage before it can launch a follow-on spacecraft in 2021. ORS-5 launched Aug. 26, 2017 and is equipped with an optical sensor to provide rapid, continuous scanning to detect movement in geosynchronous orbit. SBSS works in concert with an array of networked, ground-based sensors including the Space Fence wide area search and surveillance system under construction on Kwajalein Atoll in the Marshall Islands.

EXTANT SYSTEM(S)

- SBSS Block 10. Launched in 2010; active.

- ORS-5. Experimental satellite launched in 2017 to augment SBSS; active.

Function: Orbital surveillance and object identification.

Operator: AFSPC.

First Launch: Sept. 25, 2010.

IOC: Aug. 17, 2012.

Constellation: One LEO satellite; one LEO augmentation satellite.

Design Life: Seven yr.

Launch Vehicle: Minotaur IV.

Operational Location: Schriever AFB, Colo.

Orbit Altitude: 390 miles, sun-synchronous orbit. **Contractor:** Boeing (system integration, ground segment, operations, and sustainment), Ball Aerospace (satellite).

Power: Solar arrays and batteries generating 750 watts.

Dimensions: Height approx 10 ft; 10 x 3.2 ft, plus solar panels.

Weight: Approx 2,273 lb.

■ WIDEBAND GLOBAL SATCOM (WGS) SATELLITE

Mission brief: High-capacity satellite-based communications for deployed air, land, and sea forces.

COMMENTARY

WGS is designed to provide worldwide communications coverage for tactical and fixed users and to augment and then replace DSCS X-band frequency service. Augments the one-way Global Broadcast Service Joint Program Ka-band frequency capabilities. WGS satellites also provide 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 US is partnering with Canada, Denmark, Luxembourg, the Netherlands, and New Zealand on Block II follow-on sats SV-7 to SV-10. SV-7 launched in 2015. SV-8 launched into orbit on Dec. 7, 2016, and SV-9 launched March 18, 2017. All four satellites are expected to be aloft and operational by 2019. USAF recently contracted industry to develop



Space Based Infrared System

Lockheed Martin illustration

anti-jamming capability for tactical users and is reviewing alternatives to eventually replenish the constellation with three additional satellites or develop a follow-on system.

EXTANT VARIANT(S)

- Block I. Satellites SV-1 to SV-3; launched 2007 to 2009; active.
- Block II. Satellites SV-4 to SV-9; launched 2009 to 2017; active.

Function: Communications.

Operator: AFSPC.

First Launch: October 2007.

IOC: April 16, 2008.

Constellation: Seven satellites.

Design Life: 14 yr.

Launch Vehicle: Atlas V, Delta IV.

Operational Location: Schriever AFB, Colo.

Orbit Altitude: Geosynchronous at 22,000+ miles.

Contractor: Boeing.

Power: Solar arrays generating 9,934 watts.

Dimensions: Based on Boeing 702 Bus.

Weight: 13,000 lb at launch.

Performance: Approx 10 times the capability of a DSCS satellite.

■ **X-37B ORBITAL TEST VEHICLE**

Mission brief: Reusable, unmanned, launch/reentry space platform.

COMMENTARY

X-37B is an experimental Orbital Test Vehicle (OTV) aimed at developing and maturing a reusable space-launch capability and conducting classified on-orbit missions/experiments. 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 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. X-37B is the first reusable orbiter since the Space Shuttle program and is capable of much longer missions because it is unmanned. 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 four orbital missions. The first mission (OTV-1) blasted off in 2010 lasting 224 days. The OTV-2 and OTV-3 missions launched in 2011 and 2012, extending X-37's record time on orbit to 468 days and 674 days, respectively. The most recent OTV-4 mission remained aloft for 718 days and made the craft's first landing back at Cape Canaveral on March 25, 2017.

EXTANT VARIANT(S)

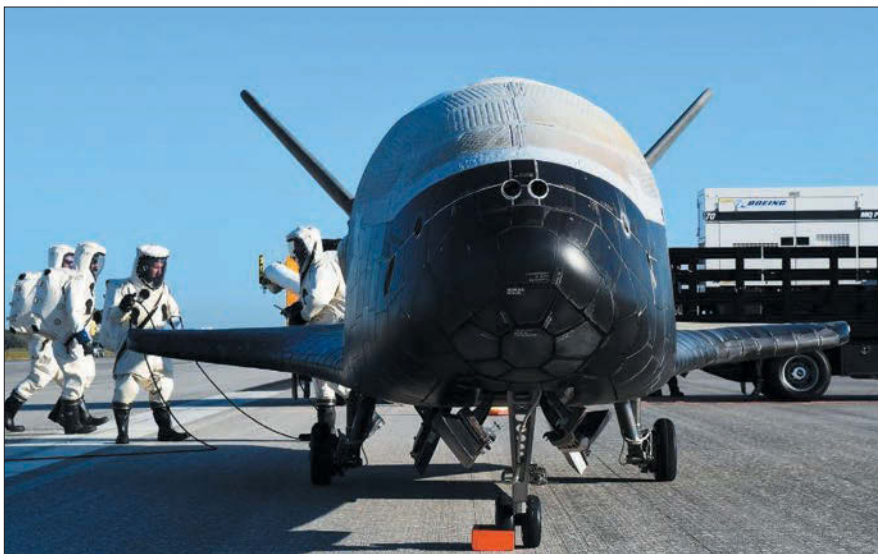
- X-37A. NASA-developed Approach and Landing Test Vehicle used for atmospheric drop testing.
- X-37B. DARPA/USAF-developed Orbital Test Vehicles.

Function: Orbital test.

Operator: AFSPC.

First Launch: April 22, 2010.

IOC: N/A.



X-37B Orbital Test Vehicle

DOD/UCLA

Launch Vehicle: Atlas V.

Production: Two.

Inventory: Two.

Operational Location: Cape Canaveral AFS, Fla. (launch/landing); Vandenberg AFB, Calif. (landing).

Orbit Altitude: Low-Earth Orbit (LEO) at 110-500 miles.

Contractor: Boeing.

Propulsion: Single liquid-propellant rocket motor.

Power: Gallium arsenide solar cells with lithium-ion batteries.

Dimensions: Span 14 ft, length 29.25 ft, height 9.5 ft.

Weight: 11,000 lb at launch.

Endurance: 718+ days on orbit.

Aaron M. U. Church is a freelance aviation writer and Active Duty officer stationed at Yokota AB, Japan. He is a former *Air Force Magazine* senior editor.



A Wideband Global SATCOM satellite atop a ULA Delta IV rocket

UCLA

Leaders Through the Years



2018 USAF Almanac

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 Sept. 18, 1947			
Chief of Staff	Gen. Carl A. Spaatz	Sept. 26, 1947	April 29, 1948

^aBetween April 1917 and May 1918, the Aviation Section was known by various other names: Aeronautical Division, Airplane Division, Air Division, and Air Service Division.

^bThe 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.

^cThe 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 No. 1, issued Sept. 26, 1947.

Headquarters USAF Leaders

SECRETARY OF THE AIR FORCE

Stuart Symington	Sept. 18, 1947	April 24, 1950	John J. Welch Jr. (acting)	April 29, 1989	May 21, 1989
Thomas K. Finletter	April 24, 1950	Jan. 20, 1953	Donald B. Rice	May 22, 1989	Jan. 20, 1993
Harold E. Talbott	Feb. 4, 1953	Aug. 13, 1955	Michael B. Donley (acting)	Jan. 20, 1993	July 13, 1993
Donald A. Quarles	Aug. 15, 1955	April 30, 1957	Gen. Merrill A. McPeak (acting)	July 14, 1993	Aug. 5, 1993
James H. Douglas Jr.	May 1, 1957	Dec. 10, 1959	Sheila E. Widnall	Aug. 6, 1993	Oct. 31, 1997
Dudley C. Sharp	Dec. 11, 1959	Jan. 20, 1961	F. Whitten Peters*	Nov. 1, 1997	Jan. 20, 2001
Eugene M. Zuckert	Jan. 23, 1961	Sept. 30, 1965	Lawrence J. Delaney (acting)	Jan. 20, 2001	June 1, 2001
Harold Brown	Oct. 1, 1965	Feb. 14, 1969	James G. Roche	June 1, 2001	Jan. 20, 2005
Robert C. Seamans Jr.	Feb. 15, 1969	May 14, 1973	Peter B. Teets (acting)	Jan. 20, 2005	March 25, 2005
John L. McClucas*	May 15, 1973	Nov. 23, 1975	Michael L. Dominguez (acting)	March 25, 2005	July 29, 2005
James W. Plummer (acting)	Nov. 23, 1975	Jan. 2, 1976	Preston M. Geren (acting)	July 29, 2005	Nov. 3, 2005
Thomas C. Reed	Jan. 2, 1976	April 6, 1977	Michael W. Wynne	Nov. 3, 2005	June 20, 2008
John C. Stetson	April 6, 1977	May 18, 1979	Michael B. Donley*	June 21, 2008	June 21, 2013
Hans M. Mark*	May 18, 1979	Feb. 9, 1981	Eric Fanning (acting)	June 21, 2013	Dec. 20, 2013
Verne Orr	Feb. 9, 1981	Nov. 30, 1985	Deborah Lee James	Dec. 20, 2013	Jan. 19, 2017
Russell A. Rourke	Dec. 6, 1985	April 7, 1986	Lisa S. Disbrow (acting)	Jan. 20, 2017	May 16, 2017
Edward C. Aldridge Jr.*	April 8, 1986	Dec. 16, 1988	Heather A. Wilson	May 16, 2017	
James F. McGovern (acting)	Dec. 16, 1988	April 29, 1989			

*Served as acting Secretary: McClucas 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. Michael J. Dugan	July 1, 1990	Sept. 17, 1990
Gen. Hoyt S. Vandenberg	April 30, 1948	June 29, 1953	Gen. John Michael Loh (acting)	Sept. 18, 1990	Oct. 27, 1990
Gen. Nathan F. Twining	June 30, 1953	June 30, 1957	Gen. Merrill A. McPeak	Oct. 27, 1990	Oct. 25, 1994
Gen. Thomas D. White	July 1, 1957	June 30, 1961	Gen. Ronald R. Fogleman	Oct. 25, 1994	Sept. 1, 1997
Gen. Curtis E. LeMay	June 30, 1961	Jan. 31, 1965	Gen. Ralph E. Eberhart (acting)	Sept. 1, 1997	Oct. 6, 1997
Gen. John P. McConnell	Feb. 1, 1965	July 31, 1969	Gen. Michael E. Ryan	Oct. 6, 1997	Sept. 6, 2001
Gen. John D. Ryan	Aug. 1, 1969	July 31, 1973	Gen. John P. Jumper	Sept. 6, 2001	Sept. 2, 2005
Gen. George S. Brown	Aug. 1, 1973	June 30, 1974	Gen. T. Michael Moseley	Sept. 2, 2005	July 12, 2008
Gen. David C. Jones	July 1, 1974	June 20, 1978	Gen. Duncan J. McNabb (acting)	July 12, 2008	Aug. 12, 2008
Gen. Lew Allen Jr.	July 1, 1978	June 30, 1982	Gen. Norton A. Schwartz	Aug. 12, 2008	Aug. 10, 2012
Gen. Charles A. Gabriel	July 1, 1982	June 30, 1986	Gen. Mark A. Welsh III	Aug. 10, 2012	July 1, 2016
Gen. Larry D. Welch	July 1, 1986	June 30, 1990	Gen. David L. Goldfein	July 1, 2016	

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 L. 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	
Gen. Jerome F. O'Malley	June 1, 1982	Oct. 5, 1983			

CHIEF MASTER SERGEANT OF THE AIR FORCE

CMSAF Paul W. Airey	April 3, 1967	July 31, 1969	CMSAF Gary R. Pfingston	Aug. 1, 1990	Oct. 25, 1994
CMSAF Donald L. Harlow	Aug. 1, 1969	Sept. 30, 1971	CMSAF David J. Campanale	Oct. 26, 1994	Nov. 4, 1996
CMSAF Richard D. Kislring	Oct. 1, 1971	Sept. 30, 1973	CMSAF Eric W. Benken	Nov. 5, 1996	July 30, 1999
CMSAF Thomas N. Barnes	Oct. 1, 1973	July 31, 1977	CMSAF Frederick J. Finch	July 30, 1999	July 1, 2002
CMSAF Robert D. Gaylor	Aug. 1, 1977	July 31, 1979	CMSAF Gerald R. Murray	July 1, 2002	June 30, 2006
CMSAF James M. McCoy	Aug. 1, 1979	July 31, 1981	CMSAF Rodney J. McKinley	June 30, 2006	June 30, 2009
CMSAF Arthur L. Andrews	Aug. 1, 1981	July 31, 1983	CMSAF James A. Roy	June 30, 2009	Jan. 24, 2013
CMSAF Sam E. Parish	Aug. 1, 1983	June 30, 1986	CMSAF James A. Cody	Jan. 24, 2013	Feb. 17, 2017
CMSAF James C. Binnicker	July 1, 1986	July 31, 1990	CMSAF Kalet O. Wright	Feb. 17, 2017	

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 in the next section.

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	

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	

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	

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	

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	

For past leaders, see Air Force Reserve in Historic Major Command Leaders.



AFSPC Commander Gen. John Raymond (r), receives a briefing from the 5th Combat Communications Group at Robins AFB, Ga.

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	

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	

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	

For past leaders, see Military Airlift Command in Historic Major Command Leaders.

Major Command and ANG Leaders (continued)

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	

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	

For past leaders, see Far East Air Forces in Historic Major Command Leaders.

US AIR FORCES IN EUROPE

Lt. Gen. John K. Cannon	Aug. 7, 1945	Aug. 14, 1947
Brig. Gen. John F. McBlain (acting)	Aug. 14, 1947	Oct. 20, 1947
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



Over the Korean Peninsula, an F-16 from the 51st FW, Osan AB, South Korea, shares the sky with a Marine Corps F-35B stealth fighter.

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.	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. Philip 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	

For past leaders, see US Strategic Air Forces in Europe in Historic Major Command Leaders.

Historic Major Command Leaders

AIR (AEROSPACE) DEFENSE COMMAND

Lt. Gen. George E. Stratemeyer	March 27, 1946	Nov. 30, 1948
Maj. Gen. Gordon P. Saville	Dec. 1, 1948	Sept. 1, 1949
Lt. Gen. Ennis C. Whitehead	Jan. 1, 1951	Aug. 24, 1951
Gen. Benjamin W. Chidlaw	Aug. 25, 1951	May 31, 1955
Maj. Gen. Frederic Smith (acting)	June 1, 1955	July 19, 1955
Gen. Earle E. Partridge	July 20, 1955	Sept. 16, 1956
Lt. Gen. Joseph H. Atkinson	Sept. 17, 1956	Feb. 28, 1961
Lt. Gen. Robert M. Lee	March 1, 1961	July 5, 1963
Maj. Gen. Robert H. Terrill (acting)	July 6, 1963	July 31, 1963
Lt. Gen. Herbert B. Thatcher	Aug. 1, 1963	July 31, 1967
Lt. Gen. Arthur C. Agan Jr.	Aug. 1, 1967	Feb. 28, 1970
Lt. Gen. Thomas K. McGehee	March 1, 1970	June 30, 1973
Gen. Seth J. McKee	July 1, 1973	Sept. 30, 1973
Gen. Lucius D. Clay Jr.	Oct. 1, 1973	Aug. 31, 1975
Gen. Daniel James Jr.	Sept. 1, 1975	Dec. 6, 1977
Gen. James E. Hill	Dec. 6, 1977	Dec. 31, 1979
Gen. James V. Hartinger	Jan. 1, 1980	March 31, 1980

Established March 21, 1946. Assigned to Continental Air Command 1948. Discontinued 1950. Regained majcom status 1951. Redesignated Aerospace Defense Command Jan. 15, 1968. Inactivated March 31, 1980.

AIR FORCE COMMUNICATIONS COMMAND

Maj. Gen. Harold W. Grant	July 1, 1961	Feb. 15, 1962
Maj. Gen. Kenneth P. Bergquist	Feb. 16, 1962	June 30, 1965
Maj. Gen. J. Francis Taylor (acting)	July 1, 1965	Oct. 18, 1965
Maj. Gen. Richard P. Klocko	Oct. 19, 1965	July 2, 1967
Maj. Gen. Robert W. Paulson	July 15, 1967	Aug. 1, 1969
Maj. Gen. Paul R. Stoney	Aug. 1, 1969	Oct. 31, 1973
Maj. Gen. Donald L. Werbeck	Nov. 1, 1973	Aug. 24, 1975
Maj. Gen. Rupert H. Burris	Aug. 25, 1975	Oct. 31, 1977
Maj. Gen. Robert E. Sadler	Nov. 1, 1977	June 21, 1979
Maj. Gen. Robert T. Herres	June 22, 1979	July 27, 1981
Maj. Gen. Robert F. McCarthy	July 27, 1981	June 1, 1984
Maj. Gen. Gerald L. Prather	June 1, 1984	Aug. 28, 1986
Maj. Gen. John T. Stihl	Aug. 28, 1986	March 29, 1988
Maj. Gen. James S. Cassity Jr.	March 29, 1988	May 16, 1989
Maj. Gen. Robert H. Ludwig	May 16, 1989	Nov. 9, 1990
Maj. Gen. John S. Fairfield	Nov. 9, 1990	July 1, 1991

Formerly Air Force Communications Service. Redesignated Air Force Communications Command 1979. Changed to field operating agency July 1, 1991.

AIR FORCE LOGISTICS COMMAND

Lt. Gen. Nathan F. Twining	March 9, 1946	Oct. 13, 1947
Gen. Joseph T. McNarney	Oct. 14, 1947	Aug. 31, 1949
Lt. Gen. Benjamin W. Chidlaw	Sept. 1, 1949	Aug. 20, 1951
Gen. Edwin W. Rawlings	Aug. 21, 1951	Feb. 28, 1959
Lt. Gen. William F. McKee (acting)	March 1, 1959	March 14, 1959
Gen. Samuel E. Anderson	March 15, 1959	July 31, 1961
Gen. William F. McKee	Aug. 1, 1961	June 30, 1962
Gen. Mark E. Bradley Jr.	July 1, 1962	July 31, 1965
Gen. Kenneth B. Hobson	Aug. 1, 1965	July 31, 1967
Gen. Thomas P. Gerrity	Aug. 1, 1967	Feb. 24, 1968
Lt. Gen. Lewis L. Mundell (acting)	Feb. 24, 1968	March 28, 1968
Gen. Jack G. Merrell	March 29, 1968	Sept. 11, 1972
Gen. Jack J. Catton	Sept. 12, 1972	Aug. 31, 1974
Gen. William V. McBride	Sept. 1, 1974	Aug. 31, 1975
Gen. F. Michael Rogers	Sept. 1, 1975	Jan. 31, 1978
Gen. Bryce Poe II	Feb. 1, 1978	July 31, 1981
Gen. James P. Mullins	Aug. 1, 1981	Nov. 1, 1984
Gen. Earl T. O'Loughlin	Nov. 1, 1984	July 31, 1987
Gen. Alfred G. Hansen	July 31, 1987	Oct. 31, 1989
Gen. Charles C. McDonald	Oct. 31, 1989	July 1, 1992

Antecedents: AAF Materiel and Services 1944; AAF Technical Service Command 1944; Air Technical Service Command 1945; Air Materiel Command 1946; Air Force Logistics Command 1961. Inactivated July 1, 1992.



F-89D Scorpion Interceptors from the 1950s belonging to Air Defense Command.

AIR FORCE RESERVE

Maj. Gen. Rollin B. Moore Jr.	Aug. 1, 1968	Jan. 27, 1972
Brig. Gen. Alfred Verhulst (acting)	Jan. 27, 1972	March 16, 1972
Maj. Gen. Homer I. Lewis	March 16, 1972	April 16, 1975
Maj. Gen. William Lyon	April 16, 1975	April 17, 1979
Maj. Gen. Richard Bodycombe	April 17, 1979	Nov. 1, 1982
Maj. Gen. Sloan R. Gill	Nov. 1, 1982	Nov. 1, 1986
Maj. Gen. Roger P. Scheer	Nov. 1, 1986	Nov. 1, 1990
Maj. Gen. John J. Closner III	Nov. 1, 1990	Nov. 1, 1994
Maj. Gen. Robert A. McIntosh	Nov. 1, 1994	Feb. 17, 1997

Established as Air Force Reserve, an operating agency, June 21, 1968. Became a direct reporting unit July 1, 1978. Returned to agency status May 1, 1983. Became a field operating agency Feb. 5, 1991. Redesignated Air Force Reserve Command Feb. 17, 1997. For current leaders, see Air Force Reserve Command in Major Command and ANG Leaders.

AIR FORCE SYSTEMS COMMAND

Maj. Gen. David M. Schlatter	Feb. 1, 1950	June 24, 1951
Lt. Gen. Earle E. Partridge	June 24, 1951	June 20, 1953
Lt. Gen. Donald L. Putt	June 30, 1953	April 14, 1954
Lt. Gen. Thomas S. Power	April 15, 1954	June 30, 1957
Maj. Gen. John Sessums (acting)	July 1, 1957	July 31, 1959
Lt. Gen. Samuel E. Anderson	Aug. 1, 1957	March 9, 1959
Maj. Gen. John Sessums (acting)	March 10, 1959	April 24, 1959
Gen. Bernard A. Schriever	April 25, 1959	Aug. 31, 1966
Gen. James Ferguson	Sept. 1, 1966	Aug. 30, 1970
Gen. George S. Brown	Sept. 1, 1970	July 31, 1973
Gen. Samuel C. Phillips	Aug. 1, 1973	Aug. 31, 1975
Gen. William J. Evans	Sept. 1, 1975	July 31, 1977
Gen. Lew Allen Jr.	Aug. 1, 1977	March 13, 1978
Gen. Alton D. Slay	March 14, 1978	Feb. 1, 1981
Gen. Robert T. Marsh	Feb. 1, 1981	Aug. 1, 1984
Gen. Lawrence A. Skantze	Aug. 1, 1984	July 17, 1987
Gen. Bernard P. Randolph	July 17, 1987	April 1, 1990
Gen. Ronald W. Yates	April 1, 1990	July 1, 1992

Formerly Air Research and Development Command. Redesignated Air Force Systems Command April 1, 1961. Inactivated July 1, 1992.

AIR PROVING GROUND COMMAND

Maj. Gen. Carl A. Brandt	October 1946	August 1948
Maj. Gen. William E. Kepner	August 1948	June 1950
Maj. Gen. Bryant L. Boatner	July 1950	July 1952
Maj. Gen. Patrick W. Timberlake	July 1952	April 1955
Maj. Gen. Robert W. Burns	August 1955	July 1957

Designated a center December 1957.

Historic Major Command Leaders (continued)

AIR TRAINING COMMAND

Lt. Gen. Barton K. Yount	Jan. 28 1942	Sept. 27, 1945	Lt. Gen. George B. Simler	Sept. 1, 1970	Sept. 9, 1972
Maj. Gen. James P. Hodges	Sept. 27, 1945	April 13, 1946	Lt. Gen. William V. McBride	Sept. 9, 1972	Aug. 31, 1974
Lt. Gen. John K. Cannon	April 13, 1946	Oct. 13, 1948	Lt. Gen. George H. McKee	Sept. 1, 1974	Aug. 28, 1975
Lt. Gen. Robert W. Harper	Oct. 14, 1948	June 30, 1954	Gen. John W. Roberts	Aug. 29, 1975	April 1, 1979
Maj. Gen. Glenn O. Barcus (acting)	July 1, 1954	July 25, 1954	Gen. Bennie L. Davis	April 1, 1979	July 28, 1981
Lt. Gen. Charles T. Myers	July 26, 1954	July 31, 1958	Gen. Thomas M. Ryan Jr.	July 29, 1981	June 22, 1983
Lt. Gen. Frederic H. Smith Jr.	Aug. 1, 1958	July 31, 1959	Gen. Andrew P. Iosue	June 23, 1983	Aug. 27, 1986
Lt. Gen. James E. Briggs	Aug. 1, 1959	July 31, 1963	Lt. Gen. John A. Shaud	Aug. 28, 1986	June 5, 1988
Lt. Gen. Robert W. Burns	Aug. 1, 1963	Aug. 10, 1964	Lt. Gen. Robert C. Oaks	June 6, 1988	June 24, 1990
Lt. Gen. William W. Momyer	Aug. 11, 1964	June 30, 1966	Lt. Gen. Joseph W. Ashy	June 25, 1990	Dec. 9, 1992
Lt. Gen. Sam Maddux Jr.	July 1, 1966	Aug. 30, 1970	Gen. Henry Viccellio Jr.	Dec. 11, 1992	June 30, 1993

Established as Air Corps Flying Training Command Jan. 23, 1942. Redesignated as AAF Flying Training Command March 15, 1942; AAF Training Command July 31, 1943; Air Training Command July 1, 1946; Air Education and Training Command July 1, 1993. For current leaders, see Air Education and Training Command in Major Command and ANG Leaders.

AIR UNIVERSITY

Maj. Gen. Muir S. Fairchild	March 15, 1946	May 17, 1948	Lt. Gen. Alvan C. Gillem II	Aug. 1, 1970	Oct. 31, 1973
Maj. Gen. Robert W. Harper	May 17, 1948	Oct. 15, 1948	Lt. Gen. F. Michael Rogers	Nov. 1, 1973	Aug. 31, 1975
Gen. George C. Kenney	Oct. 16, 1948	July 27, 1951	Lt. Gen. Raymond B. Furlong	Sept. 1, 1975	July 1, 1979
Lt. Gen. Idwal H. Edwards	July 28, 1951	Feb. 28, 1953	Lt. Gen. Stanley M. Umstead	July 1, 1979	July 24, 1981
Maj. Gen. John DeF. Barker (acting)	March 1, 1953	April 14, 1953	Lt. Gen. Charles G. Cleveland	July 24, 1981	Aug. 1, 1984
Lt. Gen. Laurence S. Kuter	April 15, 1953	May 31, 1955	Lt. Gen. Thomas C. Richards	Aug. 1, 1984	Nov. 6, 1986
Lt. Gen. Dean C. Strother	June 1, 1955	June 30, 1958	Lt. Gen. Truman Spangrud	Nov. 6, 1986	July 12, 1988
Lt. Gen. Walter E. Todd	July 15, 1958	July 31, 1961	Lt. Gen. Ralph E. Havens	July 12, 1988	Oct. 6, 1989
Lt. Gen. Troup Miller Jr.	Aug. 1, 1961	Dec. 31, 1963	Maj. Gen. David C. Reed	Oct. 6, 1989	Jan. 4, 1990
Lt. Gen. Ralph P. Swofford Jr.	Jan. 1, 1964	July 31, 1965	Lt. Gen. Charles G. Boyd	Jan. 4, 1990	Oct. 26, 1992
Lt. Gen. John W. Carpenter III	Aug. 1, 1965	July 31, 1968	Lt. Gen. Jay W. Kelley	Oct. 27, 1992	June 30, 1993
Lt. Gen. Albert P. Clark	Aug. 1, 1968	July 31, 1970			

With lineage dating to the Air Service School, Feb. 25, 1920. Designated Air University, a major command, March 12, 1946. Lost majcom status July 1, 1978; regained July 1, 1983; lost again July 1, 1993.

ALASKAN AIR COMMAND

Brig. Gen. Joseph H. Atkinson	Oct. 1, 1946	Feb. 25, 1949	Maj. Gen. Wendell W. Bowman	July 26, 1961	Aug. 8, 1963
Brig. Gen. Frank A. Armstrong Jr.	Feb. 26, 1949	Dec. 27, 1950	Col. Alfred Walton (acting)	Aug. 9, 1963	Aug. 14, 1963
Maj. Gen. William D. Old	Dec. 27, 1950	Oct. 14, 1952	Maj. Gen. James C. Jensen	Aug. 15, 1963	Nov. 14, 1966
Brig. Gen. W. R. Agee	Oct. 27, 1952	Feb. 26, 1953	Maj. Gen. Thomas E. Moore	Nov. 15, 1966	July 24, 1969
Maj. Gen. George R. Acheson	Feb. 26, 1953	Feb. 1, 1956	Maj. Gen. Joseph A. Cunningham	July 25, 1969	July 31, 1972
Brig. Gen. T. Alan Bennett (acting)	Feb. 1, 1956	Feb. 24, 1956	Maj. Gen. Donavon F. Smith	Aug. 1, 1972	June 5, 1973
Lt. Gen. Joseph H. Atkinson	Feb. 24, 1956	July 16, 1956	Maj. Gen. Charles W. Carson Jr.	June 18, 1973	March 2, 1974
Maj. Gen. Frank A. Armstrong Jr.	July 17, 1956	Oct. 23, 1956	Col. David T. Stockman (acting)	March 3, 1974	March 18, 1974
Maj. Gen. James H. Davies	Oct. 24, 1956	June 27, 1957	Maj. Gen. Jack K. Gamble	March 19, 1974	June 30, 1975
Lt. Gen. Frank A. Armstrong Jr.	June 28, 1957	Aug. 18, 1957	Lt. Gen. James E. Hill	July 1, 1975	Oct. 14, 1976
Brig. Gen. Kenneth H. Gibson	Aug. 19, 1957	Aug. 13, 1958	Lt. Gen. M. L. Boswell	Oct. 15, 1976	June 30, 1978
Maj. Gen. C. F. Necrason	Aug. 14, 1958	July 19, 1961	Lt. Gen. Winfield W. Scott Jr.	July 1, 1978	April 1, 1981
Brig. Gen. Jack A. Gibbs (acting)	July 20, 1961	July 25, 1961	Lt. Gen. Lynwood E. Clark	April 1, 1981	Aug. 31, 1983
			Lt. Gen. Bruce K. Brown	Sept. 1, 1983	Sept. 26, 1985
			Lt. Gen. David L. Nichols	Sept. 27, 1985	May 22, 1988
			Lt. Gen. Thomas G. McInerney	May 22, 1988	Aug. 9, 1990

Activated as Alaskan Air Force 1942. Redesignated: Eleventh Air Force 1942; Alaskan Air Command 1945; 11th Air Force Aug. 9, 1990, under Pacific Air Forces.

CONTINENTAL AIR COMMAND

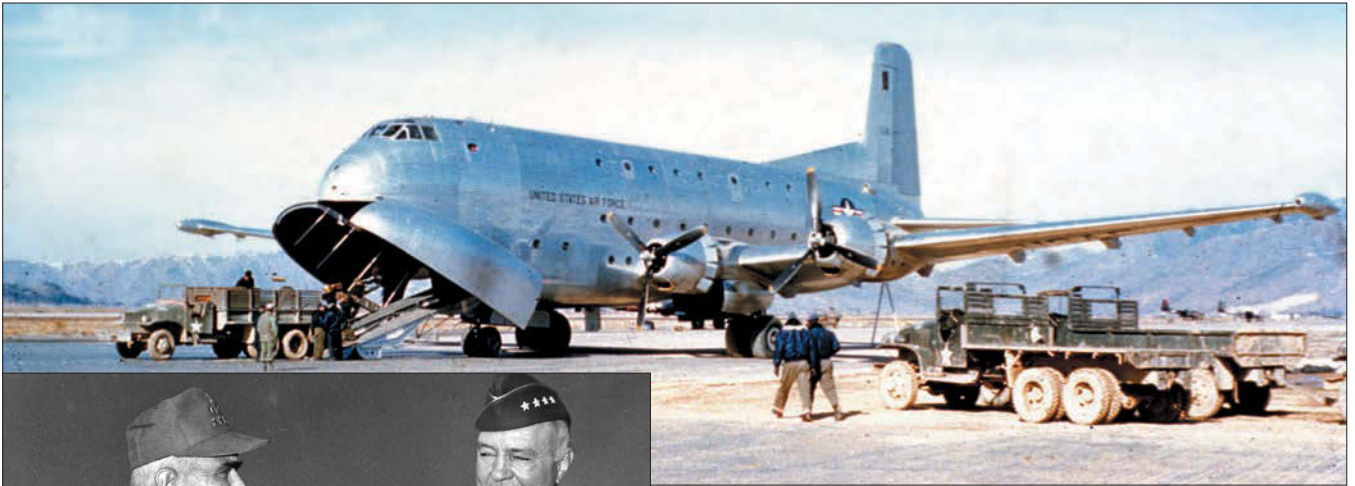
Lt. Gen. George E. Stratemeyer	Dec. 1, 1948	April 15, 1949
Lt. Gen. Ennis C. Whitehead	April 15, 1949	Dec. 14, 1950
Maj. Gen. Willis H. Hale	Dec. 14, 1950	Feb. 18, 1952
Lt. Gen. Leon W. Johnson	Feb. 18, 1952	Dec. 14, 1955
Lt. Gen. Charles B. Stone III	Dec. 15, 1955	June 30, 1957
Lt. Gen. William E. Hall	July 1, 1957	Sept. 30, 1961
Lt. Gen. Gordon A. Blake	Sept. 30, 1961	June 30, 1962
Lt. Gen. Edward J. Timberlake	July 1, 1962	June 19, 1965
Maj. Gen. Albert Wilson (acting)	June 19, 1965	Aug. 18, 1965
Lt. Gen. Cecil H. Childre	Aug. 18, 1965	May 1966
Maj. Gen. Stanley Holtoner (acting)	May 1966	July 30, 1966
Lt. Gen. Henry Viccellio Sr.	Aug. 1, 1966	Aug. 1, 1968

Established Dec. 1, 1948. Inactivated Aug. 1, 1968.



A student and instructor pilot at Air Training Command's undergraduate navigator school prepare for flight in a T-37 aircraft at Mather AFB, Calif.

Historic Major Command Leaders (continued)



The C-124 Globemaster considerably improved USAF airlift capability in the Far East in the 1950s.



Gen. William Westmoreland (l), commander of US Forces in Vietnam, and Gen. Howell Estes Jr., commander of Military Airlift Command.

ELECTRONIC SECURITY COMMAND/AIR FORCE INTELLIGENCE COMMAND

Col. Roy H. Lynn	Oct. 26, 1948	July 5, 1949
Col. Travis M. Hetherington	July 6, 1949	Feb. 21, 1951
Maj. Gen. Roy H. Lynn	Feb. 22, 1951	Feb. 13, 1953
Maj. Gen. Harold H. Bassett	Feb. 14, 1953	Jan. 3, 1957
Maj. Gen. Gordon L. Blake	Jan. 4, 1957	Aug. 5, 1959
Maj. Gen. John B. Ackerman	Aug. 6, 1959	Sept. 20, 1959
Maj. Gen. Millard Lewis	Sept. 21, 1959	Aug. 31, 1962
Maj. Gen. Richard P. Klocko	Sept. 1, 1962	Oct. 15, 1965
Maj. Gen. Louis E. Coira	Oct. 16, 1965	July 18, 1969
Maj. Gen. Carl W. Stapleton	July 19, 1969	Feb. 23, 1973
Maj. Gen. Walter T. Galligan	Feb. 24, 1973	May 16, 1974
Maj. Gen. Howard P. Smith	May 17, 1974	July 31, 1975
Maj. Gen. Kenneth D. Burns	Aug. 1, 1975	Jan. 18, 1979
Maj. Gen. Doyle E. Larson	Jan. 19, 1979	July 31, 1983
Maj. Gen. John B. Marks	Aug. 1, 1983	April 16, 1985
Maj. Gen. Paul H. Martin	April 17, 1985	Aug. 14, 1989
Maj. Gen. Gary W. O'Shaughnessy	Aug. 15, 1989	June 1, 1993
Maj. Gen. Kenneth A. Minihan	June 2, 1993	Oct. 1, 1993

Formerly USAF Security Service. Redesignated Electronic Security Command Aug. 1, 1979; Air Force Intelligence Command Oct. 1, 1991. Changed to field operating agency, Air Intelligence Agency, Oct. 1, 1993.

FAR EAST AIR FORCES

Gen. George C. Kenney	Aug. 3, 1944	Dec. 30, 1945
Lt. Gen. Ennis C. Whitehead	Dec. 30, 1945	April 26, 1949
Lt. Gen. George E. Stratmeyer	April 26, 1949	May 21, 1951
Lt. Gen. Earle E. Partridge (acting)	May 21, 1951	June 10, 1951
Gen. Otto P. Weyland	June 10, 1951	March 26, 1954
Gen. Earle E. Partridge	March 26, 1954	June 4, 1955
Gen. Laurence S. Kuter	June 4, 1955	July 1, 1959

Activated as Far East Air Forces Aug. 3, 1944. Redesignated Pacific Air Command, US Army, Dec. 6, 1945; Far East Air Forces Jan. 1, 1947; Pacific Air Forces July 1, 1957. For current leaders, see Pacific Air Forces in Major Command and ANG Leaders.

HEADQUARTERS COMMAND

Brig. Gen. Burton M. Hovey	Jan. 3, 1946	Dec. 13, 1948
Brig. Gen. Sydney D. Grubbs	Dec. 14, 1948	Oct. 1, 1950
Brig. Gen. Morris J. Lee	Oct. 2, 1950	June 13, 1952
Brig. Gen. Stoyte O. Ross	June 14, 1952	July 4, 1956
Maj. Gen. Reuben C. Hood Jr.	Aug. 1, 1956	June 30, 1959
Maj. Gen. Brooke E. Allen	Aug. 3, 1959	Dec. 31, 1965
Maj. Gen. Rollen H. Anthis	Jan. 10, 1966	Nov. 30, 1967
Maj. Gen. Milton B. Adams	Dec. 1, 1967	June 30, 1968
Maj. Gen. Nils O. Ohman	July 5, 1968	April 30, 1972
Maj. Gen. John L. Locke	May 1, 1972	Feb. 25, 1974
Maj. Gen. Maurice R. Reilly	Feb. 26, 1974	August 1975
Maj. Gen. William C. Norris	Sept. 1, 1975	June 30, 1976

Established as Bolling Field Command 1946. Redesignated Headquarters Command, USAF, March 17, 1948. Inactivated 1976.

MILITARY AIRLIFT COMMAND

Maj. Gen. Robert M. Olds	May 29, 1941	April 1, 1942
Lt. Gen. Harold L. George	April 1, 1942	Sept. 20, 1946
Maj. Gen. Robert M. Webster	Sept. 20, 1946	July 1, 1947
Maj. Gen. Robert W. Harper	July 1, 1947	June 1, 1948
Lt. Gen. Laurence S. Kuter	June 1, 1948	Nov. 19, 1951
Lt. Gen. Joseph Smith	Nov. 19, 1951	July 1, 1958
Lt. Gen. William H. Tunner	July 1, 1958	June 1, 1960
Gen. Joe W. Kelly	June 1, 1960	July 19, 1964
Gen. Howell M. Estes Jr.	July 19, 1964	Aug. 1, 1969
Gen. Jack J. Catton	Aug. 1, 1969	Sept. 12, 1972
Lt. Gen. Jay T. Robbins (acting)	Sept. 12, 1972	Sept. 20, 1972
Gen. Paul K. Carlton	Sept. 20, 1972	April 1, 1977
Gen. William G. Moore Jr.	April 1, 1977	July 1, 1979
Gen. Robert E. Huyser	July 1, 1979	June 26, 1981
Gen. James R. Allen	June 26, 1981	June 30, 1983
Gen. Thomas M. Ryan Jr.	June 30, 1983	Sept. 20, 1985
Gen. Duane H. Cassidy	Sept. 20, 1985	Sept. 22, 1989
Gen. Hansford T. Johnson	Sept. 22, 1989	June 1, 1992

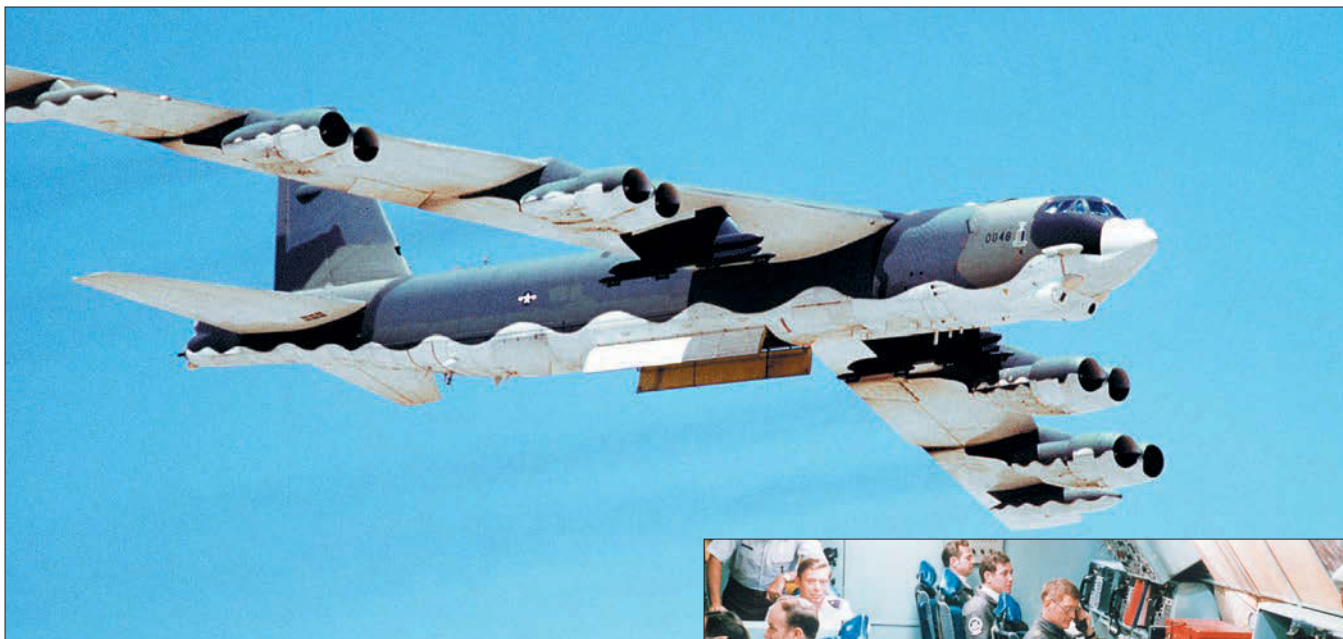
Established as Air Corps Ferrying Command May 29, 1941. Redesignated AAF Ferry Command March 9, 1942; AAF Ferrying Command March 31, 1942; Air Transport Command July 1, 1942; Military Air Transport Service June 1, 1948; Military Airlift Command Jan. 1, 1966. Inactivated June 1, 1992. Consolidated with Air Mobility Command. For current leaders, see Air Mobility Command in Major Command and ANG Leaders.

NORTHEAST AIR COMMAND

Maj. Gen. Lyman P. Whitten	Oct. 6, 1950	March 14, 1952
Maj. Gen. Charles T. Myers	March 14, 1952	July 26, 1954
Lt. Gen. Glenn O. Barcus	July 26, 1954	March 31, 1957

Newfoundland Base Command, part of Military Air Transport Service, was reorganized and redesignated Northeast Air Command, a new major command, Oct. 1, 1950. Inactivated March 31, 1957.

Historic Major Command Leaders (continued)



A SAC B-52H Stratofortress during the multinational joint service Exercise Bright Star '85 out of Cairo West AB, Egypt.



SAC Chief Gen. Richard Ellis (r) receiving top-level communications in his airborne command post on Dec. 1, 1979.

STRATEGIC AIR COMMAND

Brig. Gen. Eugene H. Beebe	Dec. 15, 1944	March 1, 1945
Maj. Gen. St. Clair Streett	March 1, 1945	July 1, 1945
Gen. Henry H. Arnold	July 1, 1945	March 21, 1946
Gen. George C. Kenney	March 21, 1946	Oct. 18, 1948
Gen. Curtis E. LeMay	Oct. 19, 1948	June 30, 1957
Gen. Thomas S. Power	July 1, 1957	Nov. 30, 1964
Gen. John D. Ryan	Dec. 1, 1964	Jan. 31, 1967
Gen. Joseph J. Nazzaro	Feb. 1, 1967	July 28, 1968
Gen. Bruce K. Holloway	July 29, 1968	April 30, 1972
Gen. John C. Meyer	May 1, 1972	July 31, 1974
Gen. Russell E. Dougherty	Aug. 1, 1974	July 31, 1977
Gen. Richard H. Ellis	Aug. 1, 1977	July 31, 1981
Gen. Bennie L. Davis	Aug. 1, 1981	July 31, 1985
Gen. Larry D. Welch	Aug. 1, 1985	June 30, 1986
Gen. John T. Chain	July 1, 1986	Jan. 31, 1991
Gen. George L. Butler	Feb. 1, 1991	June 1, 1992

Established as Continental Air Forces Dec. 13, 1944. Redesignated Strategic Air Command March 21, 1946. Inactivated June 1, 1992. Redesignated and activated as Air Force Global Strike Command Aug. 7, 2009. For current leaders, see Air Force Global Strike Command in Major Command and ANG Leaders.

TACTICAL AIR COMMAND

Lt. Gen. Elwood R. Quesada	March 21, 1946	Nov. 24, 1948
Maj. Gen. Robert M. Lee	Nov. 24, 1948	July 8, 1950
Maj. Gen. Otto P. Weyland	July 8, 1950	July 17, 1950
Maj. Gen. Glenn O. Barcus	July 17, 1950	Jan. 25, 1951
Gen. John K. Cannon	Jan. 25, 1951	May 1, 1954
Gen. Otto P. Weyland	May 1, 1954	Aug. 1, 1959
Gen. Frank F. Everest	Aug. 1, 1959	Oct. 1, 1961
Gen. Walter C. Sweeney Jr.	Oct. 1, 1961	Aug. 1, 1965
Gen. Gabriel P. Disosway	Aug. 1, 1965	Aug. 1, 1968
Gen. William W. Momyer	Aug. 1, 1968	Oct. 1, 1973
Gen. Robert J. Dixon	Oct. 1, 1973	May 1, 1978
Gen. W. L. Creech	May 1, 1978	Sept. 28, 1984
Gen. Jerome F. O'Malley	Sept. 28, 1984	May 22, 1985
Gen. Robert D. Russ	May 22, 1985	March 26, 1991
Gen. John Michael Loh	March 26, 1991	June 1, 1992

Established as Tactical Air Command March 21, 1946. Lost majcom status and assigned to Continental Air Command Dec. 1, 1948. Returned to majcom status Dec. 1, 1950. Inactivated June 1, 1992. Consolidated with Air Combat Command. For current leaders, see Air Combat Command in Major Command and ANG Leaders.

US AIR FORCES SOUTHERN COMMAND/CARIBBEAN

Maj. Gen. Hubert R. Harmon	July 31, 1946	Oct. 3, 1947
Brig. Gen. Glen C. Jamison (acting)	Oct. 4, 1947	Nov. 12, 1947
Maj. Gen. Willis H. Hale	Nov. 13, 1947	Oct. 19, 1949
Brig. Gen. Rosenham Beam	Oct. 20, 1949	Nov. 5, 1950
Brig. Gen. Emil C. Kiel	Nov. 6, 1950	June 10, 1953
Maj. Gen. Reuben C. Hood Jr.	June 11, 1953	June 16, 1956
Maj. Gen. Truman H. Landon	June 20, 1956	June 1, 1959
Maj. Gen. Leland S. Stranathan	Aug. 3, 1959	Sept. 8, 1963
Maj. Gen. Robert A. Breitweiser	Sept. 11, 1963	July 9, 1966
Maj. Gen. Reginald J. Clizbe	Aug. 6, 1966	June 14, 1968
Maj. Gen. Kenneth O. Sanborn	June 14, 1968	April 7, 1972
Maj. Gen. Arthur G. Salisbury	April 7, 1972	Oct. 31, 1974
Maj. Gen. James M. Breedlove	Oct. 31, 1974	Jan. 1, 1976

Antecedents: Panama Canal Air Force 1940; Caribbean Air Force 1941; Sixth Air Force 1942; Caribbean Air Command July 31, 1946; US Air Forces Southern Command July 8, 1963. Inactivated Jan. 1, 1976.

US STRATEGIC AIR FORCES IN EUROPE

Brig. Gen. Asa N. Duncan	Jan 28, 1942	May 5, 1942
Maj. Gen. Carl A. Spaatz	May 5, 1942	Dec. 1, 1942
Lt. Gen. Ira C. Eaker	Dec. 1, 1942	Jan. 6, 1944
Gen. Carl A. Spaatz	Jan. 6, 1944	June 3, 1945
Lt. Gen. John K. Cannon	June 3, 1945	June 13, 1945
Gen. Carl A. Spaatz	June 13, 1945	July 4, 1945
Lt. Gen. John K. Cannon	July 4, 1945	Aug. 7, 1945

Established as 8th Air Force Jan. 19, 1942. Redesignated Eighth Air Force Sept. 18, 1942; United States Strategic Air Forces in Europe Feb. 22, 1944; US Air Forces in Europe Aug. 7, 1945. For current leaders, see US Air Forces in Europe in the Major Command and ANG Leaders.

Headquarters DOD Leaders

SECRETARY OF DEFENSE

James V. Forrestal	Sept. 17, 1947	March 28, 1949	Harold Brown	Jan. 21, 1977	Jan. 20, 1981
Louis A. Johnson	March 28, 1949	Sept. 19, 1950	Caspar W. Weinberger	Jan. 21, 1981	Nov. 23, 1987
George C. Marshall	Sept. 21, 1950	Sept. 12, 1951	Frank C. Carlucci	Nov. 23, 1987	Jan. 20, 1989
Robert A. Lovett	Sept. 17, 1951	Jan. 20, 1953	Richard B. Cheney	March 21, 1989	Jan. 20, 1993
Charles E. Wilson	Jan. 28, 1953	Oct. 8, 1957	Les Aspin	Jan. 21, 1993	Feb. 3, 1994
Neil H. McElroy	Oct. 9, 1957	Dec. 1, 1959	William J. Perry	Feb. 3, 1994	Jan. 23, 1997
Thomas S. Gates	Dec. 2, 1959	Jan. 20, 1961	William S. Cohen	Jan. 24, 1997	Jan. 20, 2001
Robert S. McNamara	Jan. 21, 1961	Feb. 29, 1968	Donald H. Rumsfeld	Jan. 20, 2001	Dec. 18, 2006
Clark M. Clifford	March 1, 1968	Jan. 20, 1969	Robert M. Gates	Dec. 18, 2006	July 1, 2011
Melvin R. Laird	Jan. 22, 1969	Jan. 29, 1973	Leon E. Panetta	July 1, 2011	Feb. 27, 2013
Elliot L. Richardson	Jan. 30, 1973	May 24, 1973	Chuck Hagel	Feb. 27, 2013	Feb. 17, 2015
James R. Schlesinger	July 2, 1973	Nov. 19, 1975	Ashton B. Carter	Feb. 17, 2015	Jan. 19, 2017
Donald H. Rumsfeld	Nov. 20, 1975	Jan. 20, 1977	James N. Mattis	Jan. 20, 2017	

CHAIRMAN OF THE JOINT CHIEFS OF STAFF

Gen. of the Army Omar N. Bradley	Aug. 16, 1949	Aug. 15, 1953	Adm. William J. Crowe Jr., USN	Oct. 1, 1985	Sept. 30, 1989
Adm. Arthur W. Radford, USN	Aug. 15, 1953	Aug. 15, 1957	Gen. Colin L. Powell, USA	Oct. 1, 1989	Sept. 30, 1993
Gen. Nathan F. Twining, USAF	Aug. 15, 1957	Sept. 30, 1960	Adm. David Jeremiah, USN (acting)	Oct. 1, 1993	Oct. 24, 1993
Gen. Lyman L. Lemnitzer, USA	Oct. 1, 1960	Sept. 30, 1962	Gen. John M. Shalikashvili, USA	Oct. 25, 1993	Sept. 30, 1997
Gen. Maxwell D. Taylor, USA	Oct. 1, 1962	July 1, 1964	Gen. Henry H. Shelton, USA	Oct. 1, 1997	Oct. 1, 2001
Gen. Earle G. Wheeler, USA	July 3, 1964	July 2, 1970	Gen. Richard B. Myers, USAF	Oct. 1, 2001	Sept. 30, 2005
Adm. Thomas H. Moorer, USN	July 2, 1970	July 1, 1974	Gen. Peter Pace, USMC	Sept. 30, 2005	Oct. 1, 2007
Gen. George S. Brown, USAF	July 1, 1974	June 20, 1978	Adm. Michael G. Mullen, USN	Oct. 1, 2007	Sept. 30, 2011
Gen. David C. Jones, USAF	June 21, 1978	June 18, 1982	Gen. Martin E. Dempsey, USA	Sept. 30, 2011	Sept. 25, 2015
Gen. John W. Vessey Jr., USA	June 18, 1982	Sept. 30, 1985	Gen. Joseph F. Dunford Jr., USMC	Sept. 25, 2015	

VICE CHAIRMAN OF THE JOINT CHIEFS OF STAFF

Gen. Robert T. Herres, USAF	Feb. 6, 1987	Feb. 28, 1990	Gen. Peter Pace, USMC	Oct. 1, 2001	Aug. 12, 2005
Adm. David E. Jeremiah, USN	March 1, 1990	Feb. 28, 1994	Adm. Edmund Giambastiani Jr., USN	Aug. 12, 2005	Aug. 3, 2007
Adm. William A. Owens, USN	March 1, 1994	Feb. 27, 1996	Gen. James E. Cartwright, USMC	Aug. 4, 2007	Aug. 4, 2011
Gen. Joseph W. Ralston, USAF	March 1, 1996	Feb. 29, 2000	Adm. James A. Winnefeld Jr., USN	Aug. 4, 2011	July 31, 2015
Gen. Richard B. Myers, USAF	March 1, 2000	Oct. 1, 2001	Gen. Paul J. Selva, USAF	July 31, 2015	



The Joint Chiefs of Staff in 1994 (left to right): Gen. Carl Mundy, Commandant of the Marine Corps; Gen. Gordon Sullivan, Chief of Staff, Army; Gen. Merrill McPeak, Chief of Staff, Air Force; Adm. Frank Kelso II, Chief of Naval Operations; Army Gen. John Shalikashvili, Chairman of the Joint Chiefs of Staff; and Adm. William Owens, Vice Chairman of the Joint Chiefs of Staff.

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 in the next section.



USAF Gen. Joseph Ralston (I) Supreme Allied Commander, Europe, at Sidi Slimane AB, Morocco, looks over a theater of operations map with the Moroccan Chief of Staff.

US 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	

US 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	

US 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
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	

US 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	

US 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
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
Adm. Harry B. Harris Jr., USN	May 27, 2015	

US 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	

Formerly US Caribbean Command Nov. 1, 1947. Redesignated June 6, 1963. For historical leaders, see US Caribbean Command in Historic Unified Command Leaders section.

Unified Command, National Guard Bureau, and NORAD Leaders (continued)

US 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	

US 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	

Merged the functions of US Space Command into US Strategic Command Oct. 1, 2002.



Lt. Col. Frank Sullivan (l) and Lt. Gen. Russell Davis (c), chief, National Guard Bureau, speak with an airman during the exercise New Horizon 2002 in Jamaica.

US TRANSPORTATION COMMAND

Gen. Duane H. Cassidy, USAF	July 1, 1987	Sept. 21, 1989
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	

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. Greenleaf, 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	

Served as acting chief: Fleming 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	

Historic Unified Command Leaders

ALASKAN COMMAND

Maj. Gen. Howard A. Craig, USAF	Jan. 1, 1947	Oct. 17, 1947
Lt. Gen. Nathan F. Twining, USAF	Oct. 17, 1947	July 1, 1950
Lt. Gen. William E. Kepner, USAF	July 1, 1950	March 1, 1953
Lt. Gen. Joseph A. Atkinson, USAF	March 1, 1953	Oct. 1, 1956
Lt. Gen. Frank A. Armstrong Jr., USAF	Oct. 1, 1956	Aug. 1, 1961
Lt. Gen. George W. Mundy, USAF	Aug. 1, 1961	Aug. 1, 1963
Lt. Gen. Raymond J. Reeves, USAF	Aug. 1, 1963	July 28, 1966
Lt. Gen. Glen R. Birchard, USAF	July 28, 1966	June 29, 1967
Lt. Gen. Robert A. Breitweiser, USAF	June 29, 1967	Aug. 1, 1969
Lt. Gen. Robert G. Ruegg, USAF	Aug. 1, 1969	Aug. 1, 1972
Lt. Gen. James C. Sherrill, USAF	Aug. 1, 1972	Sept. 1, 1974
Lt. Gen. James E. Hill, USAF	Sept. 1, 1974	July 1, 1975

Disestablished July 1, 1975.

CONTINENTAL AIR DEFENSE COMMAND

Gen. Benjamin W. Chidlaw, USAF	Sept. 1, 1954	July 1, 1955
Gen. Earle E. Partridge, USAF	July 1, 1955	Aug. 1, 1959
Gen. Laurence S. Kuter, USAF	Aug. 1, 1959	Aug. 1, 1960
Gen. John K. Gerhart, USAF	Aug. 1, 1960	April 1, 1965
Gen. Dean C. Strother, USAF	April 1, 1965	Aug. 1, 1966
Gen. Raymond J. Reeves, USAF	Aug. 1, 1966	Aug. 1, 1969
Gen. Seth J. McKee, USAF	Aug. 1, 1969	Oct. 1, 1973
Gen. Lucius D. Clay Jr., USAF	Oct. 1, 1973	June 30, 1975

Disestablished June 30, 1975. Established as specified command, Aerospace Defense Command, July 1, 1975. ADCOM disestablished Dec. 19, 1986.

EUROPEAN COMMAND

Gen. Lucius D. Clay, USA	March 15, 1947	Aug. 23, 1949
Gen. Thomas T. Handy, USA	Aug. 23, 1949	Aug. 1, 1952

Redesignated US Army Europe as Army component of new US European Command Aug. 1, 1952.

FAR EAST COMMAND

Gen. of the Army Douglas MacArthur, USA	Jan. 1, 1947	April 11, 1951
Gen. Matthew B. Ridgway, USA	April 11, 1951	May 9, 1952
Gen. Mark W. Clark, USA	May 9, 1952	Oct. 5, 1953
Gen. John E. Hull, USA	Oct. 5, 1953	April 1, 1955
Gen. Maxwell D. Taylor, USA	April 1, 1955	June 5, 1955
Gen. Lyman L. Lemnitzer, USA	June 5, 1955	July 1, 1957

Disestablished July 1, 1957. Functions assumed by US Pacific Command.

NORTHEAST COMMAND

Maj. Gen. Lyman P. Whitten, USAF	Oct. 1, 1950	March 20, 1952
Lt. Gen. Charles T. Myers, USAF	March 20, 1952	July 26, 1954
Lt. Gen. Glenn O. Barcus, USAF	July 26, 1954	Sept. 1, 1956

Disestablished Sept. 1, 1956.

US CARIBBEAN COMMAND

Lt. Gen. Willis D. Crittenger, USA	Nov. 1, 1947	June 28, 1948
Lt. Gen. Matthew B. Ridgway, USA	June 28, 1948	Oct. 1, 1949
Lt. Gen. William H. H. Morris, USA	Oct. 1, 1949	April 1, 1952
Lt. Gen. Horace L. McBride, USA	April 1, 1952	June 15, 1954
Lt. Gen. William K. Harrison Jr., USA	June 15, 1954	Jan. 5, 1957
Lt. Gen. Robert M. Montague, USA	Jan. 5, 1957	Feb. 20, 1958
Maj. Gen. Truman Landon, USAF (acting)	Feb. 20, 1958	April 1, 1958
Lt. Gen. Ridgely Gaither, USA	April 1, 1958	July 15, 1960
Lt. Gen. Robert F. Sink, USA	July 15, 1960	Feb. 1, 1961
Gen. Andrew P. O'Meara, USA	Feb. 1, 1961	June 6, 1963

Redesignated US Southern Command June 6, 1963.

US JOINT FORCES COMMAND

Adm. William H. P. Blandy, USN	Dec. 1, 1947	Feb. 1, 1950
Adm. William M. Fechteler, USN	Feb. 1, 1950	Aug. 15, 1951
Adm. Lynde D. McCormick, USN	Aug. 15, 1951	April 12, 1954
Adm. Jerauld Wright, USN	April 12, 1954	Feb. 28, 1960
Adm. Robert L. Dennison, USN	Feb. 28, 1960	April 30, 1963
Adm. Harold P. Smith, USN	April 30, 1963	April 30, 1965
Adm. Thomas H. Moorer, USN	April 30, 1965	June 17, 1967
Adm. Ephraim P. Holmes, USN	June 17, 1967	Sept. 30, 1970
Adm. Charles K. Duncan, USN	Sept. 30, 1970	Oct. 31, 1972
Adm. Ralph W. Cousins, USN	Oct. 31, 1972	May 30, 1975
Adm. Isaac C. Kidd Jr., USN	May 30, 1975	Sept. 30, 1978
Adm. Harry D. Train II, USN	Sept. 30, 1978	Sept. 30, 1982
Adm. Wesley D. McDonald, USN	Sept. 30, 1982	Nov. 27, 1985
Adm. Lee Baggett Jr., USN	Nov. 27, 1985	Nov. 22, 1988
Adm. Frank B. Kelso II, USN	Nov. 22, 1988	May 18, 1990
Adm. Leon A. Edney, USN	May 18, 1990	July 13, 1992
Adm. Paul D. Miller, USN	July 13, 1992	Oct. 31, 1994
Gen. John J. Sheehan, USMC	Oct. 31, 1994	Sept. 24, 1997
Adm. Harold W. Gehman Jr., USN	Sept. 24, 1997	Sept. 5, 2000
Gen. William F. Kernan, USA	Sept. 5, 2000	Oct. 2, 2002
Adm. Edmund Giambastiani Jr., USN	Oct. 2, 2002	Aug. 1, 2005
Lt. Gen. Robert Wagner, USA (acting)	Aug. 1, 2005	Nov. 10, 2005
Gen. Lance L. Smith, USAF	Nov. 10, 2005	Nov. 9, 2007
Gen. James N. Mattis, USMC	Nov. 9, 2007	Aug. 8, 2010
Lt. Gen. Keith L. Huber, USA (acting)	Aug. 8, 2010	Oct. 29, 2010
Gen. Raymond T. Odierno, USA	Oct. 29, 2010	Aug. 4, 2011

Formerly US Atlantic Command, established Dec. 1, 1947. Redesignated US Joint Forces Command Oct. 7, 1999. Disestablished Aug. 4, 2011.

US READINESS COMMAND

Gen. Paul D. Adams, USA	Oct. 9, 1961	Nov. 1, 1966
Gen. Theodore J. Conway, USA	Nov. 1, 1966	Aug. 1, 1969
Gen. John L. Throckmorton, USA	Aug. 1, 1969	Feb. 1, 1973
Gen. Bruce Palmer Jr., USA	Feb. 1, 1973	Dec. 9, 1974
Gen. John J. Hennessey, USA	Dec. 9, 1974	Aug. 1, 1979
Gen. Volney F. Warner, USA	Aug. 1, 1979	Aug. 1, 1981
Gen. Donn A. Starry, USA	Aug. 1, 1981	June 22, 1983
Gen. Wallace H. Nutting, USA	June 22, 1983	June 28, 1985
Gen. Fred K. Mahaffey, USA	June 28, 1985	Sept. 30, 1986
Lt. Gen. Harry Goodall, USAF (acting)	Sept. 30, 1986	Oct. 10, 1986
Gen. James J. Lindsay, USA	Oct. 10, 1986	Sept. 30, 1987

Assumed functions of US Strike Command, which was established December 1961 and disestablished Dec. 31, 1971. US Readiness Command disestablished Sept. 30, 1987.

US SPACE COMMAND

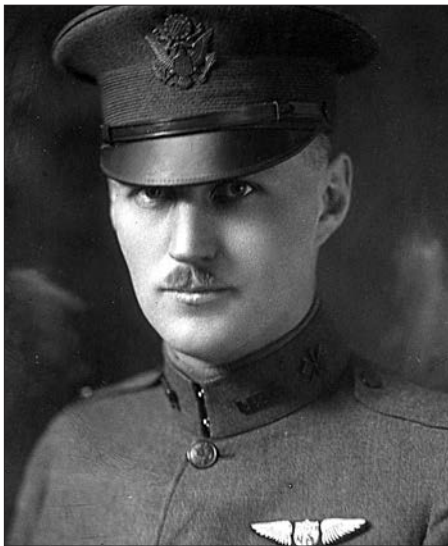
Gen. Robert T. Herres, USAF	Sept. 23, 1985	Feb. 5, 1987
Gen. John L. Piotrowski, USAF	Feb. 6, 1987	March 30, 1990
Gen. Donald J. Kutyna, USAF	April 1, 1990	June 30, 1992
Gen. Charles A. Horner, USAF	June 30, 1992	Sept. 12, 1994
Gen. Joseph W. Ashy, USAF	Sept. 13, 1994	Aug. 26, 1996
Gen. Howell M. Estes 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	Oct. 1, 2002

Disestablished Oct. 1, 2002. Functions assumed by US Strategic Command.

Guide to Aces and Heroes

2018 USAF Almanac

MAJOR DECORATIONS



Harold Goettler



Horace Carswell Jr.



John Jerstad



Neel Kearby



John Levitow



William Pitsenbarger

USAF Recipients of the Medal of Honor

NAME AND RANK AT TIME OF ACTION	PLACE OF BIRTH	DATE OF ACTION	PLACE OF ACTION
World War I			
Bleckley, 2nd Lt. Erwin R.	Wichita, Kan.	Oct. 6, 1918	Binarville, France
Goettler, 1st Lt. Harold E.	Chicago	Oct. 6, 1918	Binarville, France
Luke, 2nd Lt. Frank Jr.	Phoenix	Sept. 29, 1918	Murvaux, France
Rickenbacker, 1st Lt. Edward V.	Columbus, Ohio	Sept. 25, 1918	Billy, France
World War II			
Baker, Lt. Col. Addison E.	Chicago	Aug. 1, 1943	Ploesti, Romania
Bong, Maj. Richard I.	Superior, Wis.	Oct. 10-Nov. 15, 1944	Southwest Pacific
Carswell, Maj. Horace S. Jr.	Fort Worth, Texas	Oct. 26, 1944	South China Sea
Castle, Brig. Gen. Frederick W.	Manila, Philippines	Dec. 24, 1944	Liège, Belgium
Cheli, Maj. Ralph	San Francisco	Aug. 18, 1943	Wewak, New Guinea
Craw, Col. Demas T.	Traverse City, Mich.	Nov. 8, 1942	Port Lyautey, French Morocco
Doolittle, Lt. Col. James H.	Alameda, Calif.	April 18, 1942	Tokyo
Erwin, SSgt. Henry E.	Adamsville, Ala.	April 12, 1945	Koriyama, Japan
Femoyer, 2nd Lt. Robert E.	Huntington, W.Va.	Nov. 2, 1944	Merseburg, Germany
Gott, 1st Lt. Donald J.	Arnett, Okla.	Nov. 9, 1944	Saarbrücken, Germany
Hamilton, Maj. Pierpont M.	Tuxedo Park, N.Y.	Nov. 8, 1942	Port Lyautey, French Morocco
Howard, Lt. Col. James H.	Canton, China	Jan. 11, 1944	Oschersleben, Germany
Hughes, 2nd Lt. Lloyd H.	Alexandria, La.	Aug. 1, 1943	Ploesti, Romania
Jerstad, Maj. John L.	Racine, Wis.	Aug. 1, 1943	Ploesti, Romania
Johnson, Col. Leon W.	Columbia, Mo.	Aug. 1, 1943	Ploesti, Romania
Kane, Col. John R.	McGregor, Texas	Aug. 1, 1943	Ploesti, Romania
Kearby, Col. Neel E.	Wichita Falls, Texas	Oct. 11, 1943	Wewak, New Guinea
Kingsley, 2nd Lt. David R.	Portland, Ore.	June 23, 1944	Ploesti, Romania
Knight, 1st Lt. Raymond L.	Houston	April 25, 1945	Po Valley, Italy
Lawley, 1st Lt. William R. Jr.	Leeds, Ala.	Feb. 20, 1944	Leipzig, Germany
Lindsey, Capt. Darrell R.	Jefferson, Iowa	Aug. 9, 1944	Pontoise, France
Mathies, Sgt. Archibald	Scotland	Feb. 20, 1944	Leipzig, Germany
Mathis, 1st Lt. Jack W.	San Angelo, Texas	March 18, 1943	Vege sack, Germany
McGuire, Maj. Thomas B. Jr.	Ridgewood, N.J.	Dec. 25-26, 1944	Luzon, Philippines
Metzger, 2nd Lt. William E. Jr.	Lima, Ohio	Nov. 9, 1944	Saarbrücken, Germany
Michael, 1st Lt. Edward S.	Chicago	April 11, 1944	Brunswick, Germany
Morgan, 2nd Lt. John C.	Vernon, Texas	July 28, 1943	Kiel, Germany
Pease, Capt. Harl Jr.	Plymouth, N.H.	Aug. 7, 1942	Rabaul, New Britain
Pucket, 1st Lt. Donald D.	Longmont, Colo.	July 9, 1944	Ploesti, Romania
Sarnoski, 2nd Lt. Joseph R.	Simpson, Pa.	June 16, 1943	Buka, Solomon Islands
Shomo, Maj. William A.	Jeannette, Pa.	Jan. 11, 1945	Luzon, Philippines
Smith, Sgt. Maynard H.	Caro, Mich.	May 1, 1943	Saint-Nazaire, France
Truemper, 2nd Lt. Walter E.	Aurora, Ill.	Feb. 20, 1944	Leipzig, Germany
Vance, Lt. Col. Leon R. Jr.	Enid, Okla.	June 5, 1944	Wimereux, France
Vosler, TSgt. Forrest L.	Lyndonville, N.Y.	Dec. 20, 1943	Bremen, Germany
Walker, Brig. Gen. Kenneth N.	Cerrillos, N.M.	Jan. 5, 1943	Rabaul, New Britain
Wilkins, Maj. Raymond H.	Portsmouth, Va.	Nov. 2, 1943	Rabaul, New Britain
Zeamer, Capt. Jay Jr.	Carlisle, Pa.	June 16, 1943	Buka, Solomon Islands
Korean War			
Davis, Maj. George A. Jr.	Dublin, Texas	Feb. 10, 1952	Sinuiju, Yalu River, North Korea
Loring, Maj. Charles J. Jr.	Portland, Maine	Nov. 22, 1952	Sniper Ridge, North Korea
Sebille, Maj. Louis J.	Harbor Beach, Mich.	Aug. 5, 1950	Hamchang, South Korea
Walmsley, Capt. John S. Jr.	Baltimore	Sept. 14, 1951	Yangdok, North Korea
Vietnam War			
Bennett, Capt. Steven L.	Palestine, Texas	June 29, 1972	Quang Tri, South Vietnam
Day, Maj. George E.	Sioux City, Iowa	Aug. 26, 1967-March 14, 1973	Conspicuous gallantry while POW
Dethlefsen, Capt. Merlyn H.	Greenville, Iowa	March 10, 1967	Thai Nguyen, North Vietnam
Etchberger, CMSgt. Richard L.	Hamburg, Pa.	March 11, 1968	Phou Pha Thi, Laos
Fisher, Maj. Bernard F.	San Bernardino, Calif.	March 10, 1966	A Shau Valley, South Vietnam
Fleming, 1st Lt. James P.*	Sedalia, Mo.	Nov. 26, 1968	Duc Co, S. Vietnam
Jackson, Lt. Col. Joe M.*	Newnan, Ga.	May 12, 1968	Kham Duc, South Vietnam
Jones, Col. William A. III	Norfolk, Va.	Sept. 1, 1968	Dong Hoi, North Vietnam
Levitow, A1C John L.	Hartford, Conn.	Feb. 24, 1969	Long Binh, South Vietnam
Pitsenbarger, A1C William H.	Piqua, Ohio	April 11, 1966	Cam My, South Vietnam
Sijan, Capt. Lance P.	Milwaukee	Nov. 9, 1967-Jan. 22, 1968	Conspicuous gallantry while POW
Thorsness, Maj. Leo K.	Walnut Grove, Minn.	April 19, 1967	North Vietnam
Wilbanks, Capt. Hilliard A.	Cornelia, Ga.	Feb. 24, 1967	Da Lat, South Vietnam
Young, Capt. Gerald O.	Anacortes, Wash.	Nov. 9, 1967	Khe Sanh, South Vietnam

*Living Medal of Honor recipient

USAF Recipients of the Air Force Cross

World War II

Brown, 2nd Lt. Charles L.
Drew, 1st Lt. Urban L.
Sloan, Lt. Col. William J.

Cuban Missile Crisis

Anderson, Maj. Rudolph Jr.

Vietnam War

Adams, TSgt. Victor R.
Allee, Maj. Richard K.
Allison, Lt. Col. John V.
Armstrong, Maj. Larry D.
Atterberry, Lt. Col. Edwin L.
Baer, Lt. Col. Allan R.
Baldwin, Maj. Robert L.
Beale, Maj. Robert S.
Black, A3C Arthur N.
Bode, Maj. John R.
Boyd, Capt. Charles G.
Boyd, Lt. Col. William Jr.
Brickel, Lt. Col. James R.
Britt, Maj. Aquilla F.
Britton, Col. Warner A.
Broughton, Col. Jacksel M.
Brower, Capt. Ralph W.
Bucher, Maj. Bernard L.
Burroughs, Maj. William D.
Caldwell, Capt. William R.
Campbell, Maj. Jesse W.
Campbell, Maj. Thomas A.
Carroll, Maj. John L.
Carter, 1st Lt. William R.
Cherry, Col. Fred V.
Clarke, Maj. Colin A.
Clay, SSgt. Eugene L.
Cobeil, Lt. Col. Earl G.
Cody, Capt. Howard R.
Collins, Capt. Willard M.
Conley, Lt. Col. Eugene O.
Conran, Maj. Philip J.
Cooper, Lt. Col. William E.
Corder, Capt. John A.
Courtney, Capt. Terence F.
Curtis, Capt. Thomas J.
Dallman, Lt. Col. Howard M.



Howard Dallman

Day, Col. George E.
Dayton, Maj. Thomas E.
DeBellevue, Capt. Charles B.
DeTar, Maj. Dean E.
Donelson, Capt. Nicholas J.

RANK ABBREVIATIONS

Cpl.: Corporal
F.O.: Flight Officer
Pfc.: Private First Class
Pvt.: Private
Sfc.: Sergeant First Class
Sgt.: Sergeant

For other ranks, see USAF Grades and Insignia.

Donohue, Maj. Frederic M.
Dorsett, Capt. Tracey K. Jr.
Draeger, Capt. Walter F. Jr.
Dramesi, Col. John A. (2)
Engle, Capt. Charles E.
Eppinger, Maj. Dale L.
Etzel, Capt. Gregory A. M.
Feinstein, Capt. Jeffrey S.
Feuerriegel, Lt. Col. Karl T.
Finck, Maj. George C.
Firse, Capt. John A.
Fish, Sgt. Michael E.
Fleener, Capt. Delbert W.
Flynn, Lt. Gen. John P.
Francisco, Capt. Michael C.
Funderburk, Capt. Leonard J.
Gamlin, Sgt. Theodore R.
Gibson, Maj. James K.
Gilroy, Capt. Kevin A.
Gonzales, Maj. Leonard A.
Green, Maj. Joe B.



Jerry Hoblit

Griggs, Maj. Jerry M.
Gruver, Capt. John C.
Guarino, Col. Lawrence N.
Gustafson, Maj. Gerald C.
Guy, Col. Theodore W.
Hackney, A2C Duane D.
Hackney, Maj. Hunter F.
Hall, 1st Lt. James H.
Hamilton, Col. John S.
Harding, Maj. James C.
Harp, Capt. Tilford W.
Henning, Capt. Hal P.
Hickman, Capt. Vincent J.
Hoblit, Capt. Jerry N.
Hoggatt, Lt. Col. Ralph S.
Holland, Maj. Lawrence T.
Hopkins, Lt. Col. James R.
Horinek, Capt. Ramon A.
Hudson, Capt. Jackson L.
Hunt, Sgt. Russell M.



William Andrews

Jeanotte, Lt. Col. Alfred J. Jr.
Johnson, Capt. Harold E.
Kalen, Maj. Herbert D.
Kasler, Lt. Col. James H. (3)
Kennedy, Capt. Leland T. (2)
Kent, Sgt. Nacey Jr.
Killian, Col. Melvin J.
King, A1C Charles D.
Kirk, Col. Thomas H. Jr.
Knight, Col. Roy A. Jr.
Koeltzow, Maj. Paul F.
Lackey, Capt. John E.
Leetun, Capt. Darel D.
Lielmanis, 1st Lt. Atis K.
Lukasik, Capt. Bernard F.
Madden, Maj. Joseph B.
Maisey, Capt. Reginald V. Jr.
Martin, 1st Lt. Duane W.
Martin, Capt. William R.
Marx, Capt. Donald L.
Mason, Capt. Larry B.
Maysey, Sgt. Larry W.
Maywald, Capt. Phillip V.
McAllister, Maj. William W.

McCarthy, Col. James R.
McGrath, Sgt. Charles D.
McInerney, Lt. Col. James E. Jr.
McKnight, Lt. Col. George G.
McTasney, Capt. John B.
Mehr, Maj. Richard L.
Mitchell, Maj. Carl B.
Mize, Capt. John D.
Mongillo, Maj. Paul J.
Moorberg, Capt. Monte L.
Nagel, Capt. Richard A. Jr.
Newman, Sgt. Thomas A.
Norris, Lt. Col. William C.
O'Mara, Capt. Oliver E.
Olds, Col. Robin
Olsen, Maj. Don P.
Orrell, Capt. Bennie D.
Parr, Col. Ralph S. Jr.
Personett, Capt. Joseph A.
Peterson, Capt. Delbert R.
Pogreba, Lt. Col. Dean A.
Poling, Capt. Richard L.
Price, Capt. Donald S.
Richardson, Sgt. Dennis M.



Zachary Rhyner

USAF Recipients of the Air Force Cross (continued)



Christopher Baradat

Richter, 1st Lt. Karl W.
 Risner, Lt. Col. James R. (2)
 Ritchie, Capt. Richard S.
 Robinson, A1C William A.
 Robinson, Maj. William P.
 Ronca, Maj. Robert F.
 Rowan, Maj. John M.
 Schaneberg, Capt. Leroy C.
 Schmidt, Col. Norman
 Schurr, Lt. Col. Harry W.
 Scott, Capt. Travis H. Jr.
 Sellers, Maj. Jerry A.
 Sellers, Capt. Kenneth H.
 Shannon, Capt. Fred
 Shaub, SSgt. Charles L.
 Smith, TSgt. Donald G.
 Smith, Lt. Col. Robert W.
 Smith, Capt. Ronald E.
 Smith, Capt. Rowland F. Jr.
 Smith, Maj. Weston T.
 Stevens, Capt. Donald D.
 Stocks, Maj. Bruce D.
 Storz, Lt. Col. Ronald E.
 Stovall, Capt. Dale E.
 Talley, Amn. Joel E.
 Titus, Lt. Col. Robert F.
 Trautman, Maj. Konrad W.

Traynor, Capt. Dennis W. III
 Tsouprake, Maj. Peter
 Turner, Maj. Robert E.
 Weatherby, Capt. Jack W.
 Wells, Capt. Norman L.
 Whatley, Maj. Wayne N.
 White, Col. Robert M.
 Whitesides, Capt. Richard L.
 Wilke, Col. Robert F.
 Williams, Capt. David H.
 Wofford, Maj. Travis
 Wood, Maj. Patrick H.
 Worrell, 1st Lt. Rowland H. III
 Wright, Capt. Garth A.
 Wright, TSgt. LeRoy M.
 York, Maj. Glen P.

Mayaguez Incident

Backlund, 1st Lt. Donald R.
 Brims, 1st Lt. Richard C.
 Harston, SSgt. Jon D.
 Purser, Capt. Rowland W.

Operation Desert Storm

Andrews, Capt. William F.
 Johnson, Capt. Paul T.



Robert Gutierrez

Somalia

Wilkinson, TSgt. Timothy A.

War In Afghanistan

Baradat, SSgt. Christopher G.
 Chapman, TSgt. John A.

Crawford, Capt. Barry F. Jr.
 Cunningham, SrA. Jason D.
 Gutierrez, SSgt. Robert Jr.
 Hunter, SSgt. Richard
 Miller, MSgt. Keary J.
 Rhyner, SSgt. Zachary J.
 Ruiz, MSgt. Ivan M.
 Temple, SrA. Dustin H.

USAF Recipients of Special Congressional Medals (highest noncombat award)

NAME AND RANK AT TIME OF AWARD	TYPE	DATE APPROVED	ACHIEVEMENT
Aldrin, Col. Buzz	Gold	Aug. 7, 2009	Second person to walk on the moon, Apollo 11 mission, July 20, 1969
American Fighter Aces	Gold	May 19, 2014	Heroic military service and defense of freedom
Collins, Maj. Gen. Michael	Gold	Aug. 7, 2009	Command module pilot, Apollo 11 mission, July 20, 1969
Doolittle Tokyo Raiders	Gold	May 23, 2014	Bombing raid over Japan's capital, April 18, 1942
Eaker, Lt. Gen. Ira C.	Gold	Oct. 10, 1978	Distinguished aviation pioneer and Air Force leader
Filipino World War II Veterans	Gold	Dec. 14, 2016	Courage and perseverance during the war
Lindbergh, Col. Charles A.	Gold	May 4, 1928	Achievements, specifically New York City-Paris flight, May 20-21, 1927
Mitchell, Brig. Gen. William	Gold	Aug. 8, 1946	Outstanding pioneer service and foresight in American military aviation
Tuskegee Airmen	Gold	April 11, 2006	Unique military record, inspiring revolutionary reform in US armed forces
Women's Airforce Service Pilots	Gold	July 2, 2009	Pioneering military service and exemplary record
World War II members of CAP	Gold	May 30, 2014	Wartime civilian volunteers for patrol and humanitarian missions
Yeager, Brig. Gen. Charles E.	Silver	Dec. 23, 1975	Risking life, piloting X-1 aircraft faster than speed of sound, Oct. 14, 1947

Air Force Aces

By tradition, anyone with five official aerial victory credits is an ace. In compiling this list of aces who flew with the US Air Force and predecessor organizations (the Air Service, Air Corps, and Army Air Forces), *Air Force Magazine* relies on USAF's official accounting of air-to-air aerial victory credits, which is the responsibility of the Air Force Historical Research Agency, Maxwell AFB, Ala.

This record does not include some 300 pilots credited by Eighth Air Force in World War II with destroying aircraft on the ground. Eighth was the only numbered air force to count ground kills, and the Air Force subsequently limited its official recognition of World War II aces to air-to-air victories.

Air Force historians have kept the official records of aerial victories by USAF pilots and crew members since 1957. The Office of the Air Force Historian initially published four separate listings—for World War I, World War II, the Korean War, and the Vietnam War. The four volumes were corrected, updated, and combined into one comprehensive volume. AFHRA continues to correct records and update its listing.

The criteria that the Air Force established for awarding aerial victory credits varied from war to war.

In many cases during World War I, several aviators worked together to down a single aircraft. The Air Service awarded one whole credit to each aviator who contributed to the victory. A single victory could—and often did—result in three or four victory credits.

In World War II and Korea, the criteria were changed. The service divided one credit among all aviators who contributed to destruction of an enemy airplane. With the awarding of fractional credits, a single victory could result in no more than one credit.

The rules were changed again in the Vietnam War. When an F-4 downed an enemy aircraft, USAF would award two full aerial victory credits—one to the frontseater and one to the backseater. As in World War I, a single victory resulted in multiple victory credits.

Thus, the standards for World War II and Korea were more restrictive than those for World War I and Vietnam.



Boyd Wagner is the first AAF ace of World War II.



Richard Ritchie is the first USAF ace of the Vietnam War.

Some Famous Firsts

April 23, 1918	First Air Service ace in World War I: 1st Lt. Paul F. Baer
Dec. 16, 1941	First AAF ace of World War II: 1st Lt. Boyd D. Wagner
May 20, 1951	First USAF ace of the Korean War: Capt. James Jabara
Nov. 30, 1951	First USAF ace of two wars (World War II and Korea): Maj. George A. Davis Jr. (seven in World War II and 14 in Korea)
Jan. 2, 1967	First (and only) USAF ace with victories in World War II and Vietnam: Col. Robin Olds (12 in World War II and four in Vietnam)
Aug. 28, 1972	First USAF ace of Vietnam: Capt. Richard S. Ritchie

American Aces of World War I



James Meissner (8)

Rickenbacker, Capt. Edward V.	26
Luke, 2nd Lt. Frank Jr.	18
Vaughn, 1st Lt. George A.	13
Kindley, 1st Lt. Field E.	12
Springs, 1st Lt. Elliott W.	12
Landis, 1st Lt. Reed G.	10
Swaab, 1st Lt. Jacques M.	10
Baer, 1st Lt. Paul F.	9
Cassady, 1st Lt. Thomas G.	9
Hamilton, 1st Lt. Lloyd A.	9
Wright, 1st Lt. Chester E.	9
Clay, 1st Lt. Henry R. Jr.	8
Coolidge, Capt. Hamilton	8
Donaldson, 2nd Lt. John O.	8
Erwin, 1st Lt. William P.	8
Hunter, 1st Lt. Frank O'D.	8
Jones, 2nd Lt. Clinton	8
Meissner, Capt. James A.	8

In World War I, pilots who shared victories were each given one credit. This list uses the World War I counting rule.

Stenseth, 1st Lt. Martinus	8
White, 2nd Lt. Wilbert W.	8
Burdick, 2nd Lt. Howard	7
Chambers, 1st Lt. Reed M.	7
Cook, 1st Lt. Harvey W.	7
Creech, 1st Lt. Jesse O.	7
Holden, 1st Lt. Lansing C.	7
Robertson, 1st Lt. Wendel A.	7
Rummell, 1st Lt. Leslie J.	7
Schoen, 1st Lt. Karl J.	7
Sewall, 1st Lt. Sumner	7
Beane, 1st Lt. James D.	6
Biddle, Capt. Charles J.	6
Brooks, 2nd Lt. Arthur R.	6
Campbell, 1st Lt. Douglas	6
Curtis, 1st Lt. Edward P.	6
Easterbrook, 1st Lt. Arthur E.	6
Guthrie, 1st Lt. Murray K.	6
Hammond, 1st Lt. Leonard C.	6
Hays, 2nd Lt. Frank K.	6
Hudson, 1st Lt. Donald	6
Knotts, 2nd Lt. Howard C.	6
Lindsay, 1st Lt. Robert O.	6
MacArthur, 2nd Lt. John K.	6
Ponder, 2nd Lt. William T.	6
Putnam, 1st Lt. David E.	6
Stovall, 1st Lt. William H.	6
Tobin, 1st Lt. Edgar G.	6
Vasconcells, 1st Lt. Jerry C.	6
Badham, 2nd Lt. William T.	5
Bair, 1st Lt. Hilbert L.	5
Bissell, 1st Lt. Clayton L.	5
Buckley, 1st Lt. Harold R.	5
Cook, 1st Lt. Everett R.	5
D'Olive, 1st Lt. Charles R.	5
Furlow, 1st Lt. George W.	5
George, 1st Lt. Harold H.	5
Grey, 1st Lt. Charles G.	5
Haight, 1st Lt. Edward M.	5

Healy, 1st Lt. James A.	5
Keating, 1st Lt. James A.	5
Knowles, 1st Lt. James Jr.	5
Larner, 1st Lt. G. DeFreest	5
Luff, 1st Lt. Frederick E.	5
O'Neill, 2nd Lt. Ralph A.	5
Owens, 2nd Lt. John S.	5
Porter, 2nd Lt. Kenneth L.	5
Ralston, 1st Lt. Orville A.	5
Seerley, 1st Lt. John J.	5
Strahm, Capt. Victor H.	5
Todd, 2nd Lt. Robert M.	5
Vernam, 1st Lt. Remington D. B.	5
Wehner, 1st Lt. Joseph F.	5
Williams, 1st Lt. Rodney D.	5



Charles Grey (5)

Leading Army Air Forces Aces of World War II (Ten or more victories)



Walker Mahurin (20.75)

Ranks are as of last victory in World War II.

Bong, Maj. Richard I.	40
McGuire, Maj. Thomas B. Jr.	38
Gabreski, Lt. Col. Francis S.	28
Johnson, Capt. Robert S.	27
MacDonald, Col. Charles H.	27
Preddy, Maj. George E.	26.83
Meyer, Lt. Col. John C.	24
Schilling, Col. David C.	22.5
Johnson, Lt. Col. Gerald R.	22
Kearby, Col. Neel E.	22
Robbins, Maj. Jay T.	22
Christensen, Capt. Fred J.	21.5
Wetmore, Capt. Ray S.	21.25
Voll, Capt. John J.	21
Mahurin, Maj. Walker M.	20.75

Lynch, Lt. Col. Thomas J.	20
Westbrook, Lt. Col. Robert B.	20
Gentile, Capt. Don S.	19.83
Duncan, Col. Glenn E.	19.5
Carson, Capt. Leonard K.	18.5
Eagleston, Maj. Glenn T.	18.5
Beckham, Maj. Walter C.	18
Green, Maj. Herschel H.	18
Herbst, Lt. Col. John C.	18
Zemke, Col. Hubert	17.75
England, Maj. John B.	17.5
Beeson, Capt. Duane W.	17.33
Thornell, 1st Lt. John F. Jr.	17.25
Varnell, Capt. James S. Jr.	17
Johnson, Maj. Gerald W.	16.5

Leading Army Air Forces Aces of World War II (continued)

Godfrey, Capt. John T.	16.33
Anderson, Capt. Clarence E. Jr.	16.25
Dunham, Lt. Col. William D.	16
Harris, Lt. Col. Bill	16
Welch, Capt. George S.	16
Beerbower, Capt. Don M.	15.5
Brown, Maj. Samuel J.	15.5
Peterson, Capt. Richard A.	15.5
Whisner, Capt. William T. Jr.	15.5
Bradley, Lt. Col. Jack T.	15
Cragg, Maj. Edward	15
Dahlberg, Capt. Kenneth H.	15
Foy, Maj. Robert W.	15
Hofer, 2nd Lt. Ralph K.	15
Homer, Capt. Cyril F.	15
Landers, Lt. Col. John D.	14.5
Powers, Capt. Joe H.	14.5
Brown, Capt. Henry W.	14.2
Carr, 1st Lt. Bruce W.	14
Curtis, Maj. Robert C.	14
DeHaven, Capt. Robert M.	14
Emmer, Capt. Wallace N.	14
Goodson, Maj. James A.	14
Jeffrey, Lt. Col. Arthur F.	14
McComas, Lt. Col. Edward O.	14
Roberts, Capt. Daniel T. Jr.	14
West, Capt. Richard L.	14
Bochkay, Maj. Donald H.	13.83
Strait, Maj. Donald J.	13.5
Bryan, Capt. Donald S.	13.33
Carpenter, Maj. George	13.33
Brooks, 1st Lt. James L.	13
Hampshire, Capt. John F. Jr.	13
Head, Capt. Cotesworth B. Jr.	13
Holloway, Col. Bruce K.	13
Millikan, Capt. Willard W.	13
Moran, 1st Lt. Glennon T.	13
Parker, Capt. Harry A.	13
Stephens, Maj. Robert W.	13
Williamson, Capt. Felix D.	13
Brueland, Maj. Lowell K.	12.5
Brown, Maj. Quince L.	12.33
Brezas, 1st Lt. Michael	12
Chase, Lt. Col. Levi R.	12
East, Capt. Clyde B.	12



Donald Bryan (13.33)



Richard Turner (11) in front of his P-51 Mustang "Short-Fuse Sallee"



Ray Wetmore (21.25)

Gleason, Capt. George W.	12
Hively, Maj. Howard D.	12
Ladd, Capt. Kenneth G.	12
Moore, Maj. Robert W.	12
Olds, Maj. Robin	12
Schreiber, Capt. Leroy A.	12
Skogstad, 1st Lt. Norman C.	12
Sloan, 1st Lt. William J.	12
Watkins, Capt. James A.	12
Megura, Capt. Nicholas	11.83
Blakeslee, Col. Donald J. M.	11.5
Conger, Maj. Paul A.	11.5
Kirla, 1st Lt. John A.	11.5
McDonald, Maj. Norman L.	11.5
Stewart, Maj. James C.	11.5
Yeager, Capt. Charles E.	11.5
Norley, Maj. Louis H.	11.33
Frantz, 1st Lt. Carl M.	11
Goebel, Capt. Robert J.	11
Lawler, Capt. John B.	11
Lent, 1st Lt. Francis J.	11
Leverette, Lt. Col. William L.	11

Loisel, Maj. John S.	11
Lowry, 1st Lt. Wayne L.	11
McCorkle, Col. Charles M.	11
McKennon, Maj. Pierce W.	11
Mitchell, Lt. Col. John W.	11
Molland, Capt. Leland P.	11
Quirk, Capt. Michael J.	11
Riddle, 1st Lt. Robert E.	11
Shubin, 1st Lt. Murray J.	11
Smith, Capt. Cornelius M. Jr.	11
Sparks, 1st Lt. Kenneth C.	11
Turner, Maj. Richard E.	11
O'Connor, Capt. Frank Q.	10.75
Ceuleers, Lt. Col. George F.	10.5
Clark, Lt. Col. James A. Jr.	10.5
Doersch, Capt. George A.	10.5
Halton, Maj. William T.	10.5
Hovde, Maj. William J.	10.5
Littge, Capt. Raymond H.	10.5
Storch, Lt. Col. John A.	10.5
Glover, Maj. Fred W.	10.33
Anderson, 1st Lt. Charles F.	10
Aschenbrener, Capt. Robert W.	10
Blickenstaff, Lt. Col. Wayne K.	10
England, Maj. James J.	10
Giroux, Capt. William K.	10
Gladych, Squadron Leader Michael*	10
Goehausen, Capt. Walter J. Jr.	10
Harris, Capt. Ernest A.	10
Lines, 1st Lt. Ted E.	10
Rankin, 1st Lt. Robert J.	10
Reynolds, 1st Lt. Andrew J.	10
Scott, Col. Robert L. Jr.	10
Stanch, Capt. Paul M.	10
Summer, Capt. Elliot	10

*Squadron Leader Gladych was Polish and flew in service with American units, but because the Polish government in exile was headquartered in London, Polish pilots had British designations.

For a list of all Air Force-recognized World War II AAF aces, please see airforcemag.com.

USAF Aces of the Korean War

McConnell, Capt. Joseph C. Jr.	16
Jabara, Maj. James	15
Fernandez, Capt. Manuel J. Jr.	14.5
Davis, Maj. George A. Jr.	14
Baker, Col. Royal N.	13
Blesse, Maj. Frederick C.	10
Fischer, Capt. Harold E.	10
Garrison, Lt. Col. Vermont	10
Johnson, Col. James K.	10
Moore, Capt. Lonnie R.	10
Parr, Capt. Ralph S. Jr.	10
Foster, Capt. Cecil G.	9
Low, 1st Lt. James F.	9
Hagerstrom, Maj. James P.	8.5
Risner, Capt. James R.	8
Ruddell, Lt. Col. George I.	8
Buttelmann, 1st Lt. Henry	7
Jolley, Capt. Clifford D.	7
Lilley, Capt. Leonard W.	7
Adams, Maj. Donald E.	6.5
Gabreski, Col. Francis S.	6.5
Jones, Lt. Col. George L.	6.5
Marshall, Maj. Winton W.	6.5
Bolt, Maj. John F.*	6
Kasler, 1st Lt. James H.	6
Love, Capt. Robert J.	6
Whisner, Maj. William T. Jr.	5.5
Baldwin, Col. Robert P.	5
Becker, Capt. Richard S.	5
Bettinger, Maj. Stephen L.	5
Cleveland, 1st Lt. Charles G.	5
Creighton, Maj. Richard D.	5
Curtin, Capt. Clyde A.	5
Gibson, Capt. Ralph D.	5



Vermont Garrison (10)

Kincheloe, Capt. Iven C. Jr.	5
Latshaw, Capt. Robert T. Jr.	5
Moore, Capt. Robert H.	5
Overton, Capt. Dolphin D. III	5
Thyng, Col. Harrison R.	5
Wescott, Maj. William H.	5

*USMC exchange pilot.



Joseph McConnell (16)

USAF Aces of the Vietnam War

DeBellevue, Capt. Charles B.	6
Feinstein, Capt. Jeffrey S.	5
Ritchie, Capt. Richard S.	5



Jeffrey Feinstein (5)



Richard Ritchie (left) (5) and Charles DeBellevue (right) (6). They scored four of their victories while flying together.

AAF/USAF Aces With Victories in More Than One War



William Whisner Jr. is credited with 15.5 aerial victories in WW II and 5.5 in the Korean War. He also served in Vietnam.

	WW II	KOREA	VIETNAM	TOTAL
Gabreski, Col. Francis S.	28	6.5		34.5
Meyer, Col. John C.	24	2		26
Mahurin, Col. Walker M.	20.75	3.5		24.25
Davis, Maj. George A. Jr.	7	14		21
Whisner, Maj. William T. Jr.	15.5	5.5		21
Eagleston, Col. Glenn T.	18.5	2		20.5
Garrison, Lt. Col. Vermont	7.33	10		17.33
Baker, Col. Royal N.	3.5	13		16.5
Jabara, Maj. James	1.5	15		16.5
Olds, Col. Robin	12		4	16
Mitchell, Col. John W.	11	4		15
Brueland, Maj. Lowell K.	12.5	2		14.5
Hagerstrom, Maj. James P.	6	8.5		14.5
Hovde, Lt. Col. William J.	10.5	1		11.5
Johnson, Col. James K.	1	10		11
Ruddell, Lt. Col. George I.	2.5	8		10.5
Thyng, Col. Harrison R.	5	5		10
Colman, Capt. Philip E.	5	4		9
Heller, Lt. Col. Edwin L.	5.5	3.5		9
Chandler, Maj. Van E.	5	3		8
Hockery, Maj. John J.	7	1		8
Little, Maj. James W.	7	1		8
Creighton, Maj. Richard D.	2	5		7
Emmert, Lt. Col. Benjamin H. Jr.	6	1		7
Bettinger, Maj. Stephen L.	1	5		6
Visscher, Maj. Herman W.	5	1		6
Liles, Capt. Brooks J.	1	4		5
Mattson, Capt. Conrad E.	1	4		5
Shaeffer, Maj. William F.	2	3		5

Leading Air Service/AAF/USAF Aces of All Wars

Bong, Maj. Richard I.	40	WW II	Baker, Col. Royal N.	16.5	WW II, Korea
McGuire, Maj. Thomas B. Jr.	38	WW II	Jabara, Maj. James	16.5	WW II, Korea
Gabreski, Col. Francis S.	34.5	WW II, Korea	Johnson, Maj. Gerald W.	16.5	WW II
Johnson, Capt. Robert S.	27	WW II	Godfrey, Capt. John T.	16.33	WW II
MacDonald, Col. Charles H.	27	WW II	Anderson, Capt. Clarence E. Jr.	16.25	WW II
Preddy, Maj. George E.	26.83	WW II	Dunham, Lt. Col. William D.	16	WW II
Meyer, Col. John C.	26	WW II, Korea	Harris, Lt. Col. Bill	16	WW II
Rickenbacker, Capt. Edward V.	26	WW I	McConnell, Capt. Joseph C. Jr.	16	Korea
Mahurin, Col. Walker M.	24.25	WW II, Korea	Olds, Col. Robin	16	WW II, Vietnam
Schilling, Col. David C.	22.5	WW II	Welch, Capt. George S.	16	WW II
Johnson, Lt. Col. Gerald R.	22	WW II	Beerbower, Capt. Don M.	15.5	WW II
Kearby, Col. Neel E.	22	WW II	Brown, Maj. Samuel J.	15.5	WW II
Robbins, Maj. Jay T.	22	WW II	Peterson, Capt. Richard A.	15.5	WW II
Christensen, Capt. Fred J.	21.5	WW II	Bradley, Lt. Col. Jack T.	15	WW II
Wetmore, Capt. Ray S.	21.25	WW II	Cragg, Maj. Edward	15	WW II
Davis, Maj. George A. Jr.	21	WW II, Korea	Dahlberg, Capt. Kenneth H.	15	WW II
Voll, Capt. John J.	21	WW II	Foy, Maj. Robert W.	15	WW II
Whisner, Capt. William T. Jr.	21	WW II, Korea	Hofer, 2nd Lt. Ralph K.	15	WW II
Eagleston, Col. Glenn T.	20.5	WW II, Korea	Homer, Capt. Cyril F.	15	WW II
Lynch, Lt. Col. Thomas J.	20	WW II			
Westbrook, Lt. Col. Robert B.	20	WW II			
Gentile, Capt. Don S.	19.83	WW II			
Duncan, Col. Glenn E.	19.5	WW II			
Carson, Capt. Leonard K.	18.5	WW II			
Beckham, Maj. Walter C.	18	WW II			
Green, Maj. Herschel H.	18	WW II			
Herbst, Lt. Col. John C.	18	WW II			
Luke, 2nd Lt. Frank Jr.	18	WW I			
Zemke, Col. Hubert	17.75	WW II			
England, Maj. John B.	17.5	WW II			
Beeson, Capt. Duane W.	17.33	WW II			
Garrison, Lt. Col. Vermont	17.33	WW II, Korea			
Thornell, 1st Lt. John F. Jr.	17.25	WW II			
Varnell, Capt. James S. Jr.	17	WW II			



The top two scoring aces of WW II, Richard Bong (left) (40) and Thomas McGuire Jr. (38).



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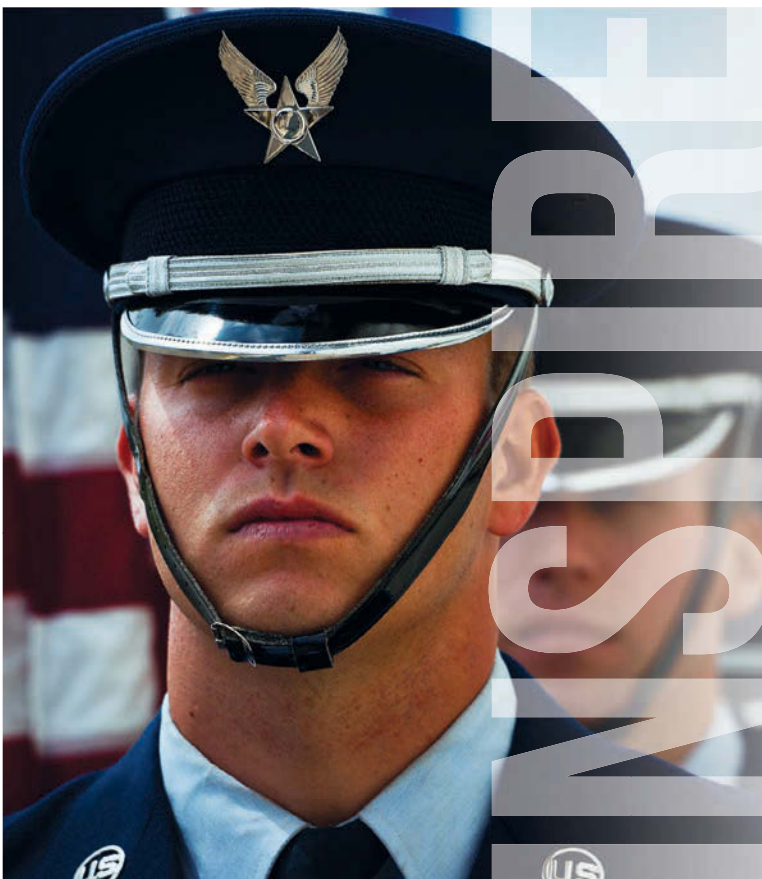
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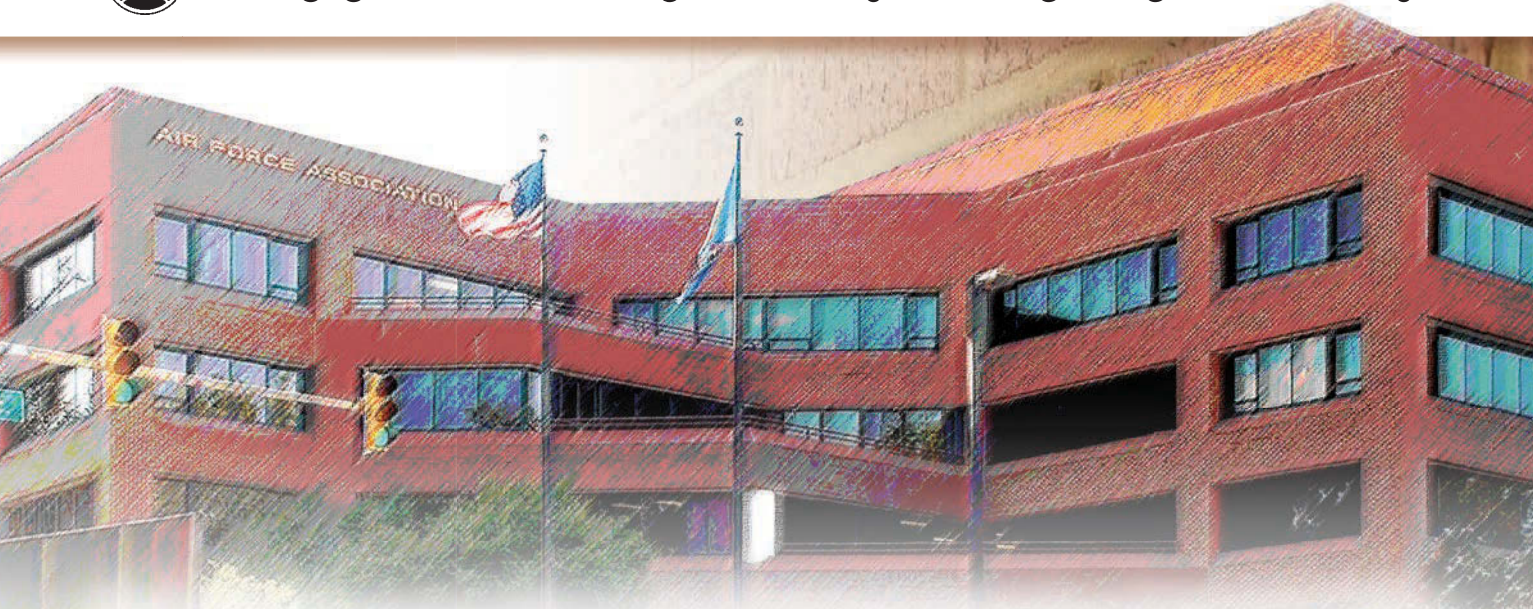
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Lloyd Swede,
Langley Chapter
Vice President for
Wounded Airmen
Affairs.

LLOYD SWEDE

Home State: Florida
Chapter: Langley Chapter (Virginia)
Joined AFA: 2014
AFA Office: Vice President, Wounded Airmen Affairs, Langley Chapter; Wounded Airman Council Member; AFA Membership Committee Military Service.
Military Service: 2007-present, Active Duty
Occupation: Civil Engineer Pavements and Equipment Instructor
Education: A.A.S., Construction Technology, Community College of the Air Force.

■ What prompted you to join?

AFA opened my eyes to so many aspects of the Air Force. Previously, I had very minimal knowledge of the different career fields outside of my own. After hearing different perspectives from speakers at the luncheons and conferences, I gained an understanding of how intricate a role AFA plays in the Air Force. The association pulls together the great minds of the past and the future leaders of the Air Force. I became a lifetime member of AFA so I could help make a difference and be a part of such an influential organization.

■ What do you enjoy most about AFA?

I enjoy getting the opportunity to meet legends in the Air Force past and present like Ret. Col. Richard E. Cole and former Chief Master Sergeants of the Air Forces. At AFA events, everyone is a Mr./Mrs./Ms.—as General Jimmy Doolittle said best, “Generals, Colonels, Second Looies, Top-kicks, and Buck Privates are all just plain “mister” in AFA. If you want to grow and get better, get around those that will stretch you and have proven it can be done. They are still serving, molding and shaping our Air Force.

■ How do we build awareness about AFA?

I believe AFA needs a well-developed app. It needs to be easy to use and current with all the latest information about AFA. We need to be able to get updates on events, communities, chapter news, and newsletters. The app should also have the ability to geolocate so new members and PCSing members can find/contact the nearest chapters to them. With technology evolving and with our generation needing to be connected at all times, I believe it would greatly help with recruiting and retention. It is our job to relay our value to the Air Force. We must find a way to consistently and intimately integrate with USAF, without burdening an already overtasked force. I should not have to explain to any airman what AFA is or why we are here.

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

Courtesy photo



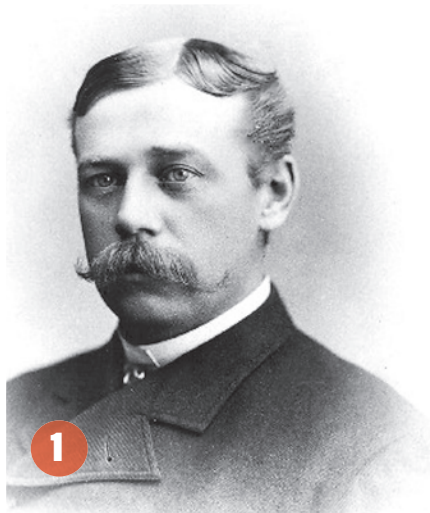
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It is the oldest continuously active base in the Air Force, and it has played a role in everything from the Great Sioux Wars to nuclear deterrence. It has gone by two names.

The first was Ft. David A. Russell, a frontier cavalry post established in Wyoming Territory in July 1867 to help protect Union Pacific workers from Indians. David Allen Russell, a heroic Union general who died in the Civil War, was its namesake for 63 years.

Then, in 1930, President Herbert Hoover changed things. Ft. Russell became Ft. Francis E. Warren. Cavalry departed and aviation arrived. Soon Ft. Warren became F. E. Warren Air Force Base.

Francis Emroy Warren was a Civil War hero. Born in 1844 in the rolling hills of western Massachusetts, he was only 18 when he enlisted in the 49th Regiment of the Massachusetts Volunteer Infantry.

On May 27, 1863, Warren's platoon was laying siege to rebels at Port Hudson, La. Rebel bombardment hit the Union force, killing most of the men. Though badly wounded, 19-year-old Corporal Warren counter-attacked and helped silence the rebel position.

For this, Warren was awarded the Medal of Honor. He served as a captain in the post-Civil War Massachusetts Militia.

Warren's life was destined for many more major moments.

Bored with his postwar life as a Massachusetts farmer and stockman, young Warren packed up in 1868 and moved to



the wild and woolly Wyoming Territory. To put his action in context, recall that this was eight years before Gen. George Custer's last stand at the Battle of Little Bighorn.

The young fortune-seeker engaged in enterprises ranging from real estate development in Cheyenne to the livestock business. He was instrumental in bringing in Cheyenne's first lighting system. He became quite wealthy and, inevitably, was drawn into Republican politics at the Territorial level.

In February 1885, President Chester A. Arthur appointed Warren to be governor of the Territory of Wyoming. In 1890, he was elected the first governor of the State of Wyoming.

Not long afterward, he was elected to the United States Senate, where he served (except for two years) until his death in late 1929. Warren was the last Civil War veteran to serve in that body. At the time of his death, he also had been a senator for 37 years, longer than any other in history.

Near the end of his life, however, Warren was surprisingly downbeat about politics. "It ought to be the last hope of any young man starting out in life," he told a newspaperman.

In its first decade under USAF ownership, Warren AFB was run by Air Training Command. Strategic Air Command took ownership in 1958 and transformed War-

1/ Photo of a young Francis Warren.
2/ ICBMs displayed at F. E. Warren.
3/ Airmen prepare a missile warhead for removal at F. E. Warren.

FRANCIS EMROY WARREN

Born: June 20, 1844, Hinsdale, Mass.

Died: Nov. 24, 1929, Washington, D.C.

Education: Hinsdale Public Schools, Hinsdale Academy

Services: US Army, Massachusetts Militia

Occupations: Rancher, businessman, politician

Political Party: Republican

Main Era: Civil War

Offices: Senate, Wyoming Terr.; Governor, Wyoming Terr.; Governor, State of Wyoming, US Senate (1890-93, 1895-1929)

Final Grade: Captain, Mass. Militia

Honors: Chairman, Senate Committee on Military Affairs

Famous Friends: Gen. John. J. Pershing, Theodore Roosevelt, William Howard Taft

Buried: Cheyenne, Wyo.

F. E. WARREN AIR FORCE BASE

State: Wyoming

Nearest City: Cheyenne

Area of Main Base: 5.1 Sq mi. 3,264 acres

Status: Open, operational

Opened (US Army): July 27, 1867

Named Ft. David A. Russell: Sept. 8, 1867

Renamed Ft. F. E. Warren: Jan. 1, 1930

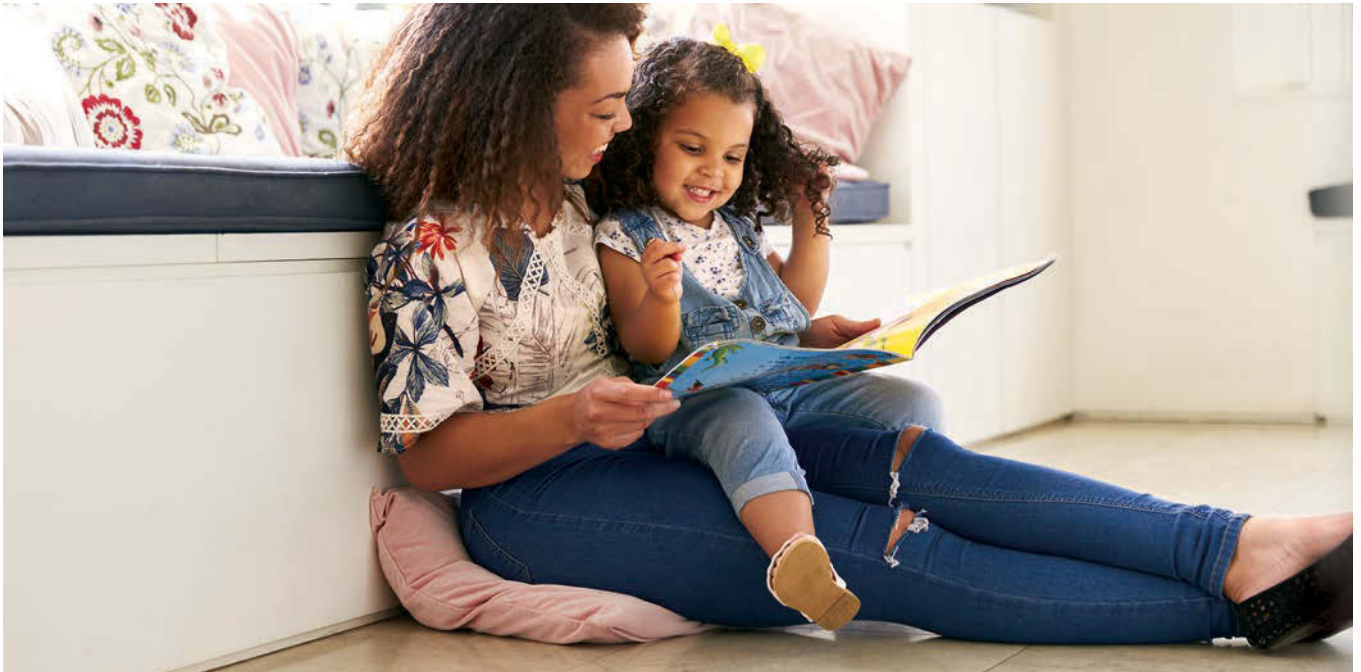
Renamed F. E. Warren AFB: Oct. 7, 1949

Current Owner: Air Force Global Strike Command

Former Owners: US Army, Air Training Command, Strategic Air Command, Air Combat Command, Air Force Space Command

ren into one of the nation's premier Cold War installations. It was the deployment site for the first operational Atlas ICBMs. Over time, Warren also became home for Minuteman and Peacekeeper ICBMs. The Peacekeepers have been decommissioned, but Warren still boasts 150 triple-warhead Minuteman III weapons. Today, the base is home to USAF's 20th Air Force.

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