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**About the cover:** Two bald eagles at Kenai Peninsula, Alaska. See "USAF Almanac 2011," p. 36. Corbis photo by Theo Allofs.



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# Editorial

**By Adam J. Hebert,** Editor in Chief

# Why Qaddafi Must Go

April 12, 2011

In mid-April, with no resolution to Libya's month-long civil war in sight, the African Union announced a cease-fire proposal enthusiastically endorsed by Muammar Qaddafi's supporters.

Libya's rebel leaders promptly rejected the proposal. The proposed truce cynically called for talks between the factions and an end to air operations defending Libyan citizens—but did not call for Qaddafi to step down.

In addition to being a murderous thug and longtime supporter of international terrorism, Qaddafi is also a master manipulator and survivalist. He has clung to power in Libya for 41 years, mostly as an international pariah. After promising to ruthlessly murder his opposition this spring—and very nearly succeeding—the only solution now is to remove him from power.

The US is not a neutral party in this issue, and it is useful to recount some of the lowlights from four decades of American "relations" with Qaddafi.

June 11, 1970: The Air Force shuts down Wheelus Air Base, near Tripoli, after Qaddafi spent his first year as Libya's dictator ordering the US base closed and harassing its occupants. At one point near the end, Qaddafi was involved in an Old West-style standoff with then-Col. Chappie James, the base commander, who had to tell Qaddafi to take his hand off his gun.

Aug. 19, 1981: After Qaddafi declares portions of the Mediterranean Sea as Libyan territory, President Reagan orders the Navy to patrol the Gulf of Sidra. A Libyan Su-22 fires a missile at patrolling Navy F-14s, and two Tomcats (one carrying Vice Adm. David J. Venlet, now director of the F-35 program) shoot down two Su-22s.

April 5, 1986: The Libyan government orchestrates the bombing of a West Berlin nightclub packed with US servicemen. The explosion kills three and injures more than 200, including 79 American troops. Nine days later, Reagan orders Operation Eldorado Canyon, a massive air raid against Libyan military facilities, command and control elements, and suspected terror training sites.

Dec. 21, 1988: A bomb rips through Pan Am Flight 103, destroying the aircraft above Lockerbie, Scotland. All 259 aboard the aircraft are killed, as are 11 people on the ground hit by the falling wreckage. After a painstaking investigation, the attack is eventually traced back to Qaddafi's Libya.

Jan. 4, 1989: In another Gulf of Sidra incident, two Libyan MiG-23s race toward the Navy's aircraft carrier *John F. Kennedy* in international waters. A pair of F-14s turn away the MiGs four times, but on the fifth and closest approach, the Tomcats shoot down the two missile-armed MiGs.

**Like it or not, the US is now committed and must lead the rebels to victory.**

Aug. 20, 2009: Lockerbie bomber Abdelbaset al Megrahi is released from prison in Scotland on "compassionate grounds," supposedly with less than three months to live. He served less than nine years of a life sentence. Megrahi is feted with a hero's welcome upon his return to Libya, where he lives to this day.

March 17, 2011: "The matter has been decided. ... We are coming," Qaddafi says as his forces close in on the rebel stronghold of Benghazi. He vows "no mercy or compassion" toward those who resist him, saying his forces will go door to door to punish his enemies. The NATO air campaign begins two days later.

"There needs to be a transition that reflects the will of the Libyan people and the departure of Qaddafi from power—and from Libya," said Secretary of State Hillary Rodham Clinton. NATO is defending Libya's citizens and enforcing a no-fly zone, relying heavily on Air Force enablers. This is not enough.

Qaddafi has proved two things during his four-decade reign of terror: (1) He will not be contained, and (2) he knows how to stay in power. Continued stalemate could lead to a divided Libya partly under Qaddafi's control, partly held by the rebels.

Whether it is leading a decisive action or an open-ended air blockade, the Air Force will be there: It alone has the intelligence, battle management, refueling, and precision attack capabilities needed to make an effective air operation possible.

A no-fly zone over Libya might seem simple enough, but this "solution" could be a disaster for the Air Force, which would be left holding the bag. Think back to the most famous US no-fly zones, over Iraq.

Operations Northern and Southern Watch defended Iraq's minorities from attack by Saddam Hussein but consumed billions of dollars, required hundreds of thousands of sorties, endured thousands of Iraqi missile and anti-aircraft artillery attacks, and forced hundreds of Air Force counterattacks against Iraq's air defenses, radars, and C2 elements.

The no-fly zones were supposed to be temporary, but lasted for 12 years—only ending with the 2003 invasion of Iraq. They were the worst of both worlds: a dead-serious mission against a foe intent on shooting down a US aircraft, but consisting mostly of uneventful flights that degraded skills and wore out equipment.

Without assertive action, the situation in Libya could easily wind up the same, and the Air Force cannot afford another permanent combat mission. Since the no-fly zones began, neither side has shown a decisive advantage. The US, NATO, Arab League, and other supporters therefore need to arm the rebels and have special operators work closely with them to coordinate movement and direct air strikes.

Qaddafi's forces, C2, and creature comforts need to be targeted and quickly destroyed. The Air Force's strike aircraft have gone home to Europe, but they can easily be recalled.

Like it or not, the US is now committed and must lead the rebels to victory. Thus far, however, others have taken the lead for various political, diplomatic, and military reasons.

Unfortunately, NATO has never had the will to lead a war without American leadership, and the Arab League has been ambivalent about the mission from the outset. UN Security Council Resolution #1973 calls for "a peaceful and sustainable solution" to Libya's civil war.

There is only one peaceful and sustainable solution. If Qaddafi stays in power, history shows he will eventually go after all those who opposed him. ■

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# Letters

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**Lavelle and Schwalier**

Your recent editorial "Justice Rejected" *[March, p. 2]* accurately reports that John D. Lavelle continues to be denied justice in the face of overwhelming evidence that he honorably carried out the orders of his Commander in Chief. It is disappointing to note that Senator McCain has not followed up on his promise to act quickly on the nomination for posthumous promotion, particularly when one considers that his grandfather, Admiral John S. ("Slew") McCain, is the only other senior officer to be promoted posthumously to four-star rank after being fired from his job.

McCain had led the fast carrier task force in the Pacific Ocean Theatre through the decisive naval battles of World War II with great skill and courage. He took the blame, and was denied promotion to four stars, when Admiral Halsey ordered his forces to stay on station in the face of Typhoon Cobra which bore down on the fleet. It resulted in the loss of 800 men and 146 aircraft. In today's parlance, Halsey was "too big to fail"; he was a national figure of great stature.

McCain died shortly after returning home after the surrender of the Japanese. A few years later, he was posthumously promoted to the four-star rank he had richly deserved. Senator McCain briefly relates the story in his book *Faith of our Fathers.* Mrs. Jo Lavelle (age 91) quietly awaits similar justice for her beloved spouse.

Lt. Gen. Aloysius G. Casey,
USAF (Ret.)
Redlands, Calif.

*Air Force* Magazine Editor in Chief Adam Hebert seemed surprised that General Lavelle and General Schwalier have not been treated fairly.

Perhaps the Navy can offer some clarity to this matter: "Even admitting for the sake of argument all of the facts alledged, ... the more important consideration in these cases is, ... unapologetically, protection of the established scope of Presidential power itself."

So wrote Cmdr. Roger Scott in his June 1998 *Military Law Review* article (Vol. 156, p. 52) "Kimmel, Short, McVay: Case Studies in Executive Authority, Law, and Individual Rights of Military Commanders."

A comparison of the results so far obtained for requested relief of other famous military scapegoats, Kimmel, Short, and McVay, are so far the same as for Lavelle and Schwalier: none.

Tom Kimmel
Cocoa Beach, Fla.

**Matador and Mace**

I read with great interest the article titled, "Victor Alert," in the March 2011 issue of *Air Force* Magazine *[p. 58]*. Although the author did a good job describing the role that the fighter squadrons played in supporting the Victor Alert effort in Europe, there were several missile organizations that supported the Victor Alert requirement during the period of the article that were not mentioned. Rebecca Grant did not even recognize the fact that the TM-76A (MGM-13B) Mace missiles of the 38th Tactical Missile Wing carried most of the Victor targets during the period from the summer of 1961 through August 1966. (The Mace missiles were deactivated in September of 1966.) There were six launch sites with eight missiles (and later 12 missiles) each that stood Victor Alert. Compare that with two Victor Alert aircraft per fighter squadron assigned to USAFE during that period to get an idea of the portion of the Victor Alert workload carried by the 38th Tactical Missile Wing.

Maj. Robert W. O'Brien,
USAF (Ret.)
San Pedro, Calif.

The article "Victor Alert" I believe has omitted an important part of the nuclear deterrent forces in Western Europe in the 1950s and 1960s.

The tactical missile Matador, TM-61C, was deployed to Germany from 1954 to 1961, three missile groups strong. It was replaced by the Mace TM-76 from 1961 to 1969.

Wilmer Schimke,
New London, Wis.

Your readers might be interested to know that in early 1959, the F-101A/C became the first single-seat fighter to become operational in England as a 24-hour, day-night, all-weather Victor Alert. That was not what the Soviets wanted, for we were providing around-the-clock good/bad weather coverage in the event they were to attack NATO.

The F-101 was procured by SAC to escort the B-47, then determined not to be useful and was transferred to TAC in 1957, along with many other fighters. Thus RAF Stations Bentwaters and Woodbridge played important roles. The principal architect was Lt. Col. John Burns, who led the effort when we were at Bergstrom Air Force Base at Austin, Tex., in 1958. I was proud to play a supporting role.

Lt. Gen. Phil Gast,
USAF (Ret.)
Durham, N.C.

Thanks for recognizing those who spent time in those alert facilities, but you did not mention that senior enlisted personnel were assigned in 1968 to manage and operate Victor Alert facilities. January 1968, I was reassigned from Wurtsmith Air Force Base to RAF Weathersfield as the NCOIC of Victor Alert, along with four technical sergeants. We replaced four lieutenants and a captain because of the shortage of officer personnel due to the Vietnam conflict. I believe that I was the first NCO in USAFE to be certified as a Victor Alert duty officer (VADO). We were informed that we were the test case to see if we could perform these duties.

Our duties were to maintain the operation center on a 24-hour basis. There were only five of us, and we had to have one man on standby to open a secondary VA in the event we had to load all of our 70 F-100s in an emergency. This required me to establish a 10-hour day shift and 14-hour night shift. We had an 18-bedroom facility that was only fully used during a buildup of all aircraft, and we were required to ensure the security and feeding of all assigned personnel. Additionaly, we

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determined the runway to be used and weather in the target and recovery area.

We maintained coding material for the aircraft launch and the arming of the nukes and were trained to manually arm a nuke if the aircraft system failed to arm the bomb. The senior bomb commander and the VADO each were armed with a 45 mm handgun and both had the combination to their separate locks on the safe. No one person had access to the code material or to the aircraft. During an alert when we received a coded message from the command post, we placed the pilots in the aircraft cockpit, and upon a launch order, we broadcasted the launch message. Before we placed the pilots in their aircraft, they were informed of the runway to be used and the weather in the target and recovery area.

On a day-to-day basis, we preflighted all alert aircraft, and on Thursdays we ran up each aircraft. I had an aircraft maintenance NCO, but each aircraft that entered VA came with its crew chief who was required to maintain the aircraft.

When we were placed on alert, such as a NATO Tactical Evaluation, we opened a secondary VA and began to build up all available aircraft. The alert usually ran for 10 to 14 days. We placed trucks in front of our nuclear-loaded aircraft to prevent an unauthorized launch when the other aircraft were launched. Upon H hour, we broadcast the aircraft launch message that began the movement of all aircraft.

I managed the RAF Weatherfield alert facility for more than two years before being reassigned as the superintendent for wing operations. Six months later, in June 1970, RAF Weathersfield was closed and the 20th Tactical Fighter Wing (20thTFW) moved to RAF Upper Heyford to transition into F-111s. I moved with the 20th TFW and two years later became the senior enlisted advisor to the 20th Air Base group commander.

CMSgt. James Jones,
USAF (Ret.)
Schertz, Tex.

Your article on Victor Alert did not include the RB-66 or the RF-4s that stood alert with the same "be off the ground in 15 minutes" requirement. Electronic jamming of enemy radar and photo confirmation of BDA was also important to the overall mission.

Fred Mills
Sumter, S.C.

■ *Many others also wrote to comment on Victor Alert aircraft or units that were not mentioned in the feature. The article was an overview of the mission and was not intended to be an inventory of all participants.—THE EDITORS*

**Forgotten Defectors?**

Having read with great interest your substantive article on "Spying on the MiGs," I was disappointed in not seeing a reference to a MiG delivered to the West by a Soviet pilot in mid-1967 *[March, p. 78].* The pilot in question had planned to defect to the West while stationed in Czechoslovakia. He planned on doing so in the course of one of the training/scramble exercises. However, there were two obstacles to his plan: 1) a lack of a detailed map showing areas beyond East Germany, and 2) a limited supply of fuel. Nevertheless once his unit was given the go-ahead—after many delays and false starts—he dove into some clouds, shut off all communications, and headed west. When he was about to run out of fuel, he spotted a potato field and decided that he would be worth more to the West if he could deliver his MiG, besides himself. He circled the field and landed, wheels up, after ripping through some telephone wires and just barely making it over an irrigation levee. He sat on the plane's wing, fired his pistol into the air, and finally decided to walk out to a road he remembered seeing while circling the field. On the road, he saw an approaching old station wagon. He stopped the driver and asked him: "East or West?" "West," replied the driver. As a USAF Reserve captain, I,

and a fellow reservist, had the unique opportunity to debrief him in a safehouse across the Chesapeake Bay. He was extremely knowledgeable, cooperative, and brought his logbook with him. Many years later, [when] I was a colonel, I met him in Arlington and gave him a ride home while I headed out to Dulles. He had since married an American girl and had a family, but to his dismay, was no longer flying.

Robert W. Parr
Burlingame, Calif.

Mr. Richelson credits the SR-71 and U-2 aircraft with providing information on communist MiG fighter deployment.

In addition to the intelligence provided by the SR and U-2 programs, valuable Photint and Elint data were collected by aircraft of the 55th Strategic Reconnaissance Wing ("The Eyes and Ears of SAC"). Before, during, and after the Cold War, the 55th was tasked with conducting strategic reconnaissance, on a global scale, along the periphery of Communist Bloc countries.

During these missions, RB-47, and later RC-135, crews were routinely intercepted and "escorted" by Soviet, Chicom, and North Korean fighter aircraft.

The majority of these intercepts were made by MiG fighters. The close proximity of the MiGs to the 55th mission aircraft gave the crew members ample opportunity to obtain excellent photography of the fighters and their configuration while giving the "Ravens" (electronic warfare officers) a unique chance to intercept Elint data on the various MiGs.

Maj, George V. Back,
USAF (Ret.)
Navarre, Fla.

I am reminded of the North Korean MiG-19 that landed at Suwon AB, South Korea, late one morning in early 1983. I was a young SEFE briefing up an instrument check when one of our pilots ran into the 25th Squadron ops yelling, "There's a MiG over the field!" The whole squadron turned out with their Kodaks in time to see a MiG-19 fly under the 51st Fighter Wing DO and his wingman who were on short final for a formation landing. They broke right and left and the MiG pilot coolly pulled a nice and tight closed pattern with the ROKAF 20 mm firing away until they saw his gear, flaps, and flashing landing light. ROKAF quick-reaction APCs stopped him midfield, and we went on alert two hours later. We got to see the airplane the next day ("Is that really the landing gear indicator sticking out of the wings?"). I saw the same jet 25 years later on display at the National War Museum in Seoul.

Col. Al Allenback,
USAF (Ret.)
Montgomery, Ala.

You did not include another well-documented incident that occurred in the early 1950s.

At that time, I was on a classified Air Force mission on a Danish island out in the Baltic Sea. One day, we were surprised to see a Polish MiG fighter circling the island, with wheels down, canopy back, and wings waggling. At the same time, we noted some Iron Curtain fighters circling off to the east and some NATO fighters circing off the west.

Since we were on radio silence due to our mission, we began to think a war had started. Finally, the MiG managed to land in a pasture, relatively undamaged, and the pilot came out waving some sort of leaflet. It turned out that he was replying to the US offer of $100,000 to anyone who would defect with a MiG.

The next day, the island was crawling with intelligence personnel, and later, they came and took the MiG back to Wright-Patterson Air Force Base in Ohio for testing and evaluation.

Later, the Polish pilot got his monetary reward and became a US citizen.

W. R. Kneller
Clifton, Pa.

**The Poltava Debacle**

Although not mentioned in John Correll's article "The Poltava Debacle" *[March, p. 64],* Brig. Gen. Hoyt Vandenberg accompanied Ambassador Averell Harriman and Maj. Gen. J. R. Deane to Moscow on Oct. 18, 1943. Vandenberg, General Arnold's representative, also was unable to make any real progress with the Russians on shuttle bombing during his three-month stint in Moscow.

In 1969, when a student at the National War College, I had lunch with Ambassador Harriman at the Fort McNair officers club. We discussed, inter alia, the all-around frustration with the foot dragging of the Soviets, and I remember well his comment that the Russian experience was likely a valuable one for my father, as he obviously gained insight into the Russian psyche that was useful later during the Cold War.

Maj. Gen. Hoyt S. Vandenberg Jr.,
USAF (Ret.)
Tucson, Ariz.

**Dear Chief**

I was very surprised and pleased to see your article on Col. Pat Fleming—my boss, benefactor, mentor, and the person that got me into Air Force flight school *["The High-Intensity Life of Patrick Fleming," March, p. 74].*

Because of a last-minute accident, I was the only member of my 1951 West Point class entering the Air Force who did not go directly to flying school. I ended up on-the-job training in maintenance at MacDill Air Force Base, where I was picked up by Colonel Fleming's B-47 Operational Engineering Section (OES), which had the objective of expediting the B-47 to operational readiness. At that time, Fleming reported directly to General LeMay, and wrote him a personal monthly letter—always starting with "Dear Chief"—reporting on the B-47 status. The word in our office was that Fleming had met LeMay on Okinawa near the end of the war, and when LeMay asked him what he was going to do now that the war was over, Fleming responded that he expected his flying days were over for quite a while because of all the sea and flight time he had just had—including the most carrier landings of any naval aviator at the time. When LeMay asked him if he would like to join the Air Force where flying was the main thing, Fleming said yes, and LeMay said he would help make it happen.

Fleming got me into Air Force flight school by flying me in several Air Force aircraft—he was an instructor pilot in about everything we had—and then he wrote a glowing letter to the Air Force surgeon general, that got me the waiver I needed to finally graduate from pilot training in January 1954. I was, of course, terribly, terribly sorry to hear of his early death in the first B-52 loss.

Maj. Gen. Gerry Hendricks,
USAF (Ret.)
Alexandria, Va.

**BUFF Memories**

Thanks for the 5th Bomb Wing photo montage *["Never-ending Stratofortress," March, p. 46].* It was like seeing old friends after many years, and for me it's been quite a few. I served in the Air Force from 1967 to 1970, and my first and only assignment after basic training was Travis AFB, Calif., then home to the 5th. We shared the base with the 60th MAW, and our B-52s and KC-135s took up not only space at the west end of the field, but also the three alert pads directly across from the main terminal/tower. Travis was—and still is—the entry/departure point for military travel to the Pacific and Far East theaters, and during the Vietnam War, it was an extremely busy one.

I was one of only 1,400 Air Force illustrators at that time, and based at Travis under then-Colonel Richmond. My office was in the headquarters building next to his, and seeing the BUFFs in the photos brought back memories. One of the most vivid was the day Colonel Richmond walked into my office and asked if I'd like to go with him. "Yes sir, I would," I answered, and the two of us drove across the runway to a spot just to left of the alert pads where three of our B-52s stood constantly ready.

Atop a bluff overlooking the base, Colonel Richmond parked the car and shut off the engine. And we sat there. I finally asked, "What are we doing?" Colonel Richmond responded, "Just wait and watch. I want you to see this."

Suddenly klaxons all over the base sounded, and we were in the beginnings of an unannounced ORI (operational readiness inspection). Alert crews streamed from their building into the three planes on the pads and started the engines, while at the same time, three KC-135s were spooling up.

Within minutes, the three B-52s were staged at the end of the runway as the three KC-135s were lining up across from them, waiting to take off.

I'll never forget the sight nor experience again the feeling watching three fully armed BUFFs leaving the runway. When the first plane was approximately halfway down the tarmac, the second began to roll, followed by the third, once No. 2 had reached the same spot. The first bomber rose into the California sky, slowly gaining altitude. The second, once airborne, banked immediately to the left, out of the first plane's exhaust, and the third pulled to the right—black smoke filling the sky as evidence of their leaving.

Then the same was repeated by the three KC-135s. All during this time, the noise was deafening, and the vibrations from the six aircraft literally shook the car. It was the most exciting visual experience of my career in the Air Force and one I will never forget.

Michael Lee
Hernando, Miss.

As an old BUFF driver with the 19th BW(H) at Homestead, it is important to note that back when the H still had "stingers" in the back, the gunner was situated in the main crew compartment and operated the guns remotely, unlike the A through F models.

Dick Blair
Vienna, Va.

**Total Force**

Every now and then I read a letter that I am convinced is either a "thought starter" or a "put on"; retired Master Sergeant Thomas' is certainly in that category. I suggest this because anyone who reaches E-7 must certainly know better than his comments indicate *[April, p. 6].*

I am a retired Guardsman who managed to end up with seven stripes, three of which I earned in the regular Air Force. Does this mean I am a "half-real" veteran or just a "semi-vet"? The possibilities are endless. In this category, I find myself associated with such famous draft dodging, like-to-dress-up-in-uniform types as Jimmy Doolittle, Ted Williams, Tex Hill, Jimmy Stewart, and of course, Harry Truman. There is some sort of a problem in calling us draft dodgers and peaceniks since we no longer have a draft.

Without going into a lot of detail, it's worth noting that Reservists and Guardsmen must meet the same technical proficiency standards as the regulars. We also have to pass the same ORI and MEI inspections. We attend the same basic training and the same tech schools and must pass the same tests for AFSC upgrades. The only difference is that we draft dodgers and peaceniks do it on weekends and on our own time. I don't know the statistics, but an awful lot of those I served with had prior active duty and often with more than one enlistment under their belt.

Among those I served with during my Air Guard time were electronic techs with associate and bachelor's degrees in engineering—we had a 702 (admin) who was a Ph.D. candidate; we had security police who were civilian police officers or DEA agents. We had a first sergeant with a graduate degree in counseling and people in finance with accounting degrees, just to name a few. I once worked for a two star who was dean of a college and with a flight surgeon who was an outstanding civilian eye surgeon and an admin officer who was president of a bank. We had pilots who jumped from an airline cockpit into an F-16. You might be surprised at the number of enlisted folks with college degrees.

I suspect that few regular Air Force squadrons could match the experience level of the average Guard unit. So, Sergeant Thomas, if there is a stigma, it is in the eyes of those who have not bothered to learn about the whole Air Force.

SMSgt. Harold A. Fulton
USAF (Ret.)
Wooster, Ohio

I read with great interest your section of "Letters" in each magazine. It was shocking to me to read an undirected comment in your April issue.

I refer to the comment by one Drew Thomas. I take very grave exception to his comments, from start to finish. I prefer to not even mention his rank.

I completed most of my enlisted career in a four percent career field. I had received my line number for master sergeant in my twelfth year, but refused promotion and left active service to obtain my college degree.

Later, I chose to join the South Dakota Air National Guard. I took a reduction in grade, but chose to serve anyway in that capacity. Later, after going through basic training again, I accepted a commission. I served another 13 years in various Guard units, but retired from my original Guard unit. Mr. Thomas' opinion that the negativism towards Guard and Reserve personnel was based on their lack of patriotism and dedication is way out of line, and very untrue.

To question the loyalty or integrity of Guardsmen or Reservists is outlandish, let alone in very poor taste—unworthy of any member of the service. It is also very unfortunate that Mr. Thomas continues to exclude the Guard and Reserve from his professional military, and classes them as draft dodgers and peaceniks. Such nonsense.

I guess such comments about "real veterans" isn't really worth discussing; I have served in both services for about the same time and am every bit a veteran of both.

As for his opinion about disturbing weekends and going to camp, I can only say while he was enjoying his 30 days a year paid vacation, I was using my two weeks vacation to fill my military obligation. I also might add that my 26+ years of service earned me a retirement paid at the 15-year rate.

Lt. Col. Douglas Jones,
USAF (Ret.)
Sibley, Iowa

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# Washington Watch

**By John A. Tirpak,** Executive Editor

**Bipolar world evaporation?; Driving bomber risks and costs; China in space ....**

## IT'S DIFFERENT THIS TIME

Defense budgets have always been cut after an extended military operation, and it will be no different as the Afghan conflict draws to an end. However, the circumstances in which the Air Force finds itself this time means this drawdown will bear far greater peril of cutting too far, Secretary of the Air Force Michael B. Donley said.

Speaking with defense reporters in Washington, D.C., Donley said the Air Force has been studying the "peaks and valleys" of defense spending, and how the service has managed through the drops in spending attending the end of previous wars. However, the strategic situation today is very different than it was the last time there was a postwar drawdown, in the early 1990s.

In the early 1990s, the Air Force—and indeed, all the military services—had just come off a prolonged period of high spending and recapitalization. The fleet was populated with nearly new F-15s and F-16s, B-1 bombers, and F-117 stealth attack aircraft.

"We had just finished a buildup … where we bought a lot of military equipment, and we had a fairly modern force," Donley said April 5.

However, he continued, "we do not have a fairly modern force today, and we're not in a position where we can delay modernization without some significant risk."

The fighters that were still fresh in 1993 are 18 years older today, and the entire fleet of Air Force aircraft has been in nonstop combat for 20 years.

Moreover, after the Cold War ended, the so-called "bipolar world" evaporated, seemingly leaving no strong adversaries for the US to face.

"The security environment of today is not of that nature," Donley noted. "It's much more dynamic, much more complex, and the threats we are living with … don't seem to be diminishing."

At the same time, Donley said, "it is a different environment this year" on Capitol Hill, "no question about that." There is "much more serious attention" on curbing deficit spending "and a recognized need to take a different approach, in which defense may be included." So the Air Force is bracing for "increasing pressure on the defense topline," Donley said, which could affect necessary modernization that has already been deferred several times.

The F-16, for example, was originally expected to retire starting in about 2005, but it has seen its service life stretched an additional 25 percent. It may have to soldier on another 10 years or more, with or without a formal service life extension program, or SLEP. Meanwhile, its replacement, the F-35, has been delayed by technical issues, while its cost has continued to climb, making it a target of budget cutters.

Exacerbating the financial situation, Donley said, is the series of continuing resolutions that funded the government since October in the absence of an enacted budget. Compelled to constantly shift money around to deal with a series of potential government shutdowns, the Air Force hadn't had either the time or the guidance to do substantive work on the Fiscal 2012 budget, he noted.

"One of the penalties of having to work on this continuing resolution is, it's taking time away from FY '12. … We will have work to do this summer, with the Congress and internally, to understand where FY '11 will come out, and how it will relate to the FY '12 budget."

Illustration by Erik Simonsen

*Rescoping the next gen bomber.*

## BOMBER BY COMMITTEE

Requirements for the Air Force's new bomber are not spelled out in an operational requirements document, but in a classified memo from Defense Secretary Robert M. Gates, Donley reported.

Typically, major acquisition programs travel up through channels until they are vetted by the Joint Requirements Oversight Council, a multiservice panel headed by the vice chairman of the Joint Chiefs of Staff. The JROC was created to ensure programs aren't duplicative and their requirements don't conflict with what other services are doing. More importantly, the JROC's requirements process is meant to ensure new systems do everything national strategy demands of them.

However, the new bomber traveled a different route, Donley said.

When the Next Generation Bomber was canceled by Gates in 2009, the Air Force "spent a good 18 months to two years" scrutinizing the program, looking for "what we did not like" and how the project could be rescoped to be more efficient, Donley said.

"When we got through with those discussions, we had a different strategic concept of what we wanted to build," he said. This led to what has since become known as the "family of systems" concept in which elements that had been part of the bomber project—intelligence-surveillance-reconnaissance functions, communications nodes, etc.—were moved "offboard," Donley said.

"It's those kinds of requirements that drive risk and drive cost," so they were driven onto other systems, he explained. The review provided USAF with "a much firmer sense of the requirements for affordability … [and] for what capabilities we would want onboard the aircraft."

All this work was done as part of a broader effort called a "front end assessment" of the Fiscal 2012 budget, Pentagon-wide throughout 2010, Donley noted.

Once the Air Force settled on what capabilities it thought the bomber should have, Donley and Air Force Chief of Staff Gen. Norton A. Schwartz "put together a memo for [Gates] that outlined our … Air Force assessment," Donley said.

"There were other views, from inside [the Office of the Secretary of Defense], from the policy community, from the acquisition shop, from CAPE [Office of Cost Assessment and Program Evaluation], others, the Joint Staff, others that participated in the front end assessment. It was a collaborative effort."

The many participants "filtered in" their recommendations to Gates, Donley said.

Gates then "made his decisions and captured those in a memorandum that gives us direction for the new long-range strike penetrating bomber, and the parameters of that and other aspects of the 'family of systems.' And that's a classified memorandum."

Donley was asked if there is, in fact, an ORD for the bomber.

"I'm not sure I have a clean answer for you on that, in terms of the distance between the programmatic direction we've gotten from the Secretary and what we have determined will be a more streamlined management process going forward," Donley said. However, "we'll be using the Rapid Capabilities Office to help manage this project."

Apparently, the bomber program is not considered a new start, and is therefore allowed to continue under the continuing resolution budget situation. Donley noted that there is $3.7 billion in the Future Years Defense Program for bomber technologies. After the Next Generation Bomber was shelved, money was applied to "an R&D program that we fashioned to continue some of the essential work, even though the program got canceled. And we will now bridge that research and development work into the new bomber program," Donley said.

## THE COST OF CONTINUING IRRESOLUTION

The Air Force won't be able to make payroll for the last pay period of Fiscal 2011 if a 2011 budget is never officially adopted, Donley said.

Congress authorized a 1.4 percent pay raise for uniformed personnel for Fiscal 2011 and "we've been spending that, but it's not funded, so we're not able to make payroll for the last pay period of this year unless we get a full-year appropriation," he explained.

Not only that, but the Air Force has been paying for relief missions in Japan and no-fly-zone activities in Libya from its operation and maintenance accounts.

The Libyan operations alone were costing upward of $4 million a day in early April—on top of an accumulated expense of more than $75 million by April 5. This cost does not include the value of the F-15E Strike Eagle destroyed in a crash in Libya—so the growing, unbudgeted expense "puts us at further jeopardy through the year," Donley noted.

"We would have faced a significant reprogramming this year in any case," he continued. "If we do not get an appropriations bill, that reprogramming is going to have to be substantially larger and will impact our position and investment programs even more so."

Donley had previously explained that the continuing resolution would make it impossible to launch a new radar program for the F-15 in Fiscal 2011 and would upset MQ-9 Reaper delivery schedules, which were to ramp up to a significantly higher production rate this year. The Air Force is under strict orders to achieve 65 orbits of Reapers by 2013—a goal now at risk because of slower-than-expected Reaper deliveries.

## AEROSPACE CHINA

China's growing aerospace capabilities are making it stronger militarily, but it's not clear what America can or should do about it. So said the authors of a new RAND study, "Ready for Takeoff: China's Advancing Aerospace Industry."

China's rollout of what appears to be a prototype fifth generation stealth fighter earlier this year—the J-20—has prompted many to wonder if American cooperation with China's commercial aerospace development is not undermining US security.

The authors—Roger Cliff, Chad J. R. Ohlandt, and David Yang—note that China's aerospace capabilities are advancing rapidly. For instance, "by 2020," they project, "China will likely have a fully deployed satellite PNT [position, navigation, and timing] system comparable to the US Global Positioning System." China's Long March rockets "have arguably become the world's most reliable medium space launch vehicles," and China has learned how to build weather, reconnaissance, communications, and signals intelligence satellites.

There is "no question that China's growing civilian aerospace capabilities are contributing to the development of its military aerospace capabilities," the RAND authors asserted. "Many aerospace systems are inherently dual-use or can provide a basis for the development of military systems."

China's limited domestic helicopter production will likely be able to satisfy its own demand for the foreseeable future, but the country won't be able to fill its needs for commercial airliners with indigenous products, the authors note. Although China is producing an indigenous small airliner comparable to the Boeing 737 and a large airliner is in the works, neither will produce in quantities necessary or soon enough to meet China's needs, so the country will have to import "roughly 4,000 new jetliners over the next 20 years."

As part of deals for new aircraft, China has demanded that its aircraft vendors set up local manufacturing capabilities and provide technology transfer. China exports those parts, which are used on airliners worldwide. Sometimes, aerospace companies establish joint ventures in China to take advantage of cheap, skilled labor. However, "today, only about one percent of US aerospace imports come from China."

But should the US do anything to try to slow or curtail China's aerospace expertise and capacity?

If the US were to try to achieve a worldwide cutoff of aerospace cooperation with China, it likely wouldn't work, the RAND authors said. "Many countries would refuse to go along with such an embargo."

A solo embargo by the US of aerospace goods and know-how to China would likewise be a self-spiting exercise, the authors said.

"A US-only ban would likely slow the development of China's military aerospace capability by only a small amount, while handing business opportunities to European and Asian companies and aggravating relations with Beijing."

Since armed conflict with China is "not inevitable," the question of what, if anything, the US can or should do about China's growing aerospace proficiency is still open.

"Whether the United States could improve its security through alterations of policy toward civil aerospace cooperation with China without having a significant negative effect on its own economic interests is unclear," the authors concluded. ■


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# Air Force World

By Aaron Church, Associate Editor

### Ellsworth Airman Dies in SWA

SrA. Michael J. Hinkle II, 24, of Corona, Calif., died in a noncombat-related incident in Southwest Asia, March 16, the Defense Department announced.

At press time, the cause of his death was still under investigation, according to DOD. Hinkle was a cyber transport systems journeyman with the 28th Communications Squadron, Ellsworth AFB, S.D.

At the time of his death, Hinkle was deployed to an undisclosed air base in Southwest Asia assigned to the 386th Expeditionary Communications Squadron.

### Eagle Down

An F-15E Strike Eagle supporting Operation Odyssey Dawn crashed in Libya on March 21. Both crew members survived ejection and were recovered.

The aircraft, assigned to RAF Lakenheath, England, and operating out of Aviano AB, Italy, suffered a malfunction during a strike sortie over northeast Libya, US Africa Command announced.

Within 90 minutes of the crash, a rescue force comprising two Marine CH-53 helicopters, two AV-8B attack aircraft, and a pair of MV-22 Ospreys from USS *Kearsarge* successfully recovered the pilot.

Friendly Libyan civilians recovered the aircraft's combat systems operator. Both crew members sustained minor injuries.

According to press reports, the aircraft went down about 25 miles outside of Benghazi, Libya's second-largest city, which was then in the hands of opposition forces.

The Air Force is investigating the cause of the incident.

### New AFRICOM Commander

Army Gen. Carter F. Ham took over as head of US Africa Command from its first leader, Army Gen. William E. Ward, on March 9, during ceremonies at the command's headquarters in Stuttgart, Germany.

Ward, who had commanded AFRICOM since its establishment in October 2007, planned to retire after more than 40 years in the Army.

Ham most recently served as commander of US Army, Europe. Almost as soon as Ham took command of AFRICOM, he was placed in charge of Operation Odyssey Dawn, the no-fly zone and combat operation over Libya.

### An Air Campaign First

Maj. Gen. Margaret H. Woodward became the first female commander in USAF history to lead an air campaign, Operation Odyssey Dawn. Taking command of 17th Air Force and US Air Forces Africa at Ramstein AB, Germany, last June, Woodward quickly rose to the challenge of planning operations in Libya.

Fresh from directing refugee evacuations at the outbreak of conflict in Libya, Woodward began coordinating allied air strikes and instituted a no-fly zone against Muammar Qaddafi's air force. Hashing out contingencies "really at the last minute," as allies joined operations by the hour, it was "almost surreal ... to have a coalition come together in that way," Woodward told the *National Journal* in March.

A KC-135 command pilot with 3,800 hours, Woodward flew combat refueling missions during Operation Just Cause in Panama and Allied Force over former Yugoslavia, as well as recent operations in Iraq and Afghanistan.

### Another F-35A IOC Slip Looms

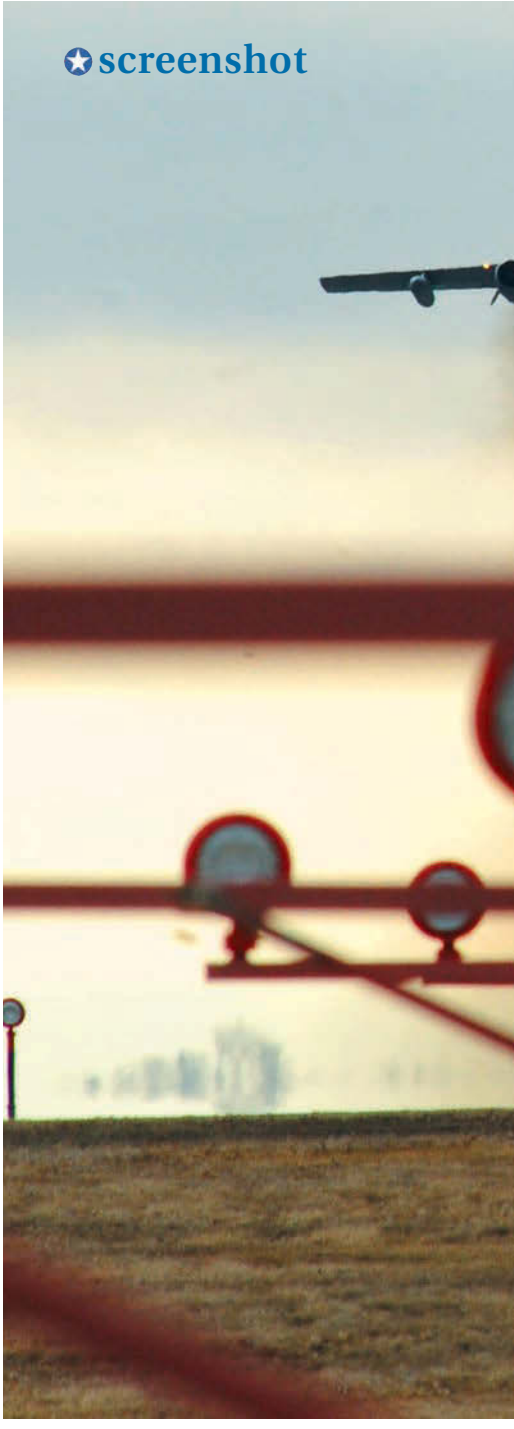
The F-35A could face another two-year delay before it becomes operational for the Air Force, senior USAF officials said.

Lt. Gen. Herbert J. Carlisle, deputy chief of staff for operations, plans, and requirements, and Lt. Gen. Mark D. Shackelford, deputy USAF acquisition executive, issued the warning March 15. Recent changes to the F-35 program are being reviewed.

"When this analysis is complete [later this year], the Air Force will re-evaluate our [initial operational capability] estimate, but we currently expect up to a two-year delay," the generals said in prepared testimony for the House Armed Services Committee's tactical air and land forces panel.

Last June, Air Combat Command estimated the F-35A would become operational in 2016, meaning the Joint Strike Fighter might not be ready for combat until 2018.

USAF photo by TSgt. Thomas Dow



**Some F-35s Flying Again**

Some, but not all, F-35 test aircraft were cleared to resume flight operations after an in-flight anomaly with one aircraft grounded the fleet in early March.

The fleetwide flight suspension went into effect as a safety precaution after airframe AF-4 experienced a dual generator failure and oil leak during a March 9 flight at Edwards AFB, Calif.

Because initial analysis determined the issue was unique to a newer generator configuration only used on later test aircraft, three F-35As (AF-1, AF-2, AF-3) and four F-35Bs (BF-1, BF-2, BF-3, BF-4) had been released from flight suspension as of March 15, according to F-35 spokesman Joe DellaVedova.

The remaining three test assets (AF-4, BF-5, CF-1) and the initial Joint Strike Fighter production versions (AF-6, AF-7) remained grounded in mid-March as program officials continued to investigate the failure's root cause.

Test aircraft AF-1made the first post-grounding flight, returning to the air March 14.

**Last Predator**

The Air Force has taken delivery of its 268th and final MQ-1 Predator remotely piloted aircraft from manufacturer General Atomics Aeronautical Systems.The milestone delivery came March 3.

The Predator entered service in the 1990s, and started out as the

**04.13.2011**

***A B-52H of the 5th Bomb Wing lifts off during Constant Vigilance '11, a combined-wing nuclear operational readiness exercise. Eight B-52s launched as the finale of a two-week effort to demonstrate scrambling and rapid launch of nuclear-armed bombers and validate the safety and security of nuclear operations.***

USAF photo by SrA. Chanise Epps

***Get the Shot:*** *SrA. Chanise Epps, a photographer with the 9th Intelligence Squadron, Beale AFB, Calif., put herself in the line of fire to capture photos of an attack on a forward operating base in Afghanistan there Dec. 28, 2010. The more than 600 photos taken by Epps helped officials assess the damage and reinforce battle positions. For her actions during the attack, Epps was recently awarded the Navy and Marine Corps Achievement Medal and the Army Combat Action Badge.*

## A Tsunami of Help

Air Force airmen flew upward of 25 sorties a day at the height of Operation Tomodachi—Japanese for "friend"—to provide relief and supplies for the thousands of people injured and dislocated by the massive magnitude 8.9 earthquake and tsunami that devastated northeast Japan in March.

Cooperating with Japanese and US Navy personnel, airmen quickly established staging points for humanitarian relief in many of the most damaged areas.

By April 1, Pacific Air Forces air assets had flown more than 444 sorties, airlifting more than 2,892 tons of relief cargo and 1,223 passengers in support of the relief operation, according to Air Force figures.

More than 750 airmen and USAF civilians deployed to Japan, augmenting the 13,000 personnel already stationed there, while 5,269 dependents and personnel were voluntarily evacuated to the US under Operation Pacific Passage.

To help confront the burgeoning nuclear disaster threatening the population and ongoing relief efforts, C-130s from Yokota AB, Japan, airlifted seven pallets of radiation-shielding boron to engineers working to stabilize the damaged Fukushima Daiichi nuclear power plant.

A Global Hawk from Andersen AFB, Guam, overflew the plant March 17, employing its electro-optical sensors to assess damage to the plant's interior, while a WC-135 Constant Phoenix staged from Eielson AFB, Alaska, monitoring atmospheric radiation levels.

As operations shifted in April from disaster relief to recovery, "we are posturing ourselves for a long-term support and an enduring commitment," said US Pacific Fleet Commander Adm. Patrick M. Walsh, speaking from Yokota Air Base, April 5.

RQ-1 expendable scout aircraft which could provide full-motion video feeds to ground controllers. The aircraft rapidly proved to be of great value, particularly in 1999, during Operation Allied Force in the Balkans.

One of the Predator's early limitations was that it could spot targets, but not strike them. Gen. John P. Jumper—then commander of US Air Forces in Europe, and later Chief of Staff—ordered some Predators to be modified so they could carry lightweight Hellfire missiles. The combination proved a great success in combat, and Predators so modified were later re-designated MQ-1 for their multimission reconnaissance and strike capability.


Photo: United States Air Force

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The type was also used by the CIA to track—and occasionally strike—terrorists in several countries.

During its service, Predator has achieved mission capable rates higher than 90 percent. The desire to carry a heavier weapons load and remain on station longer has prompted USAF to shift all production to GA's larger MQ-9 Reaper. Eventually, plans call for all Predators to be replaced by Reapers.

**USAF Tops Nunn-McCurdy List**

Between 1997 and 2009, the Air Force compiled the worst record among the military services, in terms of its acquisition program performance, according to the Government Accountability Office.

GAO reported 74 Nunn-McCurdy breaches involving 47 major defense acquisition programs, 27 involving Air Force programs—about 36 percent of the total—including some projects that committed multiple infractions.

The C-130 Avionics Modernization Program managed three cost breaches, while USAF's Space Based Infrared System satellite took the recidivist trophy, breaching the critical cost margin four times.

Army programs accounted for 19 of the breaches (26 percent), the Navy 17 (23 percent), and joint Defense Department programs for 11 (15 percent).

According to the report, "aircraft, satellite, and helicopter programs have experienced the largest number of breaches," primarily due to engineering and redesign issues, scheduling modifications, and quantity adjustments, said GAO in the March 29 report.

**Spartan Slip**

The first deployment of the C-27J, USAF's newest aircraft, will occur this summer, about four months later than originally expected. The service chalked up the delay to the newness of the aircraft and some early technical glitches, which have been remedied.

The new schedule will provide ample time to prepare the aircraft for combat theater duty, Lt. Gen. Harry M. Wyatt III, Air National Guard director, said March 30.

The entire C-27J fleet was grounded in December when routine maintenance discovered metal shavings in fuel cells across the fleet. In addition, the aircraft's head-up displays were decertified, because of a tendency to slip in flight, blocking the pilot's view. Pilots also complained that avionics systems weren't up to standards.

The first deployment had been timed to coincide with deployment of an Army aviation brigade to Afghanistan. The pressure to deploy in March was relieved by the arrival of C-130Js in theater to provide tactical support.

## 2011: An Airspace Odyssey

US combat operations over Libya officially ended in early April, but direct support of the no-fly zone by US military air assets will continue, Air Force Secretary Michael B. Donley said April 5.

"We had about 50 aircraft involved in the strike operations," Donley said. They returned to bases in the US and Europe. About 39 other aircraft will remain indefinitely to support allied operations.

NATO took command of the UN-sanctioned Operation Odyssey Dawn on March 27, taking over responsibility for policing the no-fly zone over Northern Libya, protecting opposition rebels and enforcing the international arms embargo against Libyan leader Muammar Qaddafi.

"Our airpower has significantly degraded [Qaddafi's] armor capabilities, his ability to use his armor against cities like Benghazi," Defense Secretary Robert M. Gates told NBC March 27, noting that over time, the broader coalition would assume "a larger and larger proportion of the burden," for combat operations.

USAF strike aircraft hit the bulk of Libya's fixed air defenses, securing a no-fly zone over eastern Libya in the first two days of operations. Aircraft then expanded coverage westward toward the Libyan capital, granting rebels "greater freedom of movment," and allowing delivery of humanitarian assistance, said Army Gen. Carter F. Ham, head of US Africa Command.

Prior to the handoff, US aircraft flew 529 of the 875 coalition sorties since the first salvo on March 19, said Vice Adm. William E. Gortney, Joint Staff director, in a Pentagon briefing. Gortney added that US aircraft constituted more than half of the coalition's 350-strong combat force.

The Defense Department can't predict how much operations will cost, since it's not clear how long—and in what capacity—the US will remain engaged in the operation, according to Robert F. Hale, the Pentagon's top budget official. He told the Senate Armed Services Committee on March 29 that Odyssey Dawn had thus far cost DOD $550 million. USAF operations had cost $50 million alone, Donley said. He added that the service had not yet resolved how it would be paid for.

A wide array of ground and support aircraft supplemented the traditional fighter types patrolling the no-fly zone over Libya. They included AC-130 gunships, A-10 attack aircraft, and B-1B bombers, as well as E-8C JSTARS and RQ-4 Global Hawk surveillance aircraft.

**Egyptian Refugees Airlifted**

Air Force and Marine Corps C-130s airlifted more than 1,100 Egyptian citizens from Tunisia back to Egypt between March 5 and March 15. The operation was performed at the request of the Egyptian government. The refugees had fled Libya's civil war and were stranded just over the Tunisian border.

C-130J transports from the 37th Airlift Squadron at Ramstein AB, Germany, joined Marine Corps KC-130s in the mission, staging out of NAS Souda Bay, Crete.

In addition, the transports airlifted relief supplies to Tunisia to assist in coping with nearly 6,000 refugees spilling over the border each day at the height of the Libyan violence.

**Taxed and Tired**

Twenty of the Air Force's 132 enlisted specialties and eight of its 125 officer specialties are stressed by high operating tempo, Lt. Gen. Herbert J. Carlisle, deputy chief of staff for operations, plans, and requirements told lawmakers, March 10.

To address the problem, "a number of programs are in place to bolster the manning in these career fields" and mitigate the strain on the airmen and their families, Carlisle told the House Armed Services Committee's readiness panel.

Though he didn't specify the hardest-hit career fields, USAF officials have noted drone operators, security forces, and civil engineers as among those being overtaxed.

Carlisle noted that 30,000 of the 37,000 forward deployed airmen are engaged in US Central Command's area of operations. They include 10,000 in Afghanistan, performing missions such as close air support, airlift, aerial refueling, combat rescue, and training of Afghan troops.

**Fans May Disagree**

After thrilling fans at a university football game with a stunningly low flypast, last November, Maj. Christopher Kopacek received nonjudicial punishment under the Uniform Code of Military Justice for violating altitude and speed restrictions.

Investigation found that Kopacek cleared the stadium's press box by a mere 16 feet while leading a four-ship formation of T-38s that overflew a University of Iowa football game in Iowa


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## Twenty-two USAF General Officer Billets Cut

The Air Force is losing 22 general officer authorizations as part of Defense Secretary Robert M. Gates' initiative to shed Pentagon overhead. All will disappear as incumbents complete their current tour.

The USAF positions are among 102 in total from across the services that Gates is eliminating in the latest round of efficiency cuts. Announced in a March 14 memorandum, most of the reductions target joint organizations, which in theory the moves were to affect all services equally. The service specific reductions disproportionately struck USAF, however.

The Air Force will lose twice as many slots as the Army and Navy—each losing 11—while the Marine Corps was untouched.

General officer billets under the axe are the commanders of 19th Air Force, Air Force Institute of Technology, 9th Reconnaissance Wing, 55th Wing, 76th Maintenance Wing, 309th MXW, 325th Fighter Wing, and 402nd MXW, as well as the vice commanders of 12th Air Force and 17th Air Force.

General officer positions disappearing at higher headquarters levels will be the: Air Forces Central assistant deputy commander; Air Mobility Command deputy director of operations; Air Force Special Operations Command special assistant; Air Force Space Command special assistant; Air Force Secretariat director of cyberspace operations; military deputy director in the Air Staff's studies and analyses (A9) office; assistant surgeon general for strategic medical plans and programs, and USAF's "Don't Ask, Don't Tell" review working group director.

Rounding out eliminations are the ACC staff judge advocate, AFMC SJA, AMC SJA, and USAF's deputy legislative liaison. These final four positions are among nine imposed by Gates over the objections of the Air Force and other military services.

City last November, despite minimum altitude restriction of 1,000 feet above ground level.

"While I understand that fans attending the game enjoyed the flyover, rules are in place to ensure everyone's safety," said Col. Russell Mack, 71st FTW commander, adding that the flyby "was a serious breach of flight discipline," meriting official punishment.

Kopacek, an instructor pilot with the 25th Flying Training Squadron at Vance AFB, Okla., elected to leave the Air Force voluntarily, according to Vance officials.

### Warthog Crash

An A-10 attack aircraft crashed during an April 1 training flight in Germany, southwest of Bonn.

Lt. Col. Scott Hurrelbrink, assigned to the 81st Fighter Squadron at Spangdahlem AB, Germany, survived ejection from the aircraft, sustaining minor

***A B-1 takes off from Ellsworth AFB, S.D., en route to Libya for Operation Odyssey Dawn. The March 27 mission marked the first time the Air Force launched B-1Bs from the continental US to strike targets overseas.***

USAF photo by SSgt. Marc I. Lane

## The War on Terrorism

### Operation Enduring Freedom—Afghanistan

**Casualties**

As of April 14, 2011, a total of 1,523 Americans had died in Operation Enduring Freedom. The total includes 1,521 troops and two Department of Defense civilians. Of these deaths, 1,187 were killed in action.

**Afghan Helo Instructor at Last**

Mi-17 helicopter pilot Col. Mohammad Rahim Azimy became the Afghan Air Force's first instructor pilot to train an AAF student, US Air Force air advisors announced.

"We are now starting to rebuild this Air Force," said Azimy, who operates from the AAF training center at Shindand Air Base.

US and NATO instructors have greatly helped the infant service, mentoring personnel and helping institutions grow to finally achieve this landmark, Azimy said.

Afghan autonomy in areas such as helicopter flight training is essential to developing an air arm capable of operating independently after NATO forces leave the country.

"As the first training center to provide training for flight engineers, pilots, and crew chiefs, [Shindand] is a very important place," Azimy said, underscoring his plans to "fly with more students so they, too, can become experts."

**Bagram Herc House**

Workers have completed the first permanent C-130 maintenance hangar in Afghanistan at Bagram Airfield. It opened for business March 14.

Sheltering Hercules aircraft and maintainers of the 455th Expeditionary Aircraft Maintenance Squadron from Afghanistan's harsh climate, the double bay, 60,000-square-foot facility will "boost the C-130 sortie rate and mission performance by allowing maintenance to continue working during inclement weather," said 455th Expeditionary Civil Engineer Squadron Commander Lt. Col. Phillip Howard.

At a cost of $18 million, USAF personnel constructed the hangar in two years' time.

"One of the most critical elements of what we supply is what the C-130 fleet does. ... This facility takes our ability to supply the ground force commander with combat capability to the next level," added 455th Air Expeditionary Wing Commander Brig. Gen. Jack L. Briggs II.

**Expeditionary Squadron Inactivates**

The Air Force inactivated the 766th Air Expeditionary Squadron, operated from Sharana Forward Operating Base in Afghanistan, effective March 23.

This unit was responsible for airmen serving in joint expeditionary and individual augmentee deployments at 58 NATO forward operating bases and combat outposts throughout the eastern region of Afghanistan.

The 966th AES at Bagram Airfield will now administer and oversee the operations of detached, forward deployed airmen. With the change, the 966th AES becomes Bagram's largest squadron, marshaling more than 2,700 joint expeditionary tasked and individual augmentee deployed airmen at more than 153 locations throughout eastern and northern Afghanistan.

injuries. German first responders took Hurrelbrink to a hospital in Trier.

The A-10, returning to Spangdahlem after a local training mission, was carrying training ammunition; a USAF explosive ordnance disposal team secured the crash site. A board of inquiry is looking into the accident's cause.

**Goldfein To Take Over AFCENT**

Maj. Gen. David L. Goldfein has been nominated by President Obama to receive a third star as commander of US Air Forces Central and the forward air component of US Central Command.

Goldfein has been Air Combat Command's director of operations at JB Langley-Eustis, Va., since August 2009. In his new role, he would oversee all air operations in Southwest Asia, including Afghanistan and Iraq, but not Libya (which falls under US Africa Command's geographic jurisdiction).

Goldfein will replace Lt. Gen. Gilmary Michael Hostage III, who has been head of AFCENT since August 2009. Hostage's next assignment was not immediately announced.

**Milestones for Special Ops Hercs**

The Air Force's new HC-130J rescue tanker successfully completed developmental testing by refueling from a KC-135 tanker on March 14. Two weeks later, Lockheed Martin unveiled the first new-build MC-130J special mission variant for Air Force Special Operations Command.

The two aircraft have many systems in common and are built on the same assembly line in Marietta, Ga.

USAF wants to replace all 37 of its 1960s-era HC-130P tankers with HC-130Js on a one-for-one basis. It has contracted with Lockheed Martin to build 15 of the 37 Combat Shadow II special mission aircraft USAF wants to procure.

Developmental testing of the tanker began a year ago. The HC-130J completed certification of the in-flight refueling capability for both aircraft, which are fitted with the same fueling receptacle.

The first HC-130Js and MC-130Js are due to be delivered in August, with initial operational capability slated in 2012 for both aircraft.

**Marines Begin Training at Eglin**

To ease eventual transition to the F-35B, Marine Corps aviators are currently flying F-16s with the Air Force at Eglin AFB, Fla.

The single-seat F-16's cockpit arrangement resembles the F-35's, making it a closer match than the EA-6 Prowlers, AV-8 Harriers, and F/A-18 Hornets the Marines fly.

"This training allows us to eliminate the added variables," said Capt. Mark Noble, Marine Fighter Attack Training Squadron 501 safety officer. "If we already understand flight-line procedures and guidelines and know what to expect from a similar aircraft, we can focus primarily on F-35B training," Noble added.

The group that began F-16 training in mid-March, will form the Marine Corps' initial cadre of pilots to fly the service's unique F-35B short takeoff and vertical landing variant.

F-16s involved in the program arrived at Eglin from Luke AFB, Ariz., in January.

**Green Raptor**

The F-22 Raptor is the Air Force's first fighter to be certified to use a synthetic biofuel, following flight tests at Edwards AFB, Calif.

During a March 18 test, an F-22 flew on a 50-50 blend of hydrotreated renewable jet fuel and standard JP-8 aviation fuel. The aircraft flew tests throughout the flight envelope, attaining Mach 1.5 cruise in level flight up to 40,000 feet.

The pilot reported the aircraft "performed flawlessly on the biofuel blend,

## Senior Staff Changes

**RETIREMENT:** Brig. Gen. Philip M. **Ruhlman,** Maj. Gen. Johnny A. **Weida.**

**NOMINATION: To be Lieutenant General:** David S. Fadok

**CHANGES:** Brig. Gen. Mark C. **Dillon,** from Cmdr., 86th Airlift Wg., USAFE, Ramstein AB, Germany, to Dir., Regional Affairs, Office of the Dep. Undersecretary of the AF, Intl. Affairs, USAF, Washington, D.C. ... Maj. Gen. John W. **Hesterman III,** from Vice Cmdr., 9th Air Expeditionary Task Force, ACC, Southwest Asia, to Asst. DCS, Ops., P&R, USAF, Washington, D.C. ... Brig. Gen. Paul T. **Johnson,** from Cmdr., 451st AEW, ACC, Kandahar Airfield, Afghanistan, to Dep. US Mil. Rep. to NATO, Brussels, Belgium ... Maj. Gen. Wendy M. **Masiello,** from PEO for Combat & Mission Spt., Office of the Asst. SECAF, Acq., Washington, D.C., to Dep. Asst. Secy., Contracting, Office of the Asst. SECAF, Acq., Washington, D.C. ... Brig. Gen. Eden J. **Murrie,** from Dir., Leg. Affairs, Office of Leg. Affairs, Natl. Security Staff, Exec. Office of the President, White House, Washington, D.C., to Dir., AF Svcs., DCS, Manpower, Personnel, & Svcs., USAF, Pentagon ... Brig. Gen. David E. **Petersen,** from Dep. US Mil. Rep. to NATO, Mil. Committee, NATO, Brussels, Belgium to Dep. Dir., Intel., Ops., & Nuclear Integration, AETC, Randolph AFB, Tex.

**SENIOR EXECUTIVE SERVICE CHANGES:** Gail M. **Jorgenson,** to Dir., Acq., TRANSCOM, Scott AFB, Ill. ... Rory S. **Kinney,** to Dep. Dir., $C^4$, TRANSCOM, Scott AFB, Ill. ... James L. **McGinley,** to Dir., Program Analysis & Financial Mgmt., TRANSCOM, Scott AFB, Ill. ... Barbara A. **Sisson,** to Dir., Log., Instl., & Mission Spt., AETC, Randolph AFB, Tex. ... Robert C. **Shofner,** to Dir., Enterprise Sourcing Gp., AFMC, Wright-Patterson AFB, Ohio ... David E. **Walker,** to Assoc. Dep. Asst. Secy., Acq. Integration, Office of the Asst. SECAF, Acq., Pentagon.

**COMMAND CHIEF MASTER SERGEANT CHANGE:** CMSgt. Brian S. **Hornback,** to Command Chief Master Sergeant, AFGSC, Barksdale AFB, La. ■

citing no noticeable differences from traditional JP-8," said Jeff Braun, director of the alternative fuels certification division at Wright-Patterson AFB, Ohio.

In February, the C-17 became the first USAF aircraft cleared for unconstrained use of HRJ blends, followed by the F-22, which USAF has designated as the lead platform to begin testing of HRJ in fighters. Derived from inedible herbaceous stock—in this case camelina—HRJ could help USAF reduce its dependence on foreign sources of petroleum.

### Bone Pain

The Air Force has finalized a contract to subject a B-1B bomber to a full scale fatigue test to ascertain its true service life potential. The five-year contract with Boeing is worth $200 million.

The service wants to make sure the B-1B's structure can last for the remainder of its service life, now expected to end in about 2040.

Despite a design life of 9,681 flight hours, several B-1s have already surpassed 10,000 hours and "actual use has been three to four times more severe than what was planned," said Justin Evans, B-1 sustainment lead project engineer at Oklahoma City Air Logistics Center at Tinker AFB, Okla., where preparatory work for the testing is already under way.

USAF officials accelerated the testing to provide hard data on the health of the airframe to ensure that the B-1 fleet merits continued investment.

The parties signed the contract March 4.

The test subjects the airframe to pressures simulating multiple service lifetimes; engineers refer to it as a torture test.

The Air Force is conducting similar tests with the F-15C, F-15E, and F-16C, since those aircraft will have to serve longer than anticipated, as well.

### Operators Get Satellite-Watcher

Air Force officials announced March 14 that the 1st Space Operations Squadron at Schriever AFB, Colo., took control of the Space Based Space Surveillance satellite. The squadron is now responsible for operating and maintaining command and control of the satellite.

The turnover represents the culmination of the satellite's on-orbit checkout processes and is another step toward real-world operations.

SBSS, launched last September, is equipped with a camera for monitoring other orbiting objects. "It's an agile sensor, so it can be tasked to look at high-interest objects on a more frequent basis," said Col. Stephen Butler, Air Force Space Command's chief of space situational awareness and command and control.

Boeing and Ball Aerospace built the satellite.

### SBIRS Readied To Go

After a long and checkered development and production history, GEO-1, USAF's first geosynchronous Earth orbit Space Based Infrared System satellite is being readied for launch.

The missile-warning satellite arrived at Cape Canaveral AFS, Fla., March 3. It is to be launched early this month atop a United Launch Alliance Atlas V rocket.

SBIRS has been one of the most delayed and over-cost programs in USAF's history, plagued by chronic requirements changes and redesigns. Air Force leaders developed new requirements "discipline" policies because of the SBIRS experience.

The second of two SBIRS HEO sensors on host satellites in highly elliptical orbit achieved operational certification last year.

### Explosive Debris Killed Airman

SrA. James A. Hansen was killed in an incident at JB Balad, Iraq, last fall because he was too close to the controlled detonation of unserviceable ordnance, a USAF investigation has found.

As a result, Balad officials halted all nonemergency detonations and are

USAF photo by SrA. Joe McFadden

***The Cleanup Continues:*** *Airmen clear the remnants of a house in Noda Mura, Japan, on March 29. Nearly 40 airmen and civilians from Misawa Air Base participated in Operation Tomodachi, a humanitarian relief effort aimed at helping the northeastern coastal areas of the country devastated by the tsunami that swept through March 11.*

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## X-51's Achilles' Seal

As the Air Force's X-51 Waverider hypersonic research vehicle geared up for a second test flight—this time aiming for speeds in excess of Mach 6—officials said a breached seal caused the early termination of last year's flight, which they deemed a success nonetheless.

The scramjet-powered aircraft "ran for 143 seconds before we had a vehicle anomaly," said Charles F. Brink, USAF's X-51 program manager. That duration was an order of magnitude greater than any air-breathing hypersonic craft had previously achieved.

The seal problem caused exhaust gases to accumulate inside the fuselage, severing the craft's telemetry data link and damaging avionics.

Engineers determined that discrepancies between design and actual fabrication of the interface between Boeing's vehicle and Pratt & Whitney's engine were to blame. The discovery will allow engineers to make the interface on the three remaining X-51 test vehicles "much more robust," said Brink.

The X-51 program involves four vehicles, all designed to demonstrate scramjet-powered hypersonic flight before falling into the ocean. The vehicles were not designed to be recovered, but it is hoped that each flight will last longer than the previous ones.

The X-51 comprises the Waverider vehicle mounted on an Army Tactical Missile System missile. Both are carried aloft by a B-52 mothership. After release, the ATACMS missile fires, boosting the Waverider to high speed in 30 seconds. The booster falls away and the ramjet engine is then ignited, and should continue to operate for a "nominal demonstrator flight of 240 seconds," said Brink.

On the second flight, "we plan to go fly the same profile that we tried to fly last time," he said. "We met about 80 [percent] to 90 percent of our flight-test objectives" on the first run, and "the [upcoming] flight will be to see if we [can] repeat the same success and move out further in the Mach regime," Brink told reporters.

Beginning in Fiscal 2012, the Air Force will begin pursuing "weaponizing" the X-51, Brink said. Initial efforts will focus on the miniaturization of subsystems needed to make room for a warhead, or onboard sensors.

"We are going to work on the technologies that are in the X-51 to start transitioning ... to a more weapons-friendly design," said Brink.

currently rewriting explosive ordnance disposal operating instructions.

Hansen was one of 19 bystanders observing the blast when he was struck by flying debris.. Observers, including Hansen, were "not far enough away from the explosion to be completely outside the blast range," according to a recent Air Force Materiel Command news release on the accident investigation report.

Hansen was an airfield management operations coordinator from Eglin AFB, Fla.

**JSTARS Re-Engine Engine**

Pratt & Whitney completed production of the first JT8D-219 engine for the Air Force's E-8C JSTARS ground-surveillance aircraft on March 3. After three more are built, they will be installed on an E-8C which JSTARS prime contractor Northrop Grumman uses for test and integration. The aircraft will be tested to help the Air Force decide if it wants to re-engine the entire JSTARS fleet.

The test airframe is already flying with a test configuration of JT8D-219 engines.

Developmental flight testing, slated to conclude this fall, will pave the way for the E-8C "to operate with more thrust, while consuming less fuel, compared to the TF33 engines originally installed," said Bev Deachin, Pratt's vice president for military programs.

**AFNet Good To Go**

The first stage of the Air Force's new centralized Web and e-mail management system is "suitable, effective, and mission capable," operational testers reported.

The Air Force Intranet, or AFNet, is designed to improve network security by shifting from individual base standards to a centrally managed, servicewide system and has already reduced entry points into the Air Force's network by nearly 85 percent.

At USAF bases where AFNet is already in place, it routinely blocks 60 percent of incoming message traffic, shielding bases from malicious and spam content.

Testing was done by the Air Force Operational Test and Evaluation Center's utility evaluation.

"AFNet is about keeping threats from getting into the network, and the AFOTEC report validates that we're executing on that requirement," stated AFNet system program manager Ronnie Carter.

The AFOTEC blessing, given March 18, paves the way for the system's USAF-wide implementation by the end of the fiscal year.

**Faulty Parts Check**

The Air Force is checking some of its rockets for faulty parts, since similar parts caused a recent NASA rocket to fail. The rockets are slated to launch payloads later this year.

Three Minotaur rockets, built by Orbital Sciences and planned for use in upcoming space launches may share "common hardware" with the Taurus XL rocket that malfunctioned in March, destroying NASA's Glory satellite, USAF said. Taurus is also made by Orbital.

"We believe the parts that did not function properly ... are common to the boosters we've got coming up—two in May and one in August," Air Force Space Command boss Gen. William L. Shelton told the House Armed Services Committee's strategic forces panel on March 15.

Officials at USAF's Space and Missile Systems Center at Los Angeles AFB, Calif., quickly began analysis of the three upcoming launches: the Operationally Responsive Space-1 satellite, TacSat-4 spacecraft, and Hypersonic Test Vehicle-2.

Investigators surmised that the Taurus' payload faring failed to properly separate from the craft after the rocket left Earth's atmosphere, Shelton said. At the time, he said, it was still too early to say if the Air Force would delay the launches, or what measures may be needed to adequately address the issue.

**Launch Record Unbroken**

The Air Force hasn't lost a payload during a launch since April 1999, when a software glitch doomed a Milstar communications satellite.

The failure of NASA's Glory satellite to reach orbit in March due to a shroud-separation failure didn't count against the national security satellite record, Air Force Space Command said in response to a query.

"We are at 75 and holding for successful national security space launches," AFSPC said.

National security space launches include all Air Force Space Command, Navy, Missile Defense Agency, National Oceanic and Atmospheric Administration, and National Reconnaissance Office orbital missions, AFSPC said.

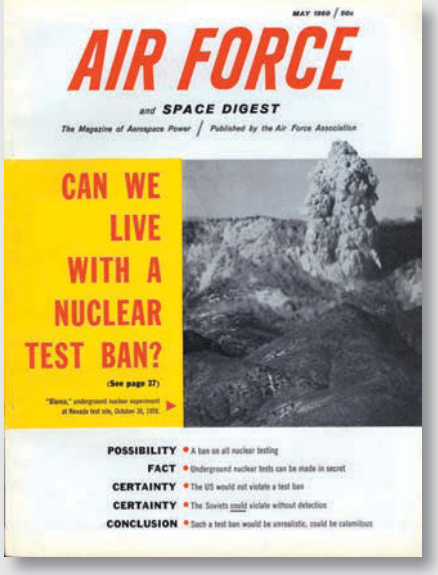
**Wildfire Fighter**

The Wyoming Air National Guard is now better equipped to fight fires, thanks to installation of new firefighting gear on its C-130s.

December 1942


May 1945


May 1960

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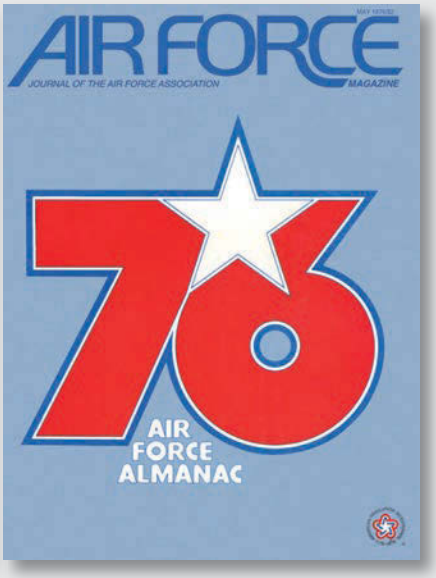


**With this issue, *Air Force* Magazine launches a new and improved USAF Almanac and—for just the fourth time in the magazine's history—introduces a brand-new logo. Under the direction of Editor Suzann Chapman, the May Almanac has been upgraded, streamlined, and revised throughout. Readers will now find it easier to navigate, and more focused on today's Air Force and the trends affecting it. The USAF Almanac will be, as always, your indispensible reference tool. The new logo was designed by Production Manager Eric Chang Lee. Previous logos debuted in 1942 (when *Air Forces* Newsletter first became *Air Force* Magazine); 1945 (while still an official Army Air Forces publication); and in 1976. The look also received many smaller tweaks over the years, with some examples shown at left.**

The 153rd Airlift Wing in Cheyenne recently received its first new generation Modular Airborne Firefighting System, MAFFS II.

The MAFFS II achieves denser coverage from higher altitude than its predecessor system. The new gear uses a single pressure-fed nozzle ducted through the aft paratroop door. It can drench a 100-foot-wide, quarter-mile-long path from 150 feet above ground.

Besides being more accurate, blowing the pressurized jet of fire retardant away from the aircraft prevents fuselage corrosion, while the self-pressurizing system cuts the amount of ground equipment needed to prep the aircraft. The Air Force aims to equip all of its Air Guard and Air Force Reserve Command aerial firefighting units with MAFFS II.

The 153rd AW is currently awaiting its second MAFFS II kit. The California Air Guard's 146th AW was the first unit to transition to the new system.

### T-6 Mishap Branded Pilot Error

An instructor pilot's error led to the crash of a T-6A trainer aircraft near Laughlin AFB, Tex., last year, an investigation team concluded.

According to Air Education and Training Command's accident investigation board, the instructor inadvertently shut down the aircraft's single engine during formation flight training with a student, then incorrectly executed the engine restart, causing catastrophic damage to the engine. The accident took place Sept. 24, 2010.

Instead of attempting a forced landing at the nearby auxiliary field, both instructor and student were overly focused on restarting the engine, and with time running out, ejected from the aircraft.

The error resulted in the loss of a $5 million aircraft, caused significant back injury to one of the pilots, and inflicted nominal damage on private property.

### GPS vs. iPhone

A proposed commercial 4G broadband network could jam the Global Positioning System, Gen. William L. Shelton, Air Force Space Command chief, told lawmakers March 15.

A company called LightSquared plans to erect more than 40,000 towers in urban centers across the nation, which USAF thinks will interfere with navigation equipment.

"We believe from what we have seen thus far that virtually every GPS receiver out there would be affected," said Shelton.

The Air Force would like to thoroughly test the actual equipment LightSquared plans to use "so that we can collect empirical data, as opposed to analytical data," Shelton said, adding that the company has shifted from "largely a space-based effort with terrestrial augmentation," to "a terrestrial-based network with space augmentation."

The company must submit specific data to obtain an operating license from the Federal Communications Commission, said Shelton. The FCC filing is due in June. Deputy Defense Secretary William J. Lynn III petitioned

the FCC to defer action until DOD has had a chance to fully analyze the data.

**Hercs To Alaska**

The Alaska Air National Guard's 144th Airlift Squadron has received the first of four former Tennessee ANG C-130s.

The transports arrived at JB Elmendorf-Richardson, Alaska, on March 24. They will grow the unit from eight to 12 aircraft, forming the basis of a new active duty association between the 144th and its active counterpart, the 537th AS, as dictated by the 2005 BRAC.

Stood up at the end of April, the 537th AS will reach initial operational capability this fall. "The active duty will work with the Pacific Air Forces air mobility division, so they can task the tails," said Lt. Col. Rich Adams, 144th AS commander.

"Whether it's the long-range radar sites here in Alaska, or to fly in the desert in a deployed status, or in the Pacific Command area of responsibility will be up to the active duty," explained Adams.

**PJ Gets Bronze Star Medal**

SSgt. Andrew Rios, a pararescueman with the 38th Rescue Squadron at Moody AFB, Ga., received the Bronze Star Medal with Valor Device for combat action March 4.

Flying as an HH-60G Pave Hawk door gunner in Afghanistan in 2009, Rios covered the evacuation of wounded troops from a convoy after it was hit by an improvised explosive device.

When the helicopter's gun jammed, Rios returned fire with his personal weapon, covering Pedro 15—a second Pavehawk—as it airlifted wounded troops from the ambush site.

When Pedro 15 was then forced down, Rios sprinted from his helicopter to provide aid, volunteering to stay at the crash site until all wounded were evacuated.

"When under fire, he only saw the tasks that needed to be accomplished and did exactly what he needed to do to complete them and save lives," said CMSgt. Matthew Wells, 38th RQS enlisted manager.

**Iraqi Flight Training Resumes**

An Iraqi Air Force instructor pilot has begun training students for the first time since the fall of Saddam Hussein's regime.

Flying the Hawker Beechcraft T-6 II, Lt. Col. Hussein Hamid conducted the first IqAF instructional flight from Tikrit Air Base March 19.

Hamid intends to train an additional 30 IqAF instructor pilots to attain a critical mass before the departure of US air advisors in December.

Beyond instructors, "I think the biggest hurdle we face for the T-6 is getting the necessary support to keep our operation airborne. Items such as maintenance will be a very critical part of our success," said Hamid, who has been commander of Tikrit's Squadron 203 since 2009.

Graduating from flight school in 1986, Hamid flew Iraqi Mirage fighters for 12 years. He left the service but rejoined in 2004 after longtime dictator Saddam had been deposed.

USAF photo by SSgt. Daylena Gonzalez

***New Inside:** Two airmen from the 25th Fighter Squadron load a Maverick missile onto an A-10 at Osan Air Base, South Korea, in April. The 25th FS successfully transitioned from the A-10A to the more capable A-10C model in December 2010.*

**Perimeter Partners**

About 250 USAF and British airmen got together at Nellis AFB, Nev., in March to share ideas on how best to protect desert air bases.

Airmen of the 822nd Base Defense Squadron at Moody AFB, Ga., joined members of the Royal Air Force's 4 Force Protection Wing for the first-ever Desert Eagle exercise.

Modeled closely on threats encountered in Southwest Asia, the exercise tasked participants to defend a simulated air base from civil unrest, direct assault, and terrorist action.

"Both we and the British kept in mind what we've seen down range. We wanted the scenarios to directly mirror those experiences so that we get the maximum training value," explained

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USAF photo by SSgt. Nadine Y. Barclay


***Removed Before Flight:** SSgt. Kemp Roderick (l) and A1C Amarawardana Danitha, maintainers with the 52nd Aircraft Maintenance Squadron, work on an F-16 engine at Aviano AB, Italy. Airmen with the 52nd AMS recently deployed from Spangdahlem AB, Germany, to the base in Italy for Operation Odyssey Dawn.*

822nd BDS intelligence officer Capt. Tyler McSpadden.

"We've worked with them before, but ... it's the first time the squads and leadership have been fully integrated," noted MSgt. Dean Mays of the 822nd BDS.

The 54-hour exercise took place March 14 to March 16 at the Nevada Test and Training Range.

**Raytheon Completes Upgrade**

USAF's Upgraded Early Warning Radar at Thule AB, Greenland, passed all system requirements and testing and is ready to begin supporting US ballistic missile defense, Raytheon announced in March.

Thule has the third Air Force early warning radar modified by Raytheon to detect ballistic missiles. Together with radars at Beale AFB, Calif., and RAF Fylingdales in the United Kingdom, Thule's radar enables the US and allies to precisely track and classify missile threats early in their trajectory.

"Our ability to leverage the technical knowledge and real-world experience from the previous upgrades at Beale and Fylingdales enabled us to deliver a system that meets current and future operational needs on time and under budget," said David R. Gulla, Raytheon's vice president for national and theater security programs. ■

## News Notes

■ The Civil Air Patrol would receive the Congressional Gold Medal for its World War II achievements, under bills pending in the House and Senate alike. CAP is credited with destroying two German U-Boats. More than 60,000 civilian CAP volunteers served during World War II; 64 died in service.

■ The Air Force's second and final low-rate production F-35A strike fighter flew for the first time from NAS Fort Worth JRB, Tex., March 4. Currently in testing at Edwards AFB, Calif., the aircraft will be assigned to Eglin AFB, Fla.

■ US and Russian arms control delegations met March 28 in Geneva, Switzerland, for the first Bilateral Consultative Commission session under New START. Meeting twice a year, the commission aims to "coordinate and discuss technical issues" related to implementation, according to the US State Department.

■ Negotiations between the US and Turkey over Turkey's planned $16 billion procurement of 100 F-35s have stalled over US refusal to release sensitive software codes that would allow modification of the aircraft. Turkey had discussed upping its F-35 buy to 116 earlier this year.

■ Air Force Reserve Command's entire 920th Rescue Wing's fleet simultaneously took to the sky for the first time in 15 years on March 6. Simulating a mass hurricane evacuation, three HC-130 tankers and six HH-60G Pave Hawks left Patrick AFB, Fla., refueling over the Atlantic coast.

■ The Air Force Senior Noncommissioned Officer Academy at Maxwell AFB, Ala., established the CMSgt. Richard Etchberger Team Award for distinguished graduates. Named for Medal of Honor recipient CMSgt. Richard L. Etchberger, the award mirrors Airman Leadership School's John Levitow Award.

■ Randolph AFB, Tex., celebrated 50 years of operating the supersonic T-38 Talon trainer on March 17, by painting one in its original 1960s-era paint scheme. Nearly 70,000 airmen began their careers flying the T-38 at Randolph since 1961.

■ The Collings Foundation unveiled a newly restored F-100F Super Sabre in a March 29 ceremony in Houston, Tex. The aircraft is painted in the colors of the F-100 flown by Medal of Honor recipient George E. Day, now a retired colonel. During festivities, Day flew the F-100 for the first time since he was shot down in one, which led to his captivity as a POW 43 years ago in North Vietnam.

■ The Air Force has awarded Goodrich a contract for two Senior Year Electro-Optical Reconnaissance Sensors payloads for the U-2. Housed in the extended nose section, the suite boasts improved range, resolution, and coverage over existing capabilities, operating across two visible and four infrared bands. ■

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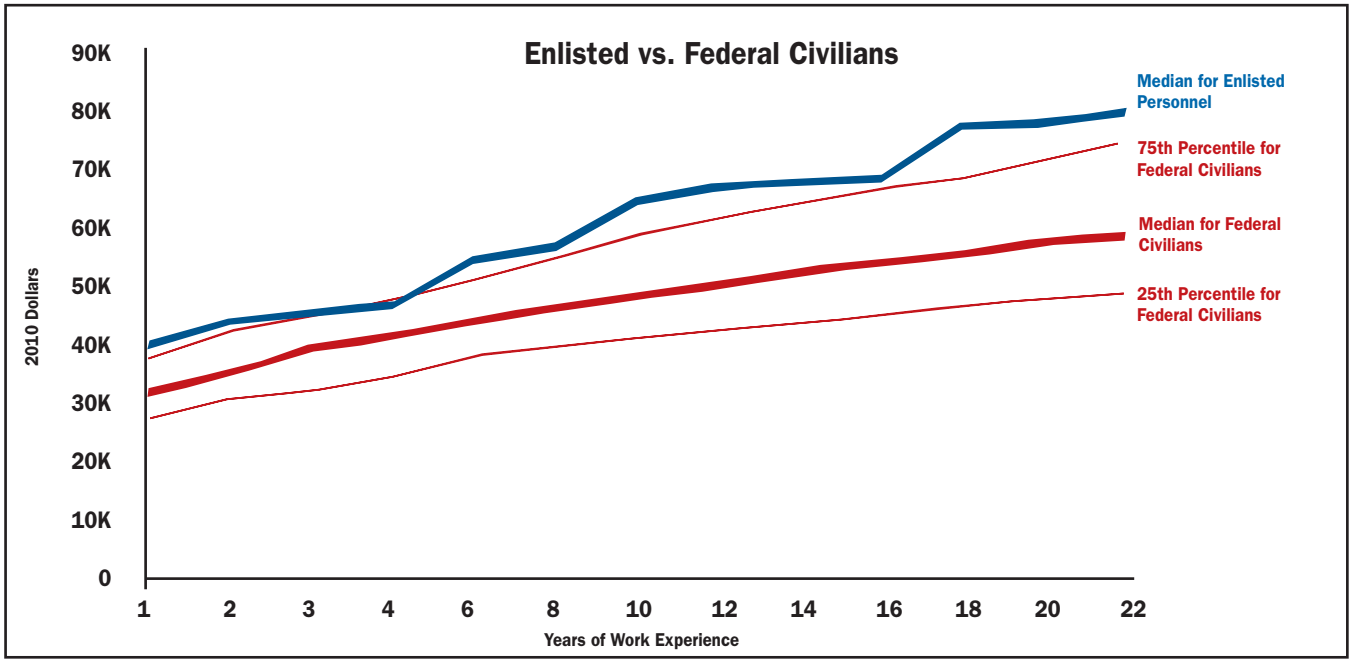
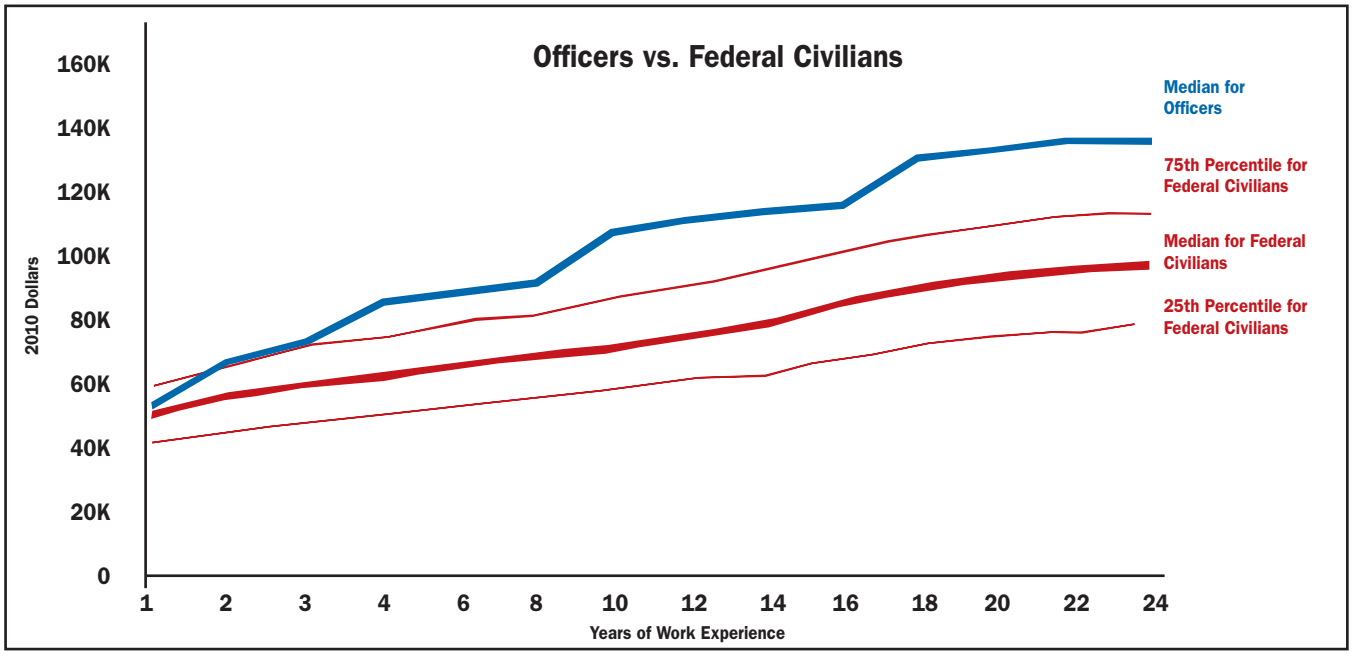
# How Does Military Pay Stack Up?

Military members should—and do—earn more than federal civilian workers. According to a Congressional Budget Office study, median cash compensation for troops exceeds that of most US government civilians with comparable education and experience. As the charts show, this is true of enlisted personnel and officers. Note: Military cash compensation = basic pay, allowances, and related tax advantages. Civilian cash compensation = earnings for full-time workers with a high school degree and some college (for comparison with enlisted) or college degree (for comparison with officers). Data are for 2011. Other studies found the military also leads in noncash and deferred benefits (health care, pensions, etc.).




Source: "Analysis of Federal Civilian and Military Compensation," Congressional Budget Office, Washington, D.C., Jan. 20, 2011. Based on data from DOD and Office of Personnel Management.

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## About the Almanac

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 section was compiled by the staff of *Air Force* Magazine under the direction of Editor Suzann Chapman. We especially acknowledge the help of the Secretary of the Air Force Office of Public Affairs, Air Staff agencies, major commands, and reserve components in bringing up to date the comparable data from last year's Almanac.

—*THE EDITORS*

Corbis photo by David Ponton/Design Pics

# The Air Force in Facts and Figures

## 2011 USAF Almanac

# Structure of the Force

## How the Air Force Is Organized

There is considerable variation in how the major commands and subordinate units of the Air Force are organized. This overview describes both the typical organization chain and USAF's Air and Space Expeditionary Force.

The **Department of Defense (DOD)** is a Cabinet agency headed by the Secretary of Defense. It was created in 1947 to consolidate pre-existing military agencies—the War Department and the Navy Department. Subordinate to DOD are the three military departments (Army, Navy, and Air Force), each headed by a civilian Secretary.

The **Joint Chiefs of Staff (JCS)** constitute the corporate military leadership of DOD. The Chairman and vice chairman of the JCS serve full time in their positions. The service Chiefs are the military heads of their respective services, although JCS responsibilities take precedence.

The **Department of the Air Force** is headed by the Secretary of the Air Force, who is supported by a staff called the Secretariat. The Chief of Staff, USAF, heads the Air Staff, and the military heads of the major commands report to the Chief of Staff.

Most Air Force units fall under a **major command,** which has broad functional responsibilities. Major commands may be divided into **numbered air forces.**

The fundamental unit of the working Air Force is the **wing.** An objective wing contains an **operations group,** which includes aircrews, intelligence units, and others; a **maintenance group,** which includes maintenance squadrons; a **mission support group,** which includes such functions as civil engineers, logistics readiness, and security forces; and a **medical group.**

Most airmen are assigned to a **squadron,** which may comprise several **flights.**

In addition to these units, there are others, including centers, field operating agencies, and direct reporting units.

### Air and Space Expeditionary Force

To relieve chronic optempo problems stemming from back-to-back operations, the Air Force developed an expeditionary concept initially called the Expeditionary Aerospace Force. The term EAF was supplanted by the term Air and Space Expeditionary Force **(AEF).** The term AEF also refers to a basic organizational unit. USAF groups its power projection and support forces into 10 AEF "buckets of capability" operating in five pairs.

Initially, combat air forces **(CAF)** deployed for a 90-day AEF rotation, with mobility air forces **(MAF)** and low-density, high-demand **(LD/HD)** forces operating on longer deployments as needed. In 2004, USAF went to a basic 120-day rotation, while LD/HD forces normally deployed for 180 days. (USAF's LD/HD forces, including battle management, battlefield airmen, and reconnaissance assets, are in near constant use and rotate more frequently than most CAF and MAF elements.)

In late 2008, USAF began employing Tempo Bands (A-E) with different deployment-to-dwell ratios. For instance, CAF forces in Tempo Band A deployed on a 1:4 ratio—four months (120 days) deployed to 16 months dwell time. The other bands operated mostly on 180-day deployment cycles. In 2010, USAF began moving Tempo Band A forces into Tempo Band B, still utilizing a 1:4 ratio but on a 180-day deployment period, thus standardizing the deployment time for most airmen. The deploy-to-dwell ratio varies among the Tempo Bands: B at 1:4; C at 1:3; D at 1:2; and E at 1:1. ▪

## Current Air Force Leaders

| | | Date in Position |
|---|---|---|
| **Secretary of the Air Force** | Michael B. Donley | Oct. 17, 2008 |
| **Air Force Chief of Staff** | Gen. Norton A. Schwartz | Aug. 12, 2008 |
| **Chief Master Sergeant of the Air Force** | CMSAF James A. Roy | June 30, 2009 |

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# People

## 2011 USAF Almanac

### USAF Total Force

(As of Sept. 30, 2010)

| | FY02 | FY03 | FY04 | FY05 | FY06 | FY07 | FY08 | FY09 | FY10 | Estimate FY11 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Air Force active duty** | | | | | | | | | | |
| Officers | 72,032 | 73,758 | 74,109 | 73,252 | 70,539 | 65,722 | 64,805 | 65,496 | 66,201 | 64,762 |
| Enlisted | 292,061 | 297,219 | 298,314 | 276,117 | 273,990 | 263,372 | 258,092 | 263,351 | 263,437 | 263,438 |
| Cadets | 4,158 | 4,085 | 4,193 | 4,327 | 4,424 | 4,401 | 4,482 | 4,561 | 4,558 | 4,000 |
| **Total Air Force active duty** | **368,251** | **375,062** | **376,616** | **353,696** | **348,953** | **333,495** | **327,379** | **333,408** | **334,196** | **332,200** |
| **Civilian personnel** | | | | | | | | | | |
| Direct hire (excluding technicians) | 121,829 | 123,887 | 122,572 | 124,534 | 128,475 | 125,636 | 124,698 | 123,106 | 134,183 | 150,595 |
| ANG technicians | 20,319 | 20,906 | 21,703 | 22,731 | 21,997 | 22,409 | 22,353 | 22,391 | 22,657 | 22,731 |
| AFRC technicians | 8,288 | 8,287 | 9,538 | 9,407 | 9,427 | 9,127 | 8,857 | 9,147 | 10,068 | 10,782 |
| **Total Direct Hire** | **150,436** | **153,080** | **153,813** | **156,672** | **159,899** | **157,172** | **155,908** | **154,644** | **166,908** | **184,108** |
| Indirect hire | 6,353 | 6,337 | 6,575 | 6,571 | 6,833 | 6,212 | 6,515 | 6,346 | 6,564 | 6,072 |
| **Total civilian personnel** | **156,789** | **159,417** | **160,388** | **163,243** | **166,732** | **163,384** | **162,423** | **160,990** | **173,472** | **190,180** |
| **Air National Guard** | | | | | | | | | | |
| Officers (Selected Reserve) | 13,928 | 13,700 | 13,633 | 13,672 | 13,782 | 13,992 | 14,115 | 14,326 | 14,389 | 15,838 |
| Enlisted (Selected Reserve) | 98,143 | 94,437 | 93,189 | 92,758 | 91,876 | 92,162 | 93,564 | 94,870 | 93,287 | 90,862 |
| **Total ANG** | **112,071** | **108,137** | **106,822** | **106,430** | **105,658** | **106,154** | **107,679** | **109,196** | **107,676** | **106,700** |
| **Air Force Reserve Command** | | | | | | | | | | |
| Officers (Selected Reserve) | 17,295 | 16,804 | 16,723 | 16,676 | 16,678 | 16,199 | 15,169 | 14,753 | 14,560 | 15,588 |
| Enlisted (Selected Reserve) | 59,337 | 57,950 | 58,599 | 59,126 | 57,397 | 54,083 | 52,396 | 53,233 | 55,559 | 55,612 |
| **Total AFRC Selected Reserve** | **76,632** | **74,754** | **75,322** | **75,802** | **74,075** | **70,282** | **67,565** | **67,986** | **70,119** | **71,200** |
| Officers (Individual Ready Reserve) | 10,275 | 9,280 | 9,912 | 9,942 | 11,356 | 13,018 | 13,633 | 12,833 | 11,692 | 11,392 |
| Enlisted (IRR) | 30,820 | 27,724 | 27,095 | 31,377 | 33,548 | 36,831 | 35,668 | 30,349 | 28,863 | 27,482 |
| **Total AFRC IRR** | **41,095** | **37,044** | **37,007** | **41,319** | **44,904** | **49,849** | **49,301** | **43,182** | **40,555** | **38,874** |
| **Total AFRC** | **117,727** | **111,758** | **112,329** | **117,121** | **118,979** | **120,131** | **116,866** | **111,168** | **110,674** | **110,074** |
| **Total Ready Reserve** | **229,798** | **219,895** | **219,151** | **223,551** | **224,637** | **226,285** | **224,545** | **220,364** | **218,350** | **216,774** |

### Armed Forces Manpower Trends, End Strength in Thousands

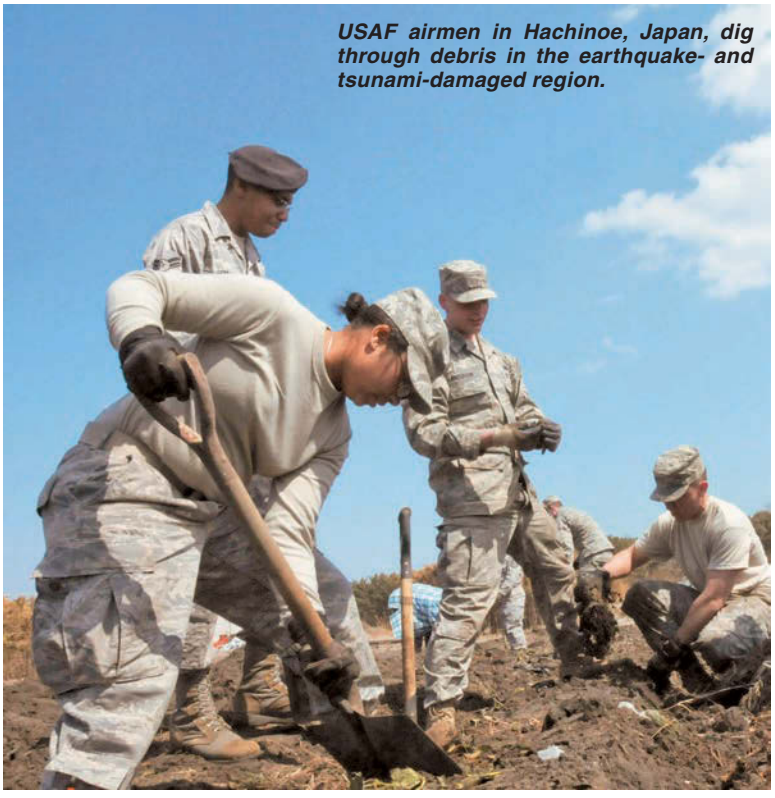
(As of Sept. 30, 2010)

| | FY02 | FY03 | FY04 | FY05 | FY06 | FY07 | FY08 | FY09 | FY10 | Estimate FY11 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Active duty military** | | | | | | | | | | |
| Air Force | 368 | 375 | 377 | 354 | 349 | 334 | 327 | 333 | 334 | 332 |
| Army | 487 | 499 | 500 | 493 | 505 | 522 | 544 | 553 | 566 | 569 |
| Marine Corps | 174 | 178 | 178 | 180 | 180 | 187 | 199 | 203 | 202 | 202 |
| Navy | 383 | 382 | 373 | 363 | 350 | 338 | 332 | 329 | 328 | 329 |
| **Total** | **1,412** | **1,434** | **1,428** | **1,390** | **1,384** | **1,381** | **1,402** | **1,418** | **1,430** | **1,432** |
| **Guard and Reserve (Selected Reserve)** | | | | | | | | | | |
| Air National Guard | 112 | 108 | 107 | 106 | 106 | 106 | 108 | 109 | 108 | 107 |
| AFRC | 77 | 75 | 75 | 76 | 74 | 71 | 68 | 68 | 70 | 71 |
| Army National Guard | 351 | 351 | 343 | 333 | 346 | 353 | 360 | 358 | 362 | 358 |
| Army Reserve | 207 | 212 | 204 | 189 | 190 | 190 | 197 | 205 | 205 | 205 |
| Marine Corps Reserve | 40 | 41 | 40 | 40 | 40 | 39 | 38 | 39 | 39 | 40 |
| Naval Reserve | 88 | 88 | 83 | 76 | 71 | 70 | 68 | 67 | 65 | 66 |
| **Total** | **875** | **875** | **852** | **820** | **827** | **829** | **839** | **846** | **849** | **847** |
| **Direct-hire civilian (full-time equivalents)** | | | | | | | | | | |
| Air Force | 150 | 153 | 154 | 157 | 160 | 157 | 156 | 155 | 167 | 184 |
| Army | 207 | 206 | 208 | 213 | 220 | 221 | 230 | 247 | 260 | 250 |
| Navy/Marine Corps | 184 | 186 | 183 | 179 | 174 | 176 | 178 | 186 | 195 | 196 |
| Defense agencies | 108 | 104 | 105 | 105 | 104 | 105 | 108 | 115 | 120 | 126 |
| **Total** | **649** | **649** | **650** | **654** | **658** | **659** | **672** | **703** | **742** | **756** |

## Active Duty Airmen by Rank

(As of Sept. 30, 2010)

| Rank | Men | Women | Total |
|---|---|---|---|
| **Officers** | | | |
| General | 12 | 0 | 12 |
| Lieutenant General | 40 | 1 | 41 |
| Major General | 93 | 11 | 104 |
| Brigadier General | 144 | 14 | 158 |
| Colonel | 3,261 | 429 | 3,690 |
| Lieutenant Colonel | 8,971 | 1,319 | 10,290 |
| Major | 11,893 | 2,502 | 14,395 |
| Captain | 18,653 | 4,944 | 23,597 |
| First Lieutenant | 5,477 | 1,632 | 7,109 |
| Second Lieutenant | 5,294 | 1,511 | 6,805 |
| **Total** | **53,838** | **12,363** | **66,201** |
| **Enlisted** | | | |
| Chief Master Sergeant of the Air Force | 1 | 0 | 1 |
| Chief Master Sergeant | 2,339 | 269 | 2,608 |
| Senior Master Sergeant | 4,514 | 694 | 5,208 |
| Master Sergeant | 22,420 | 4,025 | 26,445 |
| Technical Sergeant | 33,704 | 8,144 | 41,848 |
| Staff Sergeant | 55,623 | 14,549 | 70,172 |
| Senior Airman | 39,028 | 10,267 | 49,295 |
| Airman First Class | 42,094 | 10,368 | 52,462 |
| Airman | 5,095 | 1,130 | 6,225 |
| Airman Basic | 7,673 | 1,500 | 9,173 |
| **Total** | **212,491** | **50,946** | **263,437** |
| Academy Cadets | 3,592 | 966 | 4,558 |
| **Total Personnel** | **269,921** | **64,275** | **334,196** |



*USAF airmen in Hachinoe, Japan, dig through debris in the earthquake- and tsunami-damaged region.*

USAF photo by SSgt. Rachel Martinez

## Number and Percentage of Active Duty Airmen by Gender

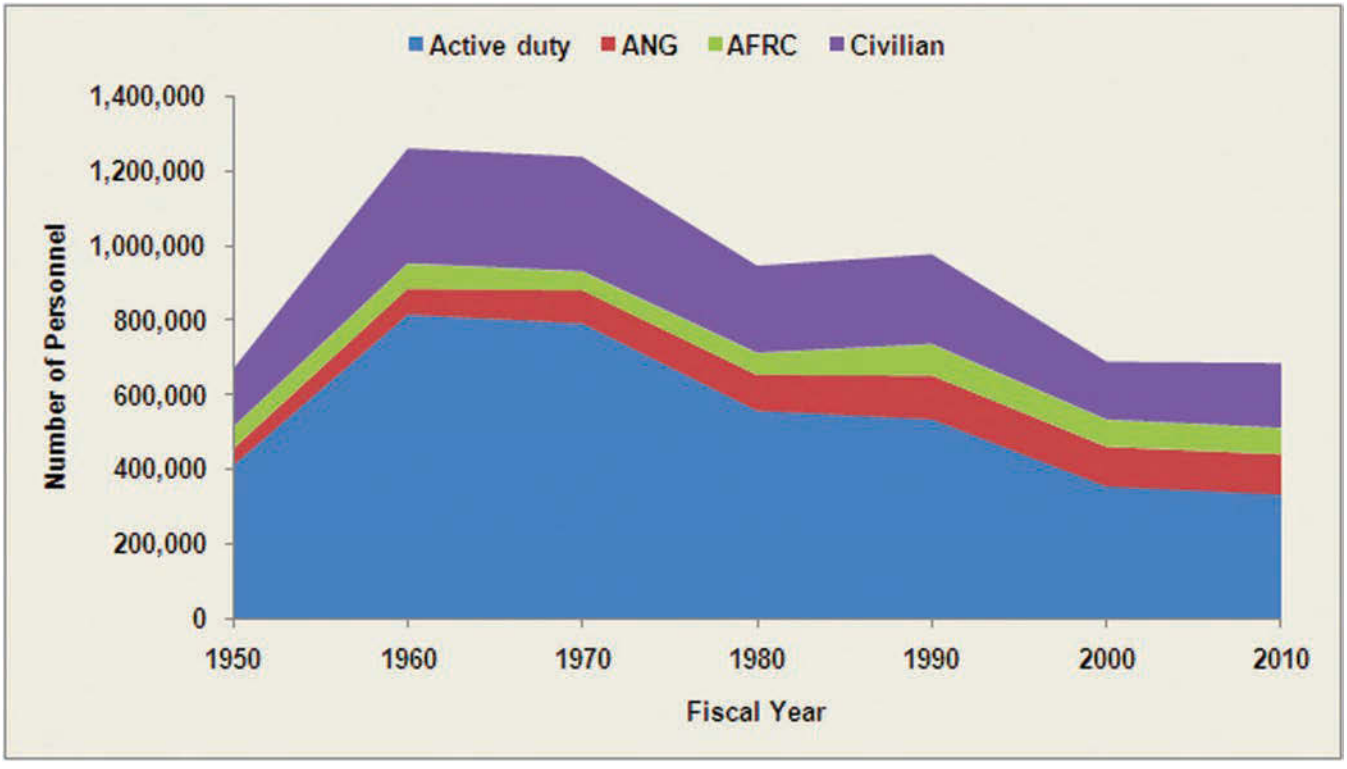
| | 1950 | 1960 | 1970 | 1980 | 1990 | 2000 | 2010 |
|---|---|---|---|---|---|---|---|
| **Officers** | | | | | | | |
| Male | 55,474 | 126,014 | 125,136 | 89,156 | 86,714 | 57,204 | 53,838 |
| Percentage | 97.3% | 97.2% | 96.4% | 91.3% | 86.7% | 82.9% | 81.3% |
| Female | 1,532 | 3,675 | 4,667 | 8,493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

## Active Duty Airmen by Region

| Regions | 1950 | 1960 | 1970 | 1980 | 1990 | 2000 | 2010 |
|---|---|---|---|---|---|---|---|
| US and its territories | 341,999 | 633,255 | 564,701 | 445,876 | 418,004 | 291,241 | 277,123 |
| Europe | 24,531 | 104,899 | 72,937 | 76,788 | 69,296 | 32,901 | 30,963 |
| East Asia and Pacific | 36,850 | 50,751 | 140,063 | 32,273 | 33,581 | 22,049 | 12,649 |
| Africa, Near East, South Asia | 1,491 | 11,160 | 608 | 674 | 376 | 8,972 | 891 |
| Western Hemisphere | 6,266 | 14,106 | 5,348 | 2,211 | 2,356 | 345 | 339 |
| Other | 140 | 581 | 7,692 | 147 | 11,620 | 146 | 12,231 |
| **Total** | **411,277** | **814,752** | **791,349** | **557,969** | **535,233** | **355,654** | **334,196** |

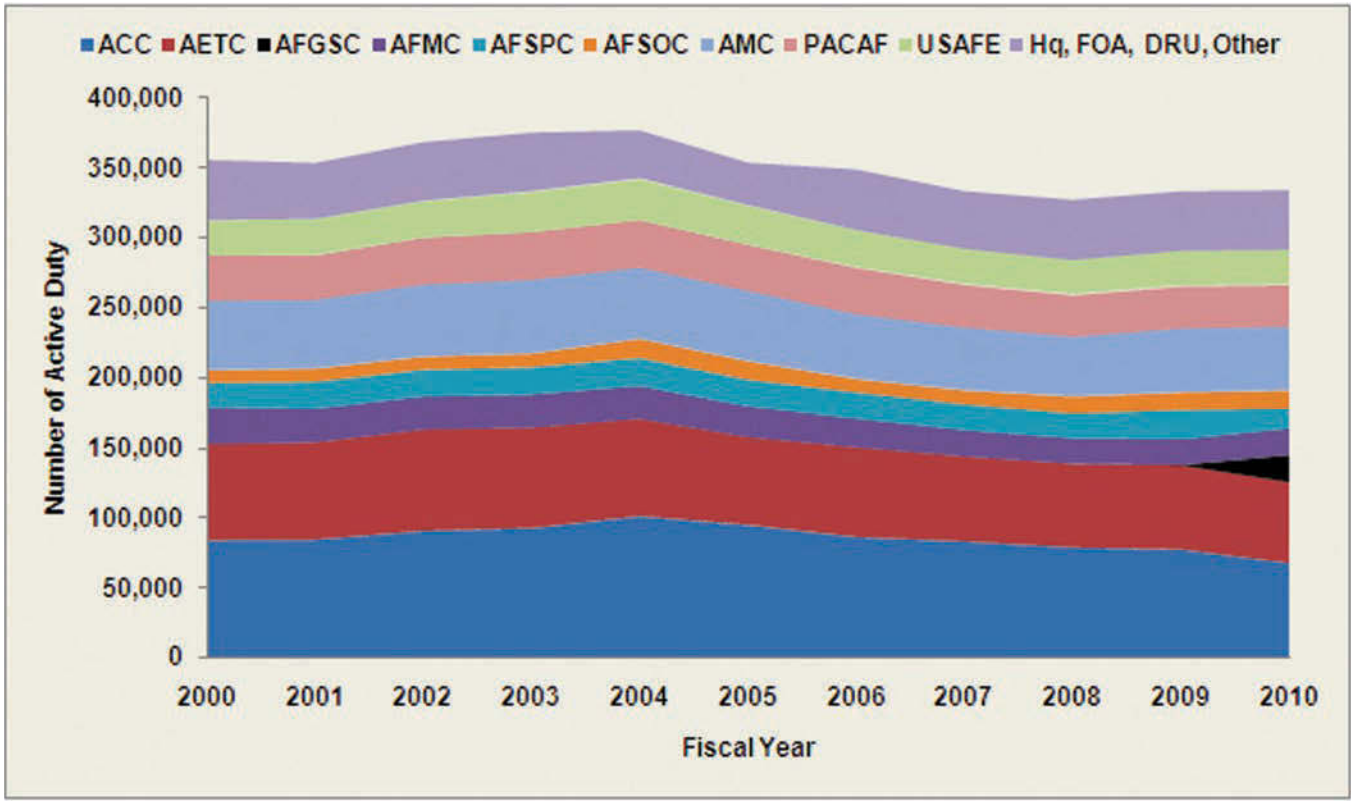
Note: Airmen deployed to Afghanistan and Iraq are included in home station regions or under other.

## Total Force Over Time




Note: Data for 1950 and 1960 as of June 30; data for other years as of Sept. 30. Sources: *Air Force* Magazine's "USAF Almanac," various years; US Census Bureau, "Statistical Abstract of the United States"; "Department of Defense Selected Manpower Statistics," various years.

## Active Duty Airmen by Active Duty Major Command




Note: Data for 1950 and 1960 as of June 30; data for other years as of Sept. 30.

## Personnel Strength by Commands, FOAs, and DRUs

(As of Sept. 30, 2010)

| | Military | Civilian | Total |
|---|---|---|---|
| **Active Duty Major Commands** | | | |
| Air Combat Command | 68,252 | 9,622 | 77,874 |
| Air Education and Training Command | 57,639 | 15,352 | 72,991 |
| Air Force Global Strike Command | 19,321 | 2,508 | 21,829 |
| Air Force Materiel Command | 19,220 | 63,205 | 82,425 |
| Air Force Space Command | 13,896 | 7,678 | 21,574 |
| Air Force Special Operations Command | 12,706 | 1,721 | 14,427 |
| Air Mobility Command | 45,840 | 9,719 | 55,559 |
| Pacific Air Forces | 29,381 | 8,072 | 37,453 |
| US Air Forces in Europe | 25,534 | 6,250 | 31,784 |
| **Total Major Commands** | **291,789** | **124,127** | **415,916** |
| | | | |
| **Field Operating Agencies (FOAs)** | | | |
| Air Force Agency for Modeling and Simulation | 8 | 15 | 23 |
| Air Force Audit Agency | 0 | 717 | 717 |
| Air Force Center for Engineering and the Environment | 38 | 528 | 566 |
| Air Force Civil Engineer Support Agency | 86 | 144 | 230 |
| Air Force Cost Analysis Agency | 29 | 100 | 129 |
| Air Force Financial Services Center | 347 | 99 | 446 |
| Air Force Flight Standards Agency | 129 | 52 | 181 |
| Air Force Historical Research Agency | 0 | 58 | 58 |
| Air Force Inspection Agency | 96 | 37 | 133 |
| Air Force Intelligence Analysis Agency | 67 | 46 | 113 |
| Air Force Intel, Surveillance, & Reconnaissance Agency | 12,078 | 2,269 | 14,347 |
| Air Force Legal Operations Agency | 483 | 260 | 743 |
| Air Force Logistics Management Agency | 28 | 15 | 43 |
| Air Force Manpower Agency | 161 | 317 | 478 |
| Air Force Medical Operations Agency | 198 | 139 | 337 |
| Air Force Medical Support Agency | 172 | 59 | 231 |
| Air Force Office of Special Investigations | 1,543 | 636 | 2,179 |
| Air Force Operations Group | 57 | 0 | 57 |
| Air Force Personnel Center | 758 | 1,358 | 2,116 |
| Air Force Personnel Operations Agency | 10 | 67 | 77 |
| Air Force Petroleum Agency | 29 | 68 | 97 |
| Air Force Public Affairs Agency | 230 | 28 | 258 |
| Air Force Real Property Agency | 0 | 97 | 97 |
| Air Force Review Boards Agency | 8 | 59 | 67 |
| Air Force Safety Center | 48 | 76 | 124 |
| Air Force Security Forces Center | 331 | 44 | 375 |
| Air Force Services Agency | 65 | 185 | 250 |
| Air Force Weather Agency | 951 | 298 | 1,249 |
| Air National Guard Readiness Center | 82 | 610 | 692 |
| **Total FOAs** | **18,032** | **8,381** | **26,413** |
| | | | |
| **Direct Reporting Units (DRUs)** | | | |
| Air Force District of Washington | 4,212 | 1,443 | 5,655 |
| Air Force Operational Test & Evaluation Center | 377 | 197 | 574 |
| US Air Force Academy (excluding cadets) | 2,253 | 1,464 | 3,717 |
| **Total DRUs** | **6,842** | **3,104** | **9,946** |
| | | | |
| **Other** | | | |
| Hq. USAF | 2,087 | 1,655 | 3,742 |
| Other | 10,888 | 36,205 | 47,093 |
| USAFA Cadets | 4,558 | 0 | 4,558 |
| **Total Other** | **17,533** | **37,860** | **53,393** |
| | | | |
| **Total Strength** | **334,196** | **173,472** | **507,668** |

## Active Duty Personnel Strength

(As of Sept. 30, 2010)

| Year | Number | Year | Number |
|---|---|---|---|
| **1907** | 3 | **1973** | 691,182 |
| **1908** | 13 | **1974** | 643,970 |
| **1909** | 27 | **1975** | 612,751 |
| **1910** | 11 | **1976** | 585,416 |
| **1911** | 23 | **1977** | 570,695 |
| **1912** | 51 | **1978** | 569,712 |
| **1913** | 114 | **1979** | 559,455 |
| **1914** | 122 | **1980** | 557,969 |
| **1915** | 208 | **1981** | 570,302 |
| **1916** | 311 | **1982** | 582,845 |
| **1917** | 1,218 | **1983** | 592,044 |
| **1918** | 195,023 | **1984** | 597,125 |
| **1919** | 25,603 | **1985** | 601,515 |
| **1920** | 9,050 | **1986** | 608,199 |
| **1921** | 11,649 | **1987** | 607,035 |
| **1922** | 9,642 | **1988** | 576,446 |
| **1923** | 9,441 | **1989** | 570,880 |
| **1924** | 10,547 | **1990** | 535,233 |
| **1925** | 9,670 | **1991** | 510,432 |
| **1926** | 9,674 | **1992** | 470,315 |
| **1927** | 10,078 | **1993** | 444,351 |
| **1928** | 10,549 | **1994** | 426,327 |
| **1929** | 12,131 | **1995** | 400,409 |
| **1930** | 13,531 | **1996** | 389,001 |
| **1931** | 14,780 | **1997** | 377,385 |
| **1932** | 15,028 | **1998** | 367,470 |
| **1933** | 15,099 | **1999** | 360,590 |
| **1934** | 15,861 | **2000** | 355,654 |
| **1935** | 16,247 | **2001** | 353,571 |
| **1936** | 17,233 | **2002** | 368,251 |
| **1937** | 19,147 | **2003** | 375,062 |
| **1938** | 21,089 | **2004** | 376,616 |
| **1939** | 23,455 | **2005** | 353,696 |
| **1940** | 51,165 | **2006** | 348,953 |
| **1941** | 152,125 | **2007** | 333,495 |
| **1942** | 764,415 | **2008** | 327,379 |
| **1943** | 2,197,114 | **2009** | 333,408 |
| **1944** | 2,372,292 | **2010** | 334,196 |
| **1945** | 2,282,259 | **2011** | 332,200 |
| **1946** | 455,515 | | |
| **1947** | 305,827 | | |
| **1948** | 387,730 | | |
| **1949** | 419,347 | | |
| **1950** | 411,277 | | |
| **1951** | 788,381 | | |
| **1952** | 983,261 | | |
| **1953** | 977,593 | | |
| **1954** | 947,918 | | |
| **1955** | 959,946 | | |
| **1956** | 909,958 | | |
| **1957** | 919,835 | | |
| **1958** | 871,156 | | |
| **1959** | 840,435 | | |
| **1960** | 814,752 | | |
| **1961** | 821,151 | | |
| **1962** | 884,025 | | |
| **1963** | 869,431 | | |
| **1964** | 856,798 | | |
| **1965** | 824,662 | | |
| **1966** | 887,353 | | |
| **1967** | 897,494 | | |
| **1968** | 904,850 | | |
| **1969** | 862,353 | | |
| **1970** | 791,349 | | |
| **1971** | 755,300 | | |
| **1972** | 725,838 | | |

2011 number is an estimate.

# Budgets

## 2011 USAF Almanac

**Terms Explained**

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

Another difference concerns the value of money. When funding is in **current** or **then-year** dollars, no adjustment for inflation has taken place. 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 factored out to make direct comparisons between budget years possible. A specific year, often the present one, is chosen as a baseline for constant dollars.

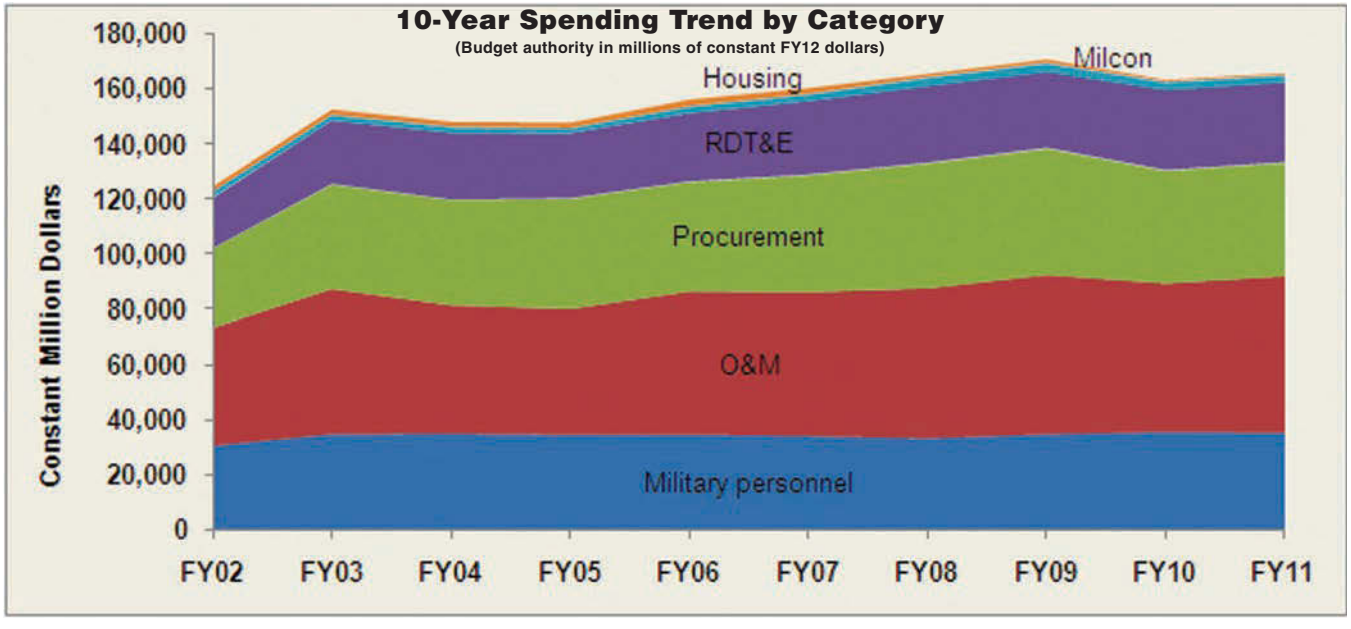
Normally, Congress first authorizes payment, then appropriates it. **Authorization** is an act of Congress that establishes or continues a federal program or agency and sets forth guidelines to which it must adhere. **Appropriation** is an act of Congress that enables federal agencies to spend money for specific purposes.

### Air Force Budget—A 10-Year Perspective

(Budget authority in millions of current and constant FY12 dollars; excludes costs of the Global War on Terror.)

| **Current dollars** | **FY02** | **FY03** | **FY04** | **FY05** | **FY06** | **FY07** | **FY08** | **FY09** | **FY10** | **FY11** |
|---|---|---|---|---|---|---|---|---|---|---|
| Military personnel | $24,751 | $28,732 | $29,681 | $30,344 | $31,398 | $31,789 | $32,180 | $33,482 | $34,835 | $34,975 |
| Operation & maintenance | 34,364 | 43,254 | 39,252 | 39,752 | 46,709 | 48,237 | 52,225 | 55,229 | 52,313 | 55,913 |
| Procurement | 23,229 | 31,380 | 32,460 | 35,117 | 35,989 | 39,542 | 43,816 | 44,182 | 40,027 | 40,785 |
| RDT&E | 14,519 | 18,825 | 20,290 | 20,551 | 22,220 | 24,566 | 26,630 | 26,289 | 28,175 | 28,440 |
| Military construction | 1,806 | 1,634 | 1,831 | 1,499 | 2,183 | 2,328 | 3,089 | 3,102 | 2,845 | 2,555 |
| Family housing | 1,374 | 1,536 | 1,441 | 1,680 | 2,086 | 1,900 | 1,001 | 1,087 | 569 | 569 |
| Rev. & mgmt. funds | 292 | 31 | 690 | -667 | 1,252 | 666 | -934 | 251 | 79 | 84 |
| Trust & receipts | -108 | -147 | -110 | -359 | -180 | -80 | -96 | -96 | -136 | -138 |
| **Total** | **$100,228** | **$125,245** | **$125,536** | **$127,918** | **$141,657** | **$148,947** | **$157,909** | **$163,526** | **$158,707** | **$163,183** |
| | | | | | | | | | | |
| **Constant dollars** | | | | | | | | | | |
| Military personnel | $30,747 | $34,890 | $35,095 | $34,699 | $34,791 | $34,265 | $33,416 | $34,908 | $35,747 | $35,430 |
| Operation & maintenance | 42,689 | 52,524 | 46,411 | 45,457 | 51,756 | 51,994 | 54,231 | 57,581 | 53,682 | 56,640 |
| Procurement | 28,856 | 38,105 | 38,381 | 40,157 | 39,878 | 42,621 | 45,499 | 46,064 | 41,074 | 41,315 |
| RDT&E | 18,036 | 22,860 | 23,991 | 23,500 | 24,621 | 26,479 | 27,653 | 27,409 | 28,912 | 28,810 |
| Military construction | 2,244 | 1,984 | 2,165 | 1,714 | 2,419 | 2,509 | 3,208 | 3,234 | 2,919 | 2,588 |
| Family housing | 1,707 | 1,865 | 1,704 | 1,921 | 2,311 | 2,048 | 1,040 | 1,133 | 584 | 576 |
| Rev. & mgmt. funds | 363 | 38 | 816 | -763 | 1,387 | 718 | -970 | 262 | 81 | 85 |
| Trust & receipts | -134 | -179 | -130 | -411 | -199 | -86 | -100 | -100 | -140 | -140 |
| **Total** | **$124,508** | **$152,087** | **$148,433** | **$146,276** | **$156,964** | **$160,547** | **$163,975** | **$170,490** | **$162,860** | **$165,304** |
| | | | | | | | | | | |
| **Percentage real growth** | | | | | | | | | | |
| Military personnel | 16.2 | 13.5 | 0.6 | -1.1 | 0.3 | -1.5 | -2.5 | 4.5 | 2.4 | -0.9 |
| Operation & maintenance | 15.3 | 23.0 | -11.6 | -2.1 | 13.9 | 0.5 | 4.3 | 6.2 | -6.8 | 5.5 |
| Procurement | 3.7 | 32.1 | 0.7 | 4.6 | -0.7 | 6.9 | 6.8 | 1.2 | -10.8 | 0.6 |
| RDT&E | 0.0 | 26.7 | 4.9 | -2.0 | 4.8 | 7.5 | 4.4 | -0.9 | 5.5 | -0.4 |
| Military construction | 26.1 | -11.6 | 9.1 | -20.8 | 41.1 | 3.7 | 27.8 | 0.8 | -9.7 | -11.3 |
| Housing | 24.8 | 9.3 | -8.7 | 12.8 | 20.3 | -11.4 | -49.2 | 9.0 | -48.5 | -1.3 |
| **Total** | **10.2** | **22.2** | **-2.4** | **-1.5** | **7.3** | **2.3** | **2.1** | **4.0** | **-4.5** | **5.0** |

Numbers do not add due to rounding.



## Defense Budget Authority

($ billions)

| | 2010 | 2011 | 2012 | Planned 2013 | 2014 | 2015 | 2016 |
|---|---|---|---|---|---|---|---|
| **No War Costs, Current dollars** | | | | | | | |
| | $527.9 | $526.1 | $553.1 | $570.7 | $586.4 | $598.2 | $610.6 |
| **No War Costs, Constant FY 2012 dollars** | | | | | | | |
| | $541.7 | $532.9 | $553.1 | $563.3 | $567.2 | $567.0 | $567.2 |
| **With War Costs, Current dollars** | | | | | | | |
| | $690.2 | $685.1 | $670.9 | $620.7 | $636.4 | $648.2 | $660.6 |
| **With War Costs, Constant FY 2012 dollars** | | | | | | | |
| | $708.3 | $694.0 | $670.9 | $612.6 | $615.6 | $614.4 | $613.7 |

## Defense Outlays

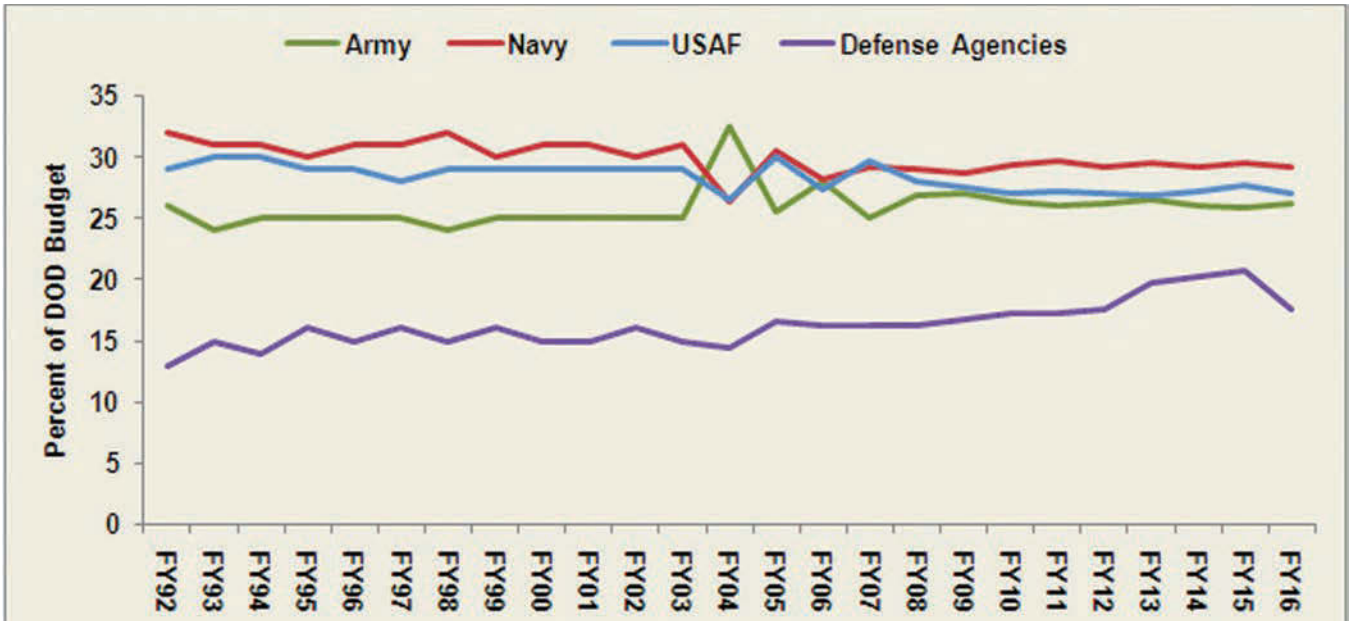
($ billions)

| | 2010 | 2011 | 2012 | Planned 2013 | 2014 | 2015 | 2016 |
|---|---|---|---|---|---|---|---|
| **Current dollars** | | | | | | | |
| | $663.7 | $733.9 | $701.6 | $643.0 | $632.5 | $639.0 | $646.4 |
| **Constant FY 2012 dollars** | | | | | | | |
| | $681.1 | $743.4 | $701.6 | $634.6 | $611.8 | $605.7 | $600.5 |

## Service and Agency Shares of Total DOD Budget

(Budget authority in billions of constant FY12 dollars)

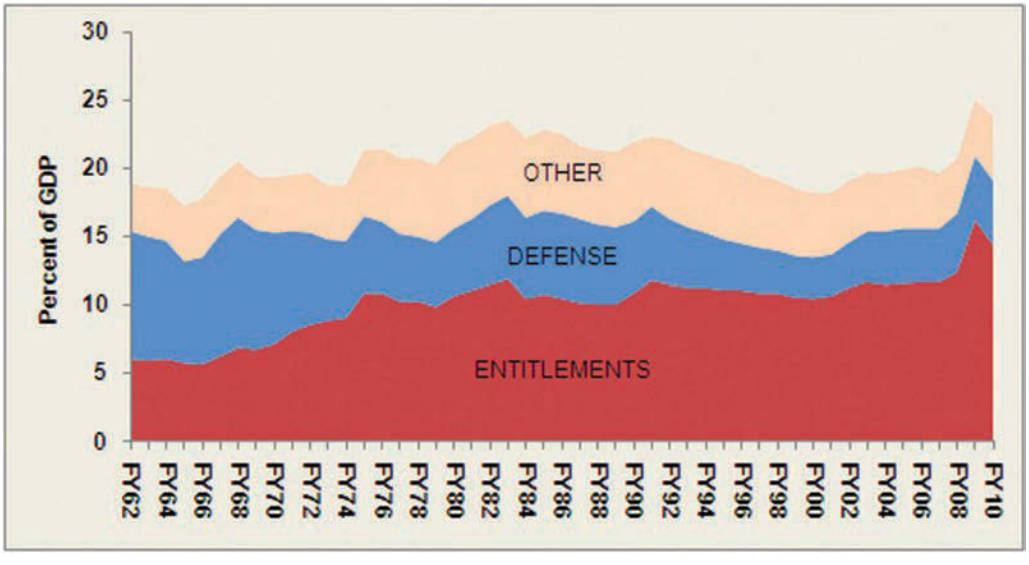
| **Dollars** | **2010** | **2011** | **2012** | Planned **2013** | **2014** | **2015** | **2016** |
|---|---|---|---|---|---|---|---|
| Air Force | 146.1 | 145.1 | 150.0 | 151.1 | 154.4 | 156.9 | 153.8 |
| Army | 142.4 | 138.6 | 144.9 | 149.3 | 147.9 | 146.6 | 148.6 |
| Navy/Marine Corps | 159.4 | 157.6 | 161.4 | 166.1 | 165.2 | 167.1 | 165.5 |
| Defense agencies | 93.9 | 91.7 | 96.8 | 111.6 | 114.7 | 117.3 | 99.3 |
| **Total** | **541.7** | **532.9** | **553.1** | **563.3** | **567.2** | **567.0** | **567.2** |
| **Percentages** | | | | | | | |
| Air Force | 27.0% | 27.2% | 27.1% | 26.8% | 27.2% | 27.7% | 27.1% |
| Army | 26.3% | 26.0% | 26.2% | 26.5% | 26.1% | 25.9% | 26.2% |
| Navy/Marine Corps | 29.4% | 29.6% | 29.2% | 29.5% | 29.1% | 29.5% | 29.2% |
| Defense agencies | 17.3% | 17.2% | 17.5% | 19.8% | 20.2% | 20.7% | 17.5% |



## Federal Budget Outlay Categories

### Percentages of GDP

| Year | Total Outlays | Deficit/ Surplus | Entitlements | Defense | Year | Total Outlays | Deficit/ Surplus | Entitlements | Defense |
|---|---|---|---|---|---|---|---|---|---|
| 1962 | 18.8 | 1.0 | 6.1 | 9.3 | 1987 | 21.6 | 3.6 | 10.2 | 6.1 |
| 1963 | 18.6 | 0.7 | 6.0 | 9.0 | 1988 | 21.3 | 3.8 | 10.1 | 5.8 |
| 1964 | 18.5 | 1.0 | 6.1 | 8.6 | 1989 | 21.2 | 3.8 | 10.1 | 5.6 |
| 1965 | 17.2 | 0.2 | 5.8 | 7.4 | 1990 | 21.9 | 4.8 | 10.9 | 5.2 |
| 1966 | 17.8 | 0.4 | 5.7 | 7.8 | 1991 | 22.3 | 5.4 | 11.8 | 5.4 |
| 1967 | 19.4 | 1.6 | 6.3 | 8.9 | 1992 | 22.1 | 5.5 | 11.5 | 4.8 |
| 1968 | 20.5 | 3.2 | 6.9 | 9.5 | 1993 | 21.4 | 4.6 | 11.3 | 4.4 |
| 1969 | 19.4 | 0.1 | 6.8 | 8.7 | 1994 | 21.0 | 3.7 | 11.3 | 4.0 |
| 1970 | 19.3 | 0.9 | 7.2 | 8.1 | 1995 | 20.6 | 3.1 | 11.1 | 3.7 |
| 1971 | 19.5 | 2.4 | 8.1 | 7.3 | 1996 | 20.2 | 2.3 | 11.1 | 3.4 |
| 1972 | 19.6 | 2.2 | 8.6 | 6.7 | 1997 | 19.5 | 1.3 | 10.9 | 3.3 |
| 1973 | 18.7 | 1.2 | 8.9 | 5.9 | 1998 | 19.1 | 0.3 | 10.9 | 3.1 |
| 1974 | 18.7 | 0.5 | 9.1 | 5.6 | 1999 | 18.5 | 0.0 | 10.6 | 3.0 |
| 1975 | 21.3 | 3.5 | 10.9 | 5.6 | 2000 | 18.2 | 0.9 | 10.5 | 3.0 |
| 1976 | 21.4 | 4.0 | 10.9 | 5.2 | 2001 | 18.2 | 0.3 | 10.7 | 3.0 |
| 1977 | 20.7 | 2.5 | 10.3 | 4.9 | 2002 | 19.1 | 3.0 | 11.3 | 3.3 |
| 1978 | 20.7 | 2.5 | 10.3 | 4.7 | 2003 | 19.7 | 4.9 | 11.7 | 3.7 |
| 1979 | 20.2 | 1.6 | 9.9 | 4.7 | 2004 | 19.6 | 4.9 | 11.5 | 3.9 |
| 1980 | 21.7 | 2.7 | 10.7 | 4.9 | 2005 | 19.9 | 4.0 | 11.6 | 4.0 |
| 1981 | 22.2 | 2.4 | 11.1 | 5.2 | 2006 | 20.1 | 3.3 | 11.7 | 3.9 |
| 1982 | 23.1 | 3.7 | 11.5 | 5.8 | 2007 | 19.6 | 2.5 | 11.7 | 3.9 |
| 1983 | 23.5 | 6.0 | 11.9 | 6.1 | 2008 | 20.7 | 4.5 | 12.4 | 4.3 |
| 1984 | 22.2 | 4.8 | 10.5 | 5.9 | 2009 | 25.0 | 11.0 | 16.2 | 4.7 |
| 1985 | 22.8 | 5.3 | 10.8 | 6.1 | 2010 | 23.8 | 9.4 | 14.4 | 4.7 |
| 1986 | 22.5 | 5.4 | 10.5 | 6.2 | | | | | |




*Source: "The Budget and Economic Outlook: Fiscal Years 2011-2021," Congressional Budget Office, January 2011.*

## Where To Find Budget Data

**Congressional Budget Office**
http://www.cbo.gov/
- Publications>>By Subject>>Budget and Economic Information>>Budget and Economic Outlook

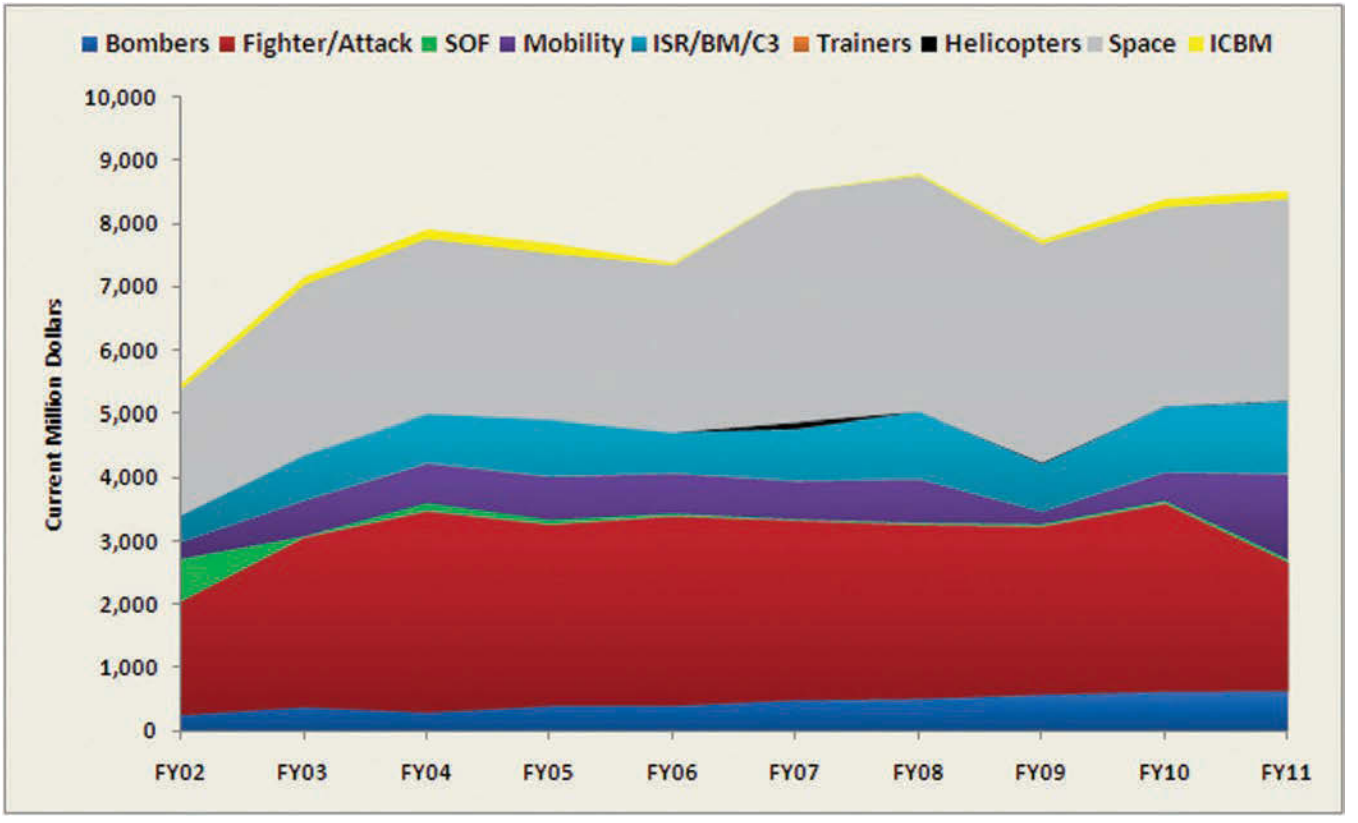
**Defense Department Comptroller**
http://comptroller.defense.gov/index.html
- Budget materials by fiscal year
- Links to budget pages for each service

**Office of Management and Budget**
http://www.whitehouse.gov/omb/
- The Budget (current fiscal year, including appendices and historical tables)
- Links to past budgets (via GPO Access)

**Government Printing Office (GPO) Access to Budget**
http://www.gpoaccess.gov/usbudget/browse.html
- Current and historical budget documents through Clinton Administration

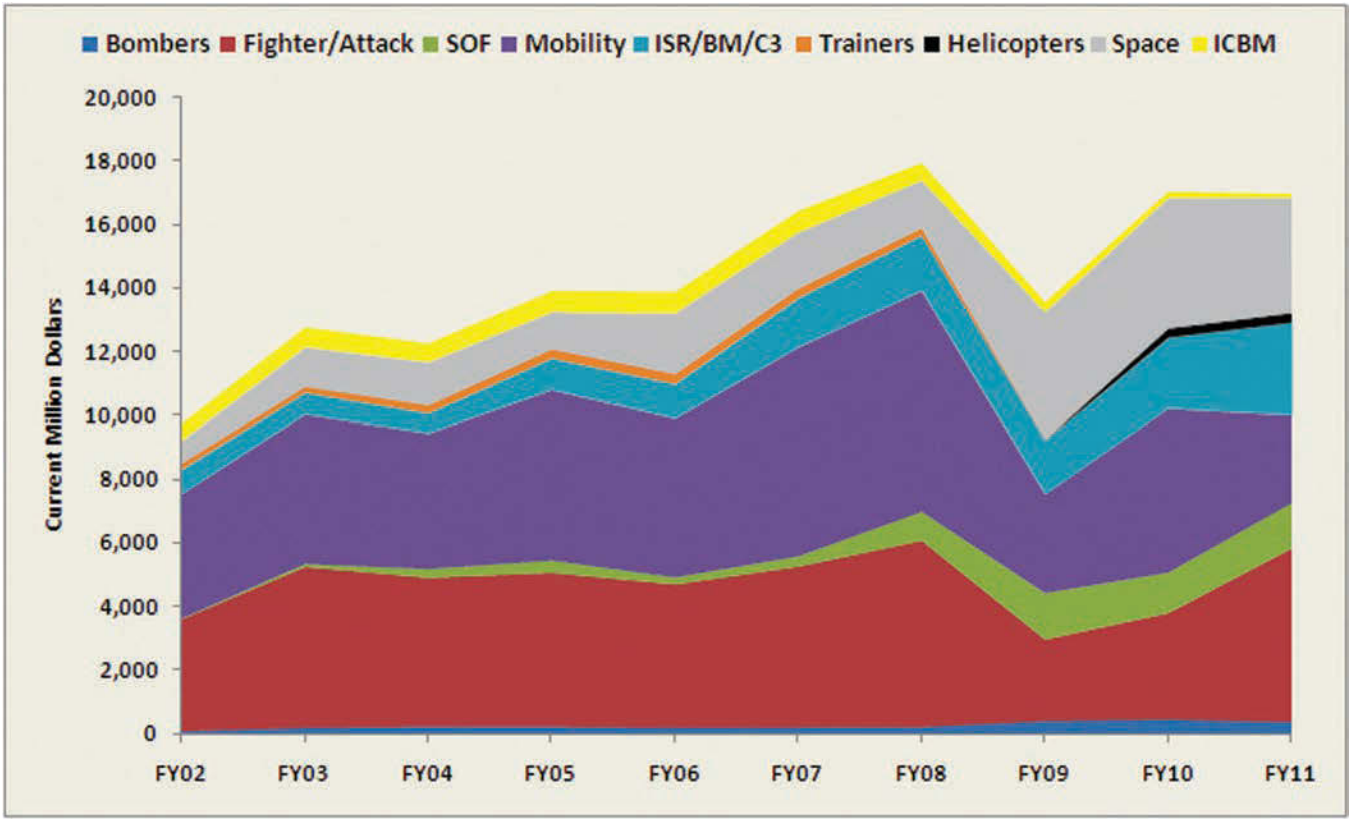
## 10 Years of RDT&E Funding for USAF Major Programs by Category

(Based on current million dollars)




## 10 Years of Procurement Funding for USAF Major Programs by Category

(Based on current million dollars)



## Aircraft Total Active Inventory (TAI)

(As of Sept. 30, 2010)

| | Active | ANG | AFRC | Total Force |
|---|---|---|---|---|
| **Bomber** | | | | |
| B-1 | 65 | | | 65 |
| B-2 | 20 | | | 20 |
| B-52 | 65 | | 9 | 74 |
| **Total** | **150** | | **9** | **159** |
| **Fighter/Attack** | | | | |
| A-10A | 21 | | 21 | 42 |
| A-10C | 163 | 106 | 23 | 292 |
| F-15C | 101 | 121 | | 222 |
| F-15D | 13 | 19 | | 32 |
| F-15E | 213 | | | 213 |
| F-16C | 471 | 321 | 49 | 841 |
| F-16D | 112 | 47 | 4 | 163 |
| F-22A | 158 | | | 158 |
| F-35 | 4 | | | 4 |
| **Total** | **1,256** | **614** | **97** | **1,967** |
| **Special Ops Forces** | | | | |
| AC-130H | 8 | | | 8 |
| AC-130U | 17 | | | 17 |
| CV-22 | 16 | | | 16 |
| E/MC-130E | 2 | | 10 | 12 |
| MC-130H | 20 | | | 20 |
| MC-130P | 23 | 4 | | 27 |
| MC-130W | 12 | | | 12 |
| **Total** | **98** | **4** | **10** | **112** |
| **ISR/BM/C3** | | | | |
| E-3B | 22 | | | 22 |
| E-3C | 9 | | | 9 |
| E-4 | 4 | | | 4 |
| E-8A | | 1 | | 1 |
| E-8C | | 17 | | 17 |
| E-9A | 2 | | | 2 |
| EC-130H | 14 | | | 14 |
| EC-130J | | 3 | | 3 |
| MC-12W | 37 | | | 37 |
| MQ-1 | 138 | 36 | | 174 |
| MQ-9 | 48 | 6 | | 54 |
| NC-135W | 1 | | | 1 |
| OC-135 | 2 | | | 2 |
| RC-26 | | 11 | | 11 |
| RC-135S | 3 | | | 3 |
| RC-135U | 2 | | | 2 |
| RC-135V | 8 | | | 8 |
| RC-135W | 9 | | | 9 |
| RQ-4A | 8 | | | 8 |
| RQ-4B | 17 | | | 17 |
| TC-130H | 1 | | | 1 |
| TC-135S | 1 | | | 1 |
| TC-135W | 2 | | | 2 |
| TU-2 | 5 | | | 5 |
| U-2 | 27 | | | 27 |
| WC-130H | | 6 | 4 | 10 |
| WC-130J | | | 10 | 10 |
| WC-135W | 2 | | | 2 |
| **Total** | **362** | **80** | **14** | **456** |

| | Active | ANG | AFRC | Total Force |
|---|---|---|---|---|
| **Tanker** | | | | |
| HC-130J | 2 | | | 2 |
| HC-130N | 3 | 6 | 1 | 10 |
| HC-130P | 16 | 3 | 4 | 23 |
| KC-10 | 59 | | | 59 |
| KC-135E | | | | 0 |
| KC-135R | 153 | 146 | 64 | 363 |
| KC-135T | 30 | 24 | | 54 |
| **Total** | **263** | **179** | **69** | **511** |
| **Transport** | | | | |
| C-5A | | 33 | 26 | 59 |
| C-5B | 30 | | 16 | 46 |
| C-5C | 2 | | | 2 |
| C-5M | 4 | | | 4 |
| C-9C | | | 3 | 3 |
| C-12C | 15 | | | 15 |
| C-12D | 6 | | | 6 |
| C-12F | 2 | | | 2 |
| C-12J | 4 | | | 4 |
| C-17 | 187 | 9 | 9 | 205 |
| C-20B | 5 | | | 5 |
| C-20C | 3 | | | 3 |
| C-20E | 1 | | | 1 |
| C-20H | 2 | | | 2 |
| C-21 | 35 | 21 | | 56 |
| C-27J | | 5 | | 5 |
| C-32 | 4 | 2 | | 6 |
| C-37A | 10 | | | 10 |
| C-37B | 1 | | | 1 |
| C-38A | | 2 | | 2 |
| C-40 | 4 | 3 | 3 | 10 |
| C-130E | 39 | 6 | | 45 |
| C-130H | 61 | 123 | 84 | 268 |
| C-130J | 40 | 26 | 8 | 74 |
| LC-130H | | 10 | | 10 |
| NC-130H | 1 | | | 1 |
| VC-25 | 2 | | | 2 |
| **Total** | **458** | **240** | **149** | **847** |
| **Helicopter** | | | | |
| HH-60 | 68 | 17 | 15 | 100 |
| TH-1H | 27 | | | 27 |
| UH-1H | 3 | | | 3 |
| UH-1N | 62 | | | 62 |
| **Total** | **160** | **17** | **15** | **192** |
| **Trainer** | | | | |
| T-1 | 177 | | | 177 |
| T-6 | 345 | | | 345 |
| T-38A | 28 | | | 28 |
| (A)T-38B | 6 | | | 6 |
| T-38C | 400 | | | 400 |
| T-41 | 4 | | | 4 |
| T-43 | 3 | | | 3 |
| T-51 | 3 | | | 3 |
| UV-18 | 3 | | | 3 |
| Gliders | 31 | | | 31 |
| **Total** | **1,000** | | | **1,000** |

**Total active inventory (TAI):** aircraft assigned to operating forces for mission, training, test, or maintenance. Includes primary, backup, and attrition reserve aircraft.

## Total Number of Aircraft in Service Over Time

(As of Sept. 30, 2010)

| Type of Aircraft—Active | FY01 | FY02 | FY03 | FY04 | FY05 | FY06 | FY07 | FY08 | FY09 | FY10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Bomber | 181 | 183 | 173 | 172 | 173 | 172 | 173 | 153 | 154 | 150 |
| Fighter/Attack | 1,619 | 1,631 | 1,628 | 1,627 | 1,622 | 1,619 | 1,552 | 1,496 | 1,468 | 1,256 |
| Special Ops Forces | 107 | 102 | 101 | 99 | 98 | 103 | 100 | 94 | 89 | 98 |
| ISR/BM/C3 | 136 | 139 | 134 | 132 | 134 | 137 | 266 | 292 | 320 | 362 |
| Tanker | 330 | 322 | 325 | 301 | 285 | 278 | 277 | 262 | 260 | 263 |
| Transport | 546 | 538 | 530 | 516 | 525 | 529 | 454 | 449 | 452 | 458 |
| Helicopter | 126 | 126 | 129 | 160 | 169 | 160 | 160 | 170 | 159 | 160 |
| Trainer | 1,293 | 1,346 | 1,308 | 1,277 | 1,267 | 1,284 | 1,111 | 1,074 | 1,114 | 1,000 |
| **Total Active Duty** | **4,338** | **4,387** | **4,328** | **4,284** | **4,273** | **4,282** | **4,093** | **3,990** | **4,016** | **3,747** |
| **Type of Aircraft—ANG** | | | | | | | | | | |
| Bomber | 18 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fighter/Attack | 804 | 798 | 777 | 771 | 764 | 765 | 746 | 687 | 664 | 614 |
| Special Ops Forces | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| ISR/BM/C3 | 8 | 7 | 7 | 24 | 26 | 29 | 28 | 45 | 45 | 80 |
| Tanker | 230 | 240 | 236 | 243 | 252 | 260 | 235 | 215 | 182 | 179 |
| Transport | 279 | 283 | 271 | 266 | 249 | 245 | 258 | 244 | 241 | 240 |
| Helicopter | 18 | 18 | 17 | 18 | 18 | 18 | 18 | 18 | 17 | 17 |
| **Total ANG** | **1,361** | **1,350** | **1,312** | **1,326** | **1,313** | **1,321** | **1,289** | **1,213** | **1,153** | **1,134** |
| **Type of Aircraft—AFRC** | | | | | | | | | | |
| Bomber | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 |
| Fighter/Attack | 122 | 122 | 121 | 120 | 120 | 120 | 104 | 103 | 108 | 97 |
| Special Ops Forces | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 10 |
| ISR/BM/C3 | 14 | 16 | 20 | 20 | 20 | 17 | 17 | 11 | 11 | 14 |
| Tanker | 79 | 78 | 76 | 81 | 89 | 89 | 85 | 69 | 69 | 69 |
| Transport | 184 | 184 | 175 | 149 | 133 | 146 | 152 | 149 | 149 | 149 |
| Helicopter | 23 | 23 | 18 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| **Total AFRC** | **445** | **446** | **433** | **408** | **400** | **410** | **396** | **370** | **375** | **363** |
| **Total Force** | **6,144** | **6,183** | **6,073** | **6,018** | **5,986** | **6,013** | **5,778** | **5,573** | **5,544** | **5,244** |

## ICBMs and Spacecraft in Service Over Time

(As of Sept. 30, 2010)

| Type of System | FY01 | FY02 | FY03 | FY04 | FY05 | FY06 | FY07 | FY08 | FY09 | FY10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Minuteman III | 500 | 500 | 500 | 500 | 500 | 450 | 450 | 450 | 450 | 450 |
| Peacekeeper | 50 | 50 | 23 | 6 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total ICBMs** | **550** | **550** | **523** | **506** | **500** | **450** | **450** | **450** | **450** | **450** |
| AEHF | | | | | | | | | | 1 |
| DMSP | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| DSCS | 5 | 5 | 10 | 11 | 9 | 9 | 9 | 9 | 9 | 8 |
| DSP (classified) | | | | | | | | | | |
| GPS | 27 | 28 | 28 | 30 | 29 | 30 | 30 | 30 | 30 | 31 |
| Milstar | 3 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| SBIRS | | | | | | | | | 2* | 4* |
| SBSS | | | | | | | | | | 1 |
| WGS | | | | | | | | | 2 | 3 |
| **Total Satellites** | **37** | **39** | **45** | **48** | **45** | **46** | **46** | **46** | **50** | **55** |

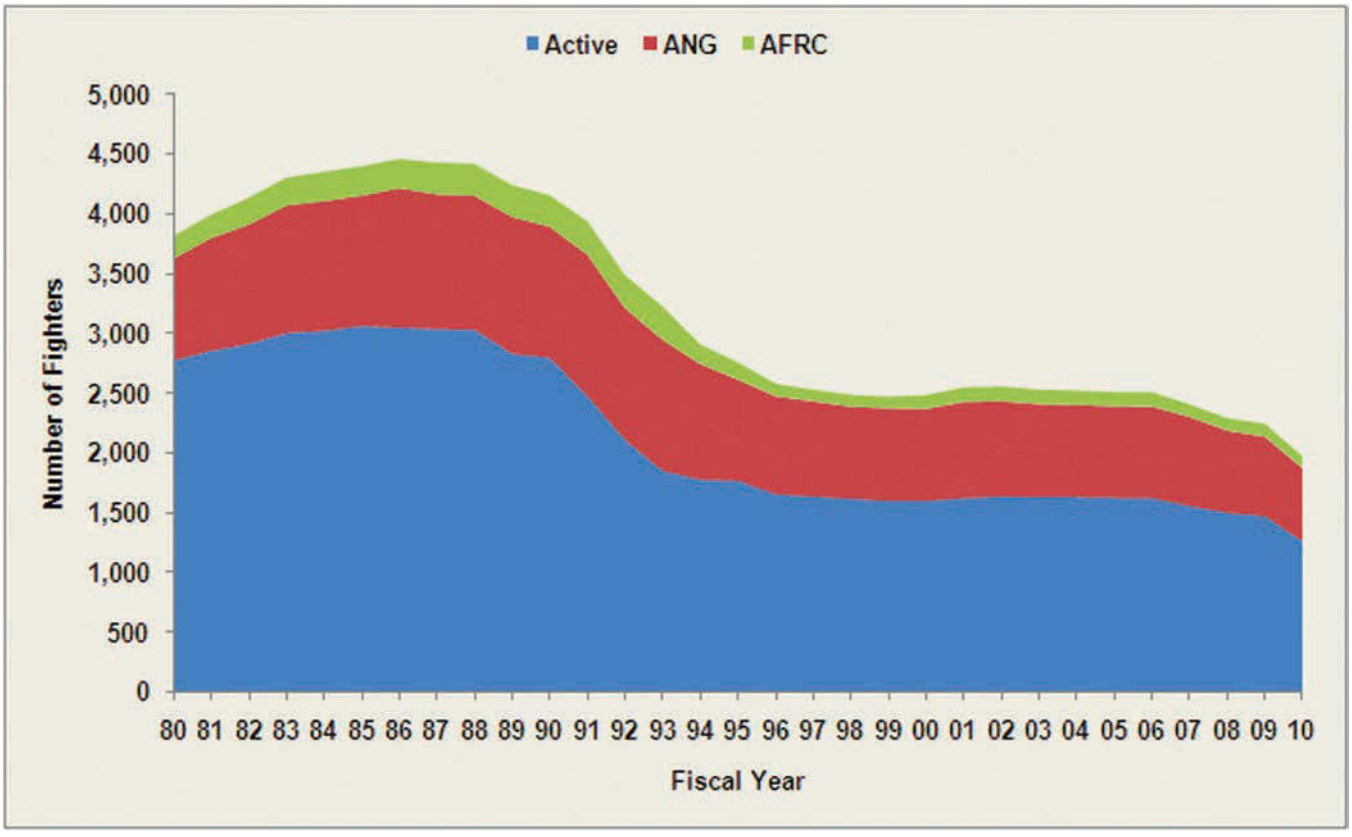
**AEHF:** Advanced Extremely High Frequency; **DMSP:** Defense Meteorological Satellite Program; **DSCS:** Defense Satellite Communications System; **DSP:** Defense Support Program; **GPS:** Global Positioning System; **SBIRS:** Space Based Infrared System; **SBSS:** Space Based Surveillance System; **WGS:** Wideband Global SATCOM
As of FY02, satellite data show the number of satellites that are primary mission capable. *Highly elliptical orbit (HEO) payloads.

## Tactical Aircraft Flying Hours per Crew per Month

(As of Sept. 30, 2010)

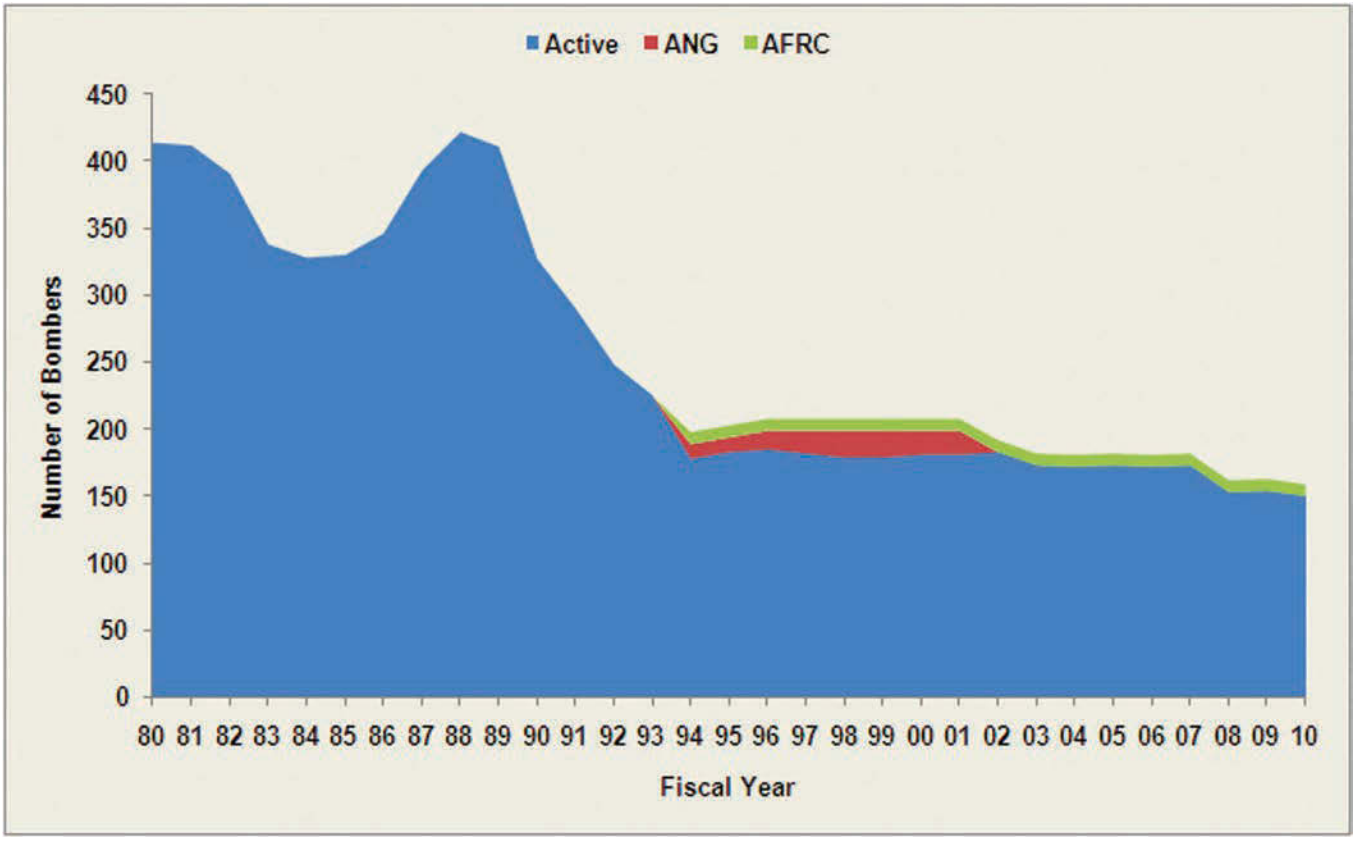
| | FY01 | FY02 | FY03 | FY04 | FY05 | FY06 | FY07 | FY08 | FY09 | FY10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Active Duty** | 15.9 | 17.2 | 17.1 | 16.9 | 15.3 | 16.0 | 15.9 | 14.4 | 17.0 | 19.4 |
| **ANG** | 10.5 | 10.5 | 10.6 | 10.6 | 10.6 | 10.6 | 10.0 | 9.0 | 9.0 | 8.5 |
| **AFRC** | 11.0 | 13.7 | 16.1 | 10.9 | 11.6 | 17.5 | 12.5 | 14.4 | 14.1 | 14.9 |

## Fighters Over TIme



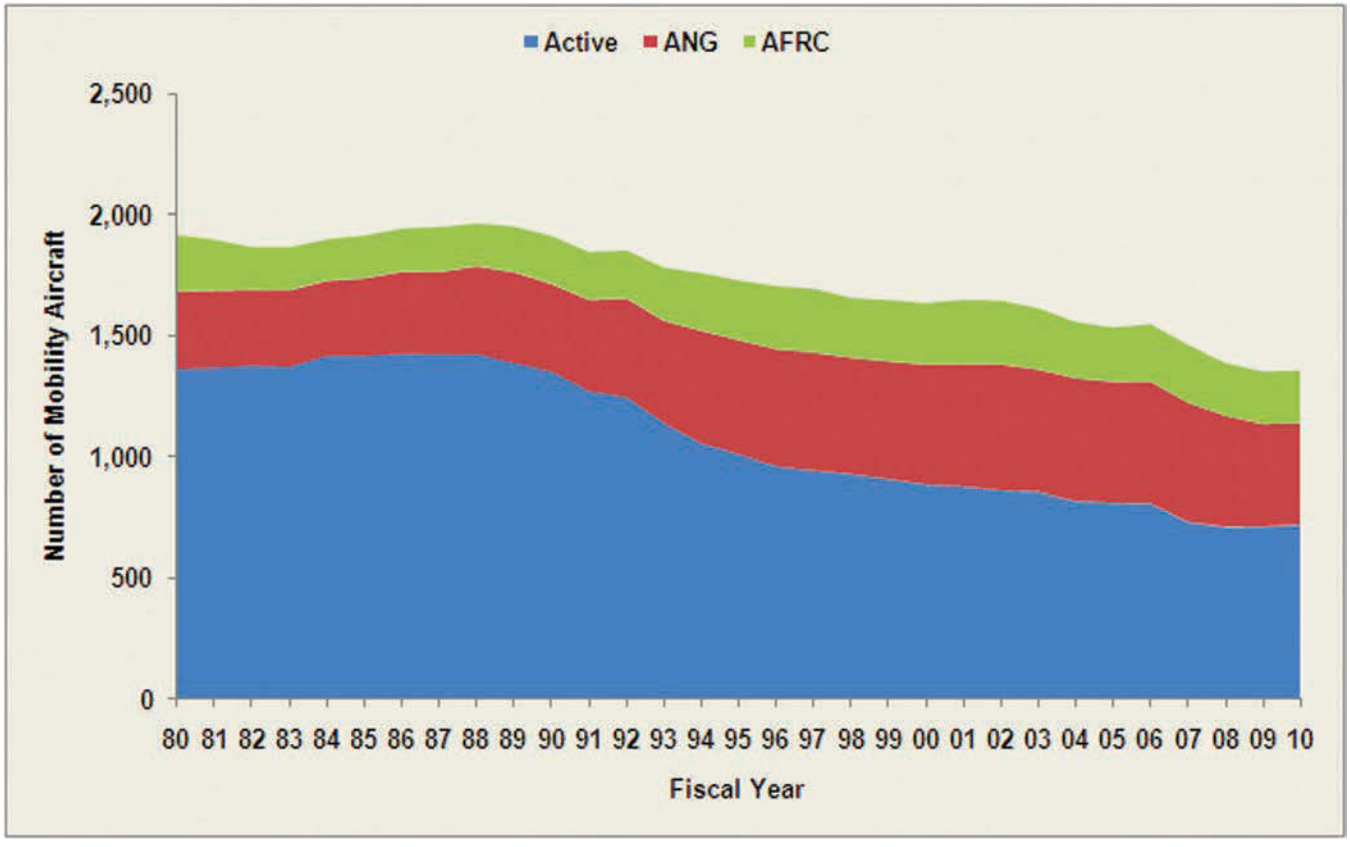

*Source for historical data: "Arsenal of Airpower: USAF Aircraft Inventory, 1950-2009," Mitchell Institute Press, November 2010.*

## Bombers Over Time



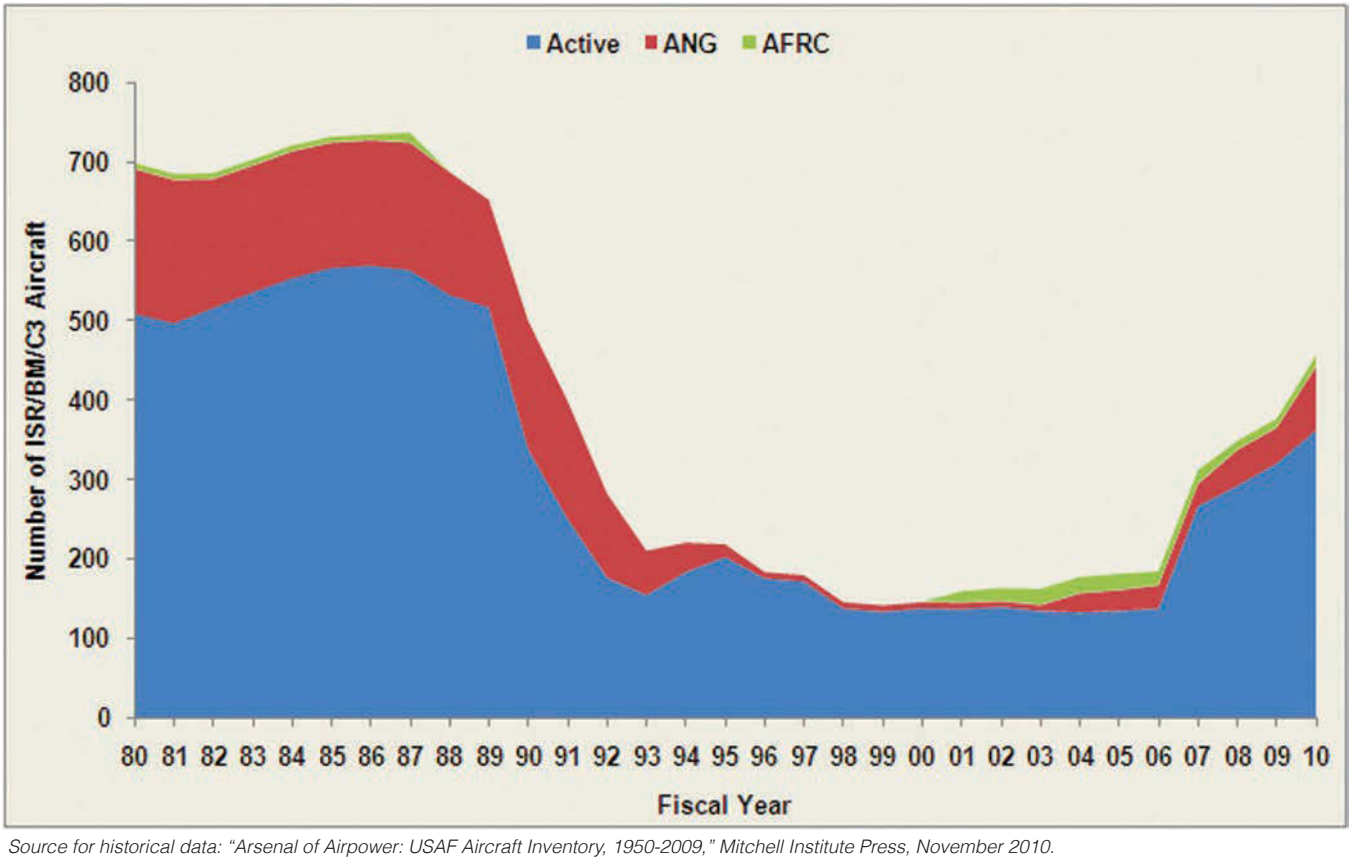

*Source for historical data: "Arsenal of Airpower: USAF Aircraft Inventory, 1950-2009," Mitchell Institute Press, November 2010.*

## Mobility Aircraft Over Time




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

## ISR/BM/C3 Aircraft Over Time




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

## Aircraft Age

(As of Sept. 30, 2010)

| Years | 0-3 | 3-6 | 6-9 | 9-12 | 12-15 | 15-18 | 18-21 | 21-24 | 24+ | Total | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Active Duty Fleet** | | | | | | | | | | | |
| A-10 | | | | | | | | | 184 | 184 | 28.6 |
| B-1 | | | | | | | | 65 | | 65 | 23.1 |
| B-2 | | | | | 7 | 9 | 3 | 1 | | 20 | 16.1 |
| B-52 | | | | | | | | | 65 | 65 | 48.8 |
| C-5 | | | | | | | | 29 | 7 | 36 | 24.3 |
| (K)C-10 | | | | | | | 1 | 11 | 47 | 59 | 25.7 |
| C-12 | 30 | 1 | 4 | 2 | | | | 4 | 23 | 64 | 14.4 |
| C-17 | 37 | 35 | 42 | 31 | 19 | 19 | 4 | | | 187 | 8.1 |
| C-20 | | | | | | 1 | 1 | 9 | | 11 | 21.7 |
| C-21 | | | | | | | | | 35 | 35 | 25.7 |
| (V)C-25 | | | | | | | 2 | | | 2 | 19.9 |
| C-32 | | | | 2 | 2 | | | | | 4 | 12.0 |
| C-37 | 2 | | 3 | 6 | | | | | | 11 | 8.2 |
| C-40 | | 2 | 2 | | | | | | | 4 | 6.6 |
| C-130 | 28 | 10 | 1 | 4 | | 15 | 20 | 22 | 159 | 259 | 30.1 |
| C-135 | | | | | | | | | 213 | 213 | 48.6 |
| CV-22 | 9 | 7 | | | | | | | | 16 | 2.6 |
| E-3 | | | | | | | | | 31 | 31 | 30.8 |
| E-4 | | | | | | | | | 4 | 4 | 36.3 |
| E-9A | | | | | | | | | 2 | 2 | 35.5 |
| F-15C-D | | | | | | | 1 | 26 | 87 | 114 | 26.5 |
| F-15E | | | 10 | 16 | | 35 | 104 | 48 | | 213 | 18.4 |
| F-16 | | 1 | 13 | 14 | 18 | 149 | 272 | 82 | 34 | 583 | 18.9 |
| F-22 | 64 | 72 | 21 | 1 | | | | | | 158 | 3.6 |
| F-35 | 4 | | | | | | | | | 4 | 1.1 |
| H-1 | | | | | | | | | 92 | 92 | 38.8 |
| H-60 | | | | 5 | 1 | 5 | 37 | 10 | 10 | 68 | 20.4 |
| MQ-1 | 69 | 69 | | | | | | | | 138 | TK |
| MQ-9 | 38 | 9 | 1 | | | | | | | 48 | 1.7 |
| RQ-4 | 14 | 9 | 2 | | | | | | | 25 | 3.0 |
| T-1 | | | | | 57 | 99 | 21 | | | 177 | 15.9 |
| T-6 | 94 | 130 | 87 | 34 | | | | | | 345 | 4.9 |
| T-38 | | | | | | | | | 434 | 434 | 43.2 |
| T-41 | | | | | | | | | 4 | 4 | 41.1 |
| T-43 | | | | | | | | | 3 | 3 | 36.3 |
| T-51 | | 3 | | | | | | | | 3 | 5.1 |
| U-2 | | | | | | | 1 | 8 | 23 | 32 | 27.2 |
| UV-18 | | | | | 1 | | | | 2 | 3 | 26.5 |
| Gliders | | | 30 | | | 1 | | | | 31 | 8.7 |
| **Total** | **389** | **348** | **216** | **115** | **105** | **333** | **467** | **315** | **1,459** | **3,747** | **23.0** |
| Percent | 10.4% | 9.3% | 5.8% | 3.1% | 2.8% | 8.9% | 12.5% | 8.4% | 38.9% | | |
| **Air National Guard Fleet** | | | | | | | | | | | |
| A-10 | | | | | | | | | 106 | 106 | 29.9 |
| C-5 | | | | | | | | | 33 | 33 | 38.8 |
| C-17 | | | 8 | | 1 | | | | | 9 | 7.2 |
| C-21 | | | | | | | | 2 | 19 | 21 | 25.4 |
| (R)C-26 | | | | | | 9 | 2 | | | 11 | 16.3 |
| C-27J | 5 | | | | | | | | | 5 | na |
| C-32 | | | 2 | | | | | | | 2 | 7.2 |
| C-38 | | | | | 2 | | | | | 2 | 12.5 |
| C-40 | | | 3 | | | | | | | 3 | 7.3 |
| C-130 | 1 | 7 | 10 | 11 | 22 | 31 | 28 | 9 | 68 | 187 | 21.3 |
| C-135 | | | | | | | | | 170 | 170 | 49.3 |
| E-8 | | 1 | 5 | 7 | 4 | | 1 | | | 18 | 10.5 |
| F-15C-D | | | | | | | | 41 | 99 | 140 | 26.7 |
| F-16 | | | | 2 | 3 | 43 | 80 | 207 | 33 | 368 | 21.1 |
| H-60 | | | | | | 7 | | 10 | | 17 | 19.7 |
| MQ-1 | 36 | | | | | | | | | 36 | na |
| MQ-9 | 6 | | | | | | | | | 6 | na |
| **Total** | **48** | **8** | **28** | **20** | **32** | **90** | **111** | **269** | **528** | **1,134** | **27.2** |
| Percent | 4.2% | 0.7% | 2.5% | 1.8% | 2.8% | 7.9% | 9.8% | 23.7% | 46.6% | | |
| **Air Force Reserve Command Fleet** | | | | | | | | | | | |
| A-10 | | | | | | | | | 44 | 44 | 29.9 |
| B-52 | | | | | | | | | 9 | 9 | 48.6 |
| C-5 | | | | | | | | 15 | 27 | 42 | 32.7 |
| C-9 | | | | | | | | | 3 | 3 | 35.5 |
| C-17 | | 8 | | 1 | | | | | | 9 | 5.7 |
| C-40 | 1 | 2 | | | | | | | | 3 | 3.2 |
| C-130 | | 7 | 7 | 4 | 6 | 18 | 16 | 25 | 38 | 121 | 22.4 |
| C-135 | | | | | | | | | 64 | 64 | 49.1 |
| F-16 | | | | | | | 1 | 50 | 2 | 53 | 22.8 |
| H-60 | | | | | | | 15 | | | 15 | 19.7 |
| **Total** | **1** | **17** | **7** | **5** | **6** | **18** | **32** | **90** | **187** | **363** | **29.8** |
| Percent | 0.3% | 4.7% | 1.9% | 1.4% | 1.7% | 5.0% | 8.8% | 24.8% | 51.5% | | |

USAF photo by MSgt. Terry Atwell

*A 127th Wing A-10 Warthog blasts its gatling gun during an exercise.*

## USAF Aircraft Tail Markings

| Code | Unit and Location |
|---|---|
| **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), Kulis ANGB, Alaska |
| **AL** | 187th FW (ANG), Montgomery Regional Arpt., Ala. |
| **AT** | Tucson Arpt., Ariz. |
| **AV** | 31st FW (USAFE), Aviano AB, Italy |
| **AZ** | 162nd FW (ANG), Tucson Arpt., Ariz. |
| **BB** | 9th RW (ACC), Beale AFB, Calif. |
| | Det. 2, 53rd Wing (ACC), Beale AFB, Calif. |
| **BC** | 110th FW (ANG), W. K. Kellogg Arpt., Mich. |
| **BD** | 917th Wing (AFRC), Barksdale AFB, La. |
| **CA** | 129th RQW (ANG), Moffett Field, Calif. |
| | 144th FW (ANG), Fresno Yosemite Arpt., Calif. |
| | 163rd RQS (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. |
| **CR** | 302nd AW (AFRC), Peterson AFB, Colo. |
| **CT** | 103rd AW (ANG), Bradley Arpt., Conn. |
| **D** | 100th ARW (USAFE), RAF Mildenhall, UK |
| **DC** | 113th Wing (ANG), JB Andrews-NAF Washington, Md. |
| **DM** | 355th FW (ACC), Davis-Monthan AFB, Ariz. |
| | 355th Wing (ACC), Davis-Monthan AFB, Ariz. |
| **DR** | 943rd RQG (AFRC), Davis-Monthan AFB, Ariz. |
| **DY** | 7th BW (ACC), Dyess AFB, Tex. |
| | 337th TES, 53rd Wing (ACC), Dyess AFB, Tex. |
| **ED** | 412th TW (AFMC), Edwards AFB, Calif. |
| **EF** | 147th RQG (ANG), Ellington Fld., Tex. |
| **EL** | 28th BW (ACC), Ellsworth AFB, S.D. |
| **EN** | 80th FTW (AETC), Sheppard AFB, Tex. |
| **ET** | 46th 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 FW (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. |
| | 461st ACW (ACC), Robins AFB, Ga. |
| **HD** | Det. 1, 53rd Wing (ACC), Holloman AFB, N.M. |
| **HH** | 15th AW (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 FW (ACC), Holloman AFB, N.M. |
| **IA** | 132nd FW (ANG), Des Moines Arpt., Iowa |
| **ID** | 124th Wing (ANG), Boise Air Terminal, Idaho |
| **IN** | 122nd FW (ANG), Fort Wayne, Ind. |

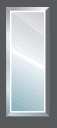
| Code | Unit and Location |
|---|---|
| **JZ** | 159th FW (ANG), NAS JRB New Orleans |
| **KC** | 442nd FW (AFRC), Whiteman AFB, Mo. |
| **KS** | 45th AS (AETC), Keesler AFB, Miss. |
| **LA** | 2nd BW (AFGSC), Barksdale AFB, La. |
| **LF** | 56th FW (ACC), Luke AFB, Ariz. |
| **LI** | 106th RQW (ANG), F. S. Gabreski Arpt., N.Y. |
| **LN** | 48th FW (USAFE), RAF Lakenheath, UK |
| **MA** | 104th FW (ANG), Barnes Arpt., Mass. |
| **MD** | 175th Wing (ANG), 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 |
| | 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. |
| **NM** | 150th FW (ANG), Kirtland AFB, N.M. |
| **NY** | 174th RQS (ANG), Hancock Fld., N.Y. |
| **OF** | 55th Wing (ACC), Offutt AFB, Neb. |
| **OH** | 178th FW (ANG), Springfield-Beckley Arpt., Ohio |
| | 179th AW (ANG), Mansfield Lahm Arpt., Ohio |
| | 180th FW (ANG), Toledo Express Arpt., Ohio |
| **OK** | 137th ARW (ANG), Will Rogers World Arpt., Okla. |
| | 138th FW (ANG), Tulsa Arpt., Okla. |
| | 552nd ACW (ACC), Tinker AFB, Okla. |
| **OS** | 51st FW (PACAF), Osan AB, South Korea |
| **OT** | 53rd Wing (ACC), Eglin AFB, Fla. |
| | 422nd TES (ACC), Nellis AFB, Nev. |
| | 49th TES (ACC), Barksdale AFB, La. |
| | Det. 4, 53rd Wing (ACC), Creech AFB, Nev. |
| **PA** | 111th FW (ANG), Willow Grove ARS, Pa. |
| **RA** | 12th FTW (AETC), Randolph AFB, Tex. |
| **RS** | 86th AW (USAFE), Ramstein AB, Germany |
| **SA** | 149th FW (ANG), Lackland AFB, Tex. |
| **SC** | 169th FW (ANG), McEntire ANGS, 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** | 301st FW (AFRC), NAS JRB Fort Worth, Tex. |
| **TY** | 325th FW (AETC), 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 (ACC), 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, Tex. |
| **YJ** | 374th AW (PACAF), Yokota AB, Japan |
| **ZZ** | 18th Wing (PACAF), Kadena AB, Japan |

# USAF Grades and Insignia

## Officer

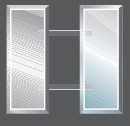
Second Lieutenant
(O-1)

Brigadier General
(O-7)



First Lieutenant
(O-2)

Major General
(O-8)



Captain
(O-3)

Lieutenant General
(O-9)

Major
(O-4)

General
(O-10)

Lieutenant Colonel
(O-5)

Colonel
(O-6)

## 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)

Chief Master Sergeant of
the Air Force

**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, formerly known as a senior enlisted advisor.

# Awards and Decorations


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


Global War on Terrorism Expeditionary Medal

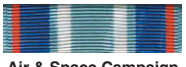

Global War on Terrorism Service Medal


Korean Service Medal


Armed Forces Service Medal


Humanitarian Service Medal


Military Outstanding Volunteer Service Medal


Air & Space Campaign Medal


Air Force Overseas Ribbon-Short


Air Force Overseas Ribbon-Long


Air Force Expeditionary Service Ribbon


Air Force Longevity Service Award 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


Philippine Defense Ribbon


Philippine Liberation Ribbon


Philippine Independence Ribbon

# Awards and Decorations Continued


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


**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.


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


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


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


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


**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.


**Silver Oak Leaf Cluster**
For sixth, 11th, etc., entitlements or in lieu of five bronze OLCs.


**Bronze Oak Leaf Cluster**
For second and subsequent awards.


**Valor Device**
For valor; not an additional award; only one per ribbon; worn to the wearer's right of OLCs on the same ribbon.


**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.


**"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.

## USAF Specialty Berets With Crests

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


**Combat Controller/Special Tactics Officer**


**Pararescue Jumper/Combat Rescue Officer**


**Security Forces**


**Survival, Evasion, Resistance, and Escape**


**Tactical Air Command and Control**
(Tactical Air Control Party crest)


**Air Liaison Officer**
(TACP crest and rank)


**Weather Parachutist**

# Major Commands and Reserve Components

## 2011 USAF Almanac

A major command is a subdivision of the Air Force assigned a major part of the Air Force mission and directly subordinate to Hq. USAF. (Note: All data as of Sept. 30, 2010)

# ACC

## Air Combat Command

**Headquarters** JB Langley-Eustis, Va.

**Established** June 1, 1992

**Commander** Gen. William M. Fraser III

### PRIMARY MISSION

Organize, train, equip, maintain, and provide strike, intelligence-surveillance-reconnaissance, battle management, command and control, rescue, and electronic warfare airpower forces to combatant commands.

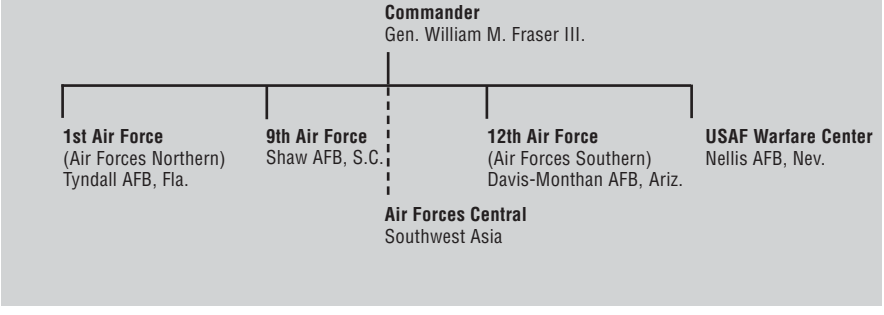
### PERSONNEL

| | |
|---|---|
| Active duty | 68,252 |
| Civilian | 9,622 |
| **Total** | **77,874** |

### EQUIPMENT (Total active inventory)

| | |
|---|---|
| Bomber | 63 |
| Fighter/Attack | 634 |
| ISR/BM/C3 | 308 |
| Tanker | 16 |
| Helicopter | 38 |
| Trainer | 23 |

**AIR COMBAT COMMAND, JB LANGLEY-EUSTIS, VA.**




# AETC

## Air Education and Training Command

**Headquarters** Randolph AFB, Tex.

**Established** July 1, 1993

**Commander** Gen. Edward A. Rice Jr.

### PRIMARY MISSION

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

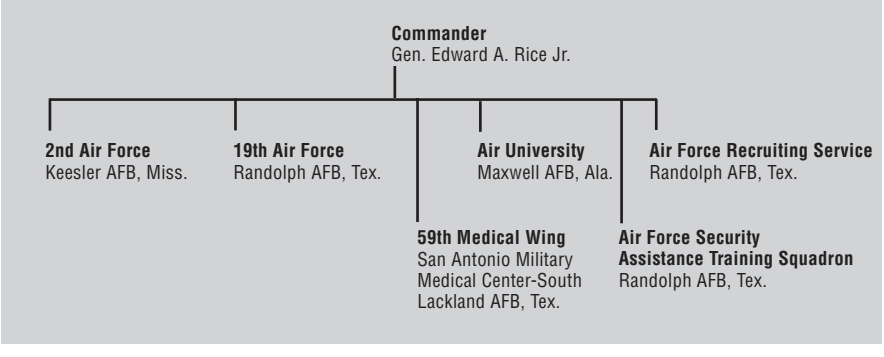
### PERSONNEL

| | |
|---|---|
| Active duty | 57,639 |
| Civilian | 15,352 |
| **Total** | **72,991** |

### EQUIPMENT (TAI)

| | |
|---|---|
| Fighter/Attack | 139 |
| Special operations forces | 12 |
| Tanker | 29 |
| Transport | 44 |
| Helicopter | 49 |
| Trainer | 954 |

**AIR EDUCATION AND TRAINING COMMAND, RANDOLPH AFB, TEX.**



# AFGSC

## Air Force Global Strike Command

**Headquarters** Barksdale AFB, La.

**Established** Aug. 7, 2009

**Commander** Lt. Gen. James M. Kowalski

### PRIMARY MISSION

Organize, train, equip, maintain, and provide ICBM forces and nuclear-capable bomber forces to combatant commanders.

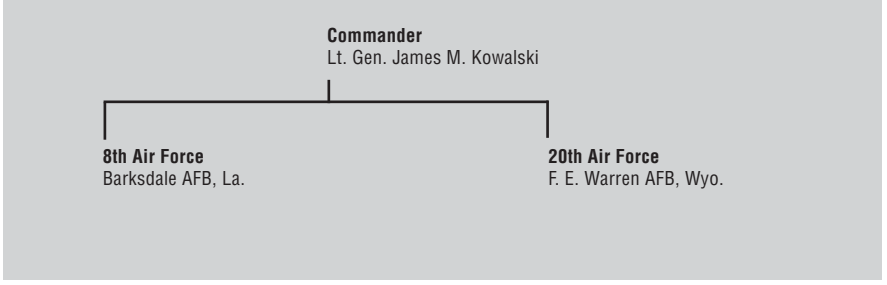
### PERSONNEL

| | |
|---|---|
| Active duty | 19,321 |
| Civilian | 2,508 |
| **Total** | **21,829** |

### EQUIPMENT (TAI)

| | |
|---|---|
| Bomber | 83 |
| Helicopter | 25 |
| ICBM | 450 |

**AIR FORCE GLOBAL STRIKE COMMAND, BARKSDALE AFB, LA.**




USAF redesignated Strategic Air Command, established Dec. 13, 1944, as Air Force Global Strike Command and activated AFGSC on Aug. 7, 2009.

# AFMC

## Air Force Materiel Command

**Headquarters** Wright-Patterson AFB, Ohio

**Established** July 1, 1992

**Commander** Gen. Donald J. Hoffman

### PRIMARY MISSION

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

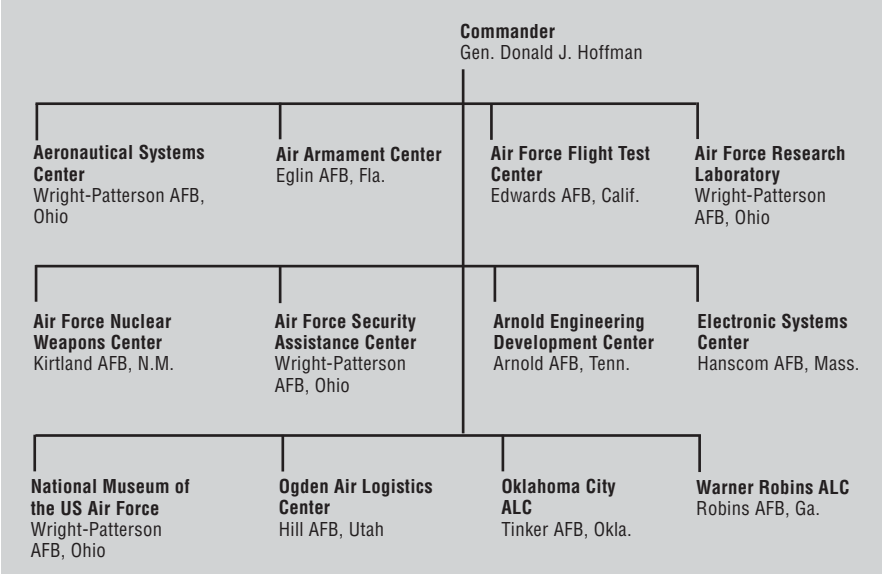
### PERSONNEL

| | |
|---|---|
| Active duty | 19,220 |
| Civilian | 63,205 |
| **Total** | **82,425** |

### EQUIPMENT (TAI)

| | |
|---|---|
| Bomber | 4 |
| Fighter/Attack | 45 |
| ISR/BM/C3 | 12 |
| Tanker | 2 |
| Transport | 25 |
| Helicopter | 5 |
| Trainer | 23 |

**AIR FORCE MATERIEL COMMAND, WRIGHT-PATTERSON AFB, OHIO**



# AFRC

## Air Force Reserve Command

**Headquarters** Robins AFB, Ga.

**Established** Feb. 17, 1997

**Commander** Lt. Gen. Charles E. Stenner Jr.

### PRIMARY MISSION

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

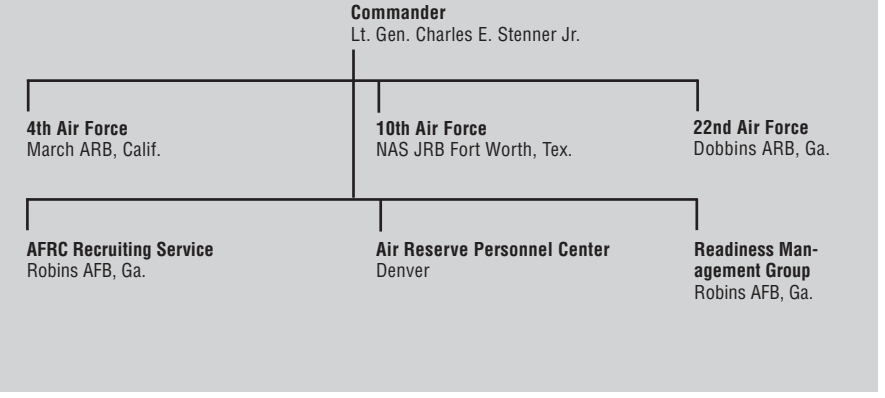
### PERSONNEL

| | |
|---|---|
| Total (selected reserve) | 70,119 |
| Active duty | 512 |
| Civilian (includes technicians) | 12,918 |
| **Total** | **83,549** |

### EQUIPMENT (TAI)

| | |
|---|---|
| Bomber | 9 |
| Fighter/Attack | 97 |
| SOF | 10 |
| ISR/BM/C3 | 14 |
| Tanker | 69 |
| Transport | 149 |
| Helicopter | 15 |

### AIR FORCE RESERVE COMMAND, ROBINS AFB, GA.




# AFSPC

## Air Force Space Command

**Headquarters** Peterson AFB, Colo.

**Established** Sept. 1, 1982

**Commander** Gen. William L. Shelton

### PRIMARY MISSION

Organize, train, equip, maintain, and provide space and cyberspace operations forces; develop, procure, and test space systems; sustain national space launch facilities.

### PERSONNEL

| | |
|---|---|
| Active duty | 13,896 |
| Civilian | 7,678 |
| **Total** | **21,574** |

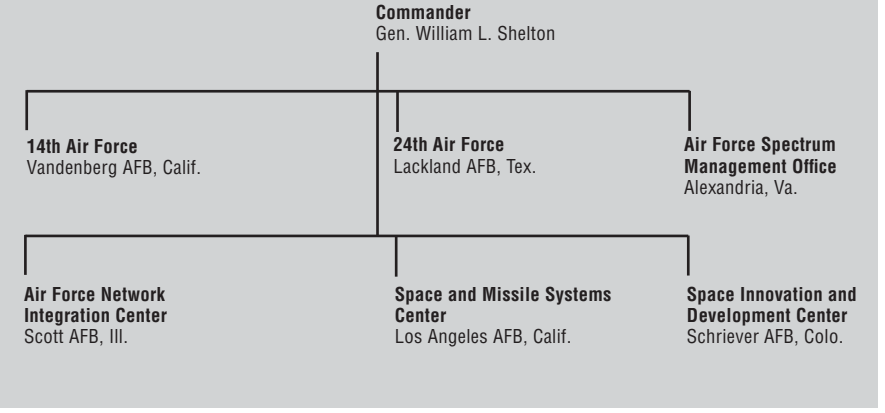
### EQUIPMENT (TAI)

Air Force Satellite Control Network
BMEWS
GEODSS
Pave PAWS
PARCS
Space surveillance radars

**Satellite systems:**

| | |
|---|---|
| AEHF | 1 |
| DSP | classified |
| GPS: Block II/IIA/IIR | 31 |
| DMSP | 2 |
| DSCS III | 8 |
| Milstar | 5 |
| SBIRS | 4 |
| WGS | 3 |
| SBSS | 1 |

### AIR FORCE SPACE COMMAND, PETERSON AFB, COLO.




**Abbreviations: BMEWS:** Ballistic Missile Early Warning System; **GEODSS:** Ground-based Electro-Optical Deep Space Surveillance System; **PAWS:** Phased Array Warning System; **PARCS:** Perimeter Acquisition Radar Attack Characterization System; for satellites, see Gallery of Weapons.

# AFSOC

## Air Force Special Operations Command

**Headquarters** Hurlburt Field, Fla.

**Established** May 22, 1990

**Commander** Lt. Gen. Donald C. Wurster

### PRIMARY MISSION

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

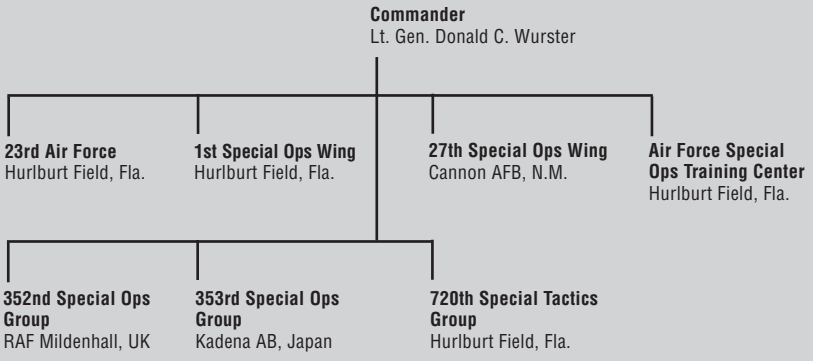
### PERSONNEL

| | |
|---|---|
| Active duty | 12,706 |
| Civilian | 1,721 |
| **Total** | **14,427** |

### EQUIPMENT (TAI)

| | |
|---|---|
| SOF | 86 |
| ISR/BM/C3 | 38 |
| Helicopter | 5 |

**AIR FORCE SPECIAL OPERATIONS COMMAND, HURLBURT FIELD, FLA.**




# AMC

## Air Mobility Command

**Headquarters** Scott AFB, Ill.

**Established** June 1, 1992

**Commander** Gen. Raymond E. Johns Jr.

### PRIMARY MISSION

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

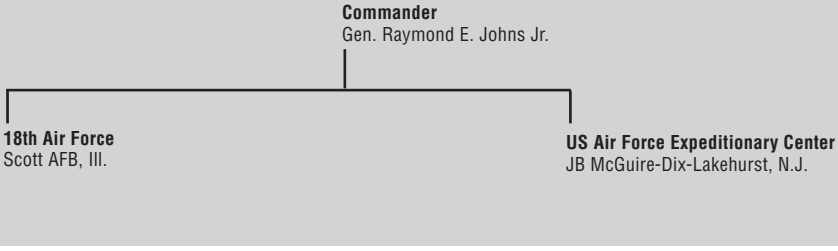
### PERSONNEL

| | |
|---|---|
| Active duty | 45,840 |
| Civilian | 9,719 |
| **Total** | **55,559** |

### EQUIPMENT (TAI)

| | |
|---|---|
| Tanker | 186 |
| Transport | 322 |

**AIR MOBILITY COMMAND, SCOTT AFB, ILL.**



# PACAF

## Pacific Air Forces

**Headquarters** JB Pearl Harbor-Hickam, Hawaii

**Established** July 1, 1957

**Commander** Gen. Gary L. North

### PRIMARY MISSION

Organize, train, equip, maintain, and provide strike, air mobility, and rescue airpower forces to support Pacific region operations.

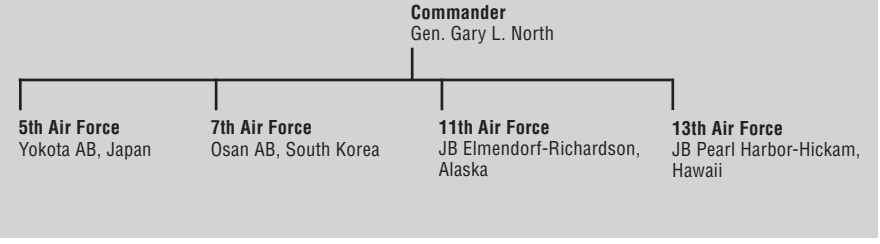
### PERSONNEL

| | |
|---|---|
| Active duty | 29,381 |
| Civilian | 8,072 |
| **Total** | **37,453** |

### EQUIPMENT (TAI)

| | |
|---|---|
| Fighter/Attack | 266 |
| ISR/BM/C3 | 4 |
| Tanker | 15 |
| Transport | 39 |
| Helicopter | 14 |

**PACIFIC AIR FORCES, JB PEARL HARBOR-HICKAM, HAWAII**




# USAFE

## US Air Forces in Europe

**Headquarters** Ramstein AB, Germany

**Established** Aug. 7, 1945

**Commander** Gen. Mark A. Welsh III

### PRIMARY MISSION

Organize, train, equip, maintain, and provide strike, air mobility, battle management, and rescue airpower forces to support European and African theater operations.

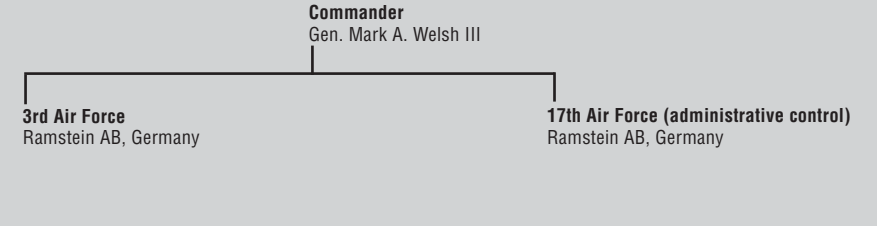
### PERSONNEL

| | |
|---|---|
| Active duty | 25,534 |
| Civilian | 6,250 |
| **Total** | **31,784** |

### EQUIPMENT (TAI)

| | |
|---|---|
| Fighter/Attack | 172 |
| Tanker | 15 |
| Transport | 28 |
| Helicopter | 5 |

**US AIR FORCES IN EUROPE, RAMSTEIN AB, GERMANY**



# ANG

## Air National Guard

**Headquarters** Washington, D.C.

**Established** Sept. 18, 1947

**Director** Lt. Gen. Harry M. Wyatt III

### 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) | 107,676 |
| Active duty | 208 |
| Civilian (includes technicians) | 23,374 |
| **Total** | **131,258** |

### EQUIPMENT (TAI)

| | |
|---|---|
| Fighter/Attack | 614 |
| SOF | 4 |
| ISR/BM/C3 | 80 |
| Tanker | 179 |
| Transport | 240 |
| Helicopter | 17 |

Note: ANG also provides numerous other mission capabilities, including aeromedical evacuation, aircraft maintenance, and security forces.

| Wing | System/Mission |
|---|---|
| 101st Air Refueling Wing | KC-135R |
| 102nd Intelligence Wing | DCGS |
| 103rd Airlift Wing | C-21, AOC, CIRF |
| 104th Fighter Wing | F-15 |
| 105th Airlift Wing | C-5A |
| 106th Rescue Wing | HC-130, HH-60 |
| 107th Airlift Wing | C-130 |
| 108th Air Refueling Wing | KC-135R |
| 109th Airlift Wing | LC-130 |
| 110th Wing | C-21 |
| 111th Fighter Wing | |
| 113th Wing | C-38, C-40, F-16 |
| 114th Fighter Wing | F-16 |
| 115th Fighter Wing | F-16 |
| 116th Air Control Wing | E-8C |
| 117th Air Refueling Wing | KC-135R |
| 118th Airlift Wing | C-130 |
| 119th Wing | C-21, MQ-1 |
| 120th Fighter Wing | F-15 |
| 121st Air Refueling Wing | KC-135R |
| 122nd Fighter Wing | F-16 |
| 123rd Airlift Wing | C-130, battlefield airmen, CRG |
| 124th Fighter Wing | A-10, battlefield airmen, CACS |
| 125th Fighter Wing | F-15, RC-26, space launch |
| 126th Air Refueling Wing | KC-135R |
| 127th Wing | A-10, KC-135R, special operations, weather |
| 128th Air Refueling Wing | KC-135R |
| 129th Rescue Wing | MC-130P, HH-60 |
| 130th Airlift Wing | C-130, RC-26 |
| 131st Bomb Wing | B-2 |
| 132nd Fighter Wing | F-16 |
| 133rd Airlift Wing | C-130 |
| 134th Air Refueling Wing | KC-135R, CACS |
| 136th Airlift Wing | C-130 |
| 137th Air Refueling Wing | KC-135R |
| 138th Fighter Wing | F-16 |
| 139th Airlift Wing | C-130 |
| 140th Wing | C-21, F-16, MGS |
| 141st Air Refueling Wing | KC-135, RC-26, combat communications |
| 142nd Fighter Wing | F-15 |
| 143rd Airlift Wing | C-130, cyber operations |
| 144th Fighter Wing | F-16, RC-26 |
| 145th Airlift Wing | C-130 |
| 146th Airlift Wing | C-130 |
| 147th Reconnaissance Wing | MQ-1 |
| 148th Fighter Wing | F-16 |
| 149th Fighter Wing | F-16, cyber operations |
| 150th Fighter Wing | pararescue and special ops training |
| 151st Air Refueling Wing | KC-135R |
| 152nd Airlift Wing | C-130, DCGS |
| 153rd Airlift Wing | C-130, CACS |
| 154th Wing | C-17, F-22, KC-135R |
| 155th Air Refueling Wing | KC-135R |
| 156th Airlift Wing | C-130 |
| 157th Air Refueling Wing | KC-135R |
| 158th Fighter Wing | F-16, cyber operations |
| 159th Fighter Wing | F-15 |
| 161st Air Refueling Wing | KC-135R |
| 162nd Fighter Wing | F-16, MQ-1, RC-26 |
| 163rd Reconnaissance Wing | MQ-1 |
| 164th Airlift Wing | C-5A |
| 165th Airlift Wing | C-130, CRTC |
| 166th Airlift Wing | C-130, cyber operations |
| 167th Airlift Wing | C-5 |
| 168th Air Refueling Wing | KC-135R, missile warning |
| 169th Fighter Wing | F-16 |
| 171st Air Refueling Wing | KC-135R |
| 172nd Airlift Wing | C-17 |
| 173rd Fighter Wing | F-15 |
| 174th Fighter Wing | MQ-9, RC-26, battlefield airmen, CACS |
| 175th Wing | A-10, C-130J, cyber operations |
| 176th Wing | C-17, C-130, HC-130, HH-60, RAOC |
| 177th Fighter Wing | F-16 |
| 178th Fighter Wing | MQ-1 ground station |
| 179th Airlift Wing | C-27J |
| 180th Fighter Wing | F-16 |
| 181st Intelligence Wing | DCGS |
| 182nd Airlift Wing | C-130 |
| 183rd Fighter Wing | CIRF, CNAF |
| 184th Intelligence Wing | Battlefield airmen, CACS, DCGS, NOSS |
| 185th Air Refueling Wing | KC-135R |
| 186th Air Refueling Wing | KC-135R, MC-12W, RC-26 |
| 187th Fighter Wing | F-16, RC-26 |
| 188th Fighter Wing | A-10 |
| 189th Airlift Wing | C-130 |
| 190th Air Refueling Wing | KC-135R |
| 192nd Fighter Wing | F-22 |
| 193rd Special Ops Wing | EC-130J |
| 194th Regional Support Wing | battlefield airmen, cyber operations |

**AOC:** Air & Space Operations Center; **CACS:** Command and Control Squadron; **CIRF:** Central Intermediate Repair Facility; **CNAF:** Component Numbered Air Force; **CRG:** Contingency Response Group; **CRTC:** Combat Readiness Training Center; **DCGS:** Distributed Common Ground Station; **MGS:** Mobile Ground Station; **NOSS:** Network Operations Security Squadron; **RAOC:** Region Air Operations Center.

# FOAs, DRUs, and Auxiliary

2011 USAF Almanac

### Air Force Agency for Modeling and Simulation

**Hq.:** Orlando, Fla.

**Estab.:** June 3, 1996

**Type:** FOA

**Mission:** Oversee air, space, and cyberspace modeling and simulation requirements and joint interoperability.

**Total Personnel:** 23

### Air Force Audit Agency

**Hq.:** Washington, D.C.

**Estab.:** July 1, 1948

**Type:** FOA

**Mission:** Provide independent and quality internal audit service.

**Total Personnel:** 717

### Air Force Center for Engineering and the Environment

**Hq.:** Lackland AFB, Tex.

**Estab.:** July 23, 1991

**Type:** FOA

**Mission:** Deliver integrated engineering and environmental management and technical services.

**Total Personnel:** 566

### Air Force Civil Engineer Support Agency

**Hq.:** Tyndall AFB, Fla.

**Estab.:** Aug. 1, 1991

**Type:** FOA

**Mission:** Provide tools and professional support to sustain civil engineer capabilities.

**Total Personnel:** 230

### Air Force Cost Analysis Agency

**Hq.:** Arlington, Va.

**Estab.:** Aug. 1, 1992

**Type:** FOA

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

**Total Personnel:** 129

### Air Force District of Washington

**Hq.:** JB Andrews, Md.

**Estab.:** July 15, 1994

**Type:** DRU

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

**Total Personnel:** 5,655

### Air Force Financial Services Center

**Hq.:** Ellsworth AFB, S.D.

**Estab.:** Sept. 14, 2007

**Type:** FOA

**Mission:** Provide military pay services to active duty and travel transactions for active and reserve component military and civilian personnel.

**Total Personnel:** 446

### Air Force Flight Standards Agency

**Hq.:** Oklahoma City

**Estab.:** 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:** 181

### Air Force Historical Research Agency

**Hq.:** Maxwell AFB, Ala.

**Estab.:** May 25, 1979

**Type:** FOA

**Mission:** Research, record, and disseminate history; collect, preserve, and manage historical document collection and oral history program; determing unit lineage and honors; verify aerial victory credits.

**Total Personnel:** 58

**FOA:** Field Operating Agency
**DRU:** Direct Reporting Unit

### Air Force Inspection Agency

**Hq.:** Kirtland AFB, N.M.

**Estab.:** 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 SECAF inspection system.

**Total Personnel:** 133

### Air Force Intelligence Analysis Agency

**Hq.:** Pentagon

**Estab.:** Feb. 2, 2001

**Type:** FOA

**Mission:** Provide intelligence, special security services, and imagery products; analyze foreign air and air defense tactics and training; manage USAF national imagery collection and interagency civil air analysis; direct global tactics analysis reporting program for theater air components.

**Total Personnel:** 113

### Air Force Intelligence, Surveillance, and Reconnaissance Agency

**Hq.:** Lackland AFB, Tex.

**Estab.:** June 8, 2007

**Type:** FOA

**Mission:** Organize, train, equip, and present forces and capabilities to conduct intelligence-surveillance-reconnaissance for combatant commanders and the nation; oversee ISR capabilities expansion to meet current and future challenges.

**Total Personnel:** 14,347

USAF photo by SrA. Chanise Epps

***A photo by an Air Force ISR Agency photographer shows a base under attack in Afghanistan.***

## Air Force Legal Operations Agency

**Hq.:** JB Anacostia-Bolling, D.C.

**Estab.:** 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:** 743

## Air Force Logistics Management Agency

**Hq.:** Maxwell AFB, Gunter Annex, Ala.

**Estab.:** Sept. 30, 1975

**Type:** FOA

**Mission:** Generate enterprise supply chain solutions for agile combat support capabilities; support logistics transformation through research analysis, wargames, enterprise architecture development, and publication of ACS literature.

**Total Personnel:** 43

## Air Force Manpower Agency

**Hq.:** Randolph AFB, Tex.

**Estab.:** Sept. 1, 1999

**Type:** FOA

**Mission:** Determine manpower requirements; oversee performance management and productivity programs; create and maintain standard position descriptions; oversee civilian classification and centralized operational classification programs.

**Total Personnel:** 478

## Air Force Medical Operations Agency

**Hq.:** Lackland AFB, Tex.

**Estab.:** 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:** 337

## Air Force Medical Support Agency

**Hq.:** JB Anacostia-Bolling, D.C.

**Estab.:** July 1, 1992

**Type:** FOA

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

**Total Personnel:** 231

## Air Force Office of Special Investigations

**Hq.:** JB Andrews, Md.

**Estab.:** Aug. 1, 1948

**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:** 2,179

## Air Force Operational Test and Evaluation Center

**Hq.:** Kirtland AFB, N.M.

**Estab.:** Jan. 1, 1974

**Type:** DRU

**Mission:** Test and evaluate new weapon systems.

**Total Personnel:** 574

## Air Force Operations Group

**Hq.:** Pentagon

**Estab.:** July 26, 1977

**Type:** FOA

**Mission:** Provide 24-hour watch on current operations; train and staff Crisis Action Team; develop weather data for National Command Authority, JCS, National Military Command Center, Army Operations Center, and other federal agencies.

**Total Personnel:** 57

## Air Force Personnel Center

**Hq.:** Randolph AFB, Tex.

**Estab.:** 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:** 2,116

AFPC was formerly the Air Force Military Personnel Center and the Air Force Civilian Personnel Management Center.

## Air Force Personnel Operations Agency

**Hq.:** Pentagon

**Estab.:** Aug. 15, 1993

**Type:** FOA

**Mission:** Analyze personnel life cycle; provide information technology applications; develop and operate officer, enlisted, and civilian models.

**Total Personnel:** 77

## Air Force Petroleum Agency

**Hq.:** Fort Belvoir, Va.

**Estab.:** Dec. 18, 2006

**Type:** FOA

**Mission:** Provide fuel-related technical, operational, and analytical support, planning, new technology development, and standards management.

**Total Personnel:** 97

## Air Force Public Affairs Agency

**Hq.:** San Antonio

**Estab.:** Oct. 1, 2008

**Type:** FOA

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

**Total Personnel:** 258

## Air Force Real Property Agency

**Hq.:** San Antonio

**Estab.:** Nov. 1, 2002

**Type:** FOA

**Mission:** Acquire, manage, and dispose of all Air Force-controlled real property worldwide.

**Total Personnel:** 97

## Air Force Review Boards Agency

**Hq.:** JB Andrews, Md.

**Estab.:** June 1, 1980

**Type:** FOA

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

**Total Personnel:** 67

## Air Force Safety Center

**Hq.:** Kirtland AFB, N.M.

**Estab.:** 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 for applicability and implementation USAF-wide; direct safety education programs.

**Total Personnel:** 124

### Air Force Security Forces Center

**Hq.:** Lackland AFB, Tex.

**Estab.:** March 17, 1997

**Type:** FOA

**Mission:** Organize, train, and equip security forces; develop force protection doctrine, programs, and policies; identify and deliver emerging force protection and force application solutions; manage corrections program and DOD military working dog activities.

**Total Personnel:** 375

### Air Force Services Agency

**Hq.:** Lackland AFB, Tex.

**Estab.:** Feb. 5, 1991

**Type:** FOA

**Mission:** Provide technical assistance, field new initiatives, and develop procedures for services functions; manage central nonappropriated funds; oversee NAF acounting and central field support systems for NAF employees and retirees.

**Total Personnel:** 250

### Air Force Weather Agency

**Hq.:** Offutt AFB, Neb.

**Estab.:** Oct. 15, 1997

**Type:** FOA

**Mission:** Provide air and space weather information to DOD, coalition, and national users; standardize training and equipment for USAF weather forces.

**Total Personnel:** 1,249

Formerly Air Weather Service, established July 1, 1937.

### ANG Readiness Center

**Hq.:** JB Andrews, Md.

**Estab.:** August 1997

**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:** 10,249

### Civil Air Patrol

**Hq.:** Maxwell AFB, Ala.

**Estab.:** Dec. 1, 1941

**Type:** Auxiliary

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

**Total Personnel:** 61,133

### US Air Force Academy

**Hq.:** Colorado Springs, Colo.

**Estab.:** April 1, 1954

**Type:** DRU

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

**Total Personnel:** 3,717

***A member of the Air Force Office of Special Investigations anti-terrorism specialty team searches for a Taliban weapons cache in Afghanistan.***

USAF photo by TSgt. Brian Davidson

# Guide to Air Force Installations Worldwide

## 2011 USAF Almanac

## Active Duty Installations

This section includes Air Force owned and operated facilities around the world. (It also lists the former USAF bases now under other service leadership as joint bases.) It is not a complete list of units by base. Many USAF installations host numerous tenants, not just other USAF units but DOD, joint, other service, and federal and civil entities.

**Altus AFB,** Okla. 73523-5000. **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 96543-5000. **Nearest city:** Yigo. **Phone:** 671-366-1110. **Owning command:** PACAF. **Units/missions:** 36th Wing (PACAF), support; 36th CRG (PACAF), bare base operations. **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 command:** AFMC. **Unit/mission:** Arnold Engineering Development Center (AFMC), test. **History:** dedicated June 25, 1951. Named for Gen. of the Army Henry H. "Hap" Arnold.

**Aviano AB,** Italy, APO AE 09604. **Nearest city:** Aviano. **Phone:** 011-39-0434-30-1110. **Owning command:** USAFE. **Units/missions:** 31st FW (USAFE), fighter operations; 603rd ACS (USAFE), C2 operations; 724th AMS (USAFE), air mobility operations. **History:** dates from 1911 as Italian air base. USAF began operations 1954.

**Barksdale AFB,** La. 71110-5000. **Nearest city:** Bossier City. **Phone:** 318-456-1110. **Owning command:** AFGSC. **Units/missions:** 2nd BW (AFGSC), bomber operations; 917th Wing (AFRC), bomber operations, training; Hq. AFGSC, management; Hq. 8th Air Force (AFGSC), operational leadership; Mighty Eighth Air Force Museum (AFGSC). **History:** activated Feb. 2, 1933. Named for Lt. Eugene H. Barksdale, WWI airman killed in August 1926 crash.

**Beale AFB,** Calif. 95903-5000. **Nearest city:** Marysville. **Phone:** 530-634-3000. **Owning command:** ACC. **Major units/missions:** 9th RW (ACC), ISR and UAV operations; 548th ISRG (AFISRA), DCGS; 940th Wing (AFRC), C2, ISR, and UAV operations. **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.

**Brooks City-Base,** Tex., 78235-5115. **Nearest city:** San Antonio. **Phone:** 210-536-1110; **Owning command:** AFMC. **Units/missions:** 311th ABW (AFMC), support; USAF School of Aerospace Medicine (AFMC), training. **History:** dates from 1918 as Brooks Field. Designated AFB 1948. Redesignated city-base 2002. Closes September 2011 under BRAC 2005. Named for San Antonio aviator Sidney Johnson Brooks Jr.

**Buckley AFB,** Colo. 80011-9524. **Nearest city:** Denver. **Phone:** 720-847-9011. **Owning command:** AFSPC. **Units/missions:** 140th Wing (ANG), air mobility and fighter operations, mobile missile warning; 460th SW (AFSPC), space operations. **History:** activated April 1, 1942 as gunnery training facility. ANG assumed control from Navy 1959. Became active duty Air Force facility Oct. 2, 2000. Named for 1st Lt. John H. Buckley, WWI flier, killed Sept. 17, 1918.

**Cannon AFB,** N.M. 88103-5000. **Nearest city:** Clovis. **Phone:** 575-784-1110. **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. 32925-5000. **Nearest city:** Cocoa Beach. **Phone:** 321-853-1110. **Owning command:** AFSPC. **Units/missions:** 5th SLS (AFSPC), space operations; Det. 1, 45th MSG (AFSPC), support. **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 1974.

### Abbreviations

| | |
|---|---|
| ABW/G | Air Base Wing/Group |
| ACW/S | Air Control Wing/Squadron |
| AFB | Air Force Base |
| AFDW | Air Force District of Washington |
| AFGLSC | Air Force Global Logistics Support Center |
| AFISRA | Air Force ISR Agency |
| AFNWC | Air Force Nuclear Weapons Center |
| AFOSI | Air Force Office of Special Investigations |
| AFRICOM | US Africa Command |
| AFRL | Air Force Research Laboratory |
| AFS | Air Force Station |
| AFWA | Air Force Weather Agency |
| AGOW | Air Ground Operations Wing |
| ALC | Air Logistics Center |
| AMS | Aircraft Maintenance Squadron |
| AMW | Air Mobility Wing |
| AOC/G | Air & Space Operations Center/Group |
| ARW/G | Air Refueling Wing/Group |
| ASOS | Air Support Operations Squadron |
| AW/S | Airlift Wing/Squadron |
| BM | Battle Management |
| C3I | Command, Control, Communications & Intelligence |
| CACS | Command & Control Squadron |
| CENTCOM | US Central Command |
| CG | Communications Group |
| CRW/G | Contingency Response Wing/Group |
| DCGS | Distributed Common Ground Station |
| ECG | Electronic Combat Group |
| FTW | Flying Training Wing |
| ICBMSG | ICBM Systems Group |
| ISRW/G | ISR Wing/Group |
| IW/S | Intelligence Wing/Squadron |
| MOH | Medal of Honor |
| MSG | Mission Support Group |
| MW | Missile Wing |
| NAF | Naval Air Facility |
| NORTHCOM | US Northern Command |
| NSA/F | Naval Support Activity/Facility |
| PACOM | US Pacific Command |
| ROPS | Range Operations Squadron |
| RQW/G/S | Rescue Wing/Group/Squadron |
| RW/G/S | Reconnaissance Wing/Group/Squadron |
| SCMG | Supply Chain Management Group |
| SLS | Space Launch Squadron |
| SMC | Space and Missile Systems Center |
| SOCOM | US Special Operations Command |
| SOW/G | Special Operations Wing/Group |
| STRATCOM | US Strategic Command |
| STS | Special Tactics Squadron |
| SW | Space Wing |
| SWS | Space Warning Squadron |
| TRANSCOM | US Transportation Command |
| TW | Training Wing |
| WEG | Weapons Evaluation Group |

**Cape Cod AFS,** Mass. 02561-0428. **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. 58220-9314. **Nearest city:** Cavalier. **Phone:** n/a. **Owning command:** AFSPC. **Unit/mission:** 10th SWS (AFSPC), missile warning. **History:** established 1975 as Army's Mickelsen Complex, a SAFEGUARD 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. 80914-6066. **Nearest city:** Colorado Springs. **Phone:** 719-474-1110. **Owning command:** AFSPC. **Units/missions:** 721st MSG (AFSPC), support; NORAD/NORTHCOM Alternate Command Center, Integrated Tactical Warning and Attack Assessment operations and training. **History:** operational April 20, 1966.

**Clear AFS,** Alaska, APO AP 99704-0013. **Nearest city:** Fairbanks. **Phone:** n/a. **Owning command:** Alaska ANG. **Units/missions:** 13th SWS (AFSPC), missile warning; 213th SWS (ANG), missile warning. **History:** dates from 1961. Facility and mission transitioning from 13th SWS to 213th SWS.

**Columbus AFB,** Miss. 39710-1000. **Nearest city:** Columbus. **Phone:** 662-434-7322. **Owning command:** AETC. **Unit/mission:** 14th FTW (AETC), training. **History:** activated 1942 for pilot training.

**Creech AFB,** Nev. 89191-5000. **Nearest city:** Indian Springs. **Phone:** 702-652-1110. **Owning command:** ACC. **Units/missions:** 432nd Wing (ACC), UAV operations, ground combat training, and Nevada Test and Training Range support; Joint Unmanned Aircraft Systems Center of Excellence, common concepts, standards, tactics, and technologies development. **History:** activated 1942 as Army camp, air-to-air gunnery training. Closed 1947. Reopened 1948 and in 1951 became a USAF auxiliary field. In 1980s, officially named Indian Springs Air Force Auxiliary Field. In 2005, renamed Creech AFB for Gen. Wilbur L. "Bill" Creech, commander, Tactical Air Command, 1978 to 1984.

**Davis-Monthan AFB,** Ariz. 85707-5000. **Nearest city:** Tucson. **Phone:** 520-228-3900. **Owning command:** ACC. **Units/missions:** 55th ECG (ACC), electronic combat operations; 162nd FW (ANG), fighter operations; 214th RG (ANG), UAV operations; 309th Aerospace Maintenance and Regeneration Group (AFMC), aerospace vehicle storage and regeneration; 355th FW (ACC), fighter operations; 563rd RQG (ACC), rescue operations; 943rd RQG (AFRC), rescue operations; Hq. 12th Air Force (ACC), operational leadership. **History:** activated 1927. Named for two local aviators: 2nd Lt. Samuel H. Davis, killed Dec. 28, 1921, and 2nd Lt. Oscar Monthan, killed March 27, 1924.

**Dover AFB,** Del. 19902-7209. **Nearest city:** Dover. **Phone:** 302-677-3000. **Owning command:** AMC. **Units/missions:** 436th AW (AMC), air mobility operations; 512th AW (AFRC), air mobility operations; Air Force Mortuary Affairs Operations Center (USAF). **History:** activated December 1941. Inactivated 1946. Reactivated February 1951.

**Dyess AFB,** Tex. 79607-1960. **Nearest city:** Abilene. **Phone:** 325-696-1110. **Owning command:** ACC. **Unit/mission:** 7th BW (ACC), bomber operations. **History:** activated April 1942. Deactivated December 1945. Reactivated as Abilene AFB September 1955. Renamed December 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:** 661-227-1110. **Owning command:** AFMC. **Units/missions:** 95th ABW (AFMC), support; Air Force Flight Test Center (AFMC), test and development; Propulsion Directorate (AFRL), R&D; 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. **Units/missions:** 33rd FW (AETC), training; 53rd Wing (ACC), test; 96th ABW (AFMC), support; Air Armament Center (AFMC), acquisition; Air Force Armament Museum (AFMC); Munitions Directorate (AFRL), R&D. **History:** activated 1935. Named for Lt. Col. Frederick I. Eglin, WWI flier killed in aircraft accident Jan. 1, 1937.

**Eielson AFB,** Alaska 99702-5000. **Nearest city:** Fairbanks. **Phone:** 907-377-1110. **Owning command:** PACAF. **Units/missions:** 168th ARW (ANG), air mobility operations; 354th FW (PACAF), aggressor force, fighter, and Red Flag-Alaska operations and 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. 57706-5000. **Nearest city:** Rapid City. **Phone:** 605-385-5056. **Owning command:** ACC. **Units/missions:** 28th BW (ACC), bomber operations; Air Force Financial Services Center (USAF). **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. 99011-9588. **Nearest city:** Spokane. **Phone:** 509-247-5705. **Owning command:** AMC. **Units/missions:** 41st ARW (ANG), air mobility operations; 92nd ARW (AMC), air mobility operations; USAF Survival 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. 82005-5000. **Nearest city:** Cheyenne. **Phone:** 307-773-1110. **Owning command:** AFGSC. **Units/missions:** 90th MW (AFGSC), ICBM operations; 153rd CACS (ANG), mobile C3I 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 1949.

**Goodfellow AFB,** Tex. 76908-4410. **Nearest city:** San Angelo. **Phone:** 325-654-1110. **Owning command:** AETC. **Unit/mission:** 17th TW (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. 58205-5000. **Nearest city:** Grand Forks. **Phone:** 701-747-3000. **Owning command:** AMC. **Unit/mission:** 319th ARW (AMC), air mobility operations. **History:** activated 1956. Named after town of Grand Forks, whose citizens bought the property for the Air Force.

**Hanscom AFB,** Mass. 01731-5000. **Nearest city:** Boston. **Phone:** 781-377-1110. **Owning command:** AFMC. **Units/missions:** 66th ABW (AFMC), support; Electronic Systems Center (AFMC), acquisition and R&D. **History:** activated 1941. Named for Laurence G. Hanscom, a pre-WWII advocate of private aviation, killed in lightplane accident 1941.

**Hill AFB,** Utah 84056-5990. **Nearest city:** Salt Lake City. **Phone:** 801-777-1110. **Owning command:** AFMC. **Units/missions:** 75th ABW (AFMC), support; 388th FW (ACC), fighter and Utah Test & Training Range operations; 419th FW (AFRC), fighter operations; 526th ICBMSG (AFNWC), ICBM acquisition and support; 748th SCMG (AFGLSC), weapons sustainment; Hill Aerospace Museum (AFMC); Ogden ALC (AFMC), maintenance and 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), fighter operations and UAV training. **History:** activated 1941. Named for Col. George Holloman, guided-missile pioneer.

**Hurlburt Field,** Fla. 32544-5000. **Nearest city:** Fort Walton Beach. **Phone:** 850-884-7190. **Owning command:** AFSOC. **Units/missions:** 1st SOW (AFSOC), special operations; 505th Command and Control Wing (ACC), C2 and ISR tactics, techniques, and procedures development and test; Air Force Combat Weather Center (AFWA), management; Air Force Special Operations Training Center (AFSOC), training; Hq. AFSOC, management; Hq. 23rd Air Force (AFSOC), operational leadership. **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:** (cmcl, from CONUS) 011-90-322-316-1110. **Owning command:** USAFE. **Unit/mission:** 39th ABW (USAFE), support. **History:** activated 1954. Named Adana AB Feb. 21, 1955. Renamed Incirlik AB Feb. 28, 1958.

**JB Anacostia-Bolling,** D.C. 20032-5000. **Nearest city:** Washington, D.C. **Phone:** 703-545-6700. **Bolling owning command:** AFDW. **Air Force agencies:** Chief of Chaplains (USAF); Surgeon General (USAF); Air Force Legal Operations Agency (USAF); Air Force Medical Operations Agency (USAF). **History:** site activated October 1917 with Army air and Navy elements. Formed joint base under Navy lead 2010. NSF 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. 20762-5000. **Nearest city:** Washington, D.C. **Phone:** 301-981-1110. **Owning command:** AFDW (USAF). **Units/missions:** 11th


Major Active Duty Air Force Bases in the US
JB Lewis-McChord (AMC)
Fairchild AFB (AMC)
Wash.
Malmstrom AFB (AFGSC)
Minot AFB (AFGSC)
Grand Forks AFB (AMC)
N.D.
Mont.
Ore.
Idaho
Minn.
Mich.
Maine
Vt.
N.H.
Hanscom AFB (AFMC)
Mass.
R.I.
Conn.
N.Y.
Mountain Home AFB (ACC)
Wyo.
S.D.
Ellsworth AFB (ACC)
Wis.
Mich.
Hill AFB (AFMC)
Beale AFB (ACC)
F. E. Warren AFB (AFGSC)
Iowa
Neb.
Nev.
Pa.
N.J.
JB McGuire-Dix-Lakehurst (AMC)
Travis AFB (AMC)
Offutt AFB (ACC)
Ohio
Del.
Dover AFB (AMC)
Schriever AFB (AFSPC)
Buckley AFB (AFSPC)
Utah
Ill.
Ind.
Wright-Patterson AFB (AFMC)
Calif.
USAF Academy
Peterson AFB (AFSPC)
Md.
W. Va.
Kan.
Whiteman AFB (ACC)
Scott AFB (AMC)
Va.
Colo.
Mo.
Ky.
JB Langley-Eustis (ACC)
Nellis AFB (ACC)
McConnell AFB (AMC)
Arnold AFB (AFMC)
Vandenberg AFB (AFSPC)
Seymour Johnson AFB (ACC)
Vance AFB (AETC)
Tenn.
N.C.
Ariz.
Kirtland AFB (AFMC)
Okla.
Pope Field (AMC)
Edwards AFB (AFMC)
Tinker AFB (AFMC)
Little Rock AFB (AMC)
S.C.
Shaw AFB (ACC)
Los Angeles AFB (AFSPC)
Luke AFB (AETC)
N.M.
Altus AFB (AETC)
Cannon AFB (AFSOC)
Ark.
JB Charleston (AMC)
Tex.
Columbus AFB (AETC)
Davis-Monthan AFB (ACC)
Holloman AFB (ACC)
Miss.
Robins AFB (AFMC)
Barksdale AFB (AFGSC)
Maxwell AFB (AETC)
Ga.
Ala.
Moody AFB (ACC)
Goodfellow AFB (AETC)
Dyess AFB (ACC)
Sheppard AFB (AETC)
La.
Keesler AFB (AETC)
Laughlin AFB (AETC)
Fla.
Hurlburt Field (AFSOC)
Eglin AFB (AFMC)
Tyndall AFB (AETC)
Patrick AFB (AFSPC)
MacDill AFB (AMC)
Randolph AFB (AETC)
Lackland AFB (AETC)
Washington, D.C.
Md.
Hq. USAF
JB Anacostia-Bolling
Va.
JB Andrews
Eielson AFB (PACAF)
JB Elmendorf-Richardson (PACAF)
Alaska
JB Pearl Harbor-Hickam (PACAF)
Oahu
Hawaii

Wing (AFDW), helicopter operations, support; 79th Medical Wing (AFDW); 89th AW (AMC), air mobility operations; 113th Wing (ANG), fighter and air mobility operations; 459th ARW (AFRC), air mobility operations; 844th CG (AFDW), cyber operations; Hq. AFOSI (USAF), management; Air Force Review Boards Agency (USAF); Air National Guard Readiness Center (ANG), support. **History:** Andrews 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. 29404-5000. **Nearest city:** Charleston. **Phone:** 843-963-1110. **Owning command:** AMC. **Units/missions:** 315th AW (AFRC), air mobility operations; 437th AW (AMC), air mobility operations; 628th ABW (AMC), support. **History:** activated 1942. Inactivated March 1946. Reactivated August 1953. Formed joint base under Air Force lead 2010. Named for city of Charleston.

**JB Elmendorf-Richardson,** Alaska 99506-5000. **Nearest city:** Anchorage. **Phone:** 907-552-1110. **Elmendorf owning command:** PACAF. **Units/missions:** 3rd Wing (PACAF), air mobility, C2, and fighter operations; 477th FG (AFRC), fighter operations; 673rd ABW (PACAF), support; Alaskan NORAD Region, operational leadership; Hq. Alaskan Command (PACOM), management; Hq. 11th Air Force (PACAF), operational leadership; Joint Task Force Alaska (NORTHCOM), operational leadership. **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. 23665-5000. **Nearest city:** Hampton. **Phone:** 757-764-1110. **Langley owning command:** ACC. **Units/missions:** 1st FW (ACC), fighter operations; 192nd FW (ANG), fighter operations; 480th ISRW (AFISRA), ISR operations; 633rd ABW (ACC), support; Air Force Global Cyberspace Integration Center (USAF), cyber 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. 98438-1109. **Nearest city:** Tacoma. **Phone:** 253-982-1110. **McChord owning command:** AMC. **Units/missions:** 62nd AW (AMC), air mobility operations; 446th AW (AFRC), air mobility operations. **History:** Lewis established 1917; McChord activated May 5, 1938. Formed as joint base under Army lead 2010. Lewis named for Capt. Meriwether Lewis of Lewis and Clark Expedition. McChord named for Col. William C. McChord, killed Aug. 18, 1937.

**JB McGuire-Dix-Lakehurst,** N.J. 08641-5000. **Nearest city:** Wrightstown. **Phone:** 609-754-1100. **McGuire owning command:** AMC. **Units/missions:** 87th ABW (AMC), support; 108th ARW (ANG), air mobility operations; 305th AMW (AMC), air mobility operations; 514th AMW (AFRC), air mobility operations; 621st Contingency Response Wing (AMC), bare base operations; Hq. 21st Expeditionary Mobility Task Force (AMC), operational leadership; US Air Force Expeditionary Center (AMC), training. **History:** McGuire activated 1941 as Fort Dix AAB. Closed after WWII. Reopened as McGuire 1948. Dix activated 1917. Navy purchased Army's Camp Kendrick in 1921 for airship station, renamed Lakehurst for city of Lakehurst, N.J. Formed as joint base under Air Force lead 2009. McGuire named for Maj. Thomas B. McGuire Jr., P-38 pilot, second leading 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 96853-5000. **Nearest city:** Honolulu. **Phone:** 808-449-7110. **Hickam owning command:** PACAF. **Units/missions:** 15th Wing (PACAF), air mobility and fighter operations; 154th Wing (ANG), air mobility and fighter operations; 515th Air Mobility Operations Wing (AMC), air mobility operations; 624th Regional Support Group (AFRC), bare base operations; Hq. PACAF, management; Hq. 13th Air Force (PACAF), 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,** Tex. 78234-5000 **Nearest city:** San Antonio. **Phone:** 210-221-1211. **Major components:** Fort Sam Houston, Lackland AFB, and Randolph AFB. (See separate entries for Lackland and Randolph.) **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 BRAC 2005.

**Kadena AB,** Japan, APO AP 96368-5000. **Nearest city:** Naha. **Phone:** 011-81-6117-34-1110. **Owning command:** PACAF. **Units/missions:** 1st Battalion, 1st Air Defense Artillery (Army), air and missile defense; 18th Wing (PACAF), air mobility, fighter, ISR, and rescue operations; 353rd SOG (AFSOC), special operations; Cmdr. Fleet Activities Okinawa (Navy), support. **History:** occupied by US forces April 1945. Named for city of Kadena on island of Okinawa.

**Keesler AFB,** Miss. 39534-5000. **Nearest city:** Biloxi. **Phone:** 228-377-1110. **Owning command:** AETC. **Units/missions:** 81st TW (AETC), training; 403rd Wing (AFRC), air mobility operations and 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. 87117-5606. **Nearest city:** Albuquerque. **Phone:** 505-846-1110. **Owning command:** AFMC. **Units/missions:** 58th SOW (AETC), special operations and pararescue training; 150th FW (ANG), special operations and pararescue training; 377th ABW (AFMC), support; 498th Nuclear Systems Wing (AFMC), weapon sustainment; Air Force Inspection Agency (USAF), inspection; Air Force Operational Test and Evaluation Center (USAF), test and R&D; AFNWC (AFMC), acquisition and weapons sustainment; Air Force Safety Center (USAF), management; Phillips Research Site, Directed Energy and Space Vehicles Directorates (AFRL), R&D; Space Development and Test Wing (SMC), test. **History:** activated January 1941. Named for Col. Roy C. Kirtland, aviation pioneer who died May 2, 1941.

**Kunsan AB,** South Korea, APO AP 96264-5000. **Nearest city:** Kunsan City. **Phone:** 011-82-63-470-1110. **Owning command:** PACAF. **Unit/mission:** 8th FW (PACAF), fighter operations. **History:** built by the Japanese in 1938.

**Lackland AFB,** Tex. 78236-5000. **Nearest city:** San Antonio. **Phone:** 210-671-2908. **Owning command:** AETC. **Units/missions:** 37th TW (AETC), training; 59th Medical Wing (AETC); 149th FW (ANG), fighter and cyber operations; 802nd MSG (AETC), support; Hq. 24th Air Force (AFSPC), operational leadership; Hq. AFISRA (USAF), management; Hq. Air Force Security Forces Center (USAF), management. **History:** activated 1941 as part of Kelly Field. Designated independent installation July 1942 as San Antonio Aviation Cadet Center. Placed under Joint Base San Antonio installation management umbrella 2009. (Also see JBSA entry.) Named 1947 for Brig. Gen. Frank D. Lackland, early commandant of Kelly Field flying school, who died 1943.

**Lajes Field,** Azores, Portugal, APO AE 09720-5000. **Nearest city:** Praia de Vitoria. **Phone:** 011-351-295-57-1110. **Owning command:** USAFE. **Unit/mission:** 65th ABW, support. **History:** US operations began 1943.

**Laughlin AFB,** Tex. 78843-5000. **Nearest city:** Del Rio. **Phone:** 830-298-3511. **Owning command:** AETC. **Unit/mission:** 47th FTW, 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. 72099-4940. **Nearest city:** Jacksonville. **Phone:** 501-987-1110. **Owning command:** AMC. **Units/missions:** 19th AW (AMC), air mobility operations; 189th AW (ANG), training; 314th AW (AETC), training. **History:** activated Oct. 9, 1955.

**Los Angeles AFB,** Calif. 90245-4657. **Nearest city:** El Segundo. **Phone:** 310-653-1110. **Owning command:** AFSPC. **Units/missions:** 61st ABW (AFSPC), support; SMC (AFSPC), acquisition and R&D. **History:** Designated LA AFS April 30, 1964. Redesignated LA 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. 85309-5000. **Nearest city:** Phoenix. **Phone:** 623-856-1110. **Owning command:** AETC. **Units/missions:** 56th FW (AETC), training; 56th Range Management Office (AETC), Barry M. Goldwater Range operations; 944th FW (AFRC), fighter operations and training. **History:** activated 1941. Named for 2nd Lt. Frank Luke Jr., observation balloon-busting ace of WWI and first American aviator to receive MOH, killed in action Sept. 29, 1918.

**MacDill AFB,** Fla. 33621-5000. **Nearest city:** Tampa. **Phone:** 813-828-1110. **Owning command:** AMC. **Units/missions:** 6th AMW (AMC), air mobility operations; Hq. CENTCOM, operational leadership; Hq. SOCOM, operational leadership; Joint Special Operations University

# Martin-Baker

**Martin-Baker** has developed the US16E Ejection Seat specifically for the Lockheed Martin F-35 Lightning II Joint Strike Fighter (JSF) against the requirements laid down through the JSF Contract Specification (JCS).
MBA has been on the JSF programme since its inception and ensuring a low risk approach was followed, the US16E design evolved from the proven Mk16 Ejection Seat range. The System Development & Demonstration (SDD) phase of the JSF programme introduced many new and demanding requirements for the Ejection Seat. These requirements have shaped the design of the US16E Ejection Seat in a manner unlike other programmes in which MBA has participated. This has led to the adoption of a fully integrated and fully productionised design from inception. The requirements may be summarised below:

## Affordability

As the F-35 is destined to replace so many different aircraft types, affordability is crucial to ensuring that the F-35 is deployed in sufficient quantities for the war-fighter. This translates into a common Ejection Seat configuration installed into all 3 cousin aircraft (the F-35A Conventional Take Off & Landing (CTOL), F-35B Short Take Off & Vertical Landing (STOVL) and F-35C Carrier Variant (CV).

## Accommodation range

The JSF requirement for crewmember accommodation has been expanded to include the widest nude population mass range (103lb to 245lb) and the multivariate accommodation range (Cases 1 through 8), as defined by the JSF sub-set of the Civilian American and European Surface Anthropometry Resource (CAESAR) database. This requirement formally introduces the female gender for the very first time.



## Terrain clearance performance

Terrain clearance is defined as the height above ground that the ejectee first attains the safe descent rate of 24ft/s while suspended under the parachute. These figures are to be achieved across the wide accommodation range. These requirements have been based on the "best-of-legacy" approach where all the Ejection Seat terrain clearance charts have been amalgamated and distilled from the US Seat inventory (Stencel SIIIS), MBA Navy Aircrew Common Ejection Seat (NACES) and Advanced Concept Ejection Seat (Douglas ACES II) into a common set of terrain clearance tables.

## Head and Neck Injury Criteria

This is the first programme to introduce the Neck Injury Criteria (NIC) due to the combination of accommodation range, gender (small female) and need for the crewmember to wear a Helmet Mounted Display (HMD). The US16E Seat is the only Ejection Seat that meets the NIC across the speed and accommodation ranges, including small females.

## Mass

As one of the F-35 aircraft variants is the STOVL configuration, Ejection Seat mass plays a critical part of the cockpit mass allocation. Design-to-mass being a fundamental principal of the MBA Seat design.

## Auto-Eject System

The STOVL aircraft propulsion configuration results in unique failure mode conditions which the crewmember is not able to react quickly enough to manually eject. This has resulted in the US16E interfacing with an LM designed auto-eject system which caters for the low altitude / low speed / adverse pitch attitude escape conditions.

## Integrated Design

The JSF Ejection Seat is Customer Furnished and not Government Furnished, which is the ideal circumstance for LM to entertain a fully integrated solution for the F-35 cockpit, balancing the design requirements for accommodation, mass, life support, HMD requirements against the AURF and LCC targets.

The US16E is made up of the following principle major assemblies:

- Guide rail assembly
- Catapult assembly
- Seat bucket assembly
- Parachute and harness assembly
- Seat survival kit assembly

The guide rail assembly is mechanically attached onto the cockpit rear bulkhead and is able to rotate manually from 16.5° to 22°. At the bottom of the rail the Air-vehicle Interface Disconnect Unit (AIDU) is attached which interfaces the electrical, ballistic, pneumatic services between the Seat and the aircraft.

The catapult is installed onto the rails and is the initial means by which the crewmember is ejected from the cockpit. The catapult contains the Neck Protection Device (NPD) which is an inflated system that supports the HMD during ejection thereby enabling the NIC requirements to be met.

The Seat bucket, which mounts all the crewmember controls, is connected to the catapult. The Seat raising actuator raises and lowers the Seat bucket over a range of 7.4".

For reasons of safety and operation, the HMD system is integrated onto the US16E Seat. The catapult carries both the Helmet Transmitter Unit (HTU) and Seat Position Sensor (SPS) which are integral to determining HMD relative position in the cockpit. The Seat bucket has integrated a Quick Disconnect Connector through which passes all the HMD signals to/from the aircraft.

The US16E Seat carries a Seat mounted life support system. The integration onto the Seat offers advantages from reach, maintenance, mass and cost perspectives. The seat bucket houses the Services Connection Package (SCP) which regulates breathing and anti-g supplies. The catapult houses the 300L Backup Oxygen System (BOS) which can be removed or re-charged on Seat. Both the SCP and BOS are supplied by Honeywell Aerospace Yeovil (HAY).
The Seat Survival Kit (SSK) contains all the survival aids, including a liferaft and automatic inflation unit (ALIU). The SSK is installed into the Seat bucket, onto which the crewmember sits. A fifth generation integrated harness is able to accommodate the wide range of crewmember sizes and provides restraint during aircraft acceleration and ejection conditions.

The US16E meets the JCS performance requirements by having a low acceleration catapult, the NPD which enables the NIC to be met, a drogue which is deployed early and downwind, a larger main parachute which is deployed early in the sequence and downwind.

**Martin-Baker is proud to be on the programme and proud to be supporting the war-fighter.**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**"Engineering for Life"**

# Major Active Duty Air Force Bases Overseas



(SOCOM), education. **History:** activated April 15, 1941. Named for Col. Leslie MacDill, killed in aircraft accident Nov. 8, 1938.

**Malmstrom AFB,** Mont. 59402-5000. **Nearest city:** Great Falls. **Phone:** 406-731-1110. **Owning command:** AFGSC. **Unit/mission:** 341st MW (AFGSC), ICBM 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. 36112-6103. **Nearest city:** Montgomery. **Phone:** 334-953-1110. **Owning command:** AETC. **Units/missions:** 42nd ABW (AETC), support; 908th AW (AFRC), air mobility operations; Air Force Historical Research Agency (USAF), historical documentation and research; Air Force Legal Operations Agency (USAF), management; Air Force Logistics Management Agency (USAF), management; Air University (AETC), education; Hq. Civil Air Patrol (USAF), management. **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. 67221-5000. **Nearest city:** Wichita. **Phone:** 316-759-6100. **Owning command:** AMC. **Units/missions:** 22nd ARW (AMC), air mobility operations; 184th IW (ANG), battlefield airmen, cyber, C2, and range 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. 25, 1945), and 2nd Lt. Thomas L. (killed July 10, 1943)—all WWII B-24 pilots.

**Minot AFB,** N.D. 58705-5000. **Nearest city:** Minot. **Phone:** 701-723-1110. **Owning command:** AFGSC. **Units/missions:** 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 96319-5000. **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. 31699-5000. **Nearest city:** Valdosta. **Phone:** 229-257-1110. **Owning command:** ACC. **Units/missions:** 23rd Wing (ACC), fighter and rescue operations; 93rd Air Ground Operations Wing (ACC), battlefield airmen operations and support; 476th FG (AFRC), fighter operations; 820th Base Defense Group (ACC), expeditionary force protection. **History:** activated June 1941. Named for Maj. George P. Moody, killed May 5, 1941.

**Mountain Home AFB,** Idaho 83648-5000. **Nearest city:** Mountain Home. **Phone:** 208-828-1110. **Owning command:** ACC. **Unit/mission:** 366th FW (ACC), fighter operations and 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. 89191-5000. **Nearest city:** Las Vegas. **Phone:** 702-652-1110. **Owning command:** ACC. **Units/missions:** 57th Wing (ACC), combat training; 98th Range Wing (ACC), Nevada Test and Training Range operations; 99th ABW (ACC), support; 926th Group (AFRC), associate missions at Creech, Eglin, and Nellis; USAF Warfare Center (ACC), operational testing, tactics development, and training. **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. 68113-5000. **Nearest city:** Omaha. **Phone:** 402-294-1110. **Owning command:** ACC. **Units/missions:** 55th Wing (ACC), C2, electronic attack, and ISR operations, support, training; Air Force Weather Agency (USAF), management; Hq. STRATCOM, operational leadership. **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 with Jan. 13, 1948, transfer to USAF.

**Osan AB,** South Korea, APO AP 96278-5000. **Nearest city:** Seoul. **Phone:** 011-82-31-661-1110. **Owning command:** PACAF. **Units/missions:** 51st FW (PACAF), fighter operations; 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, July 1950 between US and North Korean forces.

**Patrick AFB,** Fla. 32925-4500. **Nearest city:** Cocoa Beach. **Phone:** 321-494-1110. **Owning command:** AFSPC. **Units/missions:** 45th SW (AFSPC), space operations; 114th ROPS (ANG), launch range support; 920th RQW (AFRC), rescue operations; Air Force Technical Applications Center (AFISRA), nuclear monitoring. **History:** activated 1940. Named for Maj. Gen. Mason M. Patrick, Chief of AEF's Air Service in WWI and Chief of the Air Service/Air Corps, 1921 to 1927.

**Peterson AFB,** Colo. 80914-5000. **Nearest city:** Colorado Springs. **Phone:** 719-556-7321. **Owning command:** AFSPC. **Units/missions:** 21st SW (AFSPC), space operations, support; 200th AS (ANG), air mobility operations; Hq. AFSPC, management; Hq. NORAD, operational leadership; Hq. NORTHCOM, operational leadership. **History:** activated 1942. Named for 1st Lt. Edward J. Peterson, killed Aug. 8, 1942.

**Pope Field,** N.C. 28308-2391. **Nearest city:** Fayetteville. **Phone:** 910-394-1110. **Owning command:** AMC. **Units/missions:** 18th ASOS (ACC), battlefield airmen operations; 21st STS (AFSOC), special operations; 43rd AG (AMC), air mobility operations; 440th AW (AFRC), air mobility operations; USAF Combat Control School (AFSOC), training. **History:** activated 1919. Under BRAC 2005, 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 09461-5000. **Nearest city:** Cambridge. **Phone:** 011-44-1638-52-1110. **Owning command:** USAFE. **Unit/mission:** 48th FW, fighter and rescue 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 09459-2000. **Nearest city:** Cambridge. **Phone:** 011-44-1638-54-1110. **Owning command:** USAFE. **Units/missions:** 95th RS (ACC), ISR operations; 100th ARW (USAFE), air mobility operations; 352nd SOG (AFSOC), special operations; 488th IS (ACC), ISR operations. **History:** activated as RAF bomber base October 1934. Named after nearby town. US bomber operations began July 1950. SAC had control from October 1951 to July 1959, when USAFE took over.

**Ramstein AB,** Germany, APO AE 09094-0385. **Nearest city:** Ramstein. **Phone:** 011-49-6371-47-1110. **Owning command:** USAFE. **Units/missions:** 86th AW (USAFE), air mobility operations, support, including Kaiserslautern Military Community; 435th AGOW (USAFE), battlefield airmen operations; 521st Air Mobility Operations Wing (AMC), air mobility operations; Hq. 3rd AF (USAFE), operational leadership; Hq. 17th AF (AFRICOM), operational leadership; Hq. USAFE, management. **History:** originally Landstuhl AB, activated August 1952. Reactivated December 1957 as Ramstein-Landstuhl AB; later redesignated Ramstein AB.

**Randolph AFB,** Tex. 78150-5000. **Nearest city:** San Antonio. **Phone:** 210-652-1110. **Owning command:** AETC. **Units/missions:** 12th FTW (AETC), training; 902nd MSG (AETC), support; Air Force Manpower Agency (USAF), management; Air Force Personnel Center (USAF), management; Air Force Recruiting Service (AFPC), management; Air Force Services Agency (USAF), management; Hq. 19th AF (AETC), operational leadership; Hq. AETC, management. **History:** dedicated June 1930. Placed under Joint Base San Antonio installation management umbrella 2009. (Also see JBSA entry.) Named for Capt. William M. Randolph, killed Feb. 17, 1928.

**Robins AFB,** Ga. 31098. **Nearest city:** Warner Robins. **Phone:** 478-926-1110. **Owning command:** AFMC. **Units/missions:** 78th ABW (AFMC), support; 116th ACW (ANG), C2 operations; 461st ACW (ACC), C2 operations; 689th Combat Communications Wing (AFSPC), cyber operations; Hq. AFRC, management; Warner Robins ALC (AFMC), maintenance and repair. **History:** activated March 1942. Named for Brig. Gen. Augustine Warner Robins, an early chief of the Army Air Corps' Materiel Division, who died June 16, 1940.

**Schriever AFB,** Colo. 80912-2101. **Nearest city:** Colorado Springs. **Phone:** 719-567-1110. **Owning command:** AFSPC. **Units/missions:** 50th SW (AFSPC), space operations; 310th SW (AFRC), space operations; Space Innovation and Development Center (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. 62225-5000. **Nearest city:** Belleville. **Phone:** 618-256-1110. **Owning command:** AMC. **Units/missions:** 126th ARW (ANG), air mobility operations; 375th AW (AMC), air mobility operations; 618th Tanker Airlift Control Center (AMC), planning and directing worldwide air mobility operations;

932nd AW (AFRC), air mobility operations; Air Force Global Logistics Support Center (AFMC), supply chain management; Air Force Network Integration Center (AFSPC), cyber architectures, concepts, and tactics development; 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, the first enlisted man to die in an aircraft accident, killed Sept. 28, 1912.

**Seymour Johnson AFB,** N.C. 27531. **Nearest city:** Goldsboro. **Phone:** 919-722-1110. **Owning command:** ACC. **Units/missions:** 4th FW (ACC), fighter operations; 916th ARW (AFRC), air mobility operations. **History:** activated June 12, 1942. Named for Navy Lt. Seymour A. Johnson, Goldsboro native, killed March 5, 1941.

**Shaw AFB,** S.C. 29152-5000. **Nearest city:** Sumter. **Phone:** 803-895-1110. **Owning command:** ACC. **Units/missions:** 20th FW (ACC), fighter operations; Hq. 9th Air Force (ACC), management (Hq. Air Forces Central in Southwest Asia, operational leadership); Hq. Third Army, management; US Army Central, 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,** Tex. 76311-5000. **Nearest city:** Wichita Falls. **Phone:** 940-676-1110. **Owning command:** AETC. **Units/missions:** 82nd TW (AETC), training; Euro-NATO Joint Jet Pilot Training program, training. **History:** activated June 14, 1941. Named for US Sen. Morris E. Sheppard, who died April 9, 1941.

**Spangdahlem AB,** Germany, APO AE 09126-5000. **Nearest city:** Bitburg. **Phone:** 011-49-6565-61-1110. **Owning command:** USAFE. **Unit/mission:** 52nd FW (USAFE), fighter operations. **History:** built by French 1951 and turned over to US 1952. Named after nearby town.

**Thule AB,** Greenland, APO AE 09074-5000. **Nearest city:** Qaanaaq. **Phone:** (through Cheyenne Mountain AFS operator) 719-474-1110. **Owning command:** AFSPC. **Units/missions:** 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. 73145-3010. **Nearest city:** Oklahoma City. **Phone:** 405-732-7321. **Owning command:** AFMC. **Units/missions:** 72nd ABW (AFMC), support; 137th ARW (ANG), air mobility operations; 507th ARW (AFRC), air mobility operations; 552nd ACW (ACC), C2 operations; Oklahoma City ALC (AFMC), maintenance and repair. **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. 94535-5000. **Nearest city:** Fairfield. **Phone:** 707-424-1110. **Owning command:** AMC. **Units/missions:** 15th Expeditionary Mobility Task Force (AMC), operational leadership; 60th AMW (AMC), air mobility operations; 349th AMW (AFRC), air mobility operations; 615th Contingency Response Wing (AMC), bare base operations. **History:** activateds May 17, 1943. Named for Brig. Gen. Robert F. Travis, killed Aug. 5, 1950.

**Tyndall AFB,** Fla. 32403-5000. **Nearest city:** Panama City. **Phone:** 850-283-1113. **Owning command:** AETC. **Units/missions:** 53rd WEG (ACC), test; 101st AOG (ANG), support; 325th FW (AETC), training; 325th FW ANG Assoc. Unit, training; 601st AOC (ANG), C2 operations; Air Force Civil Engineer Support Agency (USAF), management; Hq. Continental US NORAD Region (NORAD)/1st AF/Air Forces Northern (ACC), 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. 80840-5025. **Nearest city:** Colorado Springs. **Phone:** 719-333-1110. **Owning command:** USAF. **Mission:** education. **History:** established April 1, 1954, at Lowry AFB, Colo. Moved to permanent location in Colorado Springs August 1958.

**Vance AFB,** Okla. 73705-5000. **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. 93437-5000. **Nearest city:** Lompoc. **Phone:** 805-606-1110. **Owning command:** AFSPC. **Units/missions:** 30th SW (AFSPC), space and launch range operations; Hq. 14th Air Force (AFSPC), operational leadership; Joint Space Operations Center (STRATCOM), C2 operations. **History:** originally Army's Camp Cooke. Activated October 1941. Taken over by USAF June 7, 1957. Renamed for Gen. Hoyt S. Vandenberg, USAF's second Chief of Staff.

**Whiteman AFB,** Mo. 65305-5000. **Nearest city:** Knob Noster. **Phone:** 660-687-1110. **Owning command:** AFGSC. **Units/missions:** 131st BW (ANG), bomber operations; 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. **Units/missions:** 445th AW (AFRC), air mobility operations; Aeronautical Systems Center (AFMC), acquisition; Air Force Institute of Technology (AETC), education; Air Force Security Assistance Center (AFMC), foreign military sales; Hq. AFMC, management; Hq. Air Force Research Laboratory (AFMC), R&D; National Air and Space Intelligence Center (AFISRA), 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 96328-5000. **Nearest city:** Tokyo. **Phone:** 011-81-311-755-1110. **Owning command:** PACAF. **Units/missions:** 374th AW (PACAF), air mobility and rescue operations; Hq. 5th Air Force (PACAF), operational leadership; 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.

# ANG and AFRC Installations

This section consolidates Air National Guard and Air Force Reserve Command facilities into a single listing. Units are listed by base names or according to the facilities they share. In addition, some ANG and AFRC units are located on USAF bases and are included under units on those bases in the "Active Duty Installations" section.

**Abraham Lincoln Capital Arpt.,** Ill. 62707-5001. **Nearest city:** Springfield. **Phone:** 217-757-1219. **Component:** ANG. **Unit/mission:** 183rd FW, Component Numbered Air Force and Centralized Intermediate Repair Facility operations.

**Allen C. Thompson Field/Jackson Arpt.,** Miss. 39232-8881. **Nearest city:** Jackson. **Phone:** 601-936-8370. **Component:** ANG. **Unit/mission:** 172nd AW, air mobility and counterdrug operations, training.

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

**Atlantic City Arpt.,** N.J. 08234-9500. **Nearest city:** Egg Harbor Township. **Phone:** 609-645-6000. **Component:** ANG. **Unit/mission:** 177th FW, fighter operations.

**Bangor Arpt.,** Maine 04401-8009. **Nearest city:** Bangor. **Phone:** 207-990-7700. **Component:** ANG. **Unit/mission:** 101st ARW, air mobility operations.

**Barnes Arpt.,** Mass. 01085-1482. **Nearest city:** Westfield. **Phone:** 413-568-9151. **Component:** ANG. **Unit/mission:** 104th FW, fighter operations.

**Birmingham Arpt.,** Ala. 35217-3545. **Nearest city:** Birmingham. **Phone:** 205-714-2000. **Component:** ANG. **Unit/mission:** 117th ARW, air mobility operations.

**Boise Air Terminal** (Gowen Field), Idaho 83705-8006. **Nearest city:** Boise. **Phone:** 208-422-5322. **Component:** ANG. **Units/missions:** 124th FW, fighter operations; 127th ASOS, battlefield airmen operations; 212th CACS, space C2 operations. **History:** named for Lt.

**Abbreviations**
*(also see p. 66)*

| | |
|---|---|
| **AES** | Aeromedical Evacuation Squadron |
| **AGS** | Air Guard Station |
| **ANGB** | Air National Guard Base |
| **ANGS** | Air National Guard Station |
| **ARB** | Air Reserve Base |
| **Arpt.** | Airport |
| **ARS** | Air Reserve Station |
| **ASOS** | Air Support Operations Squadron |
| **IOS** | Information Operations Squadron |
| **JNGB** | Joint National Guard Base |
| **JRB** | Joint Reserve Base |
| **NAS** | Naval Air Station |
| **RSW** | Regional Support Wing |

Paul R. Gowen, killed in B-10 crash in Panama July 11, 1938.

**Bradley Arpt.,** Conn. 06026-9309. **Nearest city:** Hartford. **Phone:** 860-292-2526. **Component:** ANG. **Units/missions:** 103rd AW, air mobility operations; 103rd AOG, C2 operations. **History:** named for Lt. Eugene M. Bradley, killed in P-40 crash August 1941.

**Burlington Arpt.,** Vt. 05403-5872. **Nearest city:** Burlington. **Phone:** 802-660-5215. **Component:** ANG. **Units/missions:** 158th FW, fighter operations; 229th IOS, cyber operations.

**Channel Islands ANGS,** Calif. 93041-4002. **Nearest city:** Oxnard. **Phone:** 805-986-8000. **Component:** ANG. **Unit/mission:** 146th AW, air mobility operations.

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

**Cheyenne Arpt.,** Wyo. 82009. **Nearest city:** Cheyenne. **Phone:** 307-772-6110. **Component:** ANG. **Units/missions:** 153rd AW, air mobility operations; 103rd CACS, space C2 operations.

**Des Moines Arpt.,** Iowa 50321-2799. **Nearest city:** Des Moines. **Phone:** 515-256-8210. **Component:** ANG. **Unit/mission:** 132nd FW, fighter operations.

**Dobbins ARB,** Ga. 30069-4904. **Nearest city:** Atlanta. **Phone:** 678-655-5467. **Component:** AFRC. **Units/missions:** 94th AW, air mobility operations; 94th AES, aeromedical evacuation; Hq. 22nd Air Force, operational leadership. **History:** activated 1943. Named for Capt. Charles Dobbins, pilot killed in WWII.

**Duke Field,** Fla. 32542-6644. **Nearest city:** Crestview. **Phone:** 850-883-6347. **Component:** AFRC. **Unit/mission:** 919th SOW, special operations. **History:** named for Lt. Robert L. Duke, pilot killed Dec. 29, 1943, in test flight.

**Duluth Arpt.,** Minn. 55811-6036. **Nearest city:** Duluth. **Phone:** 218-788-7210. **Component:** ANG. **Unit/mission:** 148th FW, fighter operations.

**Eastern West Virginia Arpt.** (Shepherd Field), W. Va. 25401-7702. **Nearest city:** Martinsburg. **Phone:** 304-616-5100. **Component:** ANG. **Unit/mission:** 167th AW, air mobility operations.

**Ellington Field,** Tex. 77034-5586. **Nearest city:** Houston. **Phone:** 281-929-2337. **Component:** ANG. **Unit/mission:** 147th RW, ISR operations. **History:** named for Lt. Eric L. Ellington, pilot killed November 1913.

**Forbes Field,** Kan. 66619-5370. **Nearest city:** Topeka. **Phone:** 785-861-4210. **Component:** ANG. **Unit/mission:** 190th ARW, air mobility 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:** 479-573-5188. **Component:** ANG. **Unit/mission:** 188th FW, fighter operations.

**Fort Wayne Arpt.,** Ind. 46809-0122. **Nearest city:** Fort Wayne. **Phone:** 260-478-3210. **Component:** ANG. **Unit/mission:** 122nd FW, fighter operations.

**Francis S. Gabreski Arpt.,** N.Y. 11978-1201. **Nearest city:** Westhampton Beach. **Phone:** 631-288-7335. **Component:** ANG. **Unit/mission:** 106th RQW, rescue operations. **History:** named for Col. Francis S. Gabreski, WWII and Korean War ace.

**Fresno Yosemite Arpt.,** Calif. 93727-2199. **Nearest city:** Fresno. **Phone:** 559-454-5100. **Component:** ANG. **Unit/mission:** 144th FW, fighter operations.

**Greeley ANGS,** Colo. 80631-9713. **Nearest city:** Greeley. **Phone:** 720-259-5001. **Component:** ANG. **Unit/mission:** 137th SWS, mobile missile warning. **History:** activated January 1996.

**General Mitchell Arpt.,** Wis. 53207-6299. **Nearest city:** Milwaukee. **Phone:** 414-944-8410. **Component:** ANG. **Unit/mission:** 128th ARW, air mobility operations. **History:** named for Brig. Gen. William "Billy" Mitchell.

**Greater Peoria Arpt.,** Ill. 61607-5023. **Nearest city:** Peoria. **Phone:** 309-633-5210. **Component:** ANG. **Unit/mission:** 182nd AW, air mobility operations.

**Great Falls Arpt.,** Mont. 59404-5570. **Nearest city:** Great Falls. **Phone:** 406-791-6285. **Component:** ANG. **Unit/mission:** 120th FW, fighter operations.

**Grissom ARB,** Ind. 46971-5000. **Nearest city:** Kokomo. **Phone:** 765-688-1110. **Component:** AFRC. **Unit/mission:** 434th ARW, air mobility operations. **History:** activated January 1943 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.

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

**Hancock Field,** N.Y. 13211-7099. **Nearest city:** Syracuse. **Phone:** 1-800-982-3696. **Component:** ANG. **Units/missions:** 152nd AOG, C2 operations; 174th FW, UAV and ISR operations; 222nd CACS, space C2 operations; 274th ASOS, battlefield airmen operations.

**Harrisburg Arpt.,** Pa. 17057. **Nearest city:** Harrisburg. **Phone:** 717-948-2200. **Component:** ANG. **Unit/mission:** 193rd SOW, special operations.

**Hector Arpt.,** N.D. 58102-1051. **Nearest city:** Fargo. **Phone:** 701-451-2110. **Component:** ANG. **Unit/mission:** 119th Wing, air mobility and UAV operations.

**Homestead ARB,** Fla. 33039-1299. **Nearest city:** Homestead. **Phone:** 305-224-7000. **Component:** AFRC. **Unit/mission:** 125th FW Det. 1 (ANG), fighter operations; 482nd FW (AFRC), fighter operations.

**Hulman Arpt.,** Ind. 47803. **Nearest city:** Terre Haute. **Phone:** 812-877-5210. **Component:** ANG. **Units/missions:** 113th ASOS, battlefield airmen operations; 181st IW, DCGS operations.

**Jacksonville Arpt.,** Fla. 32218-7933. **Nearest city:** Jacksonville. **Phone:** 904-741-7100. **Component:** ANG. **Unit/mission:** 125th FW, counterdrug and fighter operations.

**Joe Foss Field,** S.D. 57104-0264. **Nearest city:** Sioux Falls. **Phone:** 605-988-5700. **Component:** ANG. **Unit/mission:** 114th FW, fighter operations. **History:** named for Brig. Gen. Joseph J. Foss, WWII ace, former governor, former AFA national president and board chairman, and founder of the South Dakota ANG.

**Key Field,** Miss. 39307-7112. **Nearest city:** Meridian. **Phone:** 601-484-9000. **Component:** ANG. **Unit/mission:** 186th ARW, air mobility and counterdrug operations and training. **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:** 541-885-6198. **Component:** ANG. **Unit/mission:** 173rd FW, training. **History:** named for 2nd Lt. David R. Kingsley, MOH recipient, killed June 23, 1944, on Ploesti, Romania, oil field bombing mission.

**Kulis ANGB,** Alaska 99502-1988. **Nearest city:** Anchorage. **Phone:** 907-249-1176. **Component:** ANG. **Unit/mission:** 176th Wing, air mobility, C2, and rescue operations. **History:** named for Lt. Albert Kulis, killed in training flight 1954.

**Lambert-St. Louis Arpt.,** Mo. 63044-2371. **Nearest city:** St. Louis. **Phone:** 314-527-7000. **Component:** ANG. **Unit/mission:** 131st BW, bomber operations.

**Lincoln Arpt.,** Neb. 68524-1880. **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:** 502-364-9400. **Component:** ANG. **Unit/mission:** 123rd AW, air mobility, battlefield airmen, bare base, and C2 operations.

**Luis Munoz Marin Arpt.,** Puerto Rico 00979-1502. **Nearest city:** San Juan. **Phone:** 787-253-5101. **Component:** ANG. **Unit/mission:** 156th AW, air mobility operations.

**Mansfield Lahm Arpt.,** Ohio 44903-0179. **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. 92518-9888. **Nearest city:** Riverside. **AFRC Phone:** 951-655-4137. **ANG Phone:** 951-655-2556. **Components:** ANG/AFRC. **Units/missions:** 163rd RW (ANG), UAV and ISR operations; 452nd AMW (AFRC), air mobility operations; Hq. 4th Air Force (AFRC), operational leadership. **History:** activated March 1, 1918. Named for 2nd Lt. Peyton C. March Jr., who died of crash injuries Feb. 18, 1918.

**Martin State Arpt.,** Md. 21220-2899. **Nearest city:** Baltimore. **Phone:** 410-918-6210. **Component:** ANG. **Unit/mission:** 175th Wing, air mobility, cyber, and fighter operations.

**McEntire JNGB,** S.C. 29044. **Nearest city:** Columbia. **Phone:** 803-647-8300. **Compo-**


Air Reserve Component Bases
Wash.
Great Falls Arpt. (ANG)
Portland Arpt. (ANG/AFRC)
Ore.
Mont.
N.D.
Minn.
Duluth Arpt. (ANG)
Hector Arpt. (ANG)
Idaho
Wis.
Alpena County Arpt. (ANG)
Burlington Arpt. (ANG)
Schenectady County Arpt. (ANG)
Maine
Bangor Arpt. (ANG)
Vt.
N.H.
Pease ANGS (ANG)
Klamath Falls Arpt. (ANG)
S.D.
Minn.-St. Paul Arpt. (AFRC)
Boise Air Terminal (ANG)
Wyo.
Truax and Volk Fields (ANG)
General Mitchell Arpt. (ANG)
Mich.
Niagara Falls Arpt. (ANG/AFRC)
Hancock Field (ANG)
N.Y.
Mass.
Otis ANGB (ANG)
Barnes Arpt. (ANG)
R.I.
Conn.
Joe Foss Field (ANG)
Selfridge ANGB (ANG)
Bradley Arpt. (ANG)
Stewart ANGB (ANG)
Salt Lake City Arpt. (ANG)
Sioux Gateway Arpt. (ANG)
W. K. Kellogg Arpt. (ANG)
Youngstown ARS (AFRC)
Gabreski Arpt. (ANG)
Westover ARB (AFRC)
Iowa
Toledo Express Arpt. (ANG)
Harrisburg Arpt. (ANG)
N.J.
Quonset State Arpt. (ANG)
Fresno Yosemite Arpt. (ANG)
Cheyenne Arpt. (ANG)
Neb.
Grissom ARB (AFRC)
Mansfield Lahm Arpt. (ANG)
Pa.
Reno/Tahoe Arpt. (ANG)
Des Moines Arpt. (ANG)
Pittsburgh Arpt. (AFRC)
Atlantic City Arpt. (ANG)
Greater Peoria Arpt. (ANG)
S-B Arpt. (ANG)
Ohio
Rickenbacker ANGB
Del.
Lincoln Arpt. (ANG)
Eastern W. Va. Arpt. (ANG)
New Castle Arpt. (ANG)
Moffett Field (ANG)
Calif.
Nev.
Utah
Greeley ANGS
Ill.
Ind.
Hulman Arpt. (ANG)
Martin State Arpt. (ANG)
Rosecrans Memorial Arpt. (ANG)
Abraham Lincoln Capital Arpt. (ANG)
Fort Wayne Arpt. (ANG)
W. Va.
Md.
Kan.
Lambert-St. Louis Arpt. (ANG)
Va.
Yeager Arpt. (ANG)
Colo.
Ky.
Forbes Field (ANG)
Mo.
Louisville Arpt. (ANG)
Tulsa Arpt. (ANG)
Nashville Arpt. (ANG)
McGhee Tyson Arpt. (ANG)
Channel Islands ANGS (ANG)
Ariz.
Okla.
Tenn.
N.C.
Charlotte/Douglas Arpt. (ANG)
Sky Harbor Arpt. (ANG)
Fort Smith (ANG)
Memphis Arpt. (ANG)
N.M.
Will Rogers World Arpt. (ANG)
S.C.
Dobbins ARB (AFRC)
McEntire JNGB (ANG)
March ARB (ANG/AFRC)
Ark.
Tex.
Key Field (ANG)
Birmingham Arpt. (ANG)
Tucson Arpt. (ANG)
Allen C. Thompson Field (ANG)
Miss.
Ala.
Montgomery Arpt. (ANG)
Ga.
Savannah Hilton Head Arpt. (ANG)
NAS JRB Fort Worth (AFRC/ANG)
La.
Gulfport-Biloxi Arpt. (ANG)
NAS JRB New Orleans (ANG)
Ellington Field (ANG)
Fla.
Duke Field (AFRC)
Jacksonville Arpt. (ANG)
Homestead ARB (AFRC)
Kulis ANGB (ANG)
Alaska
Oahu
Hawaii
Washington, D.C.
Md.
Va.
Luis Munoz Marin Arpt. (ANG)
Note: S-B Arpt. in Ohio is Springfield-Beckley Arpt. (ANG)

**nent:** ANG. **Unit/mission:** 169th FW, 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:** 865-985-3200. **Component:** ANG. **Units/missions:** 134th ARW, air mobility operations; 119th CACS, space C2 operations. **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. 55450-2100. **Nearest city:** Minneapolis. **AFRC phone:** 612-713-1110. **ANG phone:** 612-713-2501. **Components:** ANG/AFRC. **Units/missions:** 133rd AW (ANG), air mobility operations; 934th AW (AFRC), air mobility operations.

**Moffett Field,** Calif. 94035. **Nearest city:** Mountain View. **Phone:** 650-603-9129. **Component:** ANG. **Unit/mission:** 129th RQW, rescue 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.

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

**Nashville Arpt.,** Tenn. 37217-2538. **Nearest city:** Nashville. **Phone:** 615-399-5410. **Component:** ANG. **Unit/mission:** 118th AW, air mobility operations.

**NAS JRB Fort Worth,** Tex. 76127-6200. **Nearest city:** Fort Worth. **Navy-hosted switchboard:** 817-782-5000. **ANG Phone:** 817-852-3202. **Components:** ANG/AFRC. **Units/missions:** 136th AW (ANG), air mobility operations; 301st FW (AFRC), fighter operations; Hq. 10th Air Force (AFRC), operational leadership.

**NAS JRB New Orleans,** La. 70143-0050. **Nearest city:** New Orleans. **Phone:** 504-391-8600. **Component:** ANG. **Unit/mission:** 159th FW, fighter operations.

**New Castle County Arpt.,** Del. 19720. **Nearest city:** Wilmington. **Phone:** 302-323-3500. **Component:** ANG. **Unit/mission:** 166th AW, air mobility and cyber operations.

**Niagara Falls Arpt./ARS,** N.Y. 14304-5001. **Nearest city:** Niagara Falls. **Phone:** 716-236-2000. **Components:** ANG/AFRC. **Units/missions:** 107th AW (ANG), air mobility operations; 914th AW (AFRC), air mobility operations.

**Otis ANGB,** Mass. 02542-1330. **Nearest city:** Falmouth. **Phone:** 508-968-4667. **Component:** ANG. **Unit/mission:** 102nd IW, DCGS operations. **History:** named for 1st Lt. Frank J. Otis, Massachusetts ARNG flight surgeon and pilot killed in 1937 crash.

**Pease Intl. Tradeport ANGS,** N.H. 03803-0157. **Nearest city:** Portsmouth. **Phone:** 603-430-2453. **Component:** ANG. **Unit/mission:** 157th ARW, 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. Base closed March 31, 1991.

**Pittsburgh Arpt./ARS,** Pa. 15108-4403. **Nearest city:** Pittsburgh. **AFRC phone:** 412-474-8511. **ANG phone:** 412-474-8511. **Components:** ANG/AFRC. **Units/missions:** 171st ARW (ANG), air mobility operations; 911th AW (AFRC), air mobility operations.

**Portland Arpt.,** Ore. 97218-2797. **Nearest city:** Portland. **Phone:** 503-335-4000. **Components:** ANG/AFRC. **Units/missions:** 142nd FW (ANG), fighter operations; 304th RQS (AFRC), rescue operations.

**Quonset State Arpt.,** R.I. 02852. **Nearest city:** Providence. **Phone:** 401-886-1210. **Component:** ANG. **Units/missions:** 102nd Information Warfare Squadron, cyber operations; 143rd AW, air mobility operations; 281st Combat Communications Group, combat communications operations.

**Reno/Tahoe Arpt.** (May Field), Nev. 89502. **Nearest city:** Reno. **Phone:** 775-788-4500. **Component:** ANG. **Unit/mission:** 152nd AW, air mobility and DCGS operations. **History:** named for Maj. Gen. James A. May, Nevada adjutant general, 1947 to 1967.

**Rickenbacker ANGB,** Ohio 43217-1161. **Nearest city:** Columbus. **Phone:** 614-492-4468. **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 SAC to ANG April 1, 1980.

**Rosecrans Memorial Arpt.,** Mo. 64503. **Nearest city:** St. Joseph. **Phone:** 816-236-3300. **Component:** ANG. **Unit/mission:** 139th AW, air mobility operations.

**Salt Lake City Arpt.,** Utah 84116. **Nearest city:** Salt Lake City. **Phone:** 801-245-2200. **Component:** ANG. **Unit/mission:** 151st ARW, air mobility operations.

**Savannah Hilton Head Arpt.,** Ga. 31408. **Nearest city:** Savannah. **Phone:** 912-966-8204. **Component:** ANG. **Units/missions:** 165th AW, air mobility operations; Combat Readiness Training Center, training.

**Schenectady County Arpt.** (Stratton ANGB), N.Y. 12302-9752. **Nearest city:** Schenectady. **Phone:** 518-344-2300. **Component:** ANG. **Unit/mission:** 109th AW, air mobility operations.

**Selfridge ANGB,** Mich. 48045-5046. **Nearest city:** Mount Clemens. **Phone:** 586-307-4011. **Components:** ANG. **Unit/mission:** 127th Wing, air mobility, fighter, and special operations forces weather 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 51111-1300. **Nearest city:** Sioux City. **Phone:** 712-233-0210. **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, a Vietnam War POW and MOH recipient.

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

**Springfield-Beckley Arpt.,** Ohio 45502-8783. **Nearest city:** Springfield. **Phone:** 937-327-2100. **Component:** ANG. **Unit/mission:** 178th FW, fighter operations.

**Stewart ANGB,** N.Y. 12550-5042. **Nearest city:** Newburgh. **Phone:** 914-563-2001. **Component:** ANG. **Unit/mission:** 105th AW, air mobility operations. **History:** Stewart AFB until 1969. Acquired by state of New York 1970.

**Toledo Express Arpt.,** Ohio 43558. **Nearest city:** Swanton. **Phone:** 419-868-4078. **Component:** ANG. **Unit/mission:** 180th FW, fighter operations.

**Truax Field,** Wis. 53704-2591. **Nearest city:** Madison. **Phone:** 608-245-4300. **Component:** ANG. **Unit/mission:** 115th FW, fighter operations. **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. 85706-6052. **Nearest city:** Tucson. **Phone:** 520-295-6210. **Component:** ANG. **Unit/mission:** 162nd FW, counterdrug, fighter, and UAV operations.

**Tulsa Arpt.,** Okla. 74115-1699. **Nearest city:** Tulsa. **Phone:** 918-833-7370. **Component:** ANG. **Unit/mission:** 138th FW, fighter operations.

**Volk Field ANGB,** Wis. 54618-5001. **Nearest city:** Madison. **Phone:** 608-427-1210. **Component:** ANG. **Units/missions:** Combat Readiness Training Center, training. **History:** named for Lt. Jerome A. Volk, first Wisconsin ANG pilot to be killed in the Korean War.

**Westover ARB,** Mass. 01022-1825. **Nearest city:** Springfield. **Phone:** 413-557-1110. **Component:** AFRC. **Unit/mission:** 439th AW, air mobility operations. **History:** dedicated April 6, 1940. Named for Maj. Gen. Oscar Westover, Chief of the Air Corps, killed Sept. 21, 1938.

**W. K. Kellogg Arpt.,** Mich. 49015-5512. **Nearest city:** Battle Creek. **Phone:** 616-969-3400. **Component:** ANG. **Units/missions:** 110th AOG, C2 operations; 110th FW, air mobility operations (interim).

**Will Rogers World Arpt.,** Okla. 73179-1090. **Nearest city:** Oklahoma City. **Phone:** 405-686-5210. **Component:** ANG. **Unit/mission:** 137th ARW, air mobility operations.

**Yeager Arpt.,** W.Va. 25311. **Nearest city:** Charleston. **Phone:** 304-341-6126. **Component:** ANG. **Unit/mission:** 130th AW, air mobility operations. **History:** named for Brig. Gen. Charles E. "Chuck" Yeager.

**Youngstown ARS,** Ohio 44473-5912. **Nearest city:** Youngstown. **Phone:** 330-609-1000. **Component:** AFRC. **Unit/mission:** 910th AW, air mobility operations.

# Gallery of USAF Weapons

Note: Inventory numbers are total active inventory figures as of Sept. 30, 2010.

By Susan H. H. Young

## 2011 USAF Almanac

## Bombers

**B-1 Lancer**
**Brief:** A long-range, air refuelable multirole bomber capable of flying intercontinental missions and penetrating enemy defenses with the largest payload of guided and unguided weapons in the Air Force inventory.
**Function:** Long-range conventional bomber.
**Operator:** ACC, AFMC.
**First Flight:** Dec. 23, 1974 (B-1A); Oct. 18, 1984 (B-1B).
**Delivered:** June 1985-May 1988.
**IOC:** Oct. 1, 1986, Dyess AFB, Tex. (B-1B).
**Production:** 104.
**Inventory:** 65.
**Aircraft Location:** Dyess AFB, Tex.; Edwards AFB, Calif.; Eglin AFB, Fla.; Ellsworth AFB, S.D.
**Contractor:** Boeing, AIL Systems, General Electric.
**Power Plant:** four General Electric F101-GE-102 turbofans, each 30,780 lb thrust.
**Accommodation:** four, pilot, copilot, and two systems officers (offensive and defensive), on zero/zero ACES II ejection seats.
**Dimensions:** span 137 ft (spread forward) to 79 ft (swept aft), length 146 ft, height 34 ft.
**Weight:** empty 192,000 lb, max operating weight 477,000 lb.
**Ceiling:** more than 30,000 ft.
**Performance:** max speed 900+ mph (at S/L), range intercontinental.
**Armament:** three internal weapons bays capable of accommodating a wide range of weapons incl up to 84 Mk 82 (500-lb) or 24 Mk 84 (2,000-lb) general-purpose bombs; up to 84 Mk 62 (500-lb) or 8 Mk 65 (2,000-lb) Quick Strike naval mines; up to 30 cluster munitions (CBU-87/89/97) or 30 Wind-Corrected Munitions Dispensers (WCMD) (CBU 103/104/105); up to 24 GBU-31 (2,000-lb) or 15 GBU-38/54 (500-lb) Joint Direct Attack Munitions (JDAMs); up to 24 AGM-158A Joint Air-to-Surface Standoff Missiles (JASSMs); or any mix of these weapons (a different type of weapon in each of three weapons bays).
**COMMENTARY**
Proposed as replacement for the B-52. Four B-1A prototypes developed and tested in 1970s. Program canceled in 1977, though flight test continued. Program revived in 1981 as B-1B variant. Blended wing/body configuration, variable-geometry design, and turbofan engines provide long range, maneuverability, high speed, and survivability. Substantial payload, excellent radar targeting system, and long loiter time. Offensive avionics include synthetic aperture radar (SAR) for tracking-targeting-engaging moving vehicles, self-targeting of stationary targets, and terrain following. GPS-aided inertial navigation system (INS) lets aircrews autonomously navigate without ground-based navigation aids and engage targets with precision. Digital Communications Improvement program allows aircrews to receive targeting data from Combined Air and Space Operations Center (CAOC) and update mission data in the offensive avionics system. Onboard self-protection electronic jamming equipment includes ALQ-161 radar warning receiver, expendable countermeasures, ALE-50 towed decoy.
**Extant Variant(s)**
■ B-1B. Vastly upgraded B-1A, with 74,000 lb increase in useable payload, improved radar, and reduction in radar cross section, but max speed cut to Mach 1.2. Production model flown in October 1984. Total production of 100 B variants. Inventory reduced to 67 aircraft in 2002. One lost since then. First used in combat against Iraq during Desert Fox in December 1998. Equipped over the years with GPS, smart weapons carriage, improved onboard computers, improved communications. Sniper targeting pod added in mid-2008. Receiving radar upgrades, fully Integrated Data Link to add Link 16 data sharing.

***B-1** Lancer* (Clive Bennett)

**B-2 Spirit**
**Brief:** Stealthy, long-range multirole bomber that can deliver nuclear and conventional munitions anywhere on the globe by flying through previously impenetrable defenses.
**Function:** Long-range heavy bomber.
**Operator:** AFGSC, ANG.
**First Flight:** July 17, 1989.
**Delivered:** Dec. 17, 1993.
**IOC:** April 1997, Whiteman AFB, Mo.
**Production:** 21.
**Inventory:** 20.
**Aircraft Location:** Whiteman AFB, Mo.
**Contractor:** Northrop Grumman, Boeing, Vought.
**Power Plant:** four General Electric F118-GE-100 turbofans, each 17,300 lb thrust.
**Accommodation:** two, mission commander and

***B-2A** Spirit* (Northrop Grumman)

pilot, on zero/zero ejection seats.
**Dimensions:** span 172 ft, length 69 ft, height 17 ft.
**Weight:** empty 160,000 lb, typical T/O weight 336,500 lb.
**Ceiling:** 50,000 ft.
**Performance:** minimum approach speed 140 mph; typical estimated unrefueled range for a hi-lo-hi mission with 16 B61 nuclear free-fall bombs is 5,000 miles, with one aerial refueling more than 10,000 miles.
**Armament:** in a nuclear role, up to 16 nuclear weapons (B61 Mod 7, B61 Mod 11, B83) on rotary launchers. In a conventional role, 80 Mk 82 500-lb bombs, 34 CBU-87/89, 80 Mk 62 sea mines, or 80 GBU-38 (500-lb) JDAMs mounted on bomb rack assemblies, or up to 16 rotary launcher-mounted weapons: 16 GBU-31 (2,000-lb) JDAMs, or a penetration version of a BLU-109, or 16 Mk 84 2,000-lb bombs; 16 Joint Standoff Weapons (JSOWs), 16 JASSMs, or eight 4,700-lb GBU-37/GBU-28C/B guided weapons. Future weapons include Small Diameter Bomb (SDB) II and the 30,000-lb Massive Ordnance Penetrator (MOP).
**COMMENTARY**
Based on the flying wing concept. Combination of advanced technologies, low observable (LO) stealth design, and high aerodynamic efficiency. Able to attack heavily defended targets and neutralize enemy defenses. First use of B-2s in combat on March 24, 1999, against Serb targets in Allied Force, with two aircraft each dropping 16 JDAMs. Smoothly blended "fuselage" section has two large weapons bays capable of carrying rotary launchers or bomb rack assemblies with up to 60,000 lb of weapons. No vertical tail surfaces. Quadruple-redundant fly-by-wire digital flight-control system, actuating moving surfaces at the wing trailing edges that combine aileron, elevator, and rudder functions.
**Extant Variant(s)**
■ B-2A Block 30. B-2 production went in three successive blocks of capability: Blocks 10, 20, and 30. All Block 10 and 20 aircraft were upgraded to Block 30, with greatly enhanced weapons capability. Using rotary launcher assembly, all B-2s are capable of employing 16 Mk 84 JDAMs, 16 JSOWs, 16 JASSMs, 16 BLU-109 JDAMs, or eight GBU-37s or GBU-28C/Bs. All B-2A Block 30s are also capable of using bomb rack assemblies in place of rotary launchers, providing the capability to employ 80 500-lb Mk 82s. Modifications to bomb racks add carriage of 80 independently targeted GBU-38 (500-lb) JDAMs. Has fully operational defensive and offensive avionics, a sophisticated mission planning system, and many operating modes for the SAR. Link 16 digital data sharing capability added and radar being replaced. A new stealth coating introduced under the Alternative High Frequency Material program dramatically improves combat readiness.

**B-52 Stratofortress**
**Brief:** A long-range, heavy multirole bomber that can carry nuclear or conventional ordnance or cruise missiles, with worldwide precision navigation capability.
**Function:** Long-range heavy bomber.
**Operator:** AFGSC, AFMC, AFRC.
**First Flight:** April 15, 1952 (YB-52 prototype).
**Delivered:** November 1955-October 1962.
**IOC:** June 19, 1955.
**Production:** 744.
**Inventory:** 74.
**Aircraft Location:** Barksdale AFB, La.; Edwards AFB, Calif.; Minot AFB, N.D.
**Contractor:** Boeing.
**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 electronic warfare officer.
**Dimensions:** span 185 ft, length 159.3 ft, height 40.7 ft.
**Weight:** empty approx 188,000 lb, gross 488,000 lb.
**Ceiling:** 50,000 ft.
**Performance:** max level speed 650 mph, range more than 10,000 miles.
**Armament:** 12 AGM-86B Air Launched Cruise Missiles (ALCMs) externally, with provision for eight more ALCMs or gravity weapons internally. Conventional weapons incl AGM-86C/D Conventional ALCMs (CALCMs), Mk-62 naval mines, Mk-82/84 GP bombs, CBU 87/89/97 unguided munitions, CBU-103/104/105 Wind-Corrected Munitions Dispenser (WCMD) guided munitions, GBU-31 and GBU-38 JDAMs, AGM-158 JASSMs, and GBU-10/12/28 laser guided bombs. Future weapons incl the Miniature Air Launched Decoy (MALD), jammer variant MALD-J, and the JASSM-ER.
**COMMENTARY**
Many variants; all but one retired. Multimission capability includes long-range precision strike, close air support (CAS), offensive counterair, air interdiction, defense suppression, maritime surveillance. Equipped with GPS, ARC-210 radio with Have Quick II anti-jam feature; secure voice and data transmission; Combat Track II radio; electro-optical (EO) viewing system using forward-looking infrared (FLIR) and high-resolution low-light-level television (LLLTV) sensors; night vision goggles (NVG). Can carry weapons targeting pods. Future plans include modification of the entire fleet with an integrated self-targeting and battle damage assessment capability and a new radar system. ECM suite uses a combination of electronic detection, jamming, and infrared (IR) countermeasures to defeat air defenses.
**Extant Variant(s)**
■ B-52H. TF33 turbofans, providing increased unrefueled range, improved defensive armament. First flown July 1960. Total production of 102 aircraft, with deliveries between May 1961 and October 1962. Employable for both conventional and nuclear missions. USAF's only nuclear/conventional cruise missile carrier. Can conduct CAS using GPS/INS guided weapons. First delivered laser guided bombs in Operation Iraqi Freedom in 2003, with Litening targeting pods. ALCMs and CALCMs carried on unique pylons or internally on a rotary launcher. Undergoing Avionics Midlife Improvement Program and ECM upgrade to the ALQ-172 set. Combat Network Communications Technology improvement aims to provide modern cockpit information avionics architecture, color displays, and enhanced situational awareness, fully integrated line-of-sight and beyond-line-of-sight data link capabilities, and mission/weapon reprogramming capability.

***B-52H** Stratofortress* (Clive Bennett)

## Fighter and Attack Aircraft

**A-10 Thunderbolt II**
**Brief:** A simple, effective twin-engine aircraft specifically designed for CAS of ground forces against a wide range of ground targets, including tanks and other armored vehicles.
**Function:** Attack aircraft.
**Operator:** ACC, AFMC, PACAF, USAFE, ANG, AFRC.
**First Flight:** Feb. 15, 1975 (preproduction).
**Delivered:** October 1975-March 1984.
**IOC:** October 1977.
**Production:** 713.
**Inventory:** 42 A-10A; 292 A-10C.
**Aircraft Location:** Barksdale AFB, La.; Boise Air Terminal, Idaho; Davis-Monthan AFB, Ariz.; Eglin AFB, Fla.; Fort Smith Arpt., Ark.; Fort Wayne Arpt., Ind.; Martin State Arpt., Md.; Moody AFB, Ga.; Nellis AFB, Nev.; Osan AB, South Korea; Selfridge ANGB, Mich.; Spangdahlem AB, Germany; Whiteman AFB, Mo.
**Contractor:** Fairchild Republic, now Lockheed Martin.
**Power Plant:** two General Electric TF34-GE-100 turbofans, each 9,065 lb thrust.
**Accommodation:** pilot only, on zero-height/518 mph-zero-speed ejection seat.
**Dimensions:** span 57.5 ft, length 53.3 ft, height 14.7 ft.
**Weight:** empty 28,000 lb, max gross 51,000 lb.
**Ceiling:** 45,000 ft.

***A-10 Thunderbolt II*** (SSgt. Aaron Allmon)

**Performance:** speed 518 mph, combat range with 9,500 lb of weapons and 1.7 hr loiter, 20 min reserve, 288 miles.
**Armament:** one 30 mm, seven-barrel, 1,174-rd capacity GAU-8 Gatling gun capable of carrying inert target practice (TP) rd, straight high-explosive incendiary (HEI), or anti-armor tailored HEI/armor-piercing incendiary (API) combat mix; 11 hardpoints for up to 16,000 lb of ordnance, incl various types of free-fall or guided bombs, such as Mk 82, Mk 84, GBU-10/12/16/38, CBU-87 Combined Effects Munition (CEM), WCMD, 2.75-in high-explosive, white phosphorous, and overt/covert illumination rockets, SUU-25 overt/covert flare dispensers, up to six AGM-65B/D/E/G/H/K Maverick missiles, and up to four AIM-9 Sidewinder missiles. Up to 480 chaff and flares carried internally to counter radar or IR threats. Up to three 600-gallon fuel tanks can also be carried.
**COMMENTARY**
Deadly combination of large and diverse weapons payload, long loiter times, austere airfield capability, maneuverability, and wide combat radius. Can operate under 1,000 ft ceilings, above 25,000 ft with advanced targeting pods and GPS guided munitions, in darkness with NVG. Performs missions of CAS, airborne FAC, interdiction, CSAR, and special operations forces (SOF) support. Prized for its ability to linger in target area. The 30 mm GAU-8 gun can kill heavily armored tanks. Cockpit protected by titanium armor. First used in combat in 1991 Gulf War.
**Extant Variant(s)**
■ A-10A. Equipped with enhanced GPS/INS, head-up display (HUD), NVG, and an Integrated Flight and Fire Control Computer to enhance weapons delivery accuracy, cockpit presentations, targeting pod integration, and terrain avoidance. Carries Pave Penny laser target identification pod and self-protection/penetration aids, including ALQ 131/184 ECM pods, ALR-69 radar warning receiver, AAR-47 missile warning system, and countermeasures system to digitally integrate the ALE-40 chaff-flare dispenser.
■ A-10C. Upgraded with precision engagement modification, new multifunction color displays, hands-on throttle and stick system, digital stores management, JDAM/WCMD integration, Sniper targeting pod capability, Situational Awareness Data Link, and integration of sensors with aircraft systems. IOC in August 2007. First combat deployment September 2007. Plans for enhanced communication and situational awareness systems.

**F-15 Eagle**
**Brief:** A supersonic, all-weather, highly maneuverable tactical fighter designed to permit USAF to swiftly gain and maintain air superiority in aerial combat.
**Function:** Air superiority fighter.
**Operator:** ACC, AFMC, PACAF, USAFE, ANG, AFRC.
**First Flight:** July 27, 1972.
**Delivered:** November 1974-85.
**IOC:** September 1975.
**Production:** 874.
**Inventory:** 254.
**Aircraft Location:** Barnes Arpt., Mass.; Eglin AFB, Fla.; Great Falls Arpt., Mont.; Jacksonville Arpt., Fla.; Kadena AB, Japan; Kingsley Field (Klamath Falls), Ore.; NAS JRB New Orleans, La.; Nellis AFB, Nev.; Portland Arpt., Ore.; RAF Lakenheath, UK.
**Contractor:** McDonnell Douglas (now Boeing), Raytheon.
**Power Plant:** Two Pratt & Whitney F100-PW-220 turbofan engines with afterburners, producing 29,000 lb of thrust from each engine.
**Accommodation:** pilot only in F-15C; two seats in F-15D.
**Dimensions:** span 42.8 ft, length 63.8 ft, height 18.7 ft.
**Weight:** empty 37,500 lb, gross 68,000 lb.
**Ceiling:** 60,000 ft.
**Performance:** (F-15C) max speed Mach 2.5, T-O run 900 ft, landing run without braking parachute 3,500 ft, ferry range with external fuel tanks more than 2,878 miles.
**Armament:** one internally mounted M61A1 20 mm six-barrel cannon (940 rd); up to four AIM-9M/X Sidewinder with four AIM-120B/C Advanced Medium-Range Air-to-Air Missiles (AMRAAMs), or up to eight AIM-120s, all carried externally.
**COMMENTARY**
World's dominant air superiority fighter for more than 30 years. Became USAF's front-line fighter upon introduction in the mid-1970s. Combines superior maneuverability and acceleration, range, weapons, and avionics. First saw combat for USAF in 1991 Gulf War, accounting for 34 of the 37 USAF air-to-air victories. Before that, flown in combat by Israeli Air Force in the 1982 Bekaa Valley War. Has amassed a total of 101 air-to-air victories.
**Extant Variant(s)**
■ F-15C/D (C = single-seat, D = two-seat). Introduced in June 1979, with an internal electronic warfare (EW) countermeasures suite, an additional 2,000 lb of internal fuel, and provision for conformal fuel tanks. Tactical capabilities were enhanced with the initiation of the Multistage Improvement Program (MSIP). The final 43 aircraft were delivered with the APG-70 radar designed for the follow-on F-15E. Some F-15C/Ds will remain in service until 2025, upgraded with APG-63(V3) active electronically scanned array (AESA) radars and beyond-line-of-sight (BLOS) satellite communication (SATCOM) radios. Other upgrades include the Joint Helmet Mounted Cuing System (JHMCS), AIM-9X missile, improved engines, Embedded GPS/INS (EGI) equipment, and Link 16 data link.

***F-15E** Strike Eagle* (Clive Bennett)

**F-15 Strike Eagle**
**Brief:** A heavily modified, two-seat, dual-role variant of the original F-15, with weapons systems totally integrated for all-weather deep interdiction missions as well as air-to-air combat.
**Function:** Dual-role fighter.
**Operator:** ACC, AFMC, USAFE, AFRC.
**First Flight:** Dec. 11, 1986.
**Delivered:** April 1988-2004.
**IOC:** September 1989.
**Production:** 236.
**Inventory:** 213.
**Aircraft Location:** Eglin AFB, Fla.; Mountain Home AFB, Idaho; Nellis AFB, Nev.; RAF Lakenheath, UK; Seymour Johnson AFB, N.C.
**Contractor:** McDonnell Douglas (now Boeing), Raytheon.
**Power Plant:** two Pratt & Whitney F100-PW-220, each 25,000 lb thrust; or F100-PW-229 turbofans, each 29,000 lb thrust with max afterburner.
**Accommodation:** crew of two, on zero/zero ejection seats.
**Dimensions:** span 42.8 ft, length 63.8 ft, height 18.5 ft.
**Weight:** empty 37,500 lb, gross 81,000 lb.
**Ceiling:** 50,000 ft.
**Performance:** max level speed at altitude Mach 2.5, ferry range with CFTs 3,000 miles.
**Armament:** one internally mounted M61A1 20 mm six-barrel cannon; up to four AIM-9 Sidewinder and up to four AIM-120 AMRAAMs or up to eight AIM-120 AMRAAMs; AGM-130; EGBU-15 and GBU 10/12/15/24/28/31/38/54 guided munitions; CBU 87/89/97 unguided munitions; CBU-103/104/105 WCMD guided munitions; GBU-39 SDB; and nuclear weapons.
**COMMENTARY**
Basic F-15 airframe strengthened and upgraded for heavyweight multirole capability. Saw first combat in Desert Storm in 1991, when 48 F-15Es deployed to Gulf and focused on hunting Scud launchers and Iraqi artillery sites. Can maneuver at nine Gs throughout flight envelope.
**Extant Variant(s)**
■ F-15E. Has advanced cockpit controls, displays, and a wide-field-of-view HUD. Array of integrated avionics and electronics to permit fight at low, medium, or high altitude, day or night, and in all weather conditions. Carries LANTIRN night-attack pods and advanced targeting pods on dedicated sensor stations. SAR radar pod provides surveillance and reconnaissance support to ground operations. Potent ground attack capability supplied by GPS-aided and precision weapons and by 20 mm gun for strafing. Air-to-air capability based on array of radar guided and IR homing weapons. Carries a large and varied ordnance load. Equipped with Link 16 and ARC-210 SATCOM. Current mod plan calls for addition of AESA radar.

**F-16 Fighting Falcon**
**Brief:** A compact, versatile, and low-cost multirole fighter aircraft that is highly maneuverable and has repeatedly proved itself in air-to-air combat, suppression of enemy air defenses (SEAD), and air-to-surface attack.
**Function:** Multirole fighter.
**Operator:** ACC, AETC, AFMC, PACAF, USAFE, ANG, AFRC.
**First Flight:** Dec. 8, 1976 (full-scale development).
**Delivered:** January 1979-2005.
**IOC:** October 1980, Hill AFB, Utah.
**Production:** 2,206.
**Inventory:** 1,004.
**Aircraft Location:** Aviano AB, Italy; Edwards AFB, Calif.; Eglin AFB, Fla.; Eielson AFB, Alaska; Hill AFB, Utah; Homestead ARB, Fla.; Kunsan AB, South Korea; Luke AFB, Ariz.; Misawa AB, Japan; NAS JRB Fort Worth, Tex.; Nellis AFB, Nev.; Osan AB, South Korea; Shaw AFB, S.C.; Spangdahlem AB, Germany; and ANG in Alabama, Arizona, California, Colorado, Florida, Indiana, Iowa, Maryland, Minnesota, New Jersey, Ohio, Oklahoma, South Carolina, South Dakota, Texas, Vermont, Wisconsin.
**Contractor:** Lockheed Martin, Northrop Grumman.
**Power Plant:** one augmented turbofan. General Electric F110-GE-100 (27,600 lb thrust) and Pratt & Whitney F100-PW-220 (23,450 lb thrust) are alternative standard engines. Increased performance engines (IPEs) in aircraft delivered from late 1991: Block 50: F110-GE-129 (29,000 lb thrust); Block 52: F100-PW-229 (29,100 lb thrust).
**Accommodation:** pilot only, on zero/zero ejection seat.
**Dimensions:** wingspan with missiles 32.7 ft, length overall 49.4 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:** max speed Mach 2, radius of action: Block 40 with two 2,000-lb bombs, two AIM-9 missiles, and external fuel, hi-lo-lo-hi 852 miles, combat range 575 miles.
**Armament:** one M61A1 20 mm multibarrel cannon, with 511 rd, mounted in fuselage; wingtip-mounted missiles; seven other external stores stations for fuel tanks and a range of air-to-air and air-to-surface munitions.
**COMMENTARY**
Workhorse of the USAF fighter fleet. A lightweight fighter supporting the majority of precision guided munitions taskings in combat operations. Among the most maneuverable fighters ever built. First flown by USAF in combat in 1991 Gulf War; USAF F-16s flew 13,500 missions, more than any other type. F-16 Common Configuration Implementation Program (CCIP) has been completed for bulk of F-16 fleets with Block 50/52 in 2006 and Block 40/42 in 2010. CCIP provides a new modular mission computer and color displays, Sniper XR advanced targeting pod, JHMCS, AIM-9X, Link 16, and improved weapons capabilities.
■ F-16C/D. Introduced in 1984, at production Block 25. Features MSIP II improvements to cockpit, airframe, and core avionics and increased-range APG-68 radar. Block 30 and 40 aircraft incorporate F110-GE-100 engine. Block 25/30/32 variants have upgrades supporting new weapons capabilities, including GBU-31/38/54 JDAM, WCMD, AIM-9X, AIM-120 updates, MALD. Has advanced IFF, NVG capability, and Situation Awareness Data Link. Follow-on improvements include the ALQ-213 EW system, ALR-69 threat warning system, and ALE-47 improved defensive countermeasures. Aircraft equipped with Litening II/Litening ER and Sniper targeting pods.
■ F-16CM Block 40/42 aircraft specializing in night attack with PGMs and wide-angle HUD. Greater takeoff weight and maneuvering limits, expanded envelope, nine-G capability. Equipped with ALE-47 defensive countermeasures, ALR-56M advanced VHSIC technology in APG-68(V5) fire-control radar, ring-laser gyro INS, GPS, enhanced-envelope gunsight, digital flight controls, automatic terrain following.
■ F-16CM Block 50/52 aircraft optimized for Suppression of Enemy Air Defenses (SEAD). Equipped with AGM-88 HARM targeting system. MSIP Stage III improvements. Incorporates GE F110 and P&W F100 increased performance engines, latest cockpit control and display technology. Weapons improvements include AIM-9X, multishot AMRAAM compatibility, GBU-31/38/54 JDAM, WCMD, AGM-158 JASSM, and laser guided bomb variants (GBU-10/12/24) using Sniper and Litening targeting pods. Downlink capability integrates with ROVER systems to support joint terminal attack controllers on the ground. Future upgrades include selective availability anti-spoofing module (SAASM), MALD with new mission planning software, and SDB integration.


***F-16** Fighting Falcon* (Jim Dunn)

**F-22 Raptor**
**Brief:** A fifth generation, multirole fighter designed to penetrate advanced anti-air threats and achieve air dominance.
**Function:** Air dominance multirole fighter.
**Operator:** ACC, AETC, AFMC, PACAF, ANG, AFRC.
**First Flight:** Sept. 7, 1997.
**Delivered:** 2002 (first production representative aircraft).
**IOC:** Dec. 15, 2005.
**Production:** 187 (planned).
**Inventory:** 158.
**Aircraft Location:** Edwards AFB, Calif.; Holloman AFB, N.M.; 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 in 35,000-lb thrust class.
**Accommodation:** pilot only, zero/zero ejection seat.
**Dimensions:** span 44.5 ft, length 62 ft, height 16.6 ft.
**Weight:** empty 43,340 lb, max takeoff 83,500 lb.
**Ceiling:** above 50,000 ft.
**Performance:** max level speed at S/L 900+ mph, range more than 2,000 miles.
**Armament:** one internal M61A2 20 mm gun; two AIM-9 Sidewinders stored internally in the side weapons bays; six AIM-120 AMRAAMs or two AIM-120 AMRAAMs and two GBU-32 JDAMs for ground attack, stored internally in the main weapons bay; beginning 2011, up to eight SDBs can replace two JDAMs.
**COMMENTARY**
USAF's newest operational fighter, built to operate day and night and in adverse weather, across spectrum of missions. Flew its first operational sortie from Langley AFB, Va., in 2006, as part of Noble Eagle. Combines stealth, supercruise, high maneuverability, and integrated avionics to counter and survive multiple anti-access threats and survive. Integrated avionics and intraflight data link permit simultaneous engagement of multiple targets. Advanced flight controls, heavy structure, high-performance engines, thrust vectoring nozzles yield great maneuverability. Future improvements include upgraded radar and up to eight SDBs for ground attack. Subsequent plans include the addition of AIM-9X and the Multifunction Advanced Data Link (MADL) for connectivity with B-2 and F-35 aircraft. Production capped by DOD at 187 aircraft.
**Extant Variant(s)**
■ F-22A. Cockpit fitted with six color LCDs. The Primary Multifunction Display provides a view of the air and ground tactical situation, including threat identity, threat priority, and tracking information, with two Secondary Multifunction Displays showing air and ground threats, stores management, and air threat information. Two additional displays give navigation, communication, identification, and flight information. A HUD shows target status, weapon status, weapon envelopes, and shoot cues. Other equipment includes AN/APG-77 radar, an EW system with radar warning receiver and missile launch detector, JTIDS, IFF, laser gyroscope inertial reference, and GPS.

***F-22A** Raptor* (Erik Simonsen)

**F-35 Lightning II**
**Brief:** An affordable, highly common family of next generation strike aircraft.
**Function:** Multirole fighter.
**Operator:** AFMC. Planned: ACC, PACAF, USAFE, AETC.
**First Flight:** Dec. 15, 2006 (F-35A prototype).
**Delivered:** April 2011 (first low-rate initial production aircraft).
**IOC:** 2016 (USAF).
**Production:** planned: 1,763 USAF (F-35A); 680 Department of the Navy (F-35B&C); unspecified number Britain; unspecified number to eight development partner countries.
**Inventory:** four.
**Aircraft Location:** Edwards AFB, Calif.; planned for Eglin AFB, Fla.; Ops-1 location announcement mid-2011; further operational and training locations TBD.
**Contractor:** Lockheed Martin, with Northrop Grumman and BAE Systems; Pratt & Whitney is propulsion contractor; General Electric is second source engine contractor for the production phase.
**Power Plant:** currently one Pratt & Whitney F135, in 40,000-lb thrust class.
**Accommodation:** pilot only, on zero/zero ejection seat.
**Dimensions:** approx span 35 ft, length 51.4 ft, height 14.2 ft.

**Weight:** empty 29,300 lb, max takeoff 70,000 lb.
**Ceiling:** 50,000 ft.
**Performance:** mil power level speed at S/L, 630 knots calibrated airspeed (KCAS) for the F-35A conventional takeoff and landing (CTOL) variant (Mach 1.6 max power for CTOL only) and the F-35C carrier variant (CV), and 600 KCAS for the F-35B short takeoff and vertical landing (STOVL) aircraft, combat radius more than 590 miles for CTOL variant, 600 miles for CV, and 450 miles for STOVL.
**Armament:** 11 weapons stations (four internal, seven external), capable of carrying bombs up to 2,500 lb. The CTOL will have one internal 25 mm gun; the STOVL and CV variants will have the same weapons with an external missionized gun pod. Internal weapons bay: CTOL: two AIM-120Cs AMRAAMs and two GBU-31 JDAMs. CV: two AMRAAMs and two GBU-31 JDAMs. STOVL: two AMRAAMs and two GBU-32 JDAMs. All variants will have internal and external GBU-12 and external AIM-9X. More than 30 stores are to be certified for carriage as system development continues.
**COMMENTARY**
The F-35 is a multinational program aimed at developing and fielding an affordable, highly common family of next generation strike fighters. For US forces, F-35A CTOL version for the Air Force, the F-35B STOVL version for USMC, and F-35C CV version for USN. USAF's F-35A will replace F-16 and A-10 fleets with a stealthy multirole fighter. Designed to be able to enter heavily defended enemy airspace and engage all enemy targets in any conflict. Features advanced stealth design, high maneuverability, long range, and advanced avionics. Total of 19 test aircraft are being built. Flight test commenced Dec. 15, 2006.
**Extant Variant(s)**
■ F-35A. Variant used by Air Force. First flight by a USAF test pilot on Jan. 30, 2008. An F-35A achieved supersonic speed for the first time in November 2008. The first weight-optimized F-35A, AF-1, flew for the first time Nov. 14, 2009. Still in development and test.

***F-35 Lightning II*** (Lockheed Martin photo by Randy Crites)

# Special Operations Forces Aircraft

**AC-130 Spectre/Spooky**
**Brief:** Heavily armed aircraft using side-firing weapons integrated with sophisticated sensor, navigation, and fire-control systems to provide precise firepower or area saturation for long periods, at night and in adverse weather.
**Function:** Attack aircraft.
**Operator:** AFSOC.
**First Flight:** 1967.
**Delivered:** 1968-present.
**IOC:** 1972 AC-130H, 1996 AC-130U.
**Production:** 43; incl four recent conversions.
**Inventory:** eight AC-130H; 17 AC-130U.
**Aircraft Location:** Cannon AFB, N.M. (H model); Hurlburt Field, Fla. (U model).
**Contractor:** Lockheed Martin (airframe); Boeing (AC-130H); Rockwell, now Boeing (AC-130U).
**Power Plant:** four Allison T56-A-15 turboprops, each 4,910 shp.
**Accommodation:** crew of 13.
**Dimensions:** span 132.6 ft, length 99 ft, height 38.5 ft.
**Weight:** gross 155,000 lb.
**Ceiling:** 25,000 ft.
**Performance:** speed 300 mph, range 1,300 miles, with air refueling unlimited.
**Armament:** AC-130U: one 25 mm Gatling gun, one 40 mm Bofors cannon with 256 rd, and one 105 mm Howitzer with 100 rd. AC-130H: one 40 mm Bofors cannon with 256 rd, and one 105 mm Howitzer with 100 rd.
**COMMENTARY**
Gunship modified with gun systems, electronic and EO sensors, fire-control systems, enhanced navigation systems, sophisticated communications, defensive systems, in-flight refueling capability. These systems give the crew the capability to acquire and identify targets day or night, coordinate with ground forces and C2 agencies, and deliver precise firepower to back conventional and SOF missions. For operations in Afghanistan and Iraq, the AC-130 gunships work in conjunction with the MQ-1 Predator, the latter providing live video and target referencing information.
**Extant Variant(s)**
■ AC-130H Spectre. Serves with 27th Special Operations Wing, Cannon AFB. Equipped with digital fire-control computer, EO sensors, target-acquisition systems, including FLIR and LLLTV, and are capable of in-flight refueling. Fire-control computers, navigation, communications, and sensor suites are advanced. Planned modifications include a new ground mapping/weather radar, enhanced traffic alert and collision avoidance system (ETCAS), large aircraft IR countermeasures (LAIRCM), and expanded precision weapons capability. Originally AC-130E, converted to H standard after Vietnam War. Plans call for phased replacement with J models.
■ AC-130U Spooky. Serves with 1st SOW, Hurlburt Field. Conversions of earlier gunships. Thirteen conversions by Rockwell delivered to 4th SOS in 1994-95. Four remaining conversions done by Boeing in recent years. All weapons can be subordinated to the APQ-180 digital fire-control radar, FLIR, or all-light-level television (ALLTV) for adverse weather attack operations. Plans call for use of ETCAS, Link 16, advanced gunship multispectral sensor system (GMS2), and expanded precision weapons capability.


***AC-130U Spooky*** (SrA. Julianne Showalter)

**MC-130 Combat Talon**
**Brief:** A modified C-130 able to provide global, day, night, and adverse weather capability to air-drop personnel and to deliver personnel and equipment to support US and allied SOF.
**Function:** SOF infiltration, exfiltration, and resupply.
**Operator:** AETC, AFSOC, AFRC.
**First Flight:** circa 1965 MC-130E; June 1984 MC-130H.
**Delivered:** initially 1966.
**IOC:** 1966 MC-130E; June 1991 MC-130H.
**Production:** 22 new-build MC-130Hs.
**Inventory:** 12 MC-130E; 20 MC-130H.
**Aircraft Location:** Duke Field and Hurlburt Field, Fla.; Kadena AB, Japan; Kirtland AFB, N.M.; RAF Mildenhall, UK.
**Contractor:** Lockheed Martin (airframe), Boeing (integrated weapons system support).
**Power Plant:** four Allison T56-A-15 turboprops, each 4,910 shp.
**Accommodation:** MC-130E: crew of nine; 53 troops or 26 paratroops; MC-130H: crew of seven; 77 troops, 52 paratroops, or 57 litters.
**Dimensions:** span 132.7 ft, height 38.6 ft, length 100.8 ft (MC-130E), 99.8 ft (MC-130H).
**Weight:** empty 72,892 lb, gross 155,000 lb.
**Ceiling:** 33,000 ft (MC-130H).
**Performance:** max speed 300 mph (MC-130H), range 3,110 miles, unlimited with refueling.
**COMMENTARY**
Special operations mobility aircraft. Used primarily to conduct infiltration, resupply, and exfiltration of SOF. Capable of air drop using Joint Precision Airdrop System, landing on austere and unmarked landing zones. Can support psychological operations with leaflet bundle drops. Equipped with terrain-following/terrain-avoidance (TF/TA) radars, precision navigation systems using INS/GPS, and electronic and IR countermeasures for self-protection. All models capable of aerial refueling as a receiver and tanker. The 1st, 7th, 15th SOSs support SOF in Europe, Pacific, CONUS, respectively. The 58th SOS at Kirtland AFB is responsible for MC-130H mission qualification training. The 711th SOS (AFRC), Duke Field, flies MC-130E.
**Extant Variant(s)**
■ MC-130E Combat Talon I. Fourteen modified C-130E aircraft were equipped with a pod-based system to air refuel SOF helicopters and tilt-rotor aircraft. Plans call for replacement by MC-130J variants.
■ MC-130H Combat Talon II. C-130H aircraft modified with an integrated glass cockpit were acquired in the late 1980s and early 1990s to

supplement the Combat Talon Is. All are modified with a state-of-the-art pod-based aerial refueling system to augment the MC-130E and MC-130P aerial refueling fleet.

**MC-130 Combat Shadow**
**Brief:** Aircraft that flies clandestine or low-visibility, low-level missions into denied areas to provide air refueling for SOF helicopters or to air-drop small special operations teams, small bundles, and zodiac and combat rubber raiding craft.
**Function:** Air refueling for SOF helicopters and tilt-rotor aircraft and airdrop.
**Operator:** AETC, AFSOC, ANG, AFRC.
**First Flight:** Dec. 8, 1964 (as HC-130H).
**Delivered:** from 1965.
**IOC:** 1986.
**Production:** (converted).
**Inventory:** 27.
**Aircraft Location:** Eglin AFB, Fla.; Kadena AB, Japan; Kirtland AFB, N.M.; Moffett Field, Calif.; RAF Mildenhall, UK.
**Contractor:** Lockheed Martin (airframe), Boeing.
**Power Plant:** four Allison T56-A-15 turboprops, each 4,910 shp.
**Accommodation:** four flight crew, plus four mission crew.
**Dimensions:** span 132.6 ft, length 98.8 ft, height 38.5 ft.
**Weight:** gross 155,000 lb.
**Ceiling:** 33,000 ft.
**Performance:** speed 290 mph, range with max normal payload 1,208 miles, unlimited with air refueling.
**COMMENTARY**
Specialized tanker aircraft flies clandestine formation or single-ship intrusion of hostile territory missions to provide air refueling of SOF vertical-lift and tilt-rotor assets and the infiltration, exfiltration, and resupply of SOF by airdrop or air-land operations. Secondary capabilities include the ability to air-drop small teams, bundles, and rubber raiding craft. The aircraft are JPADS capable. Equipped with improved navigation, communications, threat detection, and countermeasures systems.
**Extant Variant(s)**
■ MC-130P Combat Shadow. Fully integrated INS/GPS and NVG-compatible interior and exterior lighting. FLIR, radar and missile warning receivers, chaff, flare dispensers, NVG-compatible HUD, satellite and data-burst communications, as well as in-flight refueling capability as a receiver. Will be modified with a cargo handling system to work with palletized cargo and heavy equipment.

**MC-130 Combat Spear**
**Brief:** Aircraft that flies clandestine or low-visibility, low-level missions into denied areas to provide air refueling for SOF helicopters and tilt-rotor aircraft or to air-drop small special operations teams, small bundles, and zodiac and combat rubber raiding craft.
**Function:** Air refueling for SOF helicopter and tilt-rotor aircraft and airdrop.
**Operator:** AFSOC.
**First Flight:** Dec. 8, 1964 (as HC-130H).
**Delivered:** June 2006.
**IOC:** 2007.
**Production:** 12 (converted).
**Inventory:** 12.
**Aircraft Location:** Cannon AFB, N.M.
**Contractor:** Boeing.
**Power Plant:** four Allison T56-A-15 turboprops, each 4,910 shp.
**Accommodation:** four flight crew, plus three mission crew.
**Dimensions:** span 132.6 ft, length 98.8 ft, height 38.5 ft.
**Weight:** gross 155,000 lb.
**Ceiling:** 33,000 ft.
**Performance:** speed 300 mph, range with max normal payload 1,208 miles, unlimited with air refueling.
**COMMENTARY**
A C-130H(2) significantly modified to include an EW capability, low-light-level operational capability, and a strengthened tail to permit high-speed, low-level air-drop operations.

***MC-130H** Combat Talon II* (SSgt. Samuel Morse)

**Extant Variant(s)**
■ MC-130W Combat Spear. Equipped with technically advanced refueling pods, providing the ability to refuel SOF helicopters and tilt-rotor aircraft. It also is capable of supporting limited C2 operations. Can be air refueled to extend its mission range. Select MC-130Ws will be modified to MC-130W Dragon Spear configuration with a precision strike package to support battlefield overwatch missions.

**V-22 Osprey**
**Brief:** A long-range, tilt-rotor, multimission transport aircraft designed to have the maneuverability and lift capability of a helicopter and the speed and range of a fixed wing aircraft. It can operate in adverse weather and restricted visibility.
**Function:** Multimission airlift.
**Operator:** AETC, AFSOC.
**First Flight:** March 19, 1989 (V-22).
**Delivered:** 2006.
**IOC:** 2009.
**Production:** 50 (planned).
**Inventory:** 16.
**Aircraft Location:** Hurlburt Field, Fla.; Kirtland AFB, N.M.
**Contractor:** Bell Boeing, Raytheon.
**Power Plant:** two Rolls Royce-Allison AE1107C turboshafts, each 6,200 shp.
**Accommodation:** four (two pilots, two flight engineers); additional pilot for extended duration missions; up to 18 troops or 8,000 lb internal cargo.
**Dimensions:** proprotor diameter 38 ft, width, rotors turning 84.6 ft, fuselage length 57.3 ft, height 22 ft.
**Weight:** gross weight 34,900 lb, max VTO 52,870 lb; STO 57,000 lb, self-deploy T-O 60,500 lb.
**Ceiling:** 25,000 ft.
**Performance:** typically will carry troops or cargo over a 500-mile combat radius at 265 mph. Self-deployment range with one air refueling 2,417 miles.
**COMMENTARY**
Multiengine, dual-piloted, self-deployable, medium-lift vertical takeoff and landing (VTOL) tilt-rotor aircraft, operated by both the US Air Force and US Marine Corps. Air Force's first operational squadron, 8th SOS at Hurlburt Field, Fla., received first aircraft in January 2007. First operational deployment, to Africa, took place in November 2008; first combat deployment, to Iraq, in summer 2009.
**Extant Variant(s)**
■ CV-22B. Air Force's variant of the V-22 Osprey. Operates with forces of US Special Operations Command. Mission is long-range clandestine penetration of denied areas in adverse weather and low visibility to infiltrate, exfiltrate, resupply SOF. Optimized for special missions, including in nuclear, biological, and chemical (NBC) warfare conditions. Designed to operate from land bases, austere forward operating locations, and air capable ships without reconfiguration or modification. In-flight refueling extends combat mission range. Equipped with fully integrated precision navigation suite, a digital cockpit management system,

***CV-22 Osprey*** (SSgt. Michael B. Keller)

FLIR, integrated NVG HUD, TF/TA radar, digital map system. Has robust self-defense avionics and secure anti-jam communications.

## ISR/BM/C3 Aircraft

**E-3 Sentry**
**Brief:** Heavily modified Boeing 707-320B aircraft, fitted with an extensive complement of mission avionics providing all-weather air surveillance and command, control, and communications for tactical and air defense forces.
**Function:** Airborne early warning, tactical battle management (BM), and C2 of theater air forces.
**Operator:** ACC, PACAF, AFRC.
**First Flight:** Oct. 31, 1975 (full avionics).
**Delivered:** March 1977-84.
**IOC:** 1977.
**Production:** 33.
**Inventory:** 22 E-3B; nine E-3C.
**Aircraft Location:** JB Elmendorf-Richardson, Alaska; Kadena AB, Japan; Tinker AFB, Okla.
**Contractor:** Boeing, Northrop Grumman (radar), Lockheed Martin (computer).
**Power Plant:** four Pratt & Whitney TF33-PW-100/100A turbofans, each 21,000 lb thrust.
**Accommodation:** flight crew of four, 13-19 mission specialists.
**Dimensions:** span 145.8 ft, length 152.9 ft, height 41.5 ft.
**Weight:** gross 347,000 lb.
**Ceiling:** 38,000 ft.
**Performance:** optimum cruise 370 mph, endurance eight hr unrefueled.
**COMMENTARY**
BM aircraft capable of conducting surveillance from Earth's surface to the stratosphere, over land or water, at a range of more than 200 miles. Coordinates actions of hundreds of strike, support, and cargo aircraft. Integrates C2, BM, surveillance, target detection, and tracking in one platform. Operates in direct subordination to joint or combined air operations center. Employed either alone or together with other C2BM and ISR elements. Allows theater forces to find, fix, track, target airborne or maritime threats and locate emitters.
**Extant Variant(s)**
■ E-3B. Upgrade of earliest E-3As. Equipped with much-enhanced computer capabilities, jam-resistant communications, austere maritime surveillance capability, upgraded radio communications, and five additional display consoles.
■ E-3C. Upgrade to US/NATO Standard E-3A aircraft. Equipped with additional radio, console, and radar capabilities. Delivery began 1984. Block 40/45 upgrade is a major initiative for all AWACS aircraft, significantly enhancing the Air Force's air C2BM capabilities for the 21st century battlefield. It provides increased mission effectiveness for AWACS operators, improved reliability of the mission system, and lower life-cycle costs.

**E-4 National Airborne Operations Center**
**Brief:** A four-engine, swept-wing, long-range high-altitude airplane providing a highly survivable command, control, and communications (C3) center allowing national leaders to direct US forces, execute emergency war orders, and coordinate actions by civil authorities.
**Function:** Airborne operations center.
**Operator:** ACC.
**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 E-Systems.
**Power Plant:** four General Electric CF6-50E2 turbofans, each 52,500 lb thrust.
**Accommodation:** up to 112 crew and passengers.
**Dimensions:** span 195.7 ft, length 231.3 ft, height 63.4 ft.
**Weight:** gross 800,000 lb.
**Ceiling:** above 40,000 ft.
**Performance:** 6,900+ miles, unrefueled endurance in excess of 12 hr, with aerial refueling up to 72 hr.
**COMMENTARY**
Militarized version of the Boeing 747-200. Performs the National Airborne Operations Center mission. Provides survivable C3 platform in all situations, including sustained operations in a nuclear environment. First operational mission flown in March 1980.
**Extant Variant(s)**
■ E-4B. Hardened against the effects of nuclear explosions, including electromagnetic pulse (EMP). In-flight refueling capability. A 1,200-kVA electrical system supports advanced system electronics as well as state-of-the-art communications and data processing equipment such as EHF Milstar satellite terminals and six-channel International Maritime Satellite. A triband radome houses SHF communications antenna. Modernization Block 1 upgrade updates the electronic infrastructure and increases the bandwidth of external communications and onboard data transfer. Three have received MB 1 upgrade, with another to be completed in 2012.


***E-3** AWACS* (Jim Dunn)

**E-8 Joint STARS**
**Brief:** A modified Boeing 707-300 series equipped with a large canoe-shaped radome mounted under the forward part of the fuselage, housing long-range air-to-ground radar capable of locating, classifying, and tracking vehicles moving on Earth's surface out to distances in excess of 124 miles.
**Function:** Ground surveillance, BM, C2 aircraft.
**Operator:** ACC and ANG.
**First Flight:** December 1988.
**Delivered:** May 1996-2005.
**IOC:** Dec. 18, 1997.
**Production:** 18.
**Inventory:** 18.
**Aircraft Location:** Robins AFB, Ga.
**Contractor:** Northrop Grumman, Motorola, Cubic, Raytheon.
**Power Plant:** four Pratt & Whitney TF33-102C turbojets, each 19,200 lb thrust.
**Accommodation:** mission crew of 21 Air Force/Army operators (can be augmented to 34).
**Dimensions:** span 145.8 ft, length 152.9 ft, height 42.5 ft.
**Weight:** gross 336,000 lb.
**Ceiling:** 42,000 ft.
**Performance:** max operating speed Mach 0.84, endurance with one in-flight refueling 20 hr.
**COMMENTARY**
Aircraft equipped with a 24-ft-long side-looking phased air-to-ground radar capable of locating, classifying, and tracking vehicles moving on Earth's surface. Data is transmitted via data link to ground stations or other aircraft. Provides theater ground and air commanders with surveillance data to support attack operations. Evolved from Army and Air Force programs to develop capability to detect, locate, and attack enemy armor at ranges beyond the forward area of troops. The first two developmental aircraft deployed in 1991 to Desert Storm. Supported Joint Endeavor in 1995 and Allied Force in 1999. Continues to fly in support of US operations in Iraq and Afghanistan.
**Extant Variant(s)**
■ E-8C. Production version, based on commercial 707-300 airframes. Equipped with 18 operations and control consoles, two of which double as communications stations. All the aircraft have been modified to Block 20, featuring more powerful computers and an Internet protocol local area network and beyond-line-of-sight connectivity. First E-8C operational in 1996. Expected to remain in service until 2034. Re-engining with improved Pratt & Whitney JT8D turbojets is under way.

**EC-130 Commando Solo**
**Brief:** A heavily modified C-130 used for psychological warfare broadcasts and information operations.
**Function:** Psychological warfare.
**Operator:** ANG.
**First Flight:** January 1980.
**Delivered:** March 1980 (J model from 2003).
**IOC:** December 1980.
**Production:** no new-build EC-130E, seven EC-130J.
**Inventory:** three J model.
**Aircraft Location:** Harrisburg Arpt., Pa.
**Contractor:** Lockheed Martin, Raytheon, General Dynamics.
**Power Plant:** four Rolls Royce-Allison AE2100D turboprops, each 6,000 shp.
**Accommodation:** three flight crew, six mission crew.
**Dimensions:** span 132.6 ft, length 97.8 ft, height 38.9 ft.

***EC-130J** Commando Solo II* (SSgt. Tia Schroeder)

**Weight:** gross 175,000 lb.
**Ceiling:** 28,000 ft.
**Performance:** speed 393 mph, range 4,140 miles.
**COMMENTARY**
A psychological operations aircraft employed in every US war and most other contingency operations since 1980, supporting a broad spectrum of information operations and psyops missions.
**Extant Variant(s)**
■ EC-130J. Known as Commando Solo II. Used by ANG as a broadcasting station for psychological warfare operations. Specialized modifications included enhanced navigation systems, self-protection equipment, and worldwide color television configuration, air refueling. Entered service in 2004 with the 193rd SOW.

**EC-130 Compass Call**
**Brief:** A heavily modified C-130 for electronic combat.
**Function:** Electronic warfare.
**Operator:** ACC.
**First Flight:** 1981.
**Delivered:** 1982.
**IOC:** 1983; Block 30 from February 1999.
**Production:** (converted).
**Inventory:** 14.
**Aircraft Location:** Davis-Monthan AFB, Ariz.
**Contractor:** Lockheed Martin.
**Power Plant:** four Allison T56-A-15 turboprops, each 4,910 shp.
**Accommodation:** standard crew 13, incl nine mission.
**Dimensions:** span 132.6 ft, length 99 ft, height 38 ft.
**Weight:** 155,000 lb.
**Ceiling:** 25,000 ft.
**Performance:** speed 300 mph at 20,000 ft.
**COMMENTARY**
Aircraft designed to disrupt enemy C2 communications and limit adversary coordination essential for enemy force management.
**Extant Variant(s)**
■ EC-130H. Modifications include electronic attack (EA) system and air refueling capability. Programmed upgrades will expand the EC-130H's mission by procuring a secondary EA capability against early warning and acquisition radars.

**MC-12 Project Liberty**
**Brief:** A manned intelligence-surveillance-reconnaissance (ISR) version of the C-12, based on the Beechcraft King Air 350/350ER, providing near-real-time ISR to ground forces in Iraq and Afghanistan.
**Function:** Manned tactical ISR.
**Operator:** ACC, ANG.
**First Flight:** April 2009.
**Delivered:** April 2009.
**IOC:** May 2009.
**Production:** 42 (planned).
**Inventory:** 37.
**Aircraft Location:** Key Field, Miss. (initial weapon system training); one Expeditionary Reconnaissance Squadron (ERS) at JB Balad, Iraq; two ERSs at Bagram Airfield and Kandahar Airfield, Afghanistan. Other TBD.
**Contractor:** Hawker Beechcraft.
**Power Plant:** two Pratt & Whitney Canada PT6A-60A turboprops, each 1,050 shp.
**Accommodation:** two pilots and two sensor operators.
**Dimensions:** span 58 ft, length 46.7 ft, height 14.3 ft.
**Weight:** (King Air 350) gross 15,000 lb.
**Ceiling:** (King Air 350) 35,000 ft.
**Performance:** endurance: King Air 350 six hrs, King Air 350 ER 7.5 hrs.
**COMMENTARY**
A modified sensor-equipped version of the Beechcraft King Air 350/350ER-based C-12. Acquired by USAF to augment existing overhead ISR assets operating in Iraq and Afghanistan, providing ground forces with high-value targeting data and other tactical intelligence.
**Extant Variant(s)**
■ MC-12W. Modification includes full-motion video and Sigint capabilities, data links to ground forces, a state-of-the-art countermeasures system, and a Blue Force tracker. First seven aircraft are used King Air 350s; the remainder are based on the King Air 350 Extended-Range model. The MC-12W began operations in Iraq in June 2009 and in Afghanistan in December 2009.

***MC-12** Project Liberty* (SrA. Tiffany Trojca)

**MQ-1 Predator**
**Brief:** A medium-altitude, long-endurance unmanned aerial vehicle (UAV), flown remotely, providing joint force commanders with a multimission asset, by combining imagery sensors with strike capability.
**Function:** Armed reconnaissance, airborne surveillance, target acquisition.
**Operator:** ACC, AFSOC, ANG, AFRC.
**First Flight:** July 1994.
**Delivered:** July 1994 (USAF from 1996)-2011.
**IOC:** 2005.
**Production:** 186 air vehicles (objective force).
**Inventory:** 174.
**Ground Control Station (GCS) Locations:** Cannon AFB, N.M.; Creech AFB, Nev.; Davis-Monthan AFB, Ariz.; Ellington Field, Tex.; Hector Arpt., N.D.; Holloman AFB, N.M.; March ARB, Calif.; Nellis AFB, Nev. Planned: Whiteman AFB, Mo.
**Aircraft Location:** Cannon AFB, N.M.; Creech AFB, Nev.; Holloman AFB, N.M.; March ARB, Calif. Planned: Grand Forks AFB, N.D.; Fort Huachuca, Ariz.
**Contractor:** General Atomics Aeronautical Systems.
**Power Plant:** one Rotax 914F turbocharged engine.
**Accommodation:** two in GCS (pilot, sensor operator).
**Dimensions:** (Block 5/10/15) length 27 ft, height 6.9 ft, span (Block 5) 48.7 ft, (Block 10/15) 55.2 ft.
**Weight:** empty 950 lb, gross 2,250 lb.
**Ceiling:** 25,000 ft.
**Performance:** Max speed 135 mph, cruise speed 80 mph, endurance 24 hr (460 miles with 16 hr on station).
**Armament:** Two Hellfire missiles.
**COMMENTARY**
Fully operational system comprises four air vehicles, GCS, satellite link, and about 55 personnel for 24-hour operations. Aircrew comprises a pilot and sensor operator. Became a fully USAF system in 1996. Deployed over Bosnia and Iraq in 1999. Weapons capability was developed in response to experience in the Balkans. Systems since 2002 armed with Hellfire missiles, used frequently in Afghanistan and Iraq. RQ-1 designation changed to MQ-1 to denote multimission capability. USAF forward deploys launch and recovery systems and support personnel for takeoff and landing operations, while the CONUS-based GCS conducts the mission via extended communication links.
**Extant Variant(s)**
■ MQ-1B. Multimission weaponized Predator A. Carries Raytheon AN/AAS-52 Multispectral Targeting System sensor. MTS-A provides a laser target designator with EO/IR sensors in a single package. Can be controlled via direct line of sight or via satellite from a remote location. Scheduled to receive new airborne signals intelligence (Sigint) sensor payload, now under development.

**MQ-9 Reaper**
**Brief:** A medium-to-high altitude, long-endurance remotely piloted UAV. Joint force commander multimission asset as a persistent hunter-killer against emerging targets.
**Function:** Unmanned attack and ISR aircraft.
**Operator:** ACC, AFSOC, ANG.
**First Flight:** February 2001.
**Delivered:** November 2003.
**IOC:** October 2007.
**Production:** 319 (planned).
**Inventory:** 54.
**GCS Location:** Cannon AFB, N.M.; Creech AFB, Nev.; Holloman AFB, N.M.; Hancock Field, N.Y. Planned: Ellsworth AFB, S.D.
**Aircraft Location:** Cannon AFB, N.M.; Creech AFB, Nev.; Holloman AFB, N.M. Planned: Fort Drum, N.Y.
**Contractor:** General Atomics Aeronautical Systems.
**Power Plant:** one Honeywell TPE-331-10GDT turboprop engine.
**Accommodation:** two in GCS (pilot, sensor operator).
**Dimensions:** length 36.2 ft, span 66 ft.
**Weight:** empty 4,900 lb, gross 10,500 lb.
**Ceiling:** 30,000+ ft.
**Performance:** cruise speed 230 mph, endurance 14+ hours.
**Armament:** combination of AGM-114 Hellfire missiles, GBU-12/38 JDAM, and GBU-49 Paveway II.
**COMMENTARY**
System comprises several aircraft, GCS, communications equipment/links, spares, and active duty and/or contractor personnel. Aircrew comprises pilot and sensor operator. Delivers capabilities using mission kits that may contain various weapons and sensors payload combinations.
**Extant Variant(s)**
■ MQ-9B Reaper. Operational in Afghanistan since 2007. Sensor suite for targeting includes a color/monochrome daylight TV, IR image-intensified

***MQ-9** Reaper (Jim Haseltine)*

***RC-135** Rivet Joint (MSgt. Scott Wagers)*

TV with laser range finder designator to precisely designate targets for laser guided munitions. SAR enables GBU-38 JDAM targeting. Sensor capable of fine resolution in both spotlight and strip modes. SAR also has ground moving target indicator capability. Airborne surveillance capability being significantly increased with the introduction of the Gorgon Stare system.

**OC-135 Open Skies**
**Brief:** A modified C-135 aircraft that performs unarmed observation and verification flights over nations that are parties to the 1992 Open Skies Treaty.
**Function:** Observation aircraft.
**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 turbofans, each 16,050 lb thrust.
**Accommodation:** seating for 35, incl cockpit crew, aircraft maintenance crew, foreign representatives, and crew members from the Defense Threat Reduction Agency.
**Dimensions:** span 131 ft, length 135 ft, height 42 ft.
**Weight:** gross 297,000 lb.
**Ceiling:** 50,000 ft (basic C-135).
**Performance:** speed: 500+ mph, unrefueled range 3,900 miles.
**COMMENTARY**
Used for specialized arms control treaty observation and imagery collection missions with framing and panoramic optical cameras installed in the rear of the aircraft.
**Extant Variant(s)**
■ OC-135B. One vertical and two oblique KS-87E framing cameras, used for photography approximately 5,000 ft above the ground, and one KA-91C panoramic camera, which pans from side to side to provide a wide sweep for each picture, used for high-altitude photography up to approximately 35,000 ft. Data is processed and recorded by a recording and annotation system.

**RC-26 Condor**
**Brief:** Specially configured variant of the Fairchild SA227-DC C-26 Metro 23 with surveillance and communications equipment for use primarily in domestic and overseas counterdrug efforts but also increasingly for reconnaissance following natural and man-made disasters.
**Function:** Counterdrug-airborne day/night surveillance and C2.
**Operator:** ANG.
**First Flight:** 1990.
**Delivered:** C-26 first delivered 1989.
**IOC:** not available.
**Production:** 11.
**Inventory:** 11.
**Aircraft Location:** CONUS, various sites.
**Contractor:** Fairchild (airframe).
**Power Plant:** two Garrett TPE331-12UAR-701 turboprops, each 1,100 shp.
**Accommodation:** flight crew of three: two pilots and one navigator-mission systems operator; room for up to three law enforcement agents.
**Dimensions:** span 57 ft, length 59.5 ft, height 16.8 ft.
**Weight:** max gross T-O 16,500 lb.
**Ceiling:** 25,000 ft.
**Performance:** speed 334 mph, range 2,070 miles.
**COMMENTARY**
Militarized ISR platform used primarily in counterdrug operations but also during natural disasters such as hurricanes and wildfires. Provides real-time streaming video footage to ground personnel handling an emergency. Deployed to support war efforts abroad for US Central Command and US Southern Command.
**Extant Variant(s)**
■ RC-26B. Specialized equipment includes state-of-the-art digital aerial cameras and an IR video camera. An extensive communications suite allows communications from 29 to 960 MHz, including provisions for plugging in 800 MHz handheld radios, and air phone capabilities.

**RC-135 Cobra Ball, Combat Sent, Rivet Joint**
**Brief:** Specially configured variant of the Boeing C-135 Stratolifter, some variants having an elongated nose and cheeks and all containing highly advanced electronic signal collection systems. Used to acquire real-time electronic and signals intelligence data for theater and tactical commanders. Following data refers specifically to Rivet Joint variant.
**Function:** Electronic reconnaissance aircraft.
**Operator:** ACC.
**First Flight:** not available.
**Delivered:** circa 1973-99. Continuous equipment updates.
**IOC:** circa 1973.
**Production:** converted.
**Inventory:** three Cobra Ball, two Combat Sent, 17 Rivet Joint, three trainers.
**Aircraft Location:** Offutt AFB, Neb.; Kadena AB, Japan; RAF Mildenhall, UK.
**Contractor:** Boeing (airframe), L3 Communications, Textron.
**Power Plant:** four CFM International F-108-CF-201 turbofans, each 24,000 lb thrust.
**Accommodation:** flight crew of three, 14-35 mission crew.
**Dimensions:** span 131 ft, length 140 ft, height 42 ft.
**Weight:** empty gross weight 172,000 lb, max gross weight 297,000 lb.
**Ceiling:** 45,000 ft.
**Performance:** speed 500+ mph, range, with air refueling, unlimited.
**COMMENTARY**
Highly specialized fleet operated by 55th Wing at Offutt AFB, Neb. Performs worldwide reconnaissance missions.
**Extant Variant(s)**
■ RC-135S Cobra Ball. Collects measurement and signature intelligence data, providing the capability to monitor missile-associated activity. Cobra Ball can deploy anywhere in the world in 24 hours and provide on-scene EO reconnaissance for treaty verification and theater ballistic missile proliferation. Equipment includes wide-area IR sensors, long-range optical cameras, and an advanced communications suite.
■ RC-135U Combat Sent. Uses special Sigint suite to collect scientific and technical electronic intelligence (Elint) data against air-, land-, and sea-based emitter systems. Critical to effective design, programming, and reprogramming of radar warning receivers as well as jammers, decoys, and anti-radiation missiles and to the development of effective threat simulators.
■ RC-135V/W Rivet Joint. A self-contained standoff airborne Sigint collection system. Used mostly to exploit electronic battlefield 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.
■ TC-135S/W. Used for training purposes.

**RQ-4 Global Hawk**
**Brief:** A high-altitude, long-range, long-endurance UAV.
**Function:** Unmanned surveillance and reconnaissance aircraft.
**Operator:** ACC.
**First Flight:** Feb. 28, 1998.
**Delivered:** from 1995 (ACTD versions)-present.
**IOC:** November 2001 (ACTD system in Afghanistan.)
**Production:** 66 (planned): seven Block 10, six Block 20, 42 Block 30, and 11 Block 40.
**Inventory:** 25.
**Aircraft Location:** Beale AFB, Calif.; Grand Forks AFB, N.D.; Andersen AFB, Guam. Planned: two other forward operating bases.


***RQ-4** Global Hawk* (Northrop Grumman)

**Contractor:** Northrop Grumman (prime), Raytheon.
**Power Plant:** one Rolls Royce-North American AE 3007H turbofan, 7,600 lb thrust.
**Accommodation:** one launch and recovery element (LRE) pilot, one mission control element (MCE) pilot, one MCE sensor operator.
**Dimensions:** Block 10 (RQ-4A) length 44.4 ft, height 15.2 ft, span 116.2 ft; Block 20/30/40 (RQ-4B) length 47.6 ft, span 130.9 ft.
**Weight:** RQ-4A gross 26,750 lb, RQ-4B 32,500 lb.
**Ceiling:** RQ-4A 60,000+ ft, RQ-4B up to 60,000 ft.
**Performance:** max endurance 35 hr. RQ-4A cruise speed 391 mph. RQ-4B cruise speed 356 mph.
**Armament:** none.
**COMMENTARY**
Provides high-altitude, persistent remotely piloted ISR capability. The system consists of an aircraft with an integrated sensor suite, LRE, MCE, and communications and mission planning equipment. Fielded in four distinctive blocks.
**Extant Variant(s)**
■ Block 10. An imagery intelligence configuration (EO/IR/SAR) and basically a derivative of the ACTD aircraft successfully employed in Afghanistan and Iraq. Block 10s are currently performing operational missions supporting overseas contingency operations.
■ Block 20 (Imint). A larger system, adding an enhanced integrated sensor suite (EISS) in an Imint-only configuration; two are forward deployed supporting training, development testing, or joint urgent operational needs for the battlefield airborne communications node (BACN), a theater communications relay system employed in place of the EISS.
■ Block 30 (Multi-int). Employs the EISS ground target sensors and the advanced signals intelligence program (ASIP) electronic signal collection sensor to provide a Multi-int capability. Fielding of Multi-int systems planned to start in 2011 to replace Block 10s.
■ Block 40. A multimission platform expected to provide SAR/MTI, Imint, and BMC2 support, utilizing the multiplatform radar technology insertion program (MP-RTIP) sensor to simultaneously collect imagery intelligence on stationary ground targets and track ground moving targets. Integrated Block 40 aircraft and MP-RTIP sensor flight testing slated to begin in spring 2011.

**U-2 Dragon Lady**
**Brief:** Single-seat, single-engine, high-altitude endurance reconnaissance aircraft carrying a wide variety of sensors and cameras, providing continuous day or night, high-altitude, all-weather area surveillance in direct support of US forces.
**Function:** High-altitude reconnaissance.
**Operator:** ACC.
**First Flight:** Aug. 4, 1955 (U-2), 1967 (U-2R), October 1994 (U-2S).
**Delivered:** 1955-October 1989.
**IOC:** circa 1956.
**Production:** 35 (U-2S/ST).
**Inventory:** 27 U-2; five trainers.
**Aircraft Location:** Beale AFB, Calif.
**Contractor:** Lockheed Martin.
**Power Plant:** F118-GE-101 turbojet.
**Accommodation:** one (two for trainer).
**Dimensions:** span 103 ft, length 63 ft, height 16 ft.
**Weight:** gross 40,000 lb.
**Ceiling:** above 70,000 ft.
**Performance:** max speed 475 mph, max range 4,500+ miles, max endurance 10+ hr.
**COMMENTARY**
The U-2 is the Air Force's premier high-altitude reconnaissance platform, capable of carrying Multi-int sensors simultaneously, currently making it USAF's only truly operational Multi-int platform, pending the introduction of later-block RQ-4 UAVs. Although the U-2 was designed initially in the 1950s, current aircraft were produced primarily in the 1980s, when the production line was reopened to produce the TR-1, a significantly larger and more capable version than the earlier aircraft. Deliveries ended in October 1989. Conversion to S model configuration began in October 1994.
**Extant Variant(s)**
■ U-2S. A single-seat aircraft. Each current operational U-2 is in Block 20 configuration, featuring a new glass cockpit using multifunction displays, a digital autopilot, a new EW system, and new data links. Sensor upgrades include the ASARS-2A SAR sensor; SYERS-2A EO imagery system (providing multispectral and IR capability); and enhanced RF-intelligence capability. Optical bar camera is also still in use, providing broad-area synoptic imagery coverage.
■ TU-2ST. A two-seat trainer aircraft.

***U-2** Dragon Lady* (Lockheed Martin)

**WC-130 Hercules**
**Brief:** A high-wing, medium-range aircraft flown by AFRC for weather reconnaissance missions. It flies into the eye of tropical cyclones or hurricanes, collecting weather data from within the storm's environment. Following data refers specifically to WC-130J.
**Function:** Weather reconnaissance aircraft.
**Operator:** AFRC.
**First Flight:** circa 1959.
**Delivered:** October 1999-2002.
**IOC:** 1959.
**Production:** no new-build WC-130H; 10 (WC-130J).
**Inventory:** 10 WC-130H; 10 WC-130J.
**Aircraft Location:** Keesler AFB, Miss.
**Contractor:** Lockheed Martin.
**Power Plant:** four Rolls Royce AE2100D3 turboprops, each 4,500 shp.
**Accommodation:** six.
**Dimensions:** span 132.6 ft, length 97.8 ft, height 38.9 ft.
**Weight:** gross 175,000 lb.
**Ceiling:** 30,500 ft.
**Performance:** speed 374 mph at 20,000 ft.
**COMMENTARY**
Flown by AFRC's "Hurricane Hunters." The hurricane reconnaissance area includes the Atlantic Ocean, Caribbean Sea, Gulf of Mexico, and central Pacific Ocean areas.
**Extant Variant(s)**
■ WC-130H. Later version C-130s modified for weather reconnaissance duties, equipped with two external 1,400-gallon fuel tanks, an internal 1,800-gallon fuel tank, and uprated Allison T56-A-15 turboprops, each 4,910 shp. The 10 WC-130H aircraft still counted in the inventory have been recycled for other operational uses.
■ WC-130J. Weather reconnaissance version of the most recent C-130 model, operated by the 53rd WRS for weather reconnaissance duties, including penetration of tropical storms, to obtain data for forecasting storm movements. Features include improved radar, four Rolls Royce AE2100D3 turboprops, and Dowty 391 six-bladed composite propellers.

**WC-135 Constant Phoenix**
**Brief:** Atmospheric collection aircraft that supports national authorities by collecting particulate and gaseous effluents and debris in the atmosphere in support of the 1963 Limited Nuclear Test Ban Treaty.
**Function:** Air sampling and air collection operations in support of Limited Test Ban Treaty.
**Operator:** ACC.
**First Flight:** 1965
**Delivered:** 1965-96.
**IOC:** December 1965.
**Production:** 10, plus one converted EC-135C Looking Glass.
**Inventory:** two.
**Aircraft Location:** Offutt AFB, Neb.
**Contractor:** Boeing.
**Power Plant:** four Pratt & Whitney TF33-P-9 turbofans, each 16,050 lb thrust.
**Accommodation:** seating for 33, incl cockpit crew.
**Dimensions:** span 131 ft, length 135 ft, height 42 ft.
**Weight:** gross 300,500 lb.
**Ceiling:** 50,000 ft,
**Performance:** speed: 500+ mph, unrefueled range 3,900 miles.
**COMMENTARY**
Program commissioned by Gen. Dwight D. Eisenhower on Sept. 16, 1947, using modified B-29 aircraft. WB-29 flying between Alaska and Japan detected nuclear debris from Russia's first atomic test. Today, highly specialized fleet operated by 55th Wing at Offutt AFB, Neb.
**Extant Variant(s)**
■ WC-135C. Tail number 62-3582 is an extensively modified former EC-135C Looking Glass aircraft. Cockpit crew comes from 45th RS at Offutt, and special equipment operators are assigned to Det. 1, Air Force Technical Applications Center at Offutt.
■ WC-135W. Tail No. 61-2667 is a modified C-135B. Collection suite allows mission crew to detect radioactive "clouds" in real time. The aircraft is equipped with external flow-through devices to collect particulates on filter paper and a compressor system for whole air samples

collected in holding spheres. Cockpit crew comes from 45th RS at Offutt, and special equipment operators are assigned to Det. 1, AFTAC at Offutt.

# Tanker Aircraft

**HC-130 King**
**Brief:** An extended-range, combat search and rescue (CSAR)-configured C-130 that extends the range of rescue helicopters through in-flight refueling and performs tactical delivery of para-rescue jumper (PJ) specialists and/or equipment in hostile environments.
**Function:** Aerial refueling/transport.
**Operator:** ACC, AETC, ANG, AFRC.
**First Flight:** Dec. 8, 1964 (as HC-130H).
**Delivered:** from 1965.
**IOC:** 1986.
**Production:** 33 coverted N/P models, 11 planned J models.
**Inventory:** two HC-130J; 10 HC-130N; 23 HC-130P.
**Aircraft Location:** Davis-Monthan AFB, Ariz.; Francis S. Gabreski Arpt., N.Y.; Kirtland AFB, N.M.; JB Elmendorf-Richardson, Alaska; Moody AFB, Ga.; Patrick AFB, Fla.
**Contractor:** Lockheed Martin.
**Power Plant:** N/P version: four Allison T56-A-15 turboprops, each 4,910 shp.
**Accommodation:** four flight crew, plus mission crew.
**Dimensions:** N/P version: span 132.6 ft, length 98.8 ft, height 38.5 ft.
**Weight:** N/P version: gross 155,000 lb.
**Ceiling:** N/P version: 33,000 ft.
**Performance:** N/P version: speed 289 mph, range more than 4,000 miles.
**COMMENTARY**
Conducts extended visual/electronic searches over land or water. A three-man PJ team, trained in emergency trauma medicine, harsh environment survival, and assisted evasion, can be part of the crew complement when needed. Equipped with an integrated GPS/INS navigation package, radar/missile warning receivers, and chaff/flare countermeasures dispensers. Some aircraft have FLIR systems installed, and some are outfitted with personnel locating systems compatible with aircrew survival radios. Additional modifications include an improved digital low-power color radar, integrated satellite communications radio, NVG-compatible interior/exterior lighting, and cockpit armor.
**Extant Variant(s)**
■ HC-130N. H model modified with E model radome and new center wing section and modified to refuel helicopters aerially.
■ HC-130P. H model modified to refuel helicopters aerially.
■ HC-130J. Modified version of USMC KC-130J ordered to replace ACC HC-130s. IOC expected 2012.

**KC-10 Extender**
**Brief:** A modified McDonnell Douglas DC-10 that combines in a single aircraft the operations of aerial refueling and long-range cargo and aeromedical evacuation transport.
**Function:** Aerial refueling/transport.
**Operator:** AMC, AFRC (assoc.).
**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 of four, additional seating possible for up to 75 persons with 17 pallets, max 27 pallets, max cargo payload 169,409 lb.
**Dimensions:** span 165.4 ft, length 181.6 ft, height 58.1 ft.
**Weight:** gross 593,000 lb.
**Ceiling:** 42,000 ft.
**Performance:** cruising speed Mach 0.825, range with max cargo 4,400 miles.

***KC-10** Extender* (Clive Bennett)

**COMMENTARY**
USAF's largest air-refueling aircraft. Combines tasks of tanker and cargo aircraft simultaneously, enabling it to support worldwide fighter deployments. Employs an advanced aerial refueling boom or a hose and drogue system to refuel a wide variety of US and allied aircraft. Can be air refueled by a KC-135 or another KC-10, increasing its range and diminishing the need for forward bases.
**Extant Variant(s)**
■ KC-10A. DC-10 Series 30CF, modified to include fuselage fuel cells, an air refueling operator's station, aerial refueling boom and integral hose reel/drogue unit, a receiver refueling receptacle, and military avionics. Equipped with wing-mounted pods to enhance capabilities. Has communications, navigation, and surveillance equipment to meet civil air traffic requirements.

**KC-135 Stratotanker**
**Brief:** A medium-range tanker aircraft, meeting the air refueling needs of USAF bomber, fighter, cargo, and reconnaissance forces, as well as any USN, USMC, and allied aircraft; also provides aeromedical evacuation transport.
**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:** 363 KC-135R; 54 KC-135T.
**Aircraft Location:** Altus AFB, Okla.; Fairchild AFB, Wash.; Grissom ARB, Ind.; JB Andrews-NAF Washington, 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, Arizona, Illinois, Iowa, Kansas, Maine, Michigan, Mississippi, New Hampshire, Nebraska, New Jersey, Ohio, Oklahoma, Pennsylvania, Tennessee, Utah, Washington, Wisconsin.
**Contractor:** Boeing.
**Power Plant:** 4 CFM International CFM-56 turbofan engines.
**Accommodation:** crew of four, up to 80 passengers.
**Dimensions:** span 130.8 ft, length 136.2 ft, height 41.7 ft.
**Weight:** empty 119,231 lb, gross 322,500 lb.
**Ceiling:** 50,000 ft.
**Performance:** max speed 530 mph, range with max fuel 11,015 miles.
**COMMENTARY**
Mainstay of the USAF tanker fleet, similar in size and appearance to commercial 707 aircraft but designed to military specifications. Fuel tanks located in "wet wings" and fuel tanks below the floor in the fuselage.
**Extant Variant(s)**
■ KC-135R. Re-engined KC-135As with CFM turbofan engines. Can operate from relatively short runways. First flight October 1982; deliveries starting July 1984. Eight aircraft air refuelable. Twenty have wing-mounted refueling pods for enhanced refueling of US Navy and NATO aircraft. Modifications include Pacer CRAG avionics mod and Global Air Traffic Management (GATM) mod. Link 16 capability on a limited number.


***KC-135** Stratotanker* (SSgt. James L. Harper Jr.)


***C-5M** Super Galaxy* (USAF)

■ KC-135T aircraft (formerly KC-135Q) with higher thrust, turbofan engines can carry different fuels in the wing and body tanks.

# Transports

**C-5 Galaxy**
**Brief:** A heavy-lift, air refuelable cargo transport for massive strategic airlift over long ranges, including oversize cargo. Supports special operations missions.
**Function:** Cargo and troop transport.
**Operator:** AMC, ANG, AFRC.
**First Flight:** June 30, 1968.
**Delivered:** October 1969-April 1989.
**IOC:** September 1970.
**Production:** 131.
**Inventory:** 59 C-5A; 46 C-5B; two C-5C; four C-5M.
**Aircraft Location:** Dover AFB, Del.; Eastern West Virginia Arpt., W.Va.; Lackland AFB, Tex.; Memphis Arpt., Tenn.; Stewart ANGB, N.Y.; Travis AFB, Calif.; Westover ARB, Mass.; Wright-Patterson AFB, Ohio.
**Contractor:** Lockheed.
**Power Plant:** four General Electric TF39-GE-1C turbofans, each 43,000 lb thrust; (C-5M) four General Electric CF6-80C2 turbofans.
**Accommodation:** normal crew of six (two pilots, two engineers, and two loadmasters), plus rest area for 15 (relief crew, etc.) and seating for 73. There is no piece of Army combat equipment the C-5 can't carry. Possible loads: six Apache helicopters, two M1 main battle tanks (each weighing 135,400 lb), six Bradley vehicles, three CH-47 helicopters, the 74-ton mobile bridge, a quarter-million pounds of relief supplies, or a maximum of 340 passengers in an airbus configuration. Air-drop capability for single platforms weighing up to 42,000 lb.
**Dimensions:** span 222.8 ft, length 247.9 ft, height 65.1 ft.
**Weight:** empty 374,000 lb, gross 769,000 (wartime 840,000) lb.
**Ceiling:** 45,000 ft.
**Performance:** max speed at 25,000 ft 571 mph, normal cruising speed at altitude 518 mph (Mach 0.77), T-O run at S/L 8,300 ft, landing run, max landing weight at S/L 2,380 ft, range with max payload 3,434 miles, range with max fuel 7,245 miles.
**COMMENTARY**
USAF's largest airlifter. One of world's largest aircraft. Can carry unusually heavy cargo over intercontinental ranges at jet speeds, take off and land in relatively short distances, taxi on substandard surfaces in emergencies. Front and rear cargo openings permit simultaneous drive-through loading and off-loading.
**Extant Variant(s)**
■ C-5A. Basic model; 81 delivered 1969-73. Has undergone a major wing modification, extending service life by 30,000 flight hours. Incorporates new avionic subsystems developed for C-5B.
■ C-5B. Embodies all improvements since completion of C-5A production, including strengthened wings, improved turbofans, and updated avionics, with color weather radar and triple INS. First flight September 1985. First delivery (to Altus AFB, Okla.) in January 1986. Some models equipped with defensive system.
■ C-5C. Two A variants modified to carry outsize space cargo for NASA.
■ C-5M. Called Super Galaxy. Upgraded with latest avionics and new, higher performance GE CF6-80C2 turbofans. Equipped with other components installed under the Reliability Enhancement and Re-engining Program. First flight June 6, 2006. Developmental testing completed August 2008. Operational testing and evaluation concluded in 2010. Program completion is scheduled for 2017. First flight of production C-5M September 2010.

**C-9 Nightingale**
**Brief:** A twin-engine, medium-range swept-wing jet aircraft used for distinguished visitor duties.
**Function:** DV duties.
**Operator:** AFRC.
**First Flight:** August 1968.
**Delivered:** August 1968-February 1975.
**IOC:** circa 1968.
**Production:** 24.
**Inventory:** three.
**Aircraft Location:** Scott AFB, Ill.
**Contractor:** Boeing (McDonnell Douglas).
**Power Plant:** two Pratt & Whitney JT8D-9A turbofans, each 14,500 lb thrust.
**Accommodation:** crew of three.
**Dimensions:** span 93.2 ft, length 119.2 ft, height 27.4 ft.
**Weight:** gross 108,000 lb.
**Ceiling:** 35,000 ft.
**Performance:** max cruising speed at 25,000 ft 565 mph, range 2,500 miles.
**COMMENTARY**
A specially configured derivative of the DC-9 Series 30 commercial airliner. Now shares aeromedical evacuation role with C-130 and C-17 aircraft. Only USAF aircraft modified specifically for the aeromedical evacuation role.
**Extant Variant(s)**
■ C-9C. Three specially configured C-9s, delivered to Andrews AFB, Md., in 1975 for the special air mission supporting the President and other US government officials, are now in use by AFRC. Upgrades included improvements to the passenger communications equipment, GATM, terrain awareness warning system, Enhanced Mode S, and vertical separation equipment.

**C-12 Huron**
**Brief:** A twin-engine turboprop that provides diplomatic and special duty support passenger/cargo airlift and test support.
**Function:** Special airlift.
**Operator:** AFMC, PACAF.
**First Flight:** Oct. 27, 1972 (Super King Air 200).
**Delivered:** 1974-late 1980s.
**IOC:** circa 1974.
**Production:** 88.
**Inventory:** 27.
**Aircraft Location:** Edwards AFB, Calif.; Holloman AFB, N.M.; JB Elmendorf-Richardson, Alaska; Yokota AB, Japan; various overseas embassies.
**Contractor:** Beech.
**Power Plant:** (C-12J) two Pratt & Whitney Canada PT6A-65B turboprops, each 1,100 shp.
**Accommodation:** crew of two, C-12C up to eight passengers, C-12J up to 19 passengers.
**Dimensions:** (C-12J) span 54.5 ft, length 43.8 ft, height 15 ft.
**Weight:** (C-12J) empty 9,850 lb, gross 16,600 lb.
**Ceiling:** (C-12J) 25,000 ft.
**Performance:** (C-12J) max cruising speed at 16,000 ft 307 mph, range with 10 passengers 1,806 miles.
**COMMENTARY**
Military version of the Beechcraft King Air A200 series. Equipment includes the most up-to-date navigation, communication, and safety equipment plus state-of-the-art avionics.
**Extant Variant(s)**
■ C-12C. Re-engined C-12As, with PT6A-41 turboprops, deployed to overseas embassies.
■ C-12D. Similar to C model, with cargo doors, and also deployed to overseas embassies.
■ C-12F. With uprated PT6A-42 engines, to support medical airlift.
■ C-12J. A military version of the larger Beechcraft Model 1900, operated by PACAF.

**C-17 Globemaster III**
**Brief:** A heavy-lift, air refuelable cargo transport for intertheater (strategic) and intratheater (tactical) direct delivery airlift of all classes of military cargo.
**Function:** Cargo and troop transport.
**Operator:** AETC, AFMC, AMC, PACAF, ANG, AFRC.
**First Flight:** Sept. 15, 1991.
**Delivered:** June 1993-ongoing.
**IOC:** Jan. 17, 1995.
**Production:** 223 (planned).
**Inventory:** 205.
**Aircraft Location:** Allen C. Thompson Field, Miss.; Altus AFB, Okla.; Dover AFB, Del.; Edwards


***C-17** Globemaster III* (Erik Simonsen)

AFB, Calif.; 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.; Travis AFB, Calif. Planned: Wright-Patterson AFB, Ohio.
**Contractor:** Boeing.
**Power Plant:** four Pratt & Whitney F117-PW-100 turbofans, each 40,440 lb thrust.
**Accommodation:** normal flight crew of three (two pilots plus loadmaster); additional pilot may be carried. Provisions for full range of military airlift missions, incl capacity for up to 189 passengers, 102 paratroops, or 36 litters; range of military cargo incl tanks and up to three AH-64A helicopters; three Bradley vehicles; one M1A2 main battle tank with other equipment; air-drop capability for single platforms weighing up to 60,000 lb; palletized passenger seats.
**Dimensions:** span over winglet tips 169.8 ft, length 173.9 ft, height 55.1 ft.
**Weight:** empty 277,000 lb, max payload 170,900 lb, gross 585,000 lb (extended range).
**Ceiling:** 45,000 ft.
**Performance:** normal cruising speed 484 mph at 35,000 ft or 518 mph (Mach .77) at 28,000 ft, unrefueled range with 160,000 lb payload 2,760 miles, additional 690 miles with extended-range fuel containment system (ERFCS), unlimited with refueling.
**COMMENTARY**
Core airlifter of US military. Able to operate on small, austere airfields (3,000 ft by 90 ft) previously limited to C-130. Only aircraft able to directly air-land or air-drop outsize cargo into a tactical environment. First military transport to feature a full digital fly-by-wire control system and two-person cockpit, with two full-time, all-function HUDs and four multifunction electronic displays. Equipped with defensive systems.
**Extant Variant(s)**
■ C-17A. Original aircraft modernized with new block configuration to production aircraft and block upgrades to fielded aircraft. Block 17 marks the last block upgrade for the fleet; improvements include NVG-friendly combat lighting, upgraded electronic flight-control system, high-frequency data link, and formation flight system. Full retrofit up to Block 17 of previously delivered aircraft is planned for completion in 2018.

**C-20 Gulfstream**
**Brief:** A twin-engine turbofan aircraft acquired to provide airlift for high-ranking government and DOD officials.
**Function:** Operational support airlift, special air missions.
**Operator:** AMC, USAFE.
**First Flight:** December 1979.
**Delivered:** September 1983-89.
**IOC:** circa 1983.
**Production:** not available.
**Inventory:** 11.
**Aircraft Location:** JB Andrews-NAF Washington, Md.; Ramstein AB, Germany.
**Contractor:** Gulfstream.
**Power Plant:** C-20B two Rolls Royce-Spey MK511-8 turbofans, each 11,400 lb thrust; C-20H two Rolls Royce-Tay MK611-8 turbofans, each 13,850 lb thrust.
**Accommodation:** crew of five, 12 passengers.
**Dimensions:** span 77.8 ft; length (C-20B) 83.1 ft, (C-20H) 88.3 ft; height 24.3 ft.
**Weight:** C-20B gross 69,700 lb, C-20H gross 74,600 lb.
**Ceiling:** 45,000 ft.
**Performance:** max cruising speed 576 mph, range 4,250 miles.
**COMMENTARY**
Acquired in early 1980s to replace old C-140B Jetstar aircraft.
**Extant Variant(s)**
■ C-20B. Five C-20B versions, with advanced mission communications equipment and revised interior, were acquired in the late 1980s. Operated by 89th AW, JB Andrews-NAF Washington, Md., for worldwide special air missions.
■ C-20H. Two Gulfstream IV SP aircraft, with advanced technology flight-management systems and upgraded Rolls Royce engines. Equipped with GPS, vertical separation equipment, GATM, and traffic alert and collision avoidance system (TCAS). Operated by 86th AW at Ramstein AB, Germany, for operational support missions.

***C-27J Spartan*** (SrA. Joseph Harwood)

**C-21 Learjet**
**Brief:** Aircraft designed to provide cargo and passenger airlift and transport litters during medical evacuations.
**Function:** Pilot seasoning, passenger and cargo airlift.
**Operator:** AETC, AMC, USAFE, ANG.
**First Flight:** January 1973.
**Delivered:** April 1984-October 1985.
**IOC:** April 1984.
**Production:** 84.
**Inventory:** 56.
**Aircraft Location:** Bradley Arpt., Mass.; Buckley AFB, Colo.; Hector Arpt., N.D.; JB Andrews-NAF Washington, Md.; Keesler AFB, Miss.; Peterson AFB, Colo.; Ramstein AB, Germany; Scott AFB, Ill.; W. K. Kellogg Arpt., Mich.; Will Rogers Arpt., Okla.
**Contractor:** Gates Learjet.
**Power Plant:** two AlliedSignal TFE731-2 turbofans, each 3,500 lb thrust.
**Accommodation:** crew of two and up to eight passengers or 3,153 lb cargo. Convertible to aeromedical evacuation configuration.
**Dimensions:** span 39.5 ft, length 48.6 ft, height 12.2 ft.
**Weight:** empty, equipped 10,119 lb, gross 18,300 lb.
**Ceiling:** 45,000 ft.
**Performance:** max level speed at 25,000 ft 542 mph, range with max passenger load 2,306 miles, with max cargo load 1,653 miles.
**COMMENTARY**
Provides operational support for time-sensitive movement of people and cargo throughout the US and European Theaters, including aeromedical missions if required. Upgrades include GATM and TCAS.
**Extant Variant(s)**
■ C-21A. Military version of the Learjet 35A. Delivery started in April 1984 and was completed in October 1985. Dispersed throughout the Air Force, in both active force and Air National Guard. Two are being replaced with C-38s.

**C-27 Spartan**
**Brief:** A small tactical transport capable of carrying heavy loads into a wide range of airfields, including unprepared strips at high altitude.
**Function:** Tactical airlift.
**Operator:** ANG.
**First Flight:** September 1999 (developmental aircraft).
**Delivered:** 2010.
**IOC:** 2011 (planned).
**Production:** 38 (planned).
**Inventory:** five.
**Aircraft Location:** (planned) Bradley Arpt., Conn.; Hector Arpt., N.D.; Key Field, Miss.; Mansfield Lahm Arpt., Ohio; Martin State Arpt., Md.; W. K. Kellogg Arpt., Mich.
**Contractor:** L-3 Communications.
**Power Plant:** two Rolls Royce AE 2100-D2 turboprops, rated at 4,637 shp.
**Accommodation:** two flight crew; up to 68 troops or 24 paratroops, plus two loadmasters, or 36 litters plus six attendants; up to 25,353 lb cargo; 19,842 lb low velocity airdrop.
**Dimensions:** basic G.222 airframe span 94.1 ft, length 74.5 ft, height 32.1 ft.
**Weight:** gross 70,000 lb.
**Ceiling:** 30,000 ft.
**Performance:** T-O run 1,903 ft, range, with 22,046 lb payload 1,150 miles.
**COMMENTARY**
Derivative of Alenia G.222, selected in 2007 to fulfill the Joint Cargo Aircraft requirement. Acquired to support ground forces served only by the most basic airstrips, often at high altitude, or for missions where the C-130 is currently operating at half-load capacity. Considered for new gunship role. Originally a joint Army-Air Force program, now Air Force only.
**Extant Variant(s)**
■ C-27J. Equipped with digital avionics suite, NVG-compatible cockpit. Floor strength is equal to that of the C-130, and the cargo bay can accommodate C-130 pallets.

**C-32 Air Force Two**
**Brief:** A modified Boeing 757-200 used to provide backup transportation for the President. It is the primary means of travel for the vice president,


***C-32 Air Force Two*** (SSgt. Tony R. Tolley)

***C-37A Gulfstream V*** (A1C Brea Miller)

Cabinet, congressional members, and other high-ranking US and foreign officials.
**Function:** VIP air transport.
**Operator:** AMC, ANG.
**First Flight:** Feb. 19, 1982 (USAF Feb. 11, 1998).
**Delivered:** June-December 1998.
**IOC:** 1998.
**Production:** six.
**Inventory:** six.
**Aircraft Location:** JB Andrews-NAF Washington, Md.; JB McGuire-Dix-Lakehurst, N.J.
**Contractor:** Boeing.
**Power Plant:** two Pratt & Whitney PW2040 turbofans, each 41,700 lb thrust.
**Accommodation:** 16 crew and 45 passengers.
**Dimensions:** span 124.8 ft, length 155.2 ft, height 44.5 ft.
**Weight:** empty 127,800 lb, gross 255,000 lb.
**Ceiling:** 42,000 ft.
**Performance:** cruise speed Mach 0.8-0.86 (530 mph), range 5,750 miles.
**COMMENTARY**
Contract awarded in August 1996. Based on commercial off-the-shelf acquisition practices. First four aircraft delivered to 89th AW in June 1998.
**Extant Variant(s)**
■ C-32A. Commercial distinguished visitor interior includes a crew rest area, DV stateroom, conference area, and general passenger area. The passenger communications system provides worldwide clear and secure voice and data communications. Modern flight deck avionics allow operations to any suitable airfield in the world and provide an upgrade path as new capabilities become available. Upgrades include installation of a digital communications management system and broadband data transmit and receive, providing an office-in-the-sky capability.

**C-37 Gulfstream V**
**Brief:** Modified Gulfstream aircraft utilized as part of the executive fleet, providing transportation for the vice president, Cabinet, congressional members, Secretary of Defense, service Secretaries, and other prominent US and foreign officials.
**Function:** VIP air transport.
**Operator:** AMC, PACAF, USAFE.
**First Flight:** USAF October 1998.
**Delivered:** from October 1998.
**IOC:** Dec. 9, 1998.
**Production:** 10 C-37A; one C-37B.
**Inventory:** 10 C-37A; one C-37B.
**Aircraft Location:** Chievres, Belgium; JB Andrews-NAF Washington, Md.; JB Pearl Harbor-Hickam, Hawaii; MacDill AFB, Fla.
**Contractor:** Gulfstream.
**Power Plant:** two BMW-Rolls Royce BR710A1-10 turbofans, each 14,750 lb thrust.
**Accommodation:** five crew and 12 passengers.
**Dimensions:** span 93.5 ft, length 96.4 ft, height 25.8 ft.
**Weight:** empty 47,601 lb, gross 90,500 lb.
**Ceiling:** 51,000 ft.
**Performance:** cruise speed Mach 0.8 (530 mph), range 6,095 miles.
**COMMENTARY**
Military versions of "ultralong range" Gulfstream business aircraft.
**Extant Variant(s)**
■ C-37A. Military version of the Gulfstream V. Interior includes separate DV and passenger areas and a communications system capable of worldwide clear and secure voice and data. Aircraft are capable of operations at any suitable civilian or military airfield worldwide. Upgrades include GATM and continuing passenger communications system upgrades.
■ C-37B. Military version of the Gulfstream 550, modified for VIP duties. Has Honeywell Plane-View flight deck. Upgrades include a directional IR countermeasures system.

**C-38 Courier**
**Brief:** A twin-engine transcontinental aircraft used to provide transportation for DVs such as congressional or high-ranking military members. It can also be configured for medevac and a wide range of special missions including C3 in time of war.
**Function:** VIP air transport and operational support.
**Operator:** ANG.
**First Flight:** 1998.
**Delivered:** April-May 1998.
**IOC:** 1998.
**Production:** two.
**Inventory:** two.
**Aircraft Location:** JB Andrews-NAF Washington, Md.
**Contractor:** Tracor (Israel Aircraft Industries Ltd).
**Power Plant:** two AlliedSignal TFE731-40R-200G, each 4,250 lb thrust.
**Accommodation:** typically two crew and eight passengers. In medevac role: two Spectrum 500 Life Support Units and two medical attendants. All seats removable for cargo.
**Dimensions:** span 54.6 ft, length 55.6 ft, height 18.2 ft.
**Weight:** gross 24,800 lb.
**Ceiling:** cruise, 33,000 ft.
**Performance:** cruise speed Mach 0.87.
**COMMENTARY**
Military version of Astra SPX produced by IAI and supported worldwide by Galaxy Aerospace.
**Extant Variant(s)**
■ C-38A. Acquired in 1998. Equipment includes the most up-to-date navigation, communication, vertical separation, and safety equipment, as well as state-of-the-art avionics.

**C-40 Clipper**
**Brief:** A Boeing 737-700 used for medium-range airlift of personnel.
**Function:** Passenger transportation.
**Operator:** AMC, PACAF, USAFE, ANG, AFRC.
**First Flight:** USN C-40A: April 14, 1999.
**Delivered:** 2002.
**Production:** 10.
**Inventory:** four C-40B; six C-40C.
**Aircraft Location:** JB Andrews-NAF Washington, 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:** flight crew of four, plus three or four cabin crew; up to 89 passengers. C model can accommodate 111 passengers.
**Dimensions:** span 117 ft 5 in, length 110 ft 4 in, height 41 ft 2 in.
**Weight:** gross 171,000 lb.
**Ceiling:** 41,000 ft.
**Performance:** cruise speed 0.78-0.82 Mach, range 3,450 miles.
**COMMENTARY**
Military version of the commercial Boeing 737-700 aircraft. C-40s are used for transporting senior government officials and regional combatant commanders.
**Extant Variant(s)**
■ C-40B. Equipped with a DV suite, staff work area, conference area, and worldwide secure communications and data capability. Four purchased. Two assigned to Andrews and one each to Hickam and Ramstein.
■ C-40C. Equipped with DV seating area, general passenger seating area, and secure communications capability. Three C-40Cs are operated by ANG's 201st Airlift Squadron from Andrews, and three by AFRC's 932nd AS at Scott.

**C-130 Hercules**
**Brief:** A rugged aircraft capable of operating from rough dirt strips to provide theater airlift and paradropping of troops and equipment into hostile areas.
**Function:** Inter- and intratheater airlift.
**Operator:** AETC, AMC, PACAF, USAFE, ANG, AFRC.
**First Flight:** August 1954 (C-130A).
**Delivered:** December 1956-present (C-130J).
**IOC:** circa 1958.


***C-130 Hercules*** (SSgt. Brian Ferguson)

**Production:** more than 2,200.
**Inventory:** 45 C-130E; 279 C-130H; 74 C-130J.
**Aircraft Location:** Dobbins ARB, Ga.; Dyess AFB, Tex.; Keesler AFB, Miss.; Little Rock AFB, Ark.; Maxwell AFB, Ala.; Minneapolis-St. Paul Arpt./ARS, Minn.; Niagara Falls Arpt., N.Y.; Peterson AFB, Colo.; Pittsburgh Arpt., Pa.; Pope Field, N.C.; Ramstein AB, Germany; Yokota AB, Japan; and ANG in Alaska, California, Delaware, Georgia, Hawaii, Illinois, Kentucky, Maryland, Minnesota, Missouri, Nevada, New York, North Carolina, Ohio, Puerto Rico, Rhode Island, Texas, West Virginia, Wyoming.
**Contractor:** Lockheed Martin.
**Power Plant:** (C-130H) four Rolls Royce-Allison T56-A-15 turboprops, each 4,591 shp; (C-130J) four Rolls Royce-Allison AE2100D3 turboprops, each 4,700 shp.
**Accommodation:** (C-130H) crew of five; up to 92 ground troops, 64 paratroops, 74 litter patients plus attendants, 54 passengers on palletized seating, or up to five 463L standard freight pallets, etc.; max load, 45,000 lb.
**Dimensions:** span 132.6 ft, length 97.8 ft, height 38.8 ft.
**Weight:** (C-130H) empty 81,000 lb, fuel/cargo max gross 155,000 lb; (C-130J) gross 175,000 lb.
**Ceiling:** 33,000 ft at 100,000 lb T-O weight.
**Performance:** (C-130H) max cruising speed 430 mph, range with 35,000 lb payload 1,500 miles.
**COMMENTARY**
All-purpose theater transport that operates throughout USAF, performing diverse roles. Missions include tactical intratheater and intertheater airlift and airdrop support, Arctic resupply, aeromedical flights, aerial spraying, firefighting duties for the US Forest Service, and natural disaster and humanitarian relief missions. Replacement of wing boxes in 155 C-130s under way. Six hundred aircraft will receive landing gear modifications.
**Extant Variant(s)**
■ C-130E. Extended-range version of early Hercules. Total of 389 ordered, with first deliveries in 1962. Original wing modified to correct fatigue and corrosion. Self-contained nav system, with an integrated communications/navigation management suite, GPS capability, and a state-of-the-art autopilot.
■ C-130H. Model generally similar to E, with updated turboprops, redesigned outer wing, improved pneumatic systems. First delivery in July 1974. Equipped with updated avionics, improved low-power color radar, night vision instrumentation. ANG LC-130Hs modified with wheel-ski gear to support Arctic and Antarctic operations. Modernized with digital displays, flight-management systems, multifunction radar, new communications systems, and a single air data computer.
■ C-130J. Features three-crew flight operation system, Rolls Royce-Allison AE2100D engines, all composite six-blade propeller system, digital avionics, and mission computers. Flies faster, higher, and farther than earlier C-130s. ANG and AFRC units began receiving J models in 1999, active units in 2004. First wartime deployment in 2004.
■ C-130J-30. Stretch version of the J model with 15 ft added to the fuselage. Capable of transporting 128 ground troops or 92 paratroops. ANG began receiving J-30 models in 2001, active duty and AFRC units in 2004.

**VC-25 Air Force One**
**Brief:** A specially configured Boeing 747-200B used for air transport of the President and his entourage. When the President is aboard, it has the radio call sign "Air Force One."
**Function:** Air transport of the President.
**Operator:** AMC.
**First Flight:** first flown as Air Force One Sept. 6, 1990.
**Delivered:** August-December 1990.
**IOC:** circa 1990.
**Production:** two.
**Inventory:** two.
**Aircraft Location:** JB Andrews-NAF Washington, Md.
**Contractor:** Boeing.
**Power Plant:** four General Electric CF6 turbofans, each 56,700 lb thrust.


***VC-25** Air Force One* (Butch Ramsey)

**Accommodation:** crew of 26, up to 76 passengers.
**Dimensions:** span 195.7 ft, length 231.8 ft, height 63.4 ft.
**Weight:** long-range mission T-O weight 803,700 lb, gross 833,000 lb.
**Ceiling:** 45,000 ft.
**Performance:** speed 630 mph (Mach 0.92), normal cruising speed Mach 0.84, unrefueled range 7,820 miles.
**COMMENTARY**
Based on the Boeing 747-200B airframe, two VC-25As assigned to Andrews support the President. 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 equipment. Upgrades include GATM and installation of a broadband data transmit and receive capability to provide video teleconferencing and office-in-the-sky capability.
**Extant Variant(s)**
■ VC-25A. Flown by the Presidential Airlift Group. Assigned to 89th AW.

# Helicopters

**HH-60 Pave Hawk**
**Brief:** Specially modified helicopters used primarily for CSAR, also aeromedical evacuation, casualty evacuation, civil SAR, and other support missions.
**Function:** Personnel recovery medium-lift helicopter.
**Operator:** ACC, AETC, AFMC, PACAF, USAFE, ANG, AFRC.
**First Flight:** October 1974.
**Delivered:** from 1982.
**IOC:** circa 1982.
**Production:** 105; 15 Pave Hawk modifications of new-build UH-60s planned.
**Inventory:** 100.
**Aircraft Location:** Davis-Monthan AFB, Ariz.; 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.
**Contractor:** United Technologies/Sikorsky.
**Power Plant:** two General Electric T700-GE-700/701C turboshafts, each 1,560-1,940 shp.
**Accommodation:** crew of four; 8-12 troops, two litters, or internal or external cargo.
**Dimensions:** rotor diameter 53.6 ft, length of fuselage 64.7 ft, height 16.7 ft.
**Weight:** max gross 22,000 lb.
**Ceiling:** 14,200 ft.
**Performance:** max speed 184 mph; max range 373 miles (internal fuel), 500 miles (auxiliary tank).
**Armament:** mounts for two 7.62 mm miniguns or two .50-caliber machine guns in cabin doors.
**COMMENTARY**
Highly modified Black Hawk helicopter. Acquired in the early 1980s. In continuous use by active duty, ANG, and AFRC air rescue units for personnel recovery, including CSAR, humanitarian, and medevac mission activities worldwide.
**Extant Variant(s)**
■ HH-60G. Equipped with advanced communications/navigation suite that includes INS/GPS/Doppler navigation systems, satellite communications, secure/anti-jam communications, and a precision landing system (PLS) that provides range/steering data to survivor radios. Automatic flight-control system, NVG lighting, FLIR, color weather radar, engine/rotor blade anti-ice system, retractable in-flight refueling probe, internal auxiliary fuel tanks, and an integral external rescue hoist. Combat enhancements include RWR, IR jammer, flare and chaff countermeasures dispensing system, and two 7.62 mm or .50-caliber machine guns.

**UH-1 Iroquois**
**Brief:** Modified Bell helicopter used to provide security and support for Air Force ICBM systems, undergraduate pilot training, combat aviation advisor training, and administrative airlift.
**Function:** Light-lift utility and training helicopter.
**Operator:** AETC, AFDW, AFGSC, AFMC, AFSOC, AMC, PACAF.
**First Flight:** 1956.

***HH-60** Pave Hawk* (Osakabe Yasuo)

**Delivered:** from September 1970.
**IOC:** circa 1970.
**Production:** 20 TH-1H; many UH-1H; 79 UH-1N.
**Inventory:** 27 TH-1H; three UH-1H; 62 UH-1N.
**Aircraft Location:** Eglin AFB, Fla.; Fairchild AFB, Wash.; F. E. Warren AFB, Wyo.; Fort Rucker, Ala.; Hurlburt Field, Fla.; JB Andrews-NAF Washington, Md.; Kirtland AFB, N.M.; Malmstrom AFB, Mont.; Minot AFB, N.D.; Yokota AB, Japan.
**Contractor:** Bell (UH-1H, UH-1N), Lockheed (TH-1H).
**Power Plant:** TH-1H: one Honeywell T53-L-703 turboshaft, 1,800 shp. UH-1H: one Lycoming T53-L-13B turboshaft, 1,400 shp. UH-1N: Pratt & Whitney Canada T400-CP-400 Turbo "Twin-Pac," 1,290 shp.
**Accommodation:** two pilots and 13 passengers or cargo, or external load of 4,000 lb (UH-1H) or 5,000 lb (TH-1H and UH-1N).
**Dimensions:** TH-1H: rotor diameter 48.0 ft, fuselage length 57.0 ft, height 13.0 ft. UH-1H: rotor diameter 48.3 ft, fuselage length 57.1 ft, height 13.6 ft. UH-1N: rotor diameter 48.0 ft, fuselage length 57.1 ft, height 13.1 ft.
**Weight:** TH-1H gross 10,500 lb, UH-1H gross 9,500 lb, UH-1N gross 10,500. Max contingency 11,200 lb.
**Ceiling:** 15,000 ft.
**Performance:** Max speed at S/L 150 mph, max cruising speed at S/L 138 mph TH-1H, 115 UH-1H/N; max range varies depending on fuel tank configuration.
**Armament:** (optional) two General Electric 7.62 mm miniguns or two 40 mm grenade launchers; two seven-tube 2.75-in rocket launchers.
**COMMENTARY**
UH-1N aircraft entered the USAF inventory in 1970, initially to provide search and rescue capabilities.
**Extant Variant(s)**
■ UH-1H. Single-engine version of UH-1 utility helicopter. Two UH-1H maintained by AFSOC for combat aviation advisor training.
■ UH-1N. Twin-engine version of the UH-1. Most used for ICBM security and administrative/DV airlift. Also used by AETC's 58th SOW, Kirtland, for training purposes and by the 336th TRG, Fairchild, for aircrew survival training. Two UH-1N helicopters are maintained by AFSOC for combat aviation advisor training.
■ TH-1H. Modified version of the UH-1H for use by the 23rd FTS, Fort Rucker, for Air Force undergraduate helicopter pilot training.

# Trainers

**T-1 Jayhawk**
**Brief:** A medium-range, twin-engine jet trainer version of the Beechcraft 400A. It is used by the Air Force to train student airlift and tanker pilots and student combat systems operators.
**Function:** Advanced pilot training.
**Operator:** AETC, AFRC.
**First Flight:** Sept. 22, 1989 (Beechcraft 400A).
**Delivered:** Jan. 17, 1992-July 1997.
**IOC:** January 1993.
**Production:** 180.
**Inventory:** 177.
**Aircraft Location:** Columbus AFB, Miss.; Laughlin AFB and Randolph AFB, Tex.; Vance AFB, Okla.; NAS Pensacola, Fla.
**Contractor:** Hawker Beechcraft.
**Power Plant:** two Pratt & Whitney Canada JT15D-5B turbofans, each 2,900 lb thrust.
**Accommodation:** two, side by side, and one to the rear; rails are fitted to accommodate an extra four seats to permit transport of maintenance teams.
**Dimensions:** span 43.5 ft, length 48.4 ft, height 13.9 ft.
**Weight:** empty 5,200 lb, gross 16,100 lb.
**Ceiling:** 41,000 ft.
**Performance:** max speed at 27,000 ft 538 mph, range 2,400 miles.
**COMMENTARY**
Military version of Beech 400A used in the advanced phase of joint specialized undergraduate pilot training (JSUPT) for students selected to fly tanker, transport, electronic warfare aircraft. Used to train student combat systems officers.


***T-1A** Jayhawk* (Lt. Col. Russell Hopkinson)

**Extant Variant(s)**
■ T-1A. Cockpit seating for instructor and two students. Special mission equipment includes GPS, an electronic flight instrument system avionics system, a single-point refueling system, an additional fuselage fuel tank, and strong bird-strike protection in the windshield and leading edges. Typically flown 100,000 flying hours a year.

**T-6 Texan II**
**Brief:** A single-engine turboprop aircraft used for training student pilots, CSOs, and naval flight officers in fundamentals of aircraft handling and instrument, formation, and night flying.
**Function:** Primary trainer.
**Operator:** AETC, USN.
**First Flight:** July 15, 1998.
**Delivered:** from May 2000 (operational aircraft).
**IOC:** November 2001.
**Production:** Planned: 452 (USAF); 315 (USN).
**Inventory:** 345 (USAF).
**Aircraft Location:** USAF: Columbus AFB, Miss.; Laughlin AFB, Randolph AFB, and Sheppard AFB, Tex.; Vance AFB, Okla. USN: NAS Corpus Christi, Tex.; NAS Whiting, Fla.; NAS Pensacola, Fla.
**Contractor:** Hawker Beechcraft (formerly Raytheon).
**Power Plant:** one Pratt & Whitney Canada PT6A-68 turboprop, 1,100 shp.
**Accommodation:** two, in tandem, on zero/zero ejection seats.
**Dimensions:** span 33.5 ft, length 33.4 ft, height 10.7 ft.
**Weight:** empty (approx) 4,707 lb, gross 6,500 lb.
**Ceiling:** 31,000 ft.
**Performance:** max speed 368 mph, range 920 miles.
**COMMENTARY**
Trainer based on Swiss Pilatus PC-9 aircraft, modified to include a strengthened fuselage, zero/zero ejection seats, large crew accommodation, upgraded engine, increased fuel capacity, pressurized cockpit, larger, bird-resistant canopy, and new digital avionics.
**Extant Variant(s)**
■ T-6A. Avionics upgrade employs glass cockpit multifunction displays and backup flight instruments, HUD, hands-on-throttle-and-stick functionality, and integrated avionics computers.
■ T-6B. Newer Navy variant. Equipped with HUD.

**T-38 Talon**
**Brief:** A twin-engine, high-altitude, supersonic jet trainer used in a variety of roles, primarily for undergraduate pilot, pilot instructor training, and introduction to fighter fundamentals training (IFFT).


***T-38** Talon* (Jo Hunter)

**Function:** Trainer.
**Operator:** ACC, AETC, AFMC, AFRC.
**First Flight:** April 1959.
**Delivered:** 1961-72.
**IOC:** March 1961.
**Production:** more than 1,100.
**Inventory:** six AT-38B; 28 T-38A; 400 T-38C.
**Aircraft Location:** Beale AFB and Edwards AFB, Calif.; Columbus AFB, Miss.; Holloman AFB, N.M.; Laughlin AFB, Randolph AFB, and Sheppard AFB, Tex.; Vance AFB, Okla.; Whiteman AFB, Mo. Planned: JB Langley-Eustis, Va.; Tyndall AFB, Fla.
**Contractor:** Northrop Grumman.
**Power Plant:** two General Electric J85-GE-5A turbojets, each 2,680 lb thrust dry, 2,900 lb thrust with afterburning.
**Accommodation:** two, in tandem, on ejection seats.
**Dimensions:** span 25.3 ft, length 46.3 ft, height 12.8 ft.
**Weight:** empty 7,164 lb, gross 12,500 lb.
**Ceiling:** above 55,000 ft.
**Performance:** max level speed 812 mph, range 1,000 miles.
**COMMENTARY**
Most now used by AETC for advanced bomber-fighter training track in JSUPT and IFFT. Used to teach supersonic techniques, aerobatics, formation, night and instrument flying, and cross-country and low-level navigation. The aircraft is also used by the USAF Test Pilot School to train test pilots and flight-test engineers at Edwards in experimental techniques, and by ACC as a companion trainer to maintain pilot proficiency. ACC to use regenerated T-38s as dedicated aggressor aircraft for F-22 training.
**Extant Variant(s)**
■ T-38A. Close in structure to the F-5A export tactical fighter. World's first supersonic trainer aircraft. Capabilities enhanced through structural renewal, full avionics upgrade with a HUD and integrated GPS/INS, and a propulsion modernization.
■ AT-38B. A slightly different version, with a gunsight and practice bomb dispenser. Used by AFMC for test and evaluation.
■ T-38C. Reconfigured A and B airframes. Avionics mod includes a HUD. First model delivered 2002; last delivery 2007. Propulsion upgraded to improve performance and reliability. Escape system upgrade program is under way to further improve safety.

**T-41 Mescalero**
**Brief:** Short-range, high-wing trainer used primarily for aerodynamic and navigation courses and USAFA Flying Team support.
**Function:** Training, support.
**Operator:** AETC.
**Delivered:** 1968.
**Inventory:** four.
**Aircraft Location:** US Air Force Academy, Colo.
**Contractor:** Cessna.
**Power Plant:** one Continental IO-360-DB piston engine, 210 hp.
**Accommodation:** two, side by side.
**Dimensions:** span 36.1 ft, length 26.5 ft, height 8.9 ft.
**Weight:** gross 2,550 lb.
**Ceiling:** 14,000 ft.
**Performance:** speed 182 mph, range 630 miles.
**COMMENTARY**
Used primarily by US Air Force Academy.
**Extant Variant(s)**
■ T-41C. Military version of Cessna 172. All-metal, strut-braced high-wing monoplane. Equipped with modern avionics, GPS, and other equipment appropriate to its mission. Used for Aero 456 flight testing, USAFA flying team support, orientation flights.

**T-51 Cessna**
**Brief:** A short-range, high-wing aircraft used primarily by the USAFA Flying Team during intercollegiate competitions.
**Function:** Training, competition.
**Operator:** AETC.
**Delivered:** 1970s.
**Inventory:** three.
**Aircraft Location:** USAFA, Colo.
**Contractor:** Cessna.
**Power Plant:** one Lycoming 0-320 E2D piston engine, 150 hp.
**Accommodation:** two, side by side.
**Dimensions:** span 33.3 ft, length 24 ft, height 8.5 ft.
**Weight:** (Cessna 150M) gross 1,760 lb.
**Ceiling:** 12,600 ft.
**Performance:** speed 162 mph, range 450 miles.
**COMMENTARY**
Military designation for civilian Cessna 150. All-metal, strut-braced, high-wing monoplane.
**Extant Variant(s)**
■ T-51A. The aircraft is equipped with modern avionics, GPS, and other equipment appropriate to its mission.

**TG-10 Merlin/Kestrel**
**Brief:** TG-10B variant used as a Basic Soaring Trainer, while the TG-10C is used as an aerobatic glider for competitions and demonstrations.
**Function:** Trainer.
**Operator:** AETC.
**Delivered:** May 2002.
**IOC:** December 2002.
**Inventory:** 12 TG-10B; five TG-10C.
**Aircraft Location:** USAFA, Colo.
**Contractor:** Blanik.
**Accommodation:** two.
**Dimensions:** span (B) 55.4 ft, (C) 46.6 ft; length (B) 27.9 ft, (C) 27.6 ft; height (B) 6.2 ft, (C) 6.9 ft.
**Weight:** (B) 1,168 lb, (C) 1,100 lb.
**Performance:** speed (B) 142.6 mph, (C) 146.1 mph; glide ratio (B) 28:1, (C) 26:1.
**COMMENTARY**
Both USAF models, produced in the Czech Republic, have a common cockpit and control layouts, allowing cadets to move between the two as necessary. TG-10 B gliders are used for local orientation flights and training. A few have been modified for wave soaring for the advanced Sailplane Racing Team training. The TG-10C gliders are used to compete in national competitions.
**Extant Variant(s)**
■ TG-10B Merlin. Civilian L-23 Super Blanik sailplane.
■ TG-10C Kestrel. Civilian L-13AC Blanik sailplane.

**TG-15 Duo Discus/Duo 2B**
**Brief:** Sailplane used for advanced cross-country training and competition.
**Function:** Trainer/cross-country competition sailplane.
**Operator:** AETC.
**Inventory:** two TG-15A; three TG-15B.
**Aircraft Location:** USAFA, Colo.
**Contractor:** Schempp-Hirth, Germany.
**Accommodation:** (A) two-seat, (B) single-seat.
**Dimensions:** span (A) 65.6 ft, (B) 49.2 ft; length (A) 28.3 ft, (B) 22.3 ft.
**Weight:** gross (A) 1,543 lb, (B) 1,157 lb.
**Performance:** max permitted speed 155 mph.
**COMMENTARY**
Sailplanes manufactured by Schempp-Hirth of Germany. Used for cross-country soaring training and Soaring Society of America national competitions.
**Extant Variant(s)**
■ TG-15A. Two-seat variant.
■ TG-15B. Single-seat variant.

**UV-18 Twin Otter**
**Brief:** Modified utility transport used for parachute jump training.
**Function:** Paradrop.
**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 Aircraft of Canada.
**Power Plant:** two Pratt & Whitney Canada PT6A-27 turboprops, each 620 ehp.
**Accommodation:** crew of two and up to 20 passengers.
**Dimensions:** span 65 ft, length 51.9 ft, height 18.7 ft.
**Weight:** gross 12,500 lb.
**Ceiling:** 25,000 ft.
**Performance:** max cruising speed 210 mph, range with 2,500 lb payload 806 miles.
**COMMENTARY**
Used at US Air Force Academy to support various parachuting activities and perform general utility


***TG-10 Kestrel*** (Mike Kaplan)

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missions. Used by the Air Force Parachute Team, The Wings of Blue.
**Extant Variant(s)**
■ UV-18B. Military variant of the civilian DeHavilland DHC-6 Twin Otter.

# Strategic Missiles

**AGM-86 Air Launched Cruise Missile**
**Brief:** A small, subsonic winged air vehicle, deployed on B-52H aircraft, which can be equipped with either a nuclear or conventional warhead and can be used to help destroy/defeat air defenses and complicate an enemy's air defense task.
**Function:** Strategic air-to-surface cruise missile.
**Operator:** AFGSC.
**First Flight:** June 1979 (full-scale development).
**Delivered:** from 1981.
**IOC:** December 1982, Griffiss AFB, N.Y.
**Production:** 1,700+.
**Unit Location:** Andersen AFB, Guam; Barksdale AFB, La.; Minot AFB, N.D.
**Contractor:** Boeing.
**Power Plant:** Williams/Teledyne CAE F107-WR-10 turbofan, 600 lb thrust.
**Guidance:** (AGM-86B) inertial plus Terrain Contour Matching (TERCOM); (AGM-86C) inertial plus GPS.
**Warhead:** (AGM-86B) W80-1 nuclear, (AGM-86C) blast/fragmentation conventional, (AGM-86D) hard target penetrating warhead.
**Dimensions:** length 20.8 ft, body diameter 2 ft, wingspan 12 ft.
**Weight:** 3,150 lb (B and C).
**Performance:** speed 550 mph, range 1,500+ miles (AGM-86B).
**COMMENTARY**
Programmed to conduct strategic attack—nuclear or conventional—on surface targets. Small radar signature and low-level flight capability enhance the missile's effectiveness.
**Extant Variant(s)**
■ AGM-86B. First production version. Last of 1,715 delivered in 1986. Undergoing service life extension program (SLEP) to extend life to 2030. USAF to cut inventory to 528 nuclear types. Force to be consolidated at Minot.
■ AGM-86C. Conventional warhead version, called CALCM. Some 600 B models converted; initial deliveries in 1987. Few remain in inventory. First used operationally in Desert Storm; used widely in subsequent combat operations. Provides adverse weather, day/night, air-to-surface, accurate, stand-off strike capability. Range greater than 500 miles. Block 1A enhancements offer improved accuracy and increased immunity to electronic jamming.
■ AGM-86D. CALCM Block II penetrator version with AUP-3(M) warhead. Provides standoff capability against hardened, deeply buried targets. Used with success in Southwest Asia operations.

**AGM-129 Advanced Cruise Missile**
**Brief:** A stealthy, long-range winged air vehicle equipped with a nuclear warhead and designed to evade enemy air- and ground-based defenses in order to strike hard, heavily defended targets at standoff distances.
**Function:** Strategic air-to-surface cruise missile.
**Operator:** AFGSC.
**First Flight:** July 1985.
**Delivered:** June 1990-August 1993.
**IOC:** circa 1991.
**Production:** 461.
**Unit Location:** Barksdale AFB, La.; Minot AFB, N.D.
**Contractor:** General Dynamics (now Raytheon), McDonnell Douglas (now Boeing).
**Power Plant:** Williams International F112-WR-100 turbofan.
**Guidance:** inertial, with TERCOM update.
**Warhead:** W80-1 nuclear.
**Dimensions:** length 20 ft 10 in, body width 2 ft 5 in, wingspan 10 ft 2 in.
**Weight:** 3,700 lb.
**Performance:** range 2,000+ miles, speed 550 mph.
**COMMENTARY**
According to 2007 announcement, USAF is retiring its entire ACM inventory. All to be demilitarized by 2013.
**Extant Variant(s)**
■ AGM-129A. Embodies stealth technology. Offers significant improvements over the original AGM-86B cruise missile in range, accuracy, survivability. Carried only by B-52 bomber.

**LGM-30 Minuteman**
**Brief:** A solid-fuel ICBM capable of being fired from silo launchers and delivering a thermonuclear payload of one to three warheads with high accuracy over great distances.
**Function:** Strategic surface-to-surface ballistic missile.
**Operator:** AFGSC.
**First Flight:** February 1961.
**Delivered:** 1962-December 1978.
**IOC:** December 1962, Malmstrom AFB, Mont.
**Production:** 1,800.
**Unit Location:** F. E. Warren AFB, Wyo.; Malmstrom AFB, Mont.; Minot AFB, N.D.
**Contractor:** Boeing.
**Power Plant:** stage 1: Thiokol M-55 solid-propellant motor, 202,600 lb thrust; stage 2: Aerojet General SR19-AJ-1 solid-propellant motor, 60,721lb thrust; stage 3: Thiokol SR73-AJ-1 solid-propellant motor, 34,400 lb thrust.
**Guidance:** inertial guidance system.
**Warhead:** one Mk 21 RV or one-three Mk 12/12A MIRVs.
**Dimensions:** length 59.9 ft, diameter of first stage 5.5 ft.
**Weight:** launch weight 79,432 lb.
**Performance:** speed at burnout more than 15,000 mph, highest point of trajectory approx 700 miles, range with max operational load more than 6,000 miles.
**COMMENTARY**
Three-stage, solid-propellant ICBM in underground silo. Sole remaining US land-based ICBM. Major life extension program ensures viability to 2020. Further proposed incremental upgrades intended to maintain viability to 2030. Major upgrades include refurbishment of liquid propulsion post-boost rocket engine, remanufacture of the solid-propellant rocket motors, replacement of the environmental control system, repair of launch facilities, installation of updated, survivable communications equipment, and a C2 sustainment program.
**Extant Variant(s)**
■ LGM-30G. Called Minuteman III. Became operational in 1970, providing improved range, rapid retargeting, and the capability to place three re-entry vehicles on three targets with a high accuracy. USAF initially deployed 550, later reducing to 500 based at Warren, Malmstrom, and Minot. Deactivation of a further 50 Minuteman IIIs was completed in July 2008.

# Tactical Missiles and Weapons

**AGM-65 Maverick**
**Brief:** A tactical, TV- or imaging infrared (IIR) guided or laser guided air-to-surface missile carried by fighters and designed for use in CAS, interdiction, and defense suppression missions, having standoff capability and high probability of strike against a wide range of targets.
**Function:** Air-to-surface guided missile.
**First Flight:** August 1969.
**Delivered:** from August 1972.
**IOC:** February 1973.
**Production:** sustainment phase.
**Contractor:** Raytheon.
**Power Plant:** Thiokol TX-481 solid-propellant rocket motor.
**Guidance:** AGM-65A/B/H/K self-homing, TV guidance system; AGM-65D/G IIR seeker; AGM-65E/E2 laser seeker.
**Warhead:** AGM-65A/B/D/H 125-lb high-explosive, shaped charge; AGM-65E/G/K 298-lb blast fragmentation.
**Dimensions:** length 8.2 ft, body diameter 1 ft, wingspan 2.3 ft.
**Weight:** launch weight AGM-65A 462 lb, AGM-65G 670 lb.
**Performance:** range about 9.2 miles.
**COMMENTARY**
Boasts long and distinguished combat record. First employed during Vietnam War; used extensively in Desert Storm and Iraqi Freedom. Integrated with

***Minuteman III*** (USAF)


***AGM-65H** Maverick* (MSgt. Michael Ammons)

A-10 and F-16 for use against tanks and columns of vehicles and in the SEAD role.

**Extant Variant(s)**

■ AGM-65B. A launch-and-leave, TV guided air-to-surface missile. Equipped with "scene magnification" TV seeker allowing pilot to identify and lock on to smaller or distant targets.

■ AGM-65D. Augments TV guidance with an IIR seeker. Equipped with lower-smoke motor. Became operational in 1986 on A-10 aircraft.

■ AGM-65E. Laser guided version ordered by USN and USMC. Sometimes used by USAF in combat operations, beginning 2007.

■ AGM-65E2. State-of the-art version of the laser guided Maverick used for precision strike against high-speed moving targets in urban settings. First delivery in 2010.

■ AGM-65G. Uses IIR seeker with an alternate 298-lb blast fragmentation warhead for use against hardened targets. Software is modified to include options for targeting ships and large land targets as well as mobile armor. Has digital autopilot and a pneumatic actuation system. First delivered in 1989.

■ AGM-65H. Equipped with upgraded TV seeker providing significant reliability, maintainability, and performance gains and double the standoff range of B variant.

■ AGM-65K. Modified G variant. Has same TV seeker as in the AGM-65H to provide a TV guided version with the 298-lb blast fragmentation warhead.

**AGM-88 HARM**

**Brief:** An air-to-surface tactical missile designed to seek and destroy enemy radar-equipped air defense sites, using an advanced guidance system that senses and homes in on enemy radar emissions.
**Function:** Air-to-surface anti-radiation missile.
**First Flight:** April 1979.
**Delivered:** 1982-98.
**IOC:** circa 1984.
**Production:** sustainment phase.
**Contractor:** Raytheon.
**Power Plant:** Thiokol smokeless, dual-thrust, solid-propellant rocket motor.
**Guidance:** passive homing guidance system, using seeker head that homes on enemy radar emissions.
**Warhead:** high-explosive fragmentation, weighing 145 lb.
**Dimensions:** length 13.7 ft, body diameter 10 in, wingspan 3.7 ft.
**Weight:** 780 to 810 lb.
**Performance:** cruising speed supersonic, altitude limits S/L to 40,000 ft, range more than 30 miles.
**COMMENTARY**
Joint USAF-Navy weapon. Great velocity and ability to cover wide range of frequencies with use of programmable digital processors in carrier aircraft's avionics and missile. Proven to be highly effective against enemy ground radar. Carried by F-16 Block 50/52s dedicated to SEAD mission. Upgrade initiatives aim to strengthen all versions against target shutdown, blanking, and blinking. Has demonstrated GPS precision navigation capability.
**Extant Variant(s)**

■ AGM-88B. Equipped with erasable and electronically programmable read-only memory, permitting in-field changes to missile memory. Older versions of the AGM-88B have software upgrades to satisfy current-standard requirements.

■ AGM-88C. Current production model. Has warhead more lethal than earlier variants. Equipped with enhanced-capability AGM-88C-1 guidance head.

**AGM-154 Joint Standoff Weapon**

**Brief:** Joint USAF and Navy family of low-cost glide weapons with a standoff capability.
**Function:** Air-to-surface guided missile.
**First Flight:** December 1994.
**Delivered:** from 2000.
**IOC:** 2000 (USAF).
**Production:** 6,114 (originally planned).
**Contractor:** Raytheon.
**Guidance:** INS/GPS.
**Warhead:** (see variants below).
**Dimensions:** length 13.3 ft.
**Weight:** 1,065-1,500 lb.
**Performance:** range 17 miles low-altitude launch, 40+ miles high-altitude launch.

***AGM-154 Joint Standoff Weapon*** (MSgt. Michael Ammons)

**COMMENTARY**
Medium-range, INS/GPS guided, standoff air-to-ground weapon. Used to attack a variety of soft and armored area targets (fixed, relocatable, mobile) during day and night, and in adverse weather conditions. Enhances aircraft survivability with launch outside range of enemy point defenses. JSOW accuracy and launch-and-leave capability allow several target kills per aircraft sortie. Arms the B-2 and F-16.
**Extant Variant(s)**

■ AGM-154A. The baseline BLU-97 variant for use against area targets.

■ AGM-154B. The BLU-108 variant provides anti-armor capability; development complete, production deferred.

**AGM-158 Joint Air-to-Surface Standoff Missile**

**Brief:** An advanced weapon designed to attack heavily defended targets with high precision at great standoff range.
**Function:** Air-to-surface guided weapon.
**First Flight:** April 8, 1999.
**Delivered:** through FY19 (planned).
**IOC:** September 2003.
**Production:** 2,400, plus 2,500 JASSM-ER (planned).
**Contractor:** Lockheed Martin, Raytheon, Honeywell.
**Power Plant:** Teledyne Continental Motors; JASSM-ER, Williams Turbofan.
**Guidance:** INS, GPS, and IIR terminal seeker.
**Warhead:** J1000 1,000-lb class penetrator.
**Dimensions:** length 14 ft.
**Weight:** 2,250 lb, (ER) 2,390 lb.
**Performance:** 1,000-lb class penetrator and blast-fragmentation warheads; standoff range greater than 200 miles.
**COMMENTARY**
Next generation missile allowing USAF fighter, bomber attack from outside ranges of enemy air defenses. Autonomous precision strike weapon. Can attack both fixed and relocatable targets, from nonhardened above ground to moderately hardened buried targets.
**Extant Variant(s)**

■ AGM-158A JASSM. Stealthy LO airframe equipped with INS/GPS guidance, IIR terminal seeker. Low operational support costs. Can be employed by B-1B, B-2, B-52H, and F-16. Integration on F-15E and F-35 proceeding. B-1B can redirect a JASSM route prior to launch.

■ AGM-158A JASSM-ER. Extended-range version, can attack at a distance of more than 500 miles. Currently in integrated flight testing. Operational test and evaluation is expected to begin in 2011.

**AIM-9 Sidewinder**

**Brief:** A supersonic, short-range, IR guided air-to-air missile with a high-explosive warhead, carried by fighter aircraft.
**Function:** Air-to-air missile.
**First Flight:** September 1953.
**Delivered:** 1957-present. First production AIM-9X delivered May 1, 2002.
**IOC:** circa 1983 (AIM-9M).
**Production:** AIM-9M, sustainment phase; AIM-9X, LRIP from November 2000, with full rate from November 2004.
**Contractor:** Raytheon, Loral.
**Power Plant:** Thiokol Hercules and Bermite Mk 36 Mod 11 solid-propellant rocket motor.
**Guidance:** solid-state IR homing guidance.
**Warhead:** high-explosive, weighing 20.8 lb.
**Dimensions:** length 9.4 ft, body diameter 5 in, fin span 2.1 ft.
**Weight:** launch weight 190 lb.
**Performance:** max speed Mach 2+, range 10+ miles.
**COMMENTARY**
Developed by the Navy for fleet air defense, adapted by USAF for fighter aircraft use. Early versions used extensively in the Vietnam War.
**Extant Variant(s)**

■ AIM-9M. Joint Navy-USAF weapon. All-altitude, all-aspect, launch-and-leave intercept capability. Equips A-10, F-15, F-16, and F/A-18 aircraft. Increased IR counter-countermeasures, improved background discrimination, reduced-smoke rocket motor. First flight in 1978.

■ AIM-9M-9. A modification to improve IRCCM capability of early missiles.

■ AIM-9X. A jointly funded Navy-USAF project, the AIM-9X entered service with USAF's F-15s at Elmendorf AFB, Alaska, in November 2003. USAF plans to buy 5,097 missiles. Carrier aircraft include the F-15, F-16, F-22, F-35, and F/A-18.

**AIM-120 AMRAAM**

**Brief:** A next generation supersonic, medium-range, active radar guided air-to-air missile with a high-explosive warhead.
**Function:** Air-to-air guided missile.
**First Flight:** December 1984.

***AIM-120 AMRAAM*** (1st Lt. Shannon Collins)

**Delivered:** 1988.
**IOC:** September 1991.
**Production:** 10,917+ planned for USAF/USN.
**Contractor:** Raytheon.
**Power Plant:** Alliant boost-sustain solid-propellant rocket motor.
**Guidance:** inertial/command, inertial with active radar terminal homing.
**Warhead:** high-explosive directed fragmentation weighing 48 lb.
**Dimensions:** (B model) length 12 ft, body diameter 7 in, span of tail control fins 2.1 ft.
**Weight:** 335 lb.
**Performance:** cruising speed approx Mach 4, range more than 23 miles.
**COMMENTARY**
Joint USAF-Navy project to replacing AIM-7 Sparrow. Equips F-15, F-16, F-22, F-35, and F/A-18 fighters. Inertial guidance and active radar terminal homing provide launch-and-maneuver capability. Missile features (compared to AIM-7) increased average velocity, reduced miss distance, improved fuzing, better warhead lethality, multiple target engagement capability, improved clutter rejection in low-altitude environments, enhanced electronic protection capability, increased maximum launch range, reduced-smoke motor, and improved maintenance and handling.
**Extant Variant(s)**
■ AIM-120B. Upgraded, reprogrammable variant of AIM-120A.
■ AIM-120C. Weapon with smaller, clipped control surfaces to provide for internal carriage in F-22A and F-35, and involves high-angle off-boresight (HOBS) launch capability. In production.
■ AIM-120D. Latest development (AMRAAM Phase 4). Adds an enhanced electronic protection suite, two-way data link, and GPS-aided navigation. Production began in 2006.

**CBU-87/103 Combined Effects Munition**
**Brief:** The CBU-87 CEM is an area munition effective against light armor, materiel, and personnel and used by USAF and Navy fighters and bombers for interdiction.
**Function:** Area munition.
**Production:** sustainment phase.
**Contractor:** Aerojet General, Honeywell, Alliant Tech.
**Guidance:** none (CBU-87).
**Dimensions:** length 7.7 ft, diameter 1.3 ft.
**Weight:** 949 lb.
**Performance:** dispenses 202 BLU-97 combined effects bomblets over an area roughly 800 ft x 400 ft.
**COMMENTARY**
A cluster-bomb family of weapons which can be delivered as low-accuracy free-fall weapon or with near precision, given installation of a simple tail kit.
**Extant Variant(s)**
■ CBU-87. Unguided gravity weapon. Combined effects type. Dispenses BLU-97 shaped-charge anti-personnel/anti-materiel fragmentary/incendiary bomblets over the target in rectangular pattern. Delivered by USAF and Navy aircraft.
■ CBU-103. Basic CBU-87 CEM given high accuracy with retrofitted Wind-Corrected Munitions Dispenser tail kit. The WCMD improves the munitions delivery accuracy when released from medium to high altitude.

**CBU-89/104 Gator**
**Brief:** The CBU-89 Gator is an anti-armor/anti-personnel mine dispenser used by USAF and Navy fighters and bombers for interdiction.
**Function:** Scatterable mines.
**Production:** sustainment phase.
**Contractor:** Honeywell, Aerojet General, Olan, Alliant Tech.
**Guidance:** none (CBU-89).
**Dimensions:** length 7.7 ft, diameter 1.3 ft.
**Weight:** 705 lb.
**Performance:** dispenses 72 BLU-91 anti-armor and 22 BLU-92 anti-personnel mines.
**COMMENTARY**
Weapons system provides low-cost means to rapidly seed a battlefield with mines delivered from high-speed aircraft and able to destroy armor.
**Extant Variant(s)**
■ CBU-89. Gravity weapon. Dispenser holds 94 mines: 72 anti-tank and 22 anti-personnel. Disperses mines over target in a circular pattern. Able to fuze anti-tank mines for three different time delay settings. Magnetic influence fuze senses armor.
■ CBU-104. Basic gravity-type Gator retrofitted with WCMD tail kit, improving the munitions delivery accuracy when released from medium to high altitude.

**CBU-105 Sensor Fuzed Weapon**
**Brief:** The CBU-97 SFW is an anti-armor munition used by fighters and bombers for multiple kills per pass against moving and stationary land combat vehicles.
**Function:** Wide-area munition.
**First Flight:** circa 1990.
**Delivered:** 1994-2013 (planned).
**IOC:** 1997.
**Production:** 6,500 (planned).
**Contractor:** Textron Systems.
**Guidance:** IR sensors in each warhead search for targets, then detonate over them.
**Dimensions:** length 7.7 ft, diameter 1.3 ft.
**Weight:** 920 lb.
**Performance:** delivers 40 lethal projectiles over an area of about 500 ft x 1,200 ft.
**COMMENTARY**
SUU-66/B tactical munitions dispenser with an FZU-39 fuze and a payload of 10 BLU-108 submunitions. Each submunition contains four "skeet" projectiles that, upon being thrown out, seek out their target and deliver an explosively formed penetrator. Each SFW can deliver a total of 40 lethal 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 after a preset time. The SFW's primary targets are massed tanks, armored personnel carriers, and self-propelled targets.
**Extant Variant(s)**
■ CBU-105. Basic gravity-type CBU-97 equipped with a WCMD tail kit. Can be delivered accurately from high altitude and in adverse weather from the A-10, B-1, B-52H, F-15E, and F-16. Combat debut came in April 2003 in Iraqi Freedom.

**CBU-107 Passive Attack Weapon**
**Brief:** The CBU-107 Passive Attack Weapon (PAW) provides the capability to attack nonhardened surface targets, with a minimum of collateral and environmental damage.
**Function:** Wide-area munition.
**First Flight:** 2002.
**Delivered:** 2002-03.
**IOC:** December 2002.
**Production:** not available, but completed March 2003.
**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 1.3 ft.
**Weight:** 1,000 lb.
**Performance:** delivers a high-speed volley of 3,000+ metal "arrows" projected from a single canister; three types of projectiles: 350 x 15 in-long rods, 1,000 x 7 in-long rods, and 2,400 small-nail size.
**COMMENTARY**
Developed to give USAF aircraft a weapon which could destroy a target but with minimum collateral and environmental damage. After release, weapon glides toward its target. Before impact, inner chamber containing the rods begins to rotate and the "arrows" are ejected in rapid succession by centrifugal force, penetrating a target within a 200-ft radius.
**Extant Variant(s)**
■ CBU-107A. Weapon destroys target with kinetic energy rather than explosive. Houses various sizes of penetrator rods inside bomb casing. Guided by a WCMD tail kit to help with accuracy. Full production completed in six months. Used during Iraqi Freedom. Equips B-52, F-15E, and F-16 aircraft.

**GBU-10 Paveway II**
**Brief:** An unpowered laser guided bomb (LGB) used to destroy high-value enemy targets from short standoff distances.
**Function:** Air-to-surface guided munition.
**First Flight:** early 1970s.
**Delivered:** from 1976.
**IOC:** 1976.
**Production:** 10,000; continuing.
**Contractor:** Lockheed Martin, Raytheon.
**Guidance:** semiactive laser.
**Warhead:** GBU-10C/D/E/F: Mk 84 bomb (2,000 lb unitary); GBU-10G/H/J: BLU-109.
**Dimensions:** length GBU-10C/D/E/F 14.1 ft, GBU-10G/H/J 14 ft; body diameter: GBU-10C/D/E/F 1.5 ft, GBU-10G/H/J 1.2 ft; wingspan 5.5 ft.
**Weight:** 1,985 lb.
**Performance:** circular error probable (CEP) 29.7 ft, range 9.2 miles.
**COMMENTARY**
Folding-wing laser and GPS guided weapon used primarily for precision bombing against nonhardened targets but capable of penetration. Can operate in cloud ceilings down to 2,500 ft. GBU-10 platforms include A-10, B-52, F-15E, and F-16 aircraft.
**Extant Variant(s)**
■ Paveway II LGB. Laser guidance provides high accuracy over distances up to 40,000 ft. More than 200,000 produced.
■ Enhanced Paveway II DMLGB. Dual-mode

laser and GPS guidance offers accurate attack out to 80,000 ft.
■ Paveway III LGB. Can be used in low-level attack, accurate at ranges up to 100,000 ft.
■ Enhanced Paveway III DMLGB. Dual-mode laser and GPS guidance offers accurate attack out to 120,000 ft.

**GBU-12/49 Paveway II**
**Brief:** An unpowered LGB used to destroy high-value enemy targets from short standoff distances.
**Function:** Air-to-surface guided munition.
**First Flight:** early 1970s.
**IOC:** 1976.
**Production:** about 30,000; continuing.
**Contractor:** Lockheed Martin, Raytheon.
**Guidance:** semiactive laser.
**Warhead:** Mk 82 (500 lb) blast/fragmentation bomb.
**Dimensions:** length 10.9 ft, body diameter 10.7 in, wingspan 4.4 ft.
**Weight:** 603 lb.
**Performance:** CEP 29.7 ft, range about six miles.
**COMMENTARY**
Improved versions of the earlier fixed wing Paveway I.
**Extant Variant(s)**
■ GBU-12 Paveway II. Used primarily to strike fixed armor. Can operate in cloud ceilings down to 2,500 ft. Equips A-10, B-52, F-15E, F-16, and MQ-9 aircraft.
■ GBU-49(V)/B (EGBU-12) Paveway II. Features both laser guidance and onboard GPS for all-weather, precision delivery capability. Arming MQ-9 Reaper aircraft.

**GBU-15**
**Brief:** An unpowered bomb carried by the F-15E and used to destroy high-value enemy targets from short standoff distances.
**Function:** Air-to-surface guided munition.
**First Flight:** 1975.
**Delivered:** 1983-complete.
**IOC:** 1983.
**Production:** more than 2,000.
**Contractor:** Boeing, Raytheon.
**Guidance:** TV or IIR seeker.
**Warhead:** Mk 84 bomb (2,000 lb unitary) or BLU-109.
**Dimensions:** length 12 ft 10 in, body diameter 1 ft 6 in, wingspan 4 ft 11 in.
**Weight:** 2,500 lb.
**Performance:** cruising speed subsonic, range about 17 miles, CEP about 10 ft.
**COMMENTARY**
Air-launched, cruciform-wing glide bomb fitted with a guidance system to give it pinpoint accuracy from low or medium altitudes. Has standoff capability. Development began in 1974, based on experience gained in Vietnam with the earlier Pave Strike GBU-8 modular weapon program. The GBU-15 is intended for tactical use to suppress enemy defenses and to destroy heavily defended targets. In direct attack, weapon locks on target before launch and flies a near-line-of-sight profile to impact. In the indirect mode, the seeker can be locked on to the target after launch, or the operator can fly the weapon manually to impact.
**Extant Variant(s)**
■ GBU-15(V)1/B. A TV guided variant, qualified for operational service in 1983.
■ GBU-15(V)2/B. IIR version entered service in 1987.
■ GBU-15-I. Combines accuracy of GBU-15 with the penetration capability of the improved 2,000 lb BLU-109/B penetrator bomb.
■ EGBU-15. GPS guided variant, allowing pilot to select either TV, IR, or GPS guidance over the target. Entered USAF service in 1999.

**GBU-24 Paveway III**
**Brief:** A precise air-to-ground low-level LGB (LLLGB) equipped with an advanced guidance kit.
**Function:** Air-to-surface penetrating glide bomb.
**First Flight:** GBU-24A/B in service May 1985.
**Delivered:** from 1986.
**IOC:** 1986.
**Production:** 14,000.
**Contractor:** Raytheon.
**Guidance:** semiactive laser.
**Warhead:** BLU-109 (A/B).
**Dimensions:** length 14.2 ft.
**Weight:** 2,350 lb.


***GBU-12*** (USAF)

**Performance:** range more than 11.5 miles.
**COMMENTARY**
Precision weapon that is effective against a broad range of high-value hard targets. Can be dropped from low, medium, or high altitude. Offers operational flexibility through use of adaptive digital autopilot and large field-of-regard, highly sensitive scanning seeker.
**Extant Variant(s)**
■ GBU-24A/B. Air-to-ground weapon equipped with third generation Paveway III guidance kit, integrated with a BLU-109 penetrating warhead. Advanced guidance section and high-lift airframe.

**GBU-28 Bunker Buster**
**Brief:** A large 5,000 lb class air-to-ground penetrating warhead (BLU-113/B) equipped with an advanced laser guidance kit, used for striking and destroying hard and deeply buried targets.
**Function:** Air-to-surface guided glide bomb.
**First Flight:** February 1991.
**Delivered:** circa 1991.
**IOC:** 1991.
**Production:** approx 500.
**Contractor:** Raytheon.
**Guidance:** laser.
**Dimensions:** length 19.2 ft, diameter 1.2 ft.
**Weight:** 4,676 lb.
**Performance:** range more than 5.75 miles.
**COMMENTARY**
Developed during Desert Storm for use against Iraq's deeply buried, hardened C2 facilities. Four GBU-28 used during the war: two for testing and two by F-111Fs against a bunker complex Feb. 27, 1991. Guidance is by a modified GBU-27 system.
**Extant Variant(s)**
■ GBU-28B/B. Integrates GPS/INS guidance into the existing GBU-28 guidance control unit to provide poor weather capability and improved target location. Entered production in 1999.
■ GBU-28C/B. Equipped with improved BLU-122/B warhead for increased penetration, lethality. Guidance and control provided by Enhanced Paveway III system with GPS/INS and laser capability. Entered production in 2005.

**GBU-31/32/38 Joint Direct Attack Munition**
**Brief:** A joint USAF-Navy INS/GPS guided weapon, carried by fighters and bombers, that provides highly accurate, autonomous, all-weather conventional bombing capability.
**Function:** Air-to-surface guided bomb.
**First Flight:** Oct. 22, 1996.
**Delivered:** 1998-2013 (planned).
**IOC:** 1998.
**Production:** 213,521 (planned).
**Contractor:** Boeing, Textron, Honeywell.
**Guidance:** INS/GPS.
**Dimensions:** Mk 84 with JDAM, 12.8 ft; BLU-109 with JDAM, 12.4 ft; Mk 83 with JDAM, 10 ft; Mk 82 with JDAM, 8 ft.
**Weight:** Mk 84 2,036/2,056 lb (USAF/USN); BLU-109 2,115/2,135 lb; Mk 83 1,013/1,028 lb; Mk 82 552/558 lb.
**Performance:** range up to 17 miles, CEP with GPS 16.4 ft, CEP with INS only 98 ft.
**COMMENTARY**
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. Acquires target information through aircraft's avionics system. Guided to target by inertial guidance kit with periodic GPS updates. Equips A-10, B-1, B-2, B-52, F-15E, F-16, F-22, MQ-9, AV-8B, F/A-18, with future integration on F-35 aircraft.
**Extant Variant(s)**
■ GBU-31. Variant adds INS/GPS guidance kit to the 2,000-lb general-purpose Mk 84 bomb or the 2,000-lb BLU-109 penetrator. First used in combat March 24, 1999.
■ GBU-32. Variant adds an INS/GPS guidance kit to the 1,000-lb general-purpose Mk 83 bomb or the 1,000-lb BLU-110 bomb.
■ GBU-38. Variant adds an INS/GPS guidance kit to the 500-lb general-purpose Mk 82 bomb or the 500-lb BLU-111 bomb.

**GBU-39 Small Diameter Bomb**
**Brief:** Extended-range all-weather, day/night 250-lb class near-precision guided munition (PGM). Provides increased loadout to achieve multiple kills per sortie and decreases collateral damage.
**Function:** Air-to-surface guided munition.
**First Flight:** May 23, 2003 (guided).
**Delivered:** from 2006.
**IOC:** 2007.
**Production:** 24,000 munitions and 2,000 carriages (planned).
**Contractor:** Boeing, SDB I; Raytheon, SDB II.
**Guidance:** GPS/INS augmented by Differential GPS.
**Dimensions:** length 70.8 in (munition); 126.4 in (carriage); 143.1 in (carriage with four munitions).
**Weight:** 285 lb (munition); 320 lb (carriage); 1,460 lb (carriage with four munitions).
**Performance:** near-precision capability at standoff range up to 46 miles.
**COMMENTARY**
Capable of destroying high-priority fixed and stationary targets from fighters and bombers in internal bays or on external hardpoints. Can be targeted and released against single or multiple targets. Acquires target coordinates prior to release. Relies on GPS/INS augmented by Differential GPS to self-navigate to the impact point. BRU-61/A smart carriage carries up to four 250-lb class GBU-39/B munitions.
**Extant Variant(s)**
■ GBU-39B SDB I. Went operational in 2006 on F-15E. Also equips A-10, B-1, B-2, B-52, F-16, F-22, F-35, and MQ-9. Contract to develop weapon issued in 2003. Fifty weapons for operational assessment delivered in 2008, with an additional 50 weapons in the inventory.


***GBU-43/B MOAB Bomb*** (USAF)

■ GBU-39B SDB II. Increment 2 under development, providing a capability to attack mobile targets from standoff in all weather.

**GBU-43 MOAB Bomb**
**Brief:** A massive PGM.
**Function:** Massive bomb.
**Guidance:** GPS/INS.
**Warhead:** 18,000 lb, high explosive.
**Dimensions:** length 30 ft, diameter 3.3 ft.
**Weight:** 21,500 lb.
**COMMENTARY**
Large, powerful, and accurately delivered conventional high-explosive bomb. Developed in only nine weeks to be available for the Iraq campaign of 2003. Given name "Massive Ordnance Air Blast," or MOAB, which also is known unofficially as "Mother of All Bombs." Live-tested in 2003; dropped from the rear of a C-130 without a parachute. Provides power to attack large area targets or enemy hidden in tunnels or caves.
**Extant Variant(s)**
■ GBU-43B. GPS guided munition with fins and inertial gyro for pitch and roll control. Weighs 21,000 lb, of which 18,700 lb is attributed to BLU 120/B warhead. History's largest satellite guided, air delivered weapon.

**GBU-54 Laser JDAM**
A joint USAF-Navy INS/GPS guided weapon equipped with a laser seeker, carried by fighters, providing highly accurate, autonomous, all-weather conventional bombing capability against stationary and moving targets.
**Function:** Air-to-surface guided bomb.
**First Flight:** 2005.
**Delivered:** April 2008-mid-2009.
**IOC:** 2008.
**Production:** 400 laser guidance kits.
**Contractor:** Boeing.
**Guidance:** INS/GPS/laser.
**Dimensions:** Mk 82 with JDAM 8 ft.
**Weight:** 552/558 lb.
**Performance:** range up to 17 miles.
**COMMENTARY**
Developed to satisfy an urgent operational requirement for extremely accurate precision weapon capable of destroying high-speed targets in Afghanistan and Iraq. Combines a laser guidance kit with the GPS/INS-based navigation of existing 500-lb GBU-38 JDAMs. First combat deployment in Iraq in 2008.
**Extant Variant(s)**
■ GBU-54B Laser JDAM. Dual mode 500 lb guided weapon. Adds DSU 38/B laser seeker to the JDAM's existing GPS/INS guidance. Features ability to attack moving targets with precision. First test in 2005; weapon released at 25,000 ft and six miles from target fell within five ft of designated impact point. Tests against moving targets showed similar accuracies.

**GBU-57 Massive Ordnance Penetrator**
**Brief:** A massive earth-penetrating weapon for use against hard and deeply buried targets.
**Function:** Massive bomb.
**Guidance:** GPS.
**Warhead:** 5,300 lb high explosive.
**Dimensions:** length 20.5 ft, diameter 31.5 in.
**Weight:** 30,000 lb.
**COMMENTARY**
Genesis of program was Iraqi Freedom, where analysis of sites hit with "bunker-buster" bombs revealed poor penetration. Development of the MOP under way at the Air Force Research Laboratory, Munitions Directorate, Eglin AFB, Fla. USAF planning to integrate weapon on B-2A stealth bomber.
**Extant Variant(s)**
■ GBU-57A. Original prototype of the weapon.
■ GBU-57B. Will equip an undisclosed number of B-2 bombers. Plans called for bomb deployment at the end of 2010. At least one successful flight-test launch.

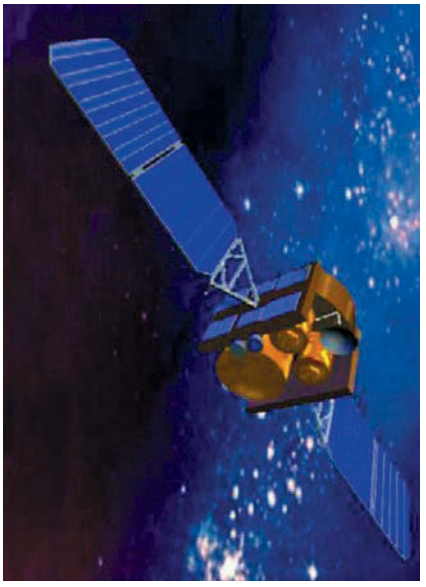
## Satellite Systems

**Advanced EHF Satellite System**
**Brief:** Joint service satellite communications system that provides global, secure, protected, and jam-resistant strategic and tactical communications for high-priority air, ground, and sea assets.
**Function:** Near-worldwide, secure, survivable satellite communications.
**Operator:** AFSPC.
**First Launch:** 2010.
**IOC:** Late 2013 (planned).
**Constellation:** four.
**Design Life:** 14 years.
**Launch Vehicle:** Atlas V.
**Operational Location:** Schriever AFB, Colo.
**Orbit Altitude:** Geosynchronous at 22,000+ miles.
**Contractor:** Lockheed Martin, Northrop Grumman.
**Power Plant:** Solar arrays generating 20,000 watts.
**Dimensions:** length 31 ft, width 98 ft (with full solar array extension).
**Weight:** 13,400 lb.
**Performance:** provides worldwide coverage between 65 north and 65 south latitude.
**COMMENTARY**
Joint service program begun during the Cold War with the fielding of Milstar and continued with the Advanced EHF (AEHF) satellite system. Backbone of strategic-tactical DOD communications. Provides secure, anti-jam communications around the world. Uses cross-linked satellites, eliminating the need for ground relay stations. Offers 24-hour-a-day capability.

**Defense Meteorological Satellite Program**
**Brief:** Satellites that collect air, land, sea, and space environmental data to support worldwide strategic and tactical military operations. Also shares data with civil agencies.
**Function:** Space and Earth environmental data collection satellite.
**Operator:** National Oceanic and Atmospheric Administration (NOAA).
**First Launch:** May 23, 1962.
**IOC:** 1965.
**Constellation:** two low Earth orbit (LEO) with one primary spacecraft in each.
**Design Life:** 48 months.
**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 Plant:** solar arrays generating 1,200-1,300 watts.
**Dimensions:** length 25 ft (with array deployed), width 4 ft.
**Weight:** 2,545 lb, including 772-lb sensor; 2,270 lb with 592-lb sensor payload.
**Performance:** DMSP satellites orbit Earth in polar orbits and primary sensor scans an area 1,800 miles wide. Each system covers the Earth in about 6 hr.
**COMMENTARY**
Critical system for the past 40+ years. Provides timely and high-quality weather information to strategic and tactical combat units worldwide. Uses operational linescan sensor to image cloud cover in visible and thermal IR and analyze cloud patterns. Equipped with microwave imagers and sounders and a suite of space environment sensors that provide critical land, sea, and space environment data. Data shared with civil agencies. AFSPC's Space and Missile Systems Center (SMC), Los Angeles AFB, Calif., handles development and acquisition of DMSP systems.
**Extant Variant(s)**
■ 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. Last launched in 2009. DMSP has two more spacecraft awaiting launch on need.

**Defense Satellite Communications System**
**Brief:** Joint service satellite system that provides high-capacity communications for deployed air, land, and sea forces.
**Function:** Communications satellite.
**Operator:** AFSPC.

***AEHF Satellite System*** (Lockheed Martin)



***DSCS*** (USAF illustration)

**First Launch:** DSCS II 1971; DSCS III 1982; DSCS III/SLEP 2000.
**IOC:** Dec. 13, 1978 (DSCS II).
**Constellation:** five (III); 14 deployed/eight currently 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 Plant:** 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:** DSCS satellites orbit Earth at about 22,000 miles altitude and employ six SHF transponder channels for secure voice and high-rate data communications.
**COMMENTARY**
Workhorse of US military's SHF communications. Provides military communications to troops in the field and commanders worldwide. SMC sustains DSCS.
**Extant Variant(s)**
■ DSCS III. Most recent configuration. Final (of 14) DSCS IIIs launched in 2003. Provides secure, uninterrupted voice and high data rate communications to military users. Used throughout Desert Storm and is the primary communications link for US forces in Bosnia and Iraq. Final four satellites received SLEP, providing higher power amplifiers, more sensitive receivers, and increased antenna connection options. Payload comprises six independent SHF transponder channels. Also carries a special-purpose single channel transponder.

**Defense Support Program**
**Brief:** An early warning spacecraft in geosynchronous orbit that provides alert of possible ballistic missile attack on US forces or homeland.
**Function:** Strategic and tactical launch detection system.
**Operator:** AFSPC.
**First Launch:** November 1970.
**IOC:** circa 1972.
**Constellation:** classified.
**Design Life:** Three yr requirement and five yr goal.
**Launch Vehicle:** Titan IV with inertial upper stage; Delta IV Heavy EELV.
**Operational Location:** Buckley AFB, Colo.; Schriever AFB, Colo.
**Orbit Altitude:** Geosynchronous at 22,000+ miles.
**Contractor:** TRW (now Northrop Grumman), Aerojet.
**Power Plant:** solar arrays generating 1,485 watts.
**Dimensions:** diameter 22 ft, height 32.8 ft, with solar paddles deployed.
**Weight:** 5,000 lb (approx).
**Performance:** Orbits at approx 22,000+ miles altitude in geosynchronous orbit; uses IR sensors to sense heat from missile and booster plumes against Earth's background.
**COMMENTARY**
Key part of North American and theater early warning systems. Capable of detecting missile launches and nuclear detonations. Originally aimed at Soviet military. Used extensively in Gulf War to detect theater missile launches against coalition forces. Successful in detecting launches, enabling timely warnings of attacks. Now accommodates 6,000 detectors, uses 1,274 watts of power, weighs some 5,200 lb. Can be used as part of early warning system for natural disasters such as forest fires. Undergone five major upgrades over the years. The 23rd and final DSP satellite launched in December 2007.
**Extant Variant(s)**
■ Phase I. Four satellites launched in period 1970-73.
■ Phase II. Three satellites launched in period 1975-77.
■ Multiorbit Satellite Performance Improvement Modification (MOS/PIM). Four satellites in period 1979-84.
■ Phase II Upgrade. Two satellites in period 1984-87.
■ DSP-1. Nine satellites in period 1989-present.

**Global Positioning System**
**Brief:** A US space-based radio-positioning system that provides 24-hour worldwide highly accurate three-dimensional location information and precision velocity and timing services to military and civilian users.
**Function:** Worldwide navigation, timing, and velocity satellite constellation.
**Operator:** AFSPC.
**First Launch:** Feb. 22, 1978.
**IOC:** Dec. 9, 1993.
**Constellation:** 31 spacecraft (11 IIA, 1 IIF, 12 IIR, 7 IIR-M).
**Design Life:** 7.5 yr (II/IIA); 12 yr (IIF); 7.5 yr (IIR/IIR-M); 15 yr (IIIA).
**Launch Vehicle:** Delta II, Delta IV.
**Operational Location:** Schriever AFB, Colo.
**Orbit Altitude:** 10,988 miles.
**Contractor:** Boeing (II, IIA, IIF), Lockheed Martin (IIR, IIR-M, IIIA).
**Power Plant:** 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 ft x 6.5 ft 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:** GPS satellites orbit the Earth every 12 hr, emitting continuous navigation signals. The signals are so accurate that time can be figured to within one-millionth of a second, velocity within a fraction of a mile per hr, and location to within a few ft. Receivers are used in aircraft, ships, and land vehicles and can also be handheld.
**COMMENTARY**
Fundamental contribution to precision bombing, CSAR, mapping, and rendezvous. Provides accurate three-dimensional (latitude, longitude, and altitude) position, velocity, and time data in an uninterrupted way.
**Extant Variant(s)**
■ GPS Block IIA. Launched first in 1997. Current constellation consist of 11 IIAs launched to replace original GPS Block I series.
■ GPS Block IIF. Equipped with extended design life, faster processors, and a new civil signal on a third frequency. First launched in 2010.
■ GPS Block IIR-M. Launched first in 2005. Offers variety of benefits such as two new signals, enhanced encryption and anti-jamming capabilities, and second civil signal.
■ GPS Block IIIA. Future generation expected to

***GPS IIF*** (USAF illustration)

provide improved accuracy, availability, integrity, and resistance to jamming. Launch is slated for 2014.

**Milstar Satellite Communications System**
**Brief:** A joint service satellite communications system that provides global, secure, protected, and jam-resistant strategic and tactical communications at all levels of conflict for high-priority air, ground, and sea assets.
**Function:** Military communications satellite.
**Operator:** AFSPC.
**First Launch:** Feb. 7, 1994.
**IOC:** July 1997 (Milstar I).
**Constellation:** five.
**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, TRW (now Northrop Grumman).
**Power Plant:** solar arrays generating 8,000 watts.
**Dimensions:** length 51 ft, width 116 ft with full solar array extension.
**Weight:** 10,000 lb.
**Performance:** constellation consists of five satellites in low-inclined geosynchronous orbit, providing worldwide coverage between 65 degrees north and 65 degrees south latitude. The oldest two satellites are still operational beyond their 10-yr design life.
**COMMENTARY**
Joint service program begun during the Cold War. Backbone of strategic-tactical DOD communications. Provides secure, anti-jam communications around the world. Uses cross-linked satellites, eliminating the need for ground relay stations. Offers 24-hour-a-day capability. Last of six satellites launched in 2003.
**Extant Variant(s)**
■ Block I. Comprises two satellites—USA-99 and USA-115—launched in the period 1994-95. Both still active.
■ Block II. Comprises four satellites—USA-143, 157, 164, and 169. All launched in period 1999-2003. USA-143 suffered launch failure. Other three still active.

**ORS-1 Satellite**
**Brief:** An ISR satellite based on an existing IR platform to provide essential intelligence gathering capabilities in direct support to US national security interests.
**Function:** Intelligence collection for specific area of responsibility (AOR).
**Operator:** AFSPC.
**First Launch:** 2011 (planned).
**IOC:** TBD.
**Constellation:** one (with possibility of second).
**Design Life:** one yr.
**Launch Vehicle:** Minotaur.
**Operational Location:** Schriever AFB, Colo.
**Orbit Altitude:** approx 249 miles.
**Contractor:** Goodrich, ATK (bus).
**COMMENTARY**
Developed by DOD's Operationally Responsive Space (ORS) office in response to an urgent need voiced in 2008. ORS-1 will provide multi-spectral imaging capability to support US Central Command's ISR mission needs. Commercial and government products used primarily to cut development time. Flown on the Multimission Space Operations Center ground system, which will be used for future mission-unique space systems.
**Extant Variant(s)**
■ ORS-1. Combines use of existing U-2 imaging technology with the proven TacSat-3 satellite bus. Tasking will come from CENTCOM, while mission execution will be accomplished by the 1st SOPS at Schriever AFB, Colo.

**Space Based Infrared System**
**Brief:** Advanced surveillance system for missile warning, missile defense, battlespace characterization, and technical intelligence. System includes satellites in geosynchronous Earth orbit (GEO) and highly elliptical orbit (HEO).
**Function:** IR space surveillance.
**Operator:** AFSPC.
**First Launch:** GEO FY11 (planned).
**IOC:** December 2001 (Increment 1).
**Constellation:** four GEO sats, two HEO sensors (planned).
**Design Life:** not available.
**Launch Vehicle:** GEO, Atlas V.
**Operational Location:** Buckley AFB and Schriever AFB, Colo.
**Orbit Altitude:** Geosynchronous and high elliptical.
**Contractor:** Lockheed Martin, Northrop Grumman.
**Power Plant:** solar array, 2,435 watts (GEO).
**Dimensions:** GEO 7 x 6.3 x 19.7 ft.
**Weight:** 5,442 lb (GEO on orbit)
**COMMENTARY**
Follow-on to the Defense Support Program satellite. System includes GEO satellites, HEO payloads, and ground assets. Fielded in increments: Increment 1 consolidated all DSP ground processing in one CONUS mission control station at Buckley. IOC declared Dec. 18, 2001. Increment 2 covers fielding of the space and ground assets. Following initial early on-orbit checks, HEO-1, the first SBIRS payload, was cleared for operational service in late 2008. HEO-2 was cleared for operational service in August 2009. The HEO payloads are the first components of the Increment 2 constellation. GEO-1 is expected to launch in 2011.

**Space Based Surveillance System**
**Brief:** Planned replacement for the Midcourse Space Experiment/Space Based Visible (MSX/SBV) satellite. Gives the US space-based capability to provide metric and characterization data on objects in space.
**Function:** Space surveillance and object identification.
**Operator:** AFSPC.
**First Launch:** September 2010.
**IOC:** May 2011 (planned).
**Constellation:** one LEO satellite.
**Design Life:** seven years.
**Launch Vehicle:** Minotaur IV.
**Operational Location:** Vandenberg AFB, Calif.
**Orbit Altitude:** 390 miles, sun-synchronous orbit.
**Contractor:** Boeing (system integration, ground segment, operations and sustainment); Ball Aerospace (satellite).
**Power Plant:** 750 watts, powered from solar arrays and batteries.
**Dimensions:** (approx) height 10 ft; 10 ft x 3.2 ft, plus solar panels.
**Weight:** (approx) 2,273 lb.
**COMMENTARY**
Will track and collect optical signatures of Earth-orbiting objects from a space-based platform. First operational satellite (SSBS Block 10) launched in September 2010. The satellite will be commanded and controlled by the 50th Space Wing, Schriever AFB, Colo., using the global Air Force Satellite Control Network.

**Wideband Global SATCOM**
**Brief:** Satellites that provide high-capacity communications for deployed forces (air, land, and sea).
**Function:** Military communications satellite.
**Operator:** AFSPC.
**First Launch:** October 2007.
**IOC:** April 16, 2008.
**Constellation:** three sats on orbit; three more planned.
**Design Life:** 14 years.
**Launch Vehicle:** Atlas V, Delta IV.
**Operational Location:** Schriever AFB, Colo.
**Orbit Altitude:** Geosynchrous at 22,000+ miles.
**Contractor:** Boeing.
**Power Plant:** 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.
**COMMENTARY**
Designed to augment DSCS III and the Global Broadcast System. Each WGS satellite provides approximately 10 times the capacity of each DSCS III satellite. Equipped with fully duplexed communications platform offering combat forces major increase in capacity, connectivity, and interoperability. Direct broadcast of digital multimedia, high-bandwidth imagery, and video information directly from global and theater sites to deployed combat forces. Features X-band, Ka-band broadcast, two-way Ka-band services, and cross-channelization between its X- and Ka-band services. Full operational capability is expected following the launch of the fifth satellite. ■

***Milstar*** (Lockheed Martin illustration)

# Leaders Through the Years



## The Nation's Air Arm and Its Early Leaders

| Designation | Commander | Dates of Service |
|---|---|---|
| **Aeronautical Division, US Signal Corps** | **Chief, Aeronautical Division** | |
| Aug. 1, 1907-July 18, 1914 | 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] | **Chief, Aviation Section** | |
| July 18, 1914-May 20, 1918 | 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** | **Director of Military Aeronautics** | |
| May 20, 1918-May 24, 1918 | Maj. Gen. William L. Kenly (Kept same title three months into absorption by Air Service) | May 20, 1918-August 1918 |
| **Army Air Service** | **Director of Air Service** | |
| May 24, 1918-July 2, 1926 | 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 |
| **Army Air Corps**[b] | **Chief of Air Corps** | |
| July 2, 1926-Sept. 18, 1947 | 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** | **Chief, Army Air Forces** | |
| June 20, 1941-Sept. 18, 1947 | 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** | **Chief of Staff** | |
| Sept. 18, 1947 | Gen. Carl A. Spaatz | Sept. 26, 1947-April 29, 1948 |

[a]Between April 1917 and May 1918, the Aviation Section was known by various other names: Aeronautical Division, Airplane Division, Air Division, and Air Service Division.

[b]The Army Air Corps became a subordinate element of the Army Air Forces June 20, 1941. Since the Army 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 Army Air Corps continued to exist as a combatant arm, and personnel of the Army Air Forces were still assigned to the Army Air Corps.

[c]The title General of the Army for Henry H. Arnold was changed to General of the Air Force by an act of Congress May 7, 1949. The position of Chief of Staff was established by a DOD-approved Army-Air Force Transfer Order issued Sept. 28, 1947.

# Headquarters USAF Leaders

## Secretaries of the Air Force

| | | |
|---|---|---|
| Stuart Symington | Sept. 18, 1947 | April 24, 1950 |
| Thomas K. Finletter | April 24, 1950 | Jan. 20, 1953 |
| Harold E. Talbott | Feb. 4, 1953 | Aug. 13, 1955 |
| Donald A. Quarles | Aug. 15, 1955 | April 30, 1957 |
| James H. Douglas Jr. | May 1, 1957 | Dec. 10, 1959 |
| Dudley C. Sharp | Dec. 11, 1959 | Jan. 20, 1961 |
| Eugene M. Zuckert | Jan. 24, 1961 | Sept. 30, 1965 |
| Harold Brown | Oct. 1, 1965 | Feb. 15, 1969 |
| Robert C. Seamans Jr. | Feb. 15, 1969 | May 14, 1973 |
| John L. McLucas* | May 15, 1973 | Nov. 23, 1975 |
| James W. Plummer (acting) | Nov. 24, 1975 | Jan. 1, 1976 |
| Thomas C. Reed | Jan. 2, 1976 | April 6, 1977 |
| John C. Stetson | April 6, 1977 | May 18, 1979 |
| Hans Mark* | May 18, 1979 | Feb. 9, 1981 |
| Verne Orr | Feb. 9, 1981 | Nov. 30, 1985 |
| Russell A. Rourke | Dec. 9, 1985 | April 7, 1986 |
| Edward C. Aldridge Jr.* | April 8, 1986 | Dec. 16, 1988 |
| James F. McGovern (acting) | Dec. 16, 1988 | April 29, 1989 |
| John J. Welch Jr. (acting) | April 29, 1989 | May 21, 1989 |
| Donald B. Rice | May 22, 1989 | Jan. 20, 1993 |
| Michael B. Donley (acting) | Jan. 20, 1993 | July 13, 1993 |
| Gen. Merrill A. McPeak (acting) | July 14, 1993 | Aug. 5, 1993 |
| Sheila E. Widnall | Aug. 6, 1993 | Oct. 31, 1997 |
| F. Whitten Peters* | Nov. 1, 1997 | Jan. 20, 2001 |
| Lawrence J. Delaney (acting) | Jan. 20, 2001 | June 1, 2001 |
| James G. Roche | June 1, 2001 | Jan. 20, 2005 |
| Peter B. Teets (acting) | Jan. 20, 2005 | March 25, 2005 |
| Michael L. Dominguez (acting) | March 25, 2005 | July 29, 2005 |
| Preston M. Geren (acting) | July 29, 2005 | Nov. 3, 2005 |
| Michael W. Wynne | Nov. 3, 2005 | June 20, 2008 |
| Michael B. Donley* | June 21, 2008 | |

*Served as acting Secretary: McLucas, until July 18, 1973; Mark, until July 26, 1979; Aldridge, until June 9, 1986; Peters, until July 30, 1999; Donley, until Oct. 17, 2008.

## USAF Chiefs of Staff

| | | |
|---|---|---|
| Gen. Carl A. Spaatz | Sept. 26, 1947 | April 29, 1948 |
| Gen. Hoyt S. Vandenberg | April 30, 1948 | June 29, 1953 |
| Gen. Nathan F. Twining | June 30, 1953 | June 30, 1957 |
| Gen. Thomas D. White | July 1, 1957 | June 30, 1961 |
| Gen. Curtis E. LeMay | June 30, 1961 | Jan. 31, 1965 |
| Gen. John P. McConnell | Feb. 1, 1965 | July 31, 1969 |
| Gen. John D. Ryan | Aug. 1, 1969 | July 31, 1973 |
| Gen. George S. Brown | Aug. 1, 1973 | June 30, 1974 |
| Gen. David C. Jones | July 1, 1974 | June 20, 1978 |
| Gen. Lew Allen Jr. | July 1, 1978 | June 30, 1982 |
| Gen. Charles A. Gabriel | July 1, 1982 | June 30, 1986 |
| Gen. Larry D. Welch | July 1, 1986 | June 30, 1990 |
| Gen. Michael J. Dugan | July 1, 1990 | Sept. 17, 1990 |
| Gen. John Michael Loh (acting) | Sept. 18, 1990 | Oct. 29, 1990 |
| Gen. Merrill A. McPeak | Oct. 30, 1990 | Oct. 25, 1994 |
| Gen. Ronald R. Fogleman | Oct. 26, 1994 | Sept. 1, 1997 |
| Gen. Ralph E. Eberhart (acting) | Sept. 2, 1997 | Oct. 5, 1997 |
| Gen. Michael E. Ryan | Oct. 6, 1997 | Sept. 6, 2001 |
| Gen. John P. Jumper | Sept. 6, 2001 | Sept. 2, 2005 |
| Gen. T. Michael Moseley | Sept. 2, 2005 | July 12, 2008 |
| Gen. Duncan J. McNabb (acting) | July 12, 2008 | Aug. 12, 2008 |
| Gen. Norton A. Schwartz | Aug. 12, 2008 | |

## USAF Vice Chiefs of Staff

| | | |
|---|---|---|
| Gen. Hoyt S. Vandenberg | Oct. 10, 1947 | April 28, 1948 |
| Gen. Muir S. Fairchild | May 27, 1948 | March 17, 1950 |
| Lt. Gen. Lauris Norstad (acting) | May 22, 1950 | Oct. 9, 1950 |
| Gen. Nathan F. Twining | Oct. 10, 1950 | June 29, 1953 |
| Gen. Thomas D. White | June 30, 1953 | June 30, 1957 |
| Gen. Curtis E. LeMay | July 1, 1957 | June 30, 1961 |
| Gen. Frederic H. Smith Jr. | July 1, 1961 | June 30, 1962 |
| Gen. Willliam F. McKee | July 1, 1962 | July 31, 1964 |
| Gen. John P. McConnell | Aug. 1, 1964 | Jan. 31, 1965 |
| Gen. William H. Blanchard | Feb. 19, 1965 | May 31, 1966 |
| Lt. Gen. Hewitt T. Wheless (acting) | June 13, 1966 | July 31, 1966 |
| Gen. Bruce K. Holloway | Aug. 1, 1966 | July 31, 1968 |
| Gen. John D. Ryan | Aug. 1, 1968 | July 31, 1969 |
| Gen. John C. Meyer | Aug. 1, 1969 | April 30, 1972 |
| Gen. Horace M. Wade | May 1, 1972 | Oct. 31, 1973 |
| Gen. Richard H. Ellis | Nov. 1, 1973 | Aug. 18, 1975 |
| Gen. William V. McBride | Sept. 1, 1975 | March 31, 1978 |
| Gen. Lew Allen Jr. | April 1, 1978 | June 30, 1978 |
| Gen. James A. Hill | July 1, 1978 | Feb. 29, 1980 |
| Gen. Robert C. Mathis | March 1, 1980 | May 31, 1982 |
| Gen. Jerome F. O'Malley | June 1, 1982 | Oct. 5, 1983 |
| Gen. Lawrence A. Skantze | Oct. 6, 1983 | July 31, 1984 |
| Gen. Larry D. Welch | Aug. 1, 1984 | July 31, 1985 |
| Gen. John L. Piotrowski | Aug. 1, 1985 | Jan. 31, 1987 |
| Gen. Monroe W. Hatch Jr. | Feb. 1, 1987 | May 24, 1990 |
| Gen. John Michael Loh | May 25, 1990 | March 25, 1991 |
| Gen. Michael P. C. Carns | May 16, 1991 | July 28, 1994 |
| Gen. Thomas S. Moorman Jr. | July 29, 1994 | July 11, 1997 |
| Gen. Ralph E. Eberhart | July 11, 1997 | May 26, 1999 |
| Gen. Lester L. Lyles | May 27, 1999 | April 17, 2000 |
| Gen. John W. Handy | April 17, 2000 | Nov. 5, 2001 |
| Gen. Robert H. Foglesong | Nov. 5, 2001 | Aug. 11, 2003 |
| Gen. T. Michael Moseley | Aug. 12, 2003 | Sept. 2, 2005 |
| Gen. John D. W. Corley | Sept. 2, 2005 | Sept. 17, 2007 |
| Gen. Duncan J. McNabb | Sept. 17, 2007 | Sept. 4, 2008 |
| Gen. William M. Fraser III | Oct. 8, 2008 | Aug. 27, 2009 |
| Gen. Carrol H. Chandler | Aug. 27, 2009 | Jan. 14, 2011 |
| Gen. Philip M. Breedlove | Jan. 14, 2011 | |

## Chief Master Sergeants of the Air Force

| | | |
|---|---|---|
| CMSAF Paul W. Airey | April 3, 1967 | July 31, 1969 |
| CMSAF Donald L. Harlow | Aug. 1, 1969 | Sept. 30, 1971 |
| CMSAF Richard D. Kisling | Oct. 1, 1971 | Sept. 30, 1973 |
| CMSAF Thomas N. Barnes | Oct. 1, 1973 | July 31, 1977 |
| CMSAF Robert D. Gaylor | Aug. 1, 1977 | July 31, 1979 |
| CMSAF James M. McCoy | Aug. 1, 1979 | July 31, 1981 |
| CMSAF Arthur L. Andrews | Aug. 1, 1981 | July 31, 1983 |
| CMSAF Sam E. Parish | Aug. 1, 1983 | June 30, 1986 |
| CMSAF James C. Binnicker | July 1, 1986 | July 31, 1990 |
| CMSAF Gary R. Pfingston | Aug. 1, 1990 | Oct. 25, 1994 |
| CMSAF David J. Campanale | Oct. 26, 1994 | Nov. 4, 1996 |
| CMSAF Eric W. Benken | Nov. 5, 1996 | July 30, 1999 |
| CMSAF Frederick J. Finch | July 30, 1999 | July 1, 2002 |
| CMSAF Gerald R. Murray | July 1, 2002 | June 30, 2006 |
| CMSAF Rodney J. McKinley | June 30, 2006 | June 30, 2009 |
| CMSAF James A. Roy | June 30, 2009 | |

# Active Major Command and ANG Leaders

## Air Combat Command

| | | |
|---|---|---|
| Gen. John Michael Loh | June 1, 1992 | June 22, 1995 |
| Gen. Joseph W. Ralston | June 23, 1995 | Feb. 27, 1996 |
| Lt. Gen. Brett M. Dula (acting) | Feb. 28, 1996 | April 4, 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 | Sept. 6, 2001 |
| Lt. Gen. Donald G. Cook (acting) | Sept. 6, 2001 | Nov. 14, 2001 |
| Gen. Hal M. Hornburg | Nov. 14, 2001 | Nov. 17, 2004 |
| Lt. Gen. Bruce A. Wright (acting) | Nov. 17, 2004 | Feb. 6, 2005 |
| Lt. Gen. William M. Fraser III (acting) | Feb. 6, 2005 | May 26, 2005 |
| Gen. Ronald E. Keys | May 26, 2005 | Oct. 2, 2007 |
| Gen. John D. W. Corley | Oct. 2, 2007 | Sept. 10, 2009 |
| Gen. William M. Fraser III | Sept. 10, 2009 | |

## Air Education and Training Command

| | | |
|---|---|---|
| Lt. Gen. John K. Cannon | April 13, 1946 | Oct. 13, 1948 |
| Lt. Gen. Robert W. Harper | Oct. 14, 1948 | June 30, 1954 |
| Maj. Gen. Glenn O. Barcus (acting) | July 1, 1954 | July 25, 1954 |
| Lt. Gen. Charles T. Myers | July 26, 1954 | July 31, 1958 |
| Lt. Gen. Frederic H. Smith Jr. | Aug. 1, 1958 | July 31, 1959 |
| Lt. Gen. James E. Briggs | Aug. 1, 1959 | July 31, 1963 |
| Lt. Gen. Robert W. Burns | Aug. 1, 1963 | Aug. 10, 1964 |
| Lt. Gen. William W. Momyer | Aug. 11, 1964 | June 30, 1966 |
| Lt. Gen. Sam Maddux Jr. | July 1, 1966 | Aug. 30, 1970 |
| Lt. Gen. George B. Simler | Sept. 1, 1970 | Sept. 9, 1972 |
| Lt. Gen. William V. McBride | Sept. 9, 1972 | Aug. 31, 1974 |
| Lt. Gen. George H. McKee | Sept. 1, 1974 | Aug. 28, 1975 |
| Gen. John W. Roberts | Aug. 29, 1975 | April 1, 1979 |
| Gen. Bennie L. Davis | April 1, 1979 | July 28, 1981 |
| Gen. Thomas M. Ryan Jr. | July 29, 1981 | June 22, 1983 |
| Gen. Andrew P. Iosue | June 23, 1983 | Aug. 27, 1986 |
| Lt. Gen. John A. Shaud | Aug. 28, 1986 | June 5, 1988 |
| Lt. Gen. Robert C. Oaks | June 6, 1988 | June 24, 1990 |
| Lt. Gen. Joseph W. Ashy | June 25, 1990 | Dec. 9, 1992 |
| Gen. Henry Viccellio Jr. | Dec. 10, 1992 | June 19, 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. 14, 2001 |
| Lt. Gen. John D. Hopper Jr. (acting) | Nov. 14, 2001 | Dec. 17, 2001 |
| Gen. Donald G. Cook | Dec. 17, 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 | Nov. 17, 2010 | |

Established as Army Air Corps Flying Training Command Jan. 23, 1942. Redesignated AAF Flying Training Command March 1942, then AAF Training Command July 31, 1943. Redesignated ATC July 1, 1946. Redesignated AETC July 1, 1993.

## Air Force Global Strike Command

| | | |
|---|---|---|
| Lt. Gen. Frank G. Klotz | Aug. 7, 2009 | Jan. 6, 2011 |
| Lt. Gen. James M. Kowalski | Jan. 6, 2011 | |

Established as Continental Air Forces Dec. 13, 1944. Redesignated Strategic Air Command March 21, 1946. (See SAC entry.) Inactivated June 1, 1992. Redesignated and activated as AFGSC Aug. 7, 2009.

## 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 E. 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 | |

## Air Force Reserve Command

| | | |
|---|---|---|
| Maj. Gen. Rollin B. Moore Jr. | Aug. 1, 1968 | Jan. 26, 1972 |
| Brig. Gen. Alfred Verhulst (acting) | Jan. 27, 1972 | March 15, 1972 |
| Maj. Gen. Homer I. Lewis | March 16, 1972 | April 8, 1975 |
| Maj. Gen. William Lyon | April 16, 1975 | April 16, 1979 |
| Maj. Gen. Richard Bodycombe | April 17, 1979 | Oct. 31, 1982 |
| Maj. Gen. Sloan R. Gill | Nov. 1, 1982 | Oct. 31, 1986 |
| Maj. Gen. Roger P. Scheer | Nov. 1, 1986 | Oct. 31, 1990 |
| Maj. Gen. John J. Closner III | Nov. 1, 1990 | Oct. 31, 1994 |
| Maj. Gen. Robert A. McIntosh | Nov. 1, 1994 | 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 | |

Formerly Air Force Reserve, AFRC became a major command Feb. 17, 1997.

## 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 | |

## 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 | |

## Air Mobility Command

| | | |
|---|---|---|
| Gen. Hansford T. Johnson | June 1, 1992 | Aug. 22, 1992 |
| Gen. Ronald R. Fogleman | Aug. 23, 1992 | Oct. 17, 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 A. 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 | |

## 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 A. 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 R. Titshaw Jr. (acting) | Nov. 17, 2008 | Feb. 2, 2009 |
| Lt. Gen. Harry M. Wyatt III | Feb. 2, 2009 | |

## Pacific Air Forces

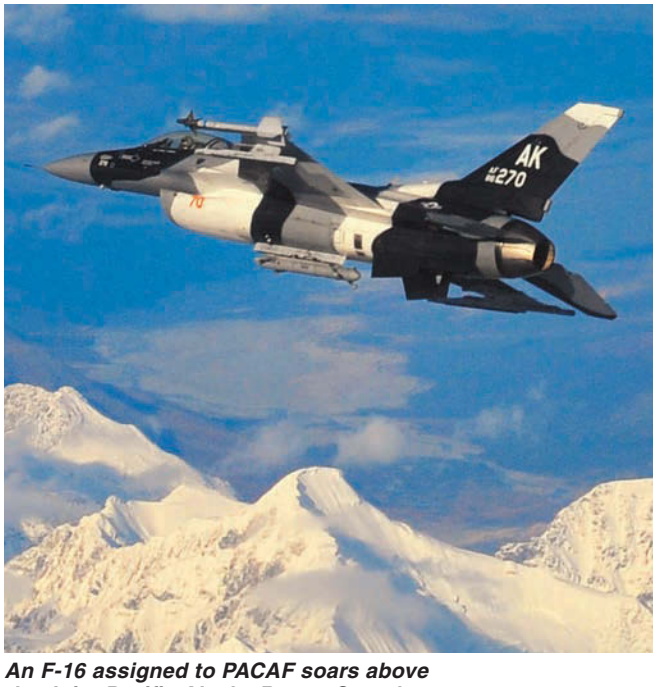
| | | |
|---|---|---|
| Lt. Gen. Ennis C. Whitehead | Dec. 30, 1945 | April 25, 1949 |
| Lt. Gen. George E. Stratemeyer | April 26, 1949 | May 20, 1951 |
| Lt. Gen. Earle E. Partridge (acting) | May 21, 1951 | June 9, 1951 |
| Gen. Otto P. Weyland | June 10, 1951 | March 25, 1954 |
| Gen. Earle E. Partridge | March 26, 1954 | May 31, 1955 |
| Gen. Laurence S. Kuter | June 1, 1955 | July 31, 1959 |
| Gen. Emmett O'Donnell Jr. | Aug. 1, 1959 | July 31, 1963 |
| Gen. Jacob E. Smart | Aug. 1, 1963 | July 31, 1964 |
| Gen. Hunter Harris Jr. | Aug. 1, 1964 | Jan. 31, 1967 |
| Gen. John D. Ryan | Feb. 1, 1967 | July 31, 1968 |
| Gen. Joseph J. Nazzaro | Aug. 1, 1968 | July 31, 1971 |
| Gen. Lucius D. Clay Jr. | Aug. 1, 1971 | Sept. 30, 1973 |
| Gen. John W. Vogt | Oct. 1, 1973 | June 30, 1974 |
| Gen. Louis L. Wilson Jr. | July 1, 1974 | May 31, 1977 |
| Lt. Gen. James A. Hill | June 1, 1977 | June 14, 1978 |
| Lt. Gen. James D. Hughes | June 15, 1978 | July 1, 1981 |
| Lt. Gen. Arnold W. Braswell | July 1, 1981 | Sept. 30, 1983 |
| Gen. Jerome F. O'Malley | Oct. 8, 1983 | Nov. 1, 1984 |
| Gen. Robert W. Bazley | Nov. 1, 1984 | Dec. 16, 1986 |
| Gen. Jack I. Gregory | Dec. 16, 1986 | July 22, 1988 |
| Gen. Merrill A. McPeak | July 22, 1988 | Oct. 30, 1990 |
| Lt. Gen. James B. Davis | Nov. 5, 1990 | Feb. 19, 1991 |
| Gen. Jimmie V. Adams | Feb. 19, 1991 | Jan. 25, 1993 |
| Gen. Robert L. Rutherford | Jan. 26, 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 | |

Activated as Far East Air Forces Aug. 3, 1944. Redesignated Pacific Air Command, US Army, Dec. 6, 1945. Redesignated FEAF Jan. 1, 1947. Redesignated Pacific Air Forces July 1, 1957.

## US Air Forces in Europe

| | | |
|---|---|---|
| Brig. Gen. John F. McBlain (acting) | Aug. 14, 1947 | Oct. 20, 1947 |
| Lt. Gen. Curtis E. LeMay | Oct. 20, 1947 | Oct. 15, 1948 |
| Lt. Gen. John K. Cannon | Oct. 16, 1948 | Jan. 20, 1951 |
| Gen. Lauris Norstad | Jan. 21, 1951 | July 26, 1953 |
| Lt. Gen. William H. Tunner | July 27, 1953 | June 30, 1957 |
| Gen. Frank F. Everest | July 1, 1957 | July 31, 1959 |
| Gen. Frederic H. Smith Jr. | Aug. 1, 1959 | June 30, 1961 |
| Gen. Truman H. Landon | July 1, 1961 | July 31, 1963 |
| Gen. Gabriel P. Disosway | Aug. 1, 1963 | July 31, 1965 |
| Gen. Bruce K. Holloway | Aug. 1, 1965 | July 31, 1966 |
| Gen. Maurice A. Preston | Aug. 1, 1966 | July 31, 1968 |
| Gen. Horace M. Wade | Aug. 1, 1968 | Jan. 31, 1969 |
| Gen. Joseph R. Holzapple | Feb. 1, 1969 | Aug. 31, 1971 |
| Gen. David C. Jones | Sept. 1, 1971 | June 30, 1974 |
| Gen. John W. Vogt | July 1, 1974 | Aug. 31, 1975 |
| Gen. Richard H. Ellis | Sept. 1, 1975 | July 31, 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 16, 1995 |
| Gen. Richard E. Hawley | July 17, 1995 | April 4, 1996 |
| Gen. Michael E. Ryan | April 4, 1996 | Oct. 5, 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 |
| Maj. Gen. Marc E. Rogers (acting) | Dec. 10, 2007 | Jan. 17, 2008 |
| Gen. Roger A. Brady | Jan. 17, 2008 | Dec. 13, 2010 |
| Gen. Mark A. Welsh III | Dec. 13, 2010 | |

Activated as 8th Air Force (1942). Redesignated Eighth Air Force Sept. 18, 1942. Redesignated US Strategic Air Forces in Europe (1944). Redesignated USAFE Aug. 7, 1945.




USAF photo by SSgt. Christopher Boitz

***An F-16 assigned to PACAF soars above the Joint Pacific Alaska Range Complex.***

# Leaders of Inactive Major Commands

## 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 H. Smith Jr. (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.

## 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 W. Sessums (acting) | July 1, 1957 | July 31, 1957 |
| Lt. Gen. Samuel E. Anderson | Aug. 1, 1957 | March 9, 1959 |
| Maj. Gen. John W. 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.

## Air University

| | | |
|---|---|---|
| Maj. Gen. Muir S. Fairchild | March 15, 1946 | May 17, 1948 |
| Maj. Gen. Robert W. Harper | May 17, 1948 | Oct. 15, 1948 |
| Gen. George C. Kenney | Oct. 16, 1948 | July 27, 1951 |
| Lt. Gen. Idwal H. Edwards | July 28, 1951 | Feb. 28, 1953 |
| Maj. Gen. John DeF. Barker (acting) | March 1, 1953 | April 14, 1953 |
| Lt. Gen. Laurence S. Kuter | April 15, 1953 | May 31, 1955 |
| Lt. Gen. Dean C. Strother | June 1, 1955 | June 30, 1958 |
| Lt. Gen. Walter E. Todd | July 15, 1958 | July 31, 1961 |
| Lt. Gen. Troup Miller Jr. | Aug. 1, 1961 | Dec. 31, 1963 |
| Lt. Gen. Ralph P. Swofford Jr. | Jan. 1, 1964 | July 31, 1965 |
| Lt. Gen. John W. Carpenter III | Aug. 1, 1965 | July 31, 1968 |
| Lt. Gen. Albert P. Clark | Aug. 1, 1968 | July 31, 1970 |
| Lt. Gen. Alvan C. Gillem II | Aug. 1, 1970 | Oct. 31, 1973 |
| Lt. Gen. F. Michael Rogers | Nov. 1, 1973 | Aug. 31, 1975 |
| Lt. Gen. Raymond B. Furlong | Sept. 1, 1975 | July 1, 1979 |
| Lt. Gen. Stanley M. Umstead | July 1, 1979 | July 24, 1981 |
| Lt. Gen. Charles G. Cleveland | July 24, 1981 | Aug. 1, 1984 |
| Lt. Gen. Thomas C. Richards | Aug. 1, 1984 | Nov. 6, 1986 |
| Lt. Gen. Truman Spangrud | Nov. 6, 1986 | July 12, 1988 |
| Lt. Gen. Ralph E. Havens | July 12, 1988 | Oct. 6, 1989 |
| Maj. Gen. David C. Reed | Oct. 6, 1989 | Jan. 4, 1990 |
| Lt. Gen. Charles G. Boyd | Jan. 4, 1990 | Oct. 26, 1992 |
| Lt. Gen. Jay W. Kelley | Oct. 27, 1992 | June 30, 1993 |

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 |
| Brig. Gen. Frank A. Armstrong Jr. | Feb. 26, 1949 | Dec. 27, 1950 |
| Maj. Gen. William D. Old | Dec. 27, 1950 | Oct. 14, 1952 |
| Brig. Gen. W. R. Agee | Oct. 27, 1952 | Feb. 26, 1953 |
| Maj. Gen. George R. Acheson | Feb. 26, 1953 | Feb. 1, 1956 |
| Brig. Gen. T. Alan Bennett (acting) | Feb. 1, 1956 | Feb. 24, 1956 |
| Lt. Gen. Joseph H. Atkinson | Feb. 24, 1956 | July 16, 1956 |
| Maj. Gen. Frank A. Armstrong Jr. | July 17, 1956 | Oct. 23, 1956 |
| Maj. Gen. James H. Davies | Oct. 24, 1956 | June 27, 1957 |
| Lt. Gen. Frank A. Armstrong Jr. | June 28, 1957 | Aug. 18, 1957 |
| Brig. Gen. Kenneth H. Gibson | Aug. 19, 1957 | Aug. 13, 1958 |
| Maj. Gen. C. F. Necrason | Aug. 14, 1958 | July 19, 1961 |
| Brig. Gen. Jack A. Gibbs (acting) | July 20, 1961 | July 25, 1961 |
| Maj. Gen. Wendell W. Bowman | July 26, 1961 | Aug. 8, 1963 |
| Col. Alfred Walton (acting) | Aug. 9, 1963 | Aug. 14, 1963 |
| Maj. Gen. James C. Jensen | Aug. 15, 1963 | Nov. 14, 1966 |
| Maj. Gen. Thomas E. Moore | Nov. 15, 1966 | July 24, 1969 |
| Maj. Gen. Joseph A. Cunningham | July 25, 1969 | July 31, 1972 |
| Maj. Gen. Donavon F. Smith | Aug. 1, 1972 | June 5, 1973 |
| Maj. Gen. Charles W. Carson Jr. | June 18, l973 | March 2, 1974 |
| Col. David T. Stockman (acting) | March 3, 1974 | March 18, 1974 |
| Maj. Gen. Jack K. Gamble | March 19, 1974 | June 30, 1975 |
| Lt. Gen. James E. Hill | July 1, 1975 | Oct. 14, 1976 |
| Lt. Gen. M. L. Boswell | Oct. 15, 1976 | June 30, 1978 |
| Lt. Gen. Winfield W. Scott Jr. | July 1, 1978 | April 1, 1981 |
| 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). Redesignated Alaskan Air Command (1945). Redesignated 11th Air Force Aug. 9, 1990, under PACAF.

## 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 | July 1966 |
| Lt. Gen. Henry Viccellio Sr. | Aug. 1, 1966 | Aug. 1, 1968 |

Established Dec. 1, 1948. Inactivated Aug. 1, 1968.

## 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 FOA, Air Intelligence Agency Oct. 1, 1993.

## 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, 1958. Inactivated 1976.


***F-102s maintained 24-hour alert status with Alaskan Air Command in 1960.***

## Military Airlift Command

| | | |
|---|---|---|
| Maj. Gen. Robert W. Harper | July 1, 1947 | June 1, 1948 |
| Lt. Gen. Laurence S. Kuter | June 1, 1948 | Oct. 28, 1951 |
| Lt. Gen. Joseph Smith | Nov. 15, 1951 | June 30, 1958 |
| Lt. Gen. William H. Tunner | July 1, 1958 | May 31, 1960 |
| Gen. Joe W. Kelly Jr. | June 1, 1960 | July 18, 1964 |
| Gen. Howell M. Estes Jr. | July 19, 1964 | July 31, 1969 |
| Gen. Jack J. Catton | Aug. 1, 1969 | Sept. 12, 1972 |
| Lt. Gen. Jay T. Robbins (acting) | Sept. 12, 1972 | Sept. 25, 1972 |
| Gen. Paul K. Carlton | Sept. 26, 1972 | March 31, 1977 |
| Gen. William G. Moore Jr. | April 1, 1977 | June 30, 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. | July 1, 1983 | Sept. 19, 1985 |
| Gen. Duane H. Cassidy | Sept. 20, 1985 | Sept. 20, 1989 |
| Gen. Hansford T. Johnson | Sept. 20, 1989 | June 1, 1992 |

Antecedents: AAC Ferrying Command (1941); AAF Ferrying Command (1942); Air Transport Command (1942); Military Air Transport Service (June 1, 1948); Military Airlift Command (Jan. 1, 1966). Inactivated June 1, 1992.

## 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, reorganized and redesignated Northeast Air Command, a new major command, Oct. 1, 1950. Inactivated March 31, 1957.

## Pacific Air Command/Seventh Air Force

| | | |
|---|---|---|
| Maj. Gen. Ralph H. Wooten | April 1947 | Aug. 31, 1948 |
| Brig. Gen. Robert F. Travis | Sept. 1, 1948 | June 1, 1949 |

Antecedents: Hawaiian Air Force (1940); 7th/Seventh Air Force (1942); Pacific Air Command (Dec. 15, 1947). Discontinued June 1, 1949.

## Strategic Air Command

| | | |
|---|---|---|
| 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 Air Force Global Strike Command Aug. 7, 2009. (See AFGSC entry)

## Tactical Air Command

| | | |
|---|---|---|
| Lt. Gen. Elwood R. Quesada | March 21, 1946 | Nov. 23, 1948 |
| Maj. Gen. Robert M. Lee | Dec. 24, 1948 | June 20, 1950 |
| Maj. Gen. Glenn O. Barcus | July 17, 1950 | Jan. 25, 1951 |
| Gen. John K. Cannon | Jan. 25, 1951 | March 31, 1954 |
| Gen. Otto P. Weyland | April 1, 1954 | July 31, 1959 |
| Gen. Frank F. Everest | Aug. 1, 1959 | Sept. 30, 1961 |
| Gen. Walter C. Sweeney Jr. | Oct. 1, 1961 | July 31, 1965 |
| Gen. Gabriel P. Disosway | Aug. 1, 1965 | July 31, 1968 |
| Gen. William W. Momyer | Aug. 1, 1968 | Sept. 30, 1973 |
| Gen. Robert J. Dixon | Oct. 1, 1973 | April 30, 1978 |
| Gen. W. L. Creech | May 1, 1978 | Nov. 1, 1984 |
| Gen. Jerome F. O'Malley | Nov. 1, 1984 | April 20, 1985 |
| Gen. Robert D. Russ | May 22, 1985 | March 26, 1991 |
| Gen. John Michael Loh | March 27, 1991 | June 1, 1992 |

Established March 21, 1946. Reassigned to Continental Air Command (1948). Removed from CAC and returned to major command status Dec. 1, 1950. Inactivated June 1, 1992.

## 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 | October 1974 |
| Maj. Gen. James M. Breedlove | October 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.

***A B-58 Hustler, assigned to Strategic Air Command, patrols in 1967.***

# Headquarters DOD Leaders

## Secretaries of Defense

| | | |
|---|---|---|
| James V. Forrestal | Sept. 17, 1947 | March 28, 1949 |
| Louis A. Johnson | March 28, 1949 | Sept. 19, 1950 |
| George C. Marshall | Sept. 21, 1950 | Sept. 12, 1951 |
| Robert A. Lovett | Sept. 17, 1951 | Jan. 20, 1953 |
| Charles E. Wilson | Jan. 28, 1953 | Oct. 8, 1957 |
| Neil H. McElroy | Oct. 9, 1957 | Dec. 1, 1959 |
| Thomas S. Gates | Dec. 2, 1959 | Jan. 20, 1961 |
| Robert S. McNamara | Jan. 21, 1961 | Feb. 29, 1968 |
| Clark M. Clifford | March 1, 1968 | Jan. 20, 1969 |
| Melvin R. Laird | Jan. 22, 1969 | Jan. 29, 1973 |
| Elliot L. Richardson | Jan. 30, 1973 | May 24, 1973 |
| James R. Schlesinger | July 2, 1973 | Nov. 19, 1975 |
| Donald H. Rumsfeld | Nov. 20, 1975 | Jan. 20, 1977 |
| Harold Brown | Jan. 21, 1977 | Jan. 20, 1981 |
| Caspar W. Weinberger | Jan. 21, 1981 | Nov. 23, 1987 |
| Frank C. Carlucci | Nov. 23, 1987 | Jan. 20, 1989 |
| Richard B. Cheney | March 21, 1989 | Jan. 20, 1993 |
| Les Aspin | Jan. 21, 1993 | Feb. 3, 1994 |
| William J. Perry | Feb. 3, 1994 | Jan. 23, 1997 |
| William S. Cohen | Jan. 24, 1997 | Jan. 20, 2001 |
| Donald H. Rumsfeld | Jan. 20, 2001 | Dec. 18, 2006 |
| Robert M. Gates | Dec. 18, 2006 | |

## Chairmen of the Joint Chiefs of Staff

| | | |
|---|---|---|
| Gen. of the Army Omar N. Bradley | Aug. 16, 1949 | Aug. 15, 1953 |
| Adm. Arthur W. Radford, USN | Aug. 15, 1953 | Aug. 15, 1957 |
| Gen. Nathan F. Twining, USAF | Aug. 15, 1957 | Sept. 30, 1960 |
| Gen. Lyman L. Lemnitzer, USA | Oct. 1, 1960 | Sept. 30, 1962 |
| Gen. Maxwell D. Taylor, USA | Oct. 1, 1962 | July 1, 1964 |
| Gen. Earle G. Wheeler, USA | July 3, 1964 | July 2, 1970 |
| Adm. Thomas H. Moorer, USN | July 2, 1970 | July 1, 1974 |
| Gen. George S. Brown, USAF | July 1, 1974 | June 20, 1978 |
| Gen. David C. Jones, USAF | June 21, 1978 | June 18, 1982 |
| Gen. John W. Vessey Jr., USA | June 18, 1982 | Sept. 30, 1985 |
| Adm. William J. Crowe Jr., USN | Oct. 1, 1985 | Sept. 30, 1989 |
| Gen. Colin L. Powell, USA | Oct. 1, 1989 | Sept. 30, 1993 |
| Adm. David Jeremiah, USN (acting) | Oct. 1, 1993 | Oct. 24, 1993 |
| Gen. John M. Shalikashvili, USA | Oct. 25, 1993 | Sept. 30, 1997 |
| Gen. Henry H. Shelton, USA | Oct. 1, 1997 | Oct. 1, 2001 |
| Gen. Richard B. Myers, USAF | Oct. 1, 2001 | Sept. 30, 2005 |
| Gen. Peter Pace, USMC | Sept. 30, 2005 | Oct. 1, 2007 |
| Adm. Michael G. Mullen, USN | Oct. 1, 2007 | |

## Vice Chairmen of the Joint Chiefs of Staff

| | | |
|---|---|---|
| Gen. Robert T. Herres, USAF | Feb. 6, 1987 | Feb. 28, 1990 |
| Adm. David E. Jeremiah, USN | March 1, 1990 | Feb. 28, 1994 |
| Adm. William A. Owens, USN | March 1, 1994 | Feb. 27, 1996 |
| Gen. Joseph W. Ralston, USAF | March 1, 1996 | Feb. 29, 2000 |
| Gen. Richard B. Myers, USAF | March 1, 2000 | Oct. 1, 2001 |
| Gen. Peter Pace, USMC | Oct. 1, 2001 | Aug. 12, 2005 |
| Adm. Edmund P. Giambastiani Jr., USN | Aug. 12, 2005 | Aug. 3, 2007 |
| Gen. James E. Cartwright, USMC | Aug. 4, 2007 | |

*In a 1960 session of the Joint Chiefs of Staff are (l-r): Army Gen. Lyman Lemnitzer, Adm. Arleigh Burke, JCS Chairman USAF Gen. Nathan Twining, USAF Gen. Thomas White, and USMC Gen. David Shoup.*

# Unified Command, National Guard Bureau, NORAD Leaders

## US Africa Command

| | | |
|---|---|---|
| Gen. William E. Ward, USA | Oct. 1, 2008 | March 9, 2011 |
| Gen. Carter F. Ham, USA | March 9, 2011 | |

## 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 E. 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 | |

## 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 | |

## US Joint Forces Command

| | | |
|---|---|---|
| Adm. William H. P. Blandy, USN | Feb. 3, 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 P. Giambastiani Jr., USN | Oct. 2, 2002 | Aug. 1, 2005 |
| Lt. Gen. Robert W. 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 | |

Formerly US Atlantic Command. Established Dec. 1, 1947. Redesignated Oct. 7, 1999.

## 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 | |

## 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 T. 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 P. 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 | |

## US Southern Command

| | | |
|---|---|---|
| Lt. Gen. Willis Crittenberger, USA | November 1947 | June 1948 |
| Lt. Gen. Matthew B. Ridgway, USA | June 1948 | October 1949 |
| Lt. Gen. William H. H. Morris, USA | October 1949 | April 1952 |
| Lt. Gen. Horace L. McBride, USA | April 1952 | June 1954 |
| Lt. Gen. William K. Harrison, USA | June 1954 | January 1957 |
| Lt. Gen. Robert M. Montague, USA | January 1957 | February 1958 |
| Lt. Gen. Ridgely Gaither, USA | April 1958 | July 1960 |
| Lt. Gen. Robert F. Sink, USA | July 1960 | February 1961 |
| Lt. Gen. Andrew P. O'Meara, USA | February 1961 | June 1963 |
| Gen. Andrew P. O'Meara, USA | June 1963 | February 1965 |
| Gen. Robert W. Porter, USA | February 1965 | February 1969 |
| Gen. George R. Mather, USA | February 1969 | September 1971 |
| Gen. George V. Underwood, USA | September 1971 | January 1973 |
| Gen. William B. Rosson, USA | January 1973 | July 1975 |
| Lt. Gen. Dennis P. McAuliffe, USA | August 1975 | September 1979 |
| Lt. Gen. Wallace H. Nutting, USA | October 1979 | May 1983 |
| Gen. Paul F. Gorman, USA | May 1983 | March 1985 |
| Gen. John R. Galvin, USA | March 1985 | June 1987 |
| Gen. Fred F. Woerner, USA | June 1987 | September 1989 |
| Gen. Maxwell R. Thurman, USA | September 1989 | November 1990 |
| Gen. George A. Joulwan, USA | November 1990 | November 1993 |
| Maj. Gen. W. T. Worthington, USAF (acting) | November 1993 | February 1994 |
| Gen. Barry R. McCaffrey, USA | February 1994 | February 1996 |
| RAdm. James B. Perkins III, USN (acting) | March 1996 | June 1996 |
| Gen. Wesley K. Clark, USA | July 1996 | July 1997 |
| Gen. Charles E. Wilhelm, USMC | September 1997 | Sept. 8, 2000 |
| Gen. Peter Pace, USMC | Sept. 8, 2000 | Sept. 30, 2001 |
| Maj. Gen. G. D. Speer, USA (acting) | September 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 | |

Formerly US Caribbean Command (1947). Activated in 1963.

## 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 |

Deactivated Oct. 1, 2002, when its functions merged with US Strategic Command.

## 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 | |

## 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. C. Robert Kehler, USAF (acting) | Aug. 10, 2007 | Oct. 3, 2007 |
| Gen. Kevin P. Chilton, USAF | Oct. 3, 2007 | Jan. 28, 2011 |
| Gen. C. Robert Kehler, USAF | Jan. 28, 2011 | |

Merged the functions of US Space Command into STRATCOM Oct. 1, 2002.

## 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 | |

## 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, 1951 | Feb. 15, 1953 |
| Maj. Gen. Earl T. Ricks, USAF (acting) | Feb. 16, 1953 | June 21, 1953 |
| Maj. Gen. Edgar C. Erickson, USA | June 22, 1953 | May 31, 1959 |
| Maj. Gen. Winston P. Wilson, USAF (acting) | June 1, 1959 | July 19, 1959 |
| Maj. Gen. Donald W. McGowan, USA | July 20, 1959 | Aug. 30, 1963 |
| Maj. Gen. Winston P. Wilson, USAF | Aug. 31, 1963 | Aug. 31, 1971 |
| Maj. Gen. Francis S. Greenlief, USA | Sept. 1, 1971 | June 23, 1974 |
| Lt. Gen. La Vern E. Weber, USA | Aug. 16, 1974 | Aug. 15, 1982 |
| Lt. Gen. Emmett H. Walker Jr., USA | Aug. 16, 1982 | Aug. 15, 1986 |
| Lt. Gen. Herbert R. Temple Jr., USA | Aug. 16, 1986 | Jan. 31, 1990 |
| Lt. Gen. John B. Conaway, USAF | Feb. 1, 1990 | Dec. 1, 1993 |
| Maj. Gen. Raymond F. 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 F. 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 | |

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 | |


***Minnesota Air National Guardsmen board a C-17 in Duluth, Minn.***

USAF photo by SSgt. Donald Acton

# Guide to Aces and Heroes

## 2011 USAF Almanac

# Major Decorations

## USAF Recipients of the Medal of Honor

| Names 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, Tex. | 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, Tex. | Aug. 1, 1943 | Ploesti, Romania |

**Harold Goettler**

**Frank Luke**

**Frederick Castle**

**Joe Jackson***

**George Davis**

**George Day***

*Living Medal of Honor recipient

## World War II (continued)

| | | | |
|---|---|---|---|
| Kearby, Col. Neel E. | Wichita Falls, Tex. | 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, Tex. | March 18, 1943 | Vegesack, 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, Tex. | 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 | St. 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 | Wimereaux, 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 |

## Korea

| | | | |
|---|---|---|---|
| Davis, Maj. George A. Jr. | Dublin, Tex. | Feb. 10, 1952 | Sinuiju,Yalu River, N. Korea |
| Loring, Maj. Charles J. Jr. | Portland, Maine | Nov. 22, 1952 | Sniper Ridge, N. Korea |
| Sebille, Maj. Louis J. | Harbor Beach, Mich. | Aug. 5, 1950 | Hamch'ang, S. Korea |
| Walmsley, Capt. John S. Jr. | Baltimore | Sept. 14, 1951 | Yangdok, N. Korea |

## Vietnam

| | | | |
|---|---|---|---|
| Bennett, Capt. Steven L. | Palestine, Tex. | June 29, 1972 | Quang Tri, S. Vietnam |
| Day, Maj. George E.* | Sioux City, Iowa | Conspicuous gallantry while POW | |
| Dethlefsen, Capt. Merlyn H. | Greenville, Iowa | March 10, 1967 | Thai Nguyen, N. 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, S. 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, S. Vietnam |
| Jones, Col. William A. III | Norfolk, Va. | Sept. 1, 1968 | Dong Hoi, N. Vietnam |
| Levitow, A1C John L. | Hartford, Conn. | Feb. 24, 1969 | Long Binh, S. Vietnam |
| Pitsenbarger, A1C William H. | Piqua, Ohio | April 11, 1966 | Cam My, S. Vietnam |
| Sijan, Capt. Lance P. | Milwaukee | Conspicuous gallantry while POW | |
| Thorsness, Maj. Leo K.* | Walnut Grove, Minn. | April 19, 1967 | N. Vietnam |
| Wilbanks, Capt. Hilliard A. | Cornelia, Ga. | Feb. 24, 1967 | Dalat, S. Vietnam |
| Young, Capt. Gerald O. | Anacortes, Wash. | Nov. 9, 1967 | Khe Sahn, S. Vietnam |

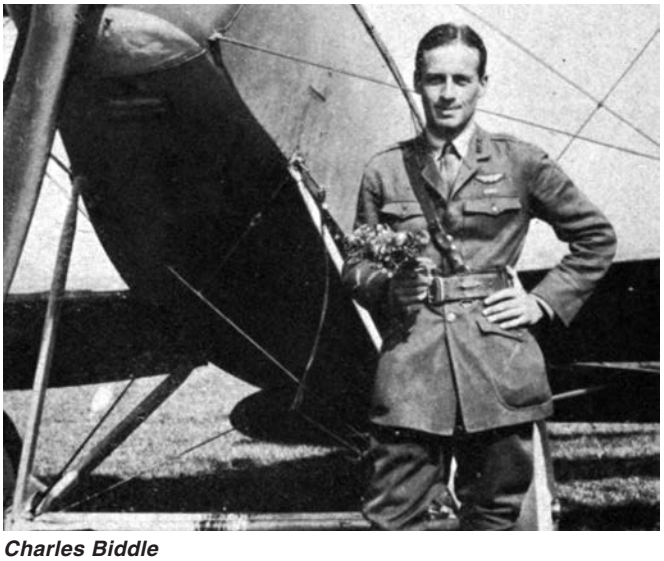
## Peacetime

| | | | |
|---|---|---|---|
| Lindbergh, Col. Charles A. | Detroit | May 20-21, 1927 | New York City-Paris flight |
| Mitchell, Brig. Gen. William | Milwaukee | Lifetime achievement | Foresight in military aviation |

# USAF Recipients of the Distinguished Service Cross

**World War I**

Abernathy, Thomas J.
Aldrich, Perry H.
Alexander, Arthur H.
Alexander, Stirling C.
Allen, Gardner P.
Andrew, Flynn L. A.
Armstrong, Rodney M.
Arthur, Dogan H. (2)
Atwater, Benjamin L.
Avery, Walter L.
Babcock, Philip R.
Backus, David H. (2)
Badham, William T.
Baer, Paul F. (2)
Bagby, Ralph B.
Bartholf, Herbert B.
Baucom, Byrne V. (2)
Beane, James D.
Beebe, David C.
Bellows, Franklin B.
Belzer, William E.
Benell, Otto E.
Bernheimer, Louis G. (2)
Biddle, Charles J.
Bissell, Clayton L.
Blake, Charles R.
Bonnalie, Allan F.
Borden, Horace
Bowers, Lloyd G.
Bowman, Samuel A.
Boyd, Theodore E.
Breese, Clinton S.
Brereton, Lewis H.
Brewster, Hugh
Brooks, Arthur R.
Broomfield, Hugh D. G.
Brotherton, William E.
Brown, Mitchell H.
Buckley, Harold R. (2)
Buford, Edward Jr.
Burdick, Howard
Burger, Valentine J. (2)
Burns, James S. D.
Burt, Byron T. Jr.
Campbell, Douglas (5)
Carroll, George C.
Cassady, Thomas G. (2)
Castleman, John R.
Chambers, Reed M. (4)
Chapman, Charles W. Jr.
Clapp, Kenneth S.
Clarke, Sheldon V.
Clay, Henry R. Jr.
Coleman, Wallace
Conover, Harvey
Cook, Everett R.
Cook, Harvey W. (2)
Coolidge, Hamilton
Cousins, John W.
Creech, Jesse O.
Curtis, Edward P.
Cutter, Edward B.
Dawson, Leo H. (2)
De Castro, Ralph E.
Diekema, Willis A.
Dillon, Raymond P.
D'Olive, Charles R.
Donaldson, John O.
Douglass, Kingman
Dowd, Meredith L.
Drew, Charles W.
Duckstein, Arthur W.
Easterbrook, Arthur E. (2)
Eaton, Warren E.
Elliott, Robert P.
Erwin, William P. (2)
Este, J. Dickinson
Farnsworth, Thomas H.
Ferrenbach, Leo C.
Fisher, George F.
Fleeson, Howard T. (2)
Follette, Justin P.
Fontaine, Hugh L. (2)
Ford, Christopher W.
Frank, William F.
Frost, John
Furlow, George W. (2)



*Charles Biddle*

Gaylord, Bradley J.
George, Harold H.
Giroux, Ernest A.
Goldthwaite, George E.
Grant, Alfred A.
Graveline, Fred C.
Greist, Edwards H.
Grey, Charles G.
Gundelach, Andre P.
Guthrie, Murray K. (3)
Hall, James N.
Hambleton, John A. (2)
Hamilton, Lloyd A.
Hammond, Leonard C.
Hart, Percival G.
Hartney, Harold E.
Harwood, Benjamin P.
Haslett, Elmer R.
Hays, Frank K.
Healy, James A.
Henderson, Phil A.
Herbert, Thomas W.
Higgs, James A. Jr.
Hill, Maury
Hill, Raymond C.
Hitchcock, Roger W.
Holden, Kenneth H.
Holden, Lansing C. Jr. (2)
Holland, Spessard L.
Hoover, William J.
Hopkins, Stephen T.
Hudson, Donald
Hunter, Frank O'D. (5)
Irving, Livingston G.
Jeffers, John N.
Jervey, Thomas M.
Jones, Arthur H.
Jones, Clinton (2)
Jordan, John W.
Kahle, Clarence C.
Kaye, Samuel Jr. (2)
Keating, James A.
Kelty, Asher E.
Kenney, George C.
Kindley, Field E. (2)
Kinney, Clair A.
Kinsley, Wilbert E.
Knotts, Howard C.
Knowles, James Jr.
Lake, Horace A.
Lambert, John H.
Landis, Reed G.
Larner, Gorman D. (2)
Lawson, Walter R.
Lee, John B.
Lindsay, Robert O.
Littauer, Kenneth P.
Llewellyn, Frank A.
Lowry, Francis B.
Luke, Frank Jr. (2)
MacArthur, John K.
MacBrayne, Winfred C.
Manning, James F. Jr.
Maughan, Russell L.
McClendon, Joel H.

*George Kenney*

McDermott, Cleveland W.
McDevitt, James A.
McDougall, Harry O.
McKay, Elmore K.
McKay, James R.
McMurry, Ora R. (2)
Meissner, James A. (2)
Mell, Patrick H.
Michener, John H.
Mitchell, John
Mitchell, William
Moore, Edward R.
Morris, Edward M.
Morse, Guy E.
Myers, Oscar B.
Neel, Roland H.
Neibling, Harlou P.
Neidecker, Bertrande C.
Nichols, Harold O.
Nixon, George R.
Norris, Sigbert A. G.
Norton, Fred W.
Noyes, Stephen H.
Nutt, Alan
O'Donnell, Paul J.
O'Neill, Ralph A. (3)
Orr, Edward
Page, Richard C. M.
Palmer, Joseph A.
Palmer, William W.
Paradise, Robert C.
Patterson, Alfred B. Jr. (2)
Payne, Karl C.
Pegues, Josiah J.
Pendell, Elmer
Peterson, David M. (2)
Petree, Harris E.
Phelps, Glen
Phillips, George R.
Plummer, Charles W.
Plush, Lewis C.
Polley, Britton
Ponder, William T.

Numbers in parentheses are total DSCs received by the individual.

Porter, Charles P. (2)
Porter, Earl W.
Porter, Kenneth L.
Potter, William C.
Preston, Glen A. (3)
Putnam, David E.
Pyne, Percy R.
Quinn, John J.
Raible, Joseph C. Jr.
Ralston, Orville A.
Rancourt, John I.
Rath, Howard G.
Raymond, Robert F.
Reeves, Dache M.
Reynolds, Clearton H.
Reynolds, John N. (2)
Richardson, James M.
Rickenbacker, Edward V. (7)
Rooney, Paul N. A.
Rorison, Harmon C.
Ross, Cleo J.
Rucker, Edward W.
Rummell, Leslie J.
Saunders, William H.
Schenck, Alexander P.
Schoen, Karl J.
Seaver, Arthur F.
Sellers, Cecil G.
Sewall, Sumner (2)
Shelby, Richard D.
Simon, Louis C. Jr. (2)
Snyder, John H.
Spaatz, Carl A.
Springs, Elliott W.
Steele, Richard W.
Stenseth, Martinus
Stevens, John H.
Stokes, John Y. Jr.
Stout, Penrose V.
Stovall, William H.
Strahm, Victor H.
Suiter, Wilbur C.
Swaab, Jacques M.
Taylor, William H.
Taylor, William J. R.
Ten Eyck, Walton B. Jr.
Thaw, William (2)
Thomas, Gerald P.
Thompson, Robert E.
Tillman, Fred A.
Tittman, Harold H.
Tobin, Edgar G.
Treadwell, Alvin H.
Vail, William H.
Vaughn, George A.
Vernam, Remington D. B.
Wallis, James E. Jr.
Waring, William W.
Warner, Donald D.
Way, Pennington H.
Wehner, Joseph F. (2)
White, Wilbert W. (2)
Williams, Bertram
Winslow, Alan F.
Wright, Burdette S.
Wright, Chester E. (2)
Wyly, Lawrence T.

### World War II

Able, Johnnie J. Jr.
Adams, Jack
Adams, Robert H.
Adkins, Frank E.
Alexander, John A.
Alison, John R.
Allen, Brooke E.
Allen, Keith N.
Alsip, Raymond H.
Ambrose, Talmadge L.
Anderson, Bernard E.
Anderson, Bernard L.
Anderson, Marshall J.
Anderson, Richard H.
Anderson, Sheldon K.
Anderson, Sherman E.
Anderson, William N.
Anderson, William T.
Andres, Arthur E.
Appold, Norman C.
Armsby, Sherman

*Carl Spaatz (center) and Paul Tibbets Jr. (right)*


*Richard Bong*

Armstrong, Frank A. Jr.
Arnold, Altus L.
Arooth, Michael
Aschenbrener, Robert W.
Ashley, Earl D.
Atkinson, Gwen G.
Atkinson, Paul G.
Avery, Lloyd
Bade, Jack A.
Bail, Bernard W.
Bakalar, John E.
Bankey, Ernest E. Jr.
Banks, Arthur E.
Barbiero, Samuel S.
Barbosa, Vicente R.
Barnicle, Gerald J.
Barrall, Robert W.
Battaglia, Salvatore
Battalio, Samuel T.
Beam, James C.
Beam, Ralph E.
Beck, Joseph A. II
Beckham, Walter C.
Beerbower, Don M.
Beeson, Duane W.
Beeson, Frank H.
Bell, Robert D.
Bengel, George H.
Benn, William G.
Benson, Marion A.
Berryman, Richard C.
Bevlock, James J.
Billingsley, Leonard
Blakeslee, Donald J. M. (2)
Bleyer, Julian M.
Blickenstaff, Wayne K.
Blissard, Grover C.
Blumer, Laurence E.
Boelens, Leo A.
Boggs, Hampton E.
Bolefahr, Wayne N.
Bong, Richard I.
Booth, Charles H. Jr.
Bostrom, Frank P.
Boudreaux, Marcus A.
Boyd, Charles K.
Boyle, Francis M.
Bradley, Jack T.
Brandon, William H.
Breeding, Paul R.
Brereton, Lewis H.
Bright, James C. Jr.
Brill, Allen
Britton, John T.
Brooks, John A. III
Brown, Albert C.
Brown, David W.
Brown, George S.
Brown, Henry W.
Brown, Samuel J.
Brown, Walter L.
Brueland, Lowell K.
Bryan, Donald S.
Buck, William E. Jr.
Burdue, Clayton C.
Burleson, Robert B.
Burney, Willis W.
Burns, Wilbert R.
Caldwell, Kenneth M.
Caldwell, Wilma T. Jr.
Cameron, William R.
Campbell, David A.
Cannon, James L.
Carmichael, Richard H. (2)
Carpenter, Reginald L.
Carr, Bruce W.
Carrington, John R.
Carruth, Thomas A.
Carswell, Horace S. Jr.
Catallo, Albert L.
Caton, Edward H.
Ceuleers, George F.
Christensen, Harold R.
Christianson, Franklin O.
Christopher, Guyton M.
Church, Russel M.
Clark, Phillip R.
Clary, Guy W.
Classen, Thomas J.
Cleven, Gale W.

Cobb, James B.
Cockriel, James R.
Coleman, Carlyle
Coleman, William F.
Collett, Howard G.
Collins, James F.
Coltharp, Chester A.
Compton, Keith K.
Conger, Paul A.
Connick, Arden D.
Corl, George P.
Corsetti, John
Cox, Leonard L.
Cox, Ray L.
Cragg, Edward
Crandall, Donald O.
Crenshaw, Claude J.
Crimmins, Fred T. Jr.
Crosbie, Maurice G.
Cullerton, William J.
Curtis, Robert C.
Czechowski, Chester M.
Dadson, Pat J.
Dahlberg, Kenneth H.
Dale, Jack D.
Dallas, Frederick W. Jr.
Dalton, Malcolm C.
Daniell, J. S.
Danver, Edison K.
Davies, John H.
Davis, Clayton E.
Davis, Robert R.
Davis, Robert T.
Dawkins, Cecil H.
Deal, James F.
Decker, Richard C.
DeGenaro, August V.
Dello-Buono, Thomas J.
Dent, Elliott E. Jr.
Diehl, John H. Jr. (2)
Dillman, Forrest E.
Dinn, Wallace S.
Dixon, Robert J.
Doherty, William K.
Dolk, Carl E.
Donaldson, I. B. Jack
Donegan, John M.
Dorwart, Robert J.
Douglas, Paul P. Jr. (2)
Dregne, Irwin H.
Drier, William C.
Dubisher, Francis E.
Dufrane, John L. Jr.
Dunagan, Sidney W.
Dunaway, John S.
Duncan, Daniel D.
Duncan, Glen E.
Dunham, William D.
Dunn, Edward B.
Dunn, Jack D.
Dunn, John A.
Durand, Edward D.
Durand, Frederick W.
Duval, Jessie B.
Dyer, Fred W.
Dyess, William E. (2)
Eagleston, Glen T.
Eareckson, William O.
Eaton, Frederick C. Jr.
Eckrich, James F.
Edeburn, Harry E.
Elam, Daniel F.
Ellis, Lewis N.
Ellis, Richard H.
Embree, Hoy D.
Emerson, Elwood R.
Emmer, Wallace N.
Endres, Robert J.
Engel, Russel W.
England, George H.
Ent, Uzal G.
Erickson, Irving A.
Evans, John G.
Exon, Arthur E.
Faires, George D.
Falletta, Charlie
Fegan, Robert W.
Ferguson, William H. Jr.
Fields, Virgil C. Jr.
Fletcher, Leo C.
Forrest, Nathan B. III
Forti, Joseph J.
Fowler, Gordon W.
Fox, Edward K.
Fox, Joseph M.
Frazier, James L.
French, Clifford E.
Fridge, Benjamin W.
Fries, Robert A.
Fry, Robert M.
Fulmer, Edward S.
Gabreski, Francis S.
Gallagher, Robert J.
Galloway, Paul E.
Gambonini, Paul B.
Garris, Benjamin L.
Garry, William J.
Gatterdam, Richard P.
Gause, Damon J.
Gautier, George J.
Gay, William M.
Geiser, Anthony W.
Gentile, Dominic S. (2)
Gerrits, James F.
Gettys, Richard O.
Gibbs, David R.
Gibson, Balfour C.
Gies, Carl P.
Gilliland, Leown A.
Gilpin, John A.
Glades, Harry V.
Glass, Walter L. Jr.
Glober, George E.
Glover, John G.
Gogoj, John J.
Goldberg, Hyman M.
Gooden, Clarence W.
Goodson, James A.
Gowder, Charles F.
Gozar, Jose P.
Grashio, Samuel C.
Gray, Leon W.
Green, Herschel H.
Greene, George B. Jr.
Grundmann, Hugh S.
Guilfoil, William K.
Haberle, Frank J.
Hageman, Earl L. Jr.
Hagerstrom, James P.
Hahn, Delbert H.
Hall, Donald P. (2)
Hall, Jack W.
Hambleton, Roscoe L.
Haning, William F. Jr.
Hanson, Robert T.
Hantman, Sidney
Hardison, Felix M.
Hargis, William D. Jr.
Harriger, Robert L.
Harrington, Archibald A.
Harris, Arizona T.
Harrison, Edgar E.
Harrison, James A.
Hascall, Alva S.
Hasek, Ivan S. Jr.
Hass, Floyd N.
Hatch, Herbert B. Jr.
Hawke, Thomas C.
Hawthorne, Harry J.
Hedlund, Earl C.
Heidger, Luther C.
Helder, Ronald L.
Heller, Edwin L.
Helmick, Frederick E.
Helmick, George H.
Henderson, Ivan W.
Hendricks, Randall W.
Henebry, John P.
Henry, Maurice V.
Herlevic, Frank A.
Herres, Francis E.
Herriott, Harold T.
Herron, Christian I.
Herron, Edwin R.
Hicks, Paul L.
Hill, David L.
Hill, James E.
Hill, Robert J.
Hillebrand, Mahlon A.
Hillsinger, Loren B.
Hinze, Frederick S. Jr.
Hipps, William G.
Hively, Howard D.
Hoag, Carl L. Jr.
Hodge, Dexter L.
Hodges, Charles W.
Hoenshell, Carl C.
Hoevet, Dean C.
Hoff, Thomas A.
Holbury, Robert J.
Holliday, Robert L.
Holmes, Walter T.
Holsberg, Wilfred G.
Holub, Anthony C.
Homer, Cyril F.
Hoover, John R.
Horton, Robert W.
House, A. T. Jr.
Hovde, William J.
Howat, Kenneth W.
Howell, John J.
Hubbard, Ronald D.
Hudson, Charles S.
Huffstickler, Benjamin F.
Hughes, Charles W.
Hull, Charles T.
Hull, Jack T.
Ingelido, Michael J.
Inman, Harold R.
Irons, John P.

***Edwin Heller***

Jackson, Roland B.
James, Joseph H. Jr.
Jamison, Roger W.
Jernigan, William D. J.
Jewell, Kenneth G.
Johnson, Albert L.
Johnson, Gerald R. (2)
Johnson, Gerald W.
Johnson, Robert S.
Johnson, Russell H.
Johnson, Theron E.
Johnson, Thomas E.
Johnson, William H.
Johnston, Robert D.
Johnston, Ruby E.
Jolly, Hoyt A. Jr.
Jones, Charles T.
Jones, Cyril W. Jr.
Jones, William M. Jr.
Joyce, John D.
Juchheim, Alwin M.
Judy, James D.
Kase, Louis N.
Kaufman, Robert P.
Keator, Randall D.
Keen, Robert J.
Kegelman, Charles C.
Kehoe, John W.
Kelly, Arthur G.
Kelly, Colin P. Jr.
Kemp, William J.
Kendrick, George E.
Kenney, George C.
Keogh, Bernard M.
Kerr, William M.
Key, Algene E.
Kimmey, Doyle
Kinnard, Claiborne H. Jr.
Kiser, George E.
Kjosness, Gustav D.
Klepinger, Nolan W.
Klette, Immanuel

Knickerbocker, Malcolm M.
Koenig, Charles W.
Koon, Ralph E.
Kosters, Allen
Kovacik, Steve H.
Kramer, Vernon J.
Krause, John E.
Krug, Richard M.
Kunkle, James K.
Lackness, Berdines
Ladisic, Peter
Lael, Francis V.
LaFleur, Joseph V.
Lambert, James V.
Land, George R.
Landry, Larry D.
Lannon, Louis A.
Larson, Harold B.
Latham, John L. Jr.
Lauraine, Loye J.
Laven, George Jr.
Ledford, Jack C.
LeMay, Curtis E.
Leverette, William L.
Levi, Nelson
Liimatainen, Alvar A.
Lillis, Joseph D.
Lines, Ted E.
Lipscomb, Paul M.
Littge, Raymond H.
Litton, William P.
Loegering, Weston A.
Lohmeyer, Marvin E.
London, Charles P.
Lonsway, Louis G.
LoPresti, Nicholas O.
Lowery, Herman F.
Lowry, Allan W.
Ludolph, George L.
Ludwig, Vance P.
Luksic, Carl J.
Lyle, Lewis E.
Lynch, Thomas J.
MacDonald, Charles H. (2)
Magoffin, Morton D.
Mahoney, John F.
Mahony, Grant M.
Mahurin, Walker M.
Manders, John H.
Marett, Samuel H.
Marpe, Frank C. Jr.
Marshall, Lyndon O.
Martin, Ernest V.
Martin, John C.
Martin, Kenneth R.
Martinson, Meynard L.
Mason, Joe L.
Matchitt, Ray J.
Matson, Rex E.
Matte, Joseph Z.
Matthews, John E.
Mayes, Herbert C.
McArthur, Paul G.
McCabe, Ernest J.
McCall, Ben J.
McCallister, Garrett H.
McCallum, Gerald
McCormick, John B.
McCullar, Kenneth D.
McCurdy, Jimmy E.
McDaniel, Gordon H.
McElroy, Joseph G.
McFarland, Kenton D.
McGrath, Thomas J.
McGuire, Thomas B. Jr.
McHenry, William S.
McLaughlin, Frank B.
McLaughlin, John A.
McLeod, Stanley A.
McMahan, Darrell E.
McMahon, Robert F.
McNees, Richard A.
McNeese, Harold G.
Meals, Elbert O.
Megura, Nicholas
Melo, Frank L.
Merkel, Howard W.
Merrill, John O.
Meyer, John C. (3)
Middlebrook, Garrett E.
Middleditch, Lyman Jr.
Miles, James E.
Miller, Guy M.
Miller, Robert E.
Millikan, Willard W.
Milton, Theodore R.
Mitchell, John W.
Mix, Joseph E.
Moats, Sanford K.
Mohler, William A.
Mohon, Ernest M. Jr.
Molina, Pedro Q.
Momyer, William W.
Monkton, Lyle
Montgomery, Robert P.
Mooney, Robert C.
Moore, Carl W.
Moore, Clarence J.
Moore, Joseph H.
Moore, Pren L.
Moore, William W.
Moran, Harold D.
Morehead, James B.
Morgan, Marion W.
Morris, James M.
Morrissey, Robert L.
Moses, John H.
Moullen, Roy F.
Moye, Albert J.
Muckley, Dwight S.
Mueller, Alvin J. Jr.
Muir, Marvin F.
Mulligan, Charles D.
Munsey, James S.
Muri, James P.
Murphy, Philip J.
Myers, Joseph
Negley, Richard V. W. Jr.
Nepil, Slavomir
Nielsen, Leland C.
Noell, Robert E.
Norton, Charles E.
Nuchols, William L.
O'Brien, Kenneth J.
O'Connor, Frank Q.
Oestreicher, Robert G.
Oettel, Fred W.
Old, Archie J.
Oldham, Richard G.
O'Leary, Eugene B.
Olson, Henry L.
O'Neal, James A.
O'Neill, Brian
O'Neill, Lawrence F.
O'Rourke, Edward J.
Orr, William F.
Owen, Albert E.
Owens, Marion P.
Paisley, Melvyn R.
Partridge, Donald D.
Patrick, Augustus R. Jr.
Pawloswski, Edward J.
Pear, Sidney A.
Pearson, John M.
Pederson, Harold L.
Pell, Floyd J.
Perdomo, Oscar F.
Peres, Jack R.
Perry, Elton S.
Peters, Robert O.
Petersen, Jacob
Peterson, Chesley G.
Petty, Charles A.
Phillips, Claude B.
Phillips, Hubert E.
Phillips, Reginald H.
Pickard, John G.
Pierce, Sammy A.
Pittman, Charles K.
Ploetz, Frederick F.
Polifka, Karl L.
Poore, Wesley A.
Posey, James T.
Post, Arthur L.
Potter, A. J.
Potts, Ramsey D. Jr.
Preddy, George E.
Price, Herbert M.
Price, Raymond E.
Priest, Royce W.
Prince, George A.
Prince, William H.
Pugh, Herbert W.
Putnam, Walter B.
Radtke, Dean M.
Rahner, Raymond M.
Ramey, Gordon A.
Ramey, Howard K.
Ramey, Roger M.
Randerson, Luther W.
Rankin, Robert J.
Rau, Oscar J.
Rauschkolb, Frank
Ray, Charles P.
Ray, John W.
Reams, Luther S.
Reeder, Sumner H.
Reeves, Charles T.
Rice, Burt H.
Richards, Conrad B.
Ridolfi, Peter J.
Righetti, Elwyn G.
Rist, Robert P.
Ritchey, Andrew J.
Robbins, Jay T. (2)
Roberts, Daniel T.
Roberts, Eugene P.
Robinson, Stanley K.
Roche, John R.
Rogers, Arthur H.
Rogers, Robert J.
Roller, John R.
Rorer, George A. Jr.
Rose, Dudley E.
Rose, Henry J.
Rosenthal, Robert

***Curtis LeMay***

Royce, Ralph
Ruegg, Robert G.
Sacks, Seymour
Sanford, James T.
Sanford, William L.
Sans, Charles H.
Saunders, Lester W.
Schellin, Roy L.
Schild, William C.
Schilling, David C. (2)
Schiltz, Glenn D. Jr.
Scholz, Richard J.
Schreiber, Leroy A.
Schulman, Herbert E.
Schuman, John P.
Sconiers, Ewart T.
Seaman, Theodore L.
Seith, Louis T.
Seitz, Bernard C.
Sellers, Thomas D.
Sewart, Allan J. Jr.
Shaw, William S.
Shelton, Stephen C.
Shingler, Herbert I.
Shirey, Harry R.
Shubin, Murray J.
Silva, Louis T.
Simeral, George A.
Sims, Tommie J.
Skinner, William E.
Slade, Richard J.
Slessor, Lee D.
Smart, Jacob E.
Smith, Donovan F.
Smith, Edmond H.
Smith, George A.
Smith, Harry W.
Smith, Jack E.
Smith, James R.
Smith, Mack H.
Smith, Stephen M.
Snyder, Donald L.
Spencer, Charles W.
Spencer, Dale F.
Sprague, Charles A.
Stach, Paul J.
Starczweski, Phillip R.
Starks, Richard F.
Steele, Henry P.
Steen, Zerrill J.
Steffy, Robert F.
Stewart, James C.
Stewart, Walter T.
Stipe, Leon D.
Stireman, John O.
Storovich, Robert D.
Strand, Robert E.
Strasburger, Alvin
Stricker, Thomas A.
Strickland, Robert F.
Strother, Donald R.
Sullivan, Leroy R.
Sussky, Ira M.
Swain, Andrew J.
Sweeney, Walter C.
Talbott, Carlos M.
Tapp, James B.
Taylor, Kenneth M.
Taylor, Robert L.
Tennille, William G. Jr.
Thomas, Jay P.
Thornbrough, George W.
Thornell, John F. Jr.
Tibbets, Paul W. Jr.
Tidwell, Billy M.
Tiedemann, John R.
Tompkins, Frederick L.
Toomey, Winston M.
Trauth, Leo J. Jr.
Travis, Robert F.
Trimingham, Charles E.
Trout, Chester E.
Troy, Edward P.
True, Clinton U.
Truluck, John H. Jr.
Tubman, Thomas J.
Tufty, Iver O.
Turner, William L.
Underwood, Carol E.
Urso, James D.
Van Deventer, Cowell
Van Ness, James
Vance, Paul W.
Vaughan, William
Via, Charles A. Jr.
Via, James E.
Villamor, Jesus A. (2)
Villines, Colin O.


***George Welch***

Vitali, Chester A.
Vogt, John E.
Voll, John J.
Vondrachek, Charles E.
Voss, Raymond J.
Wagner, Boyd D.
Wagner, Donald F.
Wainwright, John H.
Walker, Clyde B.
Walker, Leland A.
Walker, William R.
Wallace, Robert D.
Walter, Donald A.
Walters, Roy W.
Walton, Victor E.
Ward, Emery M.
Ward, Ralph E. Jr.
Warmer, Benjamin F.
Waskowitz, Frank T.
Watkins, James A.
Watson, William S.
Watt, James R.
Wayland, William J.
Weeks, Elbert W.
Weems, Thomas N. Jr.
Welch, George S.
Werner, William T. L.
Wesche, Frederick F. III
West, Richard L.
Westbrook, Robert B.
Westby, Morton K.
Westerbeke, Donald G.
Wetmore, Ray S. (2)
Whalen, Norman M.
Wheless, Hewitt T.
Wherry, William B.
Whisner, William T. Jr. (2)
White, Raymond S.
Whitehead, Ennis C.
Whitson, William D.
Whittington, Leonard H.
Wiecks, Max R.
Wiegand, Arthur H.
Wilde, Robert M.
Wilkinson, James W.
Williams, Greeley B.
Williamson, Felix D.
Wilson, Avis K.
Wilson, Frederick M.
Wilson, James W.
Wilson, Russell A.
Winters, Elmer R.
Witt, Gerald S.
Witt, Lynn E. Jr.
Wolf, John K.
Woliver, Robert M.
Wood, Howard C.
Wood, Jack W.
Wood, Richard M.
Woods, Francis
Woods, Sidney S.
Woody, Robert E.
Wright, Arthur H. Jr.
Wright, Clifton J.
Wright, Ellis W. Jr.
Wright, John B.
Wylie, John W.
Yearwood, Roy W.
Yevich, Edward S.
Zdanzukas, Vincent R.
Zemke, Hubert

### Korean War

Baker, Royal N.
Blesse, Frederick C.
Bryan, William E. Jr.
Davis, George A. Jr.
Dixon, Jacob W.
Fernandez, Manuel J. Jr.
Fischer, Harold E.
Freligh, Lawrence E.
Garrison, Vermont
Gebaur, Arthur W. Jr.
Georgi, William F.
Halton, William T.
Hicks, Forrest L.
Jabara, James
Johnson, James K.
Ledford, James H.
MacArthur, David W.
McConnell, Joseph C. Jr.
Moore, Lonnie R.
Morse, John Jr.
Najarian, John J.
Nichols, Donald
O'Donnell, Emmett Jr.
Orr, Robert H.
Overton, Dolphin D. III
Parker, Robert B.
Parr, Ralph S. Jr.
Partridge, Earle E.
Rhoads, John K.
Savage, Richard L.
Shields, Everett L. Jr.
Spath, Charles R.
Stratemeyer, George E.
Tunner, William H.
Vojvodich, Mele Jr.
Whisner, William T. Jr.
Wilkerson, Desmond R.


***Ray Wetmore***

Originally based on a compilation by C. Douglas Sterner.

# 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.

### Cuba 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.
Day, Col. George E.
Dayton, Maj. Thomas E.
DeBellevue, Capt. Charles B.
DeTar, Maj. Dean E.
Donelson, Capt. Nicholas J.
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.
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.
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.
Richter, 1st Lt. Karl W.
Risner, Lt. Col. Robinson (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
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. Bill
Johnson, Capt. Paul T.

### Somalia
Wilkinson, TSgt. Timothy A.

### Operation Enduring Freedom
Chapman, TSgt. John A.
Cunningham, SrA. Jason D.
Rhyner, SSgt. Zachary J.

*Don Olsen*


*Zachary Rhyner*

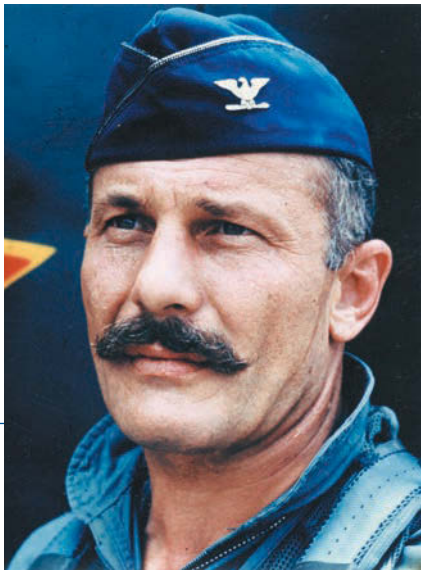

*John Chapman*

# Air Force Aces

## Some Famous Firsts

| | |
|---|---|
| **May 28, 1918** | First AEF-trained AEF ace: Capt. Edward V. Rickenbacker |
| **Dec. 7, 1941** | First AAF victories of World War II (Pearl Harbor): Lts. Harry W. Brown, Philip M. Rasmussen, Lewis M. Sanders, Gordon H. Sterling Jr., Kenneth M. Taylor, George S. Welch |
| **Dec. 16, 1941** | First AAF ace of World War II: 1st Lt. Boyd D. Wagner |
| **Nov. 8, 1950** | First jet-to-jet victory (Korean War): 1st Lt. Russell J. Brown |
| **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 |

***Left: James Jabara, the first USAF ace of the Korean War. Jabara scored 15 victories before the end of the war.***



***Right: Robin Olds is the only USAF ace with aerial victories in both World War II and the Vietnam War.***

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 updates its online listing (http://www.au.af.mil/au/afhra/avc.asp).

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.

## American Aces of World War I

**Eddie Rickenbacker** (26)

**In World War I, pilots who shared victories were each given one credit. This list uses the World War I counting rule.**

| | |
|---|---|
| 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 P. | 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 |
| 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 |

**Elliott Springs** (12)

## Army Air Forces Aces of World War II

**Don Gentile** (19.83)

**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 |

**Thomas McGuire Jr.** (38)

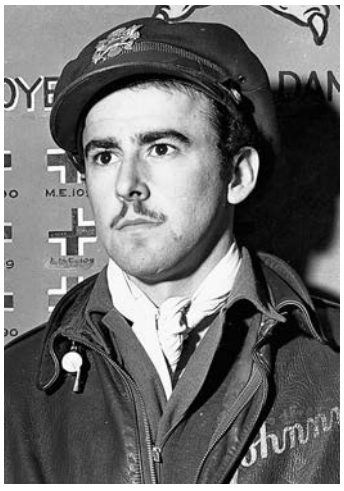
| | |
|---|---|
| Godfrey, Capt. John T. | 16.33 |
| Anderson, Capt. Clarence E. Jr. | 16.25 |
| Dunham, Lt. Col. William D. | 16 |
| Harris, Lt. Col. Bill | 16 |
| Welch, Capt. George S. | 16 |
| Beerbower, Capt. Don M. | 15.5 |
| Brown, Maj. Samuel J. | 15.5 |
| Peterson, Capt. Richard A. | 15.5 |
| 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 |
| 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 |

**Robert Johnson** (27) **and Francis Gabreski** (28)

| | |
|---|---|
| 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 |
| Gleason, Capt. George W. | 12 |
| Hively, Maj. Howard D. | 12 |
| Ladd, Capt. Kenneth G. | 12 |
| 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 |

**Hubert Zemke** (17.75)

**Richard Turner** (11)



**John Godfrey** (16.33)

| | |
|---|---|
| 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 |
| Bankey, Capt. Ernest E. Jr. | 9.5 |
| Spencer, 1st Lt. Dale F. | 9.5 |
| Adams, Capt. Fletcher E. | 9 |
| Andrew, Maj. Stephen W. | 9 |
| Banks, Maj. William M. | 9 |
| Beyer, Capt. William R. | 9 |
| Boggs, Capt. Hampton E. | 9 |
| Champlin, Capt. Frederic F. | 9 |
| Collins, Maj. Frank J. | 9 |
| Curdes, 1st Lt. Louis E. | 9 |
| Dahl, Capt. Perry J. | 9 |
| Dalglish, Maj. James B. | 9 |
| Dunkin, Capt. Richard W. | 9 |
| Emmons, 1st Lt. Eugene H. | 9 |
| Fanning, 1st Lt. Grover E. | 9 |
| Feld, 1st Lt. Sylvan | 9 |
| Fiebelkorn, 1st Lt. Ernest C. | 9 |
| Forster, 1st Lt. Joseph M. | 9 |
| Gallup, Lt. Col. Kenneth W. | 9 |
| Hill, Capt. Allen E. | 9 |
| Hurlbut, Flight Officer Frank D. | 9 |
| Juchheim, Capt. Alwin M. | 9 |
| Kiser, Capt. George E. | 9 |
| Lesicka, 1st Lt. Joseph J. | 9 |
| Meroney, Capt. Virgil K. | 9 |
| Morrill, 1st Lt. Stanley B. | 9 |
| Overfield, 1st Lt. Loyd J. | 9 |
| Paris, Capt. Joel B. III | 9 |
| Roberts, Lt. Col. Eugene P. | 9 |
| Smith, Lt. Col. Meryl M. | 9 |
| Stewart, Capt. John S. | 9 |
| White, Capt. Robert H. | 9 |
| Wolfe, Capt. Judge E. | 9 |
| Bennett, Capt. Joseph H. | 8.5 |
| Cesky, Capt. Charles J. | 8.5 |
| Dorsch, Capt. Frederick J. Jr. | 8.5 |
| Hayes, Lt. Col. Thomas L. Jr. | 8.5 |
| Hoefker, Capt. John H. | 8.5 |
| Jenkins, 2nd Lt. Otto D. | 8.5 |
| Johnson, 1st Lt. Arthur G. Jr. | 8.5 |
| Luksic, 1st Lt. Carl J. | 8.5 |
| McDowell, 1st Lt. Don | 8.5 |
| McGrattan, Capt. Bernard L. | 8.5 |
| Moats, 1st Lt. Sanford K. | 8.5 |
| Schlegel, Capt. Albert L. | 8.5 |
| Ainlay, 1st Lt. John M. | 8 |
| Allen, 1st Lt. David W. | 8 |
| Benz, Maj. Walter G. Jr. | 8 |
| Booth, 1st Lt. Robert J. | 8 |
| Bostwick, Maj. George E. | 8 |
| Broadhead, Maj. Joseph E. | 8 |
| Carroll, 1st Lt. Walter J. Jr. | 8 |
| Cruikshank, Maj. Arthur W. Jr. | 8 |
| Damstrom, 1st Lt. Fernley H. | 8 |
| Douglas, Lt. Col. Paul P. Jr. | 8 |
| Elder, Maj. John L. Jr. | 8 |
| Fiedler, Capt. Arthur C. Jr. | 8 |
| Fowle, 1st Lt. James M. | 8 |
| Gardner, Capt. William A. | 8 |
| Gaunt, Capt. Frank L. | 8 |
| Gerard, Capt. Francis R. | 8 |
| Grosshuesch, Capt. Leroy V. | 8 |
| Harris, Capt. Frederick A. | 8 |
| Hart, 1st Lt. Kenneth F. | 8 |
| Ilfrey, Capt. Jack M. | 8 |
| Jackson, Maj. Michael J. | 8 |
| Jones, Capt. John L. | 8 |
| Kinnard, Lt. Col. Claiborne H. Jr. | 8 |
| Maloney, Capt. Thomas E. | 8 |
| Momyer, Col. William W. | 8 |
| Morehead, 1st Lt. James B. | 8 |
| Novotny, 1st Lt. George P. | 8 |
| O'Neill, 1st Lt. John G. | 8 |
| Paisley, 1st Lt. Melvyn R. | 8 |
| Richardson, Maj. Elmer W. | 8 |
| Roddy, Capt. Edward F. | 8 |
| Rowland, Col. Robert R. | 8 |
| Sangermano, 1st Lt. Philip | 8 |

*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.

**Boyd Wagner** (8)

| | |
|---|---|
| Schiltz, 1st Lt. Glen D. Jr. | 8 |
| Shaw, 1st Lt. Robert M. | 8 |
| Shomo, Capt. William A. | 8 |
| Smith, Maj. Carroll C. | 8 |
| Stanton, Maj. Arland | 8 |
| Sublett, Capt. John L. | 8 |
| Tapp, Maj. James B. | 8 |
| Tovrea, 1st Lt. Philip E. Jr. | 8 |
| Tyler, Maj. James O. | 8 |
| Vogt, Maj. John W. Jr. | 8 |
| Wagner, Lt. Col. Boyd D. | 8 |
| Warford, Maj. Victor E. | 8 |
| Weaver, Capt. Charles E. | 8 |
| Lang, Capt. Joseph L. | 7.83 |
| Stewart, Lt. Col. Everett W. | 7.83 |
| Bryan, Maj. William E. Jr. | 7.5 |
| Cutler, Capt. Frank A. | 7.5 |
| Davis, Capt. Glendon V. | 7.5 |
| Glenn, Maj. Maxwell H. | 7.5 |
| Karger, 1st Lt. Dale E. | 7.5 |
| Lamb, Maj. George M. | 7.5 |
| Lasko, Capt. Charles W. | 7.5 |
| Lowell, Lt. Col. John H. | 7.5 |
| Miklajcyk, Capt. Henry J. | 7.5 |
| Righetti, Lt. Col. Elwyn G. | 7.5 |


**William Shomo** (8)

| | |
|---|---|
| Garrison, 1st Lt. Vermont | 7.33 |
| Morris, Capt. James M. | 7.33 |
| Goodnight, 1st Lt. Robert E. | 7.25 |
| Adams, Capt. Burnell W. | 7 |
| Allen, 1st Lt. Calvin D. Jr. | 7 |
| Anderson, 1st Lt. William Y. | 7 |
| Becker, Capt. Robert H. | 7 |
| Blair, Capt. Samuel V. | 7 |
| Browning, Capt. James W. | 7 |
| Carder, 1st Lt. John B. | 7 |
| Chapman, Maj. Philip G. | 7 |
| Cramer, Maj. Darrell S. | 7 |
| Crenshaw, 1st Lt. Claude J. | 7 |
| Davis, 1st Lt. George A. Jr. | 7 |
| Dean, 1st Lt. Zach W. | 7 |
| Duke, Capt. Walter F. | 7 |
| Dunaway, 1st Lt. John S. | 7 |
| Edens, 2nd Lt. Billy G. | 7 |
| Elliott, 1st Lt. Vincent T. | 7 |
| Fisher, Capt. Edwin O. | 7 |
| Fisk, Capt. Jack A. | 7 |
| Franklin, 1st Lt. Dwaine R. | 7 |
| Graham, Lt. Col. Gordon M. | 7 |
| Grant, 1st Lt. Marvin E. | 7 |
| Gregg, 1st Lt. Lee O. | 7 |
| Griffin, Maj. Joseph H. | 7 |
| Hennon, Capt. William J. | 7 |
| Hill, Maj. Frank A. | 7 |
| Hockery, Capt. John J. | 7 |
| Howard, Col. James H. | 7 |
| Jackson, Lt. Col. Willie O. Jr. | 7 |
| Jamison, Capt. Gilbert L. | 7 |
| Jett, Capt. Verl E. | 7 |
| Johnson, Capt. Clarence O. | 7 |
| Keen, 1st Lt. Robert J. | 7 |
| King, Capt. Benjamin H. | 7 |
| Kinsey, 2nd Lt. Claude R. Jr. | 7 |
| Klibbe, 2nd Lt. Frank W. | 7 |
| Kuentzel, 2nd Lt. Ward A. | 7 |
| Lamb, Capt. Robert A. | 7 |
| Lewis, Maj. Warren R. | 7 |
| Lewis, Lt. Col. William H. | 7 |
| Liebers, 2nd Lt. Lawrence P. | 7 |
| Little, 1st Lt. James W. | 7 |
| Lombard, Maj. John D. | 7 |
| Maguire, Capt. William J. | 7 |
| Marshall, Maj. Bert W. Jr. | 7 |
| McLaughlin, Capt. Murray D. | 7 |
| Moore, Maj. John T. | 7 |
| O'Brien, 1st Lt. Gilbert M. | 7 |
| Older, Lt. Col. Charles H. | 7 |
| Pierce, 1st Lt. Joseph F. | 7 |
| Pierce, 1st Lt. Sammy A. | 7 |
| Poindexter, Capt. James N. | 7 |
| Popek, Maj. Edward S. | 7 |
| Purdy, 1st Lt. John E. | 7 |
| Reynolds, 1st Lt. Robert | 7 |
| Rogers, Capt. Felix M. | 7 |
| Ross, Maj. Herbert E. | 7 |
| Sears, 1st Lt. Meldrum L. | 7 |
| Shafer, Lt. Col. Dale E. Jr. | 7 |
| Shipman, 1st Lt. Ernest | 7 |
| Shuler, 1st Lt. Lucien B. | 7 |
| Simmons, 1st Lt. John M. | 7 |
| Smith, Maj. Leslie C. | 7 |
| Smith, 1st Lt. Richard E. | 7 |
| Stone, 2nd Lt. Robert J. | 7 |
| Strand, Capt. William H. | 7 |
| Truluck, 1st Lt. John H. | 7 |
| Turner, Lt. Col. William L. | 7 |
| Tyler, 1st Lt. Gerald E. | 7 |
| Vaughn, Maj. Harley C. | 7 |
| Waters, 1st Lt. Edward T. | 7 |
| Wheadon, Capt. Elmer M. | 7 |
| Whittaker, Capt. Roy E. | 7 |
| Wicker, Maj. Samuel J. | 7 |
| Wilkinson, Capt. James W. | 7 |
| Wire, 1st Lt. Calvin C. | 7 |
| Woods, Lt. Col. Sidney S. | 7 |
| Woody, Capt. Robert E. | 7 |
| Zoerb, Capt. Daniel J. | 7 |
| Murphy, Lt. Col. John B. | 6.75 |
| Cummings, Capt. Donald M. | 6.5 |
| Gray, Maj. Rockford V. | 6.5 |
| Hoffman, 1st Lt. James E. Jr. | 6.5 |
| Hubbard, Lt. Col. Mark E. | 6.5 |
| Hunt, 1st Lt. Edward E. | 6.5 |
| Koenig, 1st Lt. Charles W. | 6.5 |
| Kruzel, Lt. Col. Joseph J. | 6.5 |
| Moseley, Capt. Mark L. | 6.5 |
| Rader, 1st Lt. Valentine S. | 6.5 |
| Riley, 1st Lt. Paul S. | 6.5 |
| Welden, 1st Lt. Robert D. | 6.25 |
| Adams, 1st Lt. Charles E. Jr. | 6 |
| Alison, Lt. Col. John R. | 6 |
| Anderson, 1st Lt. Wyman D. | 6 |
| Andrews, 1st Lt. Stanley O. | 6 |
| Baker, 1st Lt. Ellis C. Jr. | 6 |
| Baseler, Lt. Col. Robert L. | 6 |
| Bille, Maj. Henry S. | 6 |
| Blumer, Capt. Laurence E. | 6 |
| Brown, 1st Lt. Harley L. | 6 |
| Brown, Capt. Harry W. | 6 |
| Brown, Capt. Meade M. | 6 |
| Buck, Capt. George T. Jr. | 6 |
| Callaway, Maj. Raymond H. | 6 |
| Campbell, 1st Lt. Richard A. | 6 |
| Candelaria, 1st Lt. Richard G. | 6 |
| Care, Capt. Raymond C. | 6 |
| Carlson, Capt. Kendall E. | 6 |
| Carter, Capt. James R. | 6 |
| Chick, Lt. Col. Lewis W. Jr. | 6 |
| Coffey, Lt. Col. Robert L. Jr. | 6 |
| Collinsworth, Capt. J. D. | 6 |
| Cook, Capt. Walter V. | 6 |
| Crawford, 2nd Lt. Ray | 6 |
| Crim, Maj. Harry C. Jr. | 6 |
| Cundy, 1st Lt. Arthur C. | 6 |
| Czarnecki, 1st Lt. Edward J. | 6 |
| Davis, 1st Lt. Barrie S. | 6 |
| Dean, 2nd Lt. Cecil O. | 6 |
| Degraffenreid, 2nd Lt. Edwin L. | 6 |

**Vermont Garrison** (17.33, WWII and Korea)

**Urban Drew** (6)

| | |
|---|---|
| Dent, Capt. Elliott E. Jr. | 6 |
| Dillard, Capt. William J. | 6 |
| Drew, 1st Lt. Urban L. | 6 |
| Drier, Capt. William C. | 6 |
| Eason, 1st Lt. Hoyt A. | 6 |
| Emerson, Capt. Warren S. | 6 |
| Emmert, 1st Lt. Benjamin H. Jr. | 6 |
| Evans, Lt. Col. Andrew J. Jr. | 6 |
| Evans, Maj. Roy W. | 6 |
| Everhart, Capt. Lee R. | 6 |
| Fleischer, Capt. Richard H. | 6 |
| Foulis, Capt. William B. Jr. | 6 |
| Froning, 1st Lt. Alfred C. | 6 |
| Gallup, Capt. Charles S. | 6 |
| Goss, Maj. Edmund R. | 6 |
| Gresham, 1st Lt. Billy M. | 6 |
| Gumm, 1st Lt. Charles F. Jr. | 6 |
| Hagerstrom, 1st Lt. James P. | 6 |
| Hall, 1st Lt. George F. | 6 |
| Hanes, 1st Lt. William F. Jr. | 6 |
| Harmeyer, 1st Lt. Raymond F. | 6 |
| Hart, Capt. Cameron M. | 6 |
| Haviland, Capt. Fred R. Jr. | 6 |
| Hill, Col. David L. | 6 |
| Hogg, Capt. Roy B. | 6 |
| Holloway, 1st Lt. James D. | 6 |
| Howard, 1st Lt. Robert L. | 6 |
| Howes, 1st Lt. Bernard H. | 6 |
| Hurd, 1st Lt. Richard F. | 6 |
| Ince, 1st Lt. James C. | 6 |
| Johnston, Lt. Col. Robert D. | 6 |
| Jones, 1st Lt. Cyril W. Jr. | 6 |
| Jordan, Maj. Wallace R. | 6 |
| Karr, Capt. Robert A. | 6 |
| Kemp, 2nd Lt. William T. | 6 |
| Kienholz, 1st Lt. Donald D. | 6 |
| Lane, 1st Lt. John H. | 6 |
| Larson, Maj. Donald A. | 6 |
| Larson, 2nd Lt. Leland A. | 6 |
| Lubner, Capt. Martin W. | 6 |
| Lucas, Capt. Paul W. | 6 |
| Lustic, 1st Lt. Stanley J. | 6 |
| McDaniel, 1st Lt. Gordon H. | 6 |
| McGee, Capt. Donald C. | 6 |
| McKeon, Capt. Joseph T. | 6 |
| Meigs, 1st Lt. Henry II | 6 |
| Meuten, 1st Lt. Donald W. | 6 |
| Miller, Capt. Armour C. | 6 |
| Mills, Maj. Henry L. | 6 |
| Mugavero, 1st Lt. James D. | 6 |
| Murphey, Capt. Paul C. Jr. | 6 |

**John Alison** (6), **David Hill** (6), and **Albert Baumler** (5)

| | |
|---|---|
| Murphy, Capt. Alva C. | 6 |
| Ohr, Capt. Fred F. | 6 |
| Olson, Capt. Norman E. | 6 |
| Pietz, 1st Lt. John Jr. | 6 |
| Pissanos, 1st Lt. Spiros N. | 6 |
| Pugh, Capt. John F. | 6 |
| Reed, Capt. William N. | 6 |
| Reeves, 1st Lt. Horace B. | 6 |
| Reeves, 1st Lt. Leonard R. | 6 |
| Roberson, 1st Lt. Arval J. | 6 |
| Scheible, Capt. Wilbur R. | 6 |
| Schildt, 1st Lt. William J. | 6 |
| Schimanski, Capt. Robert G. | 6 |
| Simmons, 1st Lt. William J. | 6 |
| Smith, 1st Lt. John C. | 6 |
| Starck, Capt. Walter E. | 6 |
| Starnes, Capt. James R. | 6 |
| Taylor, Capt. Ralph G. Jr. | 6 |
| Thwaites, Capt. David F. | 6 |
| Turley, 2nd Lt. Grant M. | 6 |
| Vincent, Col. Clinton D. | 6 |
| Wainwright, 2nd Lt. John H. Jr. | 6 |
| Walker, 1st Lt. Thomas H. | 6 |
| Wandrey, Capt. Ralph H. | 6 |
| Welch, Capt. Robert E. | 6 |
| Wenige, 1st Lt. Arthur E. | 6 |
| Whalen, 1st Lt. William E. | 6 |
| White, 2nd Lt. Thomas A. | 6 |
| Williams, 1st Lt. James M. | 6 |
| Witt, Capt. Lynn E. Jr. | 6 |
| Wright, Capt. Ellis W. Jr. | 6 |
| Zubarik, 1st Lt. Charles J. | 6 |
| Fortier, Capt. Norman J. | 5.83 |
| Koraleski, Capt. Walter J. Jr. | 5.53 |
| Amoss, 1st Lt. Dudley M. | 5.5 |
| Bickel, 1st Lt. Carl G. | 5.5 |
| Burdick, 1st Lt. Clinton D. | 5.5 |
| Buttke, Capt. Robert L. | 5.5 |
| Compton, Capt. Gordon B. | 5.5 |
| Edwards, 1st Lt. Edward B. Jr. | 5.5 |
| Gailer, 1st Lt. Frank L. | 5.5 |
| Graham, Capt. Lindol F. | 5.5 |
| Hatala, Capt. Paul R. | 5.5 |
| Heller, Capt. Edwin L. | 5.5 |
| Holmes, 1st Lt. Besby F. | 5.5 |
| Horne, 1st Lt. Francis W. | 5.5 |
| King, 1st Lt. William B. | 5.5 |
| Lampe, 1st Lt. Richard C. | 5.5 |
| Lanphier, Capt. Thomas G. Jr. | 5.5 |
| Lenfest, Capt. Charles W. | 5.5 |
| Long, Capt. Maurice G. | 5.5 |
| McCauley, 1st Lt. Frank E. | 5.5 |
| Minchew, Capt. Leslie D. | 5.5 |
| O'Brien, Capt. William R. | 5.5 |
| Pascoe, 1st Lt. James J. | 5.5 |
| Pompetti, 1st Lt. Peter E. | 5.5 |
| Ruder, 1st Lt. Leroy A. | 5.5 |
| Shoup, 1st Lt. Robert L. | 5.5 |
| Smith, 1st Lt. Donovan F. | 5.5 |
| Tanner, Capt. William F. | 5.5 |
| Vanden Heuvel, 1st Lt. George R. | 5.5 |
| Waits, 1st Lt. Joe W. | 5.5 |
| Wang, 1st Lt. Kuang Fu | 5.5 |
| Winks, 1st Lt. Robert P. | 5.5 |
| Biel, 1st Lt. Hipolitus T. | 5.33 |
| Vinson, Capt. Arnold E. | 5.33 |
| Dorris, Maj. Harry W. | 5.25 |
| Miller, 2nd Lt. Thomas F. | 5.25 |
| Thompson, 1st Lt. Robert D. | 5.25 |
| Duffy, Capt. James E. Jr. | 5.2 |
| Abernathy, Capt. Robert W. | 5 |

**Clinton Vincent** (6)

| | |
|---|---|
| Adams, 1st Lt. Robert H. | 5 |
| Allen, 1st Lt. William H. | 5 |
| Ambort, 2nd Lt. Ernest J. | 5 |
| Ammon, 1st Lt. Robert H. | 5 |
| Andersen, 1st Lt. Leslie E. | 5 |
| Anderson, 1st Lt. Richard H. | 5 |
| Arasmith, 1st Lt. Lester L. | 5 |
| Archibald, 1st Lt. David B. | 5 |
| Aron, 1st Lt. William E. | 5 |
| Aust, Capt. Abner M. Jr. | 5 |
| Axtell, 1st Lt. Eugene D. | 5 |
| Baccus, Lt. Col. Donald A. | 5 |
| Bade, 1st Lt. Jack A. | 5 |
| Bank, 1st Lt. Raymond M. | 5 |
| Barber, 1st Lt. Rex T. | 5 |
| Barkey, 1st Lt. Robert M. | 5 |
| Barnes, 1st Lt. Truman S. | 5 |
| Baumler, Capt. Albert J. | 5 |
| Bearden, 2nd Lt. Aaron L. | 5 |
| Beavers, Capt. Edward H. Jr. | 5 |
| Benne, 1st Lt. Louis | 5 |
| Bolyard, Capt. John W. | 5 |
| Bonner, 1st Lt. Stephen J. | 5 |
| Bostrom, 1st Lt. Ernest O. | 5 |
| Bradley, Maj. John L. | 5 |
| Brown, Capt. Gerald | 5 |
| Byrne, 1st Lt. Robert J. | 5 |
| Byrnes, Capt. Robert C. | 5 |
| Castle, 2nd Lt. Nial K. | 5 |
| Chandler, Capt. George T. | 5 |
| Chandler, 1st Lt. Van E. | 5 |
| Cleaveland, 2nd Lt. Arthur B. | 5 |
| Clinger, Capt. Dallas A. | 5 |
| Cloud, Capt. Vivian A. | 5 |
| Cochran, 2nd Lt. Paul R. | 5 |
| Colman, 1st Lt. Philip E. | 5 |
| Comstock, Maj. Harold E. | 5 |
| Condon, Capt. Henry L. II | 5 |
| Coons, Capt. Merle M. | 5 |
| Cox, Capt. Ralph L. | 5 |
| Cranfill, Maj. Niven K. | 5 |
| Cullerton, 1st Lt. William J. | 5 |
| Curton, 1st Lt. Warren D. | 5 |
| Daniel, Col. William A. | 5 |
| Daniell, 1st Lt. J. S. | 5 |
| Davis, Capt. Clayton E. | 5 |
| Day, 1st Lt. William C. Jr. | 5 |
| Deakins, 1st Lt. Richard S. | 5 |
| Della, 1st Lt. George | 5 |
| Dick, Capt. Frederick E. | 5 |
| Dikovitsky, 1st Lt. Michael | 5 |
| Donaldson, 2nd Lt. I. B. Jack | 5 |
| Dregne, Lt. Col. Irwin H. | 5 |
| Dubisher, Maj. Francis E. | 5 |
| Dubois, 1st Lt. Charles H. | 5 |
| Duffey, 2nd Lt. Richard E. | 5 |
| Egan, 1st Lt. Joseph L. Jr. | 5 |
| Elder, Maj. Robert A. | 5 |
| Empey, 1st Lt. James W. | 5 |
| Ernst, 1st Lt. Herman E. | 5 |
| Faxon, 1st Lt. Richard D. | 5 |
| Felts, 1st Lt. Marion C. | 5 |
| Fenex, Capt. James E. Jr. | 5 |
| Fiedler, 1st Lt. William F. Jr. | 5 |
| Fields, Capt. Virgil C. Jr. | 5 |
| Fischette, 1st Lt. Charles R. | 5 |
| Fisher, 1st Lt. Rodney W. | 5 |

**Robert Ammon** (5)

| | |
|---|---|
| Fisk, Capt. Harry E. | 5 |
| Flack, Capt. Nelson D. Jr. | 5 |
| Ford, Maj. Claude E. | 5 |
| Gardner, Maj. Warner F. | 5 |
| Gerick, 2nd Lt. Steven | 5 |
| Gholson, Capt. Grover D. | 5 |
| Gibb, 1st Lt. Robert D. | 5 |
| Gladen, 1st Lt. Cyrus R. | 5 |
| Goodrich, 1st Lt. Burdett C. | 5 |
| Gordon, Capt. Mathew M. Jr. | 5 |
| Graham, 2nd Lt. Robert F. | 5 |
| Griffith, 1st Lt. Robert C. | 5 |
| Gross, Capt. Clayton K. | 5 |
| Grosvenor, Capt. William Jr. | 5 |
| Gupton, 1st Lt. Cheatham W. | 5 |
| Hammer, 1st Lt. Samuel E. | 5 |
| Hanna, 2nd Lt. Harry T. | 5 |
| Hanseman, 1st Lt. Chris J. | 5 |
| Harrington, 1st Lt. Archibald A. | 5 |
| Harris, Capt. Thomas L. | 5 |
| Hartley, Capt. Raymond E. Jr. | 5 |
| Hatch, 2nd Lt. Herbert B. Jr. | 5 |
| Hauver, 1st Lt. Charles D. | 5 |
| Haworth, 1st Lt. Russell C. | 5 |
| Hendricks, Maj. Randall W. | 5 |
| Hill, Maj. James E. | 5 |
| Hiro, Maj. Edwin W. | 5 |
| Hnatio, 1st Lt. Myron M. | 5 |
| Hodges, Capt. William R. | 5 |
| Hoffman, 1st Lt. Cullen J. | 5 |
| House, 1st Lt. A. T. Jr. | 5 |
| Howe, 1st Lt. David W. | 5 |
| Hoyt, Capt. Edward R. | 5 |
| Hunter, Capt. Alvaro J. | 5 |
| Icard, 2nd Lt. Joe W. | 5 |
| Johnson, Capt. Evan M. V. | 5 |
| Jones, Capt. Curran L. | 5 |
| Jones, Capt. Frank C. | 5 |
| Jones, Capt. Lynn F. | 5 |
| Jones, 2nd Lt. Warren L. | 5 |
| Julian, Maj. William H. | 5 |
| Kennedy, 1st Lt. Daniel | 5 |
| King, Maj. Charles W. | 5 |
| King, 1st Lt. David L. | 5 |
| Kirby, 1st Lt. Marion F. | 5 |
| Kirkland, 1st Lt. Lenton F. Jr. | 5 |
| Knapp, Capt. Robert H. | 5 |
| Knott, 1st Lt. Carroll S. | 5 |
| Kopsel, 1st Lt. Edward H. | 5 |
| Lathrope, 2nd Lt. Franklin C. | 5 |
| Lazear, 1st Lt. Earl R. Jr. | 5 |
| Lee, 1st Lt. Richard J. | 5 |
| Leikness, Capt. Marlow J. | 5 |
| Lenox, 2nd Lt. Jack Jr. | 5 |
| Liles, Maj. Robert L. | 5 |
| London, Capt. Charles P. | 5 |
| Loving, Capt. George G. Jr. | 5 |
| Lutton, 1st Lt. Lowell C. | 5 |
| Mackay, 2nd Lt. John A. | 5 |
| Magoffin, Col. Morton D. | 5 |
| Mahon, Capt. Keith | 5 |
| Mahony, Lt. Col. Grant | 5 |
| Mankin, Capt. Jack C. | 5 |
| Markham, Capt. Gene E. | 5 |
| Marsh, 1st Lt. Lester C. | 5 |
| Martin, Col. Kenneth R. | 5 |
| Mason, Col. Joe L. | 5 |
| Mathis, 1st Lt. William H. | 5 |
| Mathre, 2nd Lt. Milden E. | 5 |
| Matte, 1st Lt. Joseph Z. | 5 |
| Maxwell, Capt. Chester K. | 5 |
| McArthur, 1st Lt. Paul G. | 5 |
| McArthur, Capt. T. H. | 5 |
| McDonough, Maj. William F. | 5 |
| McElroy, Capt. James N. | 5 |
| McGinn, Lt. Col. John L. | 5 |
| McGuyrt, 1st Lt. John W. Jr. | 5 |
| McMinn, Flight Officer Evan D. | 5 |
| Merritt, Maj. George L. Jr. | 5 |
| Miller, 1st Lt. Everett | 5 |
| Miller, Capt. Joseph E. Jr. | 5 |
| Milliken, 1st Lt. Robert C. | 5 |
| Monk, 1st Lt. Franklin H. | 5 |
| Mooney, 2nd Lt. Raymond P. | 5 |
| Morriss, Capt. Paul V. | 5 |
| Mulhollem, 1st Lt. Robert F. | 5 |
| Myers, 1st Lt. Jennings L. | 5 |
| Myers, Lt. Col. Raymond B. | 5 |
| Nichols, Maj. Franklin A. | 5 |
| Nollmeyer, Maj. Edward M. | 5 |
| Oberhansly, Maj. Jack J. | 5 |
| Olson, 1st Lt. Paul E. | 5 |
| O'Neill, Capt. Eugene W. Jr. | 5 |
| O'Neill, 1st Lt. Lawrence F. | 5 |
| Osher, Capt. Ernest K. | 5 |
| Overcash, 1st Lt. Robert J. | 5 |
| Owens, Maj. Joel A. Jr. | 5 |
| Parham, Capt. Forrest F. | 5 |
| Paulk, 2nd Lt. Edsel | 5 |
| Payne, Capt. Carl W. | 5 |
| Perdomo, 1st Lt. Oscar F. | 5 |
| Pool, 1st Lt. Kenneth R. | 5 |
| Porter, 1st Lt. Philip B. | 5 |

**Harrison Thyng** (5)

| | |
|---|---|
| Powers, 2nd Lt. Macarthur | 5 |
| Price, Maj. Jack C. | 5 |
| Priest, 1st Lt. Royce W. | 5 |
| Pryor, Capt. Roger C. | 5 |
| Quigley, Maj. Donald L. | 5 |
| Ray, 1st Lt. C. B. | 5 |
| Reese, 1st Lt. William C. | 5 |
| Ritchey, 1st Lt. Andrew J. | 5 |
| Roberts, Capt. Newell O. | 5 |
| Rose, 1st Lt. Franklin Jr. | 5 |
| Rounds, 1st Lt. Gerald L. | 5 |
| Rudolph, 1st Lt. Henry S. | 5 |
| Rynne, Capt. William A. | 5 |
| Schank, 1st Lt. Thomas D. | 5 |
| Schriber, Capt. Louis | 5 |
| Schuh, 1st Lt. Duerr H. | 5 |
| Schultz (Shoals), Capt. Robert B. | 5 |
| Sears, 1st Lt. Alexander F. | 5 |
| Seidman, 1st Lt. Robert K. | 5 |
| Smith, Capt. Jack R. | 5 |
| Smith, Capt. Kenneth G. | 5 |
| Smith, 1st Lt. Paul A. | 5 |
| Smith, 1st Lt. Virgil H. | 5 |
| Stangel, Capt. William J. | 5 |
| Stanley, 1st Lt. Morris A. | 5 |
| Suehr, 1st Lt. Richard C. | 5 |
| Sullivan, Capt. Charles P. | 5 |
| Sutcliffe, 1st Lt. Robert C. | 5 |
| Sykes, 1st Lt. William J. | 5 |
| Talbot, Maj. Gilbert F. | 5 |
| Taylor, Col. Oliver B. | 5 |
| Thyng, Lt. Col. Harrison R. | 5 |
| Tierney, 1st Lt. Robert E. | 5 |
| Tilley, 1st Lt. John A. | 5 |
| Tordoff, Capt. Harrison B. | 5 |
| Trafton, 1st Lt. Frederick O. Jr. | 5 |
| Troxell, Capt. Clifton H. | 5 |
| Vaught, Capt. Robert H. | 5 |
| Visscher, 1st Lt. Herman W. | 5 |
| Vogt, Capt. John E. | 5 |
| Waggoner, 1st Lt. Horace Q. | 5 |
| Walker, 1st Lt. Walter B. Jr. | 5 |
| Warner, Capt. Jack A. | 5 |
| Warren, Capt. Jack R. | 5 |
| Watson, Maj. Ralph J. | 5 |
| Watts, Capt. Oran S. | 5 |
| Weatherford, 1st Lt. Sidney W. | 5 |
| Webb, Maj. Willard J. | 5 |
| Welch, Capt. Darrell G. | 5 |
| Wesson, 1st Lt. Warren M. | 5 |
| White, 1st Lt. John H. | 5 |
| Wilhelm, Capt. David C. | 5 |
| Wilkins, 2nd Lt. Paul H. | 5 |
| Williams, 1st Lt. Russell D. | 5 |
| Wilson, Capt. William F. | 5 |
| Wire, Maj. Ralph L. | 5 |
| Wiseman, Capt. Lee V. | 5 |
| Wolford, 1st Lt. John L. | 5 |
| Wright, Capt. Max J. | 5 |
| Yaeger, Capt. Robert R. Jr. | 5 |
| York, 1st Lt. Robert M. | 5 |

## USAF Aces of the Korean War

**Manuel Fernandez Jr.** (14.5)

| | |
|---|---|
| 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. Robinson | 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 |
| 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 |

**Harold Fischer** (10)

*USMC exchange pilot.

## USAF Aces of the Vietnam War

| | |
|---|---|
| DeBellevue, Capt. Charles B. | 6 |
| Feinstein, Capt. Jeffrey S. | 5 |
| Ritchie, Capt. Richard S. | 5 |

**Charles DeBellevue** (6)

**Jeffrey Feinstein** (5)

**Richard Ritchie** (5)

## AAF/USAF Aces With Victories in More Than One War

| | WW II | Korean | 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. | 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 |

**John Meyer** (26)

## Leading Air Service/AAF/USAF Aces of All Wars

| | | |
|---|---|---|
| Bong, Maj. Richard I. | 40 | WW II |
| McGuire, Maj. Thomas B. Jr. | 38 | WW II |
| Gabreski, Col. Francis S. | 34.5 | WW II, Korea |
| Johnson, Capt. Robert S. | 27 | WW II |
| MacDonald, Col. Charles H. | 27 | WW II |
| Preddy, Maj. George E. | 26.83 | WW II |
| Meyer, Col. John C. | 26 | WW II, Korea |
| Rickenbacker, Capt. Edward V. | 26 | WW I |
| Mahurin, Col. Walker M. | 24.25 | WW II, Korea |
| Schilling, Col. David C. | 22.5 | WW II |
| Johnson, Lt. Col. Gerald R. | 22 | WW II |
| Kearby, Col. Neel E. | 22 | WW II |
| Robbins, Maj. Jay T. | 22 | WW II |
| Christensen, Capt. Fred J. | 21.5 | WW II |
| Wetmore, Capt. Ray S. | 21.25 | WW II |
| Davis, Maj. George A. Jr. | 21 | WW II, Korea |
| Voll, Capt. John J. | 21 | WW II |
| Whisner, Capt. William T. Jr. | 21 | WW II, Korea |
| Eagleston, Col. Glenn T. | 20.5 | WW II, Korea |
| 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 |

**Walker Mahurin** (24.25) **and Walter Beckham** (18)

| | | |
|---|---|---|
| Baker, Col. Royal N. | 16.5 | WW II, Korea |
| Jabara, Maj. James | 16.5 | WW II, Korea |
| Johnson, Maj. Gerald W. | 16.5 | WW II |
| Godfrey, Capt. John T. | 16.33 | WW II |
| Anderson, Capt. Clarence E. Jr. | 16.25 | WW II |
| Dunham, Lt. Col. William D. | 16 | WW II |
| Harris, Lt. Col. Bill | 16 | WW II |
| McConnell, Capt. Joseph C. Jr. | 16 | Korea |
| Olds, Col. Robin | 16 | WW II, Vietnam |
| Welch, Capt. George S. | 16 | WW II |

# Down Mexico Way

*In the Mexican Civil War, forces of the rebel Francisco "Pancho" Villa in March 1916 crossed into the US and killed 17 Americans in Columbus, N.M. President Wilson ordered US forces under Brig. Gen. John Pershing to pursue Villa and capture him. On March 15, 1916, this "Punitive Expedition" entered Mexico, followed a few days later by the 1st Aero Squadron. The 1st Aero comprised eight Jenny aircraft, 11 pilots (including Capt. Benjamin Foulois), 84 enlisted airmen, 10 trucks, one automobile, and six motorcycles. The 1st suffered many mishaps but completed the first-ever US air expedition. Here, US Army Aircraft #43, a JN-3, is shown on a desolate stretch of Mexico.*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# Keeper File

keeper@afa.org

# Marshall at the Revolution

*Washington's smashing victory in the 1991 Gulf War increased predictions of a coming "Revolution in Military Affairs," or RMA. Some held that a combination of information technology and precision strike, wedded to sound operational concepts, would cause a basic shift in how wars are fought. In early 1994, Secretary of Defense William J. Perry established a steering group to coordinate all RMA work in the Pentagon. It was led by legendary defense thinker Andrew W. Marshall, DOD's director of net assessment. In a 3,300-word memo, Marshall affirmed his belief in RMA. He also warned that the US was not paying enough attention to truly major threats 20 to 30 years in the future.*

**"RMA Update"**

Andrew W. Marshall
Director of Net Assessment
Memorandum for the Record
May 2, 1994
Washington, D.C.

**Find the full text on the *Air Force* Magazine's website www.airforce-magazine.com "Keeper File"**

At the first meeting of the RMA Steering Group, Bill Perry talked about what he saw as a military technical revolution in the 70s and 80s. He mentioned that in the 70s the Carter Administration made a conscious choice in allocating resources among the four broad categories of force size, rate of procurement, readiness, and R&D.

The choice was to maintain force size, reduce procurement, reduce readiness (resulting in a hollow force), but maintain R&D. The bet was that at some time in the future, budgets would go up and the fruits of the R&D effort could be used to procure new lines of equipment that would lead to a very effective military. That bet paid off. But in the current period, the choices among those four categories have been to reduce force size, limit procurement, maintain readiness, and maintain R&D. The question he raised was whether this was a good bet on the future. ...

In my judgment three elements form the broad context for US strategic choices. The first is the transition still going on from the geopolitical structure that existed during most of the Cold War to a new structure of several major powers of which the US will very likely be the strongest. ... The second major trend is the spread of technology, weaponry, and skills out in the world, which may create a number of regional powers. These powers will take some advantage of available technologies, using them in ways that change the character of power projection for the United States and in fact for all of the larger powers. The third aspect is the prospect of a revolution in military affairs that may occur over the next 20 to 30 years, superimposed on a changed geopolitical situation. This remains a hypothesis or conjecture but one that seems plausible given the rapid pace of change in a number of technology areas. Since we are at the beginning of this revolutionary period, we cannot foresee its character and outcome; therefore the planning context is very uncertain. ...

We will want to pursue revolutionary military improvements to maintain an adequate margin of capability both over the smaller regional powers and in the long term against potential major competitors. ...

What then are the implications of this general situation for the issue that Perry raised? I would say that since we are currently in a rather favorable strategic position, with no immediate large-scale threat, we have time to think things through. I would further reduce force size (and even readiness in some part of the force) if I had to, in order to free up resources to focus on longer term goals and the intellectual problems the prospective RMA poses. ...

I would focus more on long-term goals than we are currently doing. We are not paying much attention to the potential emergence of really major competitors 20 to 30 years from now. The Defense Guidance focuses on two MRCs [major regional conflicts], near term, and moderate sized opponents who do not use nuclear weapons or display any special technical capability. ... The next 10 to 20 years ought to be seen as a period of experimentation with new concepts of operation and new organizational arrangements, searching for these and testing and experimenting with them. ... We will need to look at production of new equipment to fully explore what the technologies, weapons, and concepts and organizations can do. ...

The prospective revolution in military affairs provides both an opportunity and a challenge because other countries will try to exploit the technologies in ways that create unforeseen dangers and problems for us. The lesson of the 20s and 30s that is most compelling to me is that in the first few years of the war, the countries or military establishments that do well are those [that] have made the appropriate effort to develop concepts of operation, made the organizational changes, and did the training and doctrine development. Our challenge is to be the leader in this even more than in the development of technology or of new weapon systems. In fact the design of new systems needs to be tailored to the concepts of operation that are seen as being the most efficient and effective. ■

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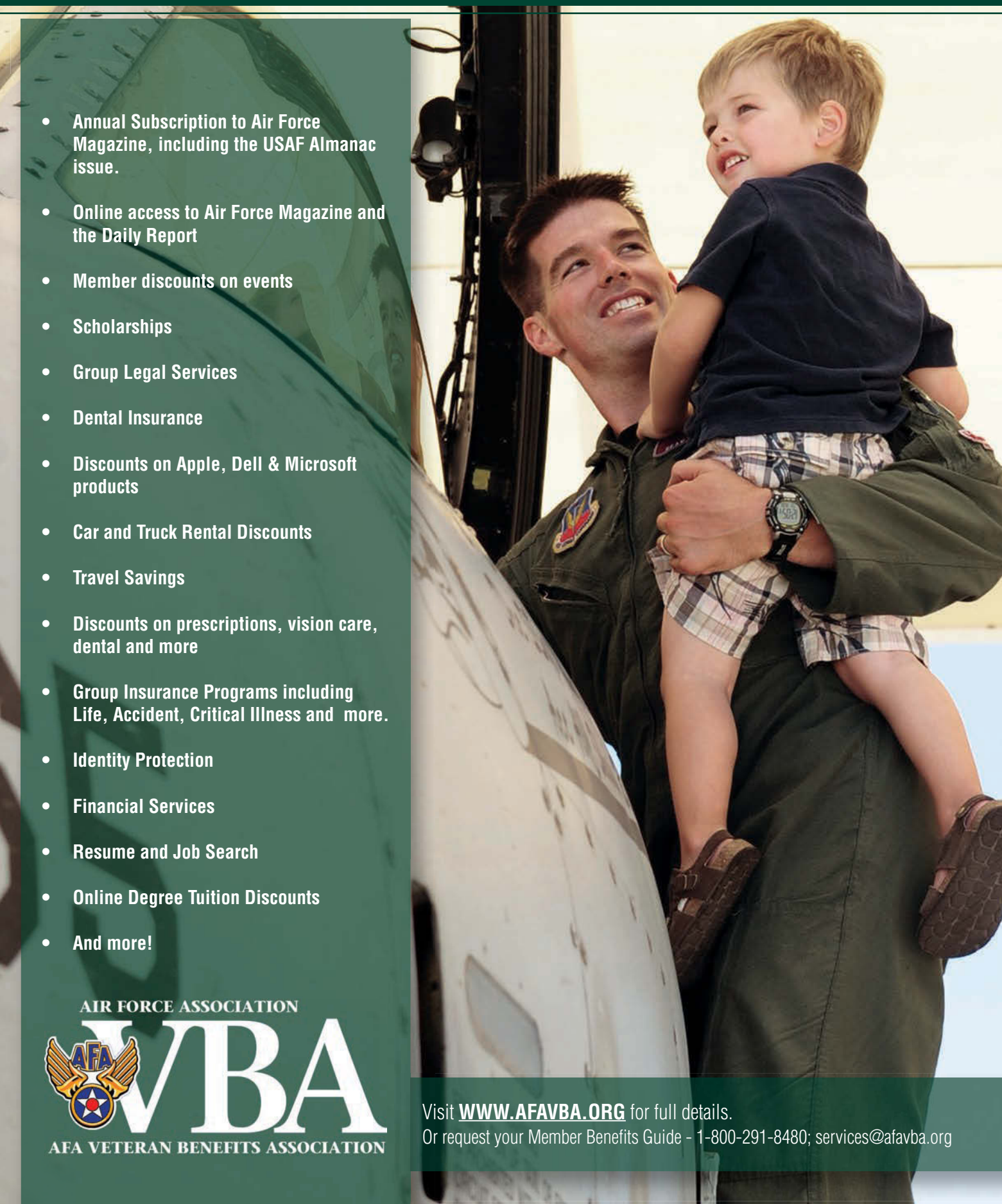

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# Verbatim

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**Operation Skedaddle**

"The Obama Administration achieved one of the President's principal goals in Libya: withdrawing US warplanes from the fight. ... Mr. Obama said that ... because of his grounding of US planes, 'the risk and the cost of the operation ... will be reduced significantly.'"**—Washington Post *editorial, April 6.***

**No-Fly Zone, Redefined**

"Your timing is exquisite. At a time when the Qaddafi forces have literally, tragically, routed the anti-Qaddafi forces, that's when we announced that the United States is abdicating its leadership role and removing some of the most valuable assets."***—Sen. John McCain (R-Ariz.) to Secretary of Defense Robert M. Gates at Senate Armed Services Committee hearing, March 31.***

**Road Not (Yet) Taken**

"Airpower in support of rebel ground forces can defeat Qaddafi's fielded forces. ... It may not be sporting to take out tanks with precision munitions dropped from a stealth bomber above 25,000 feet, but it is effective."***—Retired Gen. Charles A. Horner, Desert Storm air boss,* Wall Street Journal, *March 24.***

**The April Fool**

"[I met] this morning with Fidel Castro ... and we welcomed each other like old friends."***—Former President James Earl "Jimmy" Carter, televised remarks in Havana after visit with the Stalinist regime in Cuba, April 1.***

**Rip Van Weatherman**

"The US armed forces are a blight on the planet. I don't support soldiers. I think they're war criminals. So obviously, I'm against ROTC coming back."***—Weatherman Brian Flanagan, age 63, commenting on return of Reserve Officer Training Corps to Columbia University after 42 years,* New York Times, *April 2.***

**US at Kinetic Military Action**

"We are ... enforcing a resolution that has a very clear set of goals, which is protecting the Libyan people, averting a humanitarian crisis, and setting up a no-fly zone. Obviously that involves kinetic military action."***—Deputy National Security Advisor Ben Rhodes, comments to reporters, March 23.***

**Mortal Kombat**

"The Russians ... still have a very formidable nuclear arsenal, which does pose potentially a mortal threat to us. ... Certainly, China is growing in its military capabilities. ... So they, too, pose—potentially, from a capabilities standpoint—a threat to us, ... a mortal threat."***—Director of National Intelligence James R. Clapper in remarks to the Senate Armed Services Committee, March 10.***

**Secretary of Gullibility**

"There is a different leader in Syria now. Many of the members of Congress of both parties who have gone to Syria in recent months have said they believe he's a reformer."***—Secretary of State Hillary Rodham Clinton, referring to murderous Syrian dictator Bashar Assad, on CBS News program "Face the Nation," March 27.***

**Cyber Inadequacies**

"We are finding that we do not have the capacity to do everything we need to accomplish. To put it bluntly, we are very thin, and a crisis would quickly stress our cyber forces. ... This is not a hypothetical danger."***—Army Gen. Keith B. Alexander, head of the National Security Agency and US Cyber Command, in March 16 remarks to the House Armed Services Committee.***

**As Reported in "Duh" Magazine**

"It's [a nuclear strike on a US city] a spectacular and unthinkable situation, but the time to prepare is now and not ... after the fact."***—Alexander G. Garza, Department of Homeland Security's chief medical officer, in* USA Today, *March 15.***

**Danger of Debtzkrieg**

"I actually think the biggest threat to our national security is our national debt. ... As that debt increases, ... our national security budget will continue to get compressed."***—Adm. Michael G. Mullen, JCS Chairman, remarks at US Army Sergeants Major Academy, Fort Bliss, Tex., March 10.***

**And the Horse You Rode In On**

"There is too much talk about leaving [Afghanistan] and not enough talk about getting the job done right; too much discussion of exit and not enough discussion about continuing the fight; too much concern about when and how many troops might redeploy and not enough about what needs to be done before they leave."***—Defense Secretary Robert M. Gates, rebuking US allies in an address to the NATO ministerial in Brussels, Belgium, March 11.***

**Slow Learners**

"It's unfortunate that it took the Obama Administration more than two years to figure out what the majority of Americans already know: that 9/11 conspirator Khalid Sheikh Mohammed is not a common criminal. He's a war criminal."***—Rep. Lamar Smith (R-Tex.), House Judiciary Committee chairman, statement on Obama's decision to change course and try KSM in a military court, April 4.***

**No Boss Hoss?**

"General Cartwright has led Marine aircraft squadrons and headed the US Strategic Command. ... He is highly decorated, but, unusually among current senior brass, hasn't served in Iraq or Afghanistan, and in his career never deployed in combat. That fact alone would make him a startling choice given the last decade's sacrifices by US soldiers."**—Wall Street Journal *editorial opposing elevation of USMC Gen. James E. "Hoss" Cartwright, vice chairman of the Joint Chiefs of Staff, to the post of Chairman, March 9.***

**What Does a Woman Want?**

"I didn't hear, 'Rah, rah, we want to be in combat.' But I also didn't hear, 'We don't want to be in combat.' What they want is an equal opportunity to serve where their skills allow them to serve."***—Retired USAF Gen. Lester L. Lyles, chairman of Military Leadership Diversity Commission, on proposal to allow military women to enter the ground combat arms, American Forces Press Service, April 7.***

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# AFA National Report

natrep@afa.org

**By Frances McKenney,** Assistant Managing Editor

### More Than a Thousand

When an AFA chapter in Florida hosted a band concert, 1,100 people showed up. Yes, a thousand.

It happened in Ocala, Fla., in March when the **Red Tail Memorial Chapter,** backed by US Rep. Clifford Stearns (R) and other organizations, arranged for the US Air Force Academy Concert Band to perform locally.

Chapter President Michael H. Emig knew ahead of time the event would fill the venue, the Marion Technical Institute's auditorium: All the tickets for the free concert were scooped up on the first day they were offered.

Emig served as master of ceremonies for the evening. He spoke about AFA and introduced Stearns, an Air Force veteran and co-founder of the Air Force Caucus in Congress.

The band gave several local high school student-musicians a chance to perform with them during an evening of patriotic songs, music from movies, and tunes from the Swing Era, complete with conductor Lt. Col. Larry H. Lang playing the part of Army Air Forces band leader Maj. Glenn Miller.

Out in the lobby, the Red Tail Chapter set up information tables and recruited new members.

Emig said the concert was such a success that there's now talk of having two performances the next time.

### Hands-on Learning for Teachers

Teachers—not just students—benefit from hands-on learning. This principle guides the **Hurlburt Chapter's** annual teachers workshop in Florida.

In February, 45 teachers attended the chapter's eighth workshop. It took place at Hurlburt Field and opened at the USAF Special Operations School with a welcome from Chapter President Dann Mattiza and a presentation about Civil Air Patrol.

Chapter volunteers and base public affairs personnel escorted the teachers to the flight line to see static displays, including an AC-130 gunship from the 1st Special Operations Wing and a 53rd Weather Reconnaissance Squadron WC-130 "Hurricane Hunter."

*AFA Chairman of the Board Sandy Schlitt (left) met with several newly elected members of Congress, including New Jersey Democrat Rep. Jon Runyan (right). Here, they stand in front of Runyan's football jersey, from his days as an offensive tackle with the Philadelphia Eagles.*

Another memorable highlight from the flight line orientation: Special operations forces parachuted into the infield area, as part of an already scheduled exercise.

Chapter member David M. Loar and other volunteers next demonstrated equipment at the 19th Special Operations Squadron simulator complex. They then tried out the trainers and simulators themselves.

At lunch at Hurlburt's club, the group listened to a presentation on Embry-Riddle Aeronautical University and on a local aviation program for high school and younger students.

Hands-on seminars took place all afternoon, led by a team of instructors that the chapter cultivated through networking efforts and chapter recognition programs, Mattiza said.

For example, Amy K. Davis from Kenwood Elementary School at Fort Walton Beach led this year's workshop. The chapter had sent her to Educator's Space Camp in Huntsville, Ala., two years ago. Those supporting Davis included Megan Tucker, also a chapter Space Camp alumna; Sandy H. Palmer, a former Chapter Teacher of the Year; Glenn S. Rutland, whose students went to Space Camp with help from AFA and chapter grants in 2004; and Jeri A. Martin, a Florida Region Teacher of the Year.

Each workshop participant took home an item as valuable as the hands-on experiences from a day at Hurlburt Field: a CD of classroom-ready science, engineering, technology, and math lessons from the afternoon seminars.

**More photos at http://www.airforce-magazine.com, in "AFA National Report"**

### Joint Meeting in Dallas

Gen. Duncan J. McNabb, head of US Transportation Command, spoke in Dallas to a joint meeting of the **Seidel-AFA Dallas Chapter** and local chapters

of the Navy League and Association of the United States Army.

Some 90 people turned out for McNabb's presentation, "Mobility Supporting Worldwide Operations," reported Chapter President Robert M. Gehbauer. Seated at the head table was chapter member Herbert D. Kelleher, co-founder of Southwest Airlines and a friend of McNabb's.

According to Gehbauer, the chapter quarterly meeting, held at a country club in Richardson, Tex., marked the first joint meeting of the AFA chapter and its sister service organizations in Dallas. Also on hand were members of the Military Order of the World Wars.

The Seidel-AFA Dallas Chapter is named for the late Bob Seidel and his wife, Helen. Active in the chapter for more than five decades, they held chapter newsletter-mailing working dinners at their home for 25 years until distribution switched to e-mail. Helen Seidel now hosts executive committee quarterly gatherings at her home.

*Hurlburt Chapter workshop participants take a group photo in front of a WC-130 on the flight line at Hurlburt Field. See "Hands-on Learning for Teachers," p. 137.*

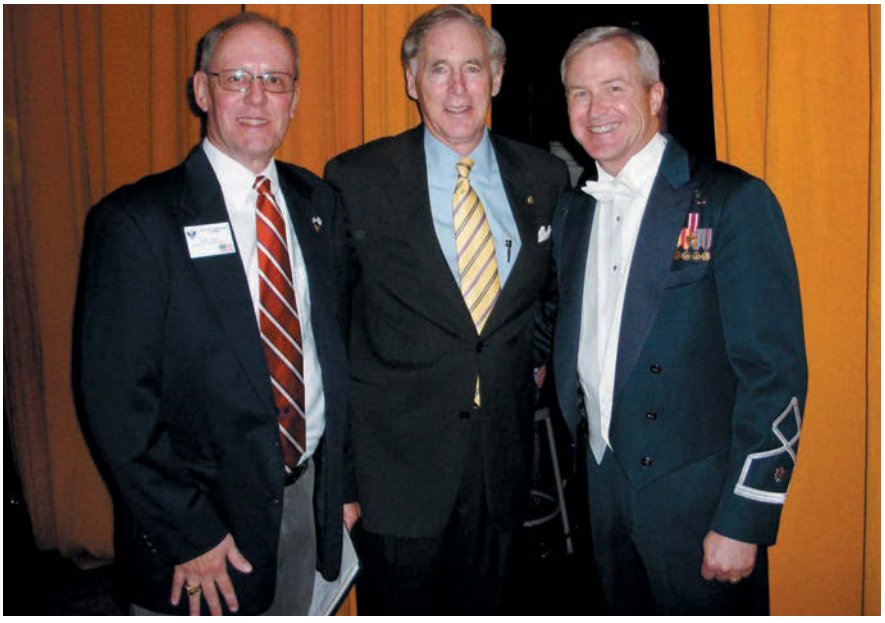
**From the AFA VC for AE**

AFA's vice chairman of the board for aerospace education addressed the **Orange County/Gen. Curtis E. LeMay Chapter** in Costa Mesa, Calif., in March.

George K. Muellner spoke on a range of topics, covering the association's aerospace education and CyberPatriot programs and commenting on the Air Force's Fiscal 2012 budget request.

The retired lieutenant general brought to the podium more than three decades of experience, including assignments as principal deputy in the USAF acquisition office and as a Vietnam War fighter pilot, which Chapter President Bryan Roland said, really caught chapter members' attention. More recently, Muellner retired from Boeing as president of advanced systems.

Roland said that he had first met the AFA leader at a California state meeting and invited Muellner to the



*Red Tail Memorial Chapter President Michael Emig (left) joined US Rep. Clifford Stearns (R-Fla.) and Lt. Col. Larry Lang, conductor of the Air Force Academy Concert Band, at a sold-out musical performance. See "More Than a Thousand," p. 137.*

chapter because he spoke from "real life experience." AFA members and veterans, Roland said, "like to hear from those who have been on the front lines of USAF."

**Old and New**

Here's how to lure an audience to an AFA meeting: Combine vintage aircraft and a well-known guest speaker. The **Tidewater Chapter** in Virginia Beach, Va., used this mix when it hosted the state AFA meeting in March.

AFAers gathered first for a morning business meeting. In the afternoon, other guests joined them for a guided tour of the nearby Military Aviation Museum.

Founded by chapter member Gerald Yagen, the museum has a collection of some 30 airplanes from different eras, services, and countries. All but one are flyable, and through a drawing, James Hannam from the **Donald W. Steele Sr. Memorial Chapter (Va.)** won a ride in a P-51, piloted by Yagen.

Gary Powers Jr. served as guest speaker for the state quarterly meeting, held that evening. Nearly 80 people turned out to hear Powers, the son of U-2 pilot Francis Gary Powers. The younger Powers spoke about the experiences of his father, whose spyplane was downed over the Soviet Union in May 1960.

Gary Powers Jr. joined the Military Aviation Museum as director in January.

**Leadership Insight**

Retired CMSAF Robert D. Gaylor spoke at the **Northeast Texas Chapter** meeting in January.

Chapter President Tammy Walden Bryant explained that Gaylor was in the area—Greenville, Tex.—visiting a nearby defense contractor. The chapter's VP, Vance M. Clarke, arranged both that appearance and this piggyback AFA meeting.

Gaylor served as the Air Force's top enlisted leader from 1977 to 1979, and according to Walden Bryant, gave the chapter members "insight into leadership" while encouraging the chapter to promote membership in AFA. He recommended giving chapter members a role in meetings, so they don't merely attend them but actively contribute to the gatherings.

Gaylor joined Walden Bryant in naming Terry Thomas as an AFA Texas Aerospace Education Foundation Charlotte Loos Fellow and presented him with a souvenir coin. Thomas received the honor to recognize his leadership as past chapter president and his recruiting of Community Partners.

"He is the cornerstone of our chapter," Walden Bryant commented, adding that Thomas had signed up nearly all of the chapter's 32 Community Partners.

The Loos fellowship is named after an AFA volunteer who served as the administrative assistant for the **Alamo Chapter** and Texas AFA for nearly 30 years. Walden Bryant added that Gaylor had personally known Loos, making his part in the chapter award presentation to Thomas especially meaningful.

**From Pancakes to Kitty Hawk**

In March, **Tidewater Chapter** members—based in Virginia Beach, Va.—escorted 180 AFJROTC cadets on a trip to a Coast Guard facility and to Kitty Hawk, N.C.

The cadets came from six high schools in the Chesapeake, Va., area. They included the students of retired Lt. Col. Gordon Strong, who heads the AFJROTC unit at Grassfield High School and is chapter secretary and aerospace education VP, as well.

Joining Strong on this field trip were William M. Cuthriell, chapter VP; Robert C. Hudson, treasurer; and members Brian Mackey and Chip Moran.

The cadets first stopped at the Coast Guard's North Carolina facility Air Station Elizabeth City, whose area of responsibility encompasses the Atlantic and Caribbean, with missions ranging from search and rescue to environmental protection. The students examined the helicopters and HC-130J aircraft used in these operations and had a


*Retired CMSAF Robert Gaylor (fourth from left, in sweater) visits with Northeast Texas Chapter members, including Chapter President Tammy Walden Bryant (third from left).*

*Grassfield High School AFJROTC cadet Kaitlyn Morrison sits in a Coast Guard rescue helicopter. The Tidewater Chapter helped AFJROTC cadets take a field trip to Coast Guard Air Station Elizabeth City, N.C., and also Kitty Hawk, N.C.*

chance to meet some Coast Guard rescue swimmers.

The group then visited the Wright Brothers National Memorial to see where the first controlled, sustained flight took place.

Where do pancakes come in? To hire the four buses needed for this field trip, the AFA chapter and the cadets raised funds by holding a pancake breakfast in February. ■

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## AFA Conventions

| | |
|---|---|
| June 2-5 | **California State Convention,** Vandenberg AFB, Calif. |
| June 4 | **Virginia State Convention,** Danville, Va. |
| June 25 | **North Carolina State Convention,** Raleigh, N.C. |
| July 8-9 | **Florida State Convention,** Ocala, Fla. |
| July 22-24 | **Texas State Convention,** Fredericksburg, Tex. |
| Sept. 17-18 | **AFA National Convention,** Washington, D.C. |
| Sept. 19-21 | **AFA Air & Space Conference,** Washington, D.C. |

# Reunions

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**6th Bomb Gp.,** Tinian. Sept. 8-11 in San Diego. **Contact:** Glenda Richards (951-687-8676) (ggr41797@msn.com).

**34th Bomb Sq.** Sept. 22-25 in Colorado Springs. **Contact:** Rod Breland, 5731 Hickory Ridge Blvd., Baton Rouge, LA 70817 (225-751-2058) (rodbrel@msn.com) (www.34thbms.com).

**110th ASOC** and **172nd TASS.** July 16 at the home of Henry Fuhs in Grand Rapids, MI. **Contact:** Henry Fuhs, 3848 E. Leonard, Grand Rapids, MI 49525 (616-949-8613 or 616-437-9059) (hankfuhs@juno.com).

**526th Fighter Sq.** Ramstein, Germany. Sept. 15-18 in Rapid City, SD. **Contact:** Don Wenzlick (402-291-0565) (dwenzlick@yahoo.com).

**6911th Electronic Security Sq,** Metro Tango, Hahn AB (around 1980s). June 16-19 in Colorado Springs. **Contact:** Cherish Shinners (828-256-6008) (mtreunion@hotmail.com) (www.mlrsinc.com/metrotango).

**AC-119 and AC-47 Gunship** reunion, all are welcome. Sept. 28-Oct. 2 in Charleston, SC. **Contact:** Gus Sininger (850-863-9649) (stinger7172@cox.net).

**Air Force Postal and Courier Assn.** Sept. 27-30 at the MCM Elegante Hotel, Albuquerque, NM. **Contacts:** Frank Vazquez (407-462-1769) or Jim Foshee (254-774-7303) (jimfoshee@sbcglobal.net).

**Pilot Tng Class 55-P.** Sept. 14-18 at the JA Nugget Resort, Reno, NV. **Contact:** Norm Fogg (865-984-8401) (normfogg@bellsouth.net).

**UPT Class 62-A.** Sept. 26-29 in Dayton, OH. **Contact:** Bill Kelher, 2718 Gray Fox Ln., Jacksonville, AR 72076 (bbkehler@aol.com). ■

E-mail unit reunion notices four months ahead of the event to reunions@afa.org, or mail notices to "Reunions," *Air Force* Magazine, 1501 Lee Highway, Arlington, VA 22209-1198. Please designate the unit holding the reunion, time, location, and a contact for more information. We reserve the right to condense notices.

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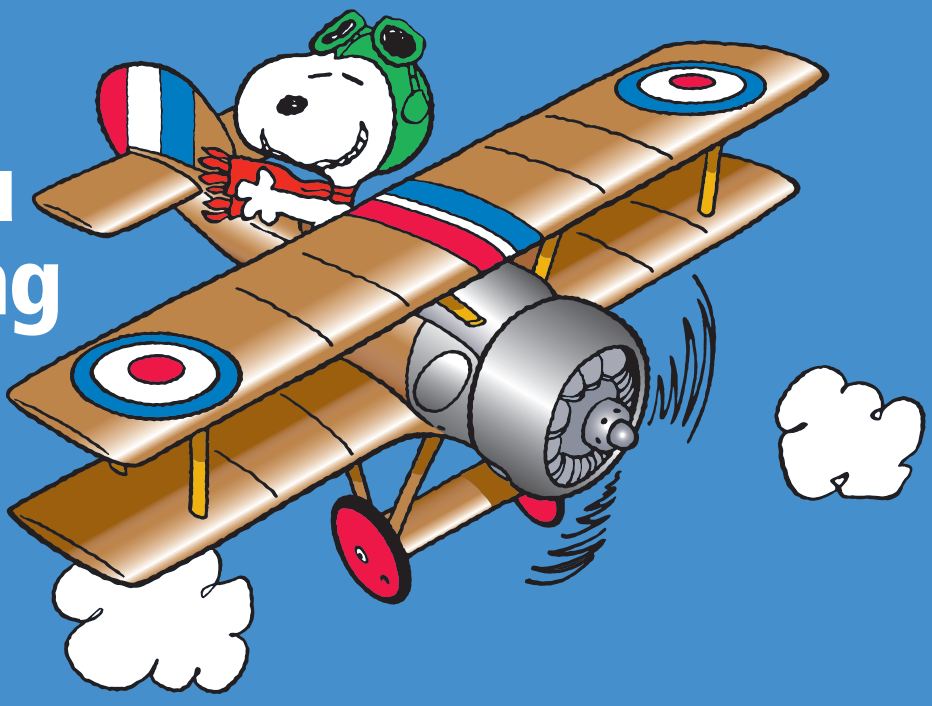

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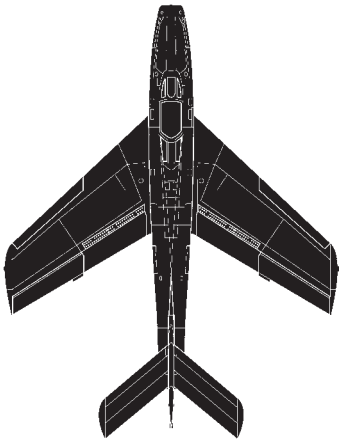
# F-84



The F-84, USAF's first postwar tactical aircraft, had an odd double identity. It began as the Thunderjet, a subsonic straight-wing fighter-bomber. Later, it became the Thunderstreak, a sleek swept-wing machine. USAF wanted a low-cost way to upgrade the Thunderjet's performance. They were, in effect, two decidedly different aircraft.

Straight-wing F-84s began entering service in 1947. The aircraft pioneered the use of air refueling for fighters and was equipped to carry tactical nuclear weapons. Thunderjets entered the Korean War in December 1950. They escorted bombers, tangled with MiGs, and played a bigger and bigger role in ground attack. These F-84s were used on two significant 1953 raids on dams, knocking out North Korean power. Even before the war began, though, USAF was trying to upgrade the aircraft.

To save time and money, Republic gave the basic F-84 a new tail and swept wings. Performance barely improved, though. Problems included severe stall pitch-up woes, engine flameouts, and unrecoverable flat spins. Had the Korean War not erupted when it did, the whole program might have been canceled.

Little by little, however, Thunderstreak performance improved. Both SAC and TAC operated the F-84F as a nuclear bomber. It also was NATO's front-line fighter-bomber throughout the 1950s. A reconnaissance version, the RF-84F Thunderflash, also did respectable service. USAF finally retired the fleet in 1964.

*—Walter J. Boyne*

**This aircraft:** An F-84F—#52-6455—as it looked in fall 1961 when assigned to 113th TFS, Indiana ANG, Terre Haute, Ind.


## In Brief

Designed, modified by Republic ★ built by Republic, GM ★ first flight Feb. 28, 1946 ★ crew of one ★ number built 7,168 ★ one turbojet engine ★ armament six .50-cal machine guns ★ **Specific to F-84E:** armament load, up to 2,000 lb of ordnance ★ max speed 620 mph ★ cruise speed 485 mph ★ max range 1,485 mi ★ weight (loaded) 15,227 lb ★ span 36 ft 5 in ★ length 38 ft 6 in ★ height 12 ft 7 in ★ **Specific to F-84F:** armament load, up to 6,000 lb of ordnance ★ max speed 685 mph ★ cruise speed 535 mph ★ max range 1,900 mi ★ weight (loaded) 27,000 lb ★ span 33 ft 7 in ★ length 43 ft 5 in ★ height 15 ft 5 in.

## Famous Fliers

**Notables:** Richard Bach, Ed Kenny (Bendix Trophy 1954), David Schilling, Hub Zemke. **Record setters:** Robert Scott and Richard Hill, average 672 mph in transcontinental flight. **Thunderbirds Pilot:** Jack Broughton.

## Interesting Facts

Used in first nonstop jet aircraft crossing of Atlantic (1950) ★ was first one-seat fighter-bomber to carry a nuclear weapon ★ chosen as original Thunderbirds aircraft ★ flown by NATO allies Belgium, France, Germany, Greece, Italy, Netherlands, Turkey ★ intended for use as "Ficon" (fighter conveyor) parasite fighter with B-36 ★ saw combat in Korea and in 1956 Suez Crisis (French F-84Fs) ★ required long takeoffs, high landing speeds ★ set US national speed record of 611 mph in 1946 ★ last USAF straight-wing jet fighter-bomber.


*An F-84E attacks a ground target with rockets.*

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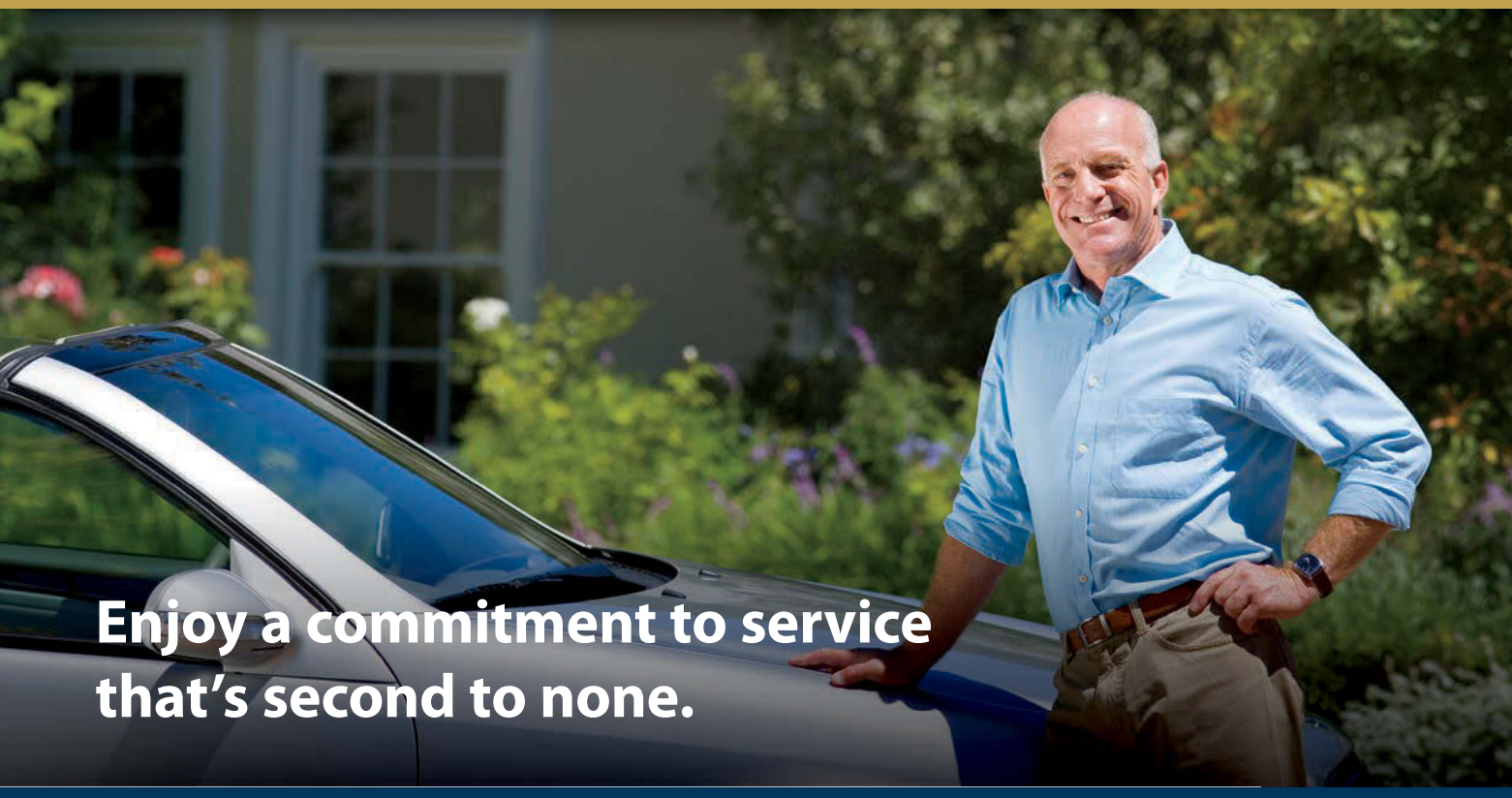


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