

MAY 1996/\$5

# AIR FORCE

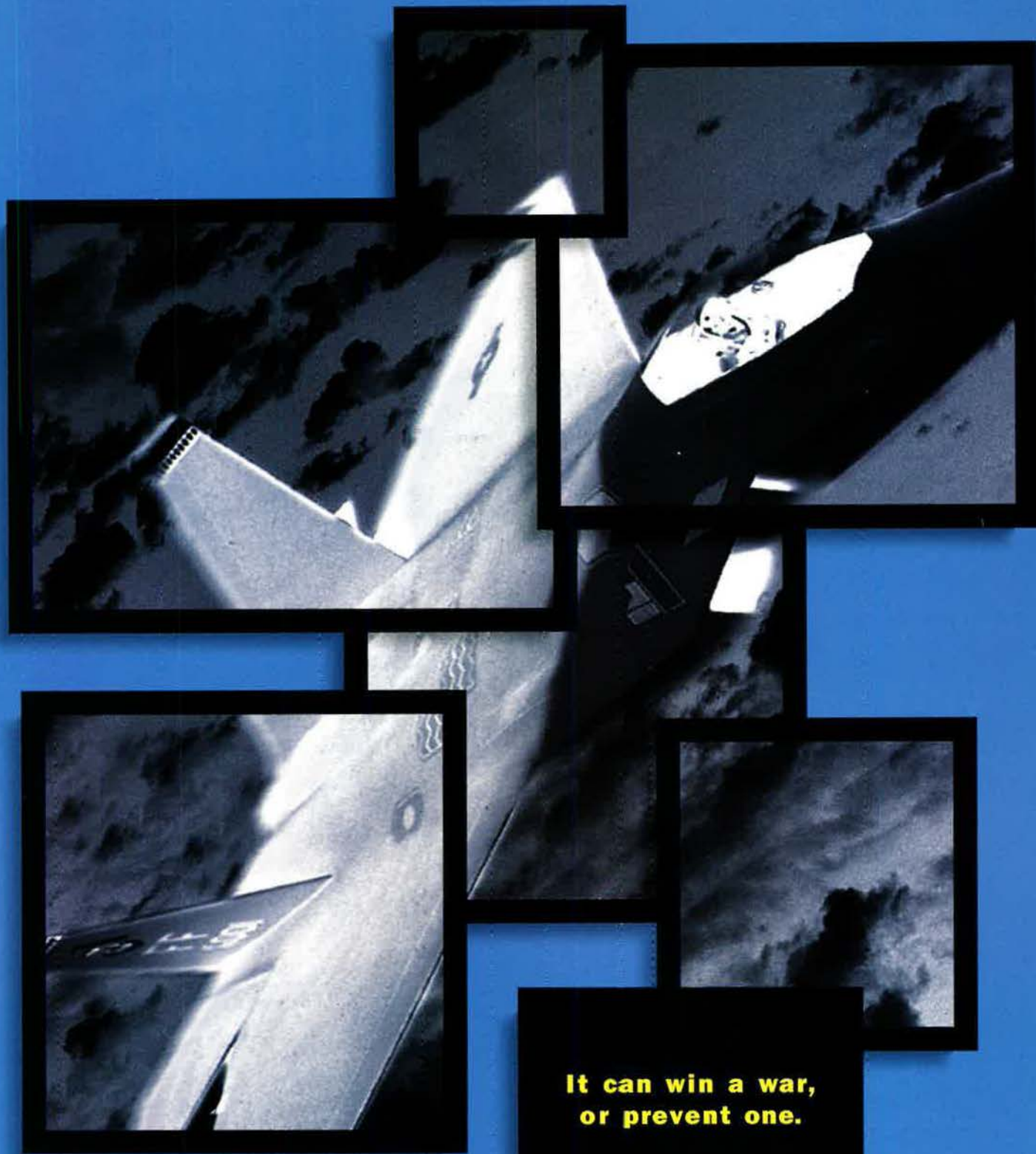
PUBLISHED BY THE AIR FORCE ASSOCIATION

MAGAZINE

USAF Almanac 1996







**It can win a war,  
or prevent one.**

WHEN THE FIRST F-22 ROLLS OFF THE ASSEMBLY LINE IT WILL SEND AN UNMISTAKABLE SIGNAL TO THE REST OF THE WORLD. AMERICA WILL NEVER RELINQUISH OUR DOMINANCE OF THE SKY. THAT SAME SIGNAL WAS HEARD LOUD AND CLEAR IN THE GULF WAR. SIMPLY BY FLEXING OUR MUSCLES, AMERICA FORCED THE IRAQI AIR FORCE TO TAKE COVER. AS A RESULT, THE WAR WAS SHORTENED AND ALLIED LIVES WERE SAVED. BUT THE AIR SUPERIORITY FIGHTER THAT FLEW IN IRAQ WILL BE 30 YEARS OLD BY THE TIME THE FIRST F-22 SQUADRON IS READY. WHICH IS WHY AMERICA NEEDS THE F-22 AS MUCH AS POTENTIAL ENEMIES FEAR IT.





# AIR FORCE

PUBLISHED BY THE AIR FORCE ASSOCIATION

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By Susan H. H. Young. Edited by John W. R. Taylor



**About the cover:** The US Air Force Honor Guard, Bolling AFB, D. C., provides ceremonial support for a variety of national and international occasions. Here (l to r), SrA. James E. Walker, Jr., SrA. Scottie W. Turner, SrA. Donald R. Blackney, and A1C Cindy L. Stephenson practice for their next ceremony. Photo by Paul Kennedy.

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KC-135 illustration is an adaptation of Dru Blair's "Airbridge."

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By John T. Correll, Editor in Chief

## The Lake Doctrine

**I**N 1984, Secretary of Defense Caspar W. Weinberger proposed six tests to determine whether US forces should be sent into combat: Is a vital national interest at stake? Will we commit sufficient resources to win? Will we sustain the commitment? Are the objectives clearly defined? Is there reasonable expectation that the public and Congress will support the operation? Have we exhausted our other options?

This became known as the "Weinberger Doctrine." It struck a harmonious chord with a generation that had learned hard lessons in half-hearted adventures from the Bay of Pigs to Vietnam to the Desert One fiasco in Iran. Thus it was that the Persian Gulf War of 1991—in marked contrast to the uncertain gradualism that characterized the Vietnam War—met all of the tests of the Weinberger Doctrine. For a change, military force was employed the right way. It worked, spectacularly.

From the first, though, the Weinberger Doctrine was an uncomfortable fit with the Clinton Administration, which came to office imbued with the idea that the instrument of military power could be and should be applied with fewer restrictions. President Clinton's first Secretary of Defense, Les Aspin, said that under the Weinberger rules, the armed forces would be employed "only very, very rarely" and that "people may not be willing to pay \$250 billion or even \$200 billion a year for a military that is not very useful."

That looser approach led to disaster in Somalia, where humanitarian relief turned into armed peace-keeping of a vague and tentative sort and eighteen US soldiers were killed trying to capture a warlord who was riding around on US aircraft two months later.

In a formal departure from the Weinberger Doctrine, Secretary of Defense William J. Perry said last year in his annual report to Congress that there are three basic instances in which the nation may use the armed forces. They can be employed not only for humanitarian mis-

sions and to protect vital interests—as in the Persian Gulf War—but also when "important but not vital interests are threatened," as in Haiti and Bosnia-Herzegovina.

A still greater divergence of policy was declared in a March 6 speech by National Security Advisor Anthony Lake, who presented the Administration's comprehensive position on the use of force. (Mr. Lake is a primary architect of the current national security strategy of "Engagement" abroad and "Enlargement" of democracy

### **The threshold for commitment of US military force abroad is lower than it used to be.**

around the world.) He laid out "seven circumstances, which taken in some combination or even alone, may call for the use of force or military forces."

- To defend against direct attacks on the United States, its citizens, and its allies.

- To counter aggression.

- To defend our key economic interests.

- To preserve, promote, and defend democracy.

- To prevent the spread of weapons of mass destruction, terrorism, international crime, and drug trafficking.

- "To maintain our reliability, because when our partnerships are strong and confidence in our leadership is high, it is easier to get others to work with us."

- For humanitarian purposes, to combat famines, natural disasters, and gross abuse of human rights.

In the broader context of his speech, Mr. Lake said many of the right things, such as that "our tools of first resort remain diplomacy and the power of our example" and that the armed forces must be given "a clear mission with achievable military goals." Neverthe-

less, the threshold for commitment of US military force is lower than it used to be. Furthermore, our intentions are not always firmly resolved before we act.

Initial military operations in the Balkans were hampered by dangerously restrictive rules of engagement. In a 1994 encounter, an American AC-130 gunship circled above a Serbian tank that had shot at some French peacekeepers. The gunship could not fire until authorization came from UN officials in Zagreb who had gone to a Chinese restaurant without their cellular telephones. By the time permission was given, the Serbs had demonstrated their contempt and gone away.

In February 1996, looking back on restrictions that applied to air operations, Gen. Ronald R. Fogleman, USAF Chief of Staff, said that, "For many of us airmen, it was very reminiscent of what we had seen in Vietnam." Earlier, the *New York Times* had quoted American officials as saying the only logic for air strikes near Sarajevo in May 1995 had been to "drop a few bombs and see what happens" and that "there was no strategy behind any of this."

On August 30, 1995, NATO finally quit fooling around and launched Operation Deliberate Force. Airpower was authorized to strike the full range of Bosnian Serb military targets. Force was applied with focus and determination rather than with hedging and hesitation. Two weeks later, armed resistance ended, and the Dayton peace agreement was not far behind.

The Weinberger Doctrine specified when military force should be used. What the Lake Doctrine does, mainly, is categorize situations in which military force might be useful. Mr. Lake's list doesn't exclude much. It goes way beyond the defense of essential US interests. It can be interpreted to justify the use of force for almost anything. It sounds altogether too much like open-ended military commitment for purposes that are of limited importance to the nation. And that, of course, was what went wrong in Vietnam. ■





*Alliant's Feb. 15 successful flight test*

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# Letters

## Tuskegee Pioneers

Thank you for the excellent account of the accomplishments of the Tuskegee Airmen [*"Tuskegee Airmen," March 1996, p. 52*]. They fought not only the Luftwaffe but also the pervasive racism that prevailed in our military during World War II.

You may not be aware that during World War I an African-American named Eugene Bullard was denied, because of his color, the right to serve as a fighter pilot for the US Army. He flew biplane fighters for the French Air Force, however, and was known and feared by the German pilots as "The Black Swallow of Death."

As an African-American, I am glad to say that things have changed since my tours of duty in the 1940s and 1950s. Three of my nephews are, respectively, pilots of the following aircraft: the C-130, the F-16, and the commercial 757.

Richard G. Braithwaite  
Jamaica, N. Y.

I take exception to the statement in "Tuskegee Airmen" about the flying instructors at Tuskegee AAF, Ala., during World War II who "refused to socialize with the black pilots." I was an instructor at that base from February 1943 until the end of the war in 1945. As I remember, we were not given the option of belonging to the Officers' Club at Tuskegee AAF.

The policy was then, and I believe still is, that instructors do not fraternize with students, regardless of race, sex, or other factors. Col. Noel F. Parish was not an instructor, as the article stated, but was base commander during the period I was stationed at Tuskegee AAF.

As to central Alabama being a "terrible place to train black pilots," the Army Air Field was established near Tuskegee because the Tuskegee Institute (an all-black college) was already there. In addition, a light aircraft training field was nearby. As was mentioned in the article, some local residents didn't want the training base there. However, most of the residents and business people in the community approved of the influx of

trainees and base personnel because of the positive economic influence.

In fairness to those of us who were the white instructors of the Tuskegee Airmen, history should remember us for the professional and competent job we did. The results of our instruction propelled the Tuskegee Airmen to their success in the air battles of Europe.

Lt. Col. William J. Hill,  
USAF (Ret.)  
Federal Way, Wash.

The article by Col. Alan L. Gropman, USAF (Ret.), on the Tuskegee Airmen was of special interest. I can help him with the names of the first class of students to graduate from the program. In the photo on p. 53, they are, left to right, George Roberts, Benjamin O. Davis, Jr., Charles Debow, Mac Ross, and Lemuel R. Custis.

The maintainers depicted working on the wing tank on p. 55 are, left to right, TSgt. Charles Haynes, SSgt. James Sheppard, and MSgt. Frank Bradley.

Philip L. Munn, Jr.  
Glastonbury, Conn.

## Misplaced Thrust

If the RAND Corp. analysts actually used the engine performance figures listed for the Block 40 F-16C and F-15E in "The Gray Threat" [*February 1996, p. 64*], Figure 1, p. 65, their conclusions in Figure 2 on p. 67 may be flawed.

In reality, the Block 40 F-16C has a General Electric F110-GE-100 with

28,000 pounds of maximum thrust. The Block 42 F-16 has the less powerful Pratt & Whitney F100-PW-220 with the 23,770 pounds maximum thrust listed in Figure 2. Not coincidentally, most Block 42s are at pilot-training sites, not at combat units.

Likewise, the Figure 1 total thrust for the F-15E of 68,200 pounds implies a per-engine performance of 34,100 pounds thrust. Even assuming the F-15E came equipped with the F100-PW-229 Increased Performance Engine, that unit yields 29,100 pounds thrust, well below what is listed. The F-22's F119-PW-100 is in the "35,000-pound class." Have F-15Es been secretly flying this engine as an F-22 test-bed? I doubt it.

The aforementioned engine-performance data are derived from USAF technical data and the January 8, 1996, *Aviation Week and Space Technology* "Aerospace Source Book." Where did RAND get its engine numbers?

SMSGt. Rob Lentini,  
USAF  
Tucson, Ariz.

■ *Sergeant Lentini is correct. Because of a typographical error, the F-15E's thrust was listed as 68,200 pounds, rather than the correct 58,200 pounds. However, the RAND authors maintain that this error does not detract from the validity of their conclusions.*—THE EDITORS

## "Puckered" in a Pinball

Will wonders never cease? That picture of the P-63 "Pinball" on p. 82 of the March issue [*"Flashback"*] is the first reference I've seen to that sorry flying machine since June 1945 and the only photograph I've ever seen.

I was one of the unfortunates sent to Kingman AAB, Ariz., in January 1945. Kingman was a basic gunnery school for B-17, B-24, and B-29 gunners-to-be and not the most desirable assignment for fighter pilots returning from overseas. Flying beat-up P-39s in simulated fighter attacks for the gunnery students' cameras was bad enough, but the advent of the

**Do you have a comment about a current issue? Write to "Letters," *Air Force Magazine*, 1501 Lee Highway, Arlington, VA 22209-1198. Letters should be concise, timely, and preferably typed. We cannot acknowledge receipt of letters. We reserve the right to condense letters as necessary. Unsigned letters are not acceptable. Photographs cannot be used or returned.**—THE EDITORS



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## Letters

Frangible Bullet Program took matters from bad to worse. The transfer from Kingman to Yucca, Ariz.—farther into the desert—did not improve the assignment.

I don't remember my checkout in that armor-plated P-63, if I got one. All I remember is what a miserable airplane it was to fly. The old epithet—"a rock with a feather in its tail"—must have originated with that airplane. The designers added God-knows-how-much weight with the armor plate and bulletproof glass but did not add power. It didn't stall—it just fell out of the air if you got it under 145–150 mph.

Like all Bell aircraft, the prop, gear, and flaps were electrically operated, but the engineers didn't boost the electrical motor output, despite the increased weight on the flaps and the gear door covers. We found out that the only way to get the gear down was to come into the downwind leg at about 160 mph and rock the airplane into as tight a 360° turn as you dared when you shoved the gear handle down. . . .

Believe me—if you could fly that beast, you could fly damn near anything. . . .

As a recently returned combat pilot, I was not elated at being assigned as a target. They said those frangible bullets couldn't penetrate that armor, but every time the hit meter in the cockpit registered, the "pucker" factor increased. I was damned glad to leave Yucca and get back into my beloved P-38 at Will Rogers Field in Oklahoma City, Okla.  
H. B. "Stub" Hatch  
La Conner, Wash.

### Training the Navigators

I read "Training Together" [*March 1996, p. 34*] with great interest and was disappointed that you overlooked a significant player in joint training. The coverage of joint navigator training was poor at best and an unforgivable slight of navigators and naval flight officers at worst. Roughly four percent of the article dealt with navigator training. Unfortunately, there were inaccuracies in that small portion of the article.

We have not produced, nor is it planned for us to produce, B-1 offensive systems operators in joint undergraduate navigator training. Additionally, B-52 navigator training will soon move to the systems operator track.

The 562d Flying Training Squadron has been in the joint navigator training business since October 1994.

Our mission is to train naval flight officers and Air Force navigators for duties in Navy EP-3E, P-3C, E-6A, and LC-130 and Air Force B-52H, KC-135, RC-135, E-3, AC-130, EC-130, MC-130, C-130, and C-141 aircraft.

Additionally, we train allied air force and naval aviators alongside US students. We do this with one Canadian, twenty-eight Navy, and fifty Air Force instructors. We have fully integrated the two services with Navy or Air Force flight commanders responsible for subordinates and students from both services.

In April, the 562d FTS will add twenty-five Air Force and Navy T-43 pilots when our sister squadron, the 558th FTS, inactivates. This year, we will produce 264 of the best aviators in the world—139 Air Force, 104 Navy, and twenty-one international flyers. Change of command in June will bring the squadron its first Navy commander. If you truly want to see joint training at its best, come talk to our students and tour our "spaces," and you will understand why I believe this is the best squadron in the Navy or the Air Force.

Lt. Col. Bruce R. Troxel, USAF  
562d Flying Training Squadron  
Randolph AFB, Tex.

### The Widow's American Radar

I was involved in the night fighter program from August 1942 to September 1945, first as commander of the 348th Night Fighter Training Squadron in Orlando, Fla., then as commander of the 422d Night Fighter Squadron in Europe during World War II. . . .

I found an error in "Locate and Liquidate" [*"Pieces of History," March 1996, p. 96*]. The P-61 Black Widow was the first US aircraft designed for night fighter operations, and its radar was American (not "British-designed," as the caption stated). The National Defense Research Committee's Radiation Laboratory at MIT did the basic development work in 1940–41. Western Electric was designated to make refinements for production and produced the radar set known as SCR-720. An earlier radar version, SCR-520, never went into production.

Western Electric produced some eighty sets of the British Mark IV radar under a Signal Corps designation of SCR-540. These sets were installed in modified A-20s, redesignated P-70s.

The British wanted the maximum number of American-made SCR-720 radars, redesignated Mark X, for their



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de Havilland Mosquitos, because of the radar's superior performance.

Maj. Gen. Oris B. Johnson,  
USAF (Ret.)  
Baton Rouge, La.

**The Letter of the Checklist**

Learning of the fatal F-15 crash at Spangdahlem AB, Germany, and reading your news item [*"NCOs Charged in Pilot's Death," December 1995 "Aerospace World," p. 17*] makes me wonder why nothing was said about the pilot of the fatal crash. True, two NCOs were derelict in their duties as repair and reclamation specialists, but why was this problem not caught during the start-up and the pilot's flight-control check?

It states in the 1F-15A-1 that "failure to ensure all flight-control surfaces move to the proper position for each stick movement may result in loss of control." It also states that a malfunction can exist that would cause the flight controls to be correct with the stick in one position, but incorrect in another position. Those procedures don't include just cycling the control stick. The instructions say to go from each position on the stick and verify that the control surfaces reflect stick position. Even if the pilot had rushed or been complacent, if he had followed the checklist he would have noticed a problem and might have saved a valuable Air Force asset, not to mention his own life.

I believe that the pilot is just as guilty as the two NCOs. The NCOs will most likely lose everything they earned in life, but the pilot already has. I hope other F-15 pilots remember how and why this happened. All NCOs and officers should follow any job guide or checklist to the letter.

SSgt. Alex L. George,  
USAF  
Wichita Falls, Tex.

■ *For information on recent developments in this case, see "F-15 Mechanics Stand Trial," "Aerospace World," p. 30.—THE EDITORS*

**An Impressive Class**

Referring to the December 1995 "Pieces of History" [*"The West Point of the Air," p. 88*], the picture of the Randolph AFB, Tex., newspaper, *Wingspread*, brings back memories. Dated Friday, June 25, 1948, the headline, "Cadet Class Begins Thursday," refers to Pilot Training Class 49-B, the premier class of cadets to go for the wings and gold bars of second lieutenant.

In addition to those at Randolph,

the class consisted of several hundred other cadets who trained simultaneously at Goodfellow AFB, Tex., and Perrin AFB, Tex. Most of the cadets had seen service as enlisted men in World War II and had completed two years of college in the interim. The Air Force was less than a year old when 49-B started its training in June 1948, learning to fly in the North American T-6 and later, still as cadets, flying the F-51, the F-80, and the B-25.

One year later, the class finished Advanced Flying Training at Barksdale AFB, La., Enid AFB, Okla., Las Vegas AFB, Nev., and Williams AFB, Ariz., and graduated on July 1, 1949, wearing blue hats and black shoes (a first, I believe). . . .

From the ranks of the cadets came three major generals, one brigadier general, a winner of the Bendix Trophy, the second and fifth pilots to check out in the A-12 (predecessor to the SR-71 "Blackbird"), several pilots who flew U-2s in the early days over Russia and Cuba, and many others of high distinction.

Lt. Col. John A. Stolly,  
USAF (Ret.)  
Dallas, Tex.

**Where's the Jayhawk?**

I was both surprised and disappointed to discover that the December issue did not include information on the T-1A Jayhawk trainer aircraft [*"World Gallery of Trainers," p. 52*]. The T-1A has been in the Air Force inventory since 1992 with more than 130 aircraft delivered so far. It has been a highly successful program with extremely high reliability rates, and the aircraft is well liked in Air Education and Training Command.

Thomas P. Knapke  
Huber Heights, Ohio

■ *Because of lack of space, "World Gallery of Trainers" is limited to small, two-seat trainers. No cabin aircraft are included. The T-1 is described separately in "Gallery of USAF Weapons" in the May issue.—THE EDITORS*

**Erratum**

In the "DoD Senior Leadership" photochart (March 1996, p. 84), the incorrect rank was printed for Gen. Barry R. McCaffrey, USA, commander in chief of US Southern Command. We regret the error.



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By Brian Green, Congressional Editor

## Congress Complains of a Shortfall

Legislators call the Clinton defense budget "underfunded" and say it won't cover the program or the strategy.

**D**URING the 1980s, the Democrats in control of Congress routinely announced that President Reagan's defense budgets were "dead on arrival" at Capitol Hill. This year, Congressional Republicans have turned the tables, describing the Clinton Administration's latest defense budget proposal as "disturbing," "disappointing," and "underfunded." The budget submitted in March—\$242.6 billion—is six percent below last year's level and the twelfth declining defense budget in a row.

Congressional critics have found several specific targets. One is the overall level of funding. Another is the continuing decline of Defense Department procurement accounts. Some on Capitol Hill warn of impending readiness problems. Finally, many lawmakers are upset about reduced funding for ballistic missile defense.

Rep. Floyd Spence (R-S. C.), chairman of the House National Security Committee, charged, "The President's Fiscal Year '97 budget request remains true to its predecessors—inadequate resources that will continue [to force] the military services to scramble to make ends meet."

Rep. C. W. "Bill" Young (R-Fla.), chairman of the House Appropriations Committee's Subcommittee on National Security, warned Secretary of Defense William J. Perry at a recent hearing, "These [budget] figures are disturbing to us, . . . and I have to tell you that I'm disappointed that, once again, we're being asked to make serious reductions in our defense program."

Congressional critics also warned that the 1997–2002 Future Years Defense Plan lacks sufficient funds to support the national strategy, which calls on US forces to be able to fight and win two major regional conflicts (MRCs) at roughly the same time.

Congressional leaders also maintained that the budget's structural

problems are compounded by optimistic assumptions about future inflation. In a recent hearing, Sen. Ted Stevens (R-Alaska), chairman of the Senate Appropriations Committee's Defense Subcommittee, elicited an admission from Pentagon Comptroller John J. Hamre that DoD inflation is higher than the 1.9 percent assumed in the budget. The lower figure, said Mr. Hamre, "is given to us, and we are directed to use [it]."

The funding deficiencies could be aggravated by the high cost of continuing contingency operations overseas. Senator Stevens claimed the budget this year is effectively reduced by \$2.2 billion, the amount needed to cover these costs.

Mr. Spence argued that tight budgets could, in time, produce further cuts in force structure. "This budget . . . begins down that slippery slope of deeper force-structure reductions," he said. He predicted that "Congress will . . . continue to aggressively push to generate internal savings through reform, downsizing, consolidation, and privatization . . . [and to] increase the defense spending top line in the budget resolution."

Sen. John McCain (R-Ariz.), a senior member of the Senate Armed Services Committee, warned, however, that "current fiscal reality" makes future significant increases in defense spending "unlikely." He recommended that US force planning "should provide, at a minimum, sufficient levels to decisively prevail in a single, generic MRC," as well as "one or more" smaller conflicts.

Cuts to the procurement account were singled out for particular criticism. Mr. Young praised the three percent pay raise and quality-of-life and readiness initiatives included in the bill. However, he was sharply critical of the cutbacks in procurement, including a deep reduction in USAF aircraft funding.

Adm. William A. Owens, the now-retired vice chairman of the Joint Chiefs of Staff, agreed with the critics. Noting the annual delay of projected increases in the investment accounts, he argued that "we've got

to stop promising ourselves and do something."

Readiness is the Administration's highest priority, but even that continues to draw critical Congressional attention. In a recent study, Senator McCain recommended moving to a system of "tiered" readiness, in which forward-deployed and crisis-response forces would remain at the highest level of readiness. The Air Force, with the exception of long-range aircraft and forward-deployed forces, would be held in second-tier readiness.

Many in Congress have also been critical of the Administration's priorities and funding of ballistic missile defense. The Administration proposed to spend about \$700 million less than the Fiscal 1996 level and wants to cut back on spending for national missile defense dramatically.

Rep. Curt Weldon (R-Pa.), a leading proponent of missile defenses, noted that the Administration is seeking to delay Congressionally mandated deployment of some theater missile defense systems by as much as six years. He also accused the Administration of grossly exaggerating the cost of a limited national missile defense. The Army, Air Force, and Ballistic Missile Defense Office (BMDO) estimate the cost at \$5 billion to \$8 billion. Other Administration officials peg the cost at tens of billions.

Mr. Weldon blasted the Administration's estimate that the ballistic missile threat posed by such countries as Iran and North Korea would not mature in the coming decade. Army Lt. Gen. Malcolm R. O'Neill, director of BMDO, suggested in testimony that the estimate was too categorical in its conclusions.

To meet these objections, Congressional leaders introduced the "Defend America Act of 1996." This would establish a national policy of deploying by the end of 2003 an affordable missile defense for all fifty states, effective "against limited, unauthorized, or accidental ballistic missile attacks." It contains goals put forth in the authorization bill last year that was vetoed by President Clinton. ■





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# The Chart Page

By Tamar A. Mehuron, Associate Editor

## The Defense Budget at a Glance

In March, President Clinton presented his proposed defense budget for Fiscal Year 1997. The document requests \$242.6 billion in budget authority and \$247.5 in outlays for the direct program (DoD activities only). The budget request for the total national defense program (DoD activities and defense activities in the Department of Energy and other federal agencies) is \$254.4 billion in budget authority and \$258.7 billion in outlays.

Fiscal 1997 marks the twelfth straight year of real decline for the defense budget.

Funding levels can be expressed in several ways. Totals are most frequently stated in **budget authority**, which is the value of new obligations the 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 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.

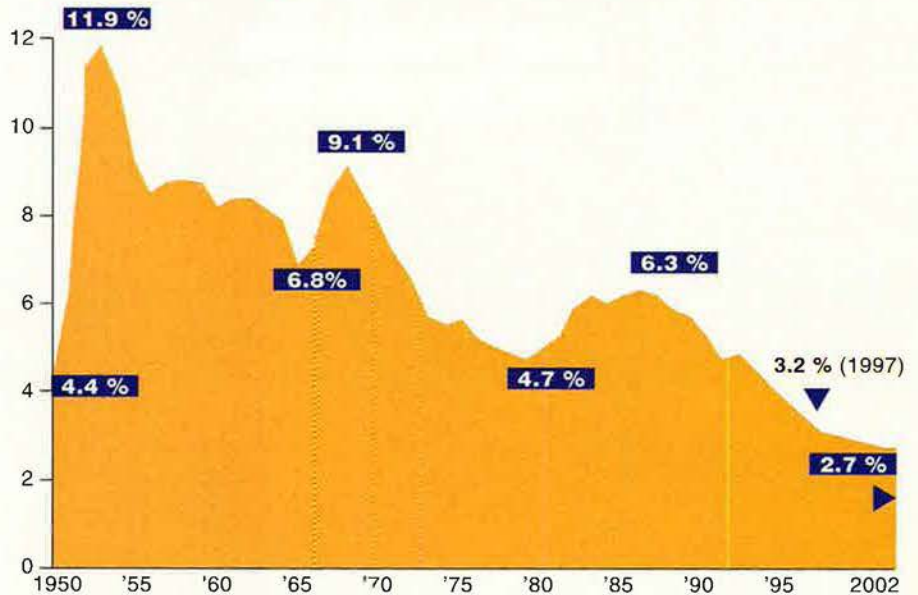
The following charts address only the Defense Department program. In some instances, numbers on the charts in this section may not sum to totals shown because of rounding. Years indicated are fiscal years.

### Cutting the Pie: Who Gets What

(Budget authority in current \$ billions)

|   | 1995         | 1996         | 1997         | Change<br>1996-97 |
|---|--------------|--------------|--------------|-------------------|
| Military personnel .....                              | 71.6         | 69.6         | 69.8         | +0.2              |
| Operations & maintenance .....                        | 93.8         | 93.6         | 89.2         | -4.4              |
| Procurement .....                                     | 43.6         | 42.3         | 38.9         | -3.4              |
| Research, development, test, & evaluation (RDT&E) ... | 34.5         | 34.9         | 34.7         | -0.2              |
| Military construction .....                           | 5.4          | 6.9          | 5.3          | -1.6              |
| Family housing .....                                  | 3.4          | 4.3          | 3.9          | -0.4              |
| Other .....   | 3.4          | 0.2          | 0.8          | +0.6              |
| <b>Total .....</b>                                    | <b>255.7</b> | <b>251.8</b> | <b>242.6</b> | <b>-9.2</b>       |

### Defense Outlays as a Share of Gross Domestic Product



Source: US Department of Defense.

### Budget Top Line

(\$ billions)

|  | 1996  | 1997  | 1998  | 1999  | 2000  | 2001  | 2002  |
|--|-------|-------|-------|-------|-------|-------|-------|
| <b>Budget authority</b><br>(current \$)          | 251.8 | 242.6 | 248.1 | 254.3 | 261.7 | 269.6 | 276.6 |
| <b>Budget authority</b><br>(constant FY 1997 \$) | 258.2 | 242.6 | 242.1 | 242.2 | 243.4 | 244.9 | 245.3 |
| <b>Outlays</b><br>(current \$)                   | 254.3 | 247.5 | 243.9 | 246.5 | 253.9 | 256.6 | 264.9 |
| <b>Outlays</b><br>(constant FY 1997 \$)          | 260.7 | 247.5 | 238.0 | 234.7 | 236.1 | 232.9 | 234.9 |



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**Service Shares**

(Budget authority)

|                            | 1996  | 1997  |   |
|----------------------------|-------|-------|---|
| <b>Current \$ billions</b> |       |       |   |
| Air Force                  | 73.9  | 72.0  | Fiscal 1997 figures are those contained in the Clinton Administration's budget request. |
| Army                       | 61.7  | 59.8  |   |
| Navy                       | 75.8  | 74.0  |   |
| Defense agencies, DoD-wide | 40.4  | 36.9  |   |
| Total                      | 251.8 | 242.6 |   |
| <b>Percentages</b>         |       |       |   |
| Air Force                  | 29.3  | 29.7  |   |
| Army                       | 24.5  | 24.6  |   |
| Navy                       | 30.1  | 30.5  |   |
| Defense agencies, DoD-wide | 16.0  | 15.2  |   |

**Manpower**

(End strength in thousands)

|                   | Change 1988-94 | 1995  | 1996  | 1997  | 1998/ Goal | Change 95-98/ Goal |
|-------------------|----------------|-------|-------|-------|------------|--------------------|
| Total active duty | -527           | 1,519 | 1,482 | 1,457 | 1,418      | -101               |
| Air Force         | -150           | 400   | 388   | 381   | 375        | -25                |
| Army              | -232           | 509   | 495   | 495   | 475        | -34                |
| Marine Corps      | -23            | 175   | 174   | 174   | 174        | -1                 |
| Navy              | -122           | 435   | 425   | 407   | 394        | -41                |
| Selected reserves | -133           | 946   | 931   | 901   | 893        | -53                |
| Civilians         | -87            | 865   | 841   | 807   | 728        | -137               |

**Force Structure Changes**

|   | Cold War Base 1990 | Base Force 1997 | Bottom-Up Review Plan |
|---|--------------------|-----------------|-----------------------|
| <b>Air Force</b>                                |                    |                 |                       |
| Active fighter wings                            | 24                 | 15.3            | 13                    |
| ANG/AFRES fighter wings                         | 12                 | 11.3            | 7                     |
| <b>Army</b>                                     |                    |                 |                       |
| Active divisions                                | 18                 | 12              | 10                    |
| Army National Guard/<br>Army Reserve brigades   | 57                 | 34              | 42 <sup>a</sup>       |
| <b>Navy</b>                                     |                    |                 |                       |
| Battle force ships (including carriers)         | 546                | 430             | 357                   |
| Aircraft carriers                               |                    |                 |                       |
| Active  | 15                 | 13              | 11                    |
| Reserve   | 1                  | —               | 1                     |
| Carrier air wings                               |                    |                 |                       |
| Active  | 13                 | 11              | 10                    |
| Reserve   | 2                  | 2               | 1                     |
| <b>Marine Corps</b> (three active, one Reserve) | 4                  | 4               | 4                     |

<sup>a</sup>Includes fifteen enhanced brigades (equivalent to 5+ divisions)

**Operational Training Rates**

|  | 1985 | 1996 | 1997 | 1998 |
|--|------|------|------|------|
| <b>Air Force</b>   |      |      |      |      |
| Flying hours per crew per month, fighter/attack aircraft | 19.1 | 19.7 | 19.3 | N/A  |
| <b>Army</b>  |      |      |      |      |
| Flying hours per crew per month                          | 13.1 | 14.5 | 14.5 | 14.5 |
| Annual tank miles  | 850  | 800  | 800  | 800  |
| <b>Navy</b>  |      |      |      |      |
| Flying hours per crew per month                          | 25   | 24   | 24   | N/A  |
| Ship steaming days per quarter                           |      |      |      |      |
| Deployed fleet   | 53.6 | 57.5 | 55.0 | N/A  |
| Nondeployed fleet  | 27.4 | 29   | 27   | N/A  |

**Total Funding of Major Programs**

(Current \$ millions, including RDT&E and procurement funding)

|  | 1997    |
|--|---------|
| <b>Air Force</b>                       |         |
| C-17 transport                         | 2,321.0 |
| F-15E fighter                          | 339.4   |
| F-22 fighter                           | 2,007.4 |
| F-16 fighter                           | 253.4   |
| B-2 bomber                             | 683.9   |
| E-8 Joint STARS aircraft               | 786.4   |
| Milstar satellite                      | 727.3   |
| Joint Primary Aircraft Training System | 133.6   |
| Joint Strike Fighter                   | 581.8   |
| <b>Army</b>                            |         |
| AH-64D helicopter                      | 397.9   |
| RAH-66 helicopter (RDT&E only)         | 288.6   |
| <b>Navy</b>                            |         |
| DDG-51 destroyer                       | 3,505.4 |
| F/A-18E/F fighter                      | 2,587.3 |
| Trident II ballistic missile           | 336.7   |
| E-2C early warning aircraft            | 212.4   |

**Procurement of Major Air Force Systems**

(Current \$ millions)

|  | 1996  | 1997  |
|--|-------|-------|
| <b>Aircraft Procurement</b>            |       |       |
| B-1B bomber                            | 55    | 17    |
| B-2 bomber                             | 747   | 105   |
| C-17 transport                         | 2,492 | 2,143 |
| C-130J transport                       | 88    | 63    |
| E-8 Joint STARS aircraft               | 458   | 529   |
| F-22 fighter                           | 0     | 0     |
| Joint Primary Aircraft Training System | 29    | 67    |
| <b>Missile Procurement</b>             |       |       |
| Advanced Medium-Range                  |       |       |
| Air-to-Air Missile                     | 178   | 117   |
| Sensor-Fuzed Weapon                    | 165   | 131   |
| <b>Other Procurement</b>               |       |       |
| Airborne Warning and Control System    | 224   | 288   |
| Space Boosters (Titan)                 | 427   | 490   |
| Global Positioning System              | 154   | 199   |
| Defense Support Program                | 65    | 71    |
| Medium Launch Vehicle                  | 178   | 176   |
| <b>RDT&amp;E</b>                       |       |       |
| Airborne Laser                         | 19    | 57    |
| Milstar                                | 583   | 727   |
| B-2 bomber                             | 589   | 528   |
| Spacebased Infrared satellite          | 362   | 293   |
| Titan                                  | 126   | 105   |
| Evolved Expendable Launch Vehicle      | 37    | 44    |
| F-22 fighter                           | 2,165 | 2,003 |
| Joint Advanced Strike Technology       | 82    | 264   |



# Washington Watch

By Robert Dudley, Executive Editor

## The "Air Dominance" Budget

The 1997 budget proposal sets a new and higher standard for airpower and calls on the services to establish "dominant battlefield awareness."



WITH its 1997 budget plan, the Defense Department made public a new and higher standard for airpower. The US expects its forces not just to overcome an enemy but to absolutely

dominate the airspace over a battlefield. Secretary of Defense William J. Perry described this new objective as "air dominance."

In another action important to the Air Force, DoD called on the services to establish "dominant battlefield awareness."

The defense budget that Secretary Perry unveiled March 4 suggests that he is willing to pay a premium for these capabilities—particularly for air dominance, meaning clear-cut, unquestioned supremacy of the type the Air Force and its Operation Desert Storm coalition partners imposed on Iraq in the 1991 Persian Gulf War.

"For decades, we've described our objective as air superiority," explained the Secretary. "In Desert Storm, . . . what we had was not air superiority but air dominance. Basically, the Air Force simply shut down the Iraqi Air Force, and therefore, our ground forces, all of our other forces, were able to operate without any interference from Iraqi air."

He added, "This is what's called air dominance. We had it in Desert Storm. We liked it, and we want to continue to have it."

DoD said it has a plan to achieve this goal, though critics warn that its realization is far from certain. Secretary Perry said the Pentagon intends to invest \$6 billion per year over the next five years on a broad, multiservice program of development

and procurement to provide the weapons of air dominance.

The DoD budget made public in March contained an overall budget request of \$242.6 billion for Fiscal 1997, starting October 1. The amount funds only DoD activities and does not include \$11.8 billion requested for defense projects managed by the Energy Department and other agencies (which push up the national defense total to \$254.4 billion.)

The one-year budget was accompanied by a 1997–2002 blueprint for total defense spending of \$1.46 trillion, as measured in 1997 dollars.

### "Air Dominance" Budget

In the air dominance budget for 1997, DoD included \$2 billion for the Air Force's F-22 stealth fighter program, \$581.8 million for the Joint Strike Fighter (JSF) program (expected to produce new fighters for the Air Force, Navy, and Marine Corps), and \$2.6 billion for the initial procurement of twelve Navy F/A-18E/F carrier-based multirole fighters.

Plans call for DoD, in the four-year period that follows—1998–2001—to commit another \$11.1 billion to the F-22 fighter program, enough to pay for the first forty aircraft. In addition, DoD would provide another \$3.2 billion for further JSF development work and \$14.3 billion for 150 more F/A-18E/Fs.

Thus, total investment for the three programs over five years would come to \$33.8 billion. One Pentagon finance official reported that the figure represents ten percent of DoD's long-range modernization budget.

The air dominance portion of the DoD budget also includes funding for a handful of older fighters remaining in service during USAF's transition to new aircraft. The Air Force in 1997 would develop and procure four F-15s and four F-16s for an attrition inventory. More fighters would be bought in the outyears.

"This is a vigorous program," said Secretary Perry. "We're doing it because we want to maintain air dominance and are not prepared to settle for less."

The Air Force normally could be expected to handle most of the airpower duties in a regional conflict. However, the Defense Department's budget recognizes a Navy role by identifying the advanced F/A-18E/F Hornet as a contributor to air dominance.

In March 13 testimony before the House National Security Committee, USAF's Chief of Staff, Gen. Ronald R. Fogleman, appeared to be anticipating disputes with the Navy and its Chief of Naval Operations, Adm. J. M. "Mike" Boorda. The General pointed out that the Air Force has 81,000 people forward deployed or forward assigned every day—in Europe, the Pacific, the Persian Gulf area, and the Americas.

In addition, he noted, the Air Force has a 3,000-strong force based at Aviano AB, Italy, fully committed to the Balkan peacekeeping operation.

"Mike Boorda likes to talk about his carriers," said the General. "He's very proud of them. He ought to be proud of them; they're great weapons. Well, Aviano is a great Air Force carrier, . . . stationed right there in the Adriatic. It never has to steam back and forth; it's there day in and day out."

Secretary Perry was attacked by critics claiming he has overemphasized tactical airpower at the expense of land and sea warfare. His retort: "We believe that everything we'll do [in war] depends on having this air dominance." He added, "The consequence of that—of having this air dominance—is that all of the other things we're trying to do on the sea and on the land are done much more effectively because they are not going to be harassed by opposing enemy air forces."

Defense Department and USAF leaders appeared to be in total agreement on tactical fighter modernization.

Air Force Secretary Sheila E. Widnall warned, "Nations around the world have caught up with us in technology" and the Air Force has to expect to face advanced weapons in the future.

### No Fair Fights Wanted

If anything, Secretary Perry was even more emphatic on this point.



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An embroidered eagle logo on a dark blue fabric. The eagle is shown in profile, facing right, with a yellow beak and a white head. Its wings are spread, and the word "DEPENDABLE" is embroidered in gold thread across the chest area. The eagle is set against a blue background that forms a semi-circle.

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"Do not take people seriously when they tell you, 'We do not need advanced fighters like the F-22 and the F/A-18 because we will not face advanced fighters,'" he warned. "We're not looking for an equal or fair fight. If we get in an air fight with somebody, we want it to be unfair. We want the advantage to be wholly and completely on our side."

General Fogleman told Congress the time for temporizing is past. "We've got to modernize tacair for all the services," he said. "And if we don't make this investment now, . . . if we don't follow through on the programs that we have started, we're going to be in a tremendously poor posture at the end of the first decade of the twenty-first century."

By 2005, the year the F-22 achieves initial operational capability, the Air Force F-15 and Navy F-14—the premier air-combat fighters in the two services—will have been in use for about thirty years.

The budget contains some \$221 million to develop modifications that would equip B-1 bombers to carry precision guided munitions. Another \$700 million is earmarked for an array of smart weapons, including the Joint Direct Attack Munition.

The budget also includes \$683.9 million to continue work associated with the B-2 bomber and its systems, though none of that money is to be used to procure additional aircraft. The Administration has provided no funds for new procurement of bombers beyond the twenty previously authorized. However, President Clinton did decide to redirect previously appropriated money to provide a twenty-first B-2. The money would be used to upgrade the first flight-test aircraft to operational status, at a projected cost of \$493 million.

In his budget presentations, the Defense Secretary called for the US military to develop ways to achieve "dominant battlefield awareness," meaning precise and detailed knowledge about an opponent in the field, in the air, or at sea. He referred to this capability as "the glue" that holds together US operations.

"Again, in Desert Storm, we had it, we liked it, and we want to continue to have it," he said.

#### **A Crucial Difference**

To illustrate the concept, DoD officials presented a drawing of a Predator unmanned aerial vehicle collecting data and relaying it instantaneously to a satellite, which was shown to be sending it down to a tactical com-

mand center. The center was then to synthesize the data, compare the product with other intelligence, and send the results out to a field commander.

"This is what we call battlefield awareness," said Secretary Perry. "It is the crucial difference."

The Secretary said that DoD would spend \$3 billion per year to achieve and sustain this capability. Planned battlefield awareness investments from 1997 through 2001 include major Air Force programs:

- \$2.6 billion for ten E-8C Joint Surveillance and Target Attack Radar System aircraft.
- \$2.9 billion for the Spacebased Infrared satellite system.
- \$3.5 billion for the Milstar satellite follow-on system.
- \$800 million to upgrade the fleet of E-3 Airborne Warning and Control System aircraft.
- \$1.6 billion for twelve additional Global Positioning System satellites.
- \$1.5 billion for unmanned aerial vehicles.

Despite strong emphasis on procurement of these selected aerospace systems, the overall Fiscal 1997 budget still is dominated by Defense Department concerns about readiness, whether personnel or materiel. "Protecting readiness remains our number one priority," said Secretary Perry. "That was true last year. It was true the year before. It is also true this year."

The figures bear him out. The requested budget proposes to fund maximum military pay raises for six years, protect operations and maintenance funding and keep it at historic highs, invest significant amounts of money in improvements to troop quality-of-life, and seek advance funding for overseas military deployments in order to keep them from becoming a drain on DoD training and maintenance accounts.

By comparison, overall procurement has stagnated for more than a decade. At this time last year, Pentagon leaders said the drought had nearly ended. Specifically, they said that Fiscal Year 1996 would mark the low point for weapon purchases and that spending would turn up in Fiscal 1997 to \$42.3 billion. It was then to rise every year and reach \$58.6 billion in 2001.

Yet, when the 1997 budget was unveiled, the procurement budget had dropped again, falling to the lowest level since before the outbreak of the Korean War.

Undaunted, the Administration

quickly refocused on a new goal. Officials claimed that they had now established Fiscal 1998 as the first year in the promised defense "recapitalization" project.

Congressional critics, mainly Republicans, expressed deep skepticism. "I am concerned that this Administration keeps promising that procurement funding will increase, but in fact it never does," said Sen. Strom Thurmond (R-S. C.), chairman of the Senate Armed Services Committee. His counterpart on the House National Security Committee, Rep. Floyd D. Spence (R-S. C.), charged, "This budget cannot even be described as a treading-water budget; it is already under water, and sinking fast."

Senate and House Republicans claimed that Congress will raise the defense request. Last year, the lawmakers projected that they would have to increase the Administration's 1997 budget by \$14 billion.

#### **Down Another \$15.6 Billion**

The latest defense spending plan proposes a real, one-year decline from 1996 levels of \$15.6 billion, or six percent. That budget, were it to be enacted by Congress, would mark the twelfth straight year of real cuts in defense spending. Moreover, plans now call for real (that is, inflation-free) defense spending to drop one more time—in 1998—before it again turns up slightly in 1999 and registers anemic growth in 2000, 2001, and 2002.

The 1997 request is, in real terms, forty percent below the inflation-adjusted sum of \$405 billion voted in Fiscal 1985, the peak year of defense spending in the post-Vietnam era.

As a share of US Gross Domestic Product, defense spending goes down to 3.2 percent in 1997 and will have dropped to 2.7 percent in Fiscal 2002, a figure that is less than half the 6.3 percent of GDP allocated to defense in the mid-1980s. "It's a very small percentage," conceded one top Pentagon financial official. "We haven't been this small since 1938."

In 1997, the biggest Pentagon spending accounts will be those that fund everyday activities—training exercises, daily operations tempo, repairs, payroll, health care, and the like. The operations and maintenance account is projected to hit \$89.2 billion, consuming 36.8 percent of the budget. Military personnel accounts will eat up another \$69.8 billion, or 28.8 percent. The "other" account



will take up \$800 million. Taken together, these fast-spending categories account for two-thirds of the new Pentagon budget.

The remaining one-third of the budget goes to long-term military investment. Weapon procurement comes to \$38.9 billion in 1997, sixteen percent of Pentagon spending. This represents a huge decline of seventy-two percent from its Reagan-era peak (\$139.3 billion, in 1997 dollars). Research and development comes in at \$34.7 billion, consuming 14.3 percent of the budget. The rest—\$9.2 billion, or 3.8 percent—goes to construction and family housing for troops around the world.

Service shares have remained relatively constant. In the coming year, approximately \$205.8 billion, or eighty-five percent of DoD's budget, will be allocated to the three military departments. (Department of Defense agencies and defense-wide activities get the other \$36.9 billion, fifteen percent of the budget.)

Of the service total, USAF receives \$72 billion, or 29.7 percent; the Navy Department (the Navy and Marine Corps) gets \$74 billion, or 30.5 percent; and the Army gets \$59.8 billion, or 24.6 percent.

#### **USAF's Top Line**

USAF's budget will fall 2.3 percent from last year's \$73.9 billion (in constant 1997 dollars). USAF's funding plan devotes \$14.4 billion to research and development, \$14.5 billion to hardware procurement, \$22.5 billion to operations and maintenance, \$19.1 billion to military personnel, and \$1.8 billion to construction and family housing. (It gains \$300 million in offsetting receipts.)

Much of the money in the 1997 budget has been allocated to keeping the force combat ready. Flying time for active USAF fighter/attack aircrews has been set at 19.3 hours per month, about the same as in 1996. Likewise, bomber and transport crews will continue flying at their current rates.

The new budget contains many new initiatives aimed at acquiring or holding on to high-quality personnel. In military pay accounts, the Administration proposed a full three percent hike effective January 1, 1997, and 3.1 percent raises effective January 1, 1998, and for the four years thereafter. The DoD proposal protects commissary benefits and variable housing rates. The budget also makes quality-of-life initiatives and improvements the top priority, Sec-

retary Perry said March 4, referring mainly to new housing.

The Air Force's portion of the proposal contains provisions to build, replace, and improve 1,712 family housing units, build fourteen new dormitories, and renovate four other dorms. Other funding will go to build one new dining hall and renovate another, construct a new child-development center, and renovate and expand one physical fitness center.

The budget allocates approximately \$18.4 billion to the reserve components, which total 900,000 Selected Reserves. The main emphasis for 1997 is on maintaining readiness and improving quality of life.

By contrast, USAF's funding for procurement and R&D combined was \$28.9 billion, which officials say is sufficient to cover only highest-priority investment programs and systems.

Getting a boost in the budget is USAF's C-17 advanced transport. The new plan includes \$2.3 billion for eight C-17s plus spare parts, research, and military construction. The official DoD program now has set the requirement at 120 of the new transports. Secretary Widnall testified that getting the C-17 into the force in numbers is "our most important near-term priority" in procurement because it is "essential" to US warfighting capabilities.

The Air Force also will spend \$63 million to buy one new C-130J theater transport.

The Ballistic Missile Defense program, which encompasses a robust theater missile defense effort and a less aggressive national missile defense program, seeks \$2.8 billion this fiscal year, down from \$3.4 billion in 1996. DoD said it planned to spend \$12 billion over the next six years on BMD—\$10 billion for theater defenses and only \$2 billion for the national missile defense systems.

Secretary Perry told Congress that the budget will enable the US to ready a thin missile defense in three years and to deploy one in another three years.

#### **Below 400,000—and Dropping**

Since the big drawdown began in the late 1980s, the White House and Congress have approved a net reduction of 692,200 active-duty troops. The large US force of 2,174,200 deployed in 1987 (the post-Vietnam peak year) will have sunk to 1,482,000 by September 30, 1996, declining by thirty-two percent.

Over the next several years, the uniformed military will lose another 64,000 active-duty troops, with the

force to level off at 1,418,000 around 2000. The force left at that time will be thirty-five percent smaller than the Cold War force at its 1987 size.

USAF's active-duty strength at the end of 1995—the last full fiscal year—stood at roughly 400,000. Plans call for the service to lose another 12,000 troops during Fiscal 1996 and 7,000 in Fiscal 1997, leaving USAF at a size of 381,000.

A short time ago, that figure was considered the final Air Force end-strength goal. However, USAF's most recently published post-drawdown goal was set at 375,000 troops. When the Air Force achieves that level, it will be 38.3 percent smaller than it was at its Reagan-era peak.

DoD officials said that civilian end strengths are being reduced at a rate of about four percent per year. The US has shed 260,000 defense civilian employees since 1990 and will lop off another 100,000 before the drawdown is over.

The 1997 budget contains no new force-structure changes for the Air Force, Army, or Marine Corps. USAF has settled in at twenty active and reserve fighter wing equivalents and a fleet of about 100 deployable bombers, the size envisioned in DoD's 1993 Bottom-Up Review of defense forces. The Army is down to ten active divisions and five reserve divisions. The Marines have three active divisions and one reserve.

The Navy deploys eleven active carriers. It has slightly recalibrated its goal for battle-force warships, raising it five ships to 346. It still must lay up another eleven warships after 1996 to reach that level.

The US will continue to draw down its strategic nuclear forces in accordance with arms agreements. The number of nuclear warheads is declining from a high of 11,000 down to 6,000 in 1998 under the first Strategic Arms Reduction Talks (START I) agreement. From that point until 2003, that number is projected to go down to about 3,600, which is the level in the START II Treaty, assuming that START II is ratified by the Russian Parliament.

Army Gen. John M. Shalikashvili, Chairman of the Joint Chiefs of Staff, told the Senate Armed Services Committee on March 6 that there should be no further cuts in force structure. "We must preserve our capability to fight and win two nearly simultaneous major regional conflicts," he said. "The force structure we have designed for this purpose is as lean as the calculus of risk will afford." ■



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An aerial map of the United States, tinted in shades of blue. A red crosshair is centered over the Midwest. Several numerical annotations are overlaid on the map: '-19042' in orange in the upper left; '17-24:51' in large white font across the center; '29.11' in orange in the lower left; and 'THAT SOM' in white in the upper right. Vertical red tick marks are visible along the bottom edge of the map.

-19042

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1975



# Aerospace World

By Suzann Chapman, Associate Editor

## Air Force Memorial Soars

Two Washington-area commissions unanimously approved a proposed design concept for the Air Force Memorial, clearing away the last major hurdle to completion of the project. The star-pattern monument is to be in place by 2000.

Though memorial designs often provoke controversy, the design by James Ingo Freed (see model, at right) won the approval of both the Commission of Fine Arts in Washington, D. C., and the National Capital Planning Commission. Fine Arts Commission Chairman J. Carter Brown called the design "absolutely brilliant."

Lt. Gen. Robert D. Springer, USAF (Ret.), executive director of the Air Force Memorial Foundation, said architect Freed and his associates made several attempts at futuristic designs before focusing on the star pattern.

The memorial will feature a structure with an open pentagonal top, the highest point rising fifty feet from a granite platform and supported by five triangular fins. At the base, the points of the fins meet the five points of an Air Force star engraved in the platform. An honor guard of four slightly larger-than-life sculpted figures emerging from a rough block of stone and holding the American and USAF flags will stand on the west side.

Below ground, the memorial will feature a 15,000-square-foot exhibit center portraying the past, present, and future Air Force and a meditation room.

It will stand on Arlington Ridge, near Arlington Cemetery and adjacent to the Iwo Jima Memorial and the Netherlands Carillon. The Memorial Foundation, a nonprofit organization set up in 1992, expects to raise \$25 million from private funds to build the memorial. The foundation has a small staff and occupies rent-free office space provided by the Air Force Association in the Washington, D. C., area.

## DoD Proposes Twenty-First B-2

The Pentagon announced March 21 that President Clinton authorized the upgrade of an existing B-2 flight



© Eric Schiller, 1995

*This is an artist's rendering of the recently approved Air Force Memorial. The fifty-foot-high structure will sit on Arlington Ridge near the Iwo Jima Memorial, overlooking the Potomac River and Washington, D. C.*

test aircraft to full operational status using \$493 million that Congress added to the Fiscal 1996 defense budget for the stealth bomber program.

The upgrade will increase the B-2 inventory to twenty-one and extend the production line from March to July of 2000. However, the Air Force had not finalized negotiations with Northrop Grumman Corp. on the actual cost for the upgrade. A senior service official stated that the Air Force believes the upgrade to the aircraft, which is designated Air Vehicle-1, can be completed within the \$493 million that Congress appropriated.

USAF officials had originally thought the upgrade might cost about \$700 million. However, the service revised its estimate based on an engineering team's week-long review of the AV-1 itself and relevant experience in upgrades to AV-2, another test B-2.

Despite the early model's less capable low observability (LO), service officials are confident they can upgrade AV-1 to Block 30 configuration and meet current LO requirements. The AV-1 aircraft was used to test

the bomber's flying qualities and to verify the Block 10 LO design.

## Final B-2 Study: Prepare for Restart

DoD's Heavy Bomber Industrial Capabilities Study, required by the Fiscal 1995 defense authorization bill, recommends that DoD keep Northrop Grumman's B-2 production line warm in Fiscal 1997. It also advocates a \$10 million investment for work to support a potential B-2 follow-on.

Under review by the Senate Armed Services Committee, the report does not say the Pentagon should buy more B-2 bombers. However, it states that preserving long-lead items, such as tooling, and planning to reassemble and activate a contractor-supplier network need attention now to ensure a successful restart of the program.

"The current B-2 curtailment program does not protect the B-2's trained industrial work force, supplier-owned facilities, proprietary subcontract processes on data, and supplier-owned tooling," states the study, prepared by TASC, Inc., of Arlington, Va. TASC



## Joint Endeavor Airlift Racks Up Miles

As of March 5, Air Mobility Command, Air Combat Command, and US Air Forces in Europe had conducted 2,296 airlift missions to support Operation Joint Endeavor, the NATO peacekeeping mission in Bosnia-Herzegovina. C-130 aircraft flew the most missions, as shown below, but the new C-17 airlifter transported the most passengers and cargo.

| Aircraft     | Missions     | Passengers    | Cargo (tons)  | JP-8 Fuel Offloaded (pounds) |
|--------------|--------------|---------------|---------------|------------------------------|
| C-5          | 195          | 3,490         | 7,118         | —                            |
| C-17         | 514          | 4,144         | 12,774        | —                            |
| C-130        | 835          | 1,356         | 3,085         | —                            |
| C-141        | 470          | 3,327         | 5,590         | —                            |
| KC-10        | 13           | 114           | 67            | 486,000                      |
| KC-135       | 231          | 227           | 112           | 12,990,000                   |
| CRAF*        | 38           | 3,036         | 1,420         | —                            |
| <b>Total</b> | <b>2,296</b> | <b>15,694</b> | <b>30,166</b> | <b>13,476,000</b>            |

\*USAF-contracted missions flown by eleven Civil Reserve Air Fleet members: Tower Air, American International Airways, Air Transport International, American Trans Air, Evergreen International, Rich International Airways, Sun Country, World Airways, Southern Air Transport, Polar Air, and Federal Express. Aircraft used were the McDonnell Douglas DC-8, DC-10, and MD-11; Boeing 747 and 757; and Lockheed L-1011.

estimates that the cost to maintain critical capabilities under an enhanced curtailment program would range from \$100 million to \$300 million.

In the executive summary to the study, released to Congress last July, TASC concluded that a distinct US bomber industry does not exist and that any of the current prime aircraft contractors could produce new bombers. The summary did state that an enhanced B-2 curtailment program would significantly improve the cost and time needed for a restart.

President Clinton in February reaffirmed that the Administration does not now intend to buy additional B-2s. However, the White House directed the Pentagon to conduct an additional study of the deep strike issue. The Fiscal 1995 Heavy Bomber Force Study, released in May 1995, determined that purchasing more precision guided munitions would be more cost-effective than buying additional B-2s.

### B-2 on Record Trip to FIDAE

The increasing participation by US defense officials and US aircraft is one indication of the rising interest in Chile's biennial aerospace trade show, the Ferie Internacional del Aire y del Espacio (FIDAE). The March 1996 show included a B-2 flyover and displays of a C-17, an F-117, two F-16s, and two F/A-18s.

Air Combat Command's 509th Bomb Wing, Whiteman AFB, Mo., used the FIDAE appearance to conduct the longest, nonstop B-2 flight to date. Capts. Greg Buelt and Jeff Kindley

left Whiteman AFB March 9 to fly the B-2 *Spirit of Kansas* on the 24.5-hour round trip to Santiago, Chile. The mission included two air refuelings, the air show flyover, and the return to Whiteman.

B-2 appearances at the 1995 Paris Air Show and Asian Aerospace '96 in Singapore, in addition to other overseas missions, included stopovers or engine-running crew changes.

### Major Relief

The Fiscal 1996 defense authoriza-

tion bill includes a provision for 1,100 additional, but so far temporary, USAF slots for majors for 1996 and 1997. USAF requested the temporary grade relief from its authorized number of active-duty majors to help relieve a slowdown in promotions.

Over the past several years, the time frame for actually pinning on the rank of major had slipped by more than a year past the service's guideline. The standard time frame to pin on major's oak leaves under the Defense Officer Personnel Management Act (DOPMA) is from nine to eleven years of service. Lately, it has taken more than twelve years.

With temporary grade relief, captains in the 1984 year group who were selected by the June 1995 promotion selection board will pin on their new rank in August 1996 rather than February 1997—six months earlier than expected. Captains in the 1985 year group who were selected by the March 1996 board will pin on three to six months earlier than expected. Members of both these groups will then fall within the eleven-year DOPMA guideline.

USAF personnel officials stated that, besides letting current selectees pin on major's leaves earlier, the grade-relief provision will enable the Air Force to promote nearly 1,100 additional captains to major in Fiscal 1996 and 1997.

Furthermore, each service has requested permanent grade relief in the Fiscal 1997 budget request. If



USAF marked the end of an era in March when its eight remaining F-4s were retired from active service at Nellis AFB, Nev., and sent to the Aerospace Maintenance and Regeneration Center, Davis-Monthan AFB, Ariz. The F-4s will continue to see useful service after being converted to drone status for use as aerial targets.

USAF photo by SrA. Mark Hoyt



enacted into law, this provision would ensure the pin-on time to major stays within DOPMA guidelines and help avoid similar slips in promotion to lieutenant colonel, according to personnel officials.

#### AMC Sees Rise in Birdstrikes

A fatal crash and rising numbers of birdstrikes have led Air Mobility Command to develop new flight restrictions and land-management procedures.

USAF ruled that the crash last year of an E-3 Airborne Warning and Control System aircraft, in which all twenty-four crew members died, was caused by a flock of geese [see "Geese Caused AWACS Disaster," March 1996 "Aerospace World," p. 10]. AMC officials also found that the command had suffered 612 aircraft birdstrikes in calendar 1995, an increase over previous years.

Changes in AMC's flight procedures to help preclude bird-related incidents include clear definitions of bird-watch conditions. In a "moderate" condition, which involves five to fifteen large birds or fifteen to thirty small birds, AMC will allow takeoffs and landings only if the departure and arrival routes avoid the bird activity. AMC also will shut down local training flights during a moderate condition.

Under a "severe" condition, which includes more than fifteen large birds or thirty small birds, the base operations group commander must determine if the area is safe for flying and approve all takeoffs and landings. The command has also imposed additional restrictions during bird migratory seasons.

AMC's Natural Resources Manager Will Summers said that base civil engineers have a variety of bird harassment methods, from using blast cannons to setting out bird feed with purgatives in it to make the birds sick and look elsewhere for food. He encourages base residents to refrain from feeding ducks and geese that gather at on-base lakes.

A long-term solution, according to Mr. Summers, involves land-management techniques, such as letting grass around runways grow longer. "Shorter grass makes it easier for the birds to find food," he said.

AMC has also sent special Bird Aircraft Strike Hazard (BASH) inspection teams to AMC bases. The teams included representatives from the command inspector general, safety, airfield operations, and civil engineering functions. Officials also said that base-level BASH working groups will meet at least monthly during migration seasons to identify potential problems.

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#### Fighters Deploy to Jordan

Pentagon officials announced in March that thirty-four USAF fighter aircraft would deploy to Jordan as part of an airpower expeditionary force (AEF).

The deployment, which a senior DoD official said the department had been developing for some time with the Kingdom of Jordan and other Middle Eastern countries, began last month and will last until mid-June. It is the second AEF to deploy to the

region; the first went to Bahrain last November.

This AEF includes approximately 850 Air Force personnel and twelve F-15s from the 1st Fighter Wing, Langley AFB, Va.; eighteen F-16s from the 347th Wing, Moody AFB, Ga., and the 366th Wing, Mountain Home AFB, Idaho; and four KC-135s from the 96th Aerial Refueling Wing, Fairchild AFB, Wash. The AEF supports Operation Southern Watch, enforcing the no-fly zone over southern Iraq.



**Greece, Germany, and the Netherlands have joined a growing number of nations** that will benefit from Hughes Electronics' Advanced Medium-Range Air-to-Air Missile (AMRAAM) for their military aircraft. AMRAAM has its own radar, enabling pilots to engage single or multiple targets and maneuver out of danger. It also has the flexibility to be used on a number of other aircraft. For example, the Royal Netherlands Air Force will use the missile for its F-16 Falcon fighters, while Germany will use it for their Luftwaffe F-4Fs. Other nations selecting AMRAAM include Sweden, Switzerland, Finland, Denmark, the United Kingdom, Turkey, and the Republic of Korea.

**The U.S. Air Force has awarded the Hughes Trophy for air defense and air superiority** to the 178th Fighter Squadron of North Dakota's Fargo Air National Guard. The mission of the North Dakota Air National Guard is to detect, identify, intercept, and engage — if necessary — any airborne intruders approaching the continental United States. The 178th squadron, nicknamed the "Happy Hooligans," won the fierce competition for outstanding performance throughout 1994. It is the only F-16 unit to win the Hughes Trophy since its inception in 1953.

**More U.S. Air Force pilots will be better able to hone their skills in emergency procedures,** flight instrumentation, and all elements of air-to-air and air-to-ground combat. This will be possible with the addition of 56 low-cost, high-fidelity F-16 simulators built by Hughes, in five different block configurations. These simulators are part of the Unit Training Device program, and employ a Virtual Dome System that gives pilots a 360-degree situational representation of battle. Other training functions include: target detection, tactical maneuvering, weapons delivery in adverse weather, day or night, as well as defeating hostile actions such as electronic jamming and countermeasures.

**The world's most advanced high energy laser pointing and tracking system, built by Hughes,** scored the first ever shoot down of a short-range rocket by a laser beam. The historic event was part of the Nautilus technology demonstration program being conducted by the U.S. Army and the Israel Ministry of Defense. Hughes originally developed the system, called the SEA LITE Beam Director, for the U.S. Navy. It has demonstrated in earlier programs the capability to acquire and track supersonic missiles, and then disable them with a focused beam of intense laser energy. Hughes, working with the U.S. Armed Forces, has developed every weapon class high energy laser pointing and tracking system built to-date.

**Employees at NASA centers across the country can rest much easier at night,** with the NASA Automated Systems Incident Response Capability (NASIRC), developed jointly by Hughes and NASA's Goddard Space Flight Center. Within minutes or hours, not the days, weeks or months it used to take, all NASA centers can be informed of emerging threats to the agency's computer/network systems, as well as incident situations. For this significant accomplishment, NASA has awarded team members its Agencywide Group Achievement Award.

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DoD expects the AEF to demonstrate the ability to put groundbased aircraft into the region quickly and operate them effectively. The senior official also said the deployment would increase the Royal Jordanian Air Force's familiarity with F-16s. The Clinton Administration had proposed a \$200 million lease of F-16s to Jordan.

### Peacekeeping Costs Tallied

The Defense Department spent about \$3.4 billion during Fiscal 1992-95 to support four United Nations peacekeeping operations, according to a General Accounting Office report released March 6.

Of the eight federal departments involved with UN operations in Haiti, Rwanda, Somalia, and what was once Yugoslavia, the Pentagon incurred 51.5 percent of the total US expenditure—\$6.6 billion. The State Department funded the next largest portion at 27.8 percent. The US Agency for International Development funded 19.3 percent and other government agencies, 1.4 percent.

Senate Majority Leader Bob Dole (R-Kan.) requested the report, which GAO developed from incremental costs, or costs that would otherwise not have been incurred, reported by each of the eight departments. GAO officials said that while the agency did not verify the accuracy of the reported costs, GAO intends to review in a future report "the consistency, accuracy, and reliability of DoD's incremental costs related to contingency operations."

### Bomb-Detection Gear Flown to Israel

A C-141 Starlifter from the 437th Airlift Wing, Charleston AFB, S. C., flew about 2,800 pounds of explosive-detection equipment to Tel Aviv, Israel, on March 5. The bomb-detection gear helped fulfill President Clinton's promise of aid to Israel following increased terrorist attacks.

Air Mobility Command said the C-141 left Hanscom AFB, Mass., on its nonstop flight. A KC-135 from the 100th Air Refueling Wing, RAF Mildenhall, UK, pumped 90,000 pounds of fuel into the C-141, enabling it to land at Tel Aviv, offload the equipment, and fly to Sigonella, Italy. The mission lasted nearly twenty-six hours.

### Reserve Cuts to Slow After 1996

The Pentagon announced in February that it would cut about 5,300 Air Force Reserve military positions in 1996, a six percent reduction from

1995 levels. However, AFRES officials stated in March that DoD's Fiscal 1997 budget provides only a slight decrease from Fiscal 1996, followed by a fairly constant military manpower ceiling into the next decade.

AFRES military end strength will drop from 73,969 in Fiscal 1996 to 73,281 in Fiscal 1997. The number of Air Reserve technicians (ARTs) and AFRES civilian positions will also drop. The ART category will shrink slightly from 9,802 to 9,704 and civilians from 5,961 to 5,618.

Overall, the Pentagon will reduce its reserve forces by 15,963 in Fiscal 1996 and another 30,000 in Fiscal 1997. With the 1997 reduction, the reserve components will be within 8,000 of the planned steady state of 893,000 for the post-Cold War reserve force, stated DoD officials.

### AFRES Creates AWACS Unit

The Air Force Reserve expanded its associate program to include Airborne Warning and Control System (AWACS) aircraft March 15 when it activated the 513th Air Control Group at Tinker AFB, Okla. It is the first Reserve unit to perform the E-3 AWACS mission.

The new Reserve group's six aircrews and support personnel will contain 425 people. Each aircrew will include two pilots, one navigator, and one flight engineer in the cockpit and a team of nineteen to twenty AWACS mission technicians. AFRES officials said that training for two aircrews will begin in July.

As an associate unit, the 513th ACG will share E-3 aircraft with the active-duty 552d Air Control Wing, also at Tinker. The 513th ACG will fall under Tinker's existing Reserve wing, the 507th Air Refueling Wing, which the Air Force probably will redesignate the 507th Wing to reflect the composite makeup of the unit, according to Reserve officials.

### EF-111s Mark 2,000 Days

USAF's twenty-four remaining combat-ready EF-111 Ravens reached a milestone February 21 when they amassed 2,000 consecutive days supporting operations in the Persian Gulf region. The radar-jamming aircraft have flown missions from Incirlik AB, Turkey, since September 1, 1990, during the Persian Gulf War buildup.

During the past five years, the 429th Electronic Combat Squadron at Cannon AFB, N. M., the Air Force's only EF-111 squadron, has made twenty-one rotations to Operation Provide Comfort, the coalition-enforced no-

fly zone over northern Iraq and Kurdish relief operations. At the same time, it has supported Operation Southern Watch, enforcing the no-fly zone over southern Iraq. The squadron also flew missions in Bosnia-Herzegovina for eight months.

EF-111 operations crews have spent at least 150 days per year on temporary duty in the Gulf region, while the unit's maintenance personnel spent 175 to 180 days per year.

Capt. Robert Bartholomew, a 429th ECS pilot, said that some people logged 300 to 400 days during the 2,000 days in the region. Eighty-five percent of 429th personnel have been on TDY to the area.

### USAFE Cuts More Force Structure

US Air Forces in Europe announced in mid-March that it plans to inactivate 17th Air Force, headquartered at Sembach Annex, Germany, and the command's three regional support groups. The changes will take effect September 30, 1996, according to a USAFE statement.

Eliminating 17th Air Force will place additional geographic responsibilities on USAFE's remaining two numbered air forces: 16th Air Force, headquartered at Aviano AB, Italy, will cover operations south of the Alps, and 3d Air Force, headquartered at RAF Mildenhall, UK, will cover operations north of the Alps.

The three groups to be inactivated are the 603d Regional Support Group at RAF Mildenhall, the 616th RSG at Aviano AB, and the 617th RSG at Sembach Annex. The RSG structure is unique to USAFE. These three RSGs are responsible primarily for supporting units that are geographically separate from large installations, a function that will be absorbed by USAFE's six wings.

### Congress Approves Troop Tax Relief

In March, both the House and Senate passed a bill that extends "combat zone" income tax benefits to troops stationed in Bosnia, Croatia, or Macedonia for NATO's Operation Joint Endeavor. Although troops have been receiving hazardous duty pay, the President had not issued an executive order declaring the operation to be a combat mission.

Rep. Jim Bunning (R-Ky.), who introduced the bill in December, said, "When you are being shot at or [are] dodging land mines, you are in a combat zone."

The bill exempts from income taxes



the full pay of enlisted personnel and warrant officers and some of the pay for officers for the period they are involved in Joint Endeavor. Among other provisions, it extends the deadline for filing tax returns and paying taxes—standard treatment for combat zones.

It also forgives the income tax and reduces taxes on the estate of any military member who dies during the operation. A key factor in Congressional floor discussions was the failure to make similar provisions for US service members killed in the Somalia peacekeeping operation.

The President signed the bill into law on March 20.

**F-15 Mechanics Stand Trial**

Two noncommissioned officers from Spangdahlem AB, Germany, will face a court-martial on charges of negligent homicide in the death of Maj. Donald G. Lowry, Jr., whose F-15C crashed May 30, 1995.

TSgts. William T. Campbell and Thomas P. Mueller, mechanics with Spangdahlem's 52d Equipment Maintenance Squadron, will stand trial together on the negligent homicide charge and four counts of dereliction

of duty, according to an Air Force spokesperson. If convicted, they could serve a maximum of four years in jail.

USAF charged the NCOs on October 10, then conducted an Article 32 investigation—similar to a civilian grand jury—to determine whether to proceed with a trial [see "NCOs Charged in Pilot's Death," December 1995 "Aerospace World," p. 17]. Maj. Gen. Charles R. Heflebower, 17th Air Force commander, decided to refer the case to a court-martial.

The accident investigation report alleged that Sergeant Campbell failed to install two flight-control rods properly and that Sergeant Mueller did not catch the mistake. Consequently, the aircraft malfunctioned during take-off, according to the report.

The report also cited errors made by the pilot—including his failure to conduct an adequate flight-control check—and, to a lesser degree, some other maintenance and operations personnel.

In an editorial for USAF's *Flying Safety* Magazine, Brig. Gen. Orin L. Godsey, the Air Force's top safety official, noted "a disturbing increase in the number of maintenance-related mishaps" in Fiscal 1995. Referring

specifically to this F-15 crash, General Godsey wrote, "The exact same improper maintenance was reported in a High Accident Potential report in 1991, and the proper actions were not taken to preclude this from happening the second time." He stressed the need "to stop being reactive to the last accident and start being proactive in preventing the next."

**Airlift Reliability Rate Improves**

Air Mobility Command officials said that the on-time departures for mobility aircraft rose five percent in the last six months of 1995 from the level established in the first half of the year. The mission departure reliability rate rose to eighty-two percent, an increase of more than 1,800 on-time departures.

Officials stated that the command hopes to achieve an interim goal of eighty-five percent by this summer. They attributed the 1995 improvement to increased awareness, reviews of policies and procedures, adjusting the sequences of events, and better scheduling practices. For instance, the command has developed ways to predict the onset of poor weather and then schedule flights around it.

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"Once we find the root causes for the delays, then we can take action to fix them," said Col. Jim Christian, chief of AMC's Mission Reliability Office. He added that the departure reliability rate is an accurate measure of AMC's ability to get the job done because taking off on time increases chances for mission success.

Colonel Christian said that the command stacks up favorably when it compares its reliability rates with those of commercial airlines. "That's pretty good, considering we flew to all but eight or nine countries in the world last year," he said. "Very few of those countries have dedicated AMC support, and that can make it very difficult to move the mission."

### **B-52 Sets Records**

A Barksdale AFB, La., B-52 and its crew set one of the ten most impressive aviation records of 1995, according to the National Aeronautic Association. There were 175 aviation records set last year.

The B-52 flight, known as Long Rifle, left Edwards AFB, Calif., on August 25, 1995, flying at an average speed of 549 mph. It flew to Adak, Alaska, and back in eleven hours, twenty-three minutes. The flight to the central Aleutians set a new record for an aircraft in the B-52 weight class flying a closed circuit of 6,250 miles, unrefueled, with a payload of 11,000 pounds.

Members of the crew included Capt. Ralph Delatour, navigator; Capt. Hank Jenkins, radar navigator; Capt. Dan Manuel, pilot and originator of the mission; Capt. Russ Mathers, aircraft commander; and Capt. Allen Patton, electronic warfare officer.

### **Field of Aeronautics Winners**

The 1995 Aviation Valor Award went to Lt. Col. John P. Bloom, Jr., 37th Airlift Squadron, Ramstein AB, Germany, as pilot in command of a C-130E performing a humanitarian mission in Bosnia. The aircraft's windshield was shattered by small-arms fire as Colonel Bloom and his crew made their final approach into Sarajevo Airport. He maintained control of the aircraft and landed safely.

Joint recipients of the Cheney Award were Capt. Charles M. Harmon and Charles M. Moncrief, 352d Special Operations Group, RAF Mildenhall, UK. The Captains conducted two long-range, low-level rescue attempts for French aviators who had been shot down near Sarajevo. On the first attempt, flying at near-treetop level and using night vision goggles, they penetrated to within nine nautical miles of a suspected SA-6 surface-to-air

missile site to search for the downed flyers. As they left the area, they came under intense antiaircraft artillery fire. They returned to the same area on the second attempt, and this time enemy fire damaged the aircraft, but they left the area only after they deemed that contact with the French aviators was improbable.

Although he did not win the Collier Trophy, Mark A. Skoog, the USAF nominee, did work that may save six to ten F-16s and their crews each year, according to USAF safety officials. With the 412th Test Wing, Edwards AFB, Calif., Mr. Skoog directed development of automated ground collision avoidance technology for F-16s. He helped develop methods to conduct test runs under conditions previously considered too hazardous.

### **B-1B Wins Mackay**

The record-breaking flights of two B-1Bs last June earned the lead bomber crew the 1995 Mackay Trophy. The Dyess AFB, Tex., B-1Bs launched fifty-eight seconds apart on June 2 to fly the historic, nonstop, around-the-world mission in just thirty-six hours, thirteen minutes, and thirty-six seconds.

It was the longest, nonaugmented-crew sortie in Air Force history, according to a USAF statement. The bombers cruised at an average speed of 631 mph, bombed three ranges on three continents, and took six air refuelings from twenty-six tankers. [See "B-1Bs Make Nonstop World Flight," August 1995 "Aerospace World," p. 24.]

Crew members included Lt. Col. Doug Raaberg and Capt. Steve Adams, Rick Carver, Kevin Clotfelter, Gerald Goodfellow, Kevin Houdek, Steve Reeves, and Chris Stewart.

### **Another Bomber Comes Home**

On March 15, five World War II crew members of B-17 #42-297683 were present at the recovery of the wreckage of their bomber, which had been shot down March 15, 1945, about eighty miles southeast of Berlin.

For the past fifty-one years, pieces of the wreckage—primarily the tail section with its number still clearly visible—formed part of a farmer's shed in Bad Muskau, a small town on the Neisse River, the boundary between Germany and Poland.

The B-17 was on a bombing raid of a synthetic oil plant at Ruhland, Germany, when it went down. Nine of its ten crew members successfully bailed out. The tenth, TSgt. Sator Sierra "Sandy" Sanchez, was killed, and his body was never recovered.

A team of USAF crash-recovery specialists from the 52d Fighter Wing, Spangdahlem AB, Germany, removed the wreckage, which was then sent to the US Air Force Museum in Dayton, Ohio, to be part of its World War II display.

### **Healthy Behavior Rising**

The Pentagon announced March 8 that its 1995 survey of health habits among military personnel shows that alcohol, tobacco, and illicit drug use are at the lowest levels since 1980, when DoD first measured health-related behavior. More than 16,000 active-duty personnel, selected to represent all ranks, completed the confidential, anonymous, and standardized survey, conducted by the Research Triangle Institute of Research Triangle Park, N. C.

In 1980, 27.6 percent of the active force acknowledged use of illicit drugs during the month prior to responding to the survey. In 1995, only three percent reported using illicit drugs. Marijuana is the most frequently used illicit drug, followed by hallucinogens and analgesics, amphetamines and other stimulants, cocaine, and tranquilizers. The personnel with the highest usage rate are less-educated young males who are single and in lower pay grades.

DoD health officials stated that heavy drinking remains a problem, although the trend is toward less alcohol consumption. Heavy drinking, defined as five or more drinks per occasion at least once a week, declined from 20.8 percent in 1980 to 17.1 percent in 1995. The average daily consumption of alcohol per service member decreased forty-four percent, from 1.48 ounces in 1980 to 0.83 ounces in 1995.

However, health officials noted that changes in the sociodemographic composition of the active force rather than true changes in consumption may account for the decline in heavy drinking. A larger portion of today's service members are in groups less likely to be heavy drinkers than were service members in 1980.

Smoking appears to have declined as well. The rate of cigarette use reported for the thirty days prior to completing the 1982 survey was 51.4 percent; by 1995 that rate had dropped to 31.9 percent.

The survey also examined stress and, for the first time, specific health issues that could affect military women. Both male and female members reported family separation as the most stressful event. Overall, the 1995 survey suggests that women have good access to health-care services, but



about thirty-three percent "perceived high levels of stress associated with being a woman in the military," said health officials.

**Declassifying on a Grand Scale**

USAF security officials announced in March that the service was beginning the first phase of a five-year plan to review 176 million pages of historical classified documents for possible declassification.

The Air Force is responding to Executive Order 12958, which requires all federal agencies to review their twenty-five-year-old classified documents. The order mandates that the documents be reviewed by April 15, 2000, or they will be automatically declassified. Estimates place the number of government-wide classified documents at ten billion.

According to security officials, the first phase includes mass distribu-

tion of an eighteen-minute video explaining the review process and its background. The video also highlights two computer-training programs containing declassification instructions, a list of declassification guides, and an explanation of the concepts behind the mass declassification.

Potentially, every unit and office in the Air Force could participate in the process. Security officials help devise classification procedures, but the offices responsible for the information determine what is classified and, consequently, what can be declassified.

**Senior Staff Changes**

**RETIREMENTS:** L/G Marcus A. Anderson, M/G Philip W. Nuber.

**PROMOTIONS:** To be **General:** Michael E. Ryan.  
To be **Lieutenant General:** Richard C. Bethurem, Richard T. Swope.

**CHANGES:** M/G (L/G selectee) **Richard C. Bethurem**, from Cmdr., Air Warfare Center, ACC, Nellis AFB, Nev., to Cmdr., Allied Air Forces Southern Europe, NATO, and Cmdr., 16th AF, USAFE, Naples, Italy, replacing L/G (Gen. selectee) Michael E. Ryan . . . **Col. (B/G selectee) Carrol H. Chandler**, from Cmdr., 33d FW, ACC, Eglin AFB, Fla., to Cmdr., 56th FW, AETC, Luke AFB, Ariz., replacing B/G (M/G selectee) Marvin R. Esmond . . . **B/G (M/G selectee) John R. Dallager**, from Cmdr., 52d FW, USAFE, Spangdahlem AB, Germany, to Cmdr., 13th AF, PACAF, and Cmdr., Southwest Pacific Air Defense Region, Andersen AFB, Guam, replacing M/G (L/G selectee) Richard T. Swope . . . **Col. (B/G selectee) Michael M. Dunn**, from Fellow, Council on Foreign Relations, AFIT, New York, N. Y., to Dir., Plans, Hq. PACAF, Hickam AFB, Hawaii, replacing B/G Rodney P. Kelly.

**B/G (M/G selectee) Marvin R. Esmond**, from Cmdr., 56th FW, AETC, Luke AFB, Ariz., to Cmdr., Air Warfare Center, ACC, Nellis AFB, Nev., replacing M/G (L/G selectee) Richard C. Bethurem . . . **Col. (B/G selectee) Thomas B. Goslin, Jr.**, from Ass't Dir., Ops., Hq. ACC, Langley AFB, Va., to Cmdr., 509th BW, ACC, Whiteman AFB, Mo., replacing B/G (M/G selectee) Ronald C. Marcotte . . . **Gen. Richard E. Hawley**, from Cmdr., AAFCE, NATO; Cmdr., Hq. USAFE; and AF Component Cmdr., USEUCOM, Ramstein AB, Germany, to Cmdr., Hq. ACC, Langley AFB, Va., replacing Gen. Joseph W. Ralston . . . **B/G James A. Jaeger**, from Asst. Dep. Dir., Ops., NSA, Fort Meade, Md., to Dir., Intel., J-2, Hq. USACOM, Norfolk, Va.

**Col. (B/G selectee) Lawrence D. Johnston**, from Cmdr., 8th FW, PACAF, Kunsan AB, South Korea, to Cmdr., 347th Wing, ACC, Moody AFB, Ga., replacing B/G (M/G selectee) Timothy A. Kinnan . . . **B/G Rodney P. Kelly**, from Dir., Plans, Hq. PACAF, Hickam AFB, Hawaii, to Dir., Plans, J-5, Hq. NORAD, Peterson AFB, Colo., replacing retiring B/G James I. Mathers . . . **B/G (M/G selectee) Timothy A. Kinnan**, from Cmdr., 347th Wing, ACC, Moody AFB, Ga., to Dep. Cmdr., 5th ATAF, NATO, Vicenza, Italy, replacing B/G (M/G selectee) David A. Sawyer . . . **B/G (M/G selectee) Ronald C. Marcotte**, from Cmdr., 509th BW, ACC, Whiteman AFB, Mo., to Dir., Strategic Target Plans, J-52, and Dep. Dir., Plans & Policy, J-5, Hq. USSTRATCOM, Offutt AFB, Neb., replacing B/G Thomas H. Neary.

**Col. (B/G selectee) John W. Meincke**, from Dir., Mission Systems, DCS/C<sup>4</sup>, Hq. USAF, Washington, D. C., to Cmdr., Western Hemisphere, DISA, Arlington, Va. . . . **B/G Thomas H. Neary**, from Dir., Strategic Target Plans, J-52, and Dep. Dir., Plans & Policy, J-5, Hq. USSTRATCOM, Offutt AFB, Neb., to Dir., Ops. and Log., J-3/J-4, Hq. USSTRATCOM, Offutt AFB, Neb., replacing L/G Phillip J. Ford . . . **Col. (B/G selectee) Victor E. Renuart, Jr.**, from Asst. Dir., Ops., Hq. USAFE, Ramstein AB, Germany, to Cmdr., 52d FW, USAFE, Spangdahlem AB, Germany, replacing B/G (M/G selectee) John R. Dallager . . . **Col. (B/G selectee) Ernest O. Robbins II**, from Dir., Civil Engineering, Hq. AFSPC, Peterson AFB, Colo., to ACC Civil Engineer, Hq. ACC, Langley AFB, Va., replacing retiring B/G John J. Allen.

**Lt. Gen. (Gen. selectee) Michael E. Ryan**, from Cmdr., Allied Air Forces Southern Europe, NATO, and Cmdr., 16th AF, USAFE, Naples, Italy, to Cmdr., AAFCE, NATO; Cmdr., Hq. USAFE; and AF Component Cmdr., USEUCOM, Ramstein AB, Germany, replacing Gen. Richard E. Hawley . . . **M/G David A. Sawyer**, from Dep. Cmdr., 5th ATAF, NATO, Vicenza, Italy, to Dir., Operational Plans & Interoperability, J-7, Jt. Staff, Washington, D. C. . . . **M/G (L/G selectee) Richard T. Swope**, from Cmdr., 13th AF, PACAF, and Cmdr., Southwest Pacific Air Defense Region, Andersen AFB, Guam, to IG, Hq. USAF, Washington, D. C., replacing retired L/G Marcus A. Anderson. ■

**Big Acquisition Savings Expected**

Air Force leaders predict that current acquisition reform measures could save the service more than \$13 billion—money that could be available for modernization and other requirements.

One of those measures is the proposed seven-year C-17 purchase, which might save \$900 million but that Congress has yet to approve. House and Senate defense appropriators apparently agree with a multi-year approach, but some think that the Air Force can get more than the projected \$900 million savings.

The Air Force also expects other big-ticket items to bring in savings. The Joint Direct Attack Munition program—a Defense Acquisition Pilot Program—could achieve a total production cost avoidance of nearly \$2.9 billion, according to DoD. JDAM program officials project a thirty-four percent reduction in development time and a unit cost savings of more than fifty percent. Air Force officials stated the cost had dropped from \$40,000 to about \$14,000 per unit.

Changes to USAF's existing Milstar communications satellite program should save the service more than \$236 million. Program officials cut contract data requirements and military standards and specifications and markedly reduced the number of inspections per satellite, from 19,243 to less than 100.

Even in its initial reform steps, USAF has "run up an impressive series of success stories," said Air Force Secretary Sheila E. Widnall. Arthur L. Money, assistant secretary of the Air Force for Acquisition, noted that for the Air Force to continue its reform push toward "faster, better, cheaper" systems, it must work closely with industry and effect a cultural change in the entire acquisition process.

**Intelligence Reforms Reviewed**

In the wake of the February resig-



nations of the two most senior National Reconnaissance Office chiefs [see "Top NRO Chiefs Resign," April 1996 "Aerospace World," p. 10], DoD is reviewing recommendations for reforming the intelligence community.

On March 4, Rep. Larry Combest (R-Tex.), chairman of the House Intelligence Committee, released his restructuring plan, which included eliminating the National Reconnaissance Office and developing a more corporate structure, with the Director of Central Intelligence as chief executive officer.

Representative Combest said he does not think the President's Commission on the Roles and Capabilities of the US Intelligence Community was aggressive enough in its recommendations, released in February. He agreed with the commission's assumptions about existing problems but disagreed with the recommendation to make the intelligence budget public.

The commission, headed by former Defense Secretary Harold Brown, rejected the notion of a single military intelligence czar, a central feature of Representative Combest's plan. Mr. Combest would create a single director of military intelligence to provide a stronger managerial center for military intelligence.

Mr. Combest's plan would also establish a Technology Development Office, which would be responsible for airborne and spaceborne intelligence collection systems but not for their operations. It would include portions of the NRO, the Defense Airborne Reconnaissance Office, and the CIA's directorate of science and technology.

Deputy Defense Secretary John P. White praised both reviews and noted that the Pentagon and the intelligence community have already instituted some changes, such as conducting joint reviews when building the Fiscal 1997 budget request.

### Reinventing the Commissary

Vice President Al Gore announced March 4 that the Defense Commissary Agency (DeCA) would be nominated for the Performance-Based Organization government-wide reinvention program. If Congress approves the proposal, part of the Fiscal 1997 defense budget request, DeCA would then be freed from some government red tape—essentially allowing it to operate more like a private-sector company.

The move to a performance-based operation would give DeCA more flexibility to achieve "greater efficiencies and appropriated-fund savings for the



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taxpayer while improving customer service and savings at the cash register," according to a DoD release.

Defense Secretary William J. Perry said the Pentagon is committed to preserving the commissary benefit but wants to streamline operations.

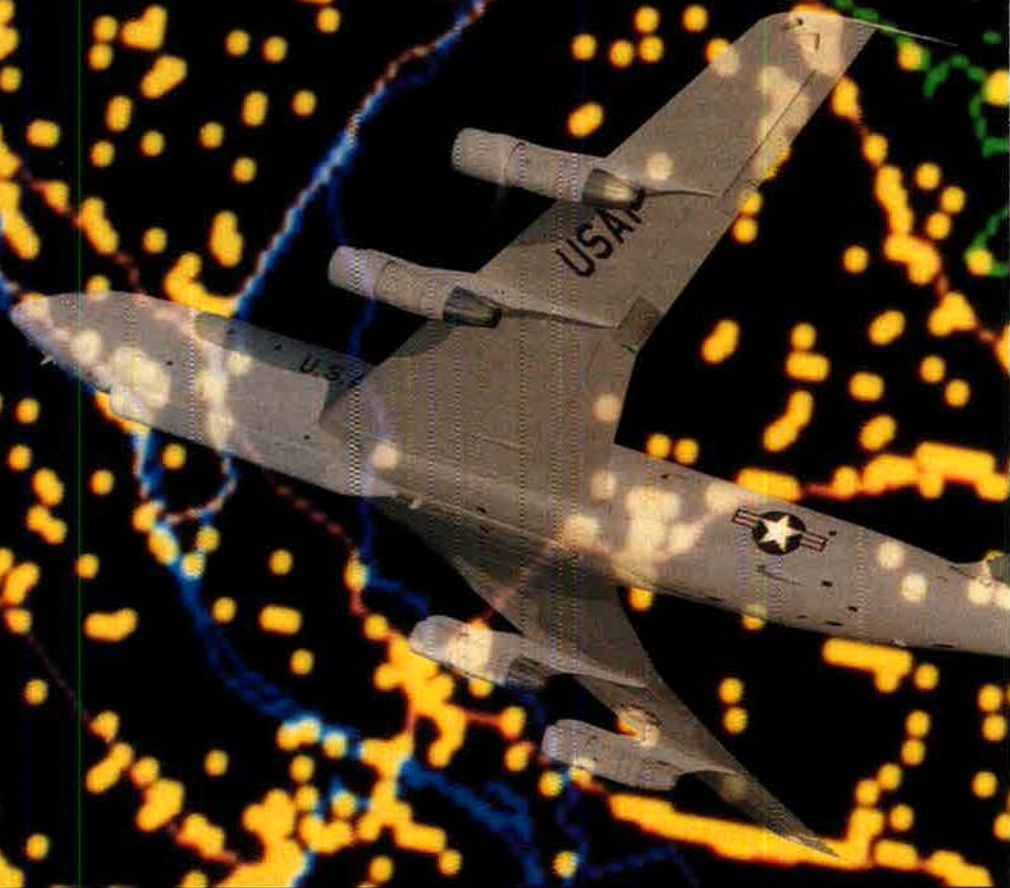
The military commissary and exchange systems have come under attack in recent years, with some critics calling for their demise. DoD leaders have repeatedly defended the

systems as necessary elements of the military benefits package.

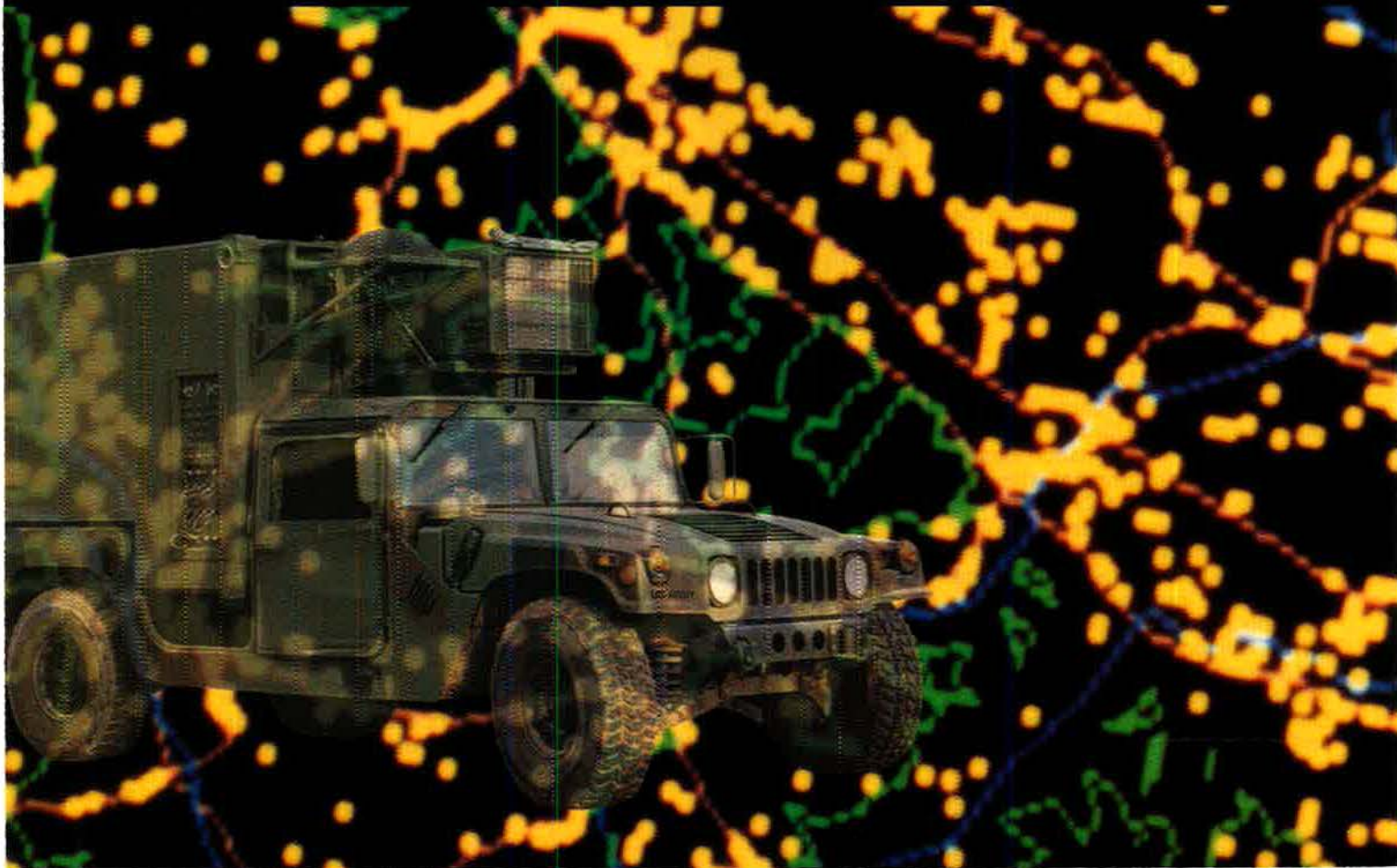
In recent Congressional testimony, the four service chiefs unilaterally suggested that the whole benefits system should be left alone to provide some stability for the troops. Gen. Ronald R. Fogleman, USAF Chief of Staff, commented that he did not know whether the proposed commissary change would work or save troops money but said it would



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## Aerospace World

“inflame the passions of the troops.” He added that they haven’t seen “very many things work to their advantage.”

### News Notes

■ Capt. Mark A. Todd, of Tulsa, Okla., was killed when an El Salvadoran O-2 aircraft crashed March 6 about twenty-five miles southwest of San Salvador. Two Salvadoran officers were also killed. Captain Todd, a member of the 6th Special Operations Squadron at Hurlburt Field, Fla., was an observer on the O-2, which was on a search-and-rescue training mission. The 1985 USAF Academy graduate and other 6th SOS members were deployed to El Salvador to enhance its air force capabilities.

■ USAF announced in March that about 360 master sergeants per year now will attend the Senior NCO Academy in residence, beginning with the October 1996 class. “The really good news,” according to CMSAF David J. Campanale, is the reinstatement of a correspondence course for those who cannot attend in residence. The new course, which will also be available in October, comes in the standard book form or on CD-ROM.

■ DoD’s managed-care health program, Tricare, has established free, twenty-four-hour phone service to help with health questions. Individuals should check with their Tricare service center for the phone number to reach a health advisor or listen to recorded health topics.

■ The Pentagon released its first Toxic-Release Inventory report in March. The report, which covers all 425 DoD installations in the US, identified 131 that released toxic chemicals into the environment in amounts above Environmental Protection Agency threshold levels. DoD officials stated that the new data will help the department achieve a goal of cutting toxic releases by fifty percent by 1999.

■ As the 939th Rescue Wing (AFRES), Portland IAP, Ore., evacuated its aircraft, spare parts, equipment, and vehicles to keep ahead of the flooding Columbia River in February, two of its helicopters and four crews continued to help rescue area civilians. Wing Commander Col. Paul Rick Davis called the unit’s evacuation “a Herculean effort.”

■ USAF officials announced February 15 that the twenty-eight HC-130N/P tanker aircraft assigned to Air Force Special Operations Command’s Combat Shadow program

have been redesignated MC-130P. The change aligns the tankers with AFSOC’s other aircraft, which all carry the M-series designation, specifying the special ops mission. The change does not affect HC-130s flown by other commands.

■ The Navy’s F/A-18 Government and Industry Team, including prime contractor McDonnell Douglas and component manufacturers Northrop Grumman and General Electric, was recognized March 7 by DoD for excellence and superior performance. Navy Secretary John H. Dalton said that the Super Hornet’s development and acquisition process is “a model for military procurement.”

■ USAF has named the Fiscal 1995 winners of the Secretary of the Air Force Awards for flying safety. AMC was named for the second time in a row as the best of the commands that fly two percent or more of total USAF flying hours. Air Force Materiel Command won among units that fly less than two percent. AFMC also won the Maj. Gen. Benjamin D. Foulois Memorial Award for having the most effective major command-level flight safety program.

■ Winners of the Fiscal 1995 Col. Will L. Tubbs Memorial Award for ground safety programs were Air Education and Training Command and the US Air Force Academy.

■ Two of USAF’s top African-American leaders won awards at the tenth annual Black Engineer of the Year Conference on February 24. Lt. Gen. Albert J. Edmonds, director of the Defense Information Systems Agency and manager of the National Communications System, was named the Black Engineer of the Year. Assistant Secretary of the Air Force for Manpower, Reserve Affairs, Installations, and Environment Rodney A. Coleman received the Black Engineer of the Year Dean’s Award.

■ The 12th Civil Engineering Squadron, Randolph AFB, Tex., and the 437th CES, Charleston AFB, S. C., won USAF’s 1995 Civil Engineering Outstanding Unit Awards for large and small units, respectively.

■ The National Society of Professional Engineers named Col. Gary P. Baumgartel, Hq. AMC, Scott AFB, Ill., as Air Force Military Engineer of 1995 and John K. Lominac, Hq. Arnold Engineering Development Center, Arnold AFB, Tenn., as the Air Force Civilian Engineer of the Year.

■ US Air Forces in Europe personnel and units captured eight of the twenty-four individual USAF civil en-





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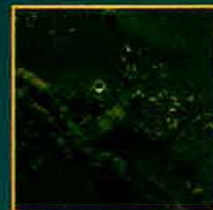
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gineering awards for 1995. AFMC won four; AETC and AMC each claimed three; ACC and AFSPC won two each; PACAF and the Air Force Civil Engineer Support Agency each received one.

■ AETC's 97th Air Mobility Wing, Altus AFB, Okla., won the 1995 Secretary of the Air Force Unit Quality Award. The award's twenty-six judges unanimously selected the wing, citing several of its programs as "best practices."

■ Another AETC base, Lackland AFB, Tex., received the 1996 Commander in Chief's Installation Excellence Award for the Air Force. USAF will provide \$500,000 to the base for quality-of-life improvements. The two other Air Force competitors, Barksdale AFB, La., and Incirlik AB, Turkey, each will receive \$250,000.

■ SrA. Shilette Addison, 488th Intelligence Squadron, RAF Mildenhall, UK, was named the Air Force's top Airman Information Manager for 1995.

■ The last active-duty unit to fly the F-4G "Wild Weasel," the 561st Fighter Squadron at Nellis AFB, Nev., was deactivated March 26. The unit's aircraft were sent to the Aerospace Maintenance and Regeneration Center at Davis-Monthan AFB, Ariz., where most will be converted to drone status for use as aerial targets.

■ Defense Secretary Perry named Margaret R. Munson to be the new director of the Defense Investigative Service. She was the acting director

### David Packard, 1913-1996

David Packard, co-founder of Hewlett Packard Corp., former deputy secretary of defense, and procurement reform leader, died of pneumonia on March 26 at Stanford University Hospital in Palo Alto, Calif. He was eighty-three.

With William R. Hewlett, Mr. Packard in 1938 launched the Silicon Valley electronics giant out of a one-car garage in Palo Alto. The company became the Valley's largest employer and an international manufacturer of computer and electronic systems, with a large volume of defense-related business.

Mr. Packard left the company in 1969 to become deputy secretary of Defense under Melvin R. Laird, President Richard M. Nixon's Defense Secretary. During two years at the Pentagon, Mr. Packard pushed for reform of military procurement and management practices. He also successfully pressed for continued development of the B-1 bomber, despite resistance from other Administration officials.

Secretary of Defense William J. Perry said that the Laird-Packard combination was one of the strongest teams ever to run the Defense Department. "Their leadership is still a model for enlightened civilian management of the military," he added.

Mr. Packard returned to Hewlett-Packard in 1971. He retired from active management in 1978 but remained chairman of the board until 1993. In the mid-1980s, Mr. Packard chaired what became known as the Packard Commission, which recommended the application of standard business practices to defense procurement activities in order to revolutionize the system. According to Secretary Perry, those recommendations are still being implemented today.

for Counterintelligence and Security Programs, in the office of the assistant secretary of Defense for Command, Control, Communications, and Intelligence.

**Obituaries**

**Broadus N. Butler**, Ph.D., a Tuskegee Airman with the 332d Fighter Group during World War II, died January 9, 1996, at age seventy-five. After the war, he served in higher-

education, government, and civic positions. He gave numerous speeches and lectures and published several articles, primarily on African-American scholarly interests.

**Adolf Galland**, one of the top German fighter aces in World War II, died February 9, 1996, at age eighty-three. He shot down 104 Allied planes but as a lieutenant general was captured in May 1945 and remained a prisoner until 1947. ■

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# The Air Force in Facts and Figures

Edited by **Tamar A. Mehuron**, Associate Editor

## 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*. We especially acknowledge the help of the Secretary of the Air Force Of-

fice of Public Affairs in its role as liaison with Air Staff agencies in bringing up to date the comparable data from last year’s Almanac.

A word of caution: Personnel figures that appear in this section in different forms will not agree (nor will they always agree with figures in command, field operating agency, and

direct reporting unit reports or in the “Guide to USAF Installations Worldwide”) because of different cutoff dates, rounding, differing methods of reporting, or categories of personnel that are excluded in some cases. These figures do illustrate trends, however, and may be helpful in placing force fluctuations in perspective.

—THE EDITORS

### The Nation’s Air Arm and Its Early Leaders

#### Designation

**Aeronautical Division, US Signal Corps**  
Aug. 1, 1907 – July 18, 1914

**Aviation Section, US Signal Corps**  
July 18, 1914 – May 20, 1918

**Division of Military Aeronautics**  
May 20, 1918 – May 24, 1918

**Air Service**  
May 24, 1918 – July 2, 1926

**Air Corps**  
July 2, 1926 – Sept. 18, 1947<sup>a</sup>

**Army Air Forces**  
June 20, 1941 – Sept. 18, 1947

**United States Air Force**  
Sept. 18, 1947

#### Commander (at highest rank)

**Chief, Aeronautical Division**  
Capt. Charles deForest Chandler  
Capt. Arthur S. Cowan

**Chief, Aviation Section**  
Lt. Col. Samuel Reber  
Lt. Col. George O. Squier  
Lt. Col. John B. Bennet

**Director of Military Aeronautics**  
Maj. Gen. William L. Kenly  
(Kept same title three months into absorption by Air Service)

**Director of Air Service**  
John D. Ryan  
Maj. Gen. Charles T. Menoher

**Chief of Air Service**  
Maj. Gen. Charles T. Menoher  
Maj. Gen. Mason M. Patrick

**Chief of Air Corps**  
Maj. Gen. Mason M. Patrick  
Maj. Gen. James E. Fechet  
Maj. Gen. Benjamin D. Foulois  
Maj. Gen. Oscar Westover  
Maj. Gen. Henry H. Arnold

**Chief, Army Air Forces**  
Lt. Gen. Henry H. Arnold

**Commanding General, AAF**  
Gen. of the Army Henry H. Arnold  
Gen. Carl A. Spaatz

**Chief of Staff, USAF**  
Gen. Carl A. Spaatz

#### Dates of Service

Aug. 1, 1907 – 1911  
1911 – unknown

July 18, 1914 – May 5, 1916  
May 20, 1916 – Feb. 19, 1917  
Feb. 19, 1917 – May 20, 1918

May 20, 1918 – Aug. 1918

Aug. 28, 1918 – Nov. 27, 1918  
Jan. 2, 1919 – June 4, 1920

June 4, 1920 – Oct. 4, 1921  
Oct. 5, 1921 – July 2, 1926

July 2, 1926 – Dec. 13, 1927  
Dec. 14, 1927 – Dec. 19, 1931  
Dec. 20, 1931 – Dec. 21, 1935  
Dec. 22, 1935 – Sept. 21, 1938  
Sept. 29, 1938 – June 20, 1941

June 20, 1941 – Mar. 9, 1942

Mar. 9, 1942 – Feb. 9, 1946  
Feb. 9, 1946 – Sept. 26, 1947

Sept. 26, 1947 – Apr. 29, 1948

For USAF leaders since 1948, see “USAF Leaders Through the Years.” 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 September 28, 1947.

<sup>a</sup>The Air Corps became a subordinate element of the Army Air Forces June 20, 1941. Since the Air Corps had been established by statute in 1926, its disestablishment required an act of Congress, which did not take place until 1947. Between March 9, 1942, and September 18, 1947, the Air Corps continued to exist as a combatant arm of the Army, and personnel of the Army Air Forces were still assigned to the Air Corps.



## 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 the typical organization chain.

The **Department of Defense (DoD)** is a Cabinet agency headed by the Secretary of Defense. It was created in 1947 to consolidate preexisting 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 units of the Air Force are assigned to one of the **major commands** (see p. 76). Major commands are headed by general officers and have broad functional or geographic responsibility. Commands may be divided into **numbered air forces**.

The fundamental unit of the working Air Force is the **wing**. The typical air force

base is built around a wing. Until recently, most wings were headed by colonels but now are usually under the command of a general officer. An objective wing typically contains an **operations group**, which includes aircrews, intelligence units, and others; a **logistics group**, which can include maintenance and supply squadrons; and a **support group**, which can include such functions as security police and civil engineers.

Most individual officers and airmen are assigned to a **squadron**, which may be composed of several flights.

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

### Air Force Personnel Strength

| Year | Strength | Year | Strength  | Year | Strength             |
|------|----------|------|-----------|------|----------------------|
| 1907 | 3        | 1937 | 19,147    | 1967 | 897,426              |
| 1908 | 13       | 1938 | 21,089    | 1968 | 904,759              |
| 1909 | 27       | 1939 | 23,455    | 1969 | 862,062              |
| 1910 | 11       | 1940 | 51,165    | 1970 | 791,078              |
| 1911 | 23       | 1941 | 152,125   | 1971 | 755,107              |
| 1912 | 51       | 1942 | 764,415   | 1972 | 725,635              |
| 1913 | 114      | 1943 | 2,197,114 | 1973 | 690,999              |
| 1914 | 122      | 1944 | 2,372,292 | 1974 | 643,795              |
| 1915 | 208      | 1945 | 2,282,259 | 1975 | 612,551              |
| 1916 | 311      | 1946 | 455,515   | 1976 | 585,207              |
| 1917 | 1,218    | 1947 | 305,827   | 1977 | 570,479              |
| 1918 | 195,023  | 1948 | 387,730   | 1978 | 569,491              |
| 1919 | 25,603   | 1949 | 419,347   | 1979 | 559,450              |
| 1920 | 9,050    | 1950 | 411,277   | 1980 | 557,969              |
| 1921 | 11,649   | 1951 | 788,381   | 1981 | 570,302              |
| 1922 | 9,642    | 1952 | 973,474   | 1982 | 582,845              |
| 1923 | 9,441    | 1953 | 977,593   | 1983 | 592,044              |
| 1924 | 10,547   | 1954 | 947,918   | 1984 | 597,125              |
| 1925 | 9,670    | 1955 | 959,946   | 1985 | 601,515              |
| 1926 | 9,674    | 1956 | 909,958   | 1986 | 608,199              |
| 1927 | 10,078   | 1957 | 919,835   | 1987 | 607,035              |
| 1928 | 10,549   | 1958 | 871,156   | 1988 | 576,446              |
| 1929 | 12,131   | 1959 | 840,028   | 1989 | 570,880              |
| 1930 | 13,531   | 1960 | 814,213   | 1990 | 535,233              |
| 1931 | 14,780   | 1961 | 820,490   | 1991 | 510,432              |
| 1932 | 15,028   | 1962 | 883,330   | 1992 | 470,315              |
| 1933 | 15,099   | 1963 | 868,644   | 1993 | 444,351              |
| 1934 | 15,861   | 1964 | 855,802   | 1994 | 426,327              |
| 1935 | 16,247   | 1965 | 823,633   | 1995 | 400,409              |
| 1936 | 17,233   | 1966 | 886,350   | 1996 | 388,200 <sup>a</sup> |

<sup>a</sup>Programmed

### USAF Educational Levels

(As of September 30, 1995)

| Enlisted                  |                |               |
|---------------------------|----------------|---------------|
| Level                     | Number         | Percent       |
| Below high school         | 32             | 0.01          |
| High school               | 64,515         | 20.29         |
| Some college              |                |               |
| ( < 2 years)              | 155,669        | 48.96         |
| AA/AS degree              | 39,362         | 12.38         |
| 2-3 years college         | 43,802         | 13.78         |
| Baccalaureate degree      | 12,827         | 4.03          |
| Master's degree or higher | 1,731          | 0.54          |
| <b>Total</b>              | <b>317,938</b> | <b>100.00</b> |

| Line Officers                     |               |               |
|-----------------------------------|---------------|---------------|
| Level                             | Number        | Percent       |
| Below                             |               |               |
| baccalaureate/unknown             | 137           | 0.22          |
| Baccalaureate degree              | 30,423        | 48.85         |
| Master's degree                   | 30,824        | 49.50         |
| Doctoral and professional degrees | 891           | 1.43          |
| <b>Total</b>                      | <b>62,275</b> | <b>100.00</b> |

Numbers are rounded and may not sum to totals.

### ICBMs and Spacecraft in Service

| Type of system                  | FY '89       | FY '90       | FY '91       | FY '92     | FY '93     | FY '94     | FY '95     |
|---------------------------------|--------------|--------------|--------------|------------|------------|------------|------------|
| Minuteman II ICBM               | 450          | 450          | 450          | 375        | 0          | 0          | 0          |
| Minuteman III ICBM              | 500          | 500          | 500          | 500        | 500        | 500        | 530        |
| Peacekeeper ICBM                | 50           | 50           | 50           | 50         | 50         | 50         | 50         |
| <b>Total ICBMs</b>              | <b>1,000</b> | <b>1,000</b> | <b>1,000</b> | <b>925</b> | <b>550</b> | <b>550</b> | <b>580</b> |
| DMSP satellite                  | 2            | 2            | 2            | 2          | 2          | 2          | 3          |
| DSCS satellite                  | 5            | 5            | 5            | 5          | 5          | 5          | 5          |
| DSP satellite (data classified) | —            | —            | —            | —          | —          | —          | —          |
| GPS satellite                   | 9            | 14           | 16           | 19         | 24         | 24         | 25         |
| Milstar                         | —            | —            | —            | —          | —          | 1          | 2          |
| <b>Total satellites</b>         | <b>16</b>    | <b>21</b>    | <b>23</b>    | <b>26</b>  | <b>31</b>  | <b>32</b>  | <b>35</b>  |

DMSP: Defense Meteorological Satellite Program    DSCS: Defense Satellite Communications System    DSP: Defense Support Program    GPS: Global Positioning System  
Satellite data show the number of satellites that are mission capable.



## Active-Duty Force Demographics

(As of September 30, 1995)

| Grade                                  | Total          | Blacks        | Women         | Other Minorities |
|--|----------------|---------------|---------------|------------------|
| <b>Officers</b>                        |                |               |               |                  |
| General                                | 274            | 8             | 6             | 3                |
| Colonel                                | 4,158          | 91            | 204           | 89               |
| Lieutenant Colonel                     | 10,659         | 603           | 1,062         | 198              |
| Major                                  | 15,516         | 1,112         | 2,333         | 371              |
| Captain                                | 32,817         | 1,784         | 5,414         | 1,267            |
| First Lieutenant                       | 7,551          | 456           | 1,516         | 447              |
| Second Lieutenant                      | 7,469          | 394           | 1,533         | 554              |
| <b>Total</b>                           | <b>78,444</b>  | <b>4,448</b>  | <b>12,068</b> | <b>2,929</b>     |
| <b>Enlisted</b>                        |                |               |               |                  |
| Chief Master Sergeant of the Air Force | 1              |               |               |                  |
| Chief Master Sergeant                  | 3,174          | 519           | 192           | 59               |
| Senior Master Sergeant                 | 6,307          | 1,169         | 582           | 173              |
| Master Sergeant                        | 32,997         | 6,501         | 3,510         | 1,227            |
| Technical Sergeant                     | 40,994         | 7,966         | 4,890         | 1,711            |
| Staff Sergeant                         | 77,002         | 15,131        | 10,087        | 4,038            |
| Sergeant/Senior Airman                 | 84,223         | 12,281        | 15,993        | 4,014            |
| Airman First Class                     | 43,461         | 5,971         | 9,628         | 2,685            |
| Airman                                 | 18,603         | 2,729         | 4,090         | 1,397            |
| Airman Basic                           | 11,176         | 1,719         | 2,506         | 922              |
| <b>Total</b>                           | <b>317,938</b> | <b>53,986</b> | <b>51,478</b> | <b>16,226</b>    |
| <b>Total personnel</b>                 | <b>396,382</b> | <b>58,434</b> | <b>63,546</b> | <b>19,155</b>    |

Average ages of military personnel ..... Officers 35, Enlisted 28

## Active-Duty Force by Grade

(As of September 30, 1995)

| Grade                                  | Number         |
|--|----------------|
| <b>Officers</b>                        |                |
| General                                | 10             |
| Lieutenant General                     | 34             |
| Major General                          | 90             |
| Brigadier General                      | 140            |
| Colonel                                | 4,158          |
| Lieutenant Colonel                     | 10,659         |
| Major                                  | 15,516         |
| Captain                                | 32,817         |
| First Lieutenant                       | 7,551          |
| Second Lieutenant                      | 7,469          |
| <b>Total</b>                           | <b>78,444</b>  |
| <b>Enlisted</b>                        |                |
| Chief Master Sergeant of the Air Force | 1              |
| Chief Master Sergeant                  | 3,174          |
| Senior Master Sergeant                 | 6,307          |
| Master Sergeant                        | 32,997         |
| Technical Sergeant                     | 40,994         |
| Staff Sergeant                         | 77,002         |
| Sergeant/Senior Airman                 | 84,223         |
| Airman First Class                     | 43,461         |
| Airman                                 | 18,603         |
| Airman Basic                           | 11,176         |
| <b>Total</b>                           | <b>317,938</b> |
| <b>Total strength</b>                  | <b>396,382</b> |

## Armed Forces Manpower Trends

(End strength figures in thousands)

|                                   | FY '90       | FY '91       | FY '92       | FY '93       | FY '94       | FY '95       | FY '96 <sup>a</sup> | FY '97 <sup>a</sup> |
|-----------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------------|---------------------|
| <b>Active-duty military</b>       |              |              |              |              |              |              |                     |                     |
| Air Force                         | 535          | 510          | 470          | 444          | 426          | 400          | 388                 | 381                 |
| Army                              | 751          | 725          | 611          | 572          | 541          | 509          | 495                 | 495                 |
| Marine Corps                      | 197          | 195          | 185          | 178          | 174          | 175          | 174                 | 174                 |
| Navy                              | 582          | 571          | 542          | 510          | 469          | 435          | 425                 | 407                 |
| <b>Total</b>                      | <b>2,065</b> | <b>2,001</b> | <b>1,808</b> | <b>1,705</b> | <b>1,611</b> | <b>1,519</b> | <b>1,482</b>        | <b>1,457</b>        |
| <b>Selected Guard and Reserve</b> |              |              |              |              |              |              |                     |                     |
| Air Force Reserve                 | 81           | 84           | 82           | 81           | 80           | 78           | 74                  | 73                  |
| Air National Guard                | 117          | 118          | 119          | 117          | 114          | 110          | 113                 | 108                 |
| Army National Guard               | 437          | 441          | 426          | 410          | 397          | 375          | 373                 | 367                 |
| Army Reserve                      | 299          | 300          | 303          | 276          | 260          | 241          | 230                 | 215                 |
| Marine Corps Reserve              | 45           | 44           | 42           | 42           | 41           | 41           | 42                  | 42                  |
| Naval Reserve                     | 149          | 150          | 142          | 132          | 108          | 101          | 99                  | 96                  |
| <b>Total</b>                      | <b>1,128</b> | <b>1,137</b> | <b>1,114</b> | <b>1,058</b> | <b>998</b>   | <b>946</b>   | <b>931</b>          | <b>901</b>          |
| <b>Direct-hire civilian</b>       |              |              |              |              |              |              |                     |                     |
| Air Force <sup>b</sup>            | 238          | 222          | 206          | 193          | 189          | 180          | 177                 | 171                 |
| Army <sup>b</sup>                 | 327          | 317          | 334          | 294          | 280          | 238          | 257                 | 249                 |
| Navy/Marine Corps                 | 331          | 319          | 309          | 285          | 269          | 245          | 241                 | 231                 |
| Defense agencies                  | 101          | 116          | 149          | 156          | 156          | 141          | 147                 | 141                 |
| <b>Total<sup>b</sup></b>          | <b>997</b>   | <b>974</b>   | <b>998</b>   | <b>928</b>   | <b>894</b>   | <b>804</b>   | <b>822</b>          | <b>792</b>          |

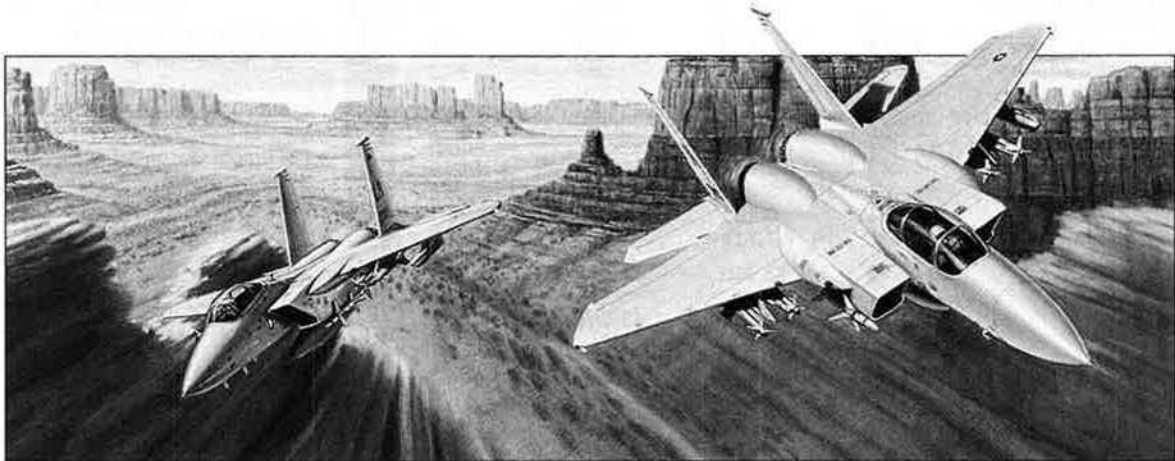
Numbers are rounded and may not sum to totals.

<sup>a</sup>Programmed manpower as of FY 1997 Clinton Administration DoD budget

<sup>b</sup>Includes Army and Air National Guard technicians, who were converted from state to federal employees in FY 1969



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## USAF Personnel Strength by Commands, FOAs, and DRUs

(DoD figures as of September 30, 1995)

|   | Military       | Civilian            | Total               |
|---|----------------|---------------------|---------------------|
| <b>Major commands</b>   |                |                     |                     |
| Air Combat Command (ACC)  | 106,993        | 13,419              | 120,412             |
| Air Education and Training Command (AETC)                       | 64,165         | 14,237              | 78,402              |
| Air Force Materiel Command (AFMC)                               | 35,938         | 75,414              | 111,352             |
| Air Force Space Command (AFSPC)                                 | 23,224         | 4,970               | 28,194              |
| Air Force Special Operations Command (AFSOC)                    | 9,243          | 516                 | 9,759               |
| Air Mobility Command (AMC)                                      | 53,114         | 9,293               | 62,407              |
| Pacific Air Forces (PACAF)                                      | 34,210         | 8,340               | 42,550              |
| United States Air Forces in Europe (USAFE)                      | 27,608         | 5,451               | 33,059              |
| <b>Total major commands</b>                                     | <b>354,495</b> | <b>131,640</b>      | <b>486,135</b>      |
| <b>Field operating agencies (FOAs)</b>                          |                |                     |                     |
| Air Force Audit Agency  | 4              | 896                 | 900                 |
| Air Force Base Conversion Agency                                | 1              | 335                 | 336                 |
| Air Force Center for Environmental Excellence                   | 56             | 373                 | 429                 |
| Air Force Civil Engineer Support Agency                         | 121            | 139                 | 260                 |
| Air Force Civilian Personnel Management Center <sup>a</sup>     | 1              | 1,108               | 1,109               |
| Air Force Command, Control, Communications, and Computer Agency | 294            | 300                 | 594                 |
| Air Force Cost Analysis Agency                                  | 37             | 78                  | 115                 |
| Air Force Doctrine Center                                       | 16             | 4                   | 20                  |
| Air Force Flight Standards Agency                               | 138            | 22                  | 160                 |
| Air Force Frequency Management Agency                           | 11             | 18                  | 29                  |
| Air Force Historical Research Agency                            | 10             | 52                  | 62                  |
| Air Force History Support Office                                | 4              | 29                  | 33                  |
| Air Force Inspection Agency                                     | 140            | 25                  | 165                 |
| Air Force Legal Services Agency                                 | 394            | 128                 | 522                 |
| Air Force Logistics Management Agency                           | 66             | 19                  | 85                  |
| Air Force Management Engineering Agency                         | 86             | 62                  | 148                 |
| Air Force Medical Operations Agency                             | 41             | 258                 | 299                 |
| Air Force Medical Support Agency                                | 52             | 45                  | 97                  |
| Air Force Military Personnel Center <sup>a</sup>                | 961            | 460                 | 1,421               |
| Air Force News Agency   | 356            | 129                 | 485                 |
| Air Force Office of Special Investigations                      | 1,503          | 441                 | 1,944               |
| Air Force Operations Group                                      | 223            | 13                  | 236                 |
| Air Force Pentagon Communications Agency                        | 647            | 289                 | 936                 |
| Air Force Personnel Operations Agency                           | 35             | 28                  | 63                  |
| Air Force Program Executive Office                              | 38             | 14                  | 52                  |
| Air Force Real Estate Agency                                    | 0              | 13                  | 13                  |
| Air Force Reserve   | 340            | 14,884 <sup>b</sup> | 15,224 <sup>b</sup> |
| Air Force Review Boards Agency                                  | 10             | 34                  | 44                  |
| Air Force Safety Agency <sup>c</sup>                            | 73             | 63                  | 136                 |
| Air Force Security Police Agency                                | 143            | 16                  | 159                 |
| Air Force Services Agency                                       | 66             | 204                 | 270                 |
| Air Force Studies and Analyses Agency                           | 62             | 22                  | 84                  |
| Air Force Technical Applications Center                         | 1,044          | 0                   | 1,044               |
| Air Intelligence Agency   | 11,168         | 2,074               | 13,242              |
| Air National Guard Readiness Center                             | 35             | 496                 | 531                 |
| Air Reserve Personnel Center                                    | 120            | 492                 | 612                 |
| Air Weather Service   | 811            | 227                 | 1,038               |
| Joint Services Survival, Evasion, Resistance, and Escape Agency | 32             | 52                  | 84                  |
| <b>Total FOAs</b>   | <b>19,139</b>  | <b>23,842</b>       | <b>42,981</b>       |
| <b>Direct reporting units (DRUs)</b>                            |                |                     |                     |
| Air Force Operational Test and Evaluation Center                | 607            | 199                 | 806                 |
| United States Air Force Academy (excluding 4,007 cadets)        | 2,566          | 1,809               | 4,375               |
| 11th Wing   | 1,526          | 1,026               | 2,552               |
| <b>Total DRUs</b>   | <b>4,699</b>   | <b>3,034</b>        | <b>7,733</b>        |
| <b>Total major commands, FOAs, DRUs</b>                         | <b>378,333</b> | <b>158,516</b>      | <b>536,849</b>      |

<sup>a</sup>Air Force Civilian Personnel Management Center and Air Force Military Personnel Center merged in October 1995 to form the Air Force Personnel Center

<sup>b</sup>Includes Air Reserve technicians

<sup>c</sup>Now Air Force Safety Center



## Air Force Installations

|                                       | FY '92 | FY '93 | FY '94 | FY '95 | FY '96 | FY '97 |
|---------------------------------------|--------|--------|--------|--------|--------|--------|
| <b>Major installations</b>            |        |        |        |        |        |        |
| US and possessions <sup>a</sup> ..... | 101    | 99     | 85     | 79     | 77     | 75     |
| Foreign .....                         | 23     | 22     | 17     | 15     | 13     | 13     |
| Worldwide .....                       | 124    | 121    | 102    | 94     | 90     | 88     |
| <b>Minor installations</b>            |        |        |        |        |        |        |
| US and possessions <sup>a</sup> ..... | 105    | 105    | 110    | 113    | 84     | 85     |
| Foreign .....                         | 17     | 14     | 12     | 7      | 4      | 4      |
| Worldwide .....                       | 122    | 119    | 122    | 120    | 88     | 89     |

<sup>a</sup>Includes Air Force Reserve and Air National Guard

### Specialties in the Enlisted Force

(As of September 30, 1995)

| Code | Career Field                            | Assigned |
|------|---|----------|
| 1A   | Aircrew Operations                      | 6,755    |
| 1C   | Command Control Systems Operations      | 12,157   |
| 1N   | Intelligence                            | 10,585   |
| 1S   | Safety                                  | 357      |
| 1T   | Aircrew Protection                      | 2,688    |
| 1W   | Weather                                 | 2,767    |
| 2A   | Manned Aerospace Maintenance            | 69,031   |
| 2B   | Marine                                  | 28       |
| 2E   | Communications-Electronics Systems      | 19,044   |
| 2F   | Fuels                                   | 4,086    |
| 2G   | Logistics Plans                         | 686      |
| 2M   | Missile & Space Systems Maintenance     | 2,881    |
| 2P   | Precision Measurement                   | 1,624    |
| 2R   | Maintenance Management Systems          | 1,987    |
| 2S   | Supply                                  | 14,996   |
| 2T   | Transportation & Vehicle Maintenance    | 14,044   |
| 2W   | Munitions & Weapons                     | 16,080   |
| 3A   | Information Management                  | 13,146   |
| 3C   | Communications-Computer Systems         | 16,116   |
| 3E   | Civil Engineering                       | 19,593   |
| 3H   | Historian                               | 104      |
| 3M   | Morale, Welfare, Recreation, & Services | 5,568    |
| 3N   | Public Affairs                          | 1,531    |
| 3P   | Security Police                         | 24,385   |
| 3R   | Printing Management                     | 292      |
| 3S   | Mission Support                         | 10,041   |
| 3U   | Manpower                                | 510      |
| 3V   | Visual Information                      | 1,756    |
| 4X   | Medical                                 | 24,388   |
| 4Y   | Dental                                  | 3,098    |
| 5J   | Paralegal                               | 922      |
| 5R   | Chapel Service Support                  | 488      |
| 6C   | Contracting                             | 1,249    |
| 6F   | Financial                               | 3,891    |
| 7S   | Special Investigation                   | 780      |
| 8    | Special Duty Identifiers                | 6,061    |
| 9    | Reporting Identifiers                   | 4,213    |

### Specialties in the Officer Force

(As of September 30, 1995)

| Code | Utilization Field Title                 | Assigned |
|------|---|----------|
| X0   | Commander & Director                    | 1,075    |
| 11   | Pilot                                   | 14,773   |
| 12   | Navigator                               | 5,236    |
| 13   | Space, Missile, Command & Control       | 6,976    |
| 14   | Intelligence                            | 2,906    |
| 15   | Weather                                 | 884      |
| 16   | Operations Support                      | 707      |
| 21   | Aircraft Maintenance & Munitions        | 2,576    |
| 22   | Space & Missile Maintenance             | 248      |
| 23   | Supply                                  | 758      |
| 24   | Transportation                          | 754      |
| 25   | Logistics Plans & Programs              | 715      |
| 31   | Security Police                         | 877      |
| 32   | Civil Engineering                       | 1,865    |
| 33   | Communications-Computer Systems         | 4,686    |
| 34   | Morale, Welfare, Recreation, & Services | 389      |
| 35   | Public Affairs                          | 399      |
| 36   | Personnel                               | 1,408    |
| 37   | Information Management                  | 1,722    |
| 38   | Manpower                                | 317      |
| 4X   | Medical                                 | 13,952   |
| 51   | Law                                     | 1,278    |
| 52   | Chaplain                                | 651      |
| 61   | Scientific/Research                     | 1,252    |
| 62   | Developmental Engineering               | 4,392    |
| 63   | Acquisition                             | 2,575    |
| 64   | Contracting                             | 1,063    |
| 65   | Financial                               | 1,110    |
| 71   | Special Investigations                  | 394      |
| 8X   | Special Duty Identifiers                | 1,944    |
| 9X   | Reporting Identifiers                   | 549      |





## People who know countermeasures count on Sanders.

We're on board the best aircraft in the world because we offer the best protection.

Combat proven in every military branch and with allies around the world, our countermeasures systems lead the industry in innovation and effectiveness. That's why people who know countermeasures systems choose Sanders.

Today, we're guiding electronic warfare into a new age with the electronic combat suite for the F-22, as well as in our solutions to the Advanced Threat Infrared Countermeasures/Common Missile Warning (ATIRCM/CMW) systems and Integrated Defensive Electronic Countermeasures (IDECM) requirements.

Backed by 40 years of experience, Sanders delivers innovative, affordable and effective countermeasures, including missile warning systems, expendables and ESM. That's how we became the industry's preferred supplier; that's how we intend to stay that way.

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A Lockheed Martin Company





## Budget Terms Explained

Funding levels can be expressed in several ways. **Budget authority** is the value of new obligations that the 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.

## Defense Department Budget Top Line and Service Shares

(\$ billions)

|  | FY '96 | FY '97 | FY '98 | FY '99 | FY '00 | FY '01 | FY '02 |
|--|--------|--------|--------|--------|--------|--------|--------|
| <b>Budget authority</b><br>(current \$)          | 251.8  | 242.6  | 248.1  | 254.3  | 261.7  | 269.6  | 276.6  |
| <b>Budget authority</b><br>(constant FY 1997 \$) | 258.2  | 242.6  | 242.1  | 242.2  | 243.4  | 244.9  | 245.3  |
| <b>Outlays</b><br>(current \$)                   | 254.3  | 247.5  | 243.9  | 246.5  | 253.9  | 256.6  | 264.9  |
| <b>Outlays</b><br>(constant FY 1997 \$)          | 260.7  | 247.5  | 238.0  | 234.7  | 236.1  | 232.9  | 234.9  |

|   | FY '93       | FY '94       | FY '95       | FY '96       | FY '97       |
|---|--------------|--------------|--------------|--------------|--------------|
| <b>Service Shares</b> (budget authority, current \$ billions) |              |              |              |              |              |
| Air Force   | 78.5         | 74.6         | 74.4         | 73.9         | 72.0         |
| Army  | 63.6         | 62.5         | 62.7         | 61.7         | 59.8         |
| Navy  | 82.6         | 78.1         | 78.2         | 75.8         | 74.0         |
| Defense agencies, DoD-wide                                    | 34.2         | 36.3         | 37.3         | 40.4         | 36.9         |
| <b>Total</b>  | <b>258.9</b> | <b>251.4</b> | <b>252.6</b> | <b>251.8</b> | <b>242.6</b> |
| <b>Percentages</b> (budget authority)                         |              |              |              |              |              |
| Air Force   | 30.3         | 29.6         | 29.5         | 29.3         | 29.7         |
| Army  | 24.6         | 24.9         | 24.8         | 24.5         | 24.6         |
| Navy  | 31.9         | 31.1         | 30.9         | 30.1         | 30.5         |
| Defense agencies, DoD-wide                                    | 13.2         | 14.4         | 14.8         | 16.0         | 15.2         |

Fiscal 1997 figures are those contained in the Clinton Administration's budget request. Numbers have been rounded.

## Air Force Budget—A Ten-Year Perspective

(Budget authority in \$ millions)

|                                | FY '87         | FY '88         | FY '89         | FY '90         | FY '91         | FY '92        | FY '93        | FY '94        | FY '95        | FY '96        |
|--------------------------------|----------------|----------------|----------------|----------------|----------------|---------------|---------------|---------------|---------------|---------------|
| <b>Current dollars</b>         |                |                |                |                |                |               |               |               |               |               |
| Military personnel             | \$21,054       | \$21,613       | \$21,851       | \$21,777       | \$22,755       | \$21,381      | \$20,141      | \$18,168      | \$19,602      | \$19,279      |
| Operations and maintenance     | 21,682         | 23,040         | 24,973         | 25,160         | 29,061         | 22,816        | 22,179        | 24,525        | 24,561        | 22,990        |
| Procurement                    | 31,959         | 26,701         | 30,981         | 30,276         | 24,041         | 23,249        | 21,803        | 17,716        | 16,529        | 15,578        |
| RDT&E                          | 14,903         | 14,617         | 14,696         | 13,507         | 12,207         | 12,867        | 12,979        | 12,021        | 11,787        | 12,425        |
| Military construction          | 1,426          | 1,414          | 1,445          | 1,453          | 1,117          | 1,200         | 1,053         | 1,554         | 816           | 780           |
| Family housing                 | 798            | 828            | 921            | 870            | 888            | 1,112         | 1,212         | 923           | 1,106         | 1,147         |
| Rev. and mgmt. funds           | 202            | 452            | 187            | 121            | 1,672          | n/a           | n/a           | n/a           | n/a           | n/a           |
| Trust and receipts             | -399           | -340           | -369           | -274           | -485           | -286          | -221          | -332          | -470          | -317          |
| <b>Total</b>                   | <b>91,624</b>  | <b>88,324</b>  | <b>94,685</b>  | <b>92,890</b>  | <b>91,257</b>  | <b>82,340</b> | <b>79,146</b> | <b>74,575</b> | <b>73,932</b> | <b>71,881</b> |
| <b>Constant FY '97 dollars</b> |                |                |                |                |                |               |               |               |               |               |
| Military personnel             | 28,510         | 28,160         | 27,568         | 27,042         | 27,045         | 24,662        | 22,268        | 19,599        | 20,645        | 19,837        |
| Operations and maintenance     | 28,778         | 30,054         | 31,175         | 30,603         | 31,825         | 25,648        | 24,252        | 26,050        | 25,811        | 23,576        |
| Procurement                    | 41,568         | 33,498         | 37,417         | 35,384         | 27,325         | 25,818        | 23,716        | 18,884        | 17,261        | 15,924        |
| RDT&E                          | 19,774         | 18,652         | 18,011         | 15,931         | 13,889         | 14,291        | 14,103        | 12,804        | 12,312        | 12,705        |
| Military construction          | 1,852          | 1,767          | 1,741          | 1,693          | 1,268          | 1,333         | 1,147         | 1,658         | 852           | 797           |
| Family housing                 | 1,046          | 1,055          | 1,128          | 1,028          | 1,005          | 1,234         | 1,315         | 981           | 1,155         | 1,172         |
| Rev. and mgmt. funds           | 269            | 585            | 232            | 144            | 1,911          | n/a           | n/a           | n/a           | n/a           | n/a           |
| Trust and receipts             | -532           | -440           | -458           | -327           | -555           | -318          | -240          | -353          | -490          | -324          |
| <b>Total</b>                   | <b>121,263</b> | <b>113,332</b> | <b>116,813</b> | <b>111,499</b> | <b>103,712</b> | <b>92,667</b> | <b>86,560</b> | <b>79,622</b> | <b>77,547</b> | <b>73,688</b> |
| <b>Percentage real growth</b>  |                |                |                |                |                |               |               |               |               |               |
| Military personnel             | 6.3            | -1.2           | -2.1           | -1.9           | 0.0            | -8.8          | -9.7          | -12.0         | 5.3           | -3.9          |
| Operations and maintenance     | -0.2           | 4.4            | 3.7            | -1.8           | 4.0            | -19.4         | -5.5          | 7.4           | -0.9          | -8.7          |
| Procurement                    | -19.1          | -19.4          | 11.7           | -5.4           | -22.8          | -5.5          | -8.2          | -20.4         | -8.6          | -7.8          |
| RDT&E                          | 10.1           | -5.7           | -3.4           | -11.6          | -12.8          | 2.9           | -1.3          | -9.2          | -3.9          | 3.2           |
| Military construction          | -21.7          | -4.6           | -1.5           | -2.7           | -25.1          | 5.1           | -14.0         | 44.6          | -48.6         | -6.5          |
| Family housing                 | -1.9           | 0.9            | 6.9            | -8.9           | -2.3           | 22.8          | 6.6           | -25.5         | 17.8          | 1.5           |
| <b>Total</b>                   | <b>-6.1</b>    | <b>-6.6</b>    | <b>3.1</b>     | <b>-4.6</b>    | <b>-7.0</b>    | <b>-10.7</b>  | <b>-6.6</b>   | <b>-8.0</b>   | <b>-2.6</b>   | <b>-5.0</b>   |

Totals may not sum due to rounding.



## Allowances for Quarters and Subsistence

| Pay Grade | Single Full Rate | Partial Rate | Married Full Rate | Officers .....  | Cash/In-Kind<br>\$149.67/month |
|-----------|------------------|--------------|-------------------|---|--------------------------------|
| O-10      | \$788.40         | \$50.70      | \$970.50          |   |                                |
| O-9       | 788.40           | 50.70        | 970.50            |   |                                |
| O-8       | 788.40           | 50.70        | 970.50            |   |                                |
| O-7       | 788.40           | 50.70        | 970.50            |   |                                |
| O-6       | 723.30           | 39.60        | 873.90            | <b>Enlisted Members</b>   | <b>E-1 All Other</b>           |
| O-5       | 696.60           | 33.00        | 842.40            | <b>&lt;4 Months</b>   | <b>Enlisted</b>                |
| O-4       | 645.60           | 26.70        | 742.50            | When on leave or authorized   |                                |
| O-3       | 517.50           | 22.20        | 614.40            | to mess separately .....  | \$6.59/day .... \$7.15/day     |
| O-2       | 410.40           | 17.70        | 524.70            | When rations in-kind  |                                |
| O-1       | 345.60           | 13.20        | 468.90            | are not available .....   | \$7.43/day .... \$8.06/day     |
|           |                  |              |                   | When assigned to duty under   |                                |
| O-3E      | 558.60           | 22.20        | 660.30            | emergency conditions where  |                                |
| O-2E      | 474.90           | 17.70        | 595.80            | no US mess facilities are   |                                |
| O-1E      | 408.30           | 13.20        | 550.50            | available .....   | \$9.86/day ... \$10.67/day     |
|           |                  |              |                   | Uniformed service members without dependents are due payment of these     |                                |
| E-9       | 478.50           | 18.60        | 630.60            | full rates of basic allowance for quarters. Partial rate payments are due |                                |
| E-8       | 439.20           | 15.30        | 581.40            | uniformed service members without dependents who do not qualify for the   |                                |
| E-7       | 375.00           | 12.00        | 539.70            | full rate. Service Academy cadet pay is \$558.04 monthly, effective       |                                |
| E-6       | 339.60           | 9.90         | 498.90            | January 1, 1996.  |                                |
| E-5       | 313.20           | 8.70         | 448.50            |   |                                |
| E-4       | 272.40           | 8.10         | 390.00            |   |                                |
| E-3       | 267.30           | 7.80         | 363.00            |   |                                |
| E-2       | 217.20           | 7.20         | 345.60            |   |                                |
| E-1       | 193.50           | 6.90         | 345.60            |   |                                |

## Annual Pay for Federal Civilians

(Effective January 1, 1996)

### General Schedule

| Grade | Step 1   | Step 2   | Step 3   | Step 4   | Step 5   | Step 6   | Step 7   | Step 8   | Step 9   | Step 10  |
|-------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| GS-1  | \$12,384 | \$12,797 | \$13,208 | \$13,619 | \$14,032 | \$14,274 | \$14,679 | \$15,089 | \$15,107 | \$15,489 |
| GS-2  | 13,923   | 14,255   | 14,717   | 15,107   | 15,274   | 15,723   | 16,172   | 16,621   | 17,070   | 17,519   |
| GS-3  | 15,193   | 15,699   | 16,205   | 16,711   | 17,217   | 17,723   | 18,229   | 18,735   | 19,241   | 19,747   |
| GS-4  | 17,055   | 17,624   | 18,193   | 18,762   | 19,331   | 19,900   | 20,469   | 21,038   | 21,607   | 22,176   |
| GS-5  | 19,081   | 19,717   | 20,353   | 20,989   | 21,625   | 22,261   | 22,897   | 23,533   | 24,169   | 24,805   |
| GS-6  | 21,269   | 21,978   | 22,687   | 23,396   | 24,105   | 24,814   | 25,523   | 26,232   | 26,941   | 27,650   |
| GS-7  | 23,634   | 24,422   | 25,210   | 25,998   | 26,786   | 27,574   | 28,362   | 29,150   | 29,938   | 30,726   |
| GS-8  | 26,175   | 27,048   | 27,921   | 28,794   | 29,667   | 30,540   | 31,413   | 32,286   | 33,159   | 34,032   |
| GS-9  | 28,912   | 29,876   | 30,840   | 31,804   | 32,768   | 33,732   | 34,696   | 35,660   | 36,624   | 37,588   |
| GS-10 | 31,839   | 32,900   | 33,961   | 35,022   | 36,083   | 37,144   | 38,205   | 39,266   | 40,327   | 41,388   |
| GS-11 | 34,981   | 36,147   | 37,313   | 38,479   | 39,645   | 40,811   | 41,977   | 43,143   | 44,309   | 45,475   |
| GS-12 | 41,926   | 43,324   | 44,722   | 46,120   | 47,518   | 48,916   | 50,314   | 51,712   | 53,110   | 54,508   |
| GS-13 | 49,856   | 51,518   | 53,180   | 54,842   | 56,504   | 58,166   | 59,828   | 61,490   | 63,152   | 64,814   |
| GS-14 | 58,915   | 60,879   | 62,843   | 64,807   | 66,771   | 68,735   | 70,699   | 72,663   | 74,627   | 76,591   |
| GS-15 | 69,300   | 71,610   | 73,920   | 76,230   | 78,540   | 80,850   | 83,160   | 85,470   | 87,780   | 90,090   |

### Executive Schedule

|             |             |             |             |             |             |
|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>ES-1</b> | <b>ES-2</b> | <b>ES-3</b> | <b>ES-4</b> | <b>ES-5</b> | <b>ES-6</b> |
| \$94,800    | \$99,300    | \$103,800   | \$109,400   | \$114,000   | \$115,700   |

**NOTE:** Since January 1994, locality-based comparability payments are applied to General Schedule (GS) and Executive Schedule (ES) positions in the continental United States. In other words, pay is higher in areas of the US where nonfederal salaries are higher. Because there are twenty-seven locality pay areas recognized by the Office of Personnel Management, there are in effect twenty-seven different GS and ES pay schedules based on the schedule above. Locality pay adjustments do not apply to employees already receiving special salary rates that exceed the locality rate nor to overseas employees.



# HOW MANY MORE REASONS DO WE NEED TO BUILD THE V-22 SOONER INSTEAD OF LATER?



PANAMA, 1990



PERSIAN GULF, 1990-1991



SOMALIA, 1993



BOSNIA, 1995

Today's world is volatile. Full of hot spots. The question is not whether American lives will be at risk, but when and where. That's why a long-range, rapid-deployment, survivable combat aircraft is vital to our nation's global interests. And why it's essential to build V-22s sooner instead of later.

The V-22 utilizes its revolutionary tiltrotor technology to combine the speed and range of a fixed-wing turboprop with the vertical takeoff and landing capabilities of a helicopter. This multi-role transport replaces 40-year-old technology.

Increasing the V-22's production rate will not only get the aircraft to the Marines and Special Operations Forces more quickly, our nation could also save more than \$8 billion in total program costs. For the sake of our men

and women in uniform, as well as the budget, sooner is better. Now is the time for action. To learn more, contact our World



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### Hazardous Duty Pay

| Pay Grade | Monthly Rate |
|-----------|--------------|
| O-10      | \$110        |
| O-9       | 110          |
| O-8       | 110          |
| O-7       | 110          |
| O-6       | 250          |
| O-5       | 250          |
| O-4       | 225          |
| O-3       | 175          |
| O-2       | 150          |
| O-1       | 125          |
| E-9       | 200          |
| E-8       | 200          |
| E-7       | 200          |
| E-6       | 175          |
| E-5       | 150          |
| E-4       | 125          |
| E-3       | 110          |
| E-2       | 110          |
| E-1       | 110          |

### Aviation Career Incentive Pay

| Phase I      |   | Phase II     |                                |
|--------------|---|--------------|--------------------------------|
| Monthly Rate | Years of Aviation Service as an Officer | Monthly Rate | Years of Service as an Officer |
| \$125        | 2 or fewer                              | \$585        | more than 18                   |
| 156          | more than 2                             | 495          | more than 20                   |
| 188          | more than 3                             | 385          | more than 22                   |
| 206          | more than 4                             | 250          | more than 25                   |
| 650          | more than 6                             |              |                                |

Provided to qualified rated officers and flight surgeons.

Officers in pay grade O-7 are paid \$200 per month. Officers in pay grade O-8 or above are paid \$206 per month.

Continuous pay ends following the twenty-fifth year of service. Grades O-6 and below with more than twenty-five years of service may receive \$250 per month for continued operational flying.

### Monthly Military Basic Rates of Pay

(Effective January 1, 1996)

| Pay Grade  | Years of Service |         |         |         |         |         |         |         |         |         |         |                      |                      |                      |                      |
|--|------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------------------|----------------------|----------------------|----------------------|
|  | < 2              | 2       | 3       | 4       | 6       | 8       | 10      | 12      | 14      | 16      | 18      | 20                   | 22                   | 24                   | 26                   |
| <b>Commissioned Officers<sup>a</sup></b>   |                  |         |         |         |         |         |         |         |         |         |         |                      |                      |                      |                      |
| O-10   | \$7,146          | \$7,397 | \$7,397 | \$7,397 | \$7,397 | \$7,681 | \$7,681 | \$8,107 | \$8,107 | \$8,687 | \$8,687 | \$9,268 <sup>b</sup> | \$9,268 <sup>b</sup> | \$9,268 <sup>b</sup> | \$9,845 <sup>b</sup> |
| O-9  | 6,333            | 6,499   | 6,638   | 6,638   | 6,638   | 6,806   | 6,806   | 7,089   | 7,089   | 7,681   | 7,681   | 8,107                | 8,107                | 8,107                | 8,687                |
| O-8  | 5,736            | 5,908   | 6,048   | 6,048   | 6,048   | 6,499   | 6,499   | 6,806   | 6,806   | 7,089   | 7,397   | 7,681                | 7,871                | 7,871                | 7,871                |
| O-7  | 4,766            | 5,090   | 5,090   | 5,090   | 5,319   | 5,319   | 5,627   | 5,627   | 5,908   | 6,499   | 6,946   | 6,946                | 6,946                | 6,946                | 6,946                |
| O-6  | 3,533            | 3,881   | 4,136   | 4,136   | 4,136   | 4,136   | 4,136   | 4,136   | 4,276   | 4,952   | 5,205   | 5,319                | 5,627                | 5,817                | 6,103                |
| O-5  | 2,825            | 3,317   | 3,547   | 3,547   | 3,547   | 3,547   | 3,654   | 3,851   | 4,109   | 4,417   | 4,670   | 4,811                | 4,979                | 4,979                | 4,979                |
| O-4  | 2,381            | 2,900   | 3,094   | 3,094   | 3,151   | 3,290   | 3,515   | 3,712   | 3,881   | 4,052   | 4,163   | 4,163                | 4,163                | 4,163                | 4,163                |
| O-3 <sup>c</sup>   | 2,213            | 2,474   | 2,645   | 2,927   | 3,067   | 3,177   | 3,349   | 3,515   | 3,601   | 3,601   | 3,601   | 3,601                | 3,601                | 3,601                | 3,601                |
| O-2 <sup>c</sup>   | 1,930            | 2,108   | 2,532   | 2,617   | 2,672   | 2,672   | 2,672   | 2,672   | 2,672   | 2,672   | 2,672   | 2,672                | 2,672                | 2,672                | 2,672                |
| O-1 <sup>c</sup>   | 1,676            | 1,744   | 2,108   | 2,108   | 2,108   | 2,108   | 2,108   | 2,108   | 2,108   | 2,108   | 2,108   | 2,108                | 2,108                | 2,108                | 2,108                |
| <b>Commissioned Officers With More Than Four Years of Active-Duty Enlisted Service</b> |                  |         |         |         |         |         |         |         |         |         |         |                      |                      |                      |                      |
| O-3E   | —                | —       | —       | 2,927   | 3,067   | 3,177   | 3,349   | 3,515   | 3,654   | 3,654   | 3,654   | 3,654                | 3,654                | 3,654                | 3,654                |
| O-2E   | —                | —       | —       | 2,617   | 2,672   | 2,756   | 2,900   | 3,011   | 3,094   | 3,094   | 3,094   | 3,094                | 3,094                | 3,094                | 3,094                |
| O-1E   | —                | —       | —       | 2,108   | 2,252   | 2,335   | 2,419   | 2,503   | 2,617   | 2,617   | 2,617   | 2,617                | 2,617                | 2,617                | 2,617                |
| <b>Enlisted Members</b>  |                  |         |         |         |         |         |         |         |         |         |         |                      |                      |                      |                      |
| E-9  | —                | —       | —       | —       | —       | —       | 2,623   | 2,682   | 2,743   | 2,806   | 2,869   | 2,924                | 3,077                | 3,197                | 3,377                |
| E-8  | —                | —       | —       | —       | —       | 2,200   | 2,263   | 2,322   | 2,383   | 2,446   | 2,501   | 2,563                | 2,714                | 2,834                | 3,016                |
| E-7  | 1,536            | 1,658   | 1,719   | 1,780   | 1,840   | 1,899   | 1,960   | 2,021   | 2,112   | 2,172   | 2,232   | 2,261                | 2,413                | 2,533                | 2,714                |
| E-6  | 1,321            | 1,440   | 1,500   | 1,564   | 1,623   | 1,681   | 1,743   | 1,832   | 1,890   | 1,951   | 1,981   | 1,981                | 1,981                | 1,981                | 1,981                |
| E-5  | 1,160            | 1,262   | 1,323   | 1,381   | 1,472   | 1,532   | 1,592   | 1,651   | 1,681   | 1,681   | 1,681   | 1,681                | 1,681                | 1,681                | 1,681                |
| E-4  | 1,081            | 1,142   | 1,209   | 1,303   | 1,354   | 1,354   | 1,354   | 1,354   | 1,354   | 1,354   | 1,354   | 1,354                | 1,354                | 1,354                | 1,354                |
| E-3  | 1,019            | 1,075   | 1,118   | 1,162   | 1,162   | 1,162   | 1,162   | 1,162   | 1,162   | 1,162   | 1,162   | 1,162                | 1,162                | 1,162                | 1,162                |
| E-2  | 981              | 981     | 981     | 981     | 981     | 981     | 981     | 981     | 981     | 981     | 981     | 981                  | 981                  | 981                  | 981                  |
| E-1 <sup>d</sup>   | 875              | 875     | 875     | 875     | 875     | 875     | 875     | 875     | 875     | 875     | 875     | 875                  | 875                  | 875                  | 875                  |

Amounts have been rounded to the nearest dollar. Basic pay while serving as Chairman of the Joint Chiefs of Staff is \$10,340.10; as Chief of Staff of the Air Force, \$9,016.80, regardless of cumulative years of service. Basic pay while serving as Chief Master Sergeant of the Air Force is \$4,008.60, regardless of cumulative years of service.

<sup>a</sup>Basic pay is limited to \$9,016.80, regardless of cumulative years of service.

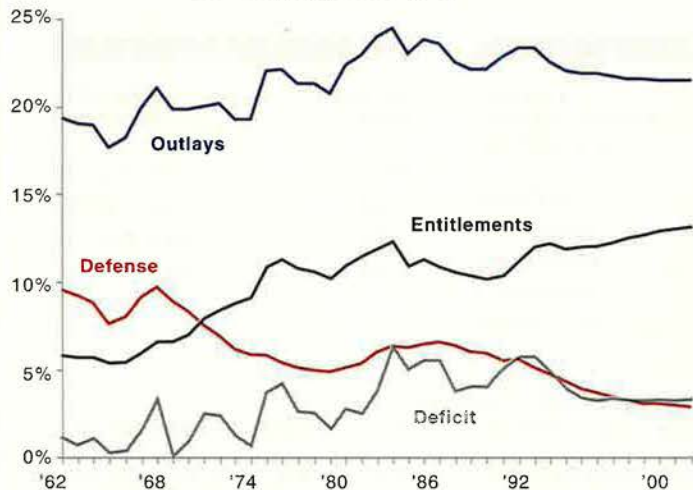
<sup>b</sup>Amount used for benefits calculation only; actual basic pay rate does not exceed legal cap of \$9,016.80.

<sup>c</sup>Does not apply to commissioned officers who have been credited with more than four years' active service as enlisted members.

<sup>d</sup>Basic pay for E-1s with less than four months of service is \$809.10.



### Federal Budget Categories as Percentages of GDP



| Year | Outlays | Deficit | Entitlements | Defense |
|------|---------|---------|--------------|---------|
| 1962 | 19.3    | 1.1     | 5.8          | 9.5     |
| 1963 | 19.0    | 0.7     | 5.7          | 9.2     |
| 1964 | 18.9    | 1.0     | 5.7          | 8.8     |
| 1965 | 17.6    | 0.2     | 5.4          | 7.6     |
| 1966 | 18.2    | 0.4     | 5.4          | 8.0     |
| 1967 | 19.9    | 1.6     | 6.0          | 9.1     |
| 1968 | 21.0    | 3.3     | 6.6          | 9.7     |
| 1969 | 19.8    | 0.1     | 6.6          | 8.9     |
| 1970 | 19.8    | 0.9     | 7.0          | 8.3     |
| 1971 | 20.0    | 2.5     | 7.9          | 7.5     |
| 1972 | 20.1    | 2.3     | 8.4          | 6.9     |
| 1973 | 19.2    | 1.2     | 8.8          | 6.1     |
| 1974 | 19.2    | 0.6     | 9.1          | 5.8     |
| 1975 | 22.0    | 3.7     | 10.9         | 5.8     |
| 1976 | 22.1    | 4.2     | 11.3         | 5.3     |
| 1977 | 21.3    | 2.6     | 10.8         | 5.1     |
| 1978 | 21.3    | 2.5     | 10.6         | 4.9     |
| 1979 | 20.7    | 1.6     | 10.2         | 4.8     |
| 1980 | 22.3    | 2.7     | 11.0         | 5.1     |
| 1981 | 22.9    | 2.5     | 11.5         | 5.3     |
| 1982 | 23.9    | 3.8     | 11.9         | 6.0     |
| 1983 | 24.4    | 6.3     | 12.4         | 6.3     |
| 1984 | 23.0    | 5.0     | 11.0         | 6.2     |
| 1985 | 23.8    | 5.6     | 11.3         | 6.4     |
| 1986 | 23.5    | 5.6     | 10.9         | 6.5     |
| 1987 | 22.5    | 3.8     | 10.6         | 6.3     |
| 1988 | 22.1    | 4.0     | 10.3         | 6.0     |
| 1989 | 22.1    | 4.0     | 10.2         | 5.9     |
| 1990 | 22.8    | 5.1     | 10.3         | 5.5     |
| 1991 | 23.3    | 5.7     | 11.2         | 5.6     |
| 1992 | 23.3    | 5.7     | 12.0         | 5.1     |
| 1993 | 22.5    | 4.8     | 12.2         | 4.7     |
| 1994 | 22.0    | 3.9     | 11.9         | 4.3     |
| 1995 | 21.8    | 3.4     | 12.0         | 3.9     |
| 1996 | 21.8    | 3.2     | 12.0         | 3.6     |
| 1997 | 21.7    | 3.3     | 12.3         | 3.4     |
| 1998 | 21.5    | 3.2     | 12.5         | 3.2     |
| 1999 | 21.5    | 3.2     | 12.7         | 3.0     |
| 2000 | 21.4    | 3.3     | 12.9         | 3.0     |
| 2001 | 21.4    | 3.2     | 13.0         | 2.9     |
| 2002 | 21.4    | 3.3     | 13.2         | 2.8     |

### Explanatory Note

Data for 1962–95 are historical. Data for 1996–2002 are projections. These four tables are based on two documents: ■ "Economic and Budget Outlook; December 1995 Update," published by the Congressional Budget Office, December 1995.

■ "Budget of the United States Government, Fiscal Year 1997," published by the Office of Management and Budget, March 1996.

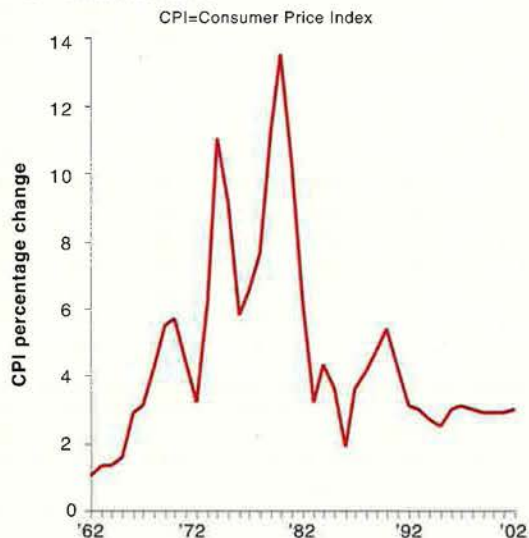
OMB was the source for 1996–2002 national defense outlay projections. All other figures were supplied by CBO. (Constant-dollar figures are derived from CBO data.)

The President and Congress have agreed in principle to balance the budget by 2002. However, the two sides did not enact a balanced budget law. CBO's figures cited herein do *not* assume enactment of a balanced budget law. OMB, on the other hand, projects lower federal outlays and elimination of deficits in the outyears.

Figures in the tables on this page and p. 51, top left, are from the Congressional Budget Office and DoD; p. 51, top right, derived from CBO. Fiscal 1996–2002 figures are projections.

### Inflation Rates

| FY   | % change | FY   | % change |
|------|----------|------|----------|
| 1962 | 1.0      | 1983 | 3.2      |
| 1963 | 1.3      | 1984 | 4.3      |
| 1964 | 1.3      | 1985 | 3.6      |
| 1965 | 1.6      | 1986 | 1.9      |
| 1966 | 2.9      | 1987 | 3.6      |
| 1967 | 3.1      | 1988 | 4.1      |
| 1968 | 4.2      | 1989 | 4.8      |
| 1969 | 5.5      | 1990 | 5.4      |
| 1970 | 5.7      | 1991 | 4.2      |
| 1971 | 4.4      | 1992 | 3.1      |
| 1972 | 3.2      | 1993 | 3.0      |
| 1973 | 6.2      | 1994 | 2.7      |
| 1974 | 11.0     | 1995 | 2.5      |
| 1975 | 9.1      | 1996 | 3.0      |
| 1976 | 5.8      | 1997 | 3.1      |
| 1977 | 6.5      | 1998 | 3.0      |
| 1978 | 7.6      | 1999 | 2.9      |
| 1979 | 11.3     | 2000 | 2.9      |
| 1980 | 13.5     | 2001 | 2.9      |
| 1981 | 10.3     | 2002 | 3.0      |
| 1982 | 6.2      |      |          |





## Federal Budget Categories

(Current \$ billions)

| Year | Outlays | Deficit | Entitlements | Defense |
|------|---------|---------|--------------|---------|
| 1962 | \$106.8 | \$5.9   | \$32.3       | \$52.6  |
| 1963 | 111.3   | 4.0     | 33.6         | 53.7    |
| 1964 | 118.5   | 6.5     | 35.7         | 55.0    |
| 1965 | 118.2   | 1.6     | 36.1         | 51.0    |
| 1966 | 134.5   | 3.1     | 39.9         | 59.0    |
| 1967 | 157.5   | 12.6    | 47.4         | 72.0    |
| 1968 | 178.1   | 27.7    | 56.1         | 82.2    |
| 1969 | 183.6   | 0.5     | 61.2         | 82.7    |
| 1970 | 195.6   | 8.7     | 68.7         | 81.9    |
| 1971 | 210.2   | 26.1    | 82.7         | 79.0    |
| 1972 | 230.7   | 26.4    | 96.8         | 79.3    |
| 1973 | 245.7   | 15.4    | 112.2        | 77.1    |
| 1974 | 269.4   | 8.0     | 127.1        | 80.7    |
| 1975 | 332.3   | 55.3    | 164.4        | 87.6    |
| 1976 | 371.8   | 70.5    | 189.7        | 89.9    |
| 1977 | 409.2   | 49.8    | 206.6        | 97.5    |
| 1978 | 458.7   | 54.9    | 228.4        | 104.6   |
| 1979 | 503.5   | 38.2    | 248.2        | 116.8   |
| 1980 | 590.9   | 72.7    | 291.5        | 134.6   |
| 1981 | 678.2   | 74.0    | 340.6        | 158.0   |
| 1982 | 745.8   | 120.1   | 372.7        | 185.9   |
| 1983 | 808.4   | 208.0   | 411.6        | 209.9   |
| 1984 | 851.8   | 185.7   | 406.3        | 228.0   |
| 1985 | 946.4   | 221.7   | 450.0        | 253.1   |
| 1986 | 990.3   | 238.0   | 459.7        | 273.8   |
| 1987 | 1,003.9 | 169.3   | 470.2        | 282.5   |
| 1988 | 1,064.1 | 194.0   | 494.2        | 290.9   |
| 1989 | 1,143.2 | 205.2   | 526.2        | 304.0   |
| 1990 | 1,252.7 | 278.0   | 567.4        | 300.1   |
| 1991 | 1,323.8 | 321.7   | 634.2        | 319.7   |
| 1992 | 1,380.9 | 340.5   | 711.7        | 302.6   |
| 1993 | 1,408.2 | 300.0   | 762.1        | 292.4   |
| 1994 | 1,461.0 | 259.0   | 789.0        | 282.4   |
| 1995 | 1,531.0 | 244.0   | 845.0        | 272.1   |
| 1996 | 1,595.0 | 236.0   | 881.0        | 265.6   |
| 1997 | 1,668.0 | 251.0   | 945.0        | 258.7   |
| 1998 | 1,736.0 | 256.0   | 1,007.0      | 254.8   |
| 1999 | 1,820.0 | 273.0   | 1,075.0      | 256.5   |
| 2000 | 1,907.0 | 289.0   | 1,147.0      | 262.9   |
| 2001 | 1,994.0 | 299.0   | 1,215.0      | 266.0   |
| 2002 | 2,100.0 | 323.0   | 1,297.0      | 275.5   |

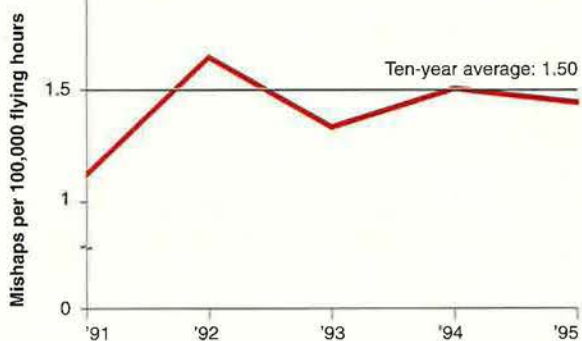
## Federal Budget Categories

(Constant Fiscal 1997 \$ billions)

| Year | Outlays | Deficit | Entitlements | Defense |
|------|---------|---------|--------------|---------|
| 1962 | \$572.5 | \$31.6  | \$173.1      | \$218.9 |
| 1963 | 588.9   | 21.2    | 177.8        | 284.1   |
| 1964 | 619.0   | 34.0    | 186.5        | 287.3   |
| 1965 | 607.7   | 8.2     | 185.6        | 262.2   |
| 1966 | 672.0   | 15.5    | 199.3        | 294.8   |
| 1967 | 763.2   | 61.1    | 229.7        | 348.9   |
| 1968 | 826.7   | 128.6   | 260.4        | 381.6   |
| 1969 | 807.8   | 2.2     | 269.3        | 363.9   |
| 1970 | 814.2   | 36.2    | 286.0        | 340.9   |
| 1971 | 838.1   | 104.1   | 329.7        | 315.0   |
| 1972 | 891.3   | 102.0   | 374.0        | 306.4   |
| 1973 | 893.8   | 56.0    | 408.2        | 280.5   |
| 1974 | 882.9   | 26.2    | 416.6        | 264.5   |
| 1975 | 998.2   | 166.1   | 493.9        | 263.2   |
| 1976 | 1,055.7 | 200.2   | 538.6        | 255.3   |
| 1977 | 1,090.9 | 132.8   | 550.8        | 259.9   |
| 1978 | 1,136.5 | 136.0   | 565.9        | 259.2   |
| 1979 | 1,120.9 | 85.0    | 552.5        | 260.0   |
| 1980 | 1,159.0 | 142.6   | 571.7        | 264.0   |
| 1981 | 1,206.0 | 131.6   | 605.7        | 281.0   |
| 1982 | 1,248.8 | 201.1   | 624.1        | 311.3   |
| 1983 | 1,311.6 | 337.5   | 667.8        | 340.6   |
| 1984 | 1,325.1 | 288.9   | 632.0        | 354.7   |
| 1985 | 1,421.1 | 332.9   | 675.7        | 380.0   |
| 1986 | 1,459.3 | 350.7   | 677.4        | 403.5   |
| 1987 | 1,427.9 | 240.8   | 668.8        | 401.8   |
| 1988 | 1,453.9 | 265.1   | 675.2        | 397.5   |
| 1989 | 1,490.4 | 267.5   | 686.0        | 396.3   |
| 1990 | 1,549.5 | 343.9   | 701.8        | 371.2   |
| 1991 | 1,571.5 | 381.9   | 752.9        | 379.5   |
| 1992 | 1,590.0 | 392.1   | 819.5        | 348.4   |
| 1993 | 1,574.2 | 335.4   | 851.9        | 326.9   |
| 1994 | 1,590.3 | 281.9   | 858.8        | 307.4   |
| 1995 | 1,625.8 | 259.1   | 897.3        | 289.0   |
| 1996 | 1,644.4 | 243.3   | 908.3        | 273.8   |
| 1997 | 1,668.0 | 251.0   | 945.0        | 258.7   |
| 1998 | 1,685.4 | 248.5   | 977.7        | 247.4   |
| 1999 | 1,717.2 | 257.6   | 1,014.3      | 242.0   |
| 2000 | 1,748.6 | 265.0   | 1,051.7      | 241.1   |
| 2001 | 1,776.8 | 266.4   | 1,082.7      | 237.0   |
| 2002 | 1,816.8 | 279.4   | 1,122.1      | 238.3   |

### Class A Mishaps

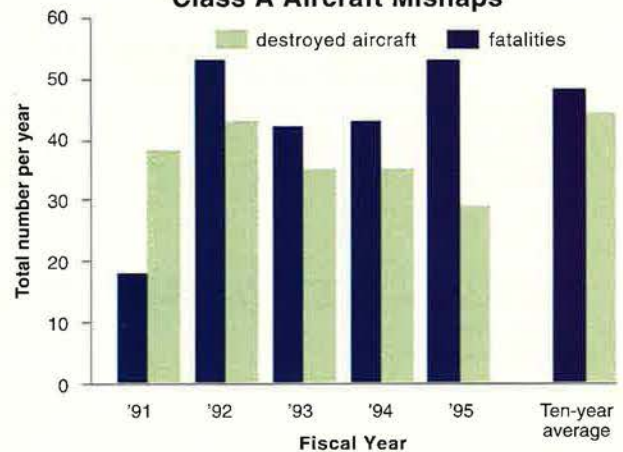
(Loss of life, permanent total disability, destroyed aircraft, or more than \$1 million in property damage)



Data provided by USAF

Fiscal Year

### Class A Aircraft Mishaps





## The Civilian Force

(As of September 30, 1995)

### General Schedule/Other

| Grade            | Force          |
|------------------|----------------|
| 1                | 203            |
| 2                | 277            |
| 3                | 1,463          |
| 4                | 5,848          |
| 5                | 13,111         |
| 6                | 7,528          |
| 7                | 9,809          |
| 8                | 1,491          |
| 9                | 13,529         |
| 10               | 920            |
| 11               | 16,615         |
| 12               | 20,400         |
| 13               | 10,113         |
| 14               | 3,489          |
| 15               | 1,233          |
| 16               | 0              |
| 17               | 0              |
| 18               | 0              |
| ST <sup>a</sup>  | 27             |
| SES <sup>b</sup> | 153            |
| <b>Total</b>     | <b>106,209</b> |

### Wage Grade Positions

| Grade        | Force         |
|--------------|---------------|
| 1            | 75            |
| 2            | 619           |
| 3            | 447           |
| 4            | 233           |
| 5            | 1,747         |
| 6            | 1,326         |
| 7            | 2,299         |
| 8            | 4,752         |
| 9            | 4,387         |
| 10           | 15,454        |
| 11           | 4,168         |
| 12           | 1,915         |
| 13           | 259           |
| 14           | 116           |
| 15           | 1             |
| <b>Total</b> | <b>37,798</b> |

### Wage Grade Leader Positions

| Grade        | Force        |
|--------------|--------------|
| 1            | 0            |
| 2            | 9            |
| 3            | 2            |
| 4            | 4            |
| 5            | 30           |
| 6            | 36           |
| 7            | 59           |
| 8            | 112          |
| 9            | 283          |
| 10           | 740          |
| 11           | 122          |
| 12           | 49           |
| 13           | 2            |
| 14           | 0            |
| 15           | 0            |
| <b>Total</b> | <b>1,448</b> |

### Wage Grade Supervisory Positions

| Grade        | Force        |
|--------------|--------------|
| 1            | 16           |
| 2            | 37           |
| 3            | 34           |
| 4            | 71           |
| 5            | 109          |
| 6            | 202          |
| 7            | 278          |
| 8            | 327          |
| 9            | 1,008        |
| 10           | 1,241        |
| 11           | 498          |
| 12           | 291          |
| 13           | 171          |
| 14           | 206          |
| 15           | 132          |
| 16           | 86           |
| 17           | 41           |
| 18           | 11           |
| <b>Total</b> | <b>4,759</b> |

### Air Force Civilian Personnel: Average Age and Length of Service

|                                     |                 |
|-------------------------------------|-----------------|
| Average length of service (overall) | <b>16 years</b> |
| General schedule                    | <b>16 years</b> |
| Federal wage system                 | <b>17 years</b> |
| Average age                         | <b>45 years</b> |

Wage grades apply to full-time employees. Table does not include ANG technicians, local national employees, or nonappropriated-fund employees.

<sup>a</sup>Scientific and Technical  
<sup>b</sup>Senior Executive Service

## Aircraft per Active-Duty USAF Squadron

(As of September 30, 1995)

| Aircraft Type | Number                   |
|---------------|--------------------------|
| A/OA-10       | 18                       |
| B-1B          | 11, 12, 16, or 17        |
| B-52          | 10, 12-14, 16, or 19     |
| C-5           | 16                       |
| C-9A          | 3-11                     |
| C-17          | 12                       |
| C-130         | 8, 10, 12, 13, 14, or 16 |
| AC-130        | 7 or 10                  |
| EC-130H       | 5                        |
| HC-130P/N     | 4-10                     |
| MC-130        | 4-12                     |
| MH-53J        | 5 or 22                  |
| MH-60G        | 8                        |
| KC-10A        | 9 or 10                  |
| KC-135        | 8-12                     |
| C-141B        | 16                       |
| E-3           | 2 or 7                   |
| F-4           | 11                       |
| F-4G          | 24                       |
| F-15          | 18                       |
| F-15E         | 18 or 24                 |
| F-16          | 18 or 24                 |
| F-111         | 18                       |
| EF-111A       | 24                       |
| F-117A        | 18                       |
| HH-60G        | 4, 5, or 8               |

For some types of aircraft, squadrons vary in size, as shown here. HC-130s, MC-130s, WC-130s, T-39s, and T-38s are counted as Total Unit Equipment, not by squadrons.



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## USAF Total Force

|                                      | FY '90         | FY '91         | FY '92         | FY '93         | FY '94         | FY '95         | FY '96         |
|--------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| <b>Air Force active duty</b>         |                |                |                |                |                |                |                |
| Officers                             | 100,000        | 96,600         | 90,400         | 84,073         | 81,003         | 78,444         | 75,928         |
| Enlisted                             | 430,800        | 409,400        | 375,700        | 356,126        | 341,317        | 317,938        | 308,272        |
| Cadets                               | 4,433          | 4,431          | 4,215          | 4,152          | 4,007          | 4,027          | 4,000          |
| <b>Total, Air Force military</b>     | <b>535,233</b> | <b>510,431</b> | <b>470,315</b> | <b>444,351</b> | <b>426,327</b> | <b>400,409</b> | <b>388,200</b> |
| Career reenlistments (second term)   | 44,600         | 41,500         | 49,100         | 38,300         | 41,000         | 37,200         | 35,300         |
| Rate                                 | 82%            | 87%            | 88%            | 90%            | 89%            | 88%            | 90%            |
| First-term reenlistments             | 23,600         | 22,500         | 21,000         | 17,600         | 13,100         | 13,500         | 11,800         |
| Rate                                 | 51%            | 59%            | 59%            | 61%            | 60%            | 65%            | 60%            |
| <b>Civilian personnel</b>            |                |                |                |                |                |                |                |
| Direct hire (excluding technicians)  | 204,129        | 188,259        | 170,549        | 158,631        | 155,385        | 146,180        | 143,864        |
| Technicians: AFRES                   | 9,596          | 9,527          | 10,467         | 9,827          | 9,398          | 9,432          | 9,802          |
| ANG                                  | 24,119         | 24,703         | 24,741         | 24,958         | 24,063         | 24,174         | 22,881         |
| Indirect hire—foreign nationals      | 11,031         | 10,172         | 8,652          | 8,246          | 7,643          | 6,643          | 6,810          |
| <b>Total civilian personnel</b>      | <b>248,875</b> | <b>232,661</b> | <b>214,409</b> | <b>201,662</b> | <b>196,489</b> | <b>186,429</b> | <b>183,357</b> |
| <b>Total military and civilian</b>   | <b>784,108</b> | <b>743,092</b> | <b>684,724</b> | <b>646,013</b> | <b>622,816</b> | <b>586,838</b> | <b>571,557</b> |
| <b>Guard and Reserve</b>             |                |                |                |                |                |                |                |
| Air National Guard, Selected Reserve | 117,786        | 117,786        | 119,083        | 117,162        | 113,587        | 109,826        | 112,707        |
| Air Force Reserve, paid              | 83,814         | 84,539         | 83,396         | 80,562         | 79,621         | 78,706         | 76,138         |
| Air Force Reserve, nonpaid           | 68,714         | 75,002         | 74,330         | 111,509        | 98,848         | 99,000         | 71,910         |
| <b>Total Ready Reserve</b>           | <b>270,314</b> | <b>277,327</b> | <b>276,809</b> | <b>309,233</b> | <b>292,056</b> | <b>287,532</b> | <b>260,755</b> |
| Standby                              | 15,369         | 14,234         | 16,000         | 13,042         | 9,926          | 14,435         | 14,000         |
| <b>Total Guard and Reserve</b>       | <b>285,683</b> | <b>291,561</b> | <b>292,809</b> | <b>322,275</b> | <b>301,982</b> | <b>301,967</b> | <b>274,755</b> |

Numbers are rounded and may not sum to totals. FYs 1989–95 are actual figures; FY 1996 is an estimate.

## Total Number of USAF Aircraft in Service and Flying Hours

|  | FY '89       | FY '90       | FY '91       | FY '92       | FY '93       | FY '94       | FY '95       |
|--|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| <b>Type of aircraft</b>                            |              |              |              |              |              |              |              |
| Bomber   | 412          | 366          | 290          | 248          | 225          | 178          | 183          |
| Tanker   | 578          | 555          | 539          | 478          | 391          | 326          | 325          |
| Fighter/interceptor/attack                         | 2,896        | 2,798        | 2,497        | 2,000        | 1,848        | 1,781        | 1,750        |
| Reconnaissance/electronic warfare                  | 416          | 346          | 303          | 238          | 241          | 225          | 318          |
| Cargo/transport                                    | 825          | 824          | 812          | 794          | 749          | 733          | 690          |
| Search & rescue (fixed wing)                       | 35           | 36           | 32           | 56           | 84           | 34           | 12           |
| Helicopter (includes rescue)                       | 205          | 212          | 213          | 206          | 203          | 189          | 123          |
| Trainer  | 1,540        | 1,535        | 1,415        | 1,313        | 1,150        | 1,188        | 1,205        |
| Utility/observation/other                          | 140          | 141          | 88           | 89           | 95           | 107          | 104          |
| <b>Total active duty</b>                           | <b>7,047</b> | <b>6,813</b> | <b>6,189</b> | <b>5,422</b> | <b>4,986</b> | <b>4,761</b> | <b>4,710</b> |
| Air National Guard                                 | 1,735        | 1,719        | 1,793        | 1,694        | 1,653        | 1,586        | 1,461        |
| Air Force Reserve                                  | 497          | 500          | 528          | 524          | 543          | 468          | 462          |
| <b>Total active duty, ANG, and AFRES</b>           | <b>9,279</b> | <b>9,032</b> | <b>8,510</b> | <b>7,640</b> | <b>7,182</b> | <b>6,815</b> | <b>6,633</b> |
| Total aircraft, including foreign-government-owned | 9,355        | 9,130        | 8,603        | 7,733        | 7,276        | 7,028        | 6,725        |
| <b>Flying hours (in thousands)</b>                 |              |              |              |              |              |              |              |
| USAF active duty                                   | 2,830        | 2,760        | 2,551        | 2,195        | 1,993        | 1,750        | 1,709        |
| Air National Guard                                 | 427          | 442          | 458          | 441          | 442          | 412          | 403          |
| Air Force Reserve                                  | 155          | 164          | 157          | 154          | 149          | 155          | 141          |
| <b>Total flying hours</b>                          | <b>3,412</b> | <b>3,366</b> | <b>3,166</b> | <b>2,790</b> | <b>2,584</b> | <b>2,317</b> | <b>2,253</b> |



## Aircraft Type, Total Active Inventory, and Primary Aircraft Authorized

(As of September 30, 1995)

**Total active inventory (TAI):** aircraft assigned to operating forces for mission, training, test, or maintenance. Includes primary, backup, attrition, and reconstitution reserve aircraft. **Primary aircraft authorized (PAA):** aircraft provided for the performance of the operational mission. The PAA form the basis for allocation of manpower, support equipment, and flying-hour funds. The operating command determines the PAA required to meet the assigned missions. PAA also include test and training requirements. In some cases, such as when delivery schedules are slipped, the total number of aircraft in operation might be less than the authorization.

| Type                             | TAI          | PAA          |
|----------------------------------|--------------|--------------|
| <b>Bomber</b>                    |              |              |
| B-1                              | 84           | 52           |
| B-2                              | 14           | 6            |
| B-52                             | 85           | 67           |
| <b>Total</b>                     | <b>183</b>   | <b>125</b>   |
| <b>Cargo/transport</b>           |              |              |
| C-5                              | 81           | 70           |
| C-9                              | 23           | 22           |
| C-12                             | 44           | 44           |
| C-17                             | 23           | 19           |
| C-20                             | 13           | 13           |
| C-21                             | 78           | 77           |
| C-23                             | 3            | 3            |
| C-27                             | 10           | 9            |
| C-130                            | 201          | 168          |
| C-135                            | 7            | 6            |
| C-137                            | 7            | 6            |
| C-141                            | 183          | 154          |
| CT-43                            | 2            | 2            |
| NC-130                           | 4            | 3            |
| NC-141                           | 2            | 2            |
| NT-39                            | 2            | 2            |
| VC-25                            | 2            | 2            |
| <b>Total</b>                     | <b>685</b>   | <b>602</b>   |
| <b>Electronic warfare/combat</b> |              |              |
| F-4G                             | 40           | 37           |
| EF-111                           | 40           | 26           |
| <b>Total</b>                     | <b>80</b>    | <b>63</b>    |
| <b>Fighter/attack</b>            |              |              |
| A-10                             | 135          | 114          |
| OA-10                            | 96           | 81           |
| F-15                             | 627          | 549          |
| F-16                             | 780          | 648          |
| F-111                            | 102          | 76           |
| F-117                            | 54           | 47           |
| YF-15                            | 1            | 0            |
| YF-117                           | 3            | 3            |
| <b>Total</b>                     | <b>1,798</b> | <b>1,518</b> |
| <b>Helicopter</b>                |              |              |
| HH-1                             | 14           | 12           |
| HH-60                            | 43           | 30           |
| TH-53                            | 6            | 4            |
| UH-1                             | 66           | 46           |
| NCH-53                           | 1            | 0            |
| <b>Total</b>                     | <b>130</b>   | <b>92</b>    |

| Type   | TAI          | PAA          |
|--|--------------|--------------|
| <b>Reconnaissance/battle management/C<sup>3</sup>I</b> |              |              |
| E-3  | 33           | 29           |
| E-4  | 4            | 3            |
| EC-18  | 6            | 4            |
| EC-130   | 22           | 16           |
| EC-135   | 17           | 14           |
| EC-137   | 1            | 1            |
| OC-135   | 1            | 2            |
| RC-135   | 19           | 15           |
| WC-135   | 5            | 0            |
| U-2  | 32           | 29           |
| <b>Total</b>   | <b>140</b>   | <b>113</b>   |
| <b>Special Operations Forces</b>                       |              |              |
| AC-130   | 21           | 19           |
| HC-130   | 28           | 25           |
| MC-130   | 38           | 33           |
| MH-53  | 40           | 33           |
| MH-60  | 13           | 11           |
| <b>Total</b>   | <b>140</b>   | <b>121</b>   |
| <b>Tanker</b>  |              |              |
| HC-130   | 3            | 3            |
| KC-10  | 59           | 54           |
| KC-135   | 263          | 241          |
| NKC-135  | 3            | 2            |
| <b>Total</b>   | <b>328</b>   | <b>300</b>   |
| <b>Trainer</b>   |              |              |
| T-1  | 123          | 49           |
| T-3  | 95           | 92           |
| AT-38  | 69           | 43           |
| T-37   | 461          | 292          |
| T-38   | 402          | 370          |
| T-39   | 1            | 1            |
| T-41   | 3            | 3            |
| T-43   | 10           | 10           |
| TC-18  | 2            | 0            |
| TC-135   | 2            | 2            |
| TG-3   | 4            | 2            |
| TG-4   | 11           | 10           |
| TG-7   | 9            | 9            |
| TG-9   | 4            | 4            |
| TG-11  | 2            | 0            |
| U-2RT/ST   | 4            | 4            |
| <b>Total</b>   | <b>1,202</b> | <b>891</b>   |
| <b>Other</b>   |              |              |
| OA-37  | 0            | 1            |
| UV-18  | 2            | 2            |
| <b>Total</b>   | <b>2</b>     | <b>3</b>     |
| <b>Total active-duty</b>                               | <b>4,688</b> | <b>3,828</b> |

## USAF Personnel by Geographic Area

(As of September 30, 1995)

|   |                |
|---|----------------|
| <b>Total military personnel</b>           | <b>400,409</b> |
| <b>US territory and special locations</b> | <b>336,106</b> |
| <b>Total in foreign countries</b>         | <b>64,303</b>  |
| <b>Western and southern Europe 34,927</b> |                |
| Germany                                   | 15,195         |
| UK  | 9,983          |
| Turkey                                    | 2,772          |
| Italy                                     | 3,984          |
| Spain                                     | 217            |
| All other countries                       | 2,776          |
| <b>East Asia and Pacific 26,132</b>       |                |
| Japan/Okinawa                             | 14,962         |
| South Korea                               | 8,661          |
| Guam                                      | 2,142          |
| All other countries                       | 367            |
| <b>Africa, Near East, south Asia 348</b>  |                |
| Saudi Arabia                              | 185            |
| Egypt                                     | 54             |
| All other countries                       | 109            |
| <b>Western hemisphere 2,290</b>           |                |
| Panama                                    | 2,096          |
| Canada                                    | 91             |
| All other countries                       | 103            |
| <b>Other areas 606</b>                    |                |





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## The Air National Guard Fleet

(As of September 30, 1995)

|                            | Age in Years |            |            |            |            |            |           |          |            | Average     | Total number |
|----------------------------|--------------|------------|------------|------------|------------|------------|-----------|----------|------------|-------------|--------------|
|                            | 0-3          | 3-6        | 6-9        | 9-12       | 12-15      | 15-18      | 18-21     | 21-24    | 24+        |             |              |
| A-10                       | —            | —          | —          | 1          | 41         | 62         | —         | —        | —          | 14.8        | 104          |
| B-1                        | —            | —          | 11         | —          | —          | —          | —         | —        | —          | 8.3         | 11           |
| C-5                        | —            | —          | —          | —          | —          | —          | —         | 3        | 10         | 24.4        | 13           |
| C-12                       | —            | —          | 4          | —          | —          | —          | —         | —        | —          | 7.7         | 4            |
| C-21                       | —            | —          | 4          | —          | —          | —          | —         | —        | —          | 8.0         | 4            |
| C-22                       | —            | —          | —          | 3          | —          | —          | —         | —        | —          | 10.7        | 3            |
| C-26                       | 15           | 18         | 7          | —          | —          | —          | —         | —        | —          | 3.4         | 40           |
| C-130                      | 30           | 38         | 17         | 26         | 13         | 16         | —         | —        | 85         | 16.5        | 225          |
| KC-135                     | —            | —          | —          | —          | —          | —          | —         | —        | 224        | 35.4        | 224          |
| C-141                      | —            | —          | —          | —          | —          | —          | —         | —        | 16         | 29.2        | 16           |
| HH-60                      | 7            | —          | 11         | —          | —          | —          | —         | —        | —          | 4.8         | 18           |
| F-4                        | —            | —          | —          | —          | —          | —          | —         | —        | 34         | 26.0        | 34           |
| F-15                       | —            | —          | —          | —          | 1          | 74         | 44        | —        | —          | 17.6        | 119          |
| F-16                       | 19           | 81         | 246        | 167        | 122        | 19         | —         | —        | —          | 9.0         | 654          |
| T-43                       | —            | —          | —          | —          | —          | —          | —         | 2        | —          | 21.3        | 2            |
| <b>Total</b>               | <b>71</b>    | <b>137</b> | <b>300</b> | <b>197</b> | <b>177</b> | <b>171</b> | <b>44</b> | <b>5</b> | <b>369</b> | <b>15.9</b> | <b>1,471</b> |
| <b>Percent<sup>a</sup></b> | <b>5</b>     | <b>9</b>   | <b>20</b>  | <b>13</b>  | <b>12</b>  | <b>12</b>  | <b>3</b>  | <b>0</b> | <b>25</b>  |             |              |

<sup>a</sup>Percentages have been rounded.

## The Air Force Reserve Fleet

(As of September 30, 1995)

|                            | Age in Years |           |           |           |           |           |          |          |            | Average     | Total number |
|----------------------------|--------------|-----------|-----------|-----------|-----------|-----------|----------|----------|------------|-------------|--------------|
|                            | 0-3          | 3-6       | 6-9       | 9-12      | 12-15     | 15-18     | 18-21    | 21-24    | 24+        |             |              |
| B-52H                      | —            | —         | —         | —         | —         | —         | —        | —        | 9          | 34.3        | 9            |
| A/OA-10                    | —            | —         | —         | —         | 2         | 42        | —        | —        | —          | 16.0        | 44           |
| C-130E                     | —            | —         | —         | —         | —         | —         | —        | —        | 36         | 32.1        | 36           |
| C-130H                     | 22           | 12        | 24        | 10        | 6         | —         | —        | —        | 1          | 6.9         | 75           |
| HC-130N                    | —            | —         | —         | —         | —         | —         | —        | —        | 6          | 26.0        | 6            |
| HC-130P                    | —            | —         | —         | —         | —         | —         | —        | —        | 8          | 30.5        | 8            |
| WC-130H                    | —            | —         | —         | —         | —         | —         | —        | —        | 10         | 30.2        | 10           |
| C-141B                     | —            | —         | —         | —         | —         | —         | —        | —        | 41         | 29.6        | 41           |
| KC-135E                    | —            | —         | —         | —         | —         | —         | —        | —        | 30         | 36.9        | 30           |
| KC-135R                    | —            | —         | —         | —         | —         | —         | —        | —        | 32         | 34.6        | 32           |
| F-16A/B/C/D                | —            | —         | 55        | 41        | 18        | —         | —        | —        | —          | 10.0        | 114          |
| C-5A                       | —            | —         | —         | —         | —         | —         | —        | —        | 32         | 26.7        | 32           |
| HH-60G                     | —            | 25        | —         | —         | —         | —         | —        | —        | —          | 5.4         | 25           |
| <b>Total</b>               | <b>22</b>    | <b>37</b> | <b>79</b> | <b>51</b> | <b>26</b> | <b>42</b> | <b>0</b> | <b>0</b> | <b>205</b> | <b>19.3</b> | <b>462</b>   |
| <b>Percent<sup>a</sup></b> | <b>5</b>     | <b>8</b>  | <b>17</b> | <b>11</b> | <b>6</b>  | <b>9</b>  | <b>—</b> | <b>—</b> | <b>44</b>  |             |              |

<sup>a</sup>Percentages have been rounded.

Chart does not include five MC-130E aircraft assigned to the 711th SOS, Duke Field, Fla., as of December 31, 1995.



### Air Defense Unit Fin Flashes

| Description  | Aircraft | Unit and Location                           |
|--|----------|---|
| <b>Air National Guard Units</b>                          |          |   |
| Minuteman over Massachusetts                             | F-15A/B  | 102d FW, Otis ANGB, Mass.                   |
| Red stripe with "Happy Hooligans" logo                   | F-16A/B  | 119th FW, Hector IAP, N. D.                 |
| Dark gray bison's skull against prairie/mountain profile | F-16A/B  | 120th FW, Great Falls IAP, Mont.            |
| Subdued hawk with banner in talons                       | F-15A/B  | 123d FS (142d FW), Portland IAP, Ore.       |
| Gray lightning bolt                                      | F-15A/B  | 125th FW, Jacksonville IAP, Fla.            |
| Black falcon with talons extended and "California" logo  | F-16A/B  | 144th FW, Fresno Air Terminal, Calif.       |
| Texas star on subdued jagged stripes with "Houston" logo | F-16A/B  | 147th FW, Ellington Field, Tex.             |
| Stars of Little Dipper constellation and "Duluth" logo   | F-16A/B  | 148th FW, Duluth IAP, Minn.                 |
| Black falcon with "Vermont" on subdued stripe            | F-16A/B  | 158th FW, Burlington IAP, Vt.               |
| Stylized "Jersey Devil" and "New Jersey" logo            | F-16A/B  | 177th FW, Atlantic City Airport, N. J.      |
| <b>Air Defense Training Units (ANG)</b>                  |          |   |
| Subdued eagle and "Oregon" logo                          | F-16A/B  | 114th FS (142d FW), Klamath Falls IAP, Ore. |
| Starburst state flag and "Arizona" logo                  | F-16A/B  | 162d FW, Tucson IAP, Ariz.                  |

### USAF Flying Squadrons by Mission Type

|                                | FY '91     | FY '92     | FY '93     | FY '94     | FY '95     | FY '96<br>1st quarter |
|--------------------------------|------------|------------|------------|------------|------------|-----------------------|
| <b>Active forces</b>           |            |            |            |            |            |                       |
| Heavy bomber                   | 18         | 17         | 15         | 12         | 10         | 10                    |
| Air refueling                  | 35         | 32         | 31         | 25         | 24         | 23                    |
| Strategic command & control    | 6          | 6          | 2          | —          | 1          | 1                     |
| Intelligence                   | 3          | 3          | 3          | —          | —          | —                     |
| Fighter                        | 70         | 61         | 61         | 53         | 54         | 54                    |
| Reconnaissance                 | 1          | 0          | 0          | 0          | 4          | 4                     |
| Electronic warfare             | 2          | 3          | 3          | 4          | 3          | 3                     |
| Special Operations Forces      | 11         | 11         | 11         | 16         | 15         | 16                    |
| Tactical air command & control | 3          | 9          | 9          | 5          | 5          | 5                     |
| Tactical air control           | 7          | 1          | 5          | 7          | 7          | 7                     |
| Weather                        | 1          | 1          | 1          | —          | —          | 1                     |
| Rescue                         | 7          | 8          | 8          | 6          | 6          | 7                     |
| Theater airlift                | 12         | 12         | 12         | 11         | 12         | 12                    |
| Long-range airlift             | 21         | 21         | 21         | 16         | 15         | 15                    |
| Special mission                | 2          | 2          | 2          | 2          | 2          | 2                     |
| Aeromedical airlift            | 3          | 3          | 3          | 3          | 3          | 3                     |
| ICBM                           | 20         | 19         | 19         | 19         | 14         | 14                    |
| Space operations               | 6          | 8          | 8          | 6          | 9          | 10                    |
| Space communications           | 3          | 3          | 3          | 3          | 3          | 2                     |
| Space warning                  | 7          | 7          | 7          | 10         | 11         | 9                     |
| Space surveillance             | 8          | 9          | 9          | 7          | 9          | 7                     |
| Space launch                   | 2          | 3          | 3          | 5          | 5          | 5                     |
| Range                          | 3          | 3          | 3          | 2          | 2          | 2                     |
| <b>Total</b>                   | <b>251</b> | <b>242</b> | <b>239</b> | <b>212</b> | <b>214</b> | <b>212</b>            |
| <b>Reserve forces</b>          |            |            |            |            |            |                       |
| ANG Selected Reserve           | 92         | 91         | 92         | 93         | 99         | 99                    |
| Air Force Reserve              | 58         | 59         | 59         | 59         | 48         | 48                    |
| Space operations               | 0          | 0          | 1          | 1          | 1          | 1                     |
| <b>Total</b>                   | <b>150</b> | <b>150</b> | <b>152</b> | <b>153</b> | <b>148</b> | <b>148</b>            |
| <b>Grand total</b>             | <b>401</b> | <b>392</b> | <b>391</b> | <b>365</b> | <b>362</b> | <b>360</b>            |



## The Active-Duty Fleet

(As of September 30, 1995)

|                            | Age in Years |            |            |            |            |            |            |            |              | Average     | Total number |
|----------------------------|--------------|------------|------------|------------|------------|------------|------------|------------|--------------|-------------|--------------|
|                            | 0-3          | 3-6        | 6-9        | 9-12       | 12-15      | 15-18      | 18-21      | 21-24      | 24+          |             |              |
| A/OA-10                    | —            | —          | —          | 14         | 186        | 31         | —          | —          | —            | 13.9        | 231          |
| B-1                        | —            | —          | 67         | 17         | —          | —          | —          | —          | —            | 8.3         | 84           |
| B-2                        | 10           | 3          | 1          | —          | —          | —          | —          | —          | —            | 2.1         | 14           |
| B-52                       | —            | —          | —          | —          | —          | —          | —          | —          | 85           | 33.8        | 85           |
| C-5                        | —            | —          | 43         | 7          | —          | —          | —          | 23         | 8            | 13.8        | 81           |
| C-9                        | —            | —          | —          | —          | —          | —          | 3          | 9          | 11           | 24.5        | 23           |
| C-10 (KC-10)               | —            | 1          | 11         | 30         | 17         | —          | —          | —          | —            | 10.7        | 59           |
| C-12                       | —            | —          | 2          | 15         | —          | 1          | 26         | —          | —            | 16.0        | 44           |
| C-17                       | 19           | 4          | —          | —          | —          | —          | —          | —          | —            | 1.6         | 23           |
| C-18 <sup>a</sup>          | 2            | —          | —          | —          | 4          | —          | —          | —          | —            | 9.4         | 6            |
| C-20                       | 1            | —          | 9          | 2          | 1          | —          | —          | —          | —            | 8.6         | 13           |
| C-21                       | —            | —          | —          | 78         | —          | —          | —          | —          | —            | 10.7        | 78           |
| C-23                       | —            | —          | —          | 3          | —          | —          | —          | —          | —            | 10.9        | 3            |
| C-25                       | —            | 2          | —          | —          | —          | —          | —          | —          | —            | 4.9         | 2            |
| C-27                       | 4            | 6          | —          | —          | —          | —          | —          | —          | —            | 3.3         | 10           |
| C-130 <sup>b</sup>         | 16           | 17         | 13         | 7          | —          | —          | 50         | 24         | 190          | 23.3        | 317          |
| C-135 <sup>b</sup>         | —            | —          | —          | —          | —          | —          | —          | —          | 317          | 33.7        | 317          |
| C-137 <sup>b</sup>         | —            | 1          | —          | 2          | —          | —          | —          | 1          | 4            | 23.5        | 8            |
| C-141 <sup>b</sup>         | —            | —          | —          | —          | —          | —          | —          | —          | 185          | 29.0        | 185          |
| E-3                        | —            | —          | —          | 3          | 8          | 13         | 9          | —          | —            | 15.9        | 33           |
| E-4                        | —            | —          | —          | —          | —          | —          | 2          | 2          | —            | 21.3        | 4            |
| E-9                        | —            | 2          | —          | —          | —          | —          | —          | —          | —            | 3.0         | 2            |
| F-4 <sup>b</sup>           | —            | —          | —          | —          | —          | —          | —          | —          | 40           | 25.4        | 40           |
| F-15                       | 36           | 119        | 120        | 102        | 140        | 105        | 5          | 1          | —            | 10.0        | 628          |
| F-16                       | 191          | 321        | 143        | 99         | 17         | 9          | —          | —          | —            | 5.4         | 780          |
| F-111                      | —            | —          | —          | —          | —          | —          | 12         | 64         | 66           | 24.3        | 142          |
| F-117 <sup>c</sup>         | —            | 57         | —          | —          | —          | —          | —          | —          | —            | 4.4         | 57           |
| G-3                        | 1            | 3          | —          | —          | —          | —          | —          | —          | —            | 4.2         | 4            |
| G-4                        | 1            | 1          | 1          | —          | 3          | 5          | —          | —          | —            | 12.5        | 11           |
| G-7                        | —            | —          | 4          | 1          | 4          | —          | —          | —          | —            | 10.0        | 9            |
| G-9                        | —            | —          | 4          | —          | —          | —          | —          | —          | —            | 8.6         | 4            |
| G-11                       | 2            | —          | —          | —          | —          | —          | —          | —          | —            | 0.2         | 2            |
| H-1                        | —            | —          | —          | —          | —          | —          | —          | 14         | 66           | 24.3        | 80           |
| H-53                       | —            | 1          | 6          | —          | —          | —          | 1          | 5          | 34           | 22.6        | 47           |
| H-60                       | 5            | 29         | 12         | 2          | 8          | —          | —          | —          | —            | 6.4         | 56           |
| T-1A                       | 102          | 21         | —          | —          | —          | —          | —          | —          | —            | 1.7         | 123          |
| T-3                        | 95           | —          | —          | —          | —          | —          | —          | —          | —            | 0.7         | 95           |
| T-37                       | —            | —          | —          | —          | —          | —          | —          | —          | 461          | 32.5        | 461          |
| T-38                       | —            | —          | —          | —          | —          | —          | —          | 12         | 459          | 28.0        | 471          |
| T-39                       | —            | —          | —          | —          | —          | —          | —          | —          | 3            | 34.6        | 3            |
| T-41                       | —            | —          | —          | —          | —          | —          | —          | —          | 3            | 25.5        | 3            |
| T-43                       | —            | —          | —          | —          | —          | —          | —          | 12         | —            | 21.6        | 12           |
| U-2                        | —            | 1          | 10         | 13         | 7          | —          | —          | —          | 5            | 12.3        | 36           |
| V-18                       | —            | —          | —          | —          | —          | —          | 2          | —          | —            | 18.0        | 2            |
| <b>Total</b>               | <b>485</b>   | <b>589</b> | <b>446</b> | <b>395</b> | <b>395</b> | <b>164</b> | <b>110</b> | <b>167</b> | <b>1,937</b> | <b>17.8</b> | <b>4,688</b> |
| <b>Percent<sup>d</sup></b> | <b>10</b>    | <b>13</b>  | <b>10</b>  | <b>8</b>   | <b>8</b>   | <b>3</b>   | <b>2</b>   | <b>4</b>   | <b>41</b>    |             |              |

<sup>a</sup>Includes EC-18

<sup>b</sup>Includes all types

<sup>c</sup>Includes YF-117

<sup>d</sup>Percentages have been rounded.



## USAF Aircraft Tail Markings (As of April 1, 1996)

| Code | Aircraft  | Unit, Location, and Command   | Code | Aircraft   | Unit, Location, and Command   |
|------|---|---|------|--|---|
| AK   | F-16C/D, A/OA-10A<br>F-15C/D/E,<br>C-130H, C-12F,<br>E-3B         | 354th FW, Eielson AFB, Alaska (PACAF)<br>3d Wing, Elmendorf AFB, Alaska (PACAF) | MK   | C-130H   | 440th AW, General Mitchell IAP/ARS, Wis. (AFRES)                              |
| AL   | F-16C/D   | 187th FW, Dannelly Field, Ala. (ANG)  | MM   | UH-1N  | 341st MW, Malmstrom AFB, Mont. (AFSPC)  |
| AU   | C-21A   | 42d ABW, Maxwell AFB, Ala. (AETC)   | MN   | C-130E   | 133d AW, Minneapolis-St. Paul IAP/ARS, Minn. (ANG)                            |
| AV   | F-16C/D   | 31st FW, Aviano AB, Italy (USAFE)   | MO   | KC-135R,<br>F-15C/D/E, F-16C/D,<br>B-1B                        | 366th Wing, Mountain Home AFB, Idaho (ACC)                                    |
| AZ   | F-16A/B/C/D   | 162d FW, Tucson IAP, Ariz. (ANG)  | MS   | C-130E   | 934th AW, Minneapolis-St. Paul IAP/ARS, Minn. (AFRES)                         |
| BB   | U-2R/S, U-2RT/ST,<br>T-38A  | 9th RW, Beale AFB, Calif. (ACC)   | MT   | B-52H<br>UH-1H   | 5th BW, Minot AFB, N. D. (ACC)<br>91st MW, Minot AFB, N. D. (AFSPC)           |
| BC   | A/OA-10A  | 110th FW, W. K. Kellogg Airport, Mich. (ANG)                                    | MX   | C-130H   | 908th AW, Maxwell AFB, Ala. (AFRES)   |
| BD   | A/OA-10A, B-52H   | 917th Wing, Barksdale AFB, La. (AFRES)  | MY   | F-16C/D,<br>A/OA-10A, C-130E                                   | 347th Wing, Moody AFB, Ga. (ACC)  |
| CA   | HH-60G, HC-130P   | 129th Rescue Wing, Moffett Federal Airfield, Calif. (ANG)                       | NF   | C-130H   | 914th AW, Niagara Falls IAP/ARS, N. Y. (AFRES)                                |
| CB   | T-37B, AT-38B,<br>T-38A   | 14th FTW, Columbus AFB, Miss. (AETC)  | NM   | F-16C/D  | 150th FW, Kirtland AFB, N. M. (ANG)   |
| CC   | F-16C/D, F-111F,<br>EF-111A                                       | 27th FW, Cannon AFB, N. M. (ACC)  | NO   | F-16C/D  | 926th FW, NAS JRB New Orleans, La. (AFRES)                                    |
| CI   | C-130E  | 146th AW, Channel Islands ANGB, Calif. (ANG)                                    | NY   | F-16C/D  | 174th FW, Syracuse Hancock IAP, N. Y. (ANG)                                   |
| CO   | F-16C/D   | 140th FW, Buckley ANGB, Colo. (ANG)   | OF   | C-135<br>(all variations<br>except OC-135B),<br>C-21A          | 55th Wing, Offutt AFB, Neb. (ACC)   |
| CR   | C-130H  | 302d AW, Peterson AFB, Colo. (AFRES)  | OH   | F-16C/D  | 178th FW, Springfield-Beckley MAP, Ohio (ANG)                                 |
| CS   | C-21A   | 21st SPW, Peterson AFB, Colo. (AFSPC)   | OK   | F-16C/D  | 180th FW, Toledo Express Airport, Ohio (ANG)                                  |
| CT   | A-10A   | 103d FW, Bradley IAP, Conn. (ANG)   | PA   | E-3B/C, TC-18E   | 138th FW, Tulsa IAP, Okla. (ANG)  |
| DB   | C-130H  | 94th AW, Dobbins ARB, Ga. (AFRES)   | PD   | C-130H   | 552d ACW, Tinker AFB, Okla. (ACC)   |
| DC   | F-16C/D   | 113th FW, Andrews AFB, Md. (ANG)  | OS   | OA-10A, F16C/D,<br>C-12F                                       | 137th AW, Will Rogers World Airport, Okla. (ANG)                              |
| DE   | C-130H  | 166th AW, New Castle County Airport, Del. (ANG)                                 | OT   | Various  | 51st FW, Osan AB, South Korea (PACAF)   |
| DM   | A/OA-10A,<br>EC-130E/H  | 355th Wing, Davis-Monthan AFB, Ariz. (ACC)                                      | PR   | Various  | 53d Wing, Eglin AFB, Fla. (ACC)   |
| DR   | HH-60G  | 939th Rescue Wing, Davis-Monthan AFB, Ariz. (AFRES)                             | PI   | C-130H   | 79th TEG, Cannon AFB, N. M. (ACC)   |
| DY   | B-1B, C-130H  | 7th Wing, Dyess AFB, Tex. (ACC)   | PD   | OA-10A   | 79th TEG, Eglin AFB, Fla. (ACC)   |
| ED   | Various   | 412th TW, Edwards AFB, Calif. (AFMC)  | PE   | HC-130P, HH-60G,<br>C-130E                                     | 111th FW, Willow Grove ARS, Pa. (ANG)   |
| EG   | F-15C/D   | 33d FW, Eglin AFB, Fla. (ACC)   | PF   | HC-130P, HH-60G,<br>C-130                                      | 939th Rescue Wing, Portland IAP, Ore. (AFRES)                                 |
| EL   | B-1B  | 28th BW, Ellsworth AFB, S. D. (ACC)   | PG   | HC-130P, HH-60G,<br>C-130E                                     | 911th AW, Pittsburgh IAP/ARS, Pa. (AFRES)                                     |
| EN   | T-37B, T-38A,<br>AT-38B   | 80th FTW, Sheppard AFB, Tex. (AETC)   | PH   | C-130H   | 156th FW, Puerto Rico IAP, Puerto Rico (ANG)                                  |
| ET   | F-15A/B/C/D/E,<br>F-16A/B/C/D,<br>F-111F, EF-111,<br>UH-1N, T-38A | 46th TW, Eglin AFB, Fla. (AFMC)   | PI   | C-130H   | 139th AW, Rosecrans Memorial Airport, Mo. (ANG)                               |
| FC   | UH-1N   | 336th TG, Fairchild AFB, Wash. (AETC)   | PL   | C-130H   | 12th FTW, Hondo MAP, Tex. (AETC)  |
| FE   | UH-1N   | 90th MW, F. E. Warren AFB, Wyo. (AFSPC)   | PM   | C-130H   | 12th FTW, Randolph AFB, Tex. (AETC)   |
| FF   | C-21A, F-15C/D<br>HH-60G,<br>HC-130N/P, C-130E                    | 1st FW, Langley AFB, Va. (ACC)<br>1st FW, Patrick AFB, Fla. (ACC)               | PN   | T-3A<br>T-1A, C-21A,<br>T-37B, T-38A,<br>AT-38B, T-43A         | 143d AW, Quonset State Airport, R. I. (ANG)                                   |
| FL   | HC-130N, HH-60G,<br>C-130   | 939th Rescue Wing, Patrick AFB, Fla. (AFRES)                                    | PO   | C-130E   | 86th AW, Ramstein AB, Germany (USAFE)   |
| FM   | F-16C/D   | 482d FW, Homestead ARS, Fla. (AFRES)  | PP   | C-130E   | 149th FW, Kelly AFB, Tex. (ANG)   |
| FS   | F-16C/D   | 188th FW, Fort Smith MAP, Ark. (ANG)  | PQ   | F-16C/D  | 183d FW, Capital MAP, Ill. (ANG)  |
| FT   | A-10A, C-130E,<br>F-16C/D   | 23d Wing, Pope AFB, N. C. (ACC)   | PR   | F-15E  | 4th FW, Seymour Johnson AFB, N. C. (ACC)                                      |
| FW   | F-16C/D   | 122d FW, Fort Wayne IAP, Ind. (ANG)   | PS   | F-15A/B  | 131st FW, Lambert-St. Louis IAP, Mo. (ANG)                                    |
| GA   | B-1B<br>C-130H  | 116th BW, Robins AFB, Ga. (ANG)<br>165th AW, Savannah IAP, Ga. (ANG)            | PT   | A-10A, EF-111A,<br>F-111F, T-38A                               | Sacramento ALC, McClellan AFB, Calif. (AFMC)                                  |
| GF   | HH-1H   | 321st MG, Grand Forks AFB, N. D. (AFSPC)  | PU   | A/OA-10A,<br>F-15C/D, F-16C/D                                  | 52d FW, Spangdahlem AB, Germany (USAFE)                                       |
| GI   | F-16C/D   | 419th FW, Hill AFB, Utah (AFRES)  | PV   | OA-10A, F-16C/D  | 20th FW, Shaw AFB, S. C. (ACC)  |
| GL   | F-16C/D   | 388th FW, Hill AFB, Utah (ACC)  | PW   | F-16C/D  | 301st FW, NAS Forth Worth JRB Carswell Field, Tex. (AFRES)                    |
| GO   | F-117A, T-38A,<br>AT-38B, HH-60G,<br>F-4E                         | 49th FW, Holloman AFB, N. M. (ACC)<br>Luftwaffe RTU, Holloman AFB, N. M.        | PX   | F-16C/D  | 181st FW, Hulman Regional Airport, Ind. (ANG)                                 |
| HT   | AT-38B  | 46th TG, Holloman AFB, N. M. (AFMC)   | PY   | F-15C/D  | 325th FW, Tyndall AFB, Fla. (AETC)  |
| HV   | UH-1N   | 30th SPW, Vandenberg AFB, Calif. (AFSPC)  | PZ   | F-16C/D  | 192d FW, Richmond IAP, Va. (ANG)  |
| HW   | C-21A, C-27A,<br>CT-43A   | 24th Wing, Howard AFB/Albrook AFS, Panama (ACC)                                 | QA   | T-37B, T-38A,<br>T-1A  | 71st FTW, Vance AFB, Okla. (AETC)   |
| IX   | C-130E  | 182d AW, Greater Peoria Airport, Ill. (ANG)                                     | QB   | C-130H   | 928th AW, O'Hare IAP/ARS, Ill. (AFRES)  |
| IS   | HH-60G  | 85th Group, NAS Keflavik, Iceland (ACC)   | QC   | Various  | 57th Wing, Nellis AFB, Nev. (ACC)   |
| JS   | E-8A/B/C  | Code is reserved for use on Joint STARS aircraft.                               | QD   | E-9A   | 475th Weapons Evaluation Group, Tyndall AFB, Fla. (ACC)                       |
| JZ   | F-15A/B   | 159th FW, NAS JRB New Orleans, La. (ANG)  | QE   | C-130E   | 913th AW, Willow Grove ARS, Pa. (AFRES)                                       |
| KC   | A/OA-10A  | 442d FW, Whiteman AFB, Mo. (AFRES)  | QF   | F-16C/D  | 115th FW, Truax Field, Wis. (ANG)   |
| KS   | C-12F, C-21A  | 81st TG, Keesler AFB, Miss. (AETC)  | QG   | B-2A, T-38A  | 509th BW, Whiteman AFB, Mo. (ACC)   |
| KT   | C-130E  | 403d Wing, Keesler AFB, Miss. (AFRES)   | QH   | F-16C/D  | 8th FW, Kunsan AB, South Korea (PACAF)  |
| KY   | C-130H  | 123d AW, Louisville IAP, Ky.  | QI   | C-130H   | 167th AW, Eastern West Virginia Regional Airport/Shepherd Field, W. Va. (ANG) |
| LA   | B-52H   | 2d BW, Barksdale AFB, La. (ACC)   | QJ   | 153d AW, Cheyenne MAP, Wyo. (ANG)                              | 153d AW, Cheyenne MAP, Wyo. (ANG)   |
| LB   | T-37B, T-38A, T-1A  | 64th FTW, Reese AFB, Tex. (AETC)  | QK   | C-21A, C-130E/H,<br>UH-1N                                      | 47th FTW, Laughlin AFB, Tex. (AETC)   |
| LF   | F-16A/B/C/D   | 56th FW, Luke AFB, Ariz. (AETC)   | QL   | C-130H   | 374th AW, Yokota AB, Japan (PACAF)  |
| LK   | C-130E/H  | 314th AW, Little Rock AFB, Ark. (ACC)   | QM   | 910th AW, Youngstown/Warren Regional Airport/ARS, Ohio (AFRES) | 910th AW, Youngstown/Warren Regional Airport/ARS, Ohio (AFRES)                |
| LN   | F-15C/D/E   | 48th FW, RAF Lakenheath, UK (USAFE)   | QN   | F-15C/D, E-3B,<br>KC-135R, HH-60G                              | 18th Wing, Kadena AB, Japan (PACAF)   |
| LR   | F-16C/D   | 944th FW, Luke AFB, Ariz. (AFRES)   |      |  |   |
| MA   | A-10A   | 104th FW, Barnes MAP, Mass. (ANG)   |      |  |   |
| MD   | A-10A   | 175th Wing, Baltimore, Md. (ANG)  |      |  |   |
| MI   | F-16A/B   | 127th Wing, Selfridge ANGB, Mich. (ANG)   |      |  |   |
| MJ   | F-16C/D   | 35th FW, Misawa AB, Japan (PACAF)   |      |  |   |

Sources: USAF; Maj. Wally Van Winkle, AFRES; and William R. Peake.

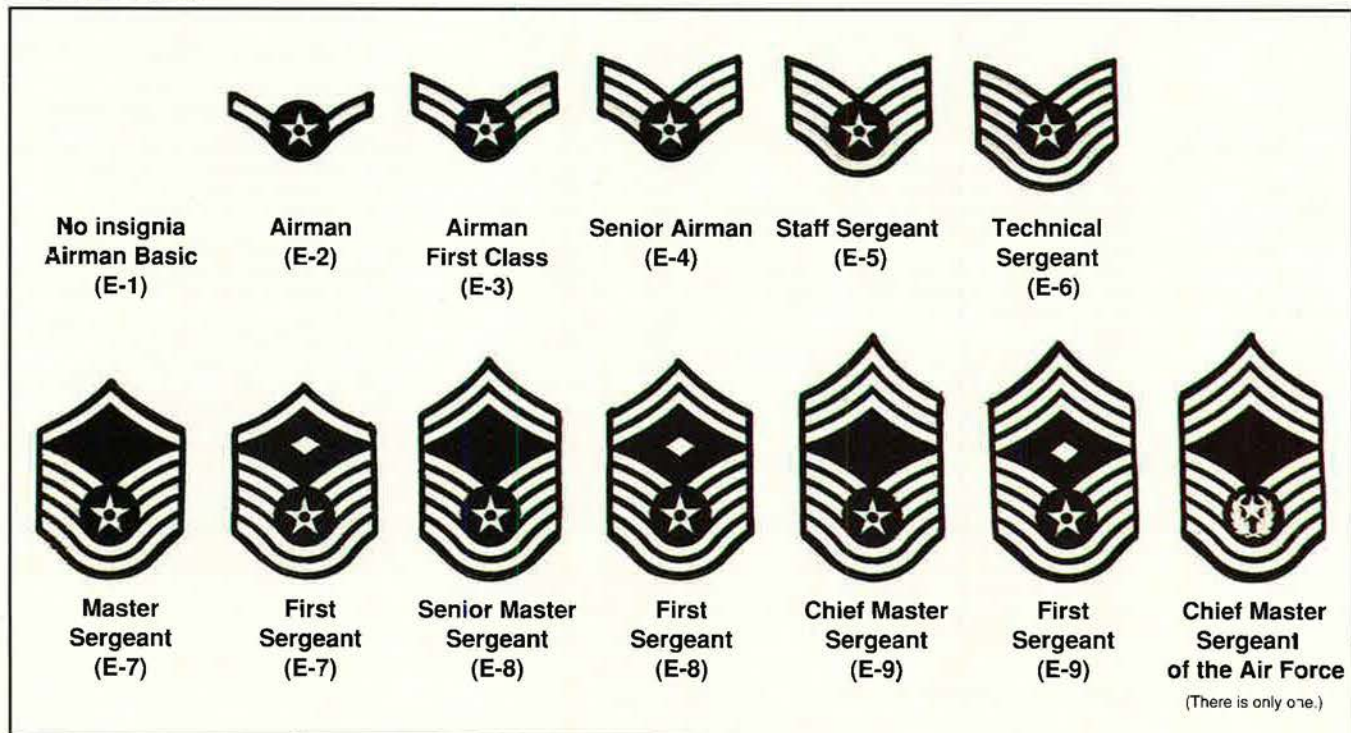


# USAF Grades and Insignia

## Officer



## Enlisted





# Awards and Decorations

This display represents, in correct order of precedence, ribbons most likely to be worn by members of today's Air Force. For information regarding ribbons not depicted, refer to AFI 36-2903 and AFR 900-48.



\*Also awarded with gold, silver, or bronze devices. The gold frame on the ribbon denotes a unit citation; without, an individual citation.



## T-38C Talon

A continued  
commitment to advanced  
pilot training.

Our new avionics upgrade package is strong evidence of Northrop Grumman's commitment to the T-38. As the T-38's Original Equipment Manufacturer (OEM), our commitment today is complemented by our teammates: Hughes Training, the OEM for the T-38 simulator, and EFW. Further, our team's upgrade experience with F-5 advanced avionics, coupled with our expertise in designing and integrating other complex platforms, gives us a decided advantage in modernizing the advanced trainer for tomorrow's front-line combat aircraft. Together, we will employ off-the-shelf hardware integrated with existing, operationally proven software to avoid nonrecurring engineering costs and ensure that our aircraft, training device, and support package is the most cost-effective and low-risk solution. The result: the USAF will be able to bring future pilots to combat readiness in less time, with less expense. Northrop Grumman. The right technologies. Right now.

**NORTHROP GRUMMAN**





# USAF Leaders Through the Years

## Secretaries of the Air Force

|                                  |                                 |                |
|----------------------------------|---------------------------------|----------------|
| Stuart Symington                 | Sept. 18, 1947                  | Apr. 24, 1950  |
| Thomas K. Finletter              | Apr. 24, 1950                   | Jan. 20, 1953  |
| Harold E. Talbott                | Feb. 4, 1953                    | Aug. 13, 1955  |
| Donald A. Quarles                | Aug. 15, 1955                   | Apr. 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 (acting)         | May 15, 1973                    | July 18, 1973  |
| John L. McLucas                  | July 18, 1973                   | Nov. 23, 1975  |
| James W. Plummer (acting)        | Nov. 24, 1975                   | Jan. 1, 1976   |
| Thomas C. Reed                   | Jan. 2, 1976                    | Apr. 6, 1977   |
| John C. Stetson                  | Apr. 6, 1977                    | May 18, 1979   |
| Hans Mark (acting)               | May 18, 1979                    | July 26, 1979  |
| Hans Mark                        | July 26, 1979                   | Feb. 9, 1981   |
| Verne Orr                        | Feb. 9, 1981                    | Nov. 30, 1985  |
| Russell A. Rourke                | Dec. 9, 1985                    | Apr. 7, 1986   |
| Edward C. Aldridge, Jr. (acting) | Apr. 8, 1986                    | June 8, 1986   |
| Edward C. Aldridge, Jr.          | June 9, 1986                    | Dec. 16, 1988  |
| James F. McGovern (acting)       | Dec. 16, 1988                   | Apr. 29, 1989  |
| John J. Welch, Jr. (acting)      | Apr. 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)  | Gen. Merrill A. McPeak (acting) | Aug. 5, 1993   |
| Sheila E. Widnall                | Aug. 6, 1993                    |                |

## USAF Chiefs of Staff

|                           |                |                |
|---------------------------|----------------|----------------|
| Gen. Carl A. Spaatz       | Sept. 26, 1947 | Apr. 29, 1948  |
| Gen. Hoyt S. Vandenberg   | Apr. 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 M. 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  |                |

## Chief Master Sergeants of the Air Force

|                          |               |                |
|--------------------------|---------------|----------------|
| CMSAF Paul W. Airey      | Apr. 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. Pflingston | Aug. 1, 1990  | Oct. 25, 1994  |
| CMSAF David J. Campanale | Oct. 26, 1994 |                |

## 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 | Apr. 4, 1996  |
| Gen. Richard E. Hawley          | Apr. 5, 1996  |               |

## Air (Aerospace) Defense Command

|   |                |                |
|---|----------------|----------------|
| Lt. Gen. George E. Stratemeyer            | Mar. 27, 1946  | Nov. 30, 1948  |
| Maj. Gen. Gordon P. Saville               | Dec. 1, 1948   | Sept. 1, 1949  |
| Lt. Gen. Ennis C. Whitehead               | Jan. 8, 1951   | Aug. 24, 1951  |
| Gen. Benjamin W. Childlaw                 | 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                    | Mar. 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                | Mar. 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  | Mar. 31, 1980 |

Discontinued July 1, 1950. Reestablished as a major command and organized Jan. 1, 1951. Redesignated Aerospace Defense Command Jan. 15, 1968.

## Air Education and Training Command

|                           |               |               |
|---------------------------|---------------|---------------|
| Gen. Henry Viccellio, Jr. | July 1, 1993  | June 19, 1995 |
| Gen. Billy J. Boles       | June 20, 1995 |               |

## 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, Jr. | July 1, 1965  | Oct. 31, 1965 |
| Maj. Gen. Richard P. Klocko      | Nov. 1, 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  | July 1, 1979  |
| Maj. Gen. Robert T. Herres       | July 1, 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 | Mar. 29, 1988 |
| Maj. Gen. James S. Cassity, Jr.  | Mar. 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 Nov. 15, 1979. Now Air Force Command, Control, Communications, and Computer Agency, an FOA.

## Air Force Intelligence Command

|                                 |              |              |
|---------------------------------|--------------|--------------|
| Maj. Gen. Gary W. O'Shaughnessy | Oct. 1, 1991 | June 1, 1993 |
| Maj. Gen. Kenneth A. Minihan    | June 2, 1993 | Oct. 1, 1993 |

Now Air Intelligence Agency, an FOA.

## Air Force Logistics Command

|                                    |                |                |
|------------------------------------|----------------|----------------|
| 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          | Mar. 1, 1959   | Mar. 14, 1959  |
| Gen. Samuel E. Anderson            | Mar. 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  | Mar. 28, 1968  |
| Gen. Jack G. Merrell               | Mar. 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. 27, 1978  |
| Gen. Bryce Poe II                  | Jan. 28, 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   |

Formerly Air Materiel Command. Redesignated Air Force Logistics Command Apr. 1, 1961. Inactivated July 1, 1992.

## Air Force Materiel Command

|                           |               |               |
|---------------------------|---------------|---------------|
| Gen. Ronald W. Yates      | July 1, 1992  | June 30, 1995 |
| Gen. Henry Viccellio, Jr. | June 30, 1995 |               |

## Air Force Reserve

|                                     |               |               |
|-------------------------------------|---------------|---------------|
| Maj. Gen. Rollin B. Moore, Jr.      | Aug. 1, 1968  | Jan. 26, 1972 |
| Brig. Gen. Alfred Verhulst (acting) | Jan. 27, 1972 | Mar. 15, 1972 |
| Maj. Gen. Homer I. Lewis            | Mar. 16, 1972 | Apr. 8, 1975  |
| Maj. Gen. William Lyon              | Apr. 16, 1975 | Apr. 16, 1979 |
| Maj. Gen. Richard Bodycombe         | Apr. 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 |



## USAF Leaders Through the Years

Maj. Gen. John J. Closner III Nov. 1, 1990 Oct. 31, 1994  
 Maj. Gen. Robert A. McIntosh Nov. 1, 1994

AFRES and ANG primary responsibilities came under Continental Air Command 1948-68. Since Mar. 16, 1972, the Chief of Air Force Reserve has also been Commander, Hq. Air Force Reserve (AFRES). Maj. Gen. Thomas Marchbanks, Jr., served as Chief, Air Force Reserve, from Jan. 18, 1968, to Feb. 1, 1971.

### 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 Mar. 29, 1990  
 Lt. Gen. Thomas S. Moorman, Jr. Mar. 29, 1990 Mar. 23, 1992  
 Gen. Donald J. Kutyna Mar. 23, 1992 July 1, 1992  
 Gen. Charles A. Horner July 1, 1992 Sept. 13, 1994  
 Gen. Joseph W. Ashy Sept. 13, 1994

### 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

### 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 Apr. 14, 1954  
 Lt. Gen. Thomas S. Power Apr. 15, 1954 June 30, 1957  
 Maj. Gen. John W. Sessums, Jr. July 1, 1957 July 31, 1957  
 Lt. Gen. Samuel E. Anderson Aug. 1, 1957 Mar. 9, 1959  
 Maj. Gen. John W. Sessums, Jr. Mar. 10, 1959 Apr. 24, 1959  
 Gen. Bernard A. Schriever Apr. 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 Mar. 13, 1978  
 Gen. Alton D. Slay Mar. 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 Apr. 1, 1990  
 Gen. Ronald W. Yates Apr. 1, 1990 July 1, 1992

Formerly Air Research and Development Command. Redesignated Air Force Systems Command Apr. 1, 1961. Inactivated July 1, 1992.

### 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

### Air National Guard

Col. William A. R. Robertson Nov. 28, 1945 Oct. 1948  
 Maj. Gen. George G. Finch Oct. 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 Apr. 19, 1974  
 Maj. Gen. John J. Pesch Apr. 20, 1974 Jan. 31, 1977  
 Maj. Gen. John T. Guice Feb. 1, 1977 Apr. 1, 1981  
 Maj. Gen. John B. Conaway Apr. 1, 1981 Nov. 1, 1988  
 Maj. Gen. Philip G. Killey Nov. 1, 1988 Jan. 28, 1994  
 Maj. Gen. Donald W. Shepperd Jan. 28, 1994

AFRES and ANG primary responsibilities came under Continental Air Command 1948-68. Since Mar. 16, 1972, the Chief of Air National Guard has also been Commander, Hq. Air National Guard (ANG).

### Air Proving Ground Command

Maj. Gen. Carl A. Brandt Oct. 1946 Aug. 1948  
 Maj. Gen. William E. Kepner Aug. 1948 June 1950  
 Maj. Gen. Bryant L. Boatner July 1950 July 1952  
 Maj. Gen. Patrick W. Timberlake July 1952 Apr. 1955  
 Maj. Gen. Robert W. Burns Aug. 1955 July 1957

Now Air Force Development Test Center, Eglin AFB, Fla.

### Air Training Command

Lt. Gen. Barton K. Yount July 7, 1943 Sept. 26, 1945  
 Maj. Gen. James P. Hodges Sept. 27, 1945 Apr. 12, 1946  
 Lt. Gen. John K. Cannon Apr. 13, 1946 Oct. 13, 1948  
 Lt. Gen. Robert W. Harper Oct. 14, 1948 June 30, 1954  
 Maj. Gen. Glenn O. Barcus 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 Apr. 1, 1979  
 Gen. Bennie L. Davis Apr. 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  
 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 30, 1993

Merged with Air University to form Air Education and Training Command July 1, 1993.

### Air University

Maj. Gen. Muir S. Fairchild Mar. 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  
 Lt. Gen. Laurence S. Kuter Apr. 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

Air University was part of Air Training Command between May 1978 and July 1983. Merged with Air Training Command to form Air Education and Training Command 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  
 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  
 Maj. Gen. Wendell W. Bowman July 26, 1961 Aug. 8, 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, 1973 Mar. 2, 1974  
 Maj. Gen. Jack K. Gamble Mar. 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 Apr. 1, 1981  
 Lt. Gen. Lynwood E. Clark Apr. 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

Now 11th Air Force.

### Continental Air Command

Lt. Gen. Ennis C. Whitehead Apr. 5, 1949 Jan. 1, 1951  
 Maj. Gen. Willis H. Hale Jan. 1, 1951 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



**Electronic Security 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. K. 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   | Apr. 16, 1985  |
| Maj. Gen. Paul H. Martin        | Apr. 17, 1985  | Aug. 14, 1989  |
| Maj. Gen. Gary W. O'Shaughnessy | Aug. 15, 1989  | Oct. 1, 1991   |

Formerly USAF Security Service. Redesignated Electronic Security Command Aug. 1, 1979. Redesignated Air Force Intelligence Command Oct. 1, 1991.

**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 A. 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  | Apr. 30, 1972 |
| Maj. Gen. John L. Locke       | May 1, 1972   | Feb. 25, 1974 |
| Maj. Gen. M. R. Reilly        | Feb. 26, 1974 | Aug. 1975     |
| Maj. Gen. William C. Norris   | Sept. 1, 1975 | June 30, 1976 |

Established as Bolling Field; organized Dec. 15, 1946. Redesignated Headquarters Command, USAF, Mar. 17, 1958. Inactivated in 1976.

**Military Airlift Command**

|                            |                |                |
|----------------------------|----------------|----------------|
| 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 |
| Gen. Paul K. Carlton       | Sept. 20, 1972 | Mar. 31, 1977  |
| Gen. William G. Moore, Jr. | Apr. 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   |

Formerly Military Air Transport Service. Redesignated Military Airlift Command Jan. 1, 1966. Inactivated June 1, 1992.

**Pacific Air Forces**

|                                      |               |                |
|--------------------------------------|---------------|----------------|
| Lt. Gen. Ennis C. Whitehead          | Dec. 30, 1945 | Apr. 25, 1949  |
| Lt. Gen. George E. Stratemeyer       | Apr. 26, 1949 | May 20, 1951   |
| Lt. Gen. Earle E. Partridge (acting) | May 21, 1951  | June 9, 1951   |
| Gen. O. P. Weyland                   | June 10, 1951 | Mar. 25, 1954  |
| Gen. Earle E. Partridge              | Mar. 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 |                |

Formerly Far East Air Forces. Redesignated Pacific Air Forces July 1, 1957.

**Strategic Air Command**

|                           |               |               |
|---------------------------|---------------|---------------|
| Gen. George C. Kenney     | Mar. 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 | Apr. 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. B. 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  |

Inactivated June 1, 1992.

**Tactical Air Command**

|                             |               |                |
|-----------------------------|---------------|----------------|
| Lt. Gen. E. R. Quesada      | Mar. 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 | Mar. 31, 1954  |
| Gen. O. P. Weyland          | Apr. 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 M. Momyer      | Aug. 1, 1968  | Sept. 30, 1973 |
| Gen. Robert J. Dixon        | Oct. 1, 1973  | Apr. 30, 1978  |
| Gen. W. L. Creech           | May 1, 1978   | Nov. 1, 1984   |
| Gen. Jerome F. O'Malley     | Nov. 1, 1984  | Apr. 20, 1985  |
| Gen. Robert D. Russ         | May 22, 1985  | Mar. 26, 1991  |
| Gen. John Michael Loh       | Mar. 27, 1991 | June 1, 1992   |

Inactivated June 1, 1992.

**US Air Forces in Europe**

|                               |               |               |
|-------------------------------|---------------|---------------|
| Brig. Gen. John F. McBain     | Aug. 15, 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   | Apr. 12, 1989 |
| Gen. Michael J. Dugan         | Apr. 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 | Apr. 4, 1996  |
| Gen. Michael E. Ryan          | Apr. 4, 1996  |               |

**US Air Forces Southern Command/Caribbean**

|                                 |                |               |
|---------------------------------|----------------|---------------|
| 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  | Apr. 7, 1972  |
| Maj. Gen. Arthur G. Salisbury   | Apr. 7, 1972   | Nov. 1, 1974  |
| Maj. Gen. James M. Breedlove    | Oct. 1974      | Jan. 1, 1976  |

**USAF Academy Superintendents**

|                                 |               |               |
|---------------------------------|---------------|---------------|
| Lt. Gen. Hubert R. Harmon       | July 27, 1954 | July 27, 1956 |
| Maj. Gen. James E. Briggs       | July 28, 1956 | Aug. 16, 1959 |
| Maj. Gen. William S. Stone      | Aug. 17, 1959 | June 30, 1962 |
| Maj. Gen. Robert H. Warren      | July 9, 1962  | June 30, 1965 |
| Lt. Gen. Thomas S. Moorman, Sr. | July 1, 1965  | July 31, 1970 |
| Lt. Gen. Albert P. Clark        | Aug. 1, 1970  | July 31, 1974 |
| Lt. Gen. James R. Allen         | Aug. 1, 1974  | June 27, 1977 |
| Lt. Gen. Kenneth L. Tallman     | June 28, 1977 | June 15, 1981 |
| Maj. Gen. Robert E. Kelley      | June 16, 1981 | June 15, 1983 |
| Lt. Gen. Winfield W. Scott, Jr. | June 16, 1983 | June 25, 1987 |
| Lt. Gen. Charles R. Hamm        | June 26, 1987 | July 1, 1991  |
| Lt. Gen. Bradley C. Hosmer      | July 1, 1991  | July 7, 1994  |
| Lt. Gen. Paul E. Stein          | July 8, 1994  |               |



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## USAF Medal of Honor Recipients

### Names, Alphabetically by Wars, and Rank at Time of Action

| Names, Alphabetically<br>by Wars, and Rank<br>at Time of Action | Home Town              | Date and Place of Action                    | Present Address or Date of Death      |
|---|------------------------|---|---------------------------------------|
| <b>World War I</b>  |                        |   |                                       |
| Bleckley, 2d Lt. Erwin R.                                       | Wichita, Kan.          | Oct. 6, 1918, Binarville, France            | KIA Oct. 6, 1918                      |
| Goettler, 2d Lt. Harold E.                                      | Chicago, Ill.          | Oct. 6, 1918, Binarville, France            | KIA Oct. 6, 1918                      |
| Luke, 2d Lt. Frank, Jr.   | Phoenix, Ariz.         | Sept. 29, 1918, Murvaux, France             | KIA Sept. 29, 1918                    |
| Rickenbacker, Capt. Edward V.                                   | Columbus, Ohio         | Sept. 25, 1918, Billy, France               | Died July 23, 1973                    |
| <b>World War II</b>   |                        |   |                                       |
| Baker, Lt. Col. Addison E.                                      | Chicago, Ill.          | Aug. 1, 1943, Ploesti, Romania              | KIA Aug. 1, 1943                      |
| Bong, Maj. Richard I.   | Poplar, Wis.           | Oct. 10–Nov. 15, 1944, Southwest Pacific    | Killed Aug. 6, 1945, Burbank, Calif.  |
| Carswell, Maj. Horace S., Jr.                                   | Fort Worth, Tex.       | Oct. 26, 1944, South China Sea              | KIA Oct. 26, 1944                     |
| Castle, Brig. Gen. Frederick W.                                 | Manila, P. I.          | Dec. 24, 1944, Liège, Belgium               | KIA Dec. 24, 1944                     |
| Cheli, Maj. Ralph   | San Francisco, Calif.  | Aug. 18, 1943, Wewak, New Guinea            | Died while POW, Mar. 6, 1944          |
| Craw, Col. Demas T.   | Traverse City, Mich.   | Nov. 8, 1942, Port Lyautey, French Morocco  | KIA Nov. 8, 1942                      |
| Doolittle, Lt. Col. James H.                                    | Alameda, Calif.        | Apr. 18, 1942, Tokyo, Japan                 | Died Sept. 27, 1993                   |
| Erwin, SSgt. Henry E.   | Adamsville, Ala.       | Apr. 12, 1945, Koriyama, Japan              | Leeds, Ala. (Ret. MSgt.)              |
| Femoyer, 2d Lt. Robert E.                                       | Huntington, W. Va.     | Nov. 2, 1944, Merseburg, Germany            | KIA Nov. 2, 1944                      |
| Gott, 1st Lt. Donald J.   | Arnett, Okla.          | Nov. 9, 1944, Saarbrücken, Germany          | KIA Nov. 9, 1944                      |
| Hamilton, Maj. Pierpont M.                                      | Tuxedo Park, N. Y.     | Nov. 8, 1942, Port Lyautey, French Morocco  | Died Mar. 4, 1982                     |
| Howard, Lt. Col. James H.                                       | Canton, China          | Jan. 11, 1944, Oschersleben, Germany        | Died Mar. 18, 1995                    |
| Hughes, 2d Lt. Lloyd H.   | Alexandria, La.        | Aug. 1, 1943, Ploesti, Romania              | KIA Aug. 1, 1943                      |
| Jerstad, Maj. John L.   | Racine, Wis.           | Aug. 1, 1943, Ploesti, Romania              | KIA Aug. 1, 1943                      |
| Johnson, Col. Leon W.   | Columbia, Mo.          | Aug. 1, 1943, Ploesti, Romania              | McLean, Va. (Ret. Gen.)               |
| Kane, Col. John R.  | McGregor, Tex.         | Aug. 1, 1943, Ploesti, Romania              | Chester, Pa. (Ret. Col.)              |
| Kearby, Col. Neel E.  | Wichita Falls, Tex.    | Oct. 11, 1943, Wewak, New Guinea            | KIA Mar. 5, 1944, Wewak, New Guinea   |
| Kingsley, 2d Lt. David R.                                       | Portland, Ore.         | June 23, 1944, Ploesti, Romania             | KIA June 23, 1944                     |
| Knight, 1st Lt. Raymond L.                                      | Houston, Tex.          | Apr. 25, 1945, Po Valley, Italy             | KIA Apr. 25, 1945                     |
| Lawley, 1st Lt. William R., Jr.                                 | Leeds, Ala.            | Feb. 20, 1944, Leipzig, Germany             | Montgomery, Ala. (Ret. Col.)          |
| Lindsey, Capt. Darrell R.                                       | Jefferson, Iowa        | Aug. 9, 1944, Pontoise, France              | KIA Aug. 9, 1944                      |
| Mathies, SSgt. Archibald  | Scotland               | Feb. 20, 1944, Leipzig, Germany             | KIA Feb. 20, 1944                     |
| Mathis, 1st Lt. Jack W.   | San Angelo, Tex.       | Mar. 18, 1943, Vegesack, Germany            | KIA Mar. 18, 1943                     |
| McGuire, Maj. Thomas B., Jr.                                    | Ridgewood, N. J.       | Dec. 25–26, 1944, Luzon, P. I.              | KIA Jan. 7, 1945, Negros, P. I.       |
| Metzger, 2d Lt. William E., Jr.                                 | Lima, Ohio             | Nov. 9, 1944, Saarbrücken, Germany          | KIA Nov. 9, 1944                      |
| Michael, 1st Lt. Edward S.                                      | Chicago, Ill.          | Apr. 11, 1944, Brunswick, Germany           | Died May 10, 1994                     |
| Morgan, 2d Lt. John C.  | Vernon, Tex.           | July 28, 1943, Kiel, Germany                | Died Jan. 17, 1991                    |
| Pease, Capt. Harl, Jr.  | Plymouth, N. H.        | Aug. 7, 1942, Rabaul, New Britain           | KIA Aug. 7, 1942                      |
| Pucket, 1st Lt. Donald D.                                       | Longmont, Colo.        | July 9, 1944, Ploesti, Romania              | KIA July 9, 1944                      |
| Sarnoski, 2d Lt. Joseph R.                                      | Simpson, Pa.           | June 16, 1943, Buka, Solomon Is.            | KIA June 16, 1943                     |
| Shomo, Maj. William A.  | Jeannette, Pa.         | Jan. 11, 1945, Luzon, P. I.                 | Died June 25, 1990                    |
| Smith, Sgt. Maynard H.  | Caro, Mich.            | May 1, 1943, St. Nazaire, France            | Died May 11, 1984                     |
| Truemper, 2d Lt. Walter E.                                      | Aurora, Ill.           | Feb. 20, 1944, Leipzig, Germany             | KIA Feb. 20, 1944                     |
| Vance, Lt. Col. Leon R., Jr.                                    | Enid, Okla.            | June 5, 1944, Wimereaux, France             | Killed July 26, 1944, near Iceland    |
| Vosler, TSgt. Forrest L.  | Lyndonville, N. Y.     | Dec. 20, 1943, Bremen, Germany              | Died Feb. 27, 1992                    |
| Walker, Brig. Gen. Kenneth N.                                   | Cerrillos, N. M.       | Jan. 5, 1943, Rabaul, New Britain           | KIA Jan. 5, 1943                      |
| Wilkins, Maj. Raymond H.  | Portsmouth, Va.        | Nov. 2, 1943, Rabaul, New Britain           | KIA Nov. 2, 1943                      |
| Zeamer, Maj. Jay, Jr.   | Carlisle, Pa.          | June 16, 1943, Buka, Solomon Is.            | Stoneham, Mass. (Ret. Lt. Col.)       |
| <b>Korea</b>  |                        |   |                                       |
| Davis, Maj. George A., Jr.                                      | Dublin, Tex.           | Feb. 10, 1952, Sinuiju-Yalu River, N. Korea | KIA Feb. 10, 1952                     |
| Loring, Maj. Charles J., Jr.                                    | Portland, Me.          | Nov. 22, 1952, Sniper Ridge, N. Korea       | KIA Nov. 22, 1952                     |
| Sebille, Maj. Louis J.  | Harbor Beach, Mich.    | Aug. 5, 1950, Hamch'ang, S. Korea           | KIA Aug. 5, 1950                      |
| Walmsley, Capt. John S., Jr.                                    | Baltimore, Md.         | Sept. 14, 1951, Yangdok, N. Korea           | KIA Sept. 14, 1951                    |
| <b>Vietnam</b>  |                        |   |                                       |
| Bennett, Capt. Steven L.  | Palestine, Tex.        | June 29, 1972, Quang Tri, S. Vietnam        | KIA June 29, 1972                     |
| Day, Col. George E.   | Sioux City, Iowa       | Conspicuous gallantry while POW             | Shalimar, Fla. (Ret. Col.)            |
| Dethlefsen, Maj. Merlyn H.                                      | Greenville, Iowa       | Mar. 10, 1967, Thai Nguyen, N. Vietnam      | Died Dec. 14, 1987                    |
| Fisher, Maj. Bernard F.   | San Bernardino, Calif. | Mar. 10, 1966, A Chau Valley, S. Vietnam    | Kuna, Idaho (Ret. Col.)               |
| Fleming, 1st Lt. James P.                                       | Sedalia, Mo.           | Nov. 26, 1968, Duc Co, S. Vietnam           | Active-duty Col., Arlington, Tex.     |
| Jackson, Lt. Col. Joe M.  | Newnan, Ga.            | May 12, 1968, Kham Duc, S. Vietnam          | Kent, Wash. (Ret. Col.)               |
| Jones, Col. William A. III                                      | Warsaw, Va.            | Sept. 1, 1968, Dong Hoi, N. Vietnam         | Killed Nov. 15, 1969, Woodbridge, Va. |
| Levitov, A1C John L.  | South Windsor, Conn.   | Feb. 24, 1969, Long Binh, S. Vietnam        | South Windsor, Conn.                  |
| Sijan, Capt. Lance P.   | Milwaukee, Wis.        | Conspicuous gallantry while POW             | Died while POW, Jan. 1968             |
| Thorsness, Lt. Col. Leo K.                                      | Seattle, Wash.         | Apr. 19, 1967, N. Vietnam                   | Seattle, Wash. (Ret. Col.)            |
| Wilbanks, Capt. Hilliard A.                                     | Cornelia, Ga.          | Feb. 24, 1967, Dalat, S. Vietnam            | KIA Feb. 24, 1967                     |
| Young, Capt. Gerald O.  | Anacortes, Wash.       | Nov. 9, 1967, Da Nang area, S. Vietnam      | Died June 6, 1990                     |



# Air Force Magazine's Guide to Aces

In compiling this list of aces who flew with the US Air Force and its predecessor organizations (the Air Service and the Army Air Forces), *Air Force Magazine* has relied on USAF's official accounting of aerial victory credits, which is the responsibility of the Air Force Historical Research Agency at Maxwell AFB, Ala.

Air Force historians have kept the official records of aerial victories by USAF pilots and crew members since 1957. A few foreign pilots are also listed. Most aerial victory credits have been earned by fighter pilots who

have destroyed enemy aircraft in the air. The Office of the Air Force Historian had previously published four separate listings—one for each of the major wars (World War I, World War II, Korea, and Vietnam). The four volumes have been corrected, updated, and combined into one comprehensive volume.

The Air Force Historical Research Agency is not authorized, nor has it ever attempted, to verify aerial victories claimed by Americans who flew with the air forces of other nations. Therefore, this list no longer con-

tains World War I victory credits for Americans serving in the Lafayette Escadrille, French Flying Corps, Royal Flying Corps, or Royal Navy. Similarly, it no longer contains World War II victory credits for Americans in the Eagle Squadrons or the Flying Tigers (American Volunteer Group). However, victories were awarded to members of the Army Air Service if they were flying with British or French units when they shot down enemy aircraft. Some World War I pilots (notably Frank Luke) were credited with victories for destroying balloons.

## American Aces of World War I



**Capt. Edward V. Rickenbacker**

|                               |       |                             |      |
|-------------------------------|-------|-----------------------------|------|
| Rickenbacker, Capt. Edward V. | 24.33 | Wright, 1st Lt. Chester E.  | 6.33 |
| Luke, 2d Lt. Frank, Jr.       | 15.83 | Jones, 2d Lt. Clinton       | 6.16 |
| Kindley, 1st Lt. Field E.     | 11.00 | Burdick, 2d Lt. Howard      | 6.00 |
| Springs, 1st Lt. Elliott W.   | 10.75 | Chambers, 1st Lt. Reed M.   | 6.00 |
| Landis, 1st Lt. Reed G.       | 10.00 | Creech, 1st Lt. Jesse O.    | 6.00 |
| Vaughn, 1st Lt. George A.     | 9.50  | Putnam, 1st Lt. David E.    | 6.00 |
| Swaab, 1st Lt. Jacques M.     | 8.50  | Cook, 1st Lt. Harvey W.     | 5.66 |
| Donaldson, 2d Lt. John O.     | 8.00  | Meissner, Capt. James A.    | 5.66 |
| Baer, 1st Lt. Paul P.         | 7.75  | Coolidge, Capt. Hamilton    | 5.58 |
| Clay, 1st Lt. Henry R., Jr.   | 7.00  | Campbell, 1st Lt. Douglas   | 5.50 |
| Hamilton, 1st Lt. Lloyd A.    | 6.83  | Knotts, 2d Lt. Howard C.    | 5.50 |
| White, 2d Lt. Wilbert W.      | 6.66  | Rummell, 1st Lt. Leslie J.  | 5.16 |
| Cassady, 1st Lt. Thomas G.    | 6.63  | Bissell, 1st Lt. Clayton L. | 5.00 |
| Holden, 1st Lt. Lansing C.    | 6.50  | Luff, 1st Lt. Frederick E.  | 5.00 |
| Hunter, 1st Lt. Frank O'D.    | 6.50  | Ponder, 2d Lt. William T.   | 5.00 |
| Stenseth, 1st Lt. Martinus    | 6.47  |                             |      |

## Some Famous US Fighter Firsts



**Col. Robin Olds**

|               |   |
|---------------|---|
| May 30, 1918  | First US-trained AEF ace: Capt. Edward V. Rickenbacker  |
| Dec. 7, 1941  | First AAF victories of WW II: Six pilots at Pearl Harbor  |
| Dec. 16, 1941 | First AAF ace of WW II: 1st Lt. Boyd D. Wagner  |
| June 27, 1950 | First USAF victories in the Korean War  |
| Nov. 8, 1950  | First jet-to-jet victory of the Korean War  |
| May 20, 1951  | First USAF ace of the Korean War: Capt. James Jabara  |
| Nov. 30, 1951 | First USAF ace of two wars (WW II and Korea): Maj. George A. Davis, Jr. (7 in WW II and 14 in Korea)          |
| Jan. 2, 1967  | First (and only) USAF ace with victories in WW II and Vietnam: Col. Robin Olds (12 in WW II and 4 in Vietnam) |



## Leading Army Air Forces Aces of World War II

(Fourteen and a half or more victories)

|                               |        |                                  |        |
|-------------------------------|--------|----------------------------------|--------|
| Bong, Maj. Richard I.         | 40     | Herbst, Lt. Col. John C.         | 18     |
| McGuire, Maj. Thomas B., Jr.  | 38     | Zemke, Lt. Col. Hubert           | 17.75  |
| Gabreski, Lt. Col. Francis S. | 28*    | England, Maj. John B.            | 17.50  |
| Johnson, Capt. Robert S.      | 27     | Beeson, Capt. Duane W.           | 17.33  |
| MacDonald, Col. Charles H.    | 27     | Thornell, 1st Lt. John F., Jr.   | 17.25  |
| Preddy, Maj. George E.        | 26.83  | Varnell, Capt. James S., Jr.     | 17     |
| Meyer, Lt. Col. John C.       | 24*    | Johnson, Maj. Gerald W.          | 16.50  |
| Schilling, Col. David C.      | 22.50  | Godfrey, Capt. John T.           | 16.33  |
| Johnson, Lt. Col. Gerald R.   | 22     | Anderson, Capt. Clarence E., Jr. | 16.25  |
| Kearby, Col. Neel E.          | 22     | Dunham, Lt. Col. William D.      | 16     |
| Robbins, Maj. Jay T.          | 22     | Harris, Lt. Col. Bill            | 16     |
| Christensen, Capt. Fred J.    | 21.50  | Welch, Capt. George S.           | 16     |
| Wetmore, Capt. Ray S.         | 21.25  | Beerbower, Capt. Donald M.       | 15.50  |
| Voll, Capt. John J.           | 21     | Brown, Maj. Samuel J.            | 15.50  |
| Mahurin, Maj. Walker M.       | 20.75* | Peterson, Capt. Richard A.       | 15.50  |
| Lynch, Lt. Col. Thomas J.     | 20     | Whisner, Capt. William T., Jr.   | 15.50* |
| Westbrook, Lt. Col. Robert B. | 20     | Bradley, Lt. Col. Jack T.        | 15     |
| Gentile, Capt. Donald S.      | 19.83  | Cragg, Maj. Edward               | 15     |
| Duncan, Col. Glenn E.         | 19.50  | Foy, Maj. Robert W.              | 15     |
| Carson, Capt. Leonard K.      | 18.50  | Hofer, 2d Lt. Ralph K.           | 15     |
| Eagleston, Maj. Glenn T.      | 18.50* | Homer, Capt. Cyril F.            | 15     |
| Beckham, Maj. Walter C.       | 18     | Landers, Lt. Col. John D.        | 14.50  |
| Green, Maj. Herschel H.       | 18     | Powers, Capt. Joe H., Jr.        | 14.50  |



**Maj. Richard I. Bong**

Ranks are as of last victory in World War II.

\*Aces who added to these scores by victories in the Korean War

## 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.      | 34.50 | WW II, Korea |
| Johnson, Lt. Col. 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.  | 24.33 | WW I         |
| Mahurin, Col. Walker M.        | 24.25 | WW II, Korea |
| Schilling, Col. David C.       | 22.50 | 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.     | 21.50 | 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.       | 20.50 | WW II, Korea |
| Lynch, Lt. Col. Thomas J.      | 20    | WW II        |
| Westbrook, Lt. Col. Robert B.  | 20    | WW II        |
| Gentile, Capt. Donald S.       | 19.83 | WW II        |



**Col. Francis S. Gabreski**



### AAF/USAF Aces With Victories in Both World War II and a Later War

|                                   | WW II | Other <sup>a</sup> | Total |
|-----------------------------------|-------|--------------------|-------|
| Gabreski, Col. Francis S.         | 28    | 6.50               | 34.50 |
| Meyer, Col. John C.               | 24    | 2                  | 26    |
| Mahurin, Col. Walker M.           | 20.75 | 3.50               | 24.25 |
| Davis, Maj. George A., Jr.        | 7     | 14                 | 21    |
| Whisner, Maj. William T., Jr.     | 15.50 | 5.50               | 21    |
| Eagleston, Col. Glenn T.          | 18.50 | 2                  | 20.50 |
| Garrison, Lt. Col. Vermont        | 7.33  | 10                 | 17.33 |
| Baker, Col. Royal N.              | 3.50  | 13                 | 16.50 |
| Jabara, Maj. James                | 1.50  | 15                 | 16.50 |
| Olds, Col. Robin                  | 12    | 4 <sup>a</sup>     | 16    |
| Mitchell, Col. John W.            | 11    | 4                  | 15    |
| Brueland, Maj. Lowell K.          | 12.50 | 2                  | 14.50 |
| Hagerstrom, Maj. James P.         | 6     | 8.50               | 14.50 |
| Hovde, Lt. Col. William J.        | 10.50 | 1                  | 11.50 |
| Johnson, Col. James K.            | 1     | 10                 | 11    |
| Ruddell, Lt. Col. George I.       | 2.50  | 8                  | 10.50 |
| Thyng, Col. Harrison R.           | 5     | 5                  | 10    |
| Colman, Capt. Philip E.           | 5     | 4                  | 9     |
| Heller, Lt. Col. Edwin L.         | 5.50  | 3.50               | 9     |
| Chandler, Maj. Van E.             | 5     | 3                  | 8     |
| Hockery, Maj. John J.             | 7     | 1                  | 8     |
| Creighton, Maj. Richard D.        | 2     | 5                  | 7     |
| Emmert, Lt. Col. Benjamin H., Jr. | 6     | 1                  | 7     |
| Bettinger, Maj. Stephen L.        | 1     | 5                  | 6     |
| Visscher, Maj. Herman W.          | 5     | 1                  | 6     |
| Liles, Capt. Brooks J.            | 1     | 4                  | 5     |
| Mattson, Capt. Conrad E.          | 1     | 4                  | 5     |
| Schaeffer, Maj. William F.        | 2     | 3                  | 5     |

<sup>a</sup>Colonel Olds's four additional victories came during the Vietnam War; all others' during the Korean War.



Maj. James Jabara

### USAF Aces of the Korean War

|                                |                   |
|--------------------------------|-------------------|
| McConnell, Capt. Joseph, Jr.   | 16                |
| Jabara, Maj. James             | 15 <sup>a</sup>   |
| Fernandez, Capt. Manuel J.     | 14.50             |
| Davis, Maj. George A., Jr.     | 14 <sup>a</sup>   |
| Baker, Col. Royal N.           | 13 <sup>a</sup>   |
| Blesse, Maj. Frederick C.      | 10                |
| Fischer, 1st Lt. Harold E.     | 10                |
| Garrison, Lt. Col. Vermont     | 10 <sup>a</sup>   |
| Johnson, Col. James K.         | 10 <sup>a</sup>   |
| 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.      | 8.50 <sup>a</sup> |
| Risner, Capt. Robinson         | 8                 |
| Ruddell, Lt. Col. George I.    | 8 <sup>a</sup>    |
| Buttleman, 1st Lt. Henry       | 7                 |
| Jolley, Capt. Clifford D.      | 7                 |
| Lilley, Capt. Leonard W.       | 7                 |
| Adams, Maj. Donald E.          | 6.50              |
| Gabreski, Col. Francis S.      | 6.50 <sup>a</sup> |
| Jones, Lt. Col. George L.      | 6.50              |
| Marshall, Maj. Winton W.       | 6.50              |
| Kasler, 1st Lt. James H.       | 6                 |
| Love, Capt. Robert J.          | 6                 |
| Whisner, Maj. William T., Jr.  | 5.50 <sup>a</sup> |
| Baldwin, Col. Robert P.        | 5                 |
| Becker, Capt. Richard S.       | 5                 |
| Bettinger, Maj. Stephen L.     | 5                 |
| Creighton, Maj. Richard D.     | 5 <sup>a</sup>    |
| 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 <sup>a</sup>    |
| Westcott, Maj. William H.      | 5                 |

<sup>a</sup>In addition to World War II victories



Cpts. Charles B. DeBellevue and Richard S. Ritchie

### USAF Aces of the Vietnam War

|                              |   |
|------------------------------|---|
| DeBellevue, Capt. Charles B. | 6 |
| Feinstein, Capt. Jeffrey S.  | 5 |
| Ritchie, Capt. Richard S.    | 5 |



# A CONTRACT SO POWERFUL, IT BEAT THE FORCES OF MOTHER NATURE.

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**F**ort McCoy, Wisconsin. The Army needed to network multiple buildings across the post. To begin with, miles of trenching work was required for underground cabling and had to be completed before the ground froze. If it wasn't, construction would grind to a halt. Any delays would significantly increase costs.

Enter ULANA II from EDS. A networking contract the Army could trust for fast-track solutions. A single contract with the people and products, flexible enough to accomplish a 12-month process in half the time. By the time the ground hardened the cabling was completed, beating Mother Nature at no extra cost to Uncle Sam.

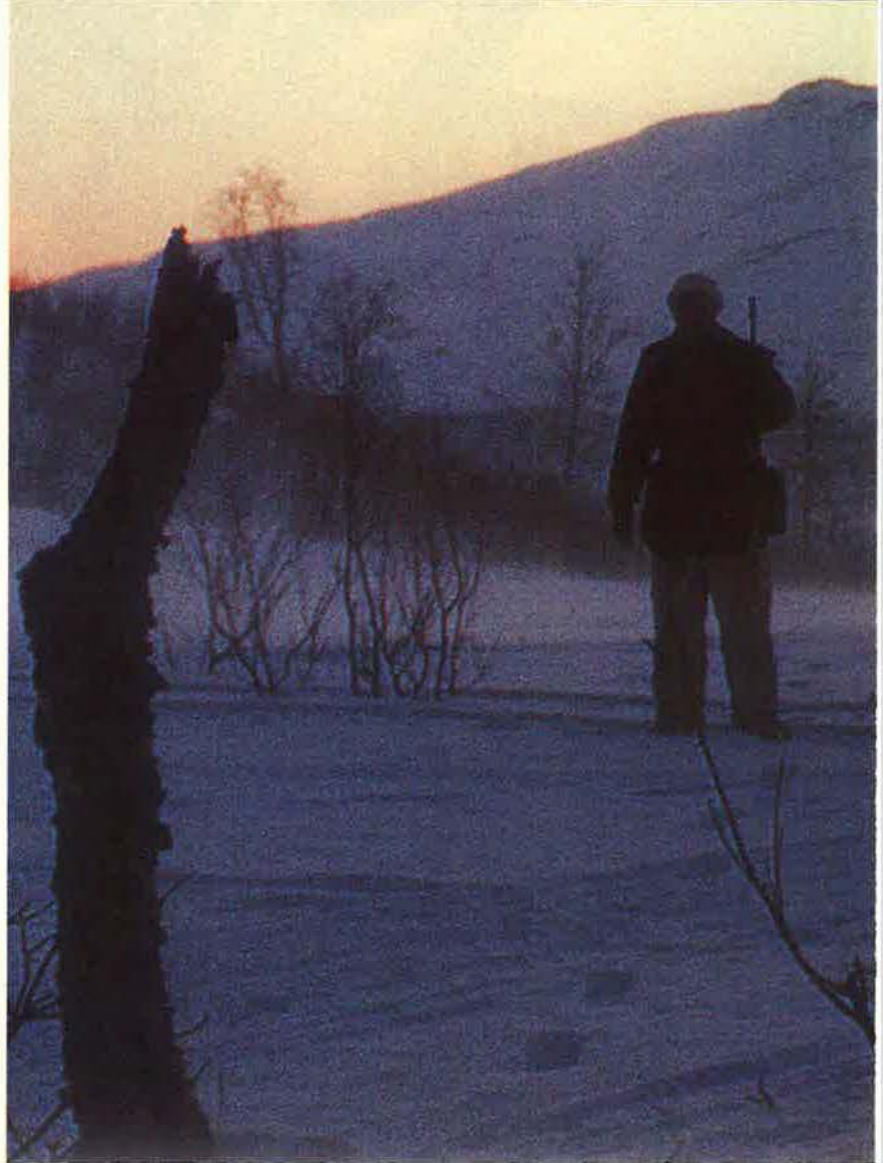
Expert teams. Proven solutions. Quick response. That's how ULANA II worked in Wisconsin, and how it works in networking projects all over the world. It can be a powerful weapon for you, too.

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## HOW TO STOP 21 TONS OF TERROR AT 116 KNOTS.

*When a fully loaded, 21-ton F-16 Fighting Falcon turns and burns, it's like a charging rhino. It takes a tough brake to stop it and an equally tough wheel to handle the roll. BFGoodrich wheel and brake systems tackle this requirement with proven technology that exceeds Lockheed Martin specifications. Our wheels*

*and brakes are the production standard at Lockheed Martin for Block 50 and are approved by the USAF on all F-16 models.*

*How tough is tough? In field service with multiple worldwide F-16 users, the BFG carbon brake demonstrate years of maintenance free performance. Superior carbon structural*



Now upgrading  
USAF's Block 40/42 F-16s



integrity and integral piston stops in our Pre-Block 40 version provide incredible safety margins. **In addition, our wheels are fully qualified for longer-wearing radial tires.**

*BFGoodrich wheels and brakes: safe, longer wear-life, higher reliability, lower operating cost and reduced logistic footprint.*

Call us at (513) 339-3811 to stop your charging rhinos. **Tough brakes for tough missions.**

**BFGoodrich**  
**Aerospace**

Aircraft Wheels & Brakes



# Major Commands

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. In general, there are two types of major commands: operational and support.



# ACC

**Air Combat Command** Headquarters Langley AFB, Va.

**Established** June 1, 1992

**Commander** Gen. Richard E. Hawley

### MISSIONS

- Operate** USAF bombers
- Operate** USAF's CONUS-based, combat-coded fighter and attack aircraft
- Organize**, train, equip, and maintain combat-ready forces
- Provide** nuclear-capable forces for US Strategic Command

### COROLLARY MISSIONS

- Monitor** and intercept illegal drug traffic
- Test** new combat equipment

### OTHER RESPONSIBILITIES

- Supply** aircraft to the five geographic unified commands: Atlantic, European, Pacific, Southern, and Central Commands
- Provide** air defense forces to North American Aerospace Defense Command
- Operate** certain air mobility forces in support of US Transportation Command

### EQUIPMENT

(Primary Aircraft Inventory)

|  |     |
|--|-----|
| Bombers (B-1B, B-2, B-52) .....                      | 123 |
| Fighters (F-15A/C, F-16) .....                       | 324 |
| Attack aircraft (A/OA-10, F-15E, F-111, F-117) ..... | 225 |
| EC/EW aircraft (F-4G, EF-111) ...                    | 36  |
| Aerial refuelers (KC-135) .....                      | 6   |
| Combat delivery (C-130, C-27) ...                    | 131 |
| Other aircraft (all types) .....                     | 175 |

### FORCE STRUCTURE

Four numbered air forces: **1st** (ANG), Tyndall AFB, Fla.; **8th**, Barksdale



Staff photo by Guy Aceto

*Eight wings in Air Combat Command fly the F-16 Fighting Falcon, one of the most versatile fighter aircraft in USAF history. These Block 50 F-16Cs from the 78th Fighter Squadron, Shaw AFB, S. C., have begun taking on a new specialty—the Suppression of Enemy Air Defenses mission.*

AFB, La.; **9th**, Shaw AFB, S. C.; **12th**, Davis-Monthan AFB, Ariz.

One direct reporting unit: Air Warfare Center  
Twenty-six wings

### PERSONNEL

|                         |                |
|-------------------------|----------------|
| Active-duty .....       | 108,704        |
| Officers .....          | 15,010         |
| Enlisted .....          | 93,694         |
| Reserve component ..... | 107,521        |
| ANG .....               | 81,192         |
| AFRES .....             | 26,329         |
| Civilian .....          | 12,981         |
| <b>Total .....</b>      | <b>229,206</b> |

### OPERATIONAL ACTIVITY

Flying hours .....

|                  |
|------------------|
| 45,000 per month |
|------------------|

**Major overseas deployments**  
Bright Star (Central Command), Central Enterprise, Crested Cap (European Command), Cobra Gold (Pacific Command), Northern Viking, Strong Resolve (Atlantic Command), Joint Endeavor

### Major CONUS JCS exercises

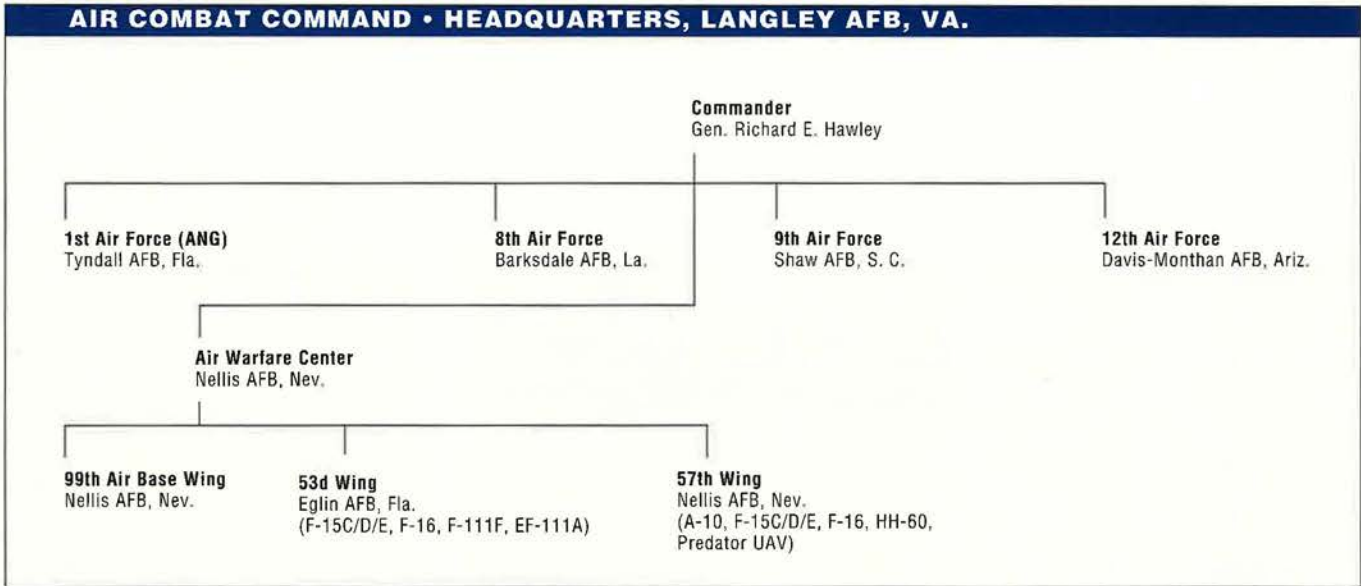
JTFEX (USACOM)  
Roving Sands (USACOM)



**Major training exercises**

Air Warrior, Nellis AFB, Nev.  
 Air Warrior II, Barksdale AFB, La.,  
 and Little Rock AFB, Ark.

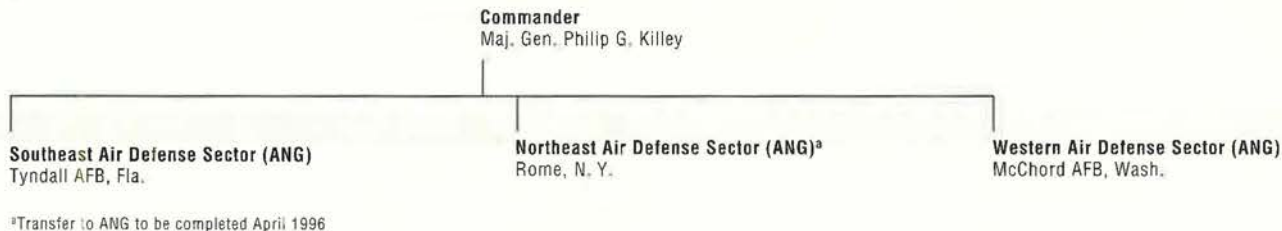
Blue Flag, Hurlburt Field, Fla.  
 Coalition Flag, Nellis AFB, Nev.  
 Green Flag, Nellis AFB, Nev.  
 Maple Flag, CFB Cold Lake, Canada  
 Red Flag, Nellis AFB, Nev.



| UNIT                           | BASE                              | WEAPONS   |
|--------------------------------|-----------------------------------|---|
| 1st Fighter Wing               | Langley AFB, Va.                  | C-21A, F-15C/D<br>(also HH-60, HC-130N/P at Patrick AFB, Fla.)                  |
| 2d Bomb Wing                   | Barksdale AFB, La.                | B-52H   |
| 4th Fighter Wing               | Seymour Johnson AFB, N. C.        | F-15E   |
| 5th Bomb Wing                  | Minot AFB, N. D.                  | B-52H   |
| 6th Air Base Wing              | MacDill AFB, Fla.                 | —   |
| 7th Wing                       | Dyess AFB, Tex.                   | B-1B, C-130H  |
| 9th Reconnaissance Wing        | Beale AFB, Calif.                 | U-2, T-38, (SR-71 at Edwards AFB, Calif.)                                       |
| 20th Fighter Wing              | Shaw AFB, S. C.                   | A-10, F-16  |
| 23d Wing                       | Pope AFB, N. C.                   | A-10, F-16, C-130E  |
| 24th Wing                      | Howard AFB, Panama                | C-21A, C-27, CT-43  |
| 27th Fighter Wing              | Cannon AFB, N. M.                 | F-16, F-111F, EF-111A   |
| 28th Bomb Wing                 | Ellsworth AFB, S. D.              | B-1B  |
| 33d Fighter Wing               | Eglin AFB, Fla.                   | F-15C/D   |
| 49th Fighter Wing              | Holloman AFB, N. M.               | F-117A, F-4E, AT-38, HH-60  |
| 53d Wing                       | Eglin AFB, Fla.                   | F-15C/D/E, F-16, F-111F, EF-111A  |
| 55th Wing                      | Offutt AFB, Neb.                  | C-21A, E-4B, RC-135S/U/V/W/X, EC-135C, TC-135S/W/B,<br>KC-135E, WC-135, OC-135B |
| 57th Wing                      | Nellis AFB, Nev.                  | A-10, F-15C/D/E, F-16, HH-60, Predator UAV                                      |
| 65th Air Base Wing             | Lajes Field, the Azores (support) | —   |
| 79th Test and Evaluation Group | Eglin AFB, Fla.                   | F-15C/D/E, F-16, F-111F, EF-111A  |
| 85th Group                     | NAS Keflavik, Iceland             | HH-60   |
| 99th Air Base Wing             | Nellis AFB, Nev.                  | —   |
| 314th Airlift Wing             | Little Rock AFB, Ark.             | C-130E/H  |
| 347th Wing                     | Moody AFB, Ga.                    | F-16, C-130E, A-10  |
| 355th Wing                     | Davis-Monthan AFB, Ariz.          | A-10, EC-130E/H   |
| 366th Wing                     | Mountain Home AFB, Idaho          | F-15C/D/E, F-16, KC-135R<br>(also B-1B at Ellsworth AFB, S. D.)                 |
| 388th Fighter Wing             | Hill AFB, Utah                    | F-16  |
| 475th Weapons Evaluation Group | Tyndall AFB, Fla.                 | E-9A  |
| 509th Bomb Wing                | Whiteman AFB, Mo.                 | B-2, T-38   |
| 552d Air Control Wing          | Tinker AFB, Okla.                 | E-3B/C  |



**1st AIR FORCE (ANG) • HEADQUARTERS, TYNDALL AFB, FLA.**



Staff photo by Guy Aceto



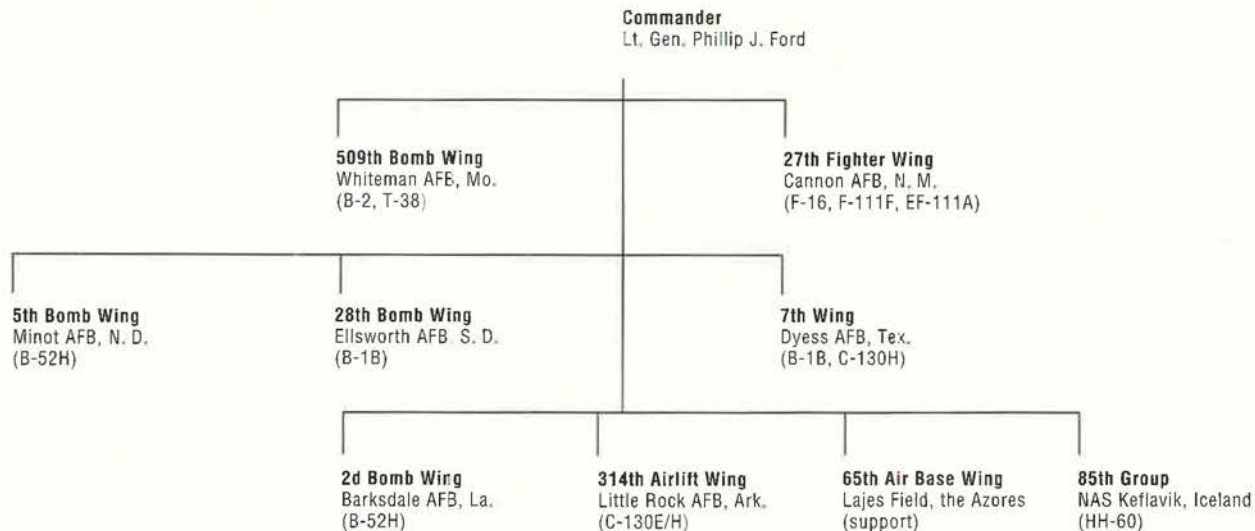
*Though it was first delivered during the Kennedy Administration, the B-52H continues to be a mainstay of ACC's bomber fleet. USAF is enhancing the BUFF's conventional capabilities to keep it viable in the next decades.*

**COMMAND NOTES**

Air Combat Command, with headquarters at Langley AFB, Va., is the primary provider of combat air forces and is the proponent for fighter, bomber, reconnaissance, combat delivery, battle-management, and rescue aircraft and command, control, communications, and intelligence systems.

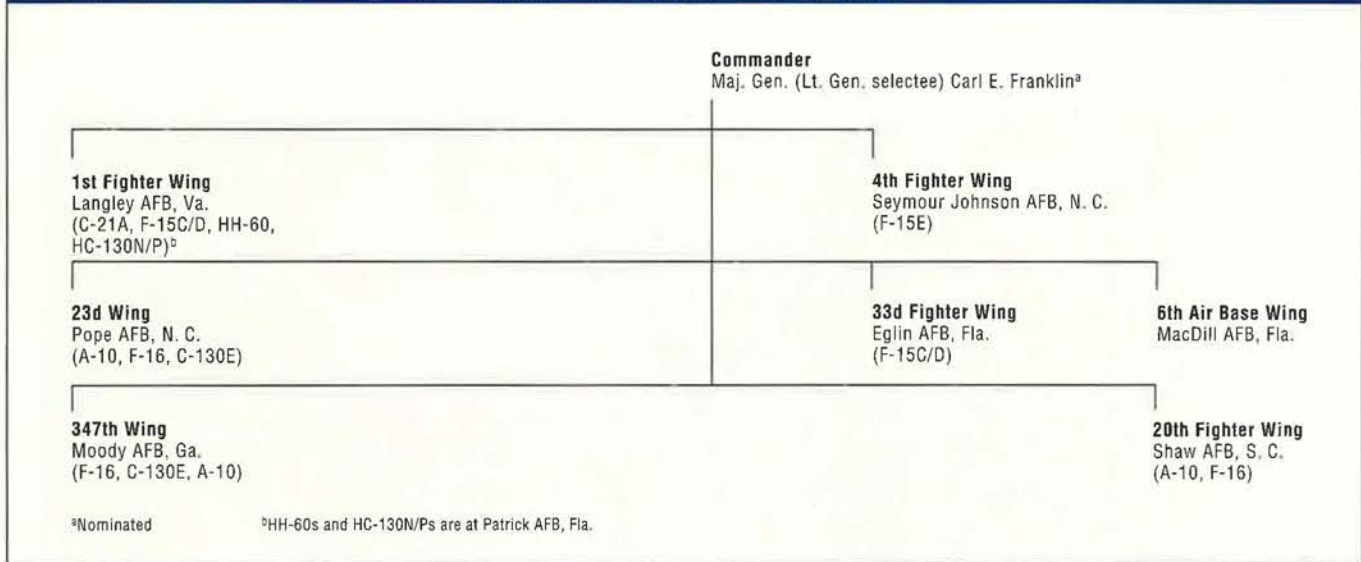
As a force provider, ACC organizes, trains, equips, and maintains combat-ready forces for rapid deployment and employment while ensuring that strategic air defense forces are ready to meet the challenges of peacetime air sovereignty and wartime air defense.

**8th AIR FORCE (ACC) • HEADQUARTERS, BARKSDALE AFB, LA.**

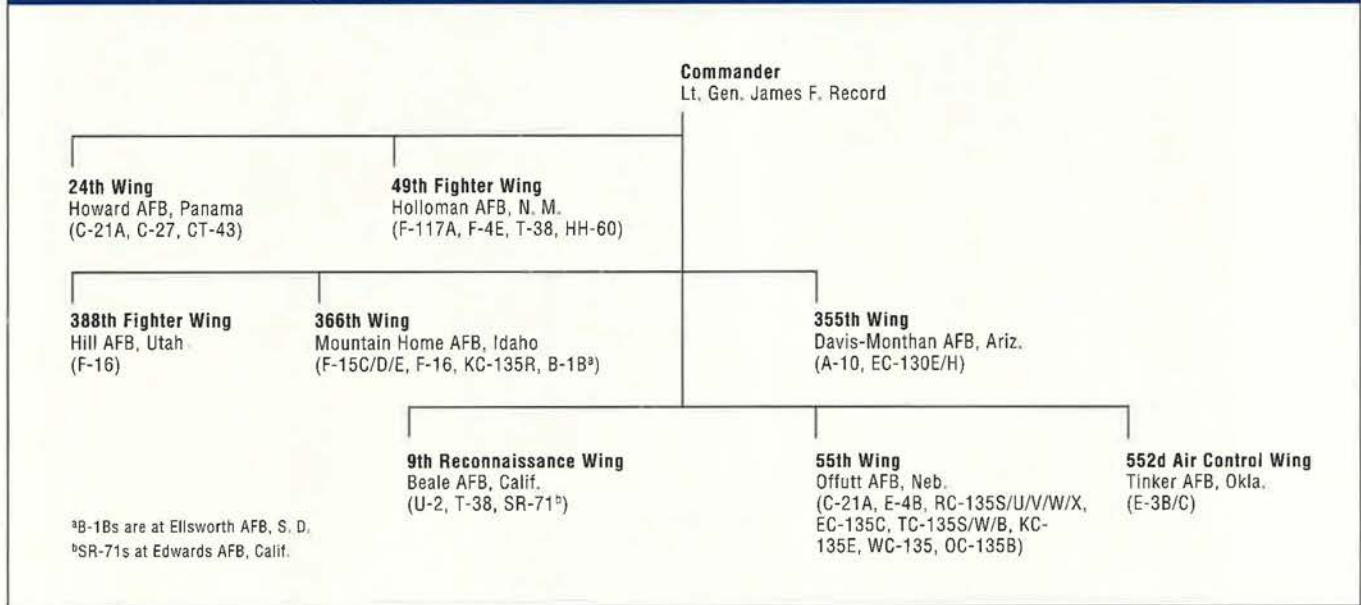




**9th AIR FORCE (ACC) • HEADQUARTERS, SHAW AFB, S. C.**



**12th AIR FORCE (ACC) • HEADQUARTERS, DAVIS-MONTHAN AFB, ARIZ.**



# AETC

## Air Education and Training Command

**Headquarters** Randolph AFB, Tex.

**Established** July 1, 1993

**Commander** Gen. Billy J. Boles

**MISSIONS**

**Recruit** and prepare officers, airmen, and civilian employees for Air Force duties

**Provide** international and interservice training and education and medical service training

**OTHER RESPONSIBILITIES**

**Recall** Individual Ready Reservists and mobility and contingency tasking support to combatant commands

**EQUIPMENT**

Trainers (T-1, T-3, T-37, T-38, T-43, AT-38) ..... 1,159  
Fighters (F-15, F-16) ..... 279

Transports and tankers (C-5, C-12, C-17, C-21, C-141, KC-135, HC/MC-130) ..... 84  
Helicopters (MH-53J, CH/NCH/TH-53A, UH-1, HH/MH-60G) ..... 27



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*{ Curved blades mean more thrust, less fuel and less noise. }  
{ Just another way the "J" saves you money over its life span. }*



## A prop that's 18% more efficient. And 100% funnier-looking.

If you're thinking of snickering at the odd-looking propellers on the new C-130J Hercules, you're going to have second thoughts after reading this. Simply by twisting the blades a bit and increasing their number to six, we've managed to give the aircraft 18% greater thrust at the same power setting.

It means at maximum gross weight, the "J" can now climb to 20,000 feet in just 14 minutes, compared to the 22 to 28 minutes of its predecessors. And with the prop's improved aerodynamic efficiency, the aircraft also uses less fuel and runs quieter.

Of course, this is just one of the many technological triumphs we've installed on the new C-130J -- additions that will lead to significant cost savings over the life span of the aircraft.

Twin-spool engines complete the aircraft's propulsion system, and allow for higher operating temperatures, higher

altitudes and a MTBF of 5,000 hours -- five times greater than before.

In addition, we've replaced a full 600 pounds of hard wiring with MIL-STD 1553 databus architecture -- keeping critical systems in constant communication with one another. Complete mission plans -- everything from terrain to weather conditions to precise drop sites -- are now put on a 2-by-3 inch card and inserted into the J's mission computer.

We've given the load master remote control for safety and more precise drops.

And we've installed twin Head Up Displays that allow the flight crew to maintain their focus outside while key instrument readings are displayed in front of them.

We've done all this for one reason only. To help you achieve the objectives of your mission. It's been our *modus operandi* since the Hercules debuted in 1955. And with this all-new, cost-efficient aircraft, it will continue to be for years to come.

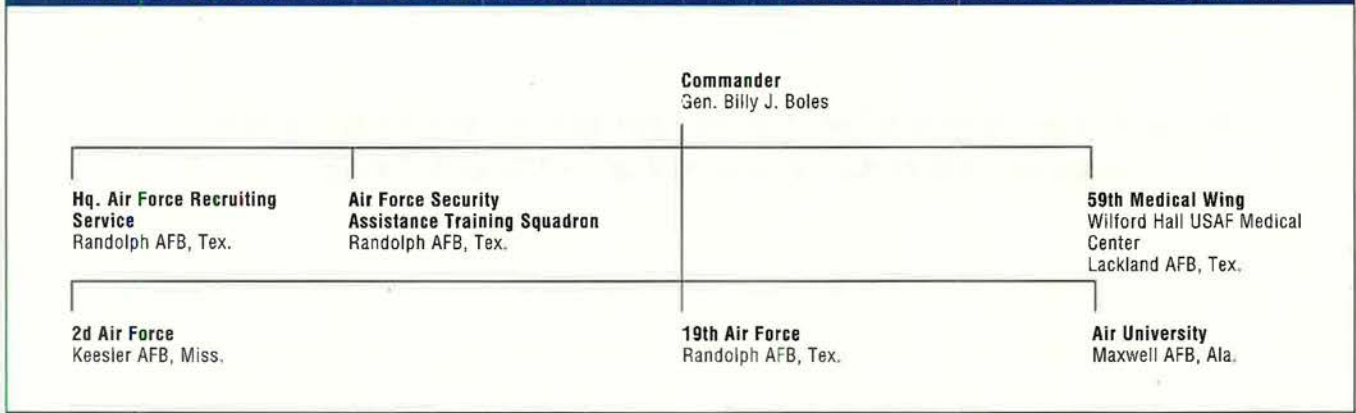


**LOCKHEED MARTIN**  
*Mission Success*





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



**FORCE STRUCTURE**

Two numbered air forces: **2d**, Keesler AFB, Miss., and **19th**, Randolph AFB, Tex.; plus an educational headquarters: **Air University**, Maxwell AFB, Ala. Also Hq. Air Force Recruiting Service and Air Force Security Assistance Training Squadron, Randolph AFB, Tex., and 59th Medical Wing, Lackland AFB, Tex.

**PERSONNEL**

Active-duty ..... 43,353  
 Officers ..... 9,348  
 Enlisted ..... 34,005  
 Reserve component ..... 2,803  
 ANG ..... 2,002  
 AFRES ..... 801  
 Civilian ..... 13,871  
**Total ..... 60,027**

Students ..... 352,093  
 Flying/technical training ..... 187,746  
 Air University ..... 164,347

**OPERATIONAL ACTIVITY**

Flying hours ..... 38,467 per month

**Major competitions**  
 Top Flight, Top Tech

**UNIT**

**BASE**

**WEAPONS**

**Flying Training Wings (Active)**

12th FTW ..... Randolph AFB, Tex. .... AT-38, C-21, T-1, T-3, T-37, T-38, T-43  
 14th FTW ..... Columbus AFB, Miss. .... AT-38, T-37, T-38  
 47th FTW ..... Laughlin AFB, Tex. .... T-1, T-37, T-38  
 56th Fighter Wing ..... Luke AFB, Ariz. .... F-16  
 58th Special Operations Wing ..... Kirtland AFB, N. M. .... HC-130, MC-130, MH-53J, TH-53A, UH-1, MH-60G  
 64th FTW ..... Reese AFB, Tex. .... T-1, T-37, T-38  
 71st FTW ..... Vance AFB, Okla. .... T-1, T-37, T-38  
 80th FTW ..... Sheppard AFB, Tex. .... AT-38, T-37, T-38  
 97th Air Mobility Wing ..... Altus AFB, Okla. .... C-5, C-17, C-141, KC-135  
 325th Fighter Wing ..... Tyndall AFB, Fla. .... F-15 (weapons director training)

**Other Flying/Aircrew Training Units (Active)**

3d Flying Training Squadron ..... Hondo Municipal Airport, Tex. .... T-3  
 45th Airlift Squadron ..... Keesler AFB, Miss. .... C-12, C-21  
 336th Training Group ..... Fairchild AFB, Wash. .... UH-1 (aircrew survival training)  
 557th Flying Training Squadron ..... US Air Force Academy, Colo. .... T-3

**Other Flying Training Units (Air National Guard)**

114th Fighter Squadron ..... Klamath Falls IAP, Ore. .... F-16  
 162d Fighter Wing ..... Tucson IAP, Ariz. .... F-16

**Technical Training Units**

17th Training Wing ..... Goodfellow AFB, Tex.  
 37th Training Wing ..... Lackland AFB, Tex.  
 81st Training Wing ..... Keesler AFB, Miss.  
 82d Training Wing ..... Sheppard AFB, Tex.  
 381st Space and Missile Training Group ..... Vandenberg AFB, Calif.

**Major Educational Units**

Air University ..... Maxwell AFB, Ala.

**Major Recruiting Units**

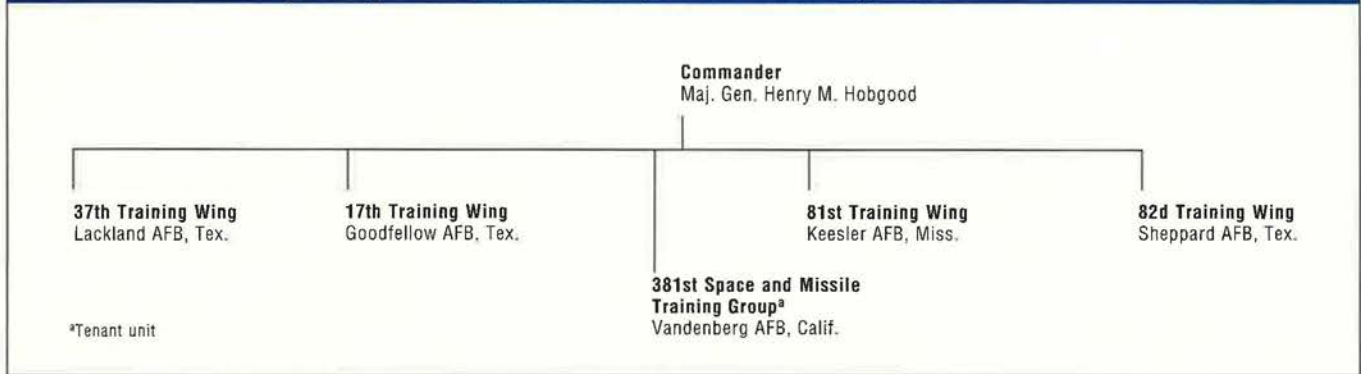
Hq. USAF Recruiting Service ..... Randolph AFB, Tex.  
 360th Recruiting Group ..... Hanscom AFB, Mass.  
 367th Recruiting Group ..... Robins AFB, Ga.  
 369th Recruiting Group ..... Lackland AFB, Tex.  
 372d Recruiting Group ..... Hill AFB, Utah

**Support Units**

42d Air Base Wing ..... Maxwell AFB, Ala.  
 602d Training Support Squadron ..... Edwards AFB, Calif.  
 619th Training Support Squadron ..... Randolph AFB, Calif.  
 AETC Training Support Squadron ..... Hill AFB, Utah



## 2d AIR FORCE (AETC) • HEADQUARTERS, KEESLER AFB, MISS.



## 19th AIR FORCE (AETC) • HEADQUARTERS, RANDOLPH AFB, TEX.



### COMMAND NOTES

Air Education and Training Command provides people ready to perform their mission when they arrive at their first operational unit. It shapes Air Force people through recruiting, training, and comprehensive education. Teaching initial, advanced, and professional military skills begins as members enter active duty and continues throughout their careers.

AETC is transferring C-17 aircrew training from Charleston AFB, S. C., to Altus AFB, Okla., and is developing the training programs and syllabus for the Joint Primary Aircraft Training System to replace the forty-year-old T-37. It is expanding its training and educational capabilities through advances in distance-learning technology and videoconferencing courses. Through new technical training programs, it provides Mission-Ready Technicians for the combatant commands. International training continues to expand as Taiwan, Turkey, Bahrain, Greece, and Singapore begin F-16 training at Luke AFB, Ariz., and Tucson IAP, Ariz. For the first

time, space and missile operations training will be integrated at Vandenberg AFB, Calif., to realize the full potential of space operations.

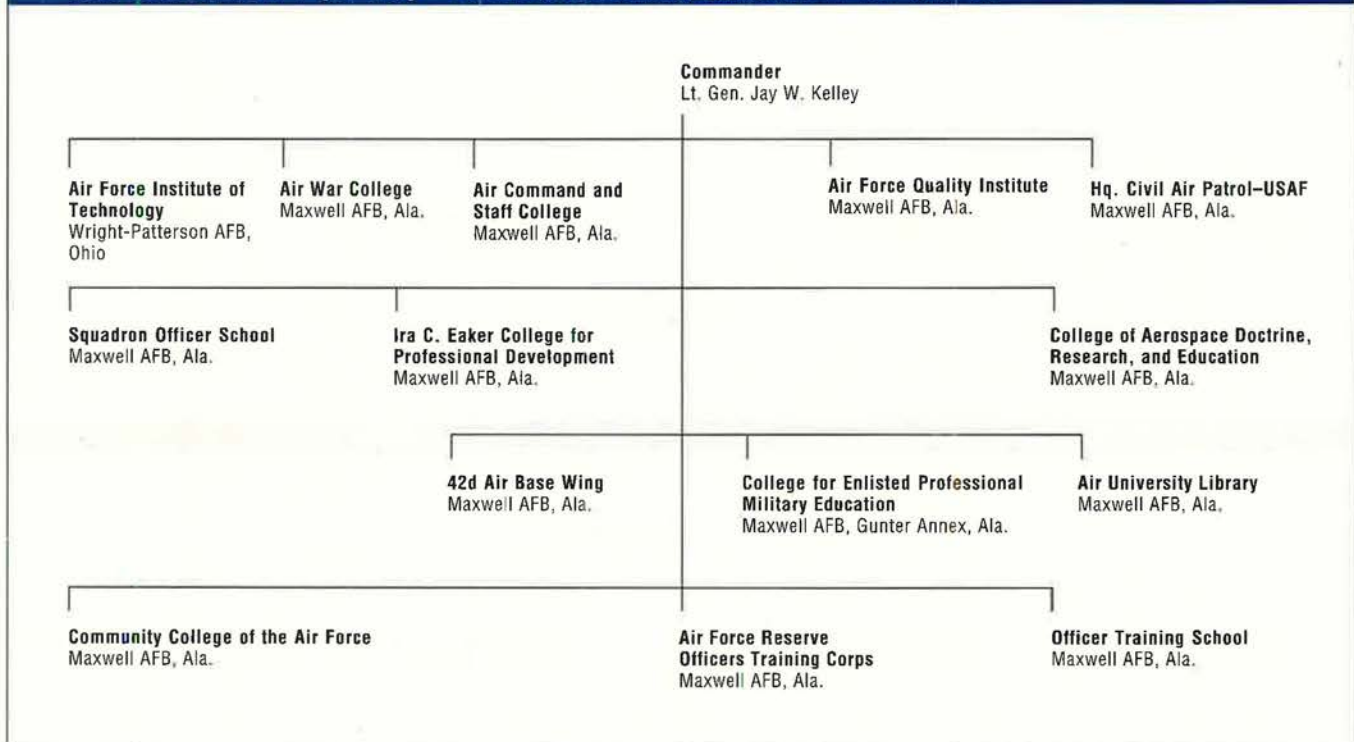


Photo by Randy Jolly

*With acquisition of the T-3, T-1, and JPATS, AETC has or will soon have up-to-date hardware to go with its modern training methods.*



**AIR UNIVERSITY (AETC) • HEADQUARTERS, MAXWELL AFB, ALA.**



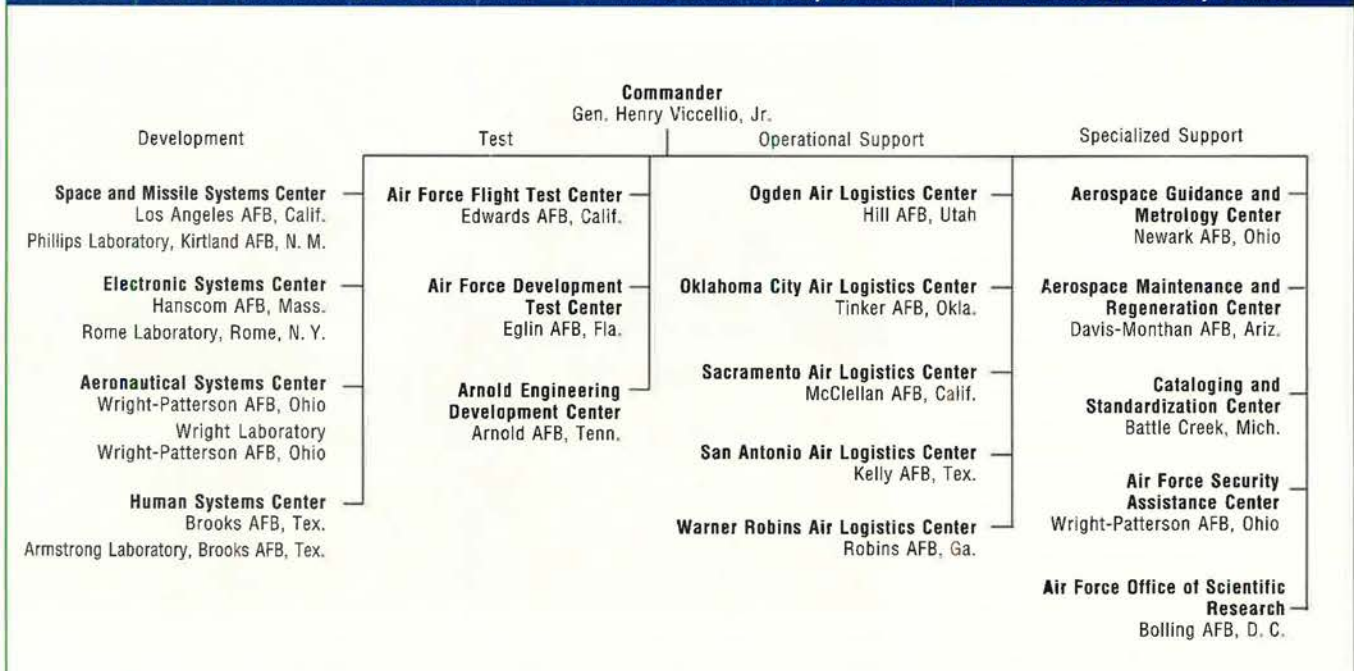
# Air Force Materiel Command

**Headquarters** Wright-Patterson AFB, Ohio

**Established** July 1, 1992

**Commander** Gen. Henry Viccellio, Jr.

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





## MISSIONS

**Manage** the integrated research, development, test, acquisition, and sustainment of weapon systems

**Produce** and acquire advanced systems

**Operate** "superlabs," major product centers, logistics centers, and test centers

**Operate** the USAF School of Aerospace Medicine and USAF Test Pilot School

## FORCE STRUCTURE

Four major product centers

Four superlaboratories

Three test centers

Five air logistics centers

Five specialized centers

## PERSONNEL

|                         |                |
|-------------------------|----------------|
| Active-duty .....       | 35,948         |
| Officers .....          | 10,788         |
| Enlisted .....          | 25,160         |
| Reserve component ..... | 3,983          |
| ANG .....               | 2,907          |
| AFRES .....             | 1,076          |
| Civilian .....          | 75,420         |
| <b>Total .....</b>      | <b>115,351</b> |

## OPERATIONAL ACTIVITY

Flying hours ..... 3,200 per month

## UNIT

|   |                            |
|---|----------------------------|
| Aeronautical Systems Center .....                   | Wright-Patterson AFB, Ohio |
| Electronic Systems Center .....                     | Hanscom AFB, Mass.         |
| Human Systems Center .....                          | Brooks AFB, Tex.           |
| Space and Missile Systems Center .....              | Los Angeles AFB, Calif.    |
| Armstrong Laboratory .....                          | Brooks AFB, Tex.           |
| Phillips Laboratory .....                           | Kirtland AFB, N. M.        |
| Rome Laboratory .....                               | Rome, N. Y.                |
| Wright Laboratory .....                             | Wright-Patterson AFB, Ohio |
| Arnold Engineering Development Center .....         | Arnold AFB, Tenn.          |
| Air Force Development Test Center .....             | Eglin AFB, Fla.            |
| Air Force Flight Test Center .....                  | Edwards AFB, Calif.        |
| Ogden Air Logistics Center .....                    | Hill AFB, Utah             |
| Oklahoma City Air Logistics Center .....            | Tinker AFB, Okla.          |
| Sacramento Air Logistics Center .....               | McClellan AFB, Calif.      |
| San Antonio Air Logistics Center .....              | Kelly AFB, Tex.            |
| Warner Robins Air Logistics Center .....            | Robins AFB, Ga.            |
| Aerospace Guidance and Metrology Center .....       | Newark AFB, Ohio           |
| Aerospace Maintenance and Regeneration Center ..... | Davis-Monthan AFB, Ariz.   |
| Air Force Security Assistance Center .....          | Wright-Patterson AFB, Ohio |
| Cataloging and Standardization Center .....         | Battle Creek, Mich.        |
| Air Force Office of Scientific Research .....       | Bolling AFB, D. C.         |

## BASE

## COMMAND NOTES

Air Force Materiel Command delivers systems that maintain the leading edge in research, acquisition, and sustainment of weapon systems. AFMC's four superlabs research and develop state-of-the-art technologies, while the four product centers use those technologies to acquire and develop systems. AFMC evaluates the systems in three test centers. Five Air Logistics Centers provide life-cycle weapon system sustainment, maintenance, and repair. Specialized centers focus on such areas as basic research, cataloging and standardization, metrology, security assistance, and "retired" weapon systems.

AFMC operates more than thirty-nine types of aircraft. More than 10,000 aircraft and approximately 32,000 engines are supported by AFMC personnel. The command's investment in research, test, and manufacturing capabilities would cost more than \$45.1 billion to replace.

# Air Force Space Command

**Headquarters** Peterson AFB, Colo.

**Established** September 1, 1982

**Commander** Gen. Joseph W. Ashy

## MISSIONS

**Operate** and test USAF ICBM forces for US Strategic Command

**Operate** missile warning radars, sensors, and satellites

**Operate** national space-launch facilities and operational boosters

**Operate** worldwide space surveillance radars and optical systems

**Provide** command and control for DoD satellites

**Provide** ballistic missile warning to NORAD and US Space Command

## COROLLARY MISSIONS

**Develop** and integrate space support for the warfighter

**Serve** as lead command for all UH-1 helicopter programs

## OTHER RESPONSIBILITIES

**Provide** communications, computer, and base support to NORAD

**Supply** range and launch facilities for military, civil, and commercial space launch

## EQUIPMENT

### Intercontinental Ballistic Missiles

|                     |     |
|---------------------|-----|
| Peacekeeper .....   | 50  |
| Minuteman III ..... | 530 |

**Satellite systems** (USAF spacecraft in service as of January 1, 1995):

|   |    |
|---|----|
| <b>Navstar Global Positioning System (GPS):</b> |    |
| Block II/IIA/IIR .....                          | 24 |

### Defense Satellite

#### Communications System:

|                |   |
|----------------|---|
| DSCS II .....  | 3 |
| DSCS III ..... | 8 |
| Milstar .....  | 2 |

#### Defense Meteorological Satellite Program (DMSP) .....

4

**Communications satellites** of NATO III, Fleet Satellite Communications System, and UHF follow-on

**Boosters:** Delta II, Atlas II, Titan II, Titan IV

#### Ballistic missile warning systems:

Defense Support Program, Ballistic Missile Early Warning System, Pave Paws radars, Perimeter Acquisition Radar Attack Characterization System, conventional radars



**Space surveillance systems:**  
Maui Optical Tracking Identification Facility, Groundbased Electro-Optical Deep Space Surveillance System, phased-array radars, mechanical tracking radars

**Satellite command-and-control system:**  
Air Force Satellite Control Network (worldwide system of nine tracking stations providing communications

links to satellites to monitor their status)

**FORCE STRUCTURE**

Two numbered air forces: **14th**, Vandenberg AFB, Calif.; **20th**, F. E. Warren AFB, Wyo.  
One direct reporting unit: Space Warfare Center  
Seven space and missile wings  
One space group, one missile group  
Six bases and seven stations  
More than fifty units worldwide

**PERSONNEL**

Active-duty ..... 21,891  
Officers ..... 4,216  
Enlisted ..... 17,675  
Reserve component ..... 337  
Civilian ..... 4,751  
Contractor personnel ..... 11,639  
**Total ..... 38,618**

**UNIT**

**BASE**

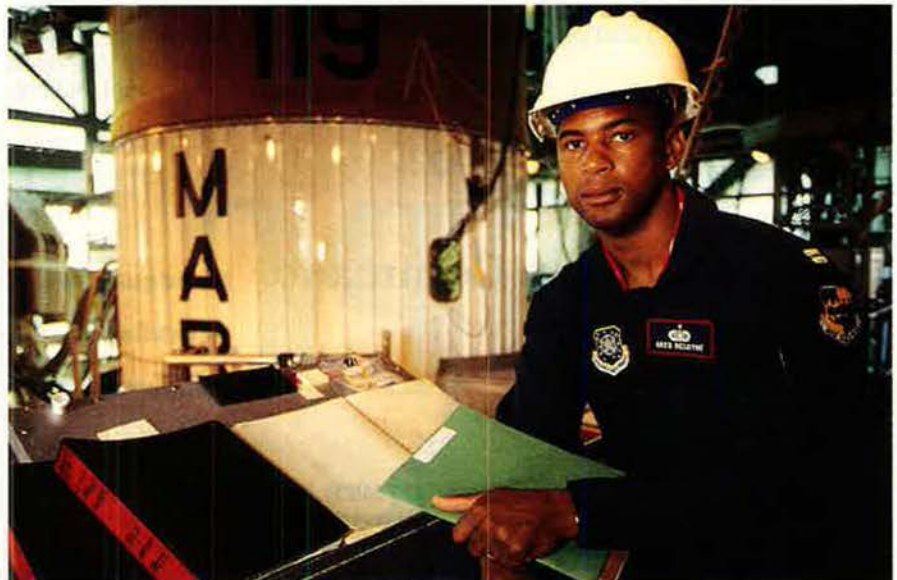
**WEAPONS/ACTIVITIES**

|                           |  |   |
|---------------------------|--|---|
| 21st Space Wing .....     | Peterson AFB, Colo. ....                                 | Missile warning and space surveillance; C-21  |
| 30th Space Wing .....     | Vandenberg AFB, Calif. ....                              | Launch, range operations for DoD, NASA, and commercial space launches; testing support of DoD space and missile systems; UH-1, Delta II, Atlas II, Titan II, Titan IV     |
| 45th Space Wing .....     | Patrick AFB, Fla. ....                                   | Launch, range operations for DoD, NASA, foreign government, and commercial space launches; shuttle program and US Navy Trident test support; Delta II, Atlas II, Titan IV |
| 50th Space Wing .....     | Falcon AFB, Colo. ....                                   | Command and control of DoD and allied nations' satellites   |
| 90th Missile Wing .....   | F. E. Warren AFB, Wyo. ....                              | UH-1, Minuteman III, and Peacekeeper ICBMs  |
| 341st Missile Wing .....  | Malmstrom AFB, Mont. ....                                | UH-1, Minuteman III ICBM  |
| 91st Missile Wing .....   | Minot AFB, N. D. ....                                    | UH-1, Minuteman III ICBM  |
| 321st Missile Group ..... | Grand Forks AFB, N. D. (inactivates September 1998) .... | HH-1H, Minuteman III ICBM   |
| 750th Space Group .....   | Onizuka AS, Calif. ....                                  | Command and control of DoD and allied nations' satellites   |

**COMMAND NOTES**

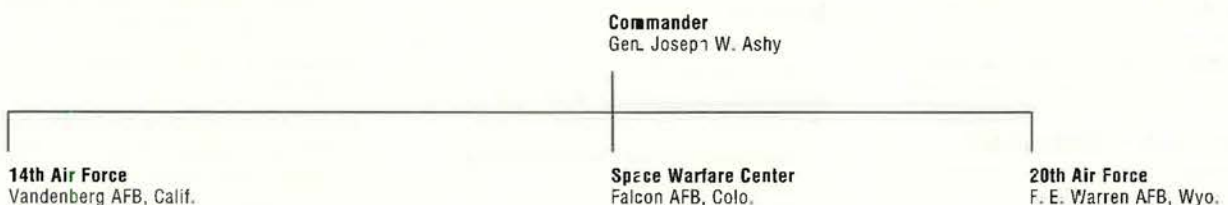
The commander of Air Force Space Command is also commander in chief of NORAD and US Space Command. 14th Air Force is a component of USSPACECOM for space forces; 20th Air Force is a component of US Strategic Command for ICBM forces.

*With dozens of satellites, thousands of highly qualified people, and a vast array of sensors, AFSPC is ready to help future commanders obtain what may be the most valuable weapon of all—information.*



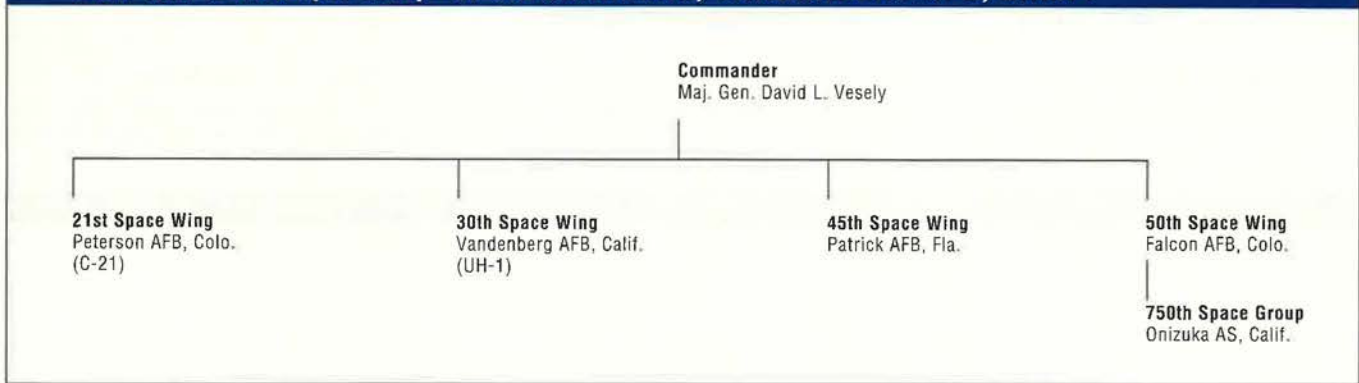
USAF photo by SSgt. Scott Weggers

**AIR FORCE SPACE COMMAND • HEADQUARTERS, PETERSON AFB, COLO.**

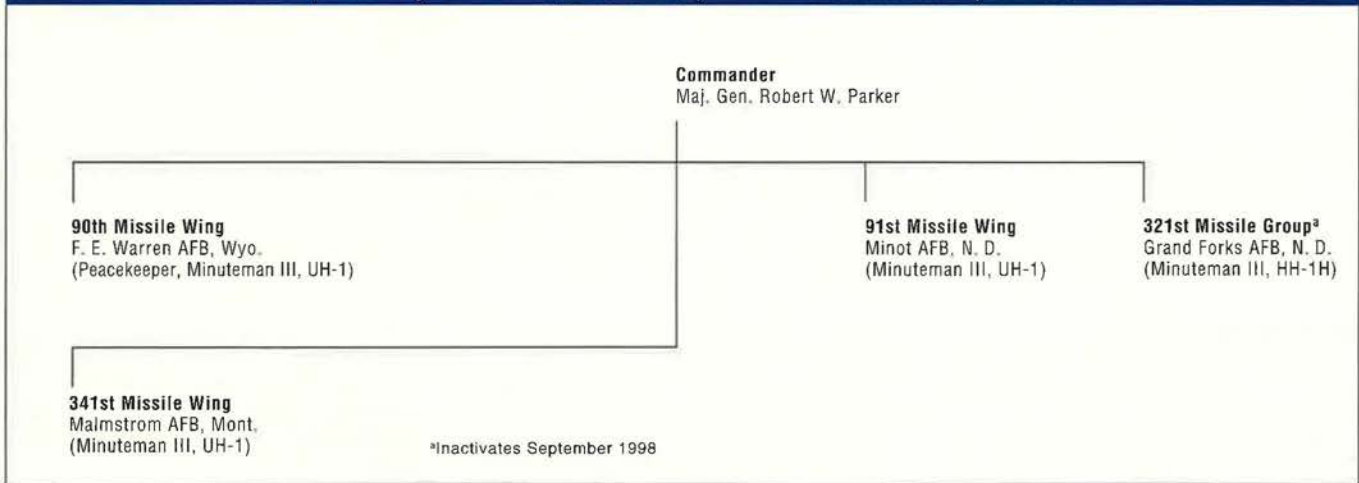




**14th AIR FORCE (AFSPC) • HEADQUARTERS, VANDENBERG AFB, CALIF.**



**20th AIR FORCE (AFSPC) • HEADQUARTERS, F. E. WARREN AFB, WYO.**



# Air Force Special Operations Command

**Headquarters** Hurlburt Field, Fla.

**Established** May 22, 1990

**Commander** Maj. Gen. James L. Hobson, Jr.

**MISSIONS**

**Serve** as the Air Force component of US Special Operations Command, a unified command  
**Deploy** specialized airpower, delivering special operations combat power anywhere, anytime  
**Provide** unconventional warfare, direct action, special reconnaissance, counterterrorism, and foreign internal defense support to the unified commands

**COROLLARY MISSIONS**

**Provide** humanitarian assistance and personnel recovery  
**Conduct** psychological and counternarcotics operations

**EQUIPMENT**

|                                  |    |
|----------------------------------|----|
| AC-130H/U Spectre gunships ..... | 20 |
| MH-53J Pave Low helicopters .... | 36 |
| MH-60G Pave Hawk helicopters ... | 10 |
| MC-130E Combat Talon I .....     | 9  |
| MC-130H Combat Talon II .....    | 21 |
| C-130E/H .....                   | 4  |
| EC-130 .....                     | 6  |
| MC-130P Combat Shadow .....      | 23 |

**FORCE STRUCTURE**

- One special operations wing
- Two special operations groups
- Special Operations School
- One flight test squadron
- One special tactics group
- One Reserve special operations wing
- One Guard special operations wing
- One air support operations squadron

**PERSONNEL**

|                         |               |
|-------------------------|---------------|
| Active-duty .....       | 9,244         |
| Officers .....          | 1,379         |
| Enlisted .....          | 7,865         |
| Reserve component ..... | 2,158         |
| ANG .....               | 1,062         |
| AFRES .....             | 1,096         |
| Civilian .....          | 785           |
| <b>Total .....</b>      | <b>12,187</b> |

**OPERATIONAL ACTIVITY**

Flying hours..... 4,386 per month  
 Many training exercises

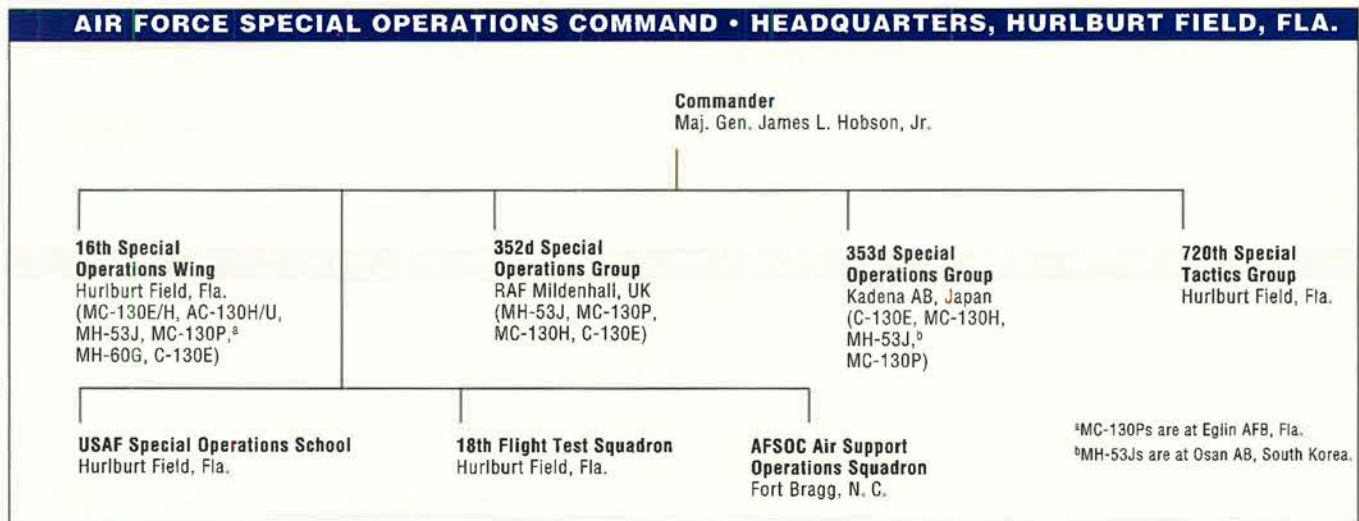


**UNIT**

**BASE**

**WEAPONS**

|                                     |                                     |   |
|-------------------------------------|-------------------------------------|---|
| 16th Special Operations Wing .....  | Hurlburt Field/Eglin AFB, Fla. .... | MC-130E/H, AC-130H/U, MH-53J, C-130E, MC-130P, MH-60G             |
| 352d Special Operations Group ..... | RAF Mildenhall, UK .....            | C-130E, MH-53J, MC-130P, MC-130H                                  |
| 353d Special Operations Group ..... | Kadena AB, Japan .....              | C-130E, MC-130H, MC-130P<br>(also MH-53J at Osan AB, South Korea) |



**COMMAND NOTES**

Several force-structure changes occurred in Air Force Special Operations Command in 1995.

Initial coordination began in December for the consolidation of all Air Force combat controllers under AFSOC's 720th Special Tactics Group. More than 500 combat controllers, currently assigned to ACC, AMC, USAF, PACAF, and AETC, will be consolidated under the 720th STG but will continue to support those commands. Combat control squadrons will be patterned after those in AFSOC. The eventual consolidation will result in manning increases in special tactics squadrons at Hurlburt

Field, Fla., Pope AFB, N. C., and McChord AFB, Wash.

In an unrelated action, the 720th STG will also gain control of all Army and Air Force weather forces worldwide. A realignment, completed January 1, 1996, saw the activation of the 10th Combat Weather Squadron at Fort Bragg, N. C., and the realignment of combat weather flights previously under USAF and PACAF to the 352d Special Operations Group, RAF Mildenhall, UK, and the 353d SOG, Kadena AB, Japan, respectively. Weather units supporting US Army Special Operations Command in the continental US are being reassigned to the 10th CWS.

AFSOC received twelve of thirteen planned AC-130U Spectre gunships in December. The command also completed the replacement of MC-130Es with H models at its overseas groups.

AFSOC's direct reporting units include the USAF Special Operations School, 13th Flight Test Squadron, and the 720th STG, all at Hurlburt Field, and the AFSOC Air Support Operations Squadron, Fort Bragg, N. C.

Other force-structure changes in 1995 saw the transfer of five MC-130E Combat Talon Is from AFSOC to the Air Force Reserve's 919th Special Operations Wing, Duke Field, Fla.

# Air Mobility Command

**Headquarters** Scott AFB, Ill.

**Established** June 1, 1992

**Commander** Lt. Gen. (Gen. selectee) Walter Kross

**MISSIONS**

**Provide** rapid, global airlift and aerial refueling for US armed forces  
**Serve** as USAF component of US Transportation Command  
**Support** wartime taskings by providing forces to theater commands

**COROLLARY MISSIONS**

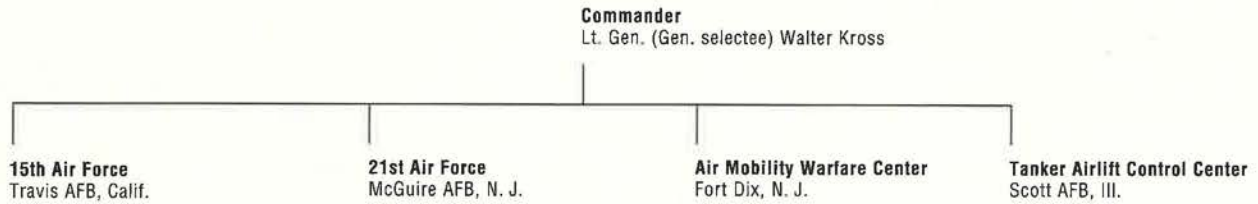
**Provide** operational support aircraft  
**Perform** Stateside aeromedical evacuation missions  
**Provide** visual documentation support

**EQUIPMENT**

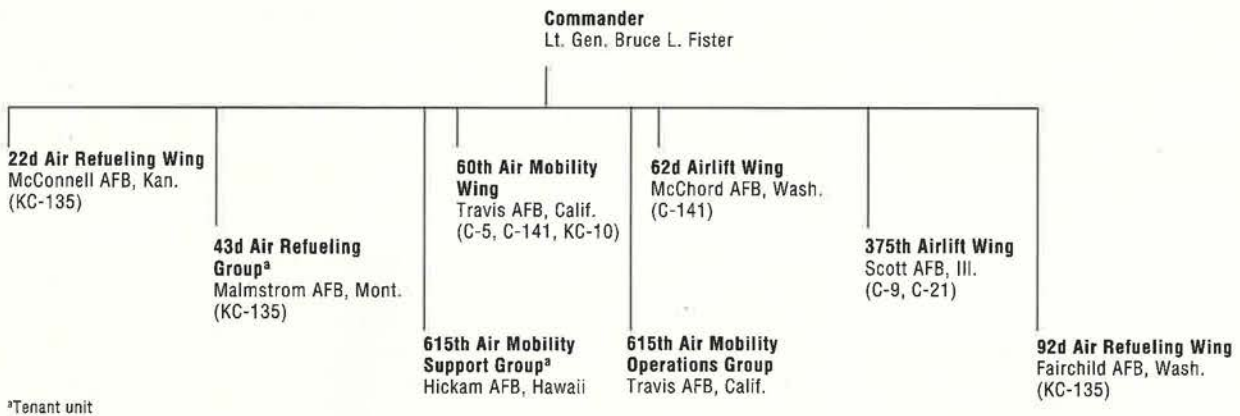
Mobility aircraft (C-5, C-17, C-141, KC-10, KC-135) ..... 824  
 Aeromedical evacuation (C-9) .... 12  
 Other aircraft (C-20, C-21, C-9, VC-25 VC-137, UH-1N) ..... 88



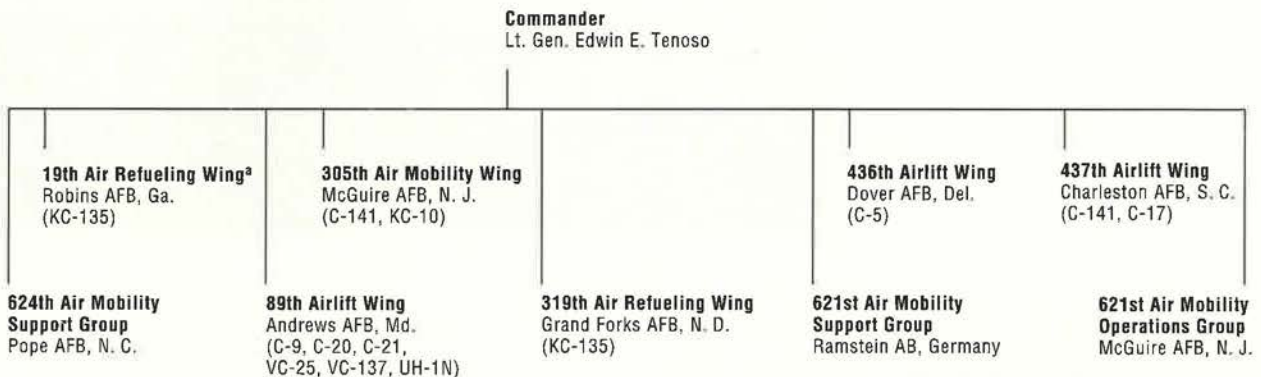
## AIR MOBILITY COMMAND • HEADQUARTERS, SCOTT AFB, ILL.



## 15th AIR FORCE (AMC) • HEADQUARTERS, TRAVIS AFB, CALIF.



## 21st AIR FORCE (AMC) • HEADQUARTERS, MCGUIRE AFB, N. J.



### FORCE STRUCTURE

Two numbered air forces:  
**15th**, Travis AFB, Calif.;  
**21st**, McGuire AFB, N. J.

Two direct reporting units: Air Mo-  
bility Warfare Center, Tanker Airlift  
Control Center

Eleven wings (airlift, air refueling)

### PERSONNEL

|                         |                |
|-------------------------|----------------|
| Active-duty .....       | 49,618         |
| Officers .....          | 7,716          |
| Enlisted .....          | 41,902         |
| Reserve component ..... | 63,722         |
| ANG .....               | 21,027         |
| AFRES .....             | 42,695         |
| Civilian .....          | 9,703          |
| <b>Total .....</b>      | <b>123,043</b> |

### OPERATIONAL ACTIVITY

Flying hours ..... 29,000+ per month

#### Major overseas deployments

Provide Comfort (Iraq), Joint En-  
deavor (Bosnia-Herzegovina), Safe  
Haven (Panama), Southern Watch  
and Vigilant Warrior (southwest  
Asia), Uphold Democracy (Haiti)



**Major training exercises**

Cobra Gold, Tandem Thrust, Team Spirit (Pacific Command); Battle Griffin, Central Enterprise, Dynamic Guard (European Command); Bright Star (Central Command); Fuertas Defense (Southern Command); Ocean Venture (Atlantic Command)

**UNIT**

**BASE**

**WEAPONS**

|                               |                             |  |
|-------------------------------|-----------------------------|--|
| 19th Air Refueling Wing* ...  | Robins AFB, Ga. ....        | KC-135                                   |
| 22d Air Refueling Wing .....  | McConnell AFB, Kan. ....    | KC-135                                   |
| 60th Air Mobility Wing .....  | Travis AFB, Calif. ....     | C-5, C-141, KC-10                        |
| 62d Airlift Wing .....        | McChord AFB, Wash. ....     | C-141                                    |
| 89th Airlift Wing .....       | Andrews AFB, Md. ....       | C-9, C-20, C-21,<br>VC-25, VC-137, UH-1N |
| 92d Air Refueling Wing .....  | Fairchild AFB, Wash. ....   | KC-135                                   |
| 305th Air Mobility Wing ..... | McGuire AFB, N. J. ....     | C-141, KC-10                             |
| 319th Air Refueling Wing ...  | Grand Forks AFB, N. D. .... | KC-135                                   |
| 375th Airlift Wing .....      | Scott AFB, Ill. ....        | C-9, C-21                                |
| 436th Airlift Wing .....      | Dover AFB, Del. ....        | C-5                                      |
| 437th Airlift Wing .....      | Charleston AFB, S. C. ....  | C-17, C-141                              |
| 43d Air Refueling Group* ...  | Malmstrom AFB, Mont. ....   | KC-135                                   |

\*Tenant unit

**COMMAND NOTES**

Air Mobility Command provides the nation with "Global Reach" and focuses on people, infrastructure, and equipment. AMC performs airlift, air refueling, and aeromedical evacuation missions worldwide. AMC applies nonlethal combat airpower across the

spectrum of conflict and supports humanitarian relief, peacekeeping operations, and a variety of other missions.

As defense budgets and personnel numbers shrink, America's security relies on US-based forces and their ability to deploy rapidly. The

command's Tanker Airlift Control Center schedules and controls all tanker and airlift operations worldwide for both DoD and USAF.

AMC's commander also serves as commander in chief of US Transportation Command.

*In terms of deployments, AMC (and its predecessors) has always been one of USAF's busiest major commands. This C-17 is unloading at Tuzla, Bosnia-Herzegovina, the latest trouble spot to require the services of AMC's assets.*



USAF photo by MSgt. Rose S. Reynolds

# PACAF

**Pacific Air Forces**

**Headquarters** Hickam AFB, Hawaii

**Established** July 1, 1957

**Commander** Gen. John G. Lorber

**MISSIONS**

**Plan**, conduct, and coordinate offensive and defensive air operations in the Pacific and Asian theaters

**Organize**, train, equip, and maintain resources to conduct air operations

**EQUIPMENT**

|   |     |
|---|-----|
| Fighters/attack aircraft (F-15C/D/E, F-16C/D, A-10) ..... | 246 |
| OA-10 forward air controllers .....                       | 18  |
| E-3 Airborne Warning and Control System aircraft .....    | 4   |
| KC-135 aerial refueling aircraft ..                       | 15  |

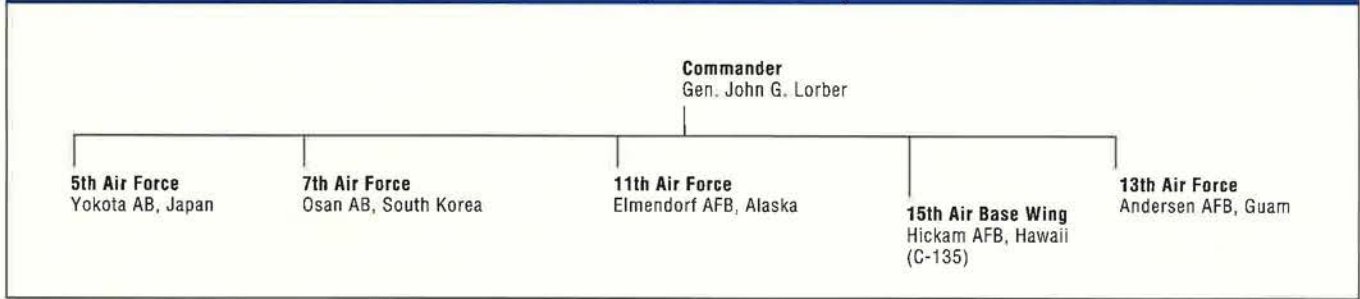
|  |    |
|--|----|
| Transport aircraft (C-9, C-12, C-21, C-130, C-135) ..... | 38 |
| Helicopters (UH-1, HH-60) .....                          | 11 |

**FORCE STRUCTURE**

Four numbered air forces:  
**5th**, Yokota AB, Japan  
**7th**, Osan AB, South Korea



**PACIFIC AIR FORCES • HEADQUARTERS, HICKAM AFB, HAWAII**



**5th AIR FORCE (PACAF) • HEADQUARTERS, YOKOTA AB, JAPAN**



**11th**, Elmendorf AFB, Alaska  
**13th**, Andersen AFB, Guam  
 Nine wings (two multimission, four fighter, one airlift, two air base)

ception Staging Onward Movement and Integration and Ulchi Focus

Lens (South Korea), Tandem Thrust (Guam)

**PERSONNEL**

Active-duty ..... 32,924  
 Officers ..... 3,927  
 Enlisted ..... 28,997  
 Reserve component ..... 4,520  
 ANG ..... 4,300  
 AFRES ..... 220  
 Civilian ..... 8,544  
**Total ..... 45,988**

**OPERATIONAL ACTIVITY**

Flying hours ..... 11,130 per month

**Major overseas deployments**

Cobra Gold (Thailand), Commando Sling (Singapore), Cope Tiger (Thailand), Cope West (Southeast Asia), Kangaroo and Pitch Black (Australia), Team Spirit (South Korea)

**Major training exercises**

Cope North and Keen Edge (Japan), Cope Thunder (Alaska), Re-

**UNIT**

**BASE**

**WEAPONS**

|                          |                              |                                  |
|--------------------------|------------------------------|----------------------------------|
| 3d Wing .....            | Elmendorf AFB, Alaska .....  | F-15C/D, C-130, E-3, F-15E, C-12 |
| 8th Fighter Wing .....   | Kunsan AB, South Korea ..... | F-16C/D                          |
| 15th Air Base Wing ..... | Hickam AFB, Hawaii .....     | C-135                            |
| 18th Wing .....          | Kadena AB, Japan ...         | F-15C/D, E-3, KC-135, HH-60      |
| 35th Fighter Wing .....  | Misawa AB, Japan .....       | F-16C/D                          |
| 36th Air Base Wing ..... | Andersen AFB, Guam .....     | —                                |
| 51st Fighter Wing .....  | Osan AB, South Korea .....   | F-16C/D, A/OA-10, C-12           |
| 354th Fighter Wing ..... | Eielson AFB, Alaska .....    | F-16C/D, A/OA-10                 |
| 374th Airlift Wing ..... | Yokota AB, Japan .....       | UH-1N, C-130, C-21, C-9          |

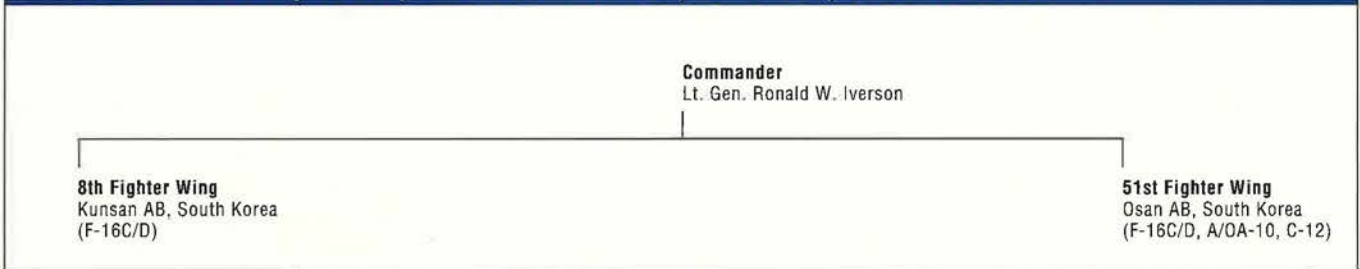
**COMMAND NOTES**

PACAF forces regularly train with Asian and Australian air units during such exercises as Cope North in Japan, Pitch Black in Australia, Cope West in various Southeast Asian nations, and Cobra Gold in Thailand. PACAF's exercise program provides realistic testing of the command's combat capability in locations and

environments where future hostilities might occur.

In Alaska, Cope Thunder 95-3, held in July 1995, saw Japan Self-Defense Forces take part for the first time in the exercise's nineteen-year history. Japanese troops were joined by US and British participants, as well as observers from France, Malaysia, and Bangladesh.

**7th AIR FORCE (PACAF) • HEADQUARTERS, OSAN AB, SOUTH KOREA**





**11th AIR FORCE (PACAF) • HEADQUARTERS, ELMENDORF AFB, ALASKA**

**Commander**  
Lt. Gen. Lawrence E. Boese

**354th Fighter Wing**  
Eielson AFB, Alaska  
(F-16C/D, A/OA-10)

**3d Wing**  
Elmendorf AFB, Alaska  
(F-15C/D/E, C-12, C-130, E-3)

**13th AIR FORCE (PACAF) • HEADQUARTERS, ANDERSEN AFB, GUAM**

**Commander**  
Maj. Gen. Richard T. Swope

**497th Fighter Training Squadron\***  
Paya Lebar Airfield, Singapore

**36th Air Base Wing**  
Andersen AFB, Guam

\*Tenant unit; base owned by Singapore government

Photo by Randy Jolly



*Problems on the Korean Peninsula and in China have increased the importance of US military presence in Pacific Rim nations. These 80th Fighter Squadron airmen training at Kunsan AB, South Korea, are minutes from the DMZ by air.*

# USAF

## US Air Forces in Europe

**Headquarters** Ramstein AB, Germany

**Established** August 15, 1947

**Commander** Gen. Michael E. Ryan

**MISSIONS**

**Plan**, conduct, control, coordinate, and support air and space operations to achieve US national and NATO objectives based on taskings assigned by the commander in chief, US European Command

**COROLLARY MISSIONS**

**Support** US military plans and operations in parts of Europe, the Mediterranean, the Middle East, and Africa

**EQUIPMENT (Active)**

Fighters (F-15C/D, F-16C/D) .... 108

Attack aircraft (A-10, F-15E) ..... 60  
 Observation aircraft (OA-10) ..... 6  
 Other aircraft (tankers, transports, reconnaissance) ..... 47  
 Conventional weapons (general-purpose bombs, cluster bombs,



guided bombs, rockets, air-to-surface missiles)

**FORCE STRUCTURE**

Three numbered air forces: **3d**, RAF Mildenhall, UK; **16th**, Aviano AB, Italy; **17th**, Sembach Annex, Germany

Six wings (one multimission, one air refueling, one airlift, and three fighter)

Three regional support groups

**PERSONNEL**

|                         |               |
|-------------------------|---------------|
| Active-duty .....       | 27,126        |
| Officers .....          | 3,233         |
| Enlisted .....          | 23,893        |
| Reserve component ..... | 362           |
| ANG .....               | 0             |
| AFRES .....             | 362           |
| Civilian .....          | 5,232         |
| <b>Total .....</b>      | <b>32,720</b> |

**OPERATIONAL ACTIVITY**

Flying hours ..... 9,453 per month

**Major training exercises**

African Eagle, Ardent Ground, Atlantic Resolve, Baltops, Brilliant

Invader, Blue Harrier, Central Enterprise, Coldfire, Distant Thunder, Dynamic Mix, Ellipse Bravo, Juniper Falconry, Juniper Stallion, Phoenix Partner, Salty Hammer, Tactical Fighter Weaponry, Trailblazer

**Major contingency operations support**

Deny Flight, Joint Endeavor (Bosnia-Herzegovina); Provide Hope IV (former USSR), Provide Comfort II

(northern Iraq), Determined Effort (Hungary)

**COMMAND NOTES**

US Air Forces in Europe shares common systems, procedures, and training with NATO forces. Headquarters USAFE is collocated with Headquarters Allied Air Forces Central Europe (AAFCE), which operationally controls Immediate Reaction Forces, Rapid Reaction Forces, and Main Defense Forces of NATO nation air forces during wartime.

**UNIT**

|                                  |  |  |
|----------------------------------|--|--|
| 31st Fighter Wing .....          | Aviano AB, Italy .....                 | F-16C/D  |
| 39th Wing .....                  | Incirlik AB, Turkey (rotational) ..... | —  |
| 48th Fighter Wing .....          | RAF Lakenheath, UK .....               | F-15E, F-15C/D                                       |
| 52d Fighter Wing .....           | Spangdahlem AB, Germany .....          | F-15C/D,<br>A/OA-10, F-16C/D                         |
| 86th Airlift Wing .....          | Ramstein AB, Germany ...               | C-9, C-20, C-21,<br>C-130E, CT-43                    |
| 100th Air Refueling Wing .....   | RAF Mildenhall, UK .....               | KC-135R,<br>Special Operations MC-130, HC-130, MH-53 |
| 603d Regional Support Group .... | RAF Mildenhall, UK                     |  |
| 616th Regional Support Group ... | Aviano AB, Italy                       |  |
| 617th Regional Support Group ... | Sembach Annex, Germany                 |  |

**BASE**

**WEAPONS**

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



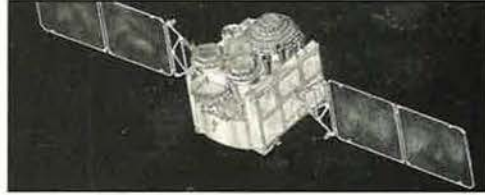
The USAFE organizational chart above shows peacetime lines of command. The chart below shows the NATO wartime command lines of authority.











We are hundreds of professionals  
working with the Air Force  
to streamline\* acquisition in a  
downsized\*\* environment.

\* **streamline** *v.t.* **1.** to bring up to date. to render more efficient by modernizing. **2.** a. organize. b. to make simpler or more efficient.

\*\* **downsize** *v.t.* to do the above with less funding and reduced manpower.

**ANSER**  
*To help you make informed decisions*

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# Field Operating Agencies

A field operating agency (FOA) is a subdivision of the Air Force that carries out field activities under the operational control of an Hq. USAF functional manager. Though the FOAs have the same administrative and organizational responsibilities as the major commands, their missions remain separate from those of the major commands.



## Air Force Audit Agency

**Headquarters** ..... Washington, D. C.  
**Established** ..... July 1, 1948  
**Director** ..... Jackie R. Crawford

### MISSION, PURPOSE, OPERATIONS

**Provide** all levels of Air Force management with independent and quality audit service  
**Produce** audit reports that evaluate the efficiency, effectiveness, and economy of Air Force programs and activities

### STRUCTURE

Acquisition and Logistics Audit Directorate, Wright-Patterson AFB, Ohio  
 Financial and Support Audit Directorate, March ARB, Calif.  
 Field Activities Directorate, Washington, D. C.  
 Four regional offices  
 Fifty-two field offices

### PERSONNEL

Active-duty ..... 5  
     Officers ..... 2  
     Enlisted ..... 3  
 Reserve component ..... 0  
 Civilians ..... 893  
**Total** ..... 898

### NOTE

The director of AFAA is the Auditor General of the Air Force.

## Air Force Base Conversion Agency

**Headquarters** ..... Arlington, Va.  
**Established** ..... November 15, 1991  
**Director** ..... Alan K. Olsen

### MISSION, PURPOSE, OPERATIONS

**Execute** environmental programs and real and personal property disposal for Air Force bases being closed or realigned under the authorities of the Base Closure and Realignment Act of 1988 and the Defense Base Closure and Realignment Act of 1990  
**Assist** communities in the conversion of closing and realigning bases from military to civilian use and ensure that property at these Air Force installations is made available for reuse as quickly and efficiently as possible

### STRUCTURE

Office of the Director  
 Base operating locations

### PERSONNEL

Active-duty ..... 2  
     Officers ..... 2  
     Enlisted ..... 0

Reserve component ..... 0  
 Civilians ..... 340  
**Total** ..... 342

## Air Force Center for Environmental Excellence

**Headquarters** ..... Brooks AFB, Tex.  
**Established** ..... July 23, 1991  
**Director** ..... Gary M. Erickson

### MISSION, PURPOSE, OPERATIONS

**Provide** Air Force commanders worldwide with services in environmental remediation, compliance, planning, and pollution prevention, including independent testing and application of environmental restoration and pollution prevention technologies

### STRUCTURE

Air Force Design Group  
 Construction Management Directorate  
 Environmental Restoration Directorate  
 Environmental Conservation and Planning Directorate  
 Pollution Prevention Directorate  
 Three regional compliance offices

### PERSONNEL

Active-duty ..... 54  
     Officers ..... 52  
     Enlisted ..... 2  
 Reserve component ..... 20  
     ANG ..... 0  
     AFRES ..... 20  
 Civilians ..... 386  
**Total** ..... 460

## Air Force Civil Engineer Support Agency

**Headquarters** ..... Tyndall AFB, Fla.  
**Established** ..... August 1, 1991  
**Commander** ..... Col. Peter K. Kloeber

### MISSION, PURPOSE, OPERATIONS

**Provide** tools, practices, and professional support to maximize Air Force civil engineer capabilities in base and contingency operations

### STRUCTURE

Contingency Support Directorate  
 Technical Support Directorate  
 Operations Support Directorate  
 Field Support Directorate



## PERSONNEL

|                         |            |
|-------------------------|------------|
| Active-duty .....       | 94         |
| Officers .....          | 23         |
| Enlisted .....          | 71         |
| Reserve component ..... | 2          |
| ANG .....               | 1          |
| AFRES .....             | 1          |
| Civilians .....         | 129        |
| <b>Total .....</b>      | <b>225</b> |

### Air Force Command, Control, Communications, and Computer Agency

Headquarters ..... Scott AFB, Ill.  
Established ..... May 28, 1993  
Commander ..... Col. Patrick M. Ryan

#### MISSION, PURPOSE, OPERATIONS

**Support** the Air Force deputy chief of staff for Command, Control, Communications, and Computers (C<sup>4</sup>)  
**Develop** and validate C<sup>4</sup> architectures, technical standards, requirements, policies, procedures, and solutions  
**Ensure** integration and interoperability among Air Force C<sup>4</sup> systems  
**Ensure** that policies, procedures, and applications take full advantage of C<sup>4</sup> capabilities to meet future information requirements

#### STRUCTURE

Four headquarters functional areas: Plans and Analysis, Systems and Procedures, Interoperability and Technology, and Resources  
C<sup>4</sup> Technology Validation Office, Barksdale AFB, La.

#### PERSONNEL

|                         |            |
|-------------------------|------------|
| Active-duty .....       | 295        |
| Officers .....          | 151        |
| Enlisted .....          | 144        |
| Reserve component ..... | 0          |
| Civilians .....         | 308        |
| <b>Total .....</b>      | <b>603</b> |

### Air Force Cost Analysis Agency

Headquarters ..... Arlington, Va.  
Established ..... August 1, 1992  
Commander ..... Col. Gregory W. McKillop

#### MISSION, PURPOSE, OPERATIONS

**Develop** independent life-cycle cost estimates of major weapon and information systems  
**Conduct** special cost reviews for the Air Force Secretariat and for other organizations as directed  
**Research** emerging changes in technologies, acquisition priorities, and industry  
**Develop** cost estimation tools, techniques, methodologies, and databases

#### STRUCTURE

Aircraft Division  
Automated Information Systems (AIS) Division  
Command, Control, and Communications (C<sup>3</sup>) Division  
Missiles and Munitions Division  
Space Systems Division  
Technical Support Division  
Operations Division

## PERSONNEL

|                         |           |
|-------------------------|-----------|
| Active-duty .....       | 29        |
| Officers .....          | 29        |
| Enlisted .....          | 0         |
| Reserve component ..... | 0         |
| Civilians .....         | 23        |
| <b>Total .....</b>      | <b>52</b> |

### Air Force Doctrine Center

Headquarters ..... Langley AFB, Va.  
Established ..... July 21, 1993  
Commander ..... Col. Robert D. Coffman

#### MISSION, PURPOSE, OPERATIONS

**Develop** and **publish** basic and operational-level doctrine for the Air Force  
**Provide** Air Force input into joint and multinational doctrine development  
**Ensure** that Air Force doctrine is consistent with policy and joint doctrine  
**Serve** as the Coordinating Review Authority for joint doctrine and for joint tactics, techniques, and procedures for which USAF is not the lead agent  
**Prepare** and present coordinated Air Force comments on joint doctrine as well as joint tactics, techniques, and procedures and their development  
**Serve** as the Air Force's primary source of expertise for military operations other than war doctrine and strategy development as well as training, education, exercises, and simulations (effective July 1, 1996)

#### PERSONNEL

|                         |           |
|-------------------------|-----------|
| Active-duty .....       | 23        |
| Officers .....          | 22        |
| Enlisted .....          | 1         |
| Reserve component ..... | 0         |
| Civilians .....         | 7         |
| <b>Total .....</b>      | <b>30</b> |

### Air Force Flight Standards Agency

Headquarters ..... Andrews AFB, Md.  
Established ..... October 1, 1991  
Commander ..... Col. William E. Schepens

#### MISSION, PURPOSE, OPERATIONS

**Develop**, standardize, evaluate, and certify Air Force policy, procedures, and equipment for global flight operations and centrally manage the Air Force Air Traffic Control and Landing Systems (ATCALS)  
**Perform** worldwide flight inspection of airfields, navigation systems, and instrument approaches during combat, contingencies, and Joint Staff exercises  
**Represent** the Secretary of the Air Force and Hq. USAF in Federal Aviation Administration (FAA) airspace management and air traffic control issues  
**Represent** the Department of Defense on issues of international airspace and air traffic control  
**Provide** flight standards and aeronautical services to develop USAF instrument requirements and training  
**Certify** procedures and directives for current and emerging cockpit display technologies and new navigation systems  
**Provide** the Air Force with air traffic control and airfield procedures, functional management, operational evaluation of air traffic control systems, and airspace management procedures  
**Lead** ATCALS planning and programming, sustainment, and coordination with FAA and military services



### STRUCTURE

USAF Representative to FAA, Hq. FAA, Washington, D. C.  
 Flight Inspection Center, Oklahoma City, Okla.  
 Airfield Operations Directorate, Andrews AFB, Md.  
 Operations Directorate, Andrews AFB, Md.  
 Resources and Requirements Directorate, Andrews AFB, Md.  
 International Programs Directorate, Andrews AFB, Md.

### PERSONNEL

|                         |            |
|-------------------------|------------|
| Active-duty .....       | 143        |
| Officers .....          | 76         |
| Enlisted .....          | 67         |
| Reserve component ..... | 4          |
| ANG .....               | 0          |
| AFRES .....             | 4          |
| Civilians .....         | 29         |
| <b>Total .....</b>      | <b>176</b> |

### EQUIPMENT

Two C-21 Learjets

## Air Force Frequency Management Agency

Headquarters ..... Arlington, Va.  
 Established ..... October 1, 1991  
 Commander ..... Col. Kimberly J. Dalrymple

### MISSION, PURPOSE, OPERATIONS

**Develop** USAF policy and procedures for radio frequency spectrum management in support of air and space combat operations  
**Represent** USAF requirements and capabilities to regulatory agencies at national and international levels  
**Direct** frequency assignments in support of global air and space operations and contingencies

### STRUCTURE

Plans Division  
 Systems Engineering Division  
 Technical Services Division

### PERSONNEL

|                         |           |
|-------------------------|-----------|
| Active-duty .....       | 8         |
| Officers .....          | 3         |
| Enlisted .....          | 5         |
| Reserve component ..... | 0         |
| Civilians .....         | 21        |
| <b>Total .....</b>      | <b>29</b> |

## Air Force Historical Research Agency

Headquarters ..... Maxwell AFB, Ala.  
 Established ..... September 12, 1949  
 Commander ..... Col. Richard S. Rauschkolb

### MISSION, PURPOSE, OPERATIONS

**Collect**, preserve, and manage the Air Force historical document collection  
**Answer** requests for historical information  
**Operate** research facilities for professional military education students, faculty, visiting scholars, and the general public  
**Determine** the lineage and honors of Air Force organizations  
**Maintain** official emblem records of Air Force organizations  
**Verify** Air Force aerial victory credits  
**Provide** manpower and historical support to preserve documents during contingency operations  
**Prepare** historical data, analyses, and manuscripts to support the Air Staff and major commands  
**Conduct** an oral history program  
**Operate** a USAF-wide automated historical data system

### STRUCTURE

Information Systems Division  
 Research Division

### PERSONNEL

|                         |           |
|-------------------------|-----------|
| Active-duty .....       | 10        |
| Officers .....          | 4         |
| Enlisted .....          | 6         |
| Reserve component ..... | 20        |
| ANG .....               | 0         |
| AFRES .....             | 20        |
| Civilians .....         | 43        |
| <b>Total .....</b>      | <b>73</b> |

## Air Force History Support Office

Headquarters ..... Washington, D. C.  
 Established ..... September 30, 1994  
 Commander ..... Col. George K. Williams

### MISSION, PURPOSE, OPERATIONS

**Research**, write, and publish books and other studies on the history of the Air Force  
**Provide** historical support through the Air Force historian to Hq. USAF  
**Publish** books to help the Air Force formulate strategy, plans, and doctrine to conduct its operations; educate Air Force students at professional military schools; provide scholars with research and teaching materials; and inform the public about the role of the Air Force and air-power in national security

### STRUCTURE

Histories Division  
 Research Division  
 Special Projects Division

### PERSONNEL

|                         |           |
|-------------------------|-----------|
| Active-duty .....       | 5         |
| Officers .....          | 4         |
| Enlisted .....          | 1         |
| Reserve component ..... | 4         |
| ANG .....               | 0         |
| AFRES .....             | 4         |
| Civilians .....         | 24        |
| <b>Total .....</b>      | <b>33</b> |

### NOTE

AFHSO was formerly the Center for Air Force History.

## Air Force Inspection Agency

Headquarters ..... Kirtland AFB, N. M.  
 Established ..... August 1, 1991  
 Commander ... Col. (Brig. Gen. selectee) Robert M. Murdock

### MISSION, PURPOSE, OPERATIONS

**Provide** Air Force leadership with objective and independent assessments of Air Force readiness, discipline, and management efficiency and effectiveness  
**Conduct** special reviews and inquiries as directed by the Air Force Secretary, Chief of Staff, and Inspector General

### STRUCTURE

Acquisition Inspection Directorate  
 Field Inspection Directorate  
 Management Inspection Directorate  
 Medical Inspection Directorate



**PERSONNEL**

|                         |            |
|-------------------------|------------|
| Active-duty .....       | 116        |
| Officers .....          | 92         |
| Enlisted .....          | 24         |
| Reserve component ..... | 0          |
| Civilians .....         | 23         |
| <b>Total .....</b>      | <b>139</b> |

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**Air Force Legal Services Agency**

**Headquarters** ..... Bolling AFB, D. C.  
**Established** ..... September 1, 1991  
**Commander** ..... Col. Richard F. Rothenburg (acting)

**MISSION, PURPOSE, OPERATIONS**

**Provide** Air Force commanders and personnel with specialized legal services: administering military justice to protect individual rights and ensure good order and discipline; preserving command freedom of action through robust defense of Air Force interests in civil litigation; providing programs to benefit the Air Force family; and supporting legal services worldwide with state-of-the-art, specialized information technology

**STRUCTURE**

Air Force Court of Criminal Appeals  
 Civil Law and Litigation Directorate  
  Commercial Litigation Division  
  Environmental Law and Litigation Division  
  General Claims Division  
  General Litigation Division  
  Legal Assistance Division  
  Tort Claims and Litigation Services Division  
 Judiciary Directorate  
  Appellate Defense Division  
  Clemency, Corrections, and Officer Review Division  
  Government Trial and Appellate Counsel Division  
  Military Justice Division  
  Trial Defense Division  
  Trial Judiciary Division  
 Legal Information Services Directorate

**PERSONNEL**

|                         |            |
|-------------------------|------------|
| Active-duty .....       | 397        |
| Officers .....          | 275        |
| Enlisted .....          | 122        |
| Reserve component ..... | 87         |
| ANG .....               | 0          |
| AFRES .....             | 87         |
| Civilians .....         | 124        |
| <b>Total .....</b>      | <b>608</b> |

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**Air Force Logistics Management Agency**

**Headquarters** ..... Maxwell AFB, Gunter Annex, Ala.  
**Established** ..... September 30, 1975  
**Commander** ..... Col. Clarence T. Lowry

**MISSION, PURPOSE, OPERATIONS**

**Develop**, analyze, test, evaluate, and recommend new or improved concepts, methods, systems, policies, and procedures to enhance logistics efficiency and effectiveness  
**Publish** the *Air Force Journal of Logistics*

**STRUCTURE**

Functional directorates  
  Contracting  
  Logistics Plans  
  Maintenance and Munitions  
  Supply

Transportation  
 Support directorates  
  Logistics Analysis  
  Plans and Programs

**PERSONNEL**

|                         |           |
|-------------------------|-----------|
| Active-duty .....       | 67        |
| Officers .....          | 52        |
| Enlisted .....          | 15        |
| Reserve component ..... | 0         |
| Civilians .....         | 18        |
| <b>Total .....</b>      | <b>85</b> |

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**Air Force Management Engineering Agency**

**Location** ..... Randolph AFB, Tex.  
**Established** ..... November 1, 1975  
**Commander** ..... Col. Charles F. Dibrell, Jr.

**MISSION, PURPOSE, OPERATIONS**

**Work** with Air Staff and major commands to achieve significant improvement through process reengineering  
**Determine** manpower requirements and manage manpower resources  
**Provide** commanders and functional managers technical expertise and process improvement techniques  
**Oversee** the implementation of technical and procedural guidance for Air Force Management Engineering and Productivity Programs  
**Serve** as the executive agent for the Navy, Army, and Air Force for the development of DoD medical manpower determinants through the Joint Health-Care Management Engineering Team

**PERSONNEL**

|                         |            |
|-------------------------|------------|
| Active-duty .....       | 87         |
| Officers .....          | 26         |
| Enlisted .....          | 61         |
| Reserve component ..... | 0          |
| Civilians .....         | 64         |
| <b>Total .....</b>      | <b>151</b> |

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**Air Force Medical Operations Agency**

**Headquarters** ..... Bolling AFB, D. C.  
**Established** ..... July 1, 1992  
**Commander** ..... Maj. Gen. Charles H. Roadman II

**MISSION, PURPOSE, OPERATIONS**

**Develop** policies and programs to improve aerospace medicine and preventive and clinical health-care services to enhance the capabilities of the Air Force

**STRUCTURE**

Aerospace Medicine  
 Operational and Flight Medicine  
 Clinical and Biomedical Research and Development  
 Clinical Quality Management  
 Family Advocacy  
 Occupational and Environmental Health  
 Patient Administration  
 Preventive Medicine  
 USAF Radioisotope Committee Secretariat

**PERSONNEL**

|                         |    |
|-------------------------|----|
| Active-duty .....       | 42 |
| Officers .....          | 37 |
| Enlisted .....          | 5  |
| Reserve component ..... | 3  |
| ANG .....               | 0  |
| AFRES .....             | 3  |



Civilians .....22  
**Total** .....67

### Air Force Medical Support Agency

**Headquarters** ..... Brooks AFB, Tex.  
**Established** ..... July 1, 1992  
**Commander** ..... Col. Sidney Brandler

#### MISSION, PURPOSE, OPERATIONS

**Improve** global performance and capability of the medical service

**Serve** as the Air Force Surgeon General's focal point for policy development, strategy, plans, consultant services, and requirements for facilities, supplies, equipment, acquisition, information systems and resources, and patient administration

#### STRUCTURE

Directorate of Medical Support  
 Health Facilities Division  
 Medical Information Systems Division  
 Medical Logistics Division  
 Patient Administration Division

#### PERSONNEL

Active-duty .....31  
 Officers .....27  
 Enlisted .....4  
 Reserve component .....0  
 Civilians .....28  
**Total** .....59

### Air Force News Agency

**Headquarters** ..... Kelly AFB, Tex.  
**Established** ..... June 1, 1978  
**Commander** ..... Col. Joseph S. Panvini

#### MISSION, PURPOSE, OPERATIONS

**Support** USAF public affairs efforts by creating and delivering information products and services, such as *Airman Magazine*, *Air Force Policy Letter*, Air Force Fact Sheets, general officer biographies, Air Force Television and Radio news, and news about service members for their hometown news media

**Communicate** and broadcast news, information, and entertainment through print and electronic media

**Operate** all USAF-managed Armed Forces Radio and Television Service outlets

#### STRUCTURE

Air Force Internal Information Directorate  
 Army and Air Force Hometown News Service  
 Business Operations Directorate  
 Hq. Air Force Broadcasting Service

#### PERSONNEL

Active-duty .....370  
 Officers .....24  
 Enlisted .....346  
 Reserve component .....0  
 Civilians .....145  
**Total** .....515

### Air Force Office of Special Investigations

**Headquarters** ..... Bolling AFB, D. C.  
**Established** ..... August 1, 1948  
**Commander** ..... Brig. Gen. Robert A. Hoffmann

#### MISSION, PURPOSE, OPERATIONS

**Provide** criminal investigative, counterintelligence information, and force protection services to commanders

**Identify** and prevent criminal activity, including homicide, drug abuse, espionage, terrorism, and sabotage, and economic (major defense contractor fraud and local fraud), environmental, and other crimes that threaten Air Force and DoD resources

**Provide** force protection to deployed wings and units

#### STRUCTURE

USAF Special Investigations Academy  
 Seven regional offices  
 Seven overseas squadrons  
 160 detachments and operating locations

#### PERSONNEL

Active-duty .....1,523  
 Officers .....404  
 Enlisted .....1,119  
 Reserve component .....416  
 ANG .....0  
 AFRES .....416  
 Civilians .....407  
 Foreign nationals .....40  
**Total** .....2,386

### Air Force Operations Group

**Headquarters** ..... Washington, D. C.  
**Established** ..... July 26, 1977  
**Commander** ..... Col. Terry L. Simpson

#### MISSION, PURPOSE, OPERATIONS

**Support** the Air Force Chief of Staff and deputy chief of staff for Plans and Operations

**Maintain** a twenty-four-hour watch on all current operations  
**Handle** emergency actions through the Air Force Operations Center

**Provide** facilities, policy, procedures, and staff for the Hq. USAF Crisis Action Team during crises, contingencies, and exercises

**Develop** policy and monitor USAF readiness and resource allocation worldwide

**Coordinate** actions among USAF major commands, other field operating agencies, and direct reporting units in response to taskings from the Joint Chiefs of Staff National Military Command Center (NMCC)

**Provide** Air Force Chief of Staff with daily status of current Air Force operations worldwide

**Assist** in providing military support to civilian authorities  
**Prepare** and provide weather data to the President, Secretary of Defense, Joint Chiefs of Staff, NMCC, Army Operations Center, and other federal agencies

**Maintain** the USAF portion of the Worldwide Military Command and Control System Intercomputer Network, the Air Force's resources and training system database and worldwide exercise scheduling database, and the Joint Uniform Lessons Learned database

#### FORCE STRUCTURE

AFOG is supported by ten Air Staff functional areas: Operations, Plans, Logistics, Manpower and Personnel, Intelligence, Civil Engineering, Security Police, Information Systems Man-



agement, Medical Readiness Division, and Chaplain Response Forces. AFOG is also supported by the Air Force Reserve and Air National Guard.

**PERSONNEL**

|                         |            |
|-------------------------|------------|
| Active-duty .....       | 224        |
| Officers .....          | 147        |
| Enlisted .....          | 77         |
| Reserve component ..... | 0          |
| Civilians .....         | 15         |
| <b>Total .....</b>      | <b>239</b> |

**Air Force Pentagon Communications Agency**

**Headquarters** ..... Washington, D. C.  
**Established** ..... October 1, 1984  
**Commander** ..... Col. Stephen E. Anno

**MISSION, PURPOSE, OPERATIONS**

**Provide** command, control, communications, and computer systems and services for the Office of the Secretary of Defense (OSD), the Joint Chiefs of Staff, the National Military Command Center (NMCC), the Secretary of the Air Force, Hq. USAF, and other command centers in Washington, D. C., as directed by Hq. USAF

**Develop** management information systems for OSD and Hq. USAF to prepare and submit the President's budget and create decision support tools for senior DoD officials to evaluate events worldwide and respond to crises

**Serve** as executive agent for the NMCC

**Maintain** five red (secure) communications switches and three black (nonsecure) switches, including the Washington Tactical Switch, 8,000 telephones, and 2,500 leased circuits

**Handle** 3,000 specialized secure telephone units, NMCC and Air Force Operations Group networks, and an extensive pager and cellular telephone network

**STRUCTURE**

- Architecture and Engineering Directorate
- Security Directorate
- Air Staff Systems Directorate
- OSD Systems Directorate
- Logistics and Acquisitions Directorate
- Mission Support Directorate
- Operations Directorate
- Resource Management Directorate
- Services Directorate
- Programs and Requirements Directorate

**PERSONNEL**

|                         |            |
|-------------------------|------------|
| Active-duty .....       | 637        |
| Officers .....          | 192        |
| Enlisted .....          | 445        |
| Reserve component ..... | 2          |
| ANG .....               | 0          |
| AFRES .....             | 2          |
| Civilians .....         | 227        |
| <b>Total .....</b>      | <b>866</b> |

**NOTE**

AFPCA was formerly the 7th Communications Group.

**Air Force Personnel Center**

**Headquarters** ..... Randolph AFB, Tex.  
**Established** ..... October 1, 1995  
**Commander** ..... Brig. Gen. Susan L. Pamerleau

**MISSION, PURPOSE, OPERATIONS**

**Provide** personnel operations service

**STRUCTURE**

- Assignments
- Mission Support
- Personnel Accountability
- Personnel Data Systems
- Personnel Programs Management
- Customer Assistance
- Civilian Personnel Operations
- Civilian Career Management

**PERSONNEL**

|                         |              |
|-------------------------|--------------|
| Active-duty .....       | 869          |
| Officers .....          | 270          |
| Enlisted .....          | 599          |
| Reserve component ..... | 7            |
| ANG .....               | 2            |
| AFRES .....             | 5            |
| Civilians .....         | 655          |
| <b>Total .....</b>      | <b>1,531</b> |

**NOTE**

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

**Air Force Personnel Operations Agency**

**Headquarters** ..... Washington, D. C.  
**Established** ..... August 15, 1993  
**Director** ..... Steve N Smith

**MISSION, PURPOSE, OPERATIONS**

**Execute** personnel programs and portions of programs located in the Washington, D. C., area

**Develop** and operate officer, enlisted, and civilian models and databases for management information

**Execute** the Air Force Employee Development Program and training budgets

**Manage** the Air Force Relocation, Employee, and Labor Relations Programs

**STRUCTURE**

- Analysis Division
- Performance Management Division
- Systems Support Division
- Work Force Appeals and Relations Division

**PERSONNEL**

|                         |           |
|-------------------------|-----------|
| Active-duty .....       | 38        |
| Officers .....          | 23        |
| Enlisted .....          | 15        |
| Reserve component ..... | 0         |
| Civilians .....         | 27        |
| <b>Total .....</b>      | <b>65</b> |

**Air Force Program Executive Office**

**Headquarters** ..... Washington, D. C.  
**Established** ..... November 1990  
**Air Force Acquisition Executive** ..... Arthur L. Money

**MISSION, PURPOSE, OPERATIONS**

**Manage** and account for the execution of major and selected Air Force acquisition programs



## STRUCTURE

### Air Force Acquisition Executive

#### Program Executive Officers:

John M. Gilligan, Battle Management  
Brig. Gen. Berwyn A. Reiter, Command, Control, and Communications  
Harry E. Schulte, Weapons  
Darleen Druyun (acting), Space  
Oscar Goldfarb, Joint Logistics Systems  
Col. (Brig. Gen. selectee) Richard V. Reynolds, Airlift and Trainers  
Maj. Gen. Robert F. Raggio, Fighters and Bombers  
Rear Adm. Craig E. Steidle, JAST

**PERSONNEL** ..... 49

## Air Force Real Estate Agency

**Headquarters** ..... Bolling AFB, D. C.  
**Established** ..... August 1, 1991  
**Director** ..... William E. Edwards

### MISSION, PURPOSE, OPERATIONS

**Acquire**, manage, and dispose of real property worldwide for the Air Force  
**Maintain** a complete land and facilities inventory  
**Plan** and execute the Real Property Management program  
**Provide** instructions to assist USAF in complying with public laws and federal and DoD guidance

### PERSONNEL

Active-duty ..... 0  
Reserve component ..... 0  
Civilians ..... 13  
**Total** ..... 13

## Air Force Reserve

**Headquarters** ..... Robins AFB, Ga.  
**Established** ..... April 14, 1948  
**Commander** ..... Maj. Gen. Robert A. McIntosh

### MISSION, PURPOSE, OPERATIONS

**Support** the active-duty force  
**Serve** in missions including fighter, bomber, airlift, aerial refueling, rescue, special operations, aeromedical evacuation, aerial fire-fighting, weather reconnaissance, and space operations  
**Provide** support and disaster relief in the US  
**Support** national counterdrug efforts

### FORCE STRUCTURE

Three numbered air forces: **4th**, McClellan AFB, Calif.; **10th**, Bergstrom ARS, Tex.; **22d**, Dobbins ARB, Ga.  
Thirty-seven flying wings  
128 groups  
397 squadrons  
106 flights

### PERSONNEL

Officers ..... 15,803  
Enlisted ..... 58,693  
Civilians (non-ART) ..... 5,416  
**Total** ..... 79,912

## EQUIPMENT

B-52H bombers ..... 9  
F-16 fighters ..... 110  
A/OA-10 attack aircraft ..... 44  
C-5A/B airlifters ..... 32  
C-141B airlifters ..... 40  
C-130E/H airlifters ..... 110  
KC-135E/R tankers ..... 72  
HC-130N/P aircraft ..... 15  
HH-60G rescue helicopters ..... 25  
WC-130H weather planes ..... 10  
MC-130E special operations ..... 5  
**Total primary aircraft authorized** ..... 472

## OPERATIONAL ACTIVITY

Coronet Oak (Central and South America), Deny Flight and Provide Promise (Bosnia-Herzegovina), Provide Comfort (northern Iraq), Provide Hope II (former Soviet Union), Provide Relief (Kenya and Somalia), Uphold Democracy (Haiti), Joint Endeavor (Bosnia)

## NOTES

The AFRES commander also serves as chief, Air Force Reserve, Washington, D. C. AFRES serves under federal government jurisdiction. Officer and enlisted personnel figures are Selected Reserve, including Air Reserve technicians—civil service employees in dual status. Approximately 12,000 of these Air Force Reservists are assigned to active-duty units under the Individual Mobilization Augmentee program. Reserve crews also fly active-duty KC-10, C-5, C-141, KC-135, C-17, and C-9 aircraft daily under the associate program.

## Air Force Review Boards Agency

**Headquarters** ..... Andrews AFB, Md.  
**Established** ..... June 1, 1980  
**Director** ..... Joe G. Lineberger

### MISSION, PURPOSE, OPERATIONS

**Manage** military and civilian appellate processes for the Secretary of the Air Force  
**Develop** overall policy and act for the Secretary of the Air Force in deciding individual cases before the boards

### STRUCTURE

Air Force Board for Correction of Military Records  
Air Force Civilian Appellate Review Office  
Air Force Personnel Council  
Air Force Personnel Board  
Board of Review  
Clemency and Parole Board  
Decorations Board  
Discharge Review Board  
DoD Civilian/Military Service Review Board  
Physical Disability Appeal Board

### PERSONNEL

Active-duty ..... 11  
Officers ..... 4  
Enlisted ..... 7  
Reserve component ..... 3  
ANG ..... 1  
AFRES ..... 2  
Civilians ..... 35  
**Total** ..... 49



## Air Force Reserve Flying Wings and Assigned Units

| Wing Hq.   | Squadron                     | Aircraft | Location              |
|--|------------------------------|----------|-----------------------|
| <b>4th Air Force (AMC) • Hq. McClellan AFB, Calif. • Brig. Gen. Wallace W. Whaley, Commander</b> |                              |          |                       |
| 349th Air Mobility Wing  | 301st Airlift Squadron       | C-5A/B   | Travis AFB, Calif.    |
|  | 312th Airlift Squadron       | C-5A/B   | Travis AFB, Calif.    |
|  | 708th Airlift Squadron       | C-141B   | Travis AFB, Calif.    |
|  | 710th Airlift Squadron       | C-141B   | Travis AFB, Calif.    |
|  | 70th Air Refueling Squadron  | KC-10A   | Travis AFB, Calif.    |
| 433d Airlift Wing  | 68th Airlift Squadron        | C-5A     | Kelly AFB, Tex.       |
|  | 97th Airlift Squadron        | C-141B   | McChord AFB, Wash.    |
| 446th Airlift Wing   | 313th Airlift Squadron       | C-141B   | McChord AFB, Wash.    |
|  | 728th Airlift Squadron       | C-141B   | McChord AFB, Wash.    |
|  | 336th Air Refueling Squadron | KC-135E  | March ARB, Calif.     |
| 452d Air Mobility Wing   | 79th Air Refueling Squadron  | KC-10A   | March ARB, Calif.     |
|  | 729th Airlift Squadron       | C-141B   | March ARB, Calif.     |
|  | 730th Airlift Squadron       | C-141B   | March ARB, Calif.     |
|  | 465th Air Refueling Squadron | KC-135R  | Tinker AFB, Okla.     |
| 507th Air Refueling Wing   | 18th Air Refueling Squadron  | KC-135R  | McConnell AFB, Kan.   |
| 931st Air Refueling Group  | 73d Airlift Squadron         | C-9A     | Scott AFB, Ill.       |
| 932d Airlift Wing  | 314th Air Refueling Squadron | KC-135E  | McClellan AFB, Calif. |
| 940th Air Refueling Wing   |                              |          |                       |

| Wing Hq.  | Squadron                            | Aircraft          | Location  |
|---|-------------------------------------|-------------------|---|
| <b>10th Air Force (ACC) • Hq. Bergstrom ARS, Tex. • Maj. Gen. David R. Smith, Commander</b> |                                     |                   |   |
| 94th Airlift Wing   | 700th Airlift Squadron              | C-130H            | Dobbins ARB, Ga. <sup>1</sup>                             |
|   | 457th Fighter Squadron              | F-16C/D           | NAS Fort Worth JRB Carswell Field, Tex. <sup>2</sup>      |
| 302d Airlift Wing   | 731st Airlift Squadron              | C-130E/H          | Peterson AFB, Colo.                                       |
|   | 815th Airlift Squadron              | C-130E            | Keesler AFB, Miss.  |
| 403d Wing   | 53d Weather Reconnaissance Squadron | WC-130H           | Keesler AFB, Miss.  |
|   | 466th Fighter Squadron              | F-16C/D           | Hill AFB, Utah  |
| 419th Fighter Wing  | 95th Airlift Squadron               | C-130H            | General Mitchell IAP/ARS, Wis. <sup>1</sup>               |
| 440th Airlift Wing  | 303d Fighter Squadron               | A/OA-10A          | Whiteman AFB, Mo.   |
| 442d Fighter Wing   | 93d Fighter Squadron                | F-16A/B           | Homestead ARS, Fla. <sup>1</sup>                          |
| 482d Fighter Wing   | 357th Airlift Squadron              | C-130H            | Maxwell AFB, Ala.   |
| 908th Airlift Wing  | 757th Airlift Squadron              | C-130H            | Youngstown-Warren Regional Airport/ARS, Ohio <sup>1</sup> |
| 911th Airlift Wing  | 758th Airlift Squadron              | C-130H            | Pittsburgh IAP/ARS, Pa. <sup>1</sup>                      |
|   | 327th Airlift Squadron              | C-130E            | Willow Grove ARS, Pa. <sup>1</sup>                        |
|   | 328th Airlift Squadron              | C-130H            | Niagara Falls IAP/ARS, N. Y. <sup>1</sup>                 |
| 914th Airlift Wing  | 47th Fighter Squadron               | A/OA-10A          | Barksdale AFB, La.  |
|   | 93d Bomb Squadron                   | B-52H             | Barksdale AFB, La.  |
| 917th Wing  | 11th Special Operations Squadron    | C-130E/H, MC-130E | Duke Field, Fla.  |
|   | 5th Special Operations Squadron     | HC-130N/P         | Eglin AFB, Fla.   |
| 919th Special Operations Wing   | 704th Fighter Squadron              | F-16C/D           | Bergstrom ARS, Tex. <sup>1</sup>                          |
| 924th Fighter Wing  | 706th Fighter Squadron              | F-16C/D           | NAS JRB New Orleans, La. <sup>2</sup>                     |
|   | 64th Airlift Squadron               | C-130H            | O'Hare IAP/ARS, Ill. <sup>1</sup>                         |
| 926th Fighter Wing  | 96th Airlift Squadron               | C-130E            | Minneapolis-St. Paul IAP/ARS, Minn. <sup>1</sup>          |
| 928th Airlift Wing  | 304th Rescue Squadron               | HC-130P, HH-60G   | Portland IAP, Ore.  |
| 934th Airlift Wing  | 301st Rescue Squadron               | HC-130N/P, HH-60G | Patrick AFB, Fla.   |
| 939th Rescue Wing   | 305th Rescue Squadron               | HH-60G            | Davis-Monthan AFB, Ariz.                                  |
|   | 302d Fighter Squadron               | F-16C/D           | Luke AFB, Ariz.   |
| 944th Fighter Wing  |                                     |                   |   |

| Wing Hq.   | Squadron                    | Aircraft | Location                         |
|--|-----------------------------|----------|----------------------------------|
| <b>22d Air Force (AMC) • Hq. Dobbins ARB, Ga. • Brig. Gen. Michael R. Lee, Commander</b> |                             |          |                                  |
| 315th Airlift Wing   | 300th Airlift Squadron      | C-141B   | Charleston AFB, S. C.            |
|  | 701st Airlift Squadron      | C-141B   | Charleston AFB, S. C.            |
|  | 707th Airlift Squadron      | C-141B   | Charleston AFB, S. C.            |
|  | 317th Airlift Squadron      | C-17A    | Charleston AFB, S. C.            |
| 434th Air Refueling Wing   | 72d Air Refueling Squadron  | KC-135R  | Grissom ARB, Ind. <sup>1</sup>   |
|  | 74th Air Refueling Squadron | KC-135R  | Grissom ARB, Ind. <sup>1</sup>   |
| 439th Airlift Wing   | 337th Airlift Squadron      | C-5A     | Westover ARB, Mass. <sup>1</sup> |
| 445th Airlift Wing   | 356th Airlift Squadron      | C-141B   | Wright-Patterson AFB, Ohio       |
|  | 89th Airlift Squadron       | C-141B   | Wright-Patterson AFB, Ohio       |
| 459th Airlift Wing   | 756th Airlift Squadron      | C-141B   | Andrews AFB, Md.                 |
| 512th Airlift Wing   | 326th Airlift Squadron      | C-5A/B   | Dover AFB, Del.                  |
|  | 709th Airlift Squadron      | C-5A/B   | Dover AFB, Del.                  |
| 514th Air Mobility Wing  | 335th Airlift Squadron      | C-141B   | McGuire AFB, N. J.               |
|  | 702d Airlift Squadron       | C-141B   | McGuire AFB, N. J.               |
|  | 732d Airlift Squadron       | C-141B   | McGuire AFB, N. J.               |
|  | 76th Air Refueling Squadron | KC-10A   | McGuire AFB, N. J.               |
|  | 78th Air Refueling Squadron | KC-10A   | McGuire AFB, N. J.               |
|  | 77th Air Refueling Squadron | KC-135R  | Seymour Johnson AFB, N. C.       |
| 916th Air Refueling Wing   | 63d Air Refueling Squadron  | KC-135E  | Selfridge ANGB, Mich.            |
| 927th Air Refueling Wing   |                             |          |                                  |

<sup>1</sup> AFRES Installation    <sup>2</sup> Tenant unit on naval base

|                                     |                                  |
|-------------------------------------|----------------------------------|
| <b>ANGB</b> Air National Guard Base | <b>IAP</b> International Airport |
| <b>ARB</b> Air Reserve Base         | <b>JRB</b> Joint Reserve Base    |
| <b>ARS</b> Air Reserve Station      | <b>NAS</b> Naval Air Station     |



## Air Force Safety Center

**Headquarters** ..... Kirtland AFB, N. M.  
**Established** ..... January 1, 1996  
**Director** ..... Brig. Gen. Orin L. Godsey

### MISSION, PURPOSE, OPERATIONS

**Execute** Air Force aviation, ground, weapons, space, and nuclear safety policies, plans, and programs

**Oversee** all USAF mishap-prevention programs, including nuclear weapons, ballistic missiles, remotely piloted vehicles, and satellites

**Conduct** USAF aircraft mishap investigation, chief of safety, and flight safety officer courses

**Contract** ground safety training for USAF personnel

**Investigate** and report on- and off-duty mishaps

**Oversee** major command mishap investigations and evaluate corrective actions for applicability and implementation USAF-wide

### STRUCTURE

Mission divisions

Aviation Safety

Ground Safety

Weapons, Space, and Nuclear Safety

Support divisions

Data Operations and Analyses

Policy, Plans, and Programs

Public and Media Affairs

Staff Judge Advocate

Resources and Manpower

### PERSONNEL

|                         |            |
|-------------------------|------------|
| Active-duty .....       | 84         |
| Officers .....          | 63         |
| Enlisted .....          | 21         |
| Reserve component ..... | 4          |
| ANG .....               | 1          |
| AFRES .....             | 3          |
| Civilians .....         | 75         |
| <b>Total</b> .....      | <b>163</b> |

### NOTES

AFSC publishes *Flying Safety* and *Road and Rec* magazines, and the *Nuclear Surety/Weapons Safety Journal*. Formerly the Air Force Safety Agency.

## Air Force Security Police Agency

**Headquarters** ..... Kirtland AFB, N. M.  
**Established** ..... February 1991  
**Commander** ..... Col. Lawrence R. Mayes

### MISSION, PURPOSE, OPERATIONS

**Provide** expertise for the security of nuclear weapons and weapon systems

**Prepare** guidance on air base defense operations and continuation training and guidance for law enforcement, resources protection, and antiterrorism USAF-wide

**Develop** and implement base-level training and combat arms training and maintenance programs

**Assist** in planning, allocating, and evaluating Security Police resources, equipment, and future technology requirements

**Develop** and maintain tables of allowance identifying Security Police equipment requirements

**Manage** Air Force corrections activities

### STRUCTURE

Corrections Directorate

Law Enforcement and Training Directorate

Physical Security Directorate  
Resources and Equipment Directorate

### PERSONNEL

|                         |            |
|-------------------------|------------|
| Active-duty .....       | 114        |
| Officers .....          | 28         |
| Enlisted .....          | 86         |
| Reserve component ..... | 10         |
| ANG .....               | 0          |
| AFRES .....             | 10         |
| Civilians .....         | 17         |
| <b>Total</b> .....      | <b>141</b> |

### FACILITIES

Det. 1, US Disciplinary Barracks, Fort Leavenworth, Kan.

Det. 2, Naval Consolidated Brig, NAS Miramar, Calif.

Det. 3, Naval Consolidated Brig, Charleston Naval Weapons Center, S. C.

## Air Force Services Agency

**Headquarters** ..... San Antonio, Tex.  
**Established** ..... February 5, 1991  
**Commander** ..... Col. Gary C. Bradham

### MISSION, PURPOSE, OPERATIONS

**Support** the bases, major commands, and Air Staff by providing technical assistance, fielding new initiatives, developing procedures, and managing selected central support functions to ensure successful services programs

**Manage** Air Force nonappropriated central funds and operate central systems, such as banking, investments, purchasing, data flow, insurance, and benefit programs

### STRUCTURE

Base-level services managers

### PERSONNEL

|                         |            |
|-------------------------|------------|
| Active-duty .....       | 71         |
| Officers .....          | 22         |
| Enlisted .....          | 49         |
| Reserve component ..... | 9          |
| Civilians .....         | 339        |
| <b>Total</b> .....      | <b>419</b> |

## Air Force Studies and Analyses Agency

**Headquarters** ..... Washington, D. C.  
**Established** ..... February 1991  
**Commander** ..... Col. Thomas L. Allen

### MISSION, PURPOSE, OPERATIONS

**Provide** analyses and simulation and modeling tools to support the assessment of force-structure options and acquisition decisions for the assistant secretaries of the Air Force and the Air Staff

**Aid** Air Force decision-makers in addressing force-sizing and force-shaping issues, weapon systems employment, resource allocation, and arms reductions proposals

**Assist** the Air Staff in preparing responses to Congressional inquiries and requests for testimony

**Serve** as the configuration manager for a variety of simulation models used within the Air Force by other DoD agencies and by civilian contractors

### STRUCTURE

Senior Analysis Review Group

Force Application Division

Force Enhancement Division



Resource Management Division  
Resource Analyses Division

### PERSONNEL

|                         |            |
|-------------------------|------------|
| Active-duty .....       | 137        |
| Officers .....          | 119        |
| Enlisted .....          | 18         |
| Reserve component ..... | 3          |
| ANG .....               | 0          |
| AFRES .....             | 3          |
| Civilians .....         | 26         |
| <b>Total .....</b>      | <b>166</b> |

## Air Force Technical Applications Center

**Headquarters** ..... Patrick AFB, Fla.  
**Established** ..... May 1, 1960  
**Commander** ..... Col. (Brig. Gen. selectee) Glen D. Shaffer

### MISSION, PURPOSE, OPERATIONS

**Monitor** compliance with several international nuclear treaties, including the Limited Test Ban Treaty, Threshold Test Ban Treaty, and Peaceful Nuclear Explosion Treaty  
**Operate** and maintain a global network of subsurface, surface, airborne, and spacebased sensors and analytical laboratories that provide national authorities with technical measurements with which to monitor foreign nuclear activity  
**Conduct** research and development of proliferation-detection technologies for all weapons of mass destruction

### STRUCTURE

Headquarters and Analysis Center, Patrick AFB, Fla.  
McClellan Central Laboratory, Technical Operations Division, McClellan AFB, Calif.  
Seven operational sites/detachments worldwide

### PERSONNEL

|                         |              |
|-------------------------|--------------|
| Active-duty .....       | 942          |
| Officers .....          | 188          |
| Enlisted .....          | 754          |
| Reserve component ..... | 0            |
| Civilians .....         | 104          |
| <b>Total .....</b>      | <b>1,046</b> |

### EQUIPMENT

Eighteen seismic arrays consisting of seismometers and associated central terminals and workstations  
Six hydroacoustic recording locations  
More than 130 sensors on thirty-six satellites, with associated ground systems instrumentation and data-processing equipment  
Airborne and groundbased equipment to collect nuclear event debris  
Atmospheric sampling equipment for TC-135 and U-2 aircraft  
Military and civilian laboratories that perform low-level radioactive sample analysis

## Air Intelligence Agency

**Headquarters** ..... Kelly AFB, Tex.  
**Established** ..... October 1, 1993  
**Commander** ..... Maj. Gen. Michael V. Hayden

### MISSION, PURPOSE, OPERATIONS

**Provide** direct intelligence, security, electronic combat, foreign technology, and treaty-monitoring support to national decision-makers and field air component commanders  
**Develop** principles and doctrines of information dominance for application in future warfare  
**Provide** combat commanders with data enabling them to de-

cide when to exploit, jam, deceive, or destroy hostile military communications

**Provide** scientific-technical intelligence support

**Provide** tailored intelligence assessments in support of Air Staff planning and policy formulation

**Conduct** USAF Sensitive Compartmented Information security functions

**Assist** Air Force components in the development of concepts, exercises, and employment of agency assets to support low-intensity conflict, counterdrug, and special operations

### EQUIPMENT

Two AN/FLR-9 antennas located in Alaska and Japan

### FORCE STRUCTURE

Air Force Information Warfare Center, Kelly AFB, Tex.  
National Air Intelligence Center, Wright-Patterson AFB, Ohio  
67th Intelligence Wing, Kelly AFB, Tex.  
26th Intelligence Group, Vogelweh, Germany  
67th Intelligence Group, Kelly AFB, Tex.  
497th Intelligence Group, Bolling AFB, D. C.  
480th Intelligence Group, Langley AFB, Va.  
544th Intelligence Group, Peterson AFB, Colo.  
692d Intelligence Group, Hickam AFB, Hawaii  
694th Intelligence Group, Fort Meade, Md.  
Intelligence Systems Group, Kelly AFB, Tex.

### PERSONNEL

|                         |               |
|-------------------------|---------------|
| Active-duty .....       | 12,186        |
| Officers .....          | 1,807         |
| Enlisted .....          | 10,379        |
| Reserve component ..... | 1,883         |
| ANG .....               | 187           |
| AFRES .....             | 1,696         |
| Civilians .....         | 2,378         |
| <b>Total .....</b>      | <b>16,447</b> |

### OPERATIONAL ACTIVITY

Provide Comfort (northern Iraq), Southern Watch (southern Iraq), Support/Uphold Democracy (Haiti)

### NOTES

AIA was formed by integrating personnel and missions of the former Air Force Intelligence Command and Air Force Intelligence Support Agency and elements of Air Combat Command. The agency reports directly to the assistant chief of staff for intelligence. In 1995, the agency supported more than fifty worldwide, joint, unified, and specified command-sponsored exercises. General Hayden also serves as director of the Joint Command and Control Warfare Center.

## Air National Guard

**Headquarters** ..... Washington, D. C.  
**Established** ..... September 18, 1947  
**Director** ..... Maj. Gen. Donald W. Shepperd

### MISSION, PURPOSE, OPERATIONS

**Provide** trained units and individuals in support of national military objectives, as a full partner in the Total Air Force  
**Support** state governors by providing equipment and trained individuals to help preserve peace, order, and public safety

### FORCE STRUCTURE

Flying units: eighty-eight wings  
Major command assignments  
  Air Combat Command  
  Air Education and Training Command  
  Air Force Special Operations Command  
  Air Mobility Command  
  Pacific Air Forces



## The Air National Guard by Major Command Assignment

(As of April 1, 1996)

|   |  |  |  |
|---|--|--|--|
| <b>C-5A transport</b><br>105th Airlift Wing   | <b>Air Mobility Command</b><br><br>Stewart IAP, N. Y.  | <b>F-15A/B fighter</b><br>131st Fighter Wing<br>159th Fighter Wing   | <br><br>Lambert–St. Louis IAP, Mo.<br>NAS JRB New Orleans, La. <sup>c</sup>  |
| <b>C-141B transport</b><br>164th Airlift Wing<br>172d Airlift Wing  | Memphis IAP, Tenn.<br>Allen C. Thompson Field, Miss.   | <b>F-15A/B fighter–air defense</b><br>102d Fighter Wing<br>142d Fighter Wing<br>125th Fighter Wing   | Otis ANGB, Mass.<br>Portland IAP, Ore.<br>Jacksonville IAP, Fla.   |
| <b>KC-135 tanker</b><br>101st Air Refueling Wing<br>107th Air Refueling Wing<br>108th Air Refueling Wing<br>117th Air Refueling Wing<br>121st Air Refueling Wing<br>126th Air Refueling Wing<br>128th Air Refueling Wing<br>134th Air Refueling Wing<br>141st Air Refueling Wing<br>151st Air Refueling Wing<br>155th Air Refueling Wing<br>157th Air Refueling Wing<br>161st Air Refueling Wing<br>163d Air Refueling Wing<br>171st Air Refueling Wing<br>186th Air Refueling Wing<br>190th Air Refueling Wing | Bangor IAP, Me.<br>Niagara Falls IAP/ARS, N. Y.<br>McGuire AFB, N. J.<br>Birmingham Airport, Ala.<br>Rickenbacker IAP, Ohio<br>O'Hare IAP/ARS, Ill.<br>General Mitchell IAP/ARS, Wis.<br>McGhee Tyson Airport, Tenn.<br>Fairchild AFB, Wash.<br>Salt Lake City IAP, Utah<br>Lincoln MAP, Neb.<br>Pease ANGB, N. H.<br>Sky Harbor IAP, Ariz.<br>March ARB, Calif.<br>Pittsburgh IAP/ARS, Pa.<br>Key Field, Miss.<br>Forbes Field, Kan.  | <b>F-16A/B/C/D fighter</b><br>113th Fighter Wing<br>114th Fighter Wing<br>115th Fighter Wing<br>122d Fighter Wing<br>127th Wing<br>132d Fighter Wing<br>138th Fighter Wing<br>140th Fighter Wing<br>149th Fighter Wing<br>150th Fighter Wing<br>156th Fighter Wing<br>169th Fighter Wing<br>174th Fighter Wing<br>178th Fighter Wing<br>180th Fighter Wing<br>181st Fighter Wing<br>183d Fighter Wing<br>185th Fighter Wing<br>187th Fighter Wing<br>188th Fighter Wing<br>192d Fighter Wing | Andrews AFB, Md.<br>Joe Foss Field, S. D.<br>Truax Field, Wis.<br>Fort Wayne IAP, Ind.<br>Selfridge ANGB, Mich.<br>Des Moines IAP, Iowa<br>Tulsa IAP, Okla.<br>Buckley ANGB, Colo.<br>Kelly AFB, Tex.<br>Kirtland AFB, N. M.<br>Puerto Rico IAP, Puerto Rico<br>McEntire ANGB, S. C.<br>Syracuse Hancock IAP, N. Y.<br>Springfield-Beckley MAP, Ohio<br>Toledo Express Airport, Ohio<br>Hulman Regional Airport, Ind.<br>Capital MAP, Ill.<br>Sioux Gateway Airport, Iowa<br>Dannelly Field, Ala.<br>Fort Smith MAP, Ark.<br>Richmond IAP, Va. |
| <b>A/OA-10A attack aircraft</b><br>103d Fighter Wing<br>104th Fighter Wing<br>110th Fighter Wing<br>124th Wing <sup>a</sup><br>175th Wing <sup>a</sup>  | <b>Air Combat Command</b><br><br>Bradley IAP, Conn.<br>Barnes MAP, Mass.<br>W. K. Kellogg Airport, Mich.<br>Boise Air Terminal, Idaho<br>Baltimore, Md.  | <b>F-16A/B fighter–air defense</b><br>119th Fighter Wing<br>120th Fighter Wing<br>127th Fighter Wing<br>144th Fighter Wing<br>147th Fighter Wing<br>148th Fighter Wing<br>158th Fighter Wing<br>177th Fighter Wing   | Hector IAP, N. D.<br>Great Falls IAP, Mont.<br>Selfridge ANGB, Mich.<br>Fresno Air Terminal, Calif.<br>Ellington Field, Tex.<br>Duluth IAP, Minn.<br>Burlington IAP, Vt.<br>Atlantic City Airport, N. J.   |
| <b>B-1 bomber</b><br>116th Bomb Wing<br>184th Bomb Wing   | Robins AFB, Ga.<br>McConnell AFB, Kan.   | <b>HC-130/HH-60G rescue aircraft</b><br>106th Rescue Wing<br>129th Rescue Wing   | Francis S. Gabreski IAP, N. Y.<br>Moffett Federal Airfield, Calif. <sup>d</sup>  |
| <b>C-130 transport</b><br>109th Airlift Wing<br>118th Airlift Wing<br>123d Airlift Wing<br>130th Airlift Wing<br>133d Airlift Wing<br><br>136th Airlift Wing<br>137th Airlift Wing<br>139th Airlift Wing<br>143d Airlift Wing<br>145th Airlift Wing<br>146th Airlift Wing<br>152d Airlift Wing<br>153d Airlift Wing<br>165th Airlift Wing<br>166th Airlift Wing<br>167th Airlift Wing<br><br>179th Airlift Wing<br>182d Airlift Wing<br>189th Airlift Wing <sup>b</sup>   | Schenectady County Airport, N. Y.<br>Nashville MAP, Tenn.<br>Standiford Field, Ky.<br>Yeager Airport, W. Va.<br>Minneapolis–St. Paul IAP/ARS,<br>Minn.<br>Dallas NAS, Tex.<br>Will Rogers World Airport, Okla.<br>Rosecrans Memorial Airport, Mo.<br>Quonset State Airport, R. I.<br>Charlotte/Douglas IAP, N. C.<br>Channel Islands ANGB, Calif.<br>Reno-Tahoe IAP, Nev.<br>Cheyenne MAP, Wyo.<br>Savannah IAP, Ga.<br>New Castle County Airport, Del.<br>Eastern West Virginia Regional<br>Airport/Shepherd Field, W. Va.<br>Mansfield Lahm Airport, Ohio<br>Greater Peoria Airport, Ill.<br>Little Rock AFB, Ark. | <b>A/OA-10A observation aircraft</b><br>111th Fighter Wing   | Willow Grove ARS, Pa.  |
| <b>Air Education and Training Command</b>   |  |  |  |
|   |  | <b>F-16A/B/C/D fighter</b><br>162d Fighter Wing<br>173d Fighter Wing   | Tucson IAP, Ariz.<br>Klamath Falls IAP, Ore.   |
| <b>Pacific Air Forces</b>   |  |  |  |
|   |  | <b>C-130 transport</b><br>154th Wing (204th Airlift Sqdn.)<br>176th Wing <sup>e</sup> (199th Fighter Sqdn.)  | Hickam AFB, Hawaii<br>Anchorage, Alaska  |
|   |  | <b>F-15A/B fighter</b><br>154th Wing <sup>f</sup>  | Hickam AFB, Hawaii   |
|   |  | <b>KC-135 tanker</b><br>168th Air Refueling Wing<br>154th Wing (203d ARS)  | Eielson AFB, Alaska<br>Hickam AFB, Hawaii  |

<sup>a</sup>Will also fly C-130s

<sup>b</sup>Aircrew CCTU

<sup>c</sup>Naval base

<sup>d</sup>NASA installation

<sup>e</sup>Includes 210th Rescue Squadron with HC-130 and HH-60G aircraft

<sup>f</sup>Includes 203d Air Refueling Squadron with KC-135 aircraft



## PERSONNEL

|                    |                |
|--------------------|----------------|
| Officers .....     | 13,521         |
| Enlisted .....     | 96,305         |
| Civilians .....    | 1,630          |
| <b>Total .....</b> | <b>111,456</b> |

## OPERATIONAL ACTIVITY

Joint Endeavor/Decisive Edge, Deny Flight, and Provide Promise (Bosnia-Herzegovina), Provide Comfort (northern Iraq), Southern Watch (southern Iraq), Coronet Nighthawk (Central America)

Relief missions for victims of several major hurricanes  
Partnership programs with nations of the former Soviet Union

## NOTES

ANG serves under state government jurisdiction except in emergencies. With more than 1,200 aircraft, it provides 100 percent of USAF's fighter-interceptor force, forty-five percent of tactical airlift, forty-three percent of KC-135 air refueling, thirty-three percent of fighters, twenty-eight percent of rescue, and eight percent of strategic airlift capability. In addition, in nonflying mission areas, ANG's tasks include 100 percent of aircraft control and warning and eighty percent of combat communications (excluding JCSS units).

## Air Reserve Personnel Center

Headquarters ..... Denver, Colo.  
Established ..... November 1, 1953  
Commander ..... Col. Frank P. Cyr, Jr.

## MISSION, PURPOSE, OPERATIONS

Provide personnel services and administrative support to ANG and AFRES members, including assignments, promotions, discharges, retirements, and presidentially activated mobilizations

## STRUCTURE

Chaplain Individual Reserve Programs Directorate  
Health Services Individual Reserve Programs Directorate  
Individual Reserve Programs Directorate  
Information Systems Support Directorate  
Personnel Directorate  
Personnel Records Management and Services Directorate  
Plans Directorate  
Public Affairs Directorate  
Resource Management and Support Services Directorate  
Staff Judge Advocate

## PERSONNEL

|                         |            |
|-------------------------|------------|
| Active-duty .....       | 114        |
| Officers .....          | 19         |
| Enlisted .....          | 95         |
| Reserve component ..... | 35         |
| ANG .....               | 1          |
| AFRES .....             | 34         |
| Civilians .....         | 500        |
| <b>Total .....</b>      | <b>649</b> |

## Air Weather Service

Headquarters ..... Scott AFB, Ill.  
Established ..... July 1, 1937  
Commander ..... Col. Joseph D. Dushan

## MISSION, PURPOSE, OPERATIONS

Provide centralized weather, climatological, and space support to the Air Force and Army

Render technical advice, develop procedures, and field systems for the integrated weather support system

## STRUCTURE

Air Force Global Weather Central, Offutt AFB, Neb.  
Air Force Combat Climatology Center, Scott AFB, Ill.  
Combat Weather Facility, Hurlburt Field, Fla.

## PERSONNEL

|                         |              |
|-------------------------|--------------|
| Active-duty .....       | 821          |
| Officers .....          | 221          |
| Enlisted .....          | 600          |
| Reserve component ..... | 8            |
| ANG .....               | 0            |
| AFRES .....             | 8            |
| Civilians .....         | 239          |
| <b>Total .....</b>      | <b>1,068</b> |

## Joint Services Survival, Evasion, Resistance, and Escape (SERE) Agency

Headquarters ..... Fort Belvoir, Va.  
Established ..... November 15, 1991  
Commander ..... Col. John C. Chapman, Jr.

## MISSION, PURPOSE, OPERATIONS

Serve as Office of the Secretary of Defense executive agent for DoD Code of Conduct/SERE training and DoD's Operational Evasion, Escape, and Recovery program

Serve as Chairman of the Joint Chiefs of Staff executive agent office of primary responsibility for Joint Evasion and Escape and operational POW/MIA matters

Develop area SERE contingency guides, evasion charts, blood chits, training programs and films, and SERE aids for use by joint commands in regional and counterdrug operations

## STRUCTURE

Operations Support Division  
Training Division  
Three operating locations

## PERSONNEL

|                         |            |
|-------------------------|------------|
| Active-duty .....       | 35         |
| Officers .....          | 9          |
| Enlisted .....          | 26         |
| Reserve component ..... | 7          |
| ANG .....               | 0          |
| AFRES .....             | 7          |
| Civilians .....         | 63         |
| <b>Total .....</b>      | <b>105</b> |

## FACILITIES

Four buildings at Fort Belvoir, Va.  
Operating locations in Virginia, Washington, and Florida

## NOTES

In 1995, the Joint Services SERE Agency provided assistance to operational units in South Korea, Bosnia-Herzegovina, Europe, southwest Asia, and Latin and South America. JSSA advised the Joint Staff, OSD, combatant commanders, and non-DoD government agencies on technical matters related to SERE, including the recovery and repatriation processing of Capt. Scott F. O'Grady, in which JSSA had an important role. JSSA helped develop a future Combat Survivor/Evader Locator (CSEL) radio for DoD's operational forces. JSSA trained high-risk-of-capture personnel worldwide, using both in-resident training and mobile training teams. JSSA also assisted the services to improve SERE training for all high-risk-of-capture operators in DoD.



## Direct Reporting Units

A direct reporting unit (DRU) is a subdivision of the Air Force, directly subordinate to Hq. USAF, separate from any major command or field operating agency because of a unique mission, legal requirements, or other factors. DRUs have the same administrative and organizational responsibilities as major commands.



### Air Force Operational Test and Evaluation Center

**Headquarters** ..... Kirtland AFB, N. M.  
**Established** ..... January 1, 1974  
**Commander** ..... Maj. Gen. George B. Harrison

#### MISSION, PURPOSE, OPERATIONS

**Plan** and conduct realistic, objective, and impartial operational tests and evaluations to determine the operational effectiveness and suitability of Air Force systems and their capacity to meet mission needs

#### STRUCTURE

Det. 2, Eglin AFB, Fla.  
 Det. 4, Peterson AFB, Colo.  
 Det. 5, Edwards AFB, Calif.

#### PERSONNEL

|                         |            |
|-------------------------|------------|
| Active-duty .....       | 659        |
| Officers .....          | 487        |
| Enlisted .....          | 172        |
| Reserve component ..... | 1          |
| ANG .....               | 1          |
| AFRES .....             | 0          |
| Civilians .....         | 195        |
| <b>Total</b> .....      | <b>855</b> |

#### NOTE

The center is conducting tests that involve the B-2 stealth bomber, the C-17 transport, Cheyenne Mountain upgrades, Joint Surveillance and Target Attack Radar System aircraft, Sensor-Fuzed Weapons, nondevelopmental airlift aircraft, and numerous command-and-control systems.

### US Air Force Academy

**Headquarters** ..... Colorado Springs, Colo.  
**Established** ..... April 1, 1954  
**Superintendent** ..... Lt. Gen. Paul E. Stein

#### MISSION, PURPOSE, OPERATIONS

**Develop** and inspire air and space leaders for the future  
**Produce** dedicated Air Force officers and leaders  
**Instill** leadership through academics, military training, athletic conditioning, and spiritual and ethical development

#### STRUCTURE

The entire group of cadets is designated the Cadet Wing. The wing is composed of four groups consisting of ten squadrons each, with about 100 cadets assigned to a squadron. Each squadron consists of members of all four classes.

#### PERSONNEL

|                   |       |
|-------------------|-------|
| Active-duty ..... | 2,402 |
| Officers .....    | 1,288 |
| Enlisted .....    | 1,114 |

|                         |              |
|-------------------------|--------------|
| Reserve component ..... | 0            |
| Cadets .....            | 4,000        |
| Civilians .....         | 1,861        |
| <b>Total</b> .....      | <b>8,263</b> |

#### EQUIPMENT

95 aircraft (T-3A aerobatics trainers; T-41D basic trainers; UV-18 jump planes; 126E and ASK-21 sailplanes; Cessna 150s; TG-3, TG-4, and TG-10 gliders; and TG-7A and TG-11A motorized gliders)

#### FACILITIES

18,325-acre site  
 Three runways  
 One grass airstrip

#### NOTE

Cadets complete four years of study for a bachelor of science degree. Four primary areas of military development are stressed: professional military studies, theoretical and applied leadership experiences, aviation science and airmanship programs, and military training.

### 11th Wing

**Headquarters** ..... Bolling AFB, D. C.  
**Established** ..... July 15, 1994  
**Commander** ..... Col. (Brig. Gen. selectee) Steven A. Roser

#### MISSION, PURPOSE, OPERATIONS

**Provide** administrative and ceremonial support to Air Force members in the National Capital Region, all fifty states, and more than ninety-six countries

**Provide** administrative support to more than 25,000 people assigned to the 11th Wing, Hq. USAF, and other joint military entities

**Support** the President, Secretary of the Air Force, and Air Force Chief of Staff, via The United States Air Force Band and Honor Guard

**Provide** personnel, operations, comptroller, accounting and finance, and recreation services for wing assets, including the day-to-day operations of Bolling AFB

**Manage** physical, personal, electronic, and information security within the Pentagon

#### STRUCTURE

Objective wing with Staff, Operations, Support, Logistics, and Medical Groups

#### PERSONNEL

|                         |              |
|-------------------------|--------------|
| Active-duty .....       | 1,572        |
| Officers .....          | 168          |
| Enlisted .....          | 1,404        |
| Reserve component ..... | 0            |
| Civilians .....         | 810          |
| <b>Total</b> .....      | <b>2,382</b> |



# Guide to Air Force Installations Worldwide



## Major Installations

Note: A major installation is an Air Force Base, Air Base, Air Guard Base, or Air Reserve Base that serves as a self-supporting center for Air Force combat, combat support, or training operations. Active-duty, Air National Guard, or Air Force Reserve units of wing size or larger operate the installation with all land, facilities, and support needed to accomplish the unit mission. There must be real property accountability through ownership of all real estate and facilities. Agreements with foreign governments that give the Air Force jurisdiction over real property meet this requirement. Shared-use agreements (as opposed to joint-use agreements where the Air Force owns the runway) do not meet the major installation criteria.

**Altus AFB**, Okla. 73523-5000; within Altus city limits. Phone (405) 482-8100; DSN 866-1110. AETC base. 97th Air Mobility Wing. Operates AETC's strategic airlift and aerial flying training schools. Maintains and supports C-5, KC-135, C-141, and C-17 aircraft. Base activated in Jan. 1943; inactivated in May 1945; reactivated in Jan. 1953. Area 4,095 acres, plus 818 leased and 1,069 easement/right-of-way. Runways 13,440 ft., with an additional 9,000-ft. parallel runway and 3,500-ft. assault strip. Altitude 1,376 ft. Military 3,500; civilians 550; approx. 400 TDY students (officer and enlisted) in training per month. Payroll \$137.7 million. Housing: 148 officer, 652 NCO, 368 VAQ, 166 VOQ, 14 TLF. 15-bed hospital.

**Andersen AFB**, Guam, APO AP 96543-5000; 2 mi. N of Yigo. Phone (commercial, from CONUS) 011-671-366-1110; DSN 366-1110. PACAF base. Hq. 13th Air Force. Host unit: 36th Air Base Wing. No USAF aircraft assigned. Associate organizations: 634th Air Mobility Support Sqdn. (AMC); 44th Aerial Port Sqdn. (AFRES); 254th Air Base Gp. (ANG); Det. 5, 750th Space Gp.; Det. 602, Air Force Office of Special Investigations (AFOSI). Navy HC-5 Helicopter Combat Support Sqdn., H-46D Sea Knight operations. Andersen is the Pacific center for power projection, regional cooperation, and multinational training. It serves as a logistic support and staging base for aircraft operating in the Pacific and Indian Oceans. Base activated in late 1944; named for Gen. James Roy Andersen, lost at sea between Kwajalein and Hawaii Feb. 26, 1946. General Andersen was Chief of Staff, Hq. AAF, Pacific Ocean Areas. Area: 20,504 acres. Runways (north) 10,555 ft. and (south) 11,182 ft. Altitude 612 ft. Military 2,163; civilians 677. Payroll \$105 million. Housing: 248 officer, 1,508 enlisted. Transient housing: 53 VOQ, 115 VAQ, 18 TLF. One USAF clinic and one Navy hospital.

**Andrews AFB**, Md. 20762-5000; 10 mi. SE of Washington, D. C. Phone (301) 981-1110; DSN

858-1110. AMC base. Gateway to the nation's capital and home of Air Force One. Host wing: 89th Airlift Wing. Responsible for presidential support and base operations; supports all branches of the armed services, several major commands, and federal agencies. The wing also hosts Det. 302, AFOSI; Hq. Air Force Flight Standards Agency; AFOSI Academy; Air National Guard Readiness Center; 113th Fighter Wing (D. C. ANG); 459th Airlift Wing (AFRES); Naval Air Facility; Marine Aircraft Gp. 49, Det. A; Hq. Air Force Review Boards Agency. Base activated May 1943; named for Lt. Gen. Frank M. Andrews, military air pioneer and WW II commander of the European theater, killed in aircraft accident May 3, 1943, in Iceland. Area 7,550 acres (including easements). Runways 9,300 ft. and 9,755 ft. Altitude 281 ft. Military 7,400; civilians 3,060. Payroll NA. Housing: 325 officer, 1,753 NCO, 414 off-base units, 974 UEQ, 325 transient (including 68 temporary living quarters for incoming personnel, 21 DV suites, 180 VOQ, 56 VAQ). 185-bed hospital.

**Arnold AFB**, Tenn., 37389; approx. 7 mi. SE of Manchester. Phone (615) 454-3000; DSN 340-5011. AFMC base. Arnold Engineering Development Center, the world's largest complex of wind tunnels, jet and rocket engine test cells, space simulation chambers, and hyperballistic ranges. AEDC supports the acquisition of new aerospace systems by conducting research, development, and evaluation testing for DoD, other government agencies, and commercial aerospace firms. Base dedicated June 25, 1951; named for Gen. of the Army H. H. "Hap" Arnold, wartime Chief of the AAF. Area 40,118 acres. Inactive 6,000-ft. runway. Altitude 1,100 ft. Military 123; civilians 201; NAF 46; contract employees 2,900. Payroll \$128.3 million. Housing: 23 officer, 17 NCO, 45 transient. Medical aid station and small VA clinic.

**Aviano AB**, Italy, APO AE 09601; adjacent to Aviano, 50 mi. N of Venice. Phone (commercial, from CONUS) 011-39-434-667111; DSN 632-1110. USAF base. Hq. 16th Air Force. 31st Fighter Wing, the only permanent US NATO fighter wing in southern Europe, and 616th Regional Support Gp. 31st FW maintains two LANTIRN-equipped F-16 fighter squadrons, the 555th and the 510th, capable of conducting offensive and defensive air combat operations, and the 603d Air Control Sqdn. One of the oldest Italian air bases, dating to 1911; USAF began operations in 1954. Area 1,140 acres. Runway 8,596 ft. Altitude 413 ft. Military 3,163; civilians 572. Payroll \$67.3 million. \$265.5 million economic impact. Housing: 850 govt.-leased units, 32 billeting spaces, 498 dorm bed spaces, approx. 1,000 contracted hotel spaces. Clinic.

**Barksdale AFB**, La. 71110-5000; in Bossier City. Phone (318) 456-2252; DSN 781-1110. ACC base. Hq. 8th Air Force; 2d Bomb Wing, B-52H operations; 49th Test Sqdn.; 917th Wing (AFRES), B-52 and A-10 operations; Det. 1, 307th Civil Engineering Sqdn. RED HORSE; 8th Air Force Museum. Base activated Feb. 2, 1933; named for Lt. Eugene H. Barksdale, WW I airman killed in Aug. 1926 crash near Wright Field, Ohio. Area 22,000 acres (18,000 acres reserved for recreation). Runway 11,756 ft. Altitude 166 ft. Military 5,799; civilians 649. Payroll \$227.2 million. Housing: 105 officer, 324 enlisted, 1,488 UEQ, 534 transient (94 VOQ, 416 VAQ, 24 TLF). 40-bed hospital.

**Beale AFB**, Calif. 95903-5000; 13 mi. E of Marysville. Phone (916) 634-3000; DSN 368-1110. ACC base. 9th Reconnaissance Wing; Det. 1, 612th Air Operations Gp. (ACC); 7th Space Warning Sqdn. (AFSPC). Aircraft include U-2 reconnaissance aircraft and T-38 Talon trainers. Originally US Army's Camp Beale. Became Air Force installation in Apr. 1948; became AFB in Nov. 1951; named for Brig. Gen. E. F. Beale, Indian agent in California prior to Civil War. Area 22,944 acres. Runway 12,000 ft. Altitude 113 ft. Military 3,078; civilians 492. Payroll \$55.8 million. Housing: 191 officer, 1,518 enlisted, 823 UEQ, 6 UOQ, 159 transient (53 VOQ, 89 VAQ, 17 TLF). 9-bed hospital.

**Bolling AFB**, D. C. 20332-5000; 3 mi. S of US Capitol. Phone (703) 545-6700; DSN 227-0101. 11th Wing; US Air Force Honor Guard; US Air Force Band; Air Force Office of Scientific Research (AFMC); Air Force Chief of Chaplains; Air Force Surgeon General; Hq. Air Force History Support Office; Hq. Air Force Office of Special Investigations; Air Force Real Estate Agency; Air Force Medical Operations Agency; Defense Intelligence Agency; Air Force Legal Services Agency. Activated in Oct. 1917; named for Col. Raynal C. Bolling, first high-ranking Air Service officer killed in WW I. Area 604 acres. No runway. Military 1,572; civilians 810. Payroll \$90 million. (Personnel and payroll figures apply to 11th Wing only.) Housing: 275 officer, 209 transient. Clinic.

**Brooks AFB**, Tex. 78235; in SE San Antonio. Phone (210) 536-1110; DSN 240-1110. AFMC base. Human Systems Center; USAF School of Aerospace Medicine (AFMC); Armstrong Laboratory, Human Systems Program Office; 70th Air Base Gp. Associate units include 70th School Sqdn. (Systems Acquisition School); Air Force Medical Support Agency; 68th Intelligence Sqdn.; Air Force Center for Environmental Excellence; Medical Systems Implementation and Training Element. Base activated Dec. 8, 1917; named for Cadet Sidney J. Brooks, Jr., killed Nov. 13, 1917,



on his commissioning flight. Area 1,310 acres. Runway length NA. Altitude 600 ft. Military 2,098; civilians 2,307. Payroll \$128 million. Housing: 70 officer, 100 NCO. Clinic.

**Cannon AFB**, N. M. 88103-5000; 7 mi. W of Clovis. Phone (505) 784-3311; DSN 681-1110. ACC base. 27th Fighter Wing, F-16 operations, and the only USAF base with EF-111A and F-111F fighter operations. (Beginning May 1995, and continuing through fall 1996, the 27th FW is retiring the F-111F.) Base activated in Aug. 1942; named for Gen. John K. Cannon, WW II commander of all Allied air forces in the Mediterranean theater and former commander, Tactical Air Command. Area 25,663 acres. Runways 10,400 ft. and 8,000 ft. Altitude 4,295 ft. Military 4,889; civilians 588. Payroll \$181.6 million. Housing: 173 officer, 1,549 enlisted, 1,051 dorm bed spaces, 6 DVQ, 45 TLF. 20-bed hospital.

**Charleston AFB**, S. C. 29404-5000; in North Charleston, 10 mi. from downtown Charleston. Phone (803) 566-6000; DSN 673-2100. AMC base. Joint-use airfield. 437th Airlift Wing; 315th AW (AFRES Assoc.); Det. 1, 158th Fighter Wing (Vermont ANG); Det. 17, Site Activation Task Force; Field Training Det. 317; Det. 719, AFOSI; 1st Combat Camera Sqdn. Base activated in Oct. 1942; inactivated in Mar. 1946; reactivated in Aug. 1953. Area 6,235 acres (including auxiliary airfield). Runway 9,000 ft. Altitude 45 ft. Military 7,352 (including AFRES); civilians 1,295. Payroll \$190 million. Housing: 127 officer, 850 NCO, 1,636 dorm spaces, 75 trailer spaces, 535 transient (7 DV suites, 128 VOQ, 400 VAQ). Clinic.

**Columbus AFB**, Miss. 39710-1000; 10 mi. NW of Columbus. Phone (601) 434-7322; DSN 742-1110. AETC base. 14th Flying Training Wing, undergraduate pilot training and Introduction to Fighter Fundamentals. Base activated in 1941 for pilot training. Area 6,015 acres. Runways 6,300 ft., 8,000 ft., and 12,000 ft. Altitude 214 ft. Military 1,541; civilians 1,346. Payroll \$99 million. Housing: 272 officer, 494 enlisted, 27 VAQ, 72 VOQ, 26 TLF/TLH. 4-bed hospital.

**Davis-Monthan AFB**, Ariz. 85707-5000; within Tucson city limits. Phone (602) 750-3900; DSN 361-1110. ACC base. 355th Wing; Hq. 12th Air Force; A-10 combat crew training; OA-10 and FAC training and operations; 41st, 42d, and 43d Electronic Combat Sqdns., EC-130E/H electronic operations; 305th Rescue Sqdn. (AFRES), MH-60G Pave Hawk helicopter operations; Det. 1, 120th Fighter Wing (Montana ANG), F-16 air defense operations. Also site of AFMC's Aerospace Maintenance and Regeneration Center, storage location for excess DoD aerospace vehicles. Base activated in 1927; named for two local early aviators: 1st Lt. Samuel H. Davis, killed Dec. 28, 1921, and 2d Lt. Oscar Monthan, killed Mar. 27, 1924. Area 11,000 acres. Runway 13,645 ft. Altitude 2,620 ft. Military 5,957; civilians 744. Payroll \$175.8 million. Housing: 132 officer, 1,107 enlisted, 482 transient (298 VAQ, 168 VOQ, 16 TLF). 35-bed hospital.

**Dover AFB**, Del. 19902-7219; 3 mi. SE of Dover. Phone (302) 677-3000; DSN 445-3000. AMC base. 436th Airlift Wing; 512th AW (AFRES Assoc.). Dover operates the largest aerial port facility on the East Coast. Base activated Dec. 1941; inactivated in 1946; reactivated Feb. 1951. Area 3,908 acres. Runway 12,900 ft. Altitude 28 ft. Military 7,213; civilians 1,120. Payroll \$140 million. Housing: 108 officer, 1,441 enlisted, 634 transient (512 VAQ, 108 VOQ, 14 TLF). 20-bed hospital.

**Dyess AFB**, Tex. 79607-1980; WSW border of Abilene. Phone (915) 696-0212; DSN 461-1110. ACC base. 7th Wing, two B-1B squadrons (one operational, one training); two C-130 squadrons. First base to activate an operational B-1B wing.

Conducts all B-1 combat crew training for the Air Force. First B-1B arrived in June 1985; wing met initial operational capability in Oct. 1986. Base activated in Apr. 1942; deactivated in Dec. 1945; reactivated as Abilene AFB Sept. 1955. In Dec. 1956, renamed for Lt. Col. William E. Dyess, WW II fighter pilot who escaped from a Japanese prison camp, killed in P-38 crash at Burbank, Calif., in Dec. 1943. Area 6,437 acres (including off-base sites). Runway 13,500 ft. Altitude 1,789 ft. Military 4,907; civilians 426. Payroll \$165.3 million. Housing: 142 officer, 4 senior enlisted, 848 enlisted, 52 VAQ, 70 VOQ, 9 DVQ, 39 TLF. 15-bed hospital.

**Edwards AFB**, Calif. 93524; 20 mi. E of Rosamond. Phone (805) 277-1110; DSN 527-1110. AFMC base. Site of Air Force Flight Test Center (AFFTC), which conducts developmental and follow-on testing and evaluation of manned and unmanned aircraft and related avionics, flight-control, and weapon systems. AFFTC also operates the USAF Test Pilot School, which trains test pilots, flight-test engineers, and flight-test navigators. Also site of Phillips Laboratory's Astronautics Directorate, NASA's Ames Dryden Flight Research Facility, and secondary landing site for space shuttle missions. Det. 2, 9th Reconnaissance Wing, SR-71 operations (ACC). Base activities began in Sept. 1933. Originally Muroc AAF; renamed for Capt. Glen W. Edwards, killed June 5, 1948, in crash of a YB-49 "Flying Wing." Area 301,000 acres. 21 runways from 4,000 to 39,000 ft. Altitude 2,302 ft. Military 4,283 (including associate units); government and contract civilians 7,400 (not including 557 NAF employees). Payroll \$570 million (including associate units and contractors). Housing: 657 officer (including BOQ), 2,348 enlisted (including 765 dormitory spaces and 191 BNCOQ), 161 transient (49 VAQ, 42 VOQ, 9 SNCOQ, 10 VIP/VOQ, 51 TLF), 189 trailer spaces. 10-bed hospital.

**Eglin AFB**, Fla. 32542; 2 mi. SW of the twin cities of Niceville and Valparaiso; 7 mi. NE of Fort Walton Beach. Phone (904) 882-1110; DSN 872-1110. AFMC base. Eglin is the nation's largest Air Force base in terms of acreage, covering an area roughly two-thirds the size of Rhode Island. Host unit: Air Force Development Test Center. Associate units: Aeronautical Systems Center, Eglin, and Armament Directorate of Wright Laboratory (AFMC); 33d Fighter Wing; 53d Wing (ACC); 96th Air Base Wing; 46th Test Wing; 919th Special Operations Wing (AFRES); 20th Space Surveillance Sqdn. (AFSPC); 9th Special Operations Sqdn.; 728th Tactical Control Sqdn.; a US Army Ranger Training Battalion; a US Navy Explosive Ordnance Disposal School; Air Force Armament Museum. Base activated in 1935; named for Lt. Col. Frederick I. Eglin, WW I flyer killed in aircraft accident Jan. 1, 1937. Area 463,452 acres. Runways 10,000 ft. and 12,000 ft. Altitude 85 ft. Military 8,484; civilians 4,303 (excluding Hurlburt Field). Payroll \$444.2 million (excluding Hurlburt Field). Housing: 263 officer, 2,071 enlisted, 1,200 unaccompanied enlisted units (dorm rooms), 226 trailer spaces (officer and enlisted), 88 family transient. 125-bed USAF regional hospital. AFMC clinic at Hurlburt Field.

**Eielson AFB**, Alaska 99702-5000; 26 mi. SE of Fairbanks. Phone (907) 377-1178; DSN (317) 377-1110. PACAF base. Host unit: 354th Fighter Wing, F-16C/D, A-10, and OA-10 operations. Base hosts recurring Cope Thunder exercises, which provide realistic combat training. Associate organizations include the Arctic Survival School (AETC); 168th Air Refueling Wing (ANG); Det. 460, Air Force Technical Applications Center. Base activated Oct. 1944; named for Carl Ben Eielson, Arctic aviation pioneer who died in an Arctic rescue mission in Nov. 1929. Area 19,790 acres (including 16 remote sites, 63,195 acres). Runway 14,500 ft. Altitude 534 ft. Military 2,741; full-time civilians (NAF, AAFES, Civil Ser-

vice) 882 (includes ANG civil service technicians) and 529 traditional and full-time ANG members. Payroll \$137.2 million. Housing: 151 officer, 1,409 enlisted. Unaccompanied housing: 8 officer units, 422 rooms, 746 bed spaces (includes NCOQ), 212 VOQ, 240 bed spaces (179 rooms) VAQ, 6 enlisted and 6 officer DVQ.

**Ellsworth AFB**, S. D. 57706-5000; 12 mi. ENE of Rapid City. Phone (605) 385-1000; DSN 675-1000. ACC base. Host unit: 28th Bomb Wing, one B-1B squadron. Associate units: 366th Wing's (Mountain Home AFB, Idaho) geographically separated 34th Bomb Sqdn., B-1B; South Dakota Air and Space Museum. Base activated in July 1942 as Rapid City AAB; renamed June 13, 1953, for Brig. Gen. Richard E. Ellsworth, killed Mar. 18, 1953, in crash of RB-36 in Newfoundland, Canada. Area 10,632 acres. Runway 13,497 ft. Altitude 3,286 ft. Military 3,724; civilians 463. Payroll \$114.8 million. Housing: 202 officer, 1,882 enlisted, 218 transient units (57 VAQ, 125 VOQ, 6 DVQ, 30 TLF). 15-bed hospital.

**Elmendorf AFB**, Alaska 99506-5000; bordering Anchorage. Phone (907) 552-1110; DSN (317) 552-1110. PACAF base. Largest composite wing in PACAF; hub for air traffic to and from the Far East. Hq. Alaskan Command; Hq. 11th Air Force (PACAF); Hq. Alaskan NORAD Region. Host unit: 3d Wing, F-15/F-15E fighter and C-130 and C-12 airlift operations, E-3 airborne air control operations, and 3d Medical Gp. Associate units: 11th Rescue Coordination Center (ANG); 381st Intelligence Sqdn.; 632d Air Mobility Support Sqdn. (AMC); various US Army, Navy, and Marine activities. Base activated in July 1940; named for Capt. Hugh Elmendorf, killed Jan. 13, 1933, at Wright Field, Ohio, while flight-testing a new pursuit plane. Area 13,130 acres. Runways 7,500 ft. and 10,000 ft. Altitude 213 ft. Military 6,565; civilians 997. Payroll \$275.9 million. Housing: 1,628 family units, 197 VOQ, 879 VAQ, 1,316 UEQ. 60-bed hospital.

**Fairchild AFB**, Wash. 99011-5000; 12 mi. WSW of Spokane. Phone (509) 247-1212; DSN 657-1212. AMC base. Air refueling hub for the western US. Host unit: 92d Air Refueling Wing (KC-135R, KC-135T). Tenant units: 366th Crew Training Gp. (Survival School, AETC); 141st Air Refueling Wing (ANG, KC-135E); 2d Support Sqdn. (ACC). Base activated in Jan. 1942; named for Gen. Muir S. Fairchild, USAF Vice Chief of Staff at his death in 1950. Area 4,543 acres. Runway 13,901 ft. Altitude 2,426 ft. Military 4,316; civilians 931. Payroll \$122.3 million. Housing: 176 officer, 1,247 NCO, 18 TLF, 154 BAQ/VAQ, 149 VOQ. 30-bed hospital.

**Falcon AFB**, Colo. 80912-5000; 10 mi. E of Colorado Springs. Phone (719) 567-1110; DSN 560-1110. AFSPC base. Host unit: 50th Space Wing. Tenant units: 76th Space Operations Sqdn.; National Test Facility; Space Warfare Center. Base activated in Oct. 1985. Area 3,840 acres. No runway. Altitude 6,267 ft. Military active-duty 2,365; civilians 435; contractors 2,000. No housing or transient quarters. Medical aid station and dental clinic.

**Francis E. Warren AFB**, Wyo. 82005-5000; adjacent to Cheyenne. Phone (307) 775-1110; DSN 481-1110. AFSPC base. Hq. 20th Air Force. Host unit: 90th Missile Wing, 50 Peacekeeper and 150 Minuteman III missiles, UH-1 helicopters; 37th Air Rescue Flight. Base activated as Fort D. A. Russell July 4, 1867; under Army jurisdiction until 1947, when reassigned to USAF. Base renamed in 1930 for Francis Emory Warren, Wyoming senator and first state governor. Area 5,866 acres, missile site area covering more than 12,600 sq. mi. in Wyoming, Colorado, and Nebraska. No runway. Altitude 6,142 ft. Military 3,655; civilians 602. Payroll \$130.7 million. Housing: 831 family units. 35-bed hospital. Air Force ICBM Museum.







**Goodfellow AFB**, Tex. 76908-5000; 2 mi. SE of San Angelo. Phone (915) 654-3217; DSN 477-3217. AETC base. The 17th Training Wing provides technical training for all Air Force members entering intelligence career fields; provides cryptologic training for members of the other military services, civilian intelligence agencies, and foreign military services; trains all US Air Force, Army, and Marine Corps personnel in fire protection and rescue and conducts Air Force special instruments training. Major units include Goodfellow NCO Academy; 344th Military Intelligence Battalion (US Army); Naval Technical Training Center Detachment; US Marine Corps Detachment. Base activated in Jan. 1941; named for Lt. John J. Goodfellow, Jr., WW I fighter pilot killed in combat Sept. 14, 1918. Area 1,136 acres. No runway. Altitude 1,877 ft. Military 3,098; civilians 751. Payroll \$143 million. Housing: 19 officer, 280 NCO, 1,000 transient (867 VAQ, 106 VOQ, 27 TLF). Clinic.

**Grand Forks AFB**, N. D. 58205-5000; 16 mi. W of Grand Forks. Phone (701) 747-3000; DSN 362-1110. AMC base. 319th Air Refueling Wing (KC-135R); 321st Missile Gp. (AFSPC, Minuteman III, HH-1H), inactivated in Sept. 1998. Home of the first of AMC's core air refueling wings. Base activated in 1956; named after the town of Grand Forks, whose citizens bought the property for the Air Force. Area 5,418 acres. Missile complex covers an additional 7,500 sq. mi. Runway 12,350 ft. Altitude 911 ft. Military 5,146; DoD civilians 501. Payroll \$208.2 million. Housing: 332 officer, 1,886 enlisted, 1,000 dormitory, 137 transient. 15-bed hospital.

**Gunter AFB**, (see Maxwell AFB, Gunter Annex).

**Hanscom AFB**, Mass. 01731-5000; 17 mi. NW of Boston. Phone (617) 377-4441; DSN 478-5980. AFMC base. Hq. Electronic Systems Center (AFMC) manages development and acquisition of C<sup>4</sup>I systems; Geophysics Directorate of Phillips Laboratory (AFMC), center for research and exploratory development in the terrestrial, atmospheric, and space environments; five divisions of Rome Laboratory's Directorate of Electromagnetics and Reliability. Base has no flying mission; transient USAF aircraft use runways of Laurence G. Hanscom Field, state-operated airfield adjoining the base. Base named for Laurence G. Hanscom, a pre-WW II advocate of private aviation, killed in a lightplane accident in 1941. Area 846 acres. Runway length NA. Altitude 133 ft. Military 2,149; civilians 1,933. Payroll \$186 million. Housing: 386 officer, 472 NCO, 35-unit TLF, 754 BOQ/VOQ. Clinic.

**Hickam AFB**, Hawaii 96853-5000; 9 mi. W of Honolulu. Phone (808) 471-7110 (Oahu military operator); DSN 471-7110. PACAF base. Hq. Pacific Air Forces. Host unit: 15th Air Base Wing, supporting Air Force units and installations in Hawaii and throughout the Pacific. Major tenant units include 154th Wing (ANG); 201st Combat Communications Gp.; 615th Air Mobility Support Gp. (AMC). Base activated in Sept. 1938; named for Lt. Col. Horace M. Hickam, air pioneer killed in crash Nov. 5, 1934, at Fort Crockett, Tex. Area 2,761 acres. Runway 12,300 ft. (joint use with Honolulu IAP). Altitude sea level. Military 3,657; civilians 1,280. Payroll \$254.2 million. Housing: 566 officer, 2,103 enlisted. Unaccompanied housing: 810 enlisted, 200 VOQ, 200 VAQ. Clinic.

**Hill AFB**, Utah 84056-5990; 8 mi. S of Ogden. Phone (801) 777-7221; DSN 777-1110. AFMC base. Hq. Ogden Air Logistics Center. Provides Integrated Weapon System Management and logistics support for silo-based ICBMs (Minuteman and Peacekeeper); F-16 and C-130 aircraft; conventional munitions, including Maverick air-to-ground missiles and laser, infrared, and electro-optical guided bombs; and other aerospace components, such as landing gear, photographic and reconnaissance equipment,

and training devices. Technology center for software and photonics. Other units include 412th Test Wing (AFMC), which manages the Utah Test and Training Range; 388th Fighter Wing (ACC); 419th Fighter Wing (AFRES); Defense Megacenters Ogden (DISA); Hill Aerospace Museum. Base activated in Nov. 1940; named for Maj. Ployer P. Hill, killed Oct. 30, 1935, while test-flying the first B-17. Area 6,698 acres; manages 962,076 acres. Runway 13,500 ft. Altitude 4,788 ft. Military 4,609; civilians 9,532. Payroll \$482 million. Housing: 179 officer, 966 NCO, 40 transient. 25-bed hospital.

**Holloman AFB**, N. M. 88330-5000; 8 mi. SW of Alamogordo. Phone (505) 475-6511; DSN 867-1110. ACC base. 49th Fighter Wing, F-117 operations (7th, 8th, and 9th Fighter Sqdns.); F-4E aircrew training (20th Fighter Sqdn. and 1st German Air Force Training Sqdn.); AT-38B aircrew training (435th Fighter Sqdn.); HH-60 helicopters (48th Rescue Sqdn.). Twelve German Tornado aircraft and 350 German personnel arrived in early 1996 and are permanently assigned to the wing. Associate units are the 46th Test Gp. (AFMC); 4th Space Warning Sqdn. (AFSPC); Det. 1, 82d Aerial Target Sqdn. (QF-106 drone operations). Base activated in 1942; named for Col. George Holloman, guided-missile pioneer. Area 59,000 acres. Runways 10,575 ft., 12,131 ft., and 8,054 ft. with 7,044 ft. overrun. Altitude 4,093 ft. Military 4,134; civilians 717. Payroll \$180.4 million. Housing: 191 officer, 1,359 enlisted, 403 transient (145 VAQ, 208 VOQ, 50 TLF), 8-bed hospital.

**Howard AFB/Albrook AFS**, Panama, APO AA 34001-5000. DSN 284-9805. ACC base. With headquarters at Howard, 24th Wing represents USAF in operations throughout Latin America. 24th Wing is an ACC unit reporting to 12th Air Force, Davis-Monthan AFB, Ariz. Major tenants: 640th Air Mobility Support Sqdn. (AMC); 33d Intelligence Sqdn. Established in 1928 as Bruja Point Military Reservation; later named for Maj. Charles Harold Howard. Military 1,661; civilians 519. Payroll \$43.6 million. Housing: 238 officer, 933 enlisted, 680 transient (554 VAQ, 120 VOQ, 6 TLF).

**Hurlburt Field**, Fla. 32544-5000; 5 mi. W of Fort Walton Beach. Phone (904) 882-1110; DSN 579-1110. AFSC base. Hq. Air Force Special Operations Command. Host unit: 16th Special Operations Wing, equipped with MC-130E Combat Talon Is, MC-130H Combat Talon IIs, AC-130H/U Spectre Gunships, MH-53J Pave Lows, MH-60G Pave Hawks, and MC-130P Combat Shadows (located at Eglin AFB), and C-130Es. Major tenants include 505th Command and Control Evaluation Gp., including the USAF Air Ground Operations School, USAF Battle Staff Training School (Blue Flag); 720th Special Tactics Gp.; 23d Special Tactics Sqdn.; Joint Warfare Center; USAF Special Operations School; 18th Flight Test Sqdn.; 823d Civil Engineering Sqdn. RED HORSE; Det. 1, 335th Technical Training Sqdn.; Det. 4, Air Weather Service; Field Training Det. 327; and Det. 309, AFOSI. Base activated in 1943; named for Lt. Donald W. Hurlburt, WW II pilot killed Oct. 1, 1943, in a crash at nearby Eglin Field Military Reservation. Area 6,600 acres. Runway 6,900 ft. Altitude 38 ft. Military 7,292; civilians 758. Payroll \$411.1 million. Housing: 48 officer, 632 enlisted, 258 VOQ/VAQ, 24 TLF. Medical clinic at Hurlburt, 125-bed hospital at Eglin AFB, 12 mi. away.

**Incirlik AB**, Turkey, APO AE 09824; 10 mi. E of Adana. Phone (commercial, from CONUS) 011-9C-322-316-1110; DSN 676-1110. USAFE base. Host unit: 39th Wing, supports Operation Provide Comfort and rotational weapons training deployments for USAFE fighter aircraft. Combined Task Force assets include Turkish F-16s, F-4s, KC-135s, British Tornados, VC-10s, French Jaguars, and US F-16s, F-15s, KC-135s, EC-3s, and UH-60 helicopters. Also home for 628th Air

Mobility Support Sqdn. (AMC), which provides a full aerial port operation. Base activated in May 1954; present unit began operations in Mar. 1966. Incirlik, in Turkish, means fig orchard. Area 3,400 acres. Runway 10,000 ft. Altitude 240 ft. Military 2,473 (including 337 GSUs), OPC Tent City 2,000 TDY personnel; civilians 2,776. Payroll \$76 million. Housing: 950 units, 205 govt.-leased, 60 BOQ, 80 TLF, 592 VAQ, 259 VOQ, 628 dorm rooms. 30-bed regional hospital, expandable to 250 beds.

**Kadena AB**, Japan, APO AP 96368-5000; 15 mi. N of Naha, Okinawa, Japan. Phone (commercial, from CONUS) 011-81-98938-1111; DSN 630-1110. PACAF base. Host organization: 18th Wing (12th, 44th, and 67th Fighter Sqdns.), F-15C/D operations; 909th Air Refueling Sqdn., KC-135 operations; 961st Airborne Air Control Sqdn., E-3 operations; 33d Rescue Sqdn., HH-60 operations. Major associate units: Support Center Pacific (AFMC), 353d Special Operations Group (AFSOC), and Training Det. 911 (AETC). Base named for city of Kadena, Okinawa, Japan. Area 15,000 acres. Runway length NA. Military 7,300; appropriated-fund civilians 2,934 (US and local nationals); USAF nonappropriated-fund civilians 1,334 (US and local nationals); local nationals 545; contractors 3,000 (monthly average). Payroll \$146 million. Housing: 899 officer, 3,073 enlisted, 124 temporary lodging units. Unaccompanied housing: 139 officer/civilian, 2,473 enlisted dormitory rooms, 276 VOQ, 274 VAQ. Clinic. US Naval Hospital at Camp Lester.

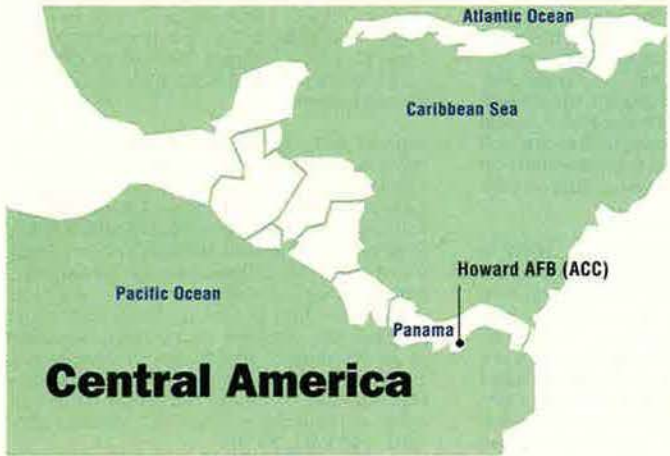
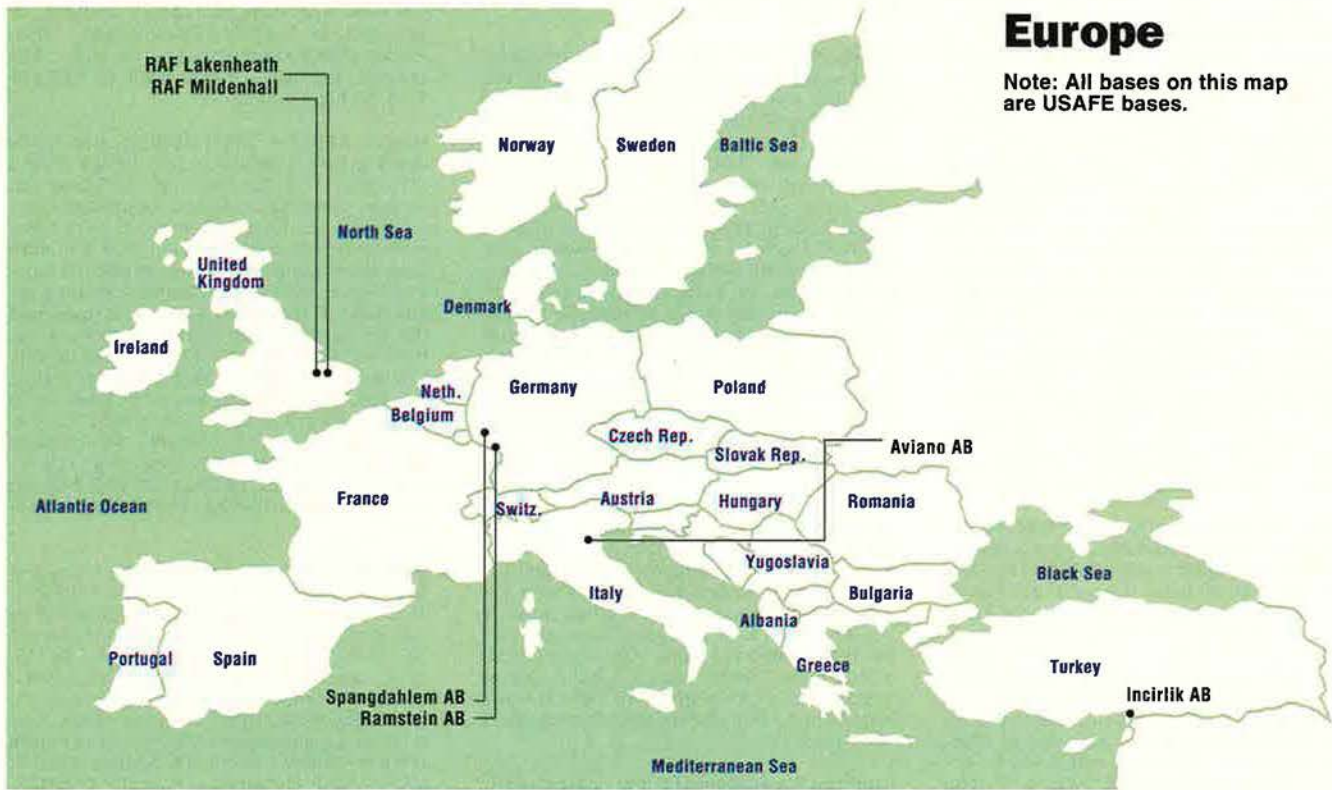
**Keesler AFB**, Miss. 39534-5000; located in Biloxi. Phone (601) 377-1110; DSN 597-1110. AETC base. Hq. 2d Air Force. 81st Training Wing (avionics, communications, electronics, radar systems, computer and command-and-control systems, weather, precision equipment, physician residencies, specialized nurse training, and medical technicians); Keesler Medical Center; 403d Wing (AFRES); AFMC engineering installation squadron; AETC NCO Academy-Keesler. Base activated June 12, 1941; named for 2d Lt. Samuel R. Keesler, Jr., a native Mississippian and WW I aerial observer killed in action Oct. 9, 1918, near Verdun, France. Area 3,546 acres. Runway 5,600 ft. Altitude 26 ft. Military 8,300; civilians 4,236. Payroll \$275 million. Housing: 287 officer, 1,666 NCO, 49 trailer spaces, 2,122 transient (366 VOQ, 1,756 VAQ). 250-bed hospital.

**Kelly AFB**, Tex. 78241-5000; 5 mi. SW of San Antonio. Phone (210) 925-1110; DSN 945-1110. AFMC base. Hq. San Antonio Air Logistics Center provides logistics management, procurement, and systems support for such Defense Department aircraft as the C-5A/B, C-17, C-9, T-37, and T-38 and for such foreign-operated aircraft as the OV-10, A-37, F-5, and C-47. As a specialized repair activity, San Antonio ALC modernizes and performs heavy depot maintenance on the entire fleet of C-5s. It also overhauls F100, TF39, and T58 engines and manages more than seventy-five percent of the USAF engine inventory, fuel and lubricants used by the Air Force and NASA, and nuclear weapons. Other major units on base: Hq. Air Intelligence Agency; Air Force Information Warfare Center; Joint Command and Control Warfare Center; Air Force News Agency; Defense Commissary Agency; 433d Airlift Wing (AFRES); 149th Fighter Wing (ANG); Defense Reutilization and Marketing Office; Air Force Audit Agency; Defense Distribution Depot; Defense Information Systems Agency. Dating from Nov. 21, 1916, Kelly AFB is the oldest continuously active air base in the US. Named for Lt. George E. M. Kelly, first Army pilot to lose his life flying a military aircraft, killed May 10, 1911. Area 4,660 acres. Runway 11,550 ft. Altitude 689 ft. Military 4,581; civilians 14,397. Payroll \$669 million. Housing: 57 officer, 374 NCO. Clinic.

**Kirtland AFB**, N. M. 87117-5606; SE quadrant of Albuquerque. Phone (505) 846-0011; DSN 246-



# Major Air Force Installations Overseas





0011. AFMC base. Hq. 377th Air Base Wing. Major agencies and units include 58th Special Operations Wing (AETC); Air Force Operational Test and Evaluation Center; Phillips Laboratory; 150th Fighter Wing (ANG); Field Command's Defense Nuclear Agency; Sandia National Laboratories; Department of Energy's Albuquerque Operations Office; Kirtland NCO Academy; 898th Munitions Sqdn.; Air Force Security Police Agency; Defense Nuclear Weapons School; Air Force Inspection Agency; Air Force Safety Center. These agencies furnish nuclear, advanced weapons, and space research, development, and testing; advanced helicopter training and search-and-rescue operations; pararescue training; and operational test and evaluation. Other units: Albuquerque Seismological Laboratory; University of New Mexico Civil Engineering Research Facility. Base activated in Jan. 1941; named for Col. Roy C. Kirtland, air pioneer and commandant of Langley Field in the 1930s, who died May 2, 1941. Area 52,678 acres. Runway 19,375 ft. Altitude 5,352 ft. Military 5,875; civilians 13,946. Payroll \$1 billion. Housing: 2,122 homes. VAQ/VOQ: 130 officer, 180 enlisted. Air Force/Veterans Administration joint medical center located outside base gates.

**Kunsan AB**, Republic of Korea, APO AP 96264-5000; 8 mi. SW of Kunsan City. Phone (commercial, from CONUS) 011-82-654-470-1110; DSN 782-1110. PACAF base. Host unit: 8th Fighter Wing, F-16C/D operations, home of the "Wolf Pack." The 8th FW converted to the F-16 in Sept. 1981, making it the first active overseas F-16 wing. Associate units include the US Army's 143d Air Defense Artillery, 1st Battalion, Echo and Foxtrot Batteries; US Army Contracting Command Korea. Base built by Japanese in 1938. Area 2,556 acres. Runway length 9,000 ft. Altitude 29 ft. Military 2,207; US civilians 17; local nationals 364. Payroll \$100.6 million. Unaccompanied housing: 247 officer, 3,940 enlisted, 9 VIP, 28 VOQ, 60 VAQ. 6-bed hospital.

**Lackland AFB**, Tex. 78236-5000; 8 mi. SW of San Antonio. Phone (210) 671-1110; DSN 473-1110. AETC base. The 37th Training Wing is the largest training wing in the Air Force. Its four primary training functions graduate more than 65,000 students annually. The 737th Training Gp. provides basic military training for about 33,000 enlisted people entering the Air Force, Air Force Reserve, and Air National Guard annually. The 37th Training Gp. conducts more than 250 technical training courses in base support functions for more than 30,000 people annually from all military services. The Defense Language Institute English Language Center conducts English language training for 2,400 international and US military students annually. The Inter-American Air Forces Academy conducts professional, technical, and management training in Spanish to military forces and government agencies from Latin American and Caribbean nations for about 660 students per year. The 59th Medical Wing (Wilford Hall USAF Medical Center) is the Air Force's largest medical facility with 592 beds. Base activated in 1941; named for Brig. Gen. Frank D. Lackland, early commandant of Kelly Field flying school, who died in 1943. Area 6,725 acres (including 3,973 acres at Lackland Training Annex). No runway. Altitude 745 ft. Military 6,357; civilians 6,202; students 8,682. Payroll \$552.6 million. Housing: 109 officer, 611 NCO, 2,363 transient (1,831 VAQ, 374 VOQ, 158 TLF).

**Lajes Field**, Azores, Portugal, APO AE 09720-5000; Terceira Island, 900 mi. W of Portugal. Phone (commercial, from CONUS) 011-351-95-530100-1110; DSN from US 535-1110, from Europe 245-1110. ACC base. Host unit: 65th Air Base Wing. Tenants: US Forces Azores; Army 1324th Medium Port Command Azores; 629th Air Mobility Support Sqdn. (AMC); Det. 6, Air Force Broadcasting Service. US operations began at Lajes Field in 1946. Area 1,148 acres. Runway

10,865 ft. Altitude 180 ft. Military 833; civilians 571. Payroll \$24.9 million. Housing: 80 officer, 404 enlisted, 30 TLF 184 VOQ, 532 VAQ, 6 DVQ, 4 SNCO. 7-bed hospital.

**Langley AFB**, Va. 23665-5000; 3 mi. N of Hampton. Phone (804) 764-1110; DSN 574-1110. ACC base. Hq. Air Combat Command. Host unit: 1st Fighter Wing, F-15 fighter operations. Associate units: Air Operations Sqdn. (ACC); Civil Engineering Sqdn. (ACC); Logistics Support Gp. (ACC); Requirements Sqdn. (ACC); Training Support Sqdn. (ACC); Computer Systems Sqdn. (ACC); ACC Heritage of America Band; US Army TRADOC Flight Det.; Army/USAF Center for Low-Intensity Conflict; Air Force Doctrine Center. Base activated Dec. 30, 1916. Langley is one of the oldest continuously active air bases in the US. Named for aviation pioneer and scientist Samuel Pierpont Langley, who died in 1906. NASA's Langley Research Center is adjacent to the base. Area 3,216 acres. Runway 10,000 ft. Altitude 10 ft. Military 7,988; civilians 1,102. Payroll \$250 million. Housing: 384 officer, 1,074 NCO, 416 transient (215 VAQ, 101 VOQ, 100 TLF). 50-bed hospital.

**Laughlin AFB**, Tex. 78843-5000; 6 mi. E of Del Rio. Phone (210) 298-3511; DSN 732-1110. AETC base. 47th Flying Training Wing, specialized undergraduate pilot training. Base activated in July 1942; named for 1st Lt. Jack Thomas Laughlin, Del Rio native, B-17 pilot killed over Java Jan. 29, 1942. Area 5,228 acres. Runways 6,246 ft., 8,310 ft., and 8,850 ft. Altitude 1,082 ft. Military 1,223; civilians 1,016. Payroll \$73.9 million. Housing: 600 units, 54 trailer spaces, 58 transient, 22 TLF. Hospital.

**Laurence G. Hanscom AFB** (see Hanscom AFB).

**Little Rock AFB**, Ark. 72099-5000; 17 mi. NE of Little Rock. Phone (501) 988-3131; DSN 731-1110. ACC base. 314th Airlift Wing, only C-130 training base in DoD, training crew members from all branches of military service and some foreign countries. Tenants include 189th Airlift Wing (ANG); 96th Mobile Aerial Port Sqdn.; 348th USAF Recruiting Sqdn.; Det. 251, AFOSI; Det. 310, 373d Field Training Sqdn.; Det. 234, Air Force Audit Agency; Combat Aerial Delivery School (ACC); Hq. Arkansas ANG. Base activated in 1955. Area 11,373 acres. Runway 12,000 ft. Altitude 310 ft. Military 4,450; civilians 589. Payroll \$179.8 million. Housing: 140 officer, 1,395 enlisted, 11 single-occupancy dormitories housing 836, 341 transient (140 VAQ, 201 VOQ). 25-bed hospital.

**Los Angeles AFB**, Calif. 90245-4687; in El Segundo, 3 mi. SE of Los Angeles IAP; base housing and support facilities 18 mi. S of the main base, in San Pedro. Phone (310) 363-1110; DSN 833-1110. AFMC base. Hq. of AFMC's Space and Missile Systems Center, responsible for research, development, acquisition, on-orbit testing, and sustainment of military space and missile systems. Support unit is 61st Air Base Gp. Area 112 acres at Los Angeles AFB and 127 acres at Fort MacArthur Annex. No runway. Altitude 95 ft. Military 1,540; civilians 1,046. Payroll \$150 million. Housing at Fort MacArthur Annex: 574 townhouses. Clinics, base exchanges, and child development centers at main base and Fort MacArthur; commissary and Family Support Center at main base.

**Luke AFB**, Ariz. 85309-5000; 20 mi. WNW of downtown Phoenix. Phone (602) 856-7411; DSN 896-1110. AETC base. 56th Fighter Wing, F-16 operations; 944th Fighter Wing (AFRES), F-16 operations; 607th Air Control Sqdn., forward air control operations. Luke, the largest fighter training base in the world, conducts USAF and allied aircrew training in the F-16. Base activated 1941; named for 2d Lt. Frank Luke, Jr., observation balloon busting ace of WW I and first American

aviator to receive the Medal of Honor, killed in action Sept. 29, 1918, near Murvaux, France. Area 4,197 acres, plus 2.7 million-acre range at Gila Bend, Ariz. Runways 10,000 ft. and 9,910 ft. Altitude 1,090 ft. Military 6,374; civilians 1,092. Payroll \$161.2 million. Housing: 95 officer, 679 enlisted, 256 transient (132 VOQ, 84 VAQ, 40 TLF). 30-bed hospital.

**MacDill AFB**, Fla. 33621-5000; located on the Interbay Peninsula in southern Tampa. Phone (813) 828-1110; DSN 968-1110. ACC base. 6th Air Base Wing; Hq. US Special Operations Command; Hq. US Central Command; Joint Communications Support Element; NOAA Aircraft Operations Center; 610th Aeromedical Evacuation Sqdn.; 290th Joint Communications Support Sqdn. The 6th ABW's mission is to operate the air base for US warfighting commands. Base activated Apr. 15, 1941; named for Col. Leslie MacDill, killed in aircraft accident Nov. 8, 1938, near Washington, D. C. Area 5,600 acres. Runways 11,480 ft. (active) and 7,167 ft. (inactive). Altitude 6 ft. Military 1,956; civilians 465. Payroll \$47.7 million. Housing: 109 officer, 571 enlisted, 23 DVQ, 62 VAQ housing 124 personnel, 137 VOQ, 24 TLF. 50-bed hospital.

**Malmstrom AFB**, Mont. 59402-5000; 1.5 mi. E of Great Falls. Phone (406) 731-1110; DSN 632-1110. AFSPC base. Host unit: 341st Missile Wing (Minuteman III). Tenant unit: 43d Air Refueling Gp. (AMC), KC-135. Base activated Dec. 15, 1942; named for Col. Einar A. Malmstrom, WW II fighter commander killed in air accident Aug. 21, 1954. Site of SAC's first Minuteman wing. Area 4,137 acres, plus about 24,000 sq. mi. of missile complex. Runway length NA. Altitude 3,525 ft. Military 4,350; civilians 428. Payroll \$178 million. Housing: 258 officer, 1,148 enlisted, 105 transient. Clinic.

**Maxwell AFB**, Ala. 36112-5000; 1 mi. WNW of Montgomery. Phone (334) 953-1110; DSN 493-1110. AETC base. 42d Air Base Wing; Hq. Air University; Air War College; Air Command and Staff College; Air Force Quality Institute; Air University Library; College of Aerospace Doctrine, Research, and Education; Air Force Reserve Officers Training Corps; Officer Training School; Ira C. Eaker College for Professional Development; Hq. Community College of the Air Force; Hq. Civil Air Patrol-USA; Squadron Officer School; Air Force Institute of Technology (at Wright-Patterson AFB, Ohio). Associate units: 908th Airlift Wing (AFRES); Air Force Historical Research Agency. Air University conducts professional military, graduate, and professional continuing education for precommissioned and commissioned officers, enlisted personnel, and civilians to prepare them for command, staff, leadership, and management responsibilities. Base activated in 1918; named for 2d Lt. William C. Maxwell, killed in air accident Aug. 12, 1920, in the Philippines. Area 2,524 acres. Runway 7,000 ft. Altitude 168 ft. Military 3,729; civilians 2,986. Payroll \$276.7 million. Housing: 268 officer, 22 senior enlisted, 348 junior enlisted, 1,211 transient (1,116 VOQ, 65 VAQ, 30 TLF). 30-bed hospital.

**Maxwell AFB, Gunter Annex**, Ala. 36114; 4 mi. NE of Montgomery. Phone (334) 416-1110; DSN 596-1110. AETC base. Under Hq. Air University; College for Enlisted Professional Military Education (includes USAF Senior NCO Academy); Extension Course Institute; Standard Systems Group (AFMC); Air Force Logistics Management Agency. Activated Aug. 27, 1940; named for William A. Gunter, longtime mayor of Montgomery and airpower advocate who died in 1940. Area 368 acres. No runway. Altitude 220 ft. Military and civilian populations and payroll data included in Maxwell entry. Housing: 104 officer, 90 senior enlisted, 130 junior enlisted, 617 transient (274 VOQ, 340 VAQ, 3 TLF).



**McChord AFB**, Wash. 98438-5000; 10 mi. S of Tacoma. Phone (206) 984-1910; DSN 984-1110. AMC base. Host unit: 62d Airlift Wing. Major tenants include: 446th Airlift Wing (AFRES); Western Air Defense Sector (ANG). The 62d AW operates the C-141 Starlifter but is scheduled to receive the C-17 Globemaster III as the C-141 fleet retires. The base is responsible for strategic airlift of personnel and cargo worldwide, on short notice, in support of national objectives. Base is adjacent to Fort Lewis, its primary customer. Base activated May 5, 1938; named for Col. William C. McChord, killed Aug. 18, 1937, while attempting a forced landing at Maidens, Va. Area 4,616 acres. Runway 10,100 ft. Altitude 323 ft. Military 4,125; civilians 1,339. Payroll \$253.6 million. Housing: 98 officer, 883 NCO, 760 dorm rooms, 289 VAQ, 71 VOQ, 12 TLF. Dispensary. Madigan Army Medical Center is located 4 mi. SE, with 414 beds (expandable to 622 in an emergency).

**McClellan AFB**, Calif. 95652-5000; 9 mi. NE of Sacramento. Phone (916) 643-2111; DSN 633-1110. AFMC base. Hq. Sacramento Air Logistics Center provides logistics management, procurement, maintenance, and distribution support for F/EF-111 and A-10 and, as a second source, for the F-15 and KC-135 weapon systems. The ALC is also program manager for the F-117A stealth fighter and will be the support center for the F-22. Other responsibilities include more than 200 electronic systems and programs and eight space systems; technology centers for very-high-speed integrated circuits, fiber optics, and advanced composites. The ALC has unique capability for robotic nondestructive inspection using X-ray and neutron radiography on F-111-sized aircraft. Other major units include Defense Depot-McClellan; Defense Information Systems Organization-McClellan; 938th Engineering Installation Sqdn.; Technical Operations Division, Air Force Technical Applications Center; 4th Air Force (AFRES); US Coast Guard Air Station, Sacramento (DoT). Named for Maj. Hezekiah McClellan, pioneer in Arctic aeronautical experiments, killed in a crash May 25, 1936. Area 3,763 acres. Runway 10,600 ft. Military 3,000; civilians 10,300. Payroll \$497 million. Housing: 100 officer, 564 enlisted, 19 transient. 77th Medical Gp. Clinic and 77th Medical Gp. Hospital located at the former Mather AFB.

**McConnell AFB**, Kan. 67221-5000; SE corner of Wichita. Phone (316) 652-6100; DSN 743-1110. AMC base. 22d Air Refueling Wing; 931st Air Refueling Gp. (AFRES Assoc.); 184th Bomb Wing (ANG). Base activated June 5, 1951; named for Capt. Fred J. McConnell, WW II B-24 pilot who died in a crash of a private plane Oct. 25, 1945, and for his brother, 2d Lt. Thomas L. McConnell, also a WW II B-24 pilot, killed July 10, 1943, during an attack on Bougainville. Area 3,113 acres. Two 12,000-ft. runways. Altitude 1,371 ft. Military 2,984; DoD civilians 423. Payroll \$104 million. Housing: 76 officer, 437 enlisted, 95 transient (49 VOQ, 26 VAQ, 20 temporary units off base).

**McGuire AFB**, N. J. 08641-5000; 18 mi. SE of Trenton. Phone (609) 724-1100; DSN 440-1100. AMC base. 305th Air Mobility Wing; Hq. 21st Air Force; 621st Air Mobility Operations Gp.; Air Mobility Warfare Center, Fort Dix, N. J.; N. J. ANG; N. J. Civil Air Patrol; 108th Air Refueling Wing (ANG); 514th Air Mobility Wing (AFRES Assoc.); McGuire NCO Academy (AETC). Base adjoins Army's Fort Dix; formerly Fort Dix AAB. Activated as AFB 1949; named for Maj. Thomas B. McGuire, Jr., P-38 pilot, second leading US ace of WW II, recipient of Medal of Honor, killed in action Jan. 7, 1945, in the Philippines. Area 3,597 acres. Runways 7,124 ft. and 10,000 ft. Altitude 133 ft. Military 10,512 (including AFRES and ANG); civilians 1,604. Payroll NA. Housing: 186 officer, 1,568 NCO, 403 transient (144 VOQ, 229 VAQ, 30 TLF).

**Minot AFB**, N. D. 58705-5000; 13 mi. N of Minot. Phone (701) 723-1110; DSN 453-1110. ACC base. 5th Bomb Wing (B-52H); 91st Missile Wing (AFSPC), Minuteman III operations; CPT Flight/23d Bomb Sqdn.; 54th Rescue Flight (UH-1N). Base activated in Jan. 1957; named after the city of Minot, whose citizens donated \$50,000 toward purchase of the land for the Air Force. Area 5,049 acres, plus additional 8,500 acres for missile sites. Runway 13,200 ft. Altitude 1,668 ft. Military 3,768; civilians 567. Payroll \$139.8 million. Housing: 394 officer, 2,047 enlisted, 22 UOQ, 1,302 dormitory spaces, 32 VAQ, 39 VOQ, 39 TLF. 45-bed hospital.

**Misawa AB**, Japan, APO AP 96319-5000; within Misawa city limits. Phone (commercial, from CONUS) Direct: 011-81-3117-66-1111. Switchboard: 011-81-176-53-5181; DSN 94-315-226-1110. PACAF base; joint-service base. Host unit: 35th Fighter Wing, F-16C/D fighter operations. Tenant units: 3d Space Surveillance Sqdn. (AFSPC); 301st Intelligence Sqdn. (AIA); Naval Air Facility; Naval Security Gp. Activity; US Army field station; Company E, US Marine Support Battalion. Base occupied by US forces in Sept. 1945. Area 3,865 acres. Runway 10,000 ft. Altitude 119 ft. Military 4,653 (total US forces); US civilians 160; local nationals 939. Payroll \$168 million. Housing: 11 senior officer, 113 field-grade officer, 211 company-grade officer, 1,835 enlisted. Unaccompanied housing: 120 officer, 871 enlisted, 166 transient (40 VAQ, 80 VOQ, 46 TLF). Unaccompanied Navy housing: 108 officer (transient), 356 enlisted (196 permanent party, 160 transient). 15-bed hospital, expandable to 65 for contingencies.

**Moody AFB**, Ga. 31699-5000; 10 mi. NNE of Valdosta. Phone (912) 333-4211; DSN 460-1110. ACC base. 347th Wing, F-16C/D (LANTIRN-equipped), C-130E, A/OA-10; 71st Air Control Sqdn. Tenant units: 336th USAF Recruiting Sqdn.; Det. 717, AFOSI; 322d Training Det. Base activated in June 1941; named for Maj. George P. Moody, killed May 5, 1941, while test-flying a Beech AT-10. Area 6,050 acres. Runway 8,000 ft. Altitude 233 ft. Military 3,752; civilians 408. Payroll \$145.9 million. Housing: 32 officer, 270 enlisted, 18 VAQ, 32 VOQ, 12 TLF, 39 trailer spaces. 10-bed hospital with Acute Care Clinic.

**Mountain Home AFB**, Idaho 83648-5000; 10 mi. SW of Mountain Home. Phone (208) 828-2111; DSN 728-2111. ACC base. 366th Wing, USAF's first and only air-intervention composite wing, with F-16C attack, F-15E interdiction, F-15C air superiority, and KC-135R air refueling aircraft prepared to deploy rapidly worldwide and perform composite air-intervention operations. Base activated in Aug. 1943. Area 9,112 acres. Runway 13,500 ft. Altitude 3,000 ft. Military 3,635; civilians 416. Payroll \$174.2 million. Housing: 246 officer, 1,275 enlisted, 178 VAQ, 16 VOQ, 65 TLF. 50-bed hospital.

**Nellis AFB**, Nev. 89191-5000; 8 mi. NE of Las Vegas. Phone (702) 652-1110; DSN 682-1110. ACC base. Host unit: Air Warfare Center. Operational elements: 57th Wing; 99th Air Base Wing; 53d Wing (Eglin AFB, Fla.). Major units within 57th Wing include the USAF Weapons School, USAF Air Demonstration Sqdn. (Thunderbirds), 57th Operations Gp., 57th Test Gp. (including 422d Test and Evaluation Sqdn.), and 57th Logistics Gp. Aircraft assigned to Nellis: A-10, F-15, F-15E, F-16, and HH-60G. Other Nellis units include the 414th Combat Training Sqdn. (Red Flag), 549th Combat Training Sqdn. (Air Warrior), 547th Intelligence Sqdn., 99th Range Gp., 820th Civil Engineering Sqdn. RED HORSE, 896th Munitions Sqdn. (AFMC), 11th Reconnaissance Sqdn. (UAV), and the 66th Rescue Sqdn. (Pave Hawks). Base activated in July 1941 as AAF Flexible Gunnery School; closed in 1947; reopened in 1949 and named for 1st Lt. William H. Nellis, WW II P-47 fighter pilot, killed Dec. 27,

1944, in Europe. Main base is 11,000 acres with a range restricted area of 3.5 million acres, plus 12,000 sq. mi. of airspace over the range and the military operating area. Runways 10,051 ft. and 10,119 ft. Altitude 1,868 ft. Military 7,009; civilians 942. Payroll \$302.7 million. Housing: 90 officer, 1,142 enlisted, 267 VAQ, 153 VOQ, 60 TLF. 119-bed Nellis Federal Hospital, a joint Air Force-Veterans Administration venture assigned to the 99th Medical Gp.

**Newark AFB**, Ohio 43057-5990; 1 mi. SW of Newark. Phone (614) 522-2171; DSN 346-7000. AFMC base. Aerospace Guidance and Metrology Center. Repairs inertial guidance and navigation systems for most Air Force missiles and aircraft as well as a variety of inertial systems for other branches of the armed forces. Also manages the Air Force's worldwide measurement and calibration program, providing the link between the National Institutes of Science and Technology and the Air Force's 180 precision measurement equipment laboratories at bases around the world. Four tenant units. Activated as an Air Force station Nov. 7, 1962. Area 70 acres. No runway. Military 60; civilians 1,400. Payroll \$70 million. Base is scheduled for closure Oct. 1, 1996.

**Offutt AFB**, Neb. 68113-5000; 8 mi. S of Omaha. Phone (402) 294-1110; DSN 271-1110. ACC base. Hq. US Strategic Command. 55th Wing; Strategic Joint Intelligence Center; Hq. Strategic Communications-Computer Center; Air Force Global Weather Central; 6th Space Operations Sqdn. (AFSPC); National Airborne Operations Center (NAOC); Air Combat Command Heartland of America Band. Base activated in 1896 as Army's Fort Crook; landing field named for 1st Lt. Jarvis J. Offutt, WW I pilot who died Aug. 13, 1918, from injuries received at Valheureux, France. Area 4,056 acres (including housing area and off-base sites). Runway 11,700 ft. Altitude 1,048 ft. Military 9,340; civilians 1,592. Payroll \$351.9 million. Housing: 337 officer, 2,293 enlisted, 69 VAQ, 102 VOQ, 60 TLF. 60-bed hospital.

**Osan AB**, Republic of Korea, APO AP 96278-5000; 38 mi. S of Seoul. Phone (commercial, from CONUS) 011-82-333-661-1110; DSN 784-4110. PACAF base. Hq. 7th Air Force. Host unit: 51st Fighter Wing, F-16C/D, C-12F, A-10, and OA-10A operations. Tenant units: 303d Intelligence Sqdn.; 631st Air Mobility Support Sqdn. (AMC); 5th Reconnaissance Sqdn.; 31st Special Operations Sqdn.; Det. 1, 4th Space Surveillance Sqdn. (AFSPC). Originally designated K-55; runway opened in Dec. 1952; renamed Osan AB in 1956 for nearby town that was the scene of first fighting between US and North Korean forces in July 1950. Area 1,674 acres. Runway 9,000 ft. Altitude 38 ft. Military 5,538; US civilians 130; local nationals 617. Payroll NA. Housing: 75 officer, 212 enlisted. Unaccompanied housing: 602 officer and senior NCO, 2,750 enlisted, 120 VOQ, 140 VAQ. 30-bed hospital.

**Patrick AFB**, Fla. 32925-3237; 2 mi. S of Cocoa Beach. Phone (407) 494-1110; DSN 854-1110. AFSPC base. Operated by the 45th Space Wing in support of DoD, NASA, and other agency and commercial missile and space programs. Major tenants: Defense Equal Opportunity Management Institute; Air Force Technical Applications Center; 1st Rescue Gp.; 41st Rescue Sqdn.; 71st Rescue Sqdn.; 301st Rescue Sqdn. (AFRES); 741st Consolidated Aircraft Maintenance Sqdn.; Joint Task Force for Joint STARS at Melbourne Regional Airport, Fla. Besides host responsibilities for Patrick AFB and Cape Canaveral AS, 45th SPW also oversees operations at tracking stations on Antigua and Ascension Islands. Patrick has supported more than 3,000 space launches from Cape Canaveral since 1950. Base activated in 1940; named for Maj. Gen. Mason M. Patrick, Chief of AEF's Air Service in WW I and Chief of the Air Service/Air Corps, 1921-27. Area 2,341



acres. Runway 9,000 ft. Altitude 9 ft. Military 2,700; civilians 1,900. Payroll \$155 million (military, civilian). Housing: 136 officer, 1,230 NCO. 15-bed hospital.

**Peterson AFB**, Colo. 80914-5000; at eastern edge of Colorado Springs. Phone (719) 556-7321; DSN 834-7011. AFSPC base. Hq. Air Force Space Command. Host unit: 21st Space Wing (AFSPC). Provides support to Hq. North American Aerospace Defense Command; Hq. US Space Command; Hq. Army Space Command; 302d Airlift Wing (AFRES). Edward J. Peterson Air & Space Museum. Base activated in 1942; named for 1st Lt. Edward J. Peterson, killed Aug. 8, 1942, in an aircraft crash at the base. Area 1,277 acres. Runway shared with city. Altitude 6,200 ft. Military active-duty 4,299; reserves 1,260; civilians 3,065. Payroll \$227.3 million. Housing: 107 officer, 384 NCO, 210 transient (72 VOQ, 98 VAQ, 40 TLF). Clinic.

**Pope AFB**, N. C. 28308-5000; 12 mi. NNW of Fayetteville. Phone (910) 394-0001; DSN 486-1110. ACC base. 23d Wing. 624th Air Mobility Support Gp. (AMC); 23d Aeromedical Evacuation Sqdn.; 23d Combat Control Sqdn.; 3d Aerial Port Sqdn. (AMC); Det. 3, MACOS (Combat Control School); 18th Air Support Operations Gp.; 24th Special Tactics Sqdn. (AFSOC). Base adjoins Army's Fort Bragg and provides intratheater airlift and close air support for airborne forces and other personnel, equipment, and supplies. Base activated in 1919; named after 1st Lt. Harley H. Pope, WW I flyer, killed Jan. 7, 1917, when his JN-4 "Jenny" crashed into the Cape Fear River near Fayetteville. Area 1,750 acres. Runway 7,500 ft. Altitude 218 ft. Military 4,052; civilians 434. Payroll \$97.7 million. Housing: 89 officer, 370 enlisted, 1,208 dormitory spaces, 153 VOQ, 111 VAQ, 8 TLF. Clinic.

**RAF Lakenheath**, United Kingdom, APO AE 09464-5000; 70 mi. NE of London; 25 mi. from Cambridge. Phone (commercial, from CONUS) 011-44-1638-52-3000; DSN 226-1110. Royal Air Force base. 48th Fighter Wing (USAFE) flies the F-15E and the F-15C and trains for and conducts air operations in support of NATO. Base activated in 1941; 48th FW began operations at RAF Lakenheath in Jan. 1960. Named after nearby village. Area 2,226 acres. Runway 9,000 ft. Altitude 32 ft. Military 5,200; civilians 2,300. Payroll \$230 million. Housing: 1,424 units, 1,093 govt.-leased housing, 326 billeting spaces. Regional medical center.

**RAF Mildenhall**, United Kingdom, APO AE 09459-5000; 30 mi. NE of Cambridge. Phone (commercial, from CONUS) 011-44-1638-54-3000; DSN 238-3000. Royal Air Force base. Hq. 3d Air Force (USAFE). 100th Air Refueling Wing (USAFE), KC-135R and European Tanker Task Force operations, regional logistics support. Associate units include 352d Special Operations Gp. (AFSOC); 627th Air Mobility Support Sqdn. (AMC); 95th Reconnaissance Sqdn. (ACC); 488th Intelligence Sqdn. (AIA); Naval Air Facility. Base activated in 1934; US presence began in July 1950; named after nearby town. Area 1,121 acres. Runway length NA. Altitude 33 ft. Military 4,765; civilians 765. Payroll \$134 million. Housing: 42 officer, 116 enlisted; US govt.-leased housing shared with RAF Lakenheath; 421 transient (40 TLF, 212 VOQ, 169 VAQ). Medical annex.

**Ramstein AB**, Germany, APO AE 09094-0385; adjacent to Ramstein; 10 mi. W of Kaiserslautern. Phone (commercial, from CONUS) 011-49-6371-47-113; DSN 480-1110. Hq. USAFE and Hq. Allied Air Forces Central Europe (NATO) base. Host unit: 86th Airlift Wing. The 86th AW has a broad mission; the 37th Airlift Sqdn. flies the C-130E Hercules, the 75th Airlift Squadron flies the C-9 Nightingale, and the 76th Airlift Squadron flies the C-20 Gulfstream, C-21 Learjet, and CT-

43. Ramstein provides inter- and intratheater operational airlift, intratheater aeromedical evacuation, and CONUS staging and aeromedical evacuation. The wing commander also serves as commander of the Kaiserslautern Military Community, the largest concentration of US citizens (49,300) outside the US. The KMC encompasses more than 1,000 sq. mi. and 12 USAF and Army military installations. Base activated and US presence began in 1953. Area 10,261 acres. Runway 8,030 ft. Altitude 782 ft. Military 8,733; civilians 4,908. Payroll \$149.5 million. Housing: 1,797; 9 govt.-leased units; 1,078 billeting units. Clinic on base, and the Landstuhl Regional Medical Center is nearby.

**Randolph AFB**, Tex. 78150-5000; 17 mi. ENE of San Antonio. Phone (210) 652-1110; DSN 487-1110. AETC base. Hq. Air Education and Training Command; Hq. 19th Air Force; 12th Flying Training Wing; T-37, T-38, AT-38, and T-1A pilot instructor training; T-43 undergraduate navigator training, C-21A airlift, and T-3 flight screening at Hondo, Tex., and the US Air Force Academy; Hq. Air Force Personnel Center; Hq. Air Force Management Engineering Agency; Hq. Air Force Services Agency; USAF Occupational Measurement Sqdn.; Hq. Air Force Recruiting Service. Base activated in June 1930; named for Capt. William M. Randolph, killed Feb. 17, 1928, when his AT-4 crashed on takeoff at Gorman, Tex. Area 5,011 acres. Two 8,350-ft. runways. Altitude 761 ft. Military 5,607; civilians 3,940. Payroll \$384 million. Housing: 254 officer, 765 NCO, 210 VAQ, 480 VOQ, 348 UEQ, 200 UOQ, 30 TLF. Clinic.

**Reese AFB**, Tex. 79489-5000; adjacent to Lubbock. Phone (806) 885-4511; DSN 838-1110. AETC base. 64th Flying Training Wing, specialized undergraduate pilot training. Base activated in 1942; named for 1st Lt. Augustus F. Reese, Jr., P-38 fighter pilot killed during a train-strafting mission at Cagliari, Sardinia, May 14, 1943. Area 3,953 acres. Runways 6,500 ft., 10,500 ft., and 10,500 ft. Altitude 3,338 ft. Military 1,326; civilians and contractors 1,166. Payroll \$50 million. Housing: 153 officer, 243 NCO, 83 transient (8 suites, 25 TLF, 34 VOQ, 16 VAQ). Clinic.

**Robins AFB**, Ga. 31098; 15 mi. SSE of Macon at Warner Robins. Phone (912) 926-1110; DSN 468-1110. AFMC base. Hq. Warner Robins Air Logistics Center provides worldwide logistics management for the F-15 air-superiority fighter, C-130 and C-141 cargo aircraft, helicopters, missiles, and remotely piloted vehicles. Other management responsibilities include the LAN-TIRN system, JTIDS, avionics, most Air Force airborne electronic warfare equipment, airborne communications equipment, airborne bomb- and gun-directing systems, fire-fighting equipment, general-purpose vehicles, and the Worldwide Military Command and Control System. 93d Air Control Wing (ACC), activated January 1996, will eventually have 2,500 personnel and 20 E-8C Joint STARS aircraft assigned. Other major units include Hq. Air Force Reserve (AFRES); 116th Bomb Wing (ANG), B-1B; 78th Air Base Wing (AFMC); 19th Air Refueling Wing (AMC) (In July 1996, the 19th ARW will be downsizing to a group, transferring all but 13 KC-135R and two EC-135 aircraft.); 5th Combat Communications Gp. (ACC); 78th Communications-Computer Systems Gp. (AFMC). Base activated in Mar. 1942; named for Brig. Gen. Augustine Warner Robins, an early chief of the Materiel Division of the Air Corps, who died June 16, 1940. Area more than 8,700 acres. Runway 12,000 ft. Altitude 294 ft. Military 4,613; civilians 12,409. Payroll \$740.7 million. Housing: 245 officer, 1,149 NCO, 40 TLF, 137 VOQ. 20-bed hospital.

**Scott AFB**, Ill. 62225-5000; 6 mi. ENE of Belleville. Phone (618) 256-1110; DSN 576-1110. AMC base. 375th Airlift Wing; Hq. Air Mobility Com-

mand; Hq. Air Force C<sup>4</sup> Agency; Hq. US Transportation Command; Hq. Air Weather Service; Combat Climatology Center; 932d Airlift Wing (AFRES Assoc.). Base activated June 14, 1917; named for Cpl. Frank S. Scott, the first enlisted man to die in an aircraft accident, killed Sept. 28, 1912, in a Wright B Flyer at College Park, Md. Area 3,230 acres. Runway 7,061 ft. Altitude 453 ft. Military 6,100; civilians 3,550. Payroll \$466 million. Housing: 304 officer, 1,394 NCO, plus 96 spaces for privately owned trailers, 300 transient, 55-bed hospital; 82-bed aeromedical staging facility.

**Seymour Johnson AFB**, N. C. 27531-5000; within city limits of Goldsboro. Phone (919) 736-5400; DSN 488-1110. ACC base. 4th Fighter Wing, F-15E operations; 916th Air Refueling Wing (AFRES), KC-135 operations. Base activated June 12, 1942; named for Navy Lt. Seymour A. Johnson, Goldsboro native, killed Mar. 5, 1941, in aircraft accident in Maryland. Area 3,233 acres. Runway 11,758 ft. Altitude 110 ft. Military 4,602; civilians 659. Payroll \$185.7 million. Housing: 154 officer, 1,544 enlisted, 7 dorms housing 504 personnel, 7 DVQ, 6 SNCOQ, 46 VOQ, 64 VAQ, 27 TLF. 15-bed hospital.

**Shaw AFB**, S. C. 29152-5000; 10 mi. WNW of Sumter. Phone (803) 668-8110; DSN 965-1110. ACC base. 20th Fighter Wing, F-16 fighter operations and A/OA-10 close air support/forward air control operations; Hq. 9th Air Force. Base activated Aug. 30, 1941; named for 2d Lt. Ervin D. Shaw, one of the first Americans to see air action in WW I, killed in France July 9, 1918, when his Bristol fighter was shot down during a reconnaissance mission. Area 3,363 acres; supports another 13,000 acres. Runways 10,000 ft. and 8,000 ft. Altitude 244 ft. Military 5,462; civilians 553. Payroll \$108.7 million. Housing: 170 officer, 1,534 enlisted, 897 UEQ, 180 transient (44 VAQ, 96 VOQ, 40 TLF). 25-bed hospital.

**Sheppard AFB**, Tex. 76311-5000; 4 mi. N of Wichita Falls. Phone (817) 676-7441; DSN 736-7441. AETC base. The 82d Training Wing includes the 82d and 782d Training Gps., which conduct courses in financial management, communications, electronics, aircraft maintenance, munitions, aerospace ground equipment, transportation, civil engineering skills, and education/training career fields; 882d Training Gp., which provides training in biomedical sciences, dentistry, health service administration, medical readiness, medicine, nursing, and the Physician Assistant Training Program; 982d Training Gp., which provides weapon system training at training detachments and operating locations worldwide; 82d Support Gp.; 82d Medical Gp.; 82d Logistics Gp. The 80th Flying Training Wing (AETC) conducts T-37 and T-38 undergraduate pilot training and instructor pilot training in the Euro-NATO Joint Jet Pilot Training program. The 80th FTW also conducts the Introduction to Fighter Fundamentals course with AT-38 aircraft. Base activated June 14, 1941; named for US Sen. Morris E. Sheppard of Texas, who died Apr. 9, 1941. Area 6,100 acres. Runways 6,000 ft., 7,000 ft., 10,000 ft., and 13,100 ft. Altitude 1,015 ft. Military 8,922; civilians 3,828. Payroll \$257 million. Housing: 171 officer, 1,058 NCO, 7,563 transient (1,772 VAQ, 4,698 UPH, 564 UEUP, 58 TLF, 103 UOQ, 368 VOQ). 90-bed hospital.

**Spangdahlem AB**, Germany, APO AE 09126-5000; 9 mi. E of Bitburg; 20 mi. NE of Trier. Phone (commercial, from CONUS) 011-49-6565-61-1110; DSN 452-1110. USAFE base. 52d Fighter Wing flies A/OA-10s, F-15s, and F-16s. Base activated and US presence began in 1953; named after local town. Area 1,282 acres. Runway 10,000 ft. Altitude 1,196 ft. Military 5,808 (including 1,387 GSUs); civilians 798 (including 63 GSUs). Payroll \$175 million. Housing: 157 officer, 2,039 enlisted, 499 govt.-leased units, 157 billeting spaces. 20-bed hospital at Bitburg Annex.



**Tinker AFB**, Okla. 73145-3010; 8 mi. SE of Oklahoma City. Phone (405) 732-7321; DSN 884-1110. AFMC base. Hq. Oklahoma City Air Logistics Center manages and provides logistics support and depot maintenance for more than 850 aircraft including the B-1B, B-2, B-52, and KC-135. Tinker is home to eight major DoD, Air Force, and Navy activities, including the 552d Air Control Wing (ACC); 507th Air Refueling Wing (AFRES), Oklahoma's only Air Force Reserve flying unit; Navy Strategic Communications Wing One. Also at Tinker are the Defense Logistics Agency's Defense Distribution Depot Oklahoma City; the 3d Combat Communications Gp.; Air Force Electronic Systems Center's 38th Engineering Installation Wing; and the Oklahoma City Megacenter (DISA), which manages Tinker's computer systems and services 110 other bases in 46 states. Base activated in Mar. 1942; named for Maj. Gen. Clarence L. Tinker, whose LB-30 (an early model B-24) went down at sea southwest of Midway Island June 7, 1942. Area 5,000 acres. Runways 10,000 ft. and 11,100 ft. Altitude 1,291 ft. Military 8,425; civilians 12,858. Payroll \$765 million. Housing: 108 officer, 622 NCO. 22-bed hospital.

**Travis AFB**, Calif. 94535-5000; 50 mi. NE of San Francisco at Fairfield. Phone (707) 424-5000; DSN 837-1110. AMC base. Hq. 15th Air Force; 60th Air Mobility Wing; 615th Air Mobility Operations Gp.; 349th Air Mobility Wing (AFRES Assoc.); David Grant Medical Center; America's Band of the Golden West; Air Museum. Base activated May 17, 1943; named for Brig. Gen. Robert F. Travis, killed Aug. 5, 1950, in a B-29 accident. Area 6,258 acres. Two runways, each approximately 11,000 ft. Altitude 62 ft. Military 12,238; civilians 2,083. Payroll \$618 million. Housing: 370 officer, 2,092 enlisted, 1,259 enlisted dormitory spaces, 924 transient (79 TLF, 201 VOQ, 644 VAQ). 298-bed hospital (acute care), 75 aeromedical staging flight beds, 52 dental treatment rooms.

**Tyndall AFB**, Fla. 32403-5000; 12 mi. E of Panama City. Phone (904) 283-1113; DSN 523-1113. AETC base. 325th Fighter Wing, F-15 operations. The 325th FW provides training for all USAF F-15 air-to-air pilots and maintains readiness for 77 aircraft and assigned operations and support personnel for combat units worldwide. Associate units include Hq. 1st Air Force; Southeast Air Defense Sector (ANG); 475th Weapons Evaluation Gp. (ACC); Air Force Civil Engineer Support Agency; 325th Training

Sqdn. Base activated Dec. 7, 1941; named for 1st Lt. Frank B. Tyndall, WW I fighter pilot killed July 15, 1930, in a P-1 crash. Area 29,115 acres. Runways 10,000 ft., 8,075 ft., and 7,065 ft. Altitude 18 ft. Military 5,237; civilians 1,109. Payroll \$181 million. Housing: 1,069 family units. 35-bed hospital.

**US Air Force Academy**, Colo. 80840-5025; N of Colorado Springs. Phone (719) 472-1818; DSN 259-3110. Direct reporting unit. Established Apr. 1, 1954. Moved to permanent location in Aug. 1958. Aircraft flown: 95, consisting of T-3A aerobatics trainers; T-41D basic trainers; TG-3, TG-4, and TG-10 gliders; TG-7A and TG-11A motorized gliders; ASK-21 and 126E sailplanes; UV-18 jump planes; Cessna 150s. Tenant: Air Force Band of the Rockies (AFSPC). Area 18,325 acres. Runways 2,300 ft., 3,500 ft., and 4,500 ft. Altitude 7,200 ft. Military 2,402; cadets 4,000; civilians 1,861. Payroll \$197.7 million. Housing: 619 officer, 609 enlisted, 78 VOQ, 25 TLF. 55-bed hospital.

**Vance AFB**, Okla. 73705-5000; 3 mi. SSW of Enid. Phone (405) 237-2121; DSN 940-2121. AETC base. 71st Flying Training Wing, undergraduate pilot training. Base activated in Nov. 1941; named for Lt. Col. Leon R. Vance, Jr., Enid native, 1939 West Point graduate, and Medal of Honor recipient, killed July 26, 1944, when air- evac plane returning to the US went down in the Atlantic near Iceland. Area 4,394 acres. Runways 5,000 ft., 9,200 ft., and 9,200 ft. Altitude 1,007 ft. Military 854; civilians 1,410 (approx. 1,200 contract employees). Payroll \$69.5 million. Housing: 130 officer, 80 enlisted, 48 transient, 10 TLF. Clinic.

**Vandenberg AFB**, Calif. 93437-5000; 8 mi. NNW of Lompoc. Phone (805) 734-8252 (ext. 6-1611); DSN 276-1110. AFSPC base. Hq. 14th Air Force. Host unit: 30th Space Wing, conducts polar-orbiting space launches and supports research and development tests for DoD, USAF, and NASA space, ballistic missile, and aeronautical systems. It also has UH-1N helicopter assets. The 30th SPW furnishes facilities and essential services to more than 60 aerospace contractors on base. Originally Army's Camp Cooke. Activated in Oct. 1941. Base taken over by USAF June 7, 1957; renamed for Gen. Hoyt S. Vandenberg, USAF's second Chief of Staff. Area 98,400 acres. Runway length NA. Altitude 400 ft. Military 3,255; civilians 1,387; civilian contractors 3,835. Payroll \$103 million (military and civilians). Housing: 494

officer, 1,499 NCO, 172 trailer spaces, 400 transient. 45-bed hospital.

**Warren AFB** (see Francis E. Warren AFB).

**Whiteman AFB**, Mo. 65305-5000; 2 mi. S of Knob Noster. Phone (816) 687-1110; DSN 975-6123. ACC base. Host unit: 509th Bomb Wing, activated Apr. 1, 1993. It received its first of 20 B-2 bombers Dec. 17, 1993. 442d Fighter Wing (AFRES). Base activated in 1942; named for Sedalia resident 2d Lt. George A. Whiteman, first pilot to die in aerial combat during the attack on Pearl Harbor. Area 4,627 acres. Runway 12,400 ft. Altitude 869 ft. Military 3,038; civilians 570. Payroll \$121.9 million. Housing: 96 officer, 893 enlisted, 77 VAQ, 49 VOQ, 31 TLF. 30-bed hospital.

**Wright-Patterson AFB**, Ohio 45433; 10 mi. ENE of Dayton. Phone (513) 257-1110; DSN 787-1110. AFMC base. Hq. Air Force Materiel Command; Hq. Aeronautical Systems Center (AFMC); Wright Laboratory; Air Force Institute of Technology (AETC); Wright-Patterson Medical Center; 88th Air Base Wing (AFMC); 445th Airlift Wing (AFRES); approximately 70 other DoD activities and government agencies. 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, in the crash of a DH-4. The Wright brothers did much of their early flying on Huffman Prairie, now in Area C of present base. The prairie is part of the Dayton Aviation Heritage National Historical Park and is open to the public. Area 8,145 acres. Runway 19,600 ft. Altitude 824 ft. Military 8,505; civilians 14,628. Payroll (FY 1994) \$879 million. Housing: 744 officer, 1,589 NCO. 301-bed hospital.

**Yokota AB**, Japan, APO AP 96328-5000; approx. 28 mi. W of Tokyo. Phone (commercial, from CONUS) 011-81-0425-2511, ext. 7020; DSN 225-7020. PACAF base. Hq. US Forces, Japan; Hq. 5th Air Force, 630th Air Mobility Support Sqdn. (AMC). Host unit: 374th Airlift Wing (PACAF), C-130, UH-1N, C-9, and C-21 operations. Primary aerial port in Japan. Base opened as Tama AAF by Japanese in 1939. Area 1,750 acres. Runway 11,000 ft. Altitude 457 ft. Military 4,135; US civilians 2,563; local nationals 1,359. Payroll \$125 million. Housing: 644 officer, 1,942 enlisted, 56 TLF. Unaccompanied housing: 184 officer, 1,330 enlisted, 59 SNCOQ, 86 VOQ, 58 VAQ. 30-bed hospital.

## Minor Installations

In addition to the installations listed above, the Air Force has a number of minor installations. These air stations perform various missions, including air defense and missile warning. Here is a listing of such installations with state (or APO), ZIP code, and major command.

|  |                  |
|--|------------------|
| Cape Canaveral AS, Fla. 32925-5000 (AFSPC)                               | DSN 467-1110     |
| Cape Cod AS, Mass. 02561-9314 (AFSPC)                                    | DSN 557-2277     |
| Cavalier AS, N. D. 58220-5000 (AFSPC)                                    | DSN 330-3292     |
| Cheyenne Mountain AS, Colo. 80914-5515 (AFSPC)                           | DSN 268-1211     |
| Clear AS, Alaska APO AP 99704 (AFSPC)                                    | DSN 317-585-6110 |
| Onizuka AS, Calif. 94088-3430 (AFSPC)                                    | DSN 561-3000     |
| Pirinclik AS (Turkey), APO AE 09825 (USAFE)                              | DSN 314-676-1110 |
| RAF Croughton (UK), APO AE 09494 (USAFE)                                 | DSN 314-236-1110 |
| Thule AB (Greenland), APO AE 09704-5000 (AFSPC) (ask for Thule operator) | DSN 268-1211     |
| Woomera AS (Australia), APO AP 96552 (AFSPC)                             | DSN 730-1350     |



# ANG and AFRES Bases

**Notes:** This section of the Guide consolidates major Air National Guard and Air Force Reserve bases into a single listing. Most ANG locations are listed according to the airports whose facilities they share. AFRES units are listed by the names of their bases and are designated as AFRES facilities. There are, in addition, some ANG and AFRES units located on active-duty bases. These may be found in the "Major Installations" section.

ANG personnel are organized into two categories. Part-time personnel are traditional Guardsmen who work in the private sector during the week, serve in ANG one weekend each month, and go on active duty for two weeks during the summer. If called up by the President, they go on active-duty military status.

ANG's second category, full-time support personnel, are Active Guard Reserve, Title 32, and Title 5 personnel. Active Guard Reserves are assigned to the state. They do not serve at the national level, but they receive the same benefits as regular active-duty military. Title 32 personnel are civilians employed full time in ANG, but they wear two hats: They can go on active-duty military service if their unit gets called up. They also participate in ANG weekend training exercises once a month and for two weeks in the summer. Title 5 personnel are federal civilian employees who hold administrative positions in ANG.

**Allen C. Thompson Field**, Miss. 39208-0810; 7 mi. E of Jackson. Phone (601) 939-3633; DSN 731-9210. 172d Airlift Wing (ANG). ANG area 116 acres. Runway 8,500 ft. Altitude 346 ft. Military 1,098, full-time personnel 264. Payroll \$25.8 million.

**Anchorage**, Alaska (Kulis ANGB at Anchorage International Airport) 99502. Phone (907) 249-1444; DSN 317-626-1659. 176th Wing (ANG); 144th Airlift Sqdn. (ANG) and 210th Air Rescue Sqdn. (ANG). Base named for Lt. Albert Kulis, killed in training flight in 1954. Area 129 acres. Runway 10,900 ft. Altitude 124 ft. Military 1,092, full-time personnel 424. Payroll \$33.7 million.

**Atlantic City Airport**, N. J. 08232-9500; 10 mi. W of Atlantic City. Phone (609) 645-6000; DSN 455-6000. 177th Fighter Wing (ANG). Area 286 acres. Runway 10,000 ft. Altitude 76 ft. Military 927, full-time support 311. Payroll \$23.4 million.

**Baltimore**, Md. (Martin State Airport) 21220-2899; 8 mi. E of Baltimore. Phone (410) 780-8270; DSN 243-6210. 175th Wing (ANG). Area 175 acres. Runway 7,000 ft. Altitude 24 ft. Military 1,807, full-time personnel 455. Payroll \$31 million.

**Bangor International Airport**, Me. 04401-3099; 4 mi. NW of Bangor. Phone (207) 990-7700; DSN 698-7700. 101st Air Refueling Wing (ANG); 776th Radar Sqdn. (ACC). Area 457 acres. Runway 11,400 ft. Altitude 192 ft. Military 938, full-time personnel 312. Payroll \$22.4 million. Small BX.

**Barnes Municipal Airport**, Mass. 01085; 3 mi. N of Westfield. Phone (413) 568-9151; DSN 636-9210. 104th Fighter Wing (ANG). Area 186 acres. Runway 9,000 ft. Altitude 270 ft. Military 1,001, full-time personnel 280. Payroll \$26.4 million.

**Bergstrom ARS**, Tex. 78719-2557; 7 mi. SE of Austin. Phone (512) 389-0444; DSN 685-1110. AFRES base. 924th Fighter Wing (AFRES), F-16 operations; Hq. 10th Air Force (AFRES); Ground Combat Readiness Center (AFRES). Area 450 acres. Runway 8,050 ft. Altitude 541 ft. Reservists 300, civilians 50. Activated as a base Sept. 22, 1942. Named for Capt. John A. E. Bergstrom, first Austin serviceman killed in WW II, who died

Dec. 8, 1941, at Clark Field, the Philippines. Deactivated as an active-duty base Sept. 30, 1993. City of Austin converting base to new airport, due to open in 1998. Runway 12,250 ft. Housing: none. No BX or commissary facilities. Reserve station to close and 924th Fighter Wing to inactivate Sept. 30, 1996.

**Birmingham Airport**, Ala. 35217. Phone (205) 841-9200; DSN 778-2210. 117th Air Refueling Wing (ANG). Area 118 acres. Runway 10,000 ft. Altitude 650 ft. Military 937, full-time personnel 298. Payroll \$21.3 million.

**Boise Air Terminal**, Idaho (Gowen Field) 83707; 6 mi. S of Boise. Phone (208) 422-5011; DSN 941-5011. 124th Wing (ANG). Also host to ARNG (Army field training site) and Marine Corps Reserve. Airport named for Lt. Paul R. Gowen, killed in B-10 crash in Panama July 11, 1938. Area 1,994 acres. Runway 9,800 ft. Altitude 2,858 ft. Military 1,170, full-time personnel 498. Payroll \$35.1 million. Limited transient facilities available during ARNG camps.

**Bradley International Airport**, Windsor Locks, Conn. 06026-5000; 15 mi. N of Hartford at East Granby. Phone (203) 292-2526; DSN 636-8310. 103d Fighter Wing (ANG); ARNG aviation battalion. Base named for Lt. Eugene M. Bradley, killed in P-40 crash in Aug. 1941. Area 126 acres. Runway 9,500 ft. Altitude 173 ft. Military 947, full-time personnel 275. Payroll \$23.7 million.

**Buckley ANGB**, Colo. 80011; 8 mi. E of Denver. Phone (303) 340-9555; DSN 877-9011. 140th Fighter Wing (ANG); Hq. Colorado ANG; 227th Air Traffic Control Flt. (ANG); 240th Civil Engineering Flt. (ANG). Also host to Navy Reserve, Marine Corps Reserve, ARNG, and Air Force units. Base activated Apr. 1, 1942, as a gunnery training facility. ANG assumed control from US Navy in 1959. Base named for Lt. John H. Buckley, National Guardsman, killed in France Sept. 27, 1918. Area 3,332 acres. Runway 11,000 ft. Altitude 5,663 ft. Military 1,255, full-time personnel 352 (including 219 Title 5 civilians). Payroll \$40.3 million.

**Burlington International Airport**, Vt. 05401; 3 mi. E of Burlington. Phone (802) 660-5215; DSN 220-5210. 158th Fighter Wing (ANG). Area 241 acres. Runway 7,800 ft. Altitude 334 ft. Military 972, full-time personnel 307. Payroll \$22.9 million.

**Capital Municipal Airport**, Ill. 63707-5000; 2 mi. NW of Springfield. Phone (217) 753-8850; DSN 892-8210. 183d Fighter Wing (ANG). Area 91 acres. Runway 8,000 ft. Altitude 592 ft. Military 1,046, full-time personnel 293. Payroll \$21.3 million.

**Channel Islands ANGB**, Point Mugu, Calif. 93041-4001. Phone (805) 986-8000; DSN 893-7000. 146th Airlift Wing (ANG). Area 206 acres. Runway 11,100 ft. Altitude 12 ft. Military 1,180, full-time personnel 271. Payroll \$22.3 million.

**Charlotte/Douglas International Airport**, Charlotte, N. C. 28208. Phone (704) 391-4100; DSN 583-9210. 145th Airlift Wing (ANG). Area 79 acres. Runway 10,000 ft. Altitude 749 ft. Military 1,291, full-time personnel 272. Payroll \$18.6 million.

**Cheyenne Municipal Airport**, Cheyenne, Wyo. 82001. Phone (307) 772-6201; DSN 943-6201. 153d Airlift Wing (ANG). Area 70 acres. Runway 8,600 ft. Altitude 6,156 ft. Military 972, full-time personnel 257. Payroll \$14.4 million.

**Dannelly Field**, Ala. 36196; 7 mi. SW of Montgomery. Phone (205) 284-7100; DSN 385-7200. 187th Fighter Wing (ANG). Base hosts 232d Com-

bat Communications Sqdn. Field named for Ens. Clarence Dannelly, Navy pilot killed at Pensacola, Fla., during WW II. Area 51 acres. Runway 9,000 ft. Altitude 221 ft. Military 973, full-time personnel 275. Payroll \$25.4 million.

**Des Moines International Airport**, Iowa 50321; within city of Des Moines. Phone (515) 287-9210; DSN 939-8210. 132d Fighter Wing (ANG). Area 113 acres. Runway 9,000 ft. Altitude 957 ft. Military 1,000, full-time personnel 306. Payroll \$25.3 million.

**Dobbins ARB**, Ga. (Marietta) 30069-5010; 16 mi. NW of Atlanta. Phone (770) 919-5000; DSN 925-5000. AFRES base. Hq. 22d Air Force (AFRES); 94th Airlift Wing (AFRES); 151st Medical Battalion (ARNG); 345th Medical Company (USAR). Base activated 1943. Named for Capt. Charles Dobbins, WW II pilot killed near Sicily. Area 1,660 acres. Runway 10,000 ft. Altitude 1,068 ft. AFRES active-duty 50, civilians 628, Reservists 2,011. Payroll \$45 million. ANG military 1,005, full-time personnel 325. Payroll \$32 million. USAR: active duty 16, Reservists 69. NAS Atlanta and Lockheed Martin Aeronautical Systems Co./Air Force Plant 6 adjoin Dobbins ARB and use airfield facilities.

**Duluth International Airport**, Minn. 55811-5000; 5 mi. NW of Duluth. Phone (218) 727-6886; DSN 825-7210. 148th Fighter Wing (ANG). Area 329 acres. Runway 10,200 ft. Altitude 1,429 ft. Military 945, full-time personnel 348. Payroll \$29.3 million.

**Eastern West Virginia Regional Airport/Shepherd Field**, W. Va. 25401; 4 mi. S of Martinsburg. Phone (304) 267-5100; DSN 242-9210. 167th Airlift Wing (ANG). Area 420 acres. Runway 7,000 ft. Altitude 556 ft. Military 1,149, full-time personnel 271. Payroll \$17.7 million.

**Ellington Field**, Tex. 77034-5586; a city of Houston airport 17 mi. SE of downtown Houston. Phone (713) 929-2110; DSN 954-2110. 147th Fighter Wing (ANG). Other tenants include NASA Flight Operations, US Coast Guard, ARNG, FAA. Base named for Lt. Eric L. Ellington, pilot killed in Nov. 1913. Area 216 acres. Runway 9,000 ft. Altitude 40 ft. Military 949, full-time personnel 321. Payroll \$28.9 million.

**Forbes Field**, Kan. 66619-5000; 2 mi. S of Topeka. Phone (913) 231-4210; DSN 720-4210. 190th Air Refueling Wing (ANG). Area 193 acres. Runway 12,800 ft. Altitude 1,079 ft. Military 840, full-time personnel 271. Payroll \$24.8 million.

**Fort Smith Municipal Airport**, Ark. 72906. Phone (501) 648-5210; DSN 962-8210. 188th Fighter Wing (ANG). Area 113 acres. Runway 8,000 ft. Altitude 468 ft. Military 998, full-time personnel 264. Payroll \$24.9 million.

**Fort Wayne International Airport**, Ind. 46809-5000; 5 mi. SSW of Fort Wayne. Phone (219) 478-3210; DSN 786-1210. 122d Fighter Wing (ANG). Area 138 acres. Runway 12,000 ft. Altitude 800 ft. Military 1,036, full-time personnel 309. Payroll \$21.9 million.

**Francis S. Gabreski International Airport**, Westhampton Beach, N. Y. 11978-1294. Phone (516) 288-7300; DSN 456-7300. 106th Rescue Wing (ANG). Named for Col. Francis S. Gabreski, third leading USAAF/USAF ace of all time. Area 71 acres. Runway 9,000 ft. Altitude 67 ft. Military 300, full-time personnel 39. Payroll \$19.7 million.

**Fresno Air Terminal**, Calif. 93727-2199; 5 mi. NE of Fresno. Phone (209) 454-5100; DSN 949-



5100. 144th Fighter Wing (ANG). Area 126 acres. Runway 9,200 ft. Altitude 332 ft. Military 900, full-time personnel 317. Payroll \$24.9 million.

**General Mitchell International Airport/ARS**, Wis. 53207-6299; 7 mi. S of Milwaukee. AFRES base. Runway 9,690 ft. Altitude 723 ft. AFRES phone (414) 482-5000; DSN 950-5000. 440th Airlift Wing (AFRES). AFRES area 103 acres. Reservists, 1,200, full-time Air Reserve technicians and civilians 350. Payroll \$20 million. ANG and AFRES have separate telephone lines and facilities. ANG phone (414) 747-4410; DSN 580-8410. 128th Air Refueling Wing (ANG). ANG area 111 acres. ANG military 910, full-time personnel 276. Payroll \$18.2 million.

**Greater Peoria Airport**, Ill. 61607-1498; 7 mi. SW of Peoria. Phone (309) 791-2282; DSN 724-2282. 182d Airlift Wing (ANG). Area 381 acres. Runway 9,500 ft. Altitude 660 ft. Military 1,081, full-time personnel 283. Payroll \$17.9 million.

**Great Falls International Airport**, Mont. 59401-5000; 5 mi. SW of Great Falls. Phone (406) 791-2282; DSN 279-2282. 120th Fighter Wing (ANG). Area 139 acres. Runway 10,500 ft. Altitude 3,674 ft. Military 981, full-time personnel 319. Payroll \$26.8 million.

**Grissom ARB**, Ind. 46971-5000; 15 mi. N of Kokomo. Phone (317) 688-5211; DSN 928-1110. AFRES base. 434th Air Refueling Wing (AFRES) and its two KC-135 Stratotanker squadrons. Activated in Jan. 1943 as Bunker Hill Naval Air Station, a training base for carrier pilots. Reactivated in June 1954 as Bunker Hill AFB. Renamed in May 1968 in honor of Lt. Col. Virgil I. "Gus" Grissom, killed Jan. 27, 1967, at Cape Kennedy, Fla., with astronauts Edward White and Roger Chaffee in Apollo capsule fire. Realigned as an AFRES base Oct. 1, 1994. Area 1,126.5 acres. Runway 12,500 ft. Altitude 800 ft. Military 1,040, civilians 800. Payroll \$43.4 million. Housing: 485 transient. Small BX.

**Gulfport-Biloxi Regional Airport**, Miss. 39501; in city of Gulfport. Phone (601) 868-6200; DSN 363-8200. Training site. Host to 255th Tactical Control Sqdn. (ANG); 1108th Aviation Repair Depot (ARNG); 173d Civil Engineering Flt. An air-to-ground gunnery range is located 70 mi. N of site. Area 269 acres. Runway 9,000 ft. Altitude 28 ft. Military 399, full-time personnel 110. Payroll \$6.2 million.

**Harrisburg International Airport**, Pa. 17057; 10 mi. E of Harrisburg. Phone (717) 948-2200; DSN 430-9200. 193d Special Operations Wing (ANG). ANG area 39 acres. Runway 9,500 ft. Altitude 310 ft. Military 1,123, full-time personnel 299. Payroll \$11.8 million.

**Hector International Airport**, Fargo, N. D. 58105-5536. Phone (701) 237-6030; DSN 362-8110. 119th Fighter Wing (ANG). Area 209 acres. Runway 9,500 ft. Altitude 900 ft. Military 1,006, full-time personnel 309. Payroll \$53.3 million.

**Homestead ARS**, Fla. 33039-1299; 5 mi. NE of Homestead. Phone (305) 224-7303; DSN 791-7303, Fax (DSN) 791-7302. AFRES base. 482d Fighter Wing (AFRES); Det. 1, 125th Fighter Wing (Fla. ANG, NORAD). Available billeting. Area approximately 1,000 acres. Runway 11,200 ft. Altitude 53 ft. Base was devastated by Hurricane Andrew in August 1992 and is operational but still under reconstruction.

**Hulman Regional Airport**, Ind. 47803-5000; 5 mi. E of Terre Haute. Phone (812) 877-5210; DSN 724-1210. 181st Fighter Wing (ANG). Area 279 acres. Runway 9,000 ft. Altitude 585 ft. Military 1,016, full-time personnel 273. Payroll \$20.7 million.

**Jacksonville International Airport**, Fla. 32229; 15 mi. NW of Jacksonville. Phone (904) 741-7100; DSN

460-7100. 125th Fighter Wing (ANG). Area 332 acres. Runway 10,000 ft. Altitude 26 ft. Military 1,017, full-time personnel 338. Payroll \$26.8 million.

**Joe Foss Field**, Sioux Falls, S. D. 57104; N side of Sioux Falls. Phone (605) 333-5700; DSN 939-7700. 114th Fighter Wing (ANG). Field named for Brig. Gen. Joseph J. Foss, WW II ace, former governor of South Dakota, former AFA National President, and founder of the S. D. ANG. Area 166 acres. Runway 9,000 ft. Altitude 1,428 ft. Military 964, full-time personnel 283. Payroll \$20 million.

**Key Field**, Meridian, Miss. 39302-1825; at municipal airport near Hwys. 20 and 59. Phone (601) 484-9000; DSN 778-9210. 186th Air Refueling Wing (ANG); host to 238th Combat Communications Sqdn. (ANG). Area 117 acres. Runway 8,000 ft. Altitude 297 ft. Military 1,060, full-time personnel 316. Payroll \$20.4 million.

**Klamath Falls International Airport** (Kingsley Field), Ore. 97603-0400; 5 mi. SE of Klamath Falls. Phone (503) 883-6350; DSN 830-6350. 173d Fighter Wing (ANG); 142d OLAD (ANG). Area 1,072 acres. Runway 10,300 ft. Altitude 4,092 ft. Military 396, full-time personnel 303. Payroll \$19 million.

**Lambert-St. Louis International Airport**, Bridgeton, Mo. 63145; 3 mi. W of St. Louis. Phone (314) 263-6200; DSN 693-6200. 131st Fighter Wing (ANG). Area 49 acres. Runway 10,600 ft. Altitude 605 ft. Military 1,298, full-time personnel 357. Payroll \$41.8 million.

**Lincoln Municipal Airport**, Neb. 68524-1897; 1 mi. NW of Lincoln. Phone (402) 458-1111; DSN 946-1111. 155th Air Refueling Wing (ANG). Also hosts ARNG unit. Area 179 acres. Runway 12,900 ft. Altitude 1,207 ft. Military 918, full-time personnel 305. Payroll \$19.1 million.

**Louisville IAP** (Standiford Field), Ky. 40213. Phone (502) 364-9400; DSN 989-4400. 123d Airlift Wing (ANG); 223d Communications Sqdn. (ANG). Area 69 acres. Runway 10,000 ft. Altitude 497 ft. Military 1,114, full-time personnel 316. Payroll \$16.8 million.

**Mansfield Lahm Airport**, Ohio 44901-5000; 3 mi. N of Mansfield. Phone (419) 521-0100; DSN 696-6210. 179th Airlift Wing (ANG). Airport named for nearby city and aviation pioneer Brig. Gen. Frank P. Lahm. Area 224 acres. Runway 9,000 ft. Altitude 1,296 ft. Military 881, full-time personnel 221. Payroll \$14.8 million. Coast Guard exchange.

**March ARB**, Calif. 92518-5000; 9 mi. SE of Riverside. Phone (909) 655-1110; DSN 947-1110. AFRES base. 452d Air Mobility Wing (AFRES host); Phone (909) 655-4520; DSN 947-4520. Also home of 163d Air Refueling Wing (Calif. ANG); 119th Fighter Group (N. D. ANG); 2d Combat Camera Sqdn.; Armed Forces Radio and Television Service; Defense Visual Information Center; Air Force Audit Agency Financial and Support Audit Directorate; US Customs Service Domestic Air Interdiction Coordination Center. Base activated Mar. 1, 1918; named for 2d Lt. Peyton C. March, Jr., who died in Texas of crash injuries Feb. 18, 1918. Area 2,300 acres. Runway 13,300 ft. Altitude 1,530 ft. AFRES and ANG 3,727, civilian 1,335, full-time technicians, 697. Payroll: \$49 million. Housing: 62 VAQ (150 beds), 85 VOQ (101 beds).

**McEntire ANGB**, S. C. 29044; 12 mi. E of Columbia. Phone (803) 695-6300; DSN 583-8201. 169th Fighter Wing (ANG). Also host to 240th Combat Communications Sqdn. (ANG) and 1st Battalion, 151st Aviation (ARNG). Base named for ANG Brig. Gen. B. B. McEntire, Jr., killed in F-104 accident in 1961. Area 2,473 acres. Runway 9,000 ft. Altitude 250 ft. Military 1,269, full-time personnel 325 (including 4 Title 5 civilians). Payroll \$24.2 million.

**McGhee Tyson Airport**, Tenn. 37901; 10 mi. SW of Knoxville. Phone (615) 985-3200; DSN 266-8200. Host to 134th Air Refueling Wing (ANG). Tenants include 228th Combat Communications Sqdn. and ANG's I. G. Brown Professional Military Education Center. Area 271 acres. Runway 9,000 ft. Altitude 980 ft. Military 1,097, full-time personnel 329. Payroll \$28.5 million.

**Memphis International Airport**, Tenn. 38181-0026; within Memphis city limits. Phone (901) 541-7111; DSN 966-8210. 164th Airlift Wing (ANG). ANG occupies 103 acres. Runway 9,300 ft. Altitude 332 ft. Military 1,019, full-time personnel 266. Payroll \$19.3 million.

**Minneapolis-St. Paul International Airport/ARS**, Minn. 55450-2000; in Minneapolis, near confluence of the Mississippi and Minnesota rivers. AFRES station. Runway 10,000 ft. Altitude 840 ft. ANG and AFRES have separate phones and facilities. ANG phone (612) 725-5631; DSN 825-5631. 133d Airlift Wing (ANG) flies C-130s. ANG area 130.5 acres. Military 1,302, full-time personnel 280. Payroll \$18.6 million. AFRES phone (612) 725-5011; DSN 825-5110. 934th Airlift Wing (AFRES) flies C-130s. AFRES area 300 acres. Full-time personnel 150, civilians 199, Reservists 1,150. Payroll \$24.3 million. Units include 210th Engineering Installation Sqdn. (ANG); 237th Air Traffic Control Flt. (ANG); Naval Reserve Readiness Command, Region 16; USAF Civil Air Patrol, NCLR and MNLO; Rothe Development Inc. (AFRES). Lodging and BX available.

**Nashville Metropolitan Airport**, Tenn. 37217-0267; 6 mi. SE of Nashville. Phone (615) 361-4600; DSN 788-6210. 118th Airlift Wing (ANG). Area 85 acres. Runway 10,200 ft. Altitude 597 ft. Military 1,164, full-time personnel 289. Payroll \$20.1 million.

**New Castle County Airport**, Del. 19720; 5 mi. S of Wilmington. Phone (302) 323-3500; DSN 445-7500. 166th Airlift Wing (ANG); ARNG aviation company. Area 57 acres. Runway 7,200 ft. Altitude 80 ft. Military 1,012, full-time personnel 240. Payroll \$16.3 million.

**Niagara Falls International Airport/ARS**, N. Y. 14304-5001; 6 mi. E of Niagara Falls. Phone (716) 236-2000; DSN 238-2000. AFRES base. 914th Airlift Wing (AFRES); 107th Air Refueling Wing (ANG). Base activated in Jan. 1952. Area 979 acres (ANG 104 acres). Runway 9,100 ft. Altitude 590 ft. AFRES Reservists 1,200, civilians 373. ANG military 807, full-time personnel 270. Total payroll \$52 million. (ANG payroll \$19.3 million).

**O'Hare International Airport/ARS**, Ill. 60666-5023; 22 mi. NW of Chicago's Loop. Phone (312) 825-5980; DSN 930-5980. AFRES base. 928th Airlift Wing (AFRES); 126th Air Refueling Wing (ANG); Defense Contract Management Area Operations, Fort Dearborn (US Army Reserve). Base activated in Apr. 1946. Named for Lt. Cmdr. Edward H. "Butch" O'Hare, USN, Medal of Honor recipient, killed Nov. 26, 1943, during battle for Gilbert Islands. Area 344 acres (ANG 36 acres). Runway 13,000 ft. Altitude 643 ft. Reservists 1,337, full-time personnel and civilians (all units) 411. Ill. ANG 1,260, full-time personnel 306. Total payroll for facility \$74.5 million. (ANG payroll \$21.2 million).

**Otis ANGB**, Mass. 02542-5001; 7 mi. NNE of Falmouth. Phone (508) 968-4667; DSN 557-4667. 102d Fighter Wing (ANG); 567th USAF Band (ANG); 101st and 202d Weather Flts. (ANG). Adjacent installations and organizations include Cape Cod AS (6th Missile Warning Sqdn., 2165th Communications Sqdn.); US Coast Guard Air Station Cape Cod; Camp Edwards ARNG Training Site; ARNG Aviation Flight Facility; 1st Battalion, 25th Marines (Reserve); Massachusetts National Cemetery (VA). Base named for 1st Lt. Frank J. Otis, ANG flight surgeon and pilot killed



in 1937 crash. Area 3,883 acres. Runway 9,500 ft. Altitude 132 ft. ANG military 1,061, full-time personnel 363. Payroll \$52.3 million.

**Pease ANGB**, Portsmouth, N. H. 03803-6505. Phone (603) 430-2453; DSN 852-2453. 157th Air Refueling Wing (ANG). Area 229 acres. Runway 11,300 ft. Altitude 101 ft. Military 891, full-time personnel 293. Payroll \$22.8 million.

**Pittsburgh International Airport/ARS**, Pa. 15108-4403; 15 mi. NW of Pittsburgh. AFRES base. Runway 11,500 ft. Altitude 1,203 ft. ANG and AFRES have separate phones and facilities. 171st Air Refueling Wing (ANG). Phone (412) 474-7359; DSN 277-7359. ANG area 179 acres. ANG military 1,391, full-time personnel 432. Payroll \$29.3 million. AFRES phone (412) 474-8000; DSN 277-8000. 911th Airlift Wing (host unit). AFRES area 176 acres. AFRES military 26, full-time personnel 142, civilians 222. Reservists 1,166. Payroll \$32.7 million. Base activated 1943. Housing: 24 VOQ, 230 enlisted qtrs. No on-base housing. Limited BX.

**Portland International Airport**, Portland, Ore. 97218-2797. Phone (503) 335-4020; DSN 638-4020. 142d Fighter Wing (ANG); 244th Combat Communications Sqdn. (ANG); 272d Combat Communications Sqdn. (ANG); Oregon Wing, CAP. Also host to 939th Rescue Wing (AFRES). Area 246 acres. Runway 11,000 ft. Altitude 26 ft. Military 1,306, full-time personnel 418 (including 51 Title 5 civilians). Payroll \$42.2 million.

**Puerto Rico International Airport** (Muniz ANGB), Puerto Rico 00914; E of San Juan. Phone (809) 253-5100; DSN 979-1514. 156th Fighter Wing (ANG). Base named for Lt. Col. José A. Muniz, killed in aircraft accident July 4, 1960. Area 84 acres. Runway 10,000 ft. Altitude 9 ft. Military 1,029, full-time personnel 309. Payroll \$29.6 million.

**Quonset State Airport**, R. I. 02852; 20 mi. S of Providence. Phone (401) 885-1210; DSN 476-3210. 143d Airlift Wing (ANG). Area 79 acres. Runway 8,000 ft. Altitude 19 ft. Military 947, full-time personnel 255. Payroll \$19.3 million.

**Reno/Tahoe International Airport**, Nev. 89502; 5 mi. SE of Reno at 1776 ANG Way. Phone (702) 788-4500; DSN 830-4500. 152d Airlift Wing (ANG). ANG installation named for Maj. Gen. James A. May, Nevada Adjutant General. Area 123 acres. Runway 10,000 ft. Altitude 4,411 ft. Military 995, full-time personnel 311. Payroll \$21.8 million.

**Richmond International Airport** (Byrd Field), Va. 23150; 4 mi. SE of downtown Richmond. Phone (804) 236-6429; DSN 864-6129. 192d Fighter Wing (ANG). Field named for Adm. Richard E. Byrd, Arctic and Antarctic explorer. Area 143 acres. Runway 9,000 ft. Altitude 167 ft. Military 998, full-time personnel 283. Payroll \$20.1 million.

**Rickenbacker Field**, Ohio 43217-5887; 13 mi. SSW of Columbus. Phone (614) 492-4223; DSN 950-8211. Base transferred from SAC to ANG Apr. 1, 1980. 121st Air Refueling Wing (ANG); Naval Air Reserve and Naval Construction (USNR). Base activated 1942. Formerly Lockbourne AFB; renamed May 7, 1974, in honor of Capt. Edward V. Rickenbacker, top US WW I ace and Medal of Honor recipient, who died July 23, 1973. Area 2,016 acres. Runway 12,100 ft. Altitude 744 ft. ANG military 1,351, full-time personnel 409. Payroll \$32.1 million.

**Rosecrans Memorial Airport**, Mo. 64503; 4 mi. W of St. Joseph. Phone (816) 236-3300; DSN 956-3300. 139th Airlift Wing (ANG). Area 302 acres. Runway 8,100 ft. Altitude 826 ft. Military 885, full-time personnel 266. Payroll \$20.4 million.

**Salt Lake City International Airport**, Utah 84116; 3 mi. W of Salt Lake City. Phone (801) 595-2200; DSN 924-9200. 151st Air Refueling Wing (ANG); 169th Electronic Security Sqdn. (ANG). Also hosts

ANG's 130th Engineering Installation Sqdn. and 109th Tactical Control Flt. Area 135 acres. Runway 12,000 ft. Altitude 4,220 ft. Military 1,353, full-time personnel 360. Payroll \$25.9 million.

**Savannah International Airport**, Ga. 31402; 4 mi. NW of Savannah. Phone (912) 966-8201; DSN 860-8201. 165th Airlift Wing (ANG). Also field training site. Area 20 acres. Runway 9,400 ft. Altitude 50 ft. Military 1,005, full-time personnel 252. Payroll \$20.5 million. Housing: 156 officer, 736 enlisted.

**Schenectady County Airport**, Scotia, N. Y. 12302-9752; 2 mi. N of Schenectady. Phone (518) 381-2300; DSN 974-9210. 109th Airlift Wing (ANG). Area 106 acres. Runway 7,000 ft. Altitude 378 ft. Military 1,056, full-time personnel 256. Payroll \$21.3 million.

**Selfridge ANGB**, Mich. 48045-5046; 3 mi. NE of Mount Clemens. Phone (313) 307-5553; DSN 273-5553. 127th Wing (ANG); 927th Air Refueling Wing (AFRES). Also hosts Air Force, Navy Reserve, Marine Corps Reserve, Army Reserve, Army units, and US Coast Guard Air Station for Detroit. Base activated July 1917; transferred to Michigan ANG July 1971. Named for 1st Lt. Thomas E. Selfridge, first Army officer to fly an airplane and first fatality of powered flight, killed Sept. 17, 1908, at Fort Myer, Va., when plane piloted by Orville Wright crashed. Area 3,070 acres. Runway 9,000 ft. Altitude 583 ft. ANG military 1,732, full-time personnel 441 (includes 507 Title 5 civilians). Payroll \$59.9 million.

**Sioux Gateway Airport**, Iowa 51110; 7 mi. S of Sioux City. Phone (712) 279-7500; DSN 939-6500. 185th Fighter Wing (ANG). Area 118 acres. Runway 9,000 ft. Altitude 1,098 ft. Military 952, full-time personnel 293. Payroll \$23.9 million.

**Sky Harbor International Airport**, Phoenix, Ariz. 85034. Phone (602) 231-8200; DSN 853-9000. 161st Air Refueling Wing (ANG). Area 58 acres. Runway 11,000 ft. Altitude 1,230 ft. Military 868, full-time personnel 251. Payroll \$22.3 million.

**Springfield-Beckley Municipal Airport**, Ohio 45501-1780; 5 mi. S of Springfield. Phone (513) 327-2100; DSN 346-2100. 178th Fighter Wing (ANG); 251st Combat Communications Gp. (ANG); 269th Combat Communications Sqdn. (ANG). Area 114 acres. Runway 9,000 ft. Altitude 1,052 ft. Military 1,171, full-time personnel 319 (includes 9 Title 5 civilians). Payroll \$27.2 million.

**Stewart International Airport**, Newburgh, N. Y. 12550-0031; 15 mi. N of USMA (West Point). Phone (914) 563-2001; DSN 636-2001. Hq. N. Y. ANG; 105th Airlift Wing (ANG); USMA subpost airport. Stewart AFB until 1969; acquired by state of New York in 1970. ANG area 276 acres. Runway 9,800 ft. Altitude 491 ft. ANG military 1,541, full-time personnel 589. Payroll \$38.7 million. Most military services available through West Point or subpost.

**Syracuse Hancock International Airport**, N. Y. 13211-7099; 5 mi. NE of Syracuse. Phone (315) 454-6100; DSN 489-9100. 174th Fighter Wing (ANG). Base operations for Hancock ANGB. 152d Tactical Control Gp.; 108th and 113th Tactical Control Sqdns. (ANG). Area 371 acres. Runway 9,000 ft. Altitude 421 ft. Military 1,086, full-time personnel 323. Payroll \$25.2 million.

**Toledo Express Airport**, Swanton, Ohio 43558; 14 mi. W of Toledo. Phone (419) 866-4078; DSN 580-4078. 180th Fighter Wing (ANG). Area 114 acres. Runway 10,600 ft. Altitude 684 ft. Military 1,023, full-time personnel 298. Payroll \$23.9 million.

**Truax Field** (Dane County Regional Airport), Wis. 53704-2591; 2 mi. N of Madison. Phone (608) 242-4200; DSN 724-8210. 115th Fighter Wing (ANG). Activated June 1942 as AAF base;

taken over by Wisconsin ANG in Apr. 1968. Named for Lt. T. L. Truax, killed in P-40 training accident in 1941. Area 154 acres. Runway 8,600 ft. Altitude 862 ft. Military 990, full-time personnel 279. Payroll \$22.4 million. Housing: 7 transient.

**Tucson International Airport**, Ariz. 85734; within Tucson city limits. Phone (602) 295-6210; DSN 924-6210. 162d Fighter Wing (ANG). Area 84 acres. Runway 11,000 ft. Altitude 2,650 ft. Military 1,448, full-time personnel 861. Payroll \$65 million.

**Tulsa International Airport**, Okla. 74115. Phone (918) 832-8300; DSN 956-5210. 138th Fighter Wing (ANG); 219th Electronic Installation Sqdn. Area 82 acres. Runway 10,000 ft. Altitude 676 ft. Military 1,115, full-time personnel 303. Payroll \$22.1 million.

**Volk Field**, Wis. 54618-5001; 90 mi. NW of Madison. Phone (608) 427-1210; DSN 798-3210. ANG field training site featuring air-to-air and air-to-ground gunnery ranges and providing training for ANG flying units. Field named for Lt. Jerome A. Volk, first Wisconsin ANG pilot killed in the Korean War. Area 2,336 acres. Runway 9,000 ft. Altitude 910 ft. Military 188, full-time personnel 105 (including 2 Title 5 civilians). Payroll \$7.4 million.

**W. K. Kellogg Airport**, Battle Creek, Mich. 49015-1291. Phone (616) 963-1596; DSN 580-3210. 110th Fighter Wing (ANG). Area 315 acres. Runway 10,000 ft. Altitude 941 ft. Military 894, full-time personnel 261. Payroll \$22.8 million.

**Westover ARB**, Mass. 01022-5000; 5 mi. NE of Chicopee. Phone (413) 557-1110; DSN 589-1110. AFRES base. 439th Airlift Wing (AFRES). Also home of Army, Navy, and Marine Corps Reserve units. Base dedicated Apr. 6, 1940; named for Maj. Gen. Oscar Westover, Chief of the Air Corps, killed Sept. 21, 1938, in crash near Burbank, Calif. Area 2,386 acres. Runway 10,400 ft. Altitude 244 ft. Full-time personnel (AFRES and tenant units): 480 Air Reserve technicians, 576 civilians. Part-time Reservists: 2,676. Payroll \$70.7 million. Housing: 356 VAQ (500 beds), 50 VOQ (80 beds).

**Willow Grove ARS**, Pa. 19090-5203; 14 mi. N of Philadelphia. AFRES base with ANG unit as tenant. 913th Airlift Wing (AFRES host). Phone (215) 443-1062; DSN 991-1062. Full-time civilians 158, Reservists 995, Air Reserve technicians 180. Reserve area 162 acres. Payroll \$21 million. Reserve base activated in Aug. 1958. Tenant 111th Fighter Wing (ANG). Phone (215) 443-1501; DSN 991-1501. ANG military 1,037, full-time personnel 268. Payroll \$19.8 million. ANG area 39 acres. AFRES shares use of adjacent runway (8,000 ft.) at NAS/JRB Willow Grove. Altitude 356 ft.

**Will Rogers World Airport**, Okla. 73169-5000; 7 mi. SW of Oklahoma City. Phone (405) 686-5210; DSN 940-8210. 137th Airlift Wing (ANG). Area 133 acres. Runway 9,800 ft. Altitude 1,290 ft. Military 1,289, full-time personnel 255. Payroll \$19.7 million.

**Yeager Airport**, W. Va. 25311-5000; 4 mi. NE of Charleston. Phone (304) 357-5100; DSN 366-6210. 130th Airlift Wing (ANG). Airport named for Brig. Gen. Charles E. "Chuck" Yeager, first man to break the sound barrier. Area 269 acres. Runway 6,300 ft. Altitude 981 ft. Military 885, full-time personnel 219. Payroll \$14.5 million.

**Youngstown/Warren Regional Airport/ARS**, Ohio 44473-0910; 16 mi. N of Youngstown. Phone (216) 392-1000; DSN 346-1000. AFRES base. 910th Airlift Wing (AFRES). Host to 757th Airlift Sqdn.; 773d Airlift Sqdn.; 76th Aerial Port Sqdn.; Navy Reserve; Marine Corps Reserve; Army Corps of Engineers; FAA. Base activated in 1953. Area 403 acres. Three runways, primary length 7,492 ft. Altitude 1,196 ft. Total reserve 1,566, active duty 27, civilian 400. Payroll \$24.6 million. ■



# Records, Trophies, and Competitions



## Absolute Aviation World Records

The desirability of a standard procedure to certify air records was recognized early in the history of powered flight. In 1905, representatives of Belgium, Germany, the US, Great Britain, France, Spain, Italy, and Switzerland met in Paris to form the Fédération Aéronautique Internationale (FAI), the world body of national aeronautic sporting interests. The FAI

today comprises the national aero clubs of seventy nations and certifies national records as world records.

Since 1922, the National Aeronautic Association (NAA), based in Arlington, Va., has been the US representative to the FAI. The NAA supervises all attempts at world and world-class records in the United States.

Absolute world records are the su-

preme achievements of all the records open to flying machines. Several of these records are more than ten years old. The NAA notes that, "since the performance of many government-backed airplanes ... is wrapped in a blanket of national security, the breaking of some of these records will depend as much on political considerations as technical ones."

| Record   | Pilot(s)                                 | Aircraft  | Route/Location                                       | Date(s)              |
|--|--|---|--|----------------------|
| Speed around the world, .. nonstop, nonrefueled: 115.65 mph (186.11 kph)                                 | Richard Rutan and ..<br>Jeana Yeager     | <i>Voyager</i> experimental ..<br>aircraft                      | Edwards AFB, Calif., .....<br>to Edwards AFB, Calif. | December 14–23, 1986 |
| Great circle distance ..... without landing:<br>24,986.727 miles<br>(40,212.139 kilometers)              | Richard Rutan and .....<br>Jeana Yeager  | <i>Voyager</i> experimental .....<br>aircraft                   | Edwards AFB, Calif., .....<br>to Edwards AFB, Calif. | December 14–23, 1986 |
| Distance in a closed ..... circuit without landing:<br>24,986.727 miles<br>(40,212.139 kilometers)       | Richard Rutan and .....<br>Jeana Yeager  | <i>Voyager</i> experimental .....<br>aircraft                   | Edwards AFB, Calif., .....<br>to Edwards AFB, Calif. | December 14–23, 1986 |
| Altitude: 123,523.58 feet ... (37,650.00 meters)   | Alexander Fedotov .....                  | E-266M, a modified .....<br>MiG-25 "Foxbat"                     | Podmoskovnoye, .....<br>USSR                         | August 31, 1977      |
| Altitude in an aircraft ..... launched from a carrier<br>airplane: 314,750.00 feet<br>(95,935.99 meters) | Maj. Robert M. White, .....<br>USAF      | North American X-15 .....<br>No. 3 research aircraft            | Edwards AFB, Calif. ....                             | July 17, 1962        |
| Altitude in horizontal ..... flight: 85,068.997 feet<br>(25,929.031 meters)                              | Capt. Robert C. Helt, .....<br>USAF      | Lockheed SR-71A .....<br>"Blackbird"<br>reconnaissance aircraft | Beale AFB, Calif. ....                               | July 28, 1976        |
| Speed over a straight ..... course: 2,193.16 mph<br>(3,529.56 kph)                                       | Capt. Eldon W. Joersz, .....<br>USAF     | Lockheed SR-71A .....<br>"Blackbird"<br>reconnaissance aircraft | Beale AFB, Calif. ....                               | July 28, 1976        |
| Speed over a closed ..... circuit: 2,092.294 mph<br>(3,367.221 kph)                                      | Maj. Adolphus H. Bledsoe, .<br>Jr., USAF | Lockheed SR-71A .....<br>"Blackbird"<br>reconnaissance aircraft | Beale AFB, Calif. ....                               | July 28, 1976        |



# The Robert J. Collier Trophy

This award, presented by the National Aeronautic Association, is the most prestigious in American aviation. It recognizes the "greatest achievement in aeronautics or astronautics in America, with respect to

improving the performance, efficiency, and safety of air or space vehicles, the value of which has been thoroughly demonstrated by actual use during the preceding year." The award is named for a prominent pub-

lisher, sportsman, and aviator. Mr. Collier, the first person to purchase a Wright airplane for personal use, commissioned the trophy and presented it to the Aero Club of America (the forerunner of the NAA) in 1911.

- 1911 **Glenn H. Curtiss.** Hydro-airplane.  
 1912 **Glenn H. Curtiss.** Flying boat.  
 1913 **Orville Wright.** Automatic stabilizer.  
 1914 **Elmer A. Sperry.** Gyroscopic control.  
 1915 **W. Sterling Burgess.** Burgess-Dunner hydro-aeroplane.  
 1916 **Elmer A. Sperry.** Drift indicator.  
 1917-20 **No award.** (World War I).  
 1921 **Grover Loening.** Aerial yacht.  
 1922 **US Mail Service.**  
 1923 **US Mail Service.** Night flying.  
 1924 **US Army.**  
 1925 **S. Albert Reed.** Metal propeller.  
 1926 **Maj. E. L. Hoffman.** Practical parachute.  
 1927 **Charles L. Lawrance.** Radial air-cooled engine.  
 1928 **Commerce Dept., Aeronautics Branch.** Airways, air navigation facilities.  
 1929 **National Advisory Committee for Aeronautics.** NACA cowling.  
 1930 **Harold Pitcairn and staff.** Autogiro.  
 1931 **Packard Motor Car Co.** Aircraft diesel engine.  
 1932 **Glenn L. Martin.** Two-engined, high-speed, weight-carrying airplane.  
 1933 **Hamilton Standard Propeller Co., Frank W. Caldwell.** Controllable-pitch propeller.  
 1934 **Maj. Albert F. Hegenberger.** Blind landing experiments.  
 1935 **Donald Douglas and staff.** DC-2.  
 1936 **Pan American Airways.** Transpacific and overwater operations.  
 1937 **Army Air Corps.** Design, equipment of stratosphere airplane.  
 1938 **Howard Hughes and crew.** Around-the-world flight.  
 1939 **US airlines.** Air travel safety record.  
 1940 **Dr. Sanford Moss, Army Air Corps.** Supercharger.  
 1941 **Air Forces and airlines.** Worldwide operations.  
 1942 **Gen. H. H. Arnold.** Leadership of US Army Air Forces.  
 1943 **Capt. Luis De Flores, USNR.** Synthetic training devices.  
 1944 **Gen. Carl A. Spaatz.** US air campaign against Germany.  
 1945 **Dr. Luis W. Alvarez.** Ground-controlled approach radar landing system.  
 1946 **Lewis A. Rodert.** Thermal ice-prevention system.  
 1947 **John Stack, Lawrence D. Bell, Capt. Charles E. Yeager.** Supersonic flight.  
 1948 **Radio Technical Commission for Aeronautics.** All-weather air traffic control system.  
 1949 **William P. Lear.** F-5 automatic pilot, automatic control coupler system.  
 1950 **Helicopter industry, military services, Coast Guard.** Rotary-wing aircraft in air rescue.  
 1951 **John Stack, associates at Langley Aeronautical Laboratory, NACA.** Transonic wind tunnel throat.  
 1952 **Leonard S. Hobbs.** J57 jet engine.  
 1953 **James H. Kindelberger, Edward H. Heinemann.** Supersonic airplanes.  
 1954 **Richard Travis Whitcomb.** Discovery, verification of area rule.  
 1955 **William M. Allen, Boeing Airplane Co., Gen. Nathan F. Twining, USAF.** B-52 bomber.  
 1956 **Charles I. McCarthy, Chance-Vought Aircraft; Vice Adm. James S. Russell, US Navy Bureau of Aeronautics.** F8U Crusader.  
 1957 **Edward P. Curtis.** "Aviation Facilities Planning" report.  
 1958 **US Air Force/Lockheed/GE F-104 team.** F-104 interceptor. **Clarence L. Johnson.** F-104 airframe design. **Neil Burgess, Gerhard Neumann.** J79 turbojet engines. **Maj. Howard C. Johnson.** Landplane altitude record. **Capt. Walter W. Irwin.** Straightaway speed record.  
 1959 **US Air Force, GD-Convair, Space Technologies Laboratories.** Atlas ICBM.  
 1960 **Vice Adm. William F. Raborn.** Polaris ballistic missile system.  
 1961 **Maj. Robert M. White, Joseph A. Walker, A. Scott Crossfield, Cmdr. Forrest Petersen.** X-15 test flights.  
 1962 **Lt. Cmdr. M. Scott Carpenter, Maj. L. Gordon Cooper, Lt. Col. John H. Glenn, Jr., Maj. Virgil I. Grissom, Cmdr. Walter M. Schirra, Jr., Cmdr. Alan B. Shepard, Jr., Maj. Donald K. Slayton.** Pioneering US manned spaceflight.  
 1963 **Clarence L. Johnson.** A-11 Mach 3 aircraft.  
 1964 **Gen. Curtis E. LeMay.** Lifetime achievement in airpower and defense.  
 1965 **James E. Webb, Hugh L. Dryden.** Gemini spaceflight program.  
 1966 **James S. McDonnell.** F-4 Phantom and Gemini space vehicles.  
 1967 **Lawrence A. Hyland, Hughes Aircraft Co., Jet Propulsion Laboratory, associated organizations.** Surveyor Program.  
 1968 **Col. Frank Borman, Capt. James A. Lovell, Jr., Lt. Col. William A. Anders, US spaceflight team.** Apollo 8, first manned lunar orbit mission.  
 1969 **Neil A. Armstrong, Col. Edwin E. Aldrin, Jr., Col. Michael Collins.** Apollo 11 moon landing.  
 1970 **Boeing Co., Pratt & Whitney, Pan Am.** Commercial 747 service.  
 1971 **Col. David R. Scott, Col. James B. Irwin, Lt. Col. Alfred M. Worden, Dr. Robert T. Gilruth.** Apollo 15 mission.  
 1972 **Adm. Thomas H. Moorer, USAF Seventh and Eighth Air Forces, Navy Task Force 77.** Operation Linebacker II.  
 1973 **Skylab Program, William C. Schneider, Skylab astronauts.** Skylab operations.  
 1974 **John F. Clark, NASA; Daniel J. Fink, GE; NASA-industry LANDSAT team; RCA; Hughes.** Space technology in resource and environmental management.  
 1975 **David S. Lewis, General Dynamics, USAF-industry team.** F-16 aviation technologies.  
 1976 **USAF, Rockwell, B-1 industry team.** The B-1 bomber.  
 1977 **Gen. Robert J. Dixon and Tactical Air Command.** Red Flag.  
 1978 **Sam B. Williams, Williams Research Corp.** Turbofan cruise missile engines.  
 1979 **Paul B. MacCready, Aeroenvironment, Bryan Allen.** *Gossamer Albatross*.  
 1980 **NASA's Voyager mission team, Dr. Edward Stone.** *Voyager* flyby of Saturn.  
 1981 **NASA, Rockwell, Martin Marietta Corp., Thiokol Corp., government-industry shuttle team, and astronauts John W. Young, Capt. Robert L. Crippen, Col. Joe H. Engle, Capt. Richard H. Truly.** First flight of *Columbia*, first shuttle.  
 1982 **T. A. Wilson, Boeing Co., supported by the FAA, industry, airlines.** 757 and 767 airliners.  
 1983 **US Army, Hughes Helicopters, industry team.** AH-64A Apache helicopter.



## The Robert J. Collier Trophy

- 1984 **NASA, Martin Marietta Corp., Astronaut Capt. Bruce McCandless II, Charles E. Whitsett, Jr., Walter W. Bollendonk.** Manned maneuvering units, satellite rescues.
- 1985 **Russell W. Meyer, Cessna Aircraft Co., Cessna Citation business jets.** Outstanding safety.
- 1986 **Jean L. Yeager, Richard G. Rutan, Elbert L. Rutan, Bruce Evans, team of volunteers.** *Voyager* flight.
- 1987 **NASA Lewis Research Center, NASA-industry team.** Advanced turboprop propulsion concepts.
- 1988 **Rear Adm. Richard H. Truly.** Manned space recovery program.
- 1989 **Ben R. Rich, Lockheed-USAF team.** F-117A Stealth fighter.
- 1990 **Bell-Boeing team.** V-22 Osprey aircraft.
- 1991 **Northrop-USAF industry team.** B-2 bomber.
- 1992 **Aerospace Corp., Rockwell International Corp., IBM Federal Systems Co., US Naval Research Laboratory, USAF.** Navstar Global Positioning System.
- 1993 **Hubble Space Telescope recovery team.** NASA Mission Directors: **Joseph Rothenberg, Brewster Shaw, J. Milton Heflin, Randy Brinkley,** and crew members of the space shuttle *Endeavour*: **Col. Richard O. Covey, Lt. Col. Tom D. Akers, Cmdr. Kenneth D. Bowersox, Kathryn C. Thornton, Claude Nicollier, Jeffrey Hoffman, F. Story Musgrave.**
- 1994 **US Air Force, McDonnell Douglas Corp., C-17 industry team.** C-17 airlifter.
- 1995 **Boeing 777 team.** Boeing 777.

## The Hughes Achievement Trophy

The Hughes Achievement Trophy is presented annually to the top Air Force squadron with an air defense mission. Hughes Aircraft Co. sponsors the award.

| Year | Unit, Base                                | Aircraft     |
|------|---|--------------|
| 1953 | 58th FIS, Otis AFB, Mass.                 | F-94C        |
| 1954 | 96th FIS, New Castle County Airport, Del. | F-94C        |
| 1955 | 496th FIS, Landstuhl AB, West Germany     | F-86D        |
| 1956 | 317th FIS, McChord AFB, Wash.             | F-86D/F-102A |
| 1957 | 512th FIS, RAF Bentwaters, England        | F-86D        |
| 1958 | 31st FIS, Elmendorf AFB, Alaska           | F-102A       |
| 1959 | 54th FIS, Ellsworth AFB, S. D.            | F-89J        |
| 1960 | 460th FIS, Portland IAP, Ore.             | F-102A       |
| 1961 | 83d FIS, Hamilton AFB, Calif.             | F-101B       |
| 1962 | 444th FIS, Charleston AFB, S. C.          | F-101B       |
| 1963 | 497th FIS, Torrejon AB, Spain             | F-102A       |
| 1964 | 329th FIS, George AFB, Calif.             | F-106A/B     |
| 1965 | 317th FIS, Elmendorf AFB, Alaska          | F-102A       |
| 1966 | 32d FIS, Soesterberg AB, the Netherlands  | F-102A       |
| 1967 | 317th FIS, Elmendorf AFB, Alaska          | F-106A/B     |
| 1968 | 64th FIS, Clark AB, the Philippines       | F-102A       |
| 1969 | 71st FIS, Malmstrom AFB, Mont.            | F-106A/B     |
| 1970 | 57th FIS, NAS Keflavik, Iceland           | F-102A       |
| 1971 | 48th FIS, Langley AFB, Va.                | F-106A/B     |
| 1972 | 43d TFS, Elmendorf AFB, Alaska            | F-4E         |
| 1973 | 555th TFS, Udorn RTAFB, Thailand          | F-4D         |
| 1974 | 119th FIG (ANG), Hector Field, N. D.      | F-101B       |
| 1975 | 318th FIS, McChord AFB, Wash.             | F-106A/B     |
| 1976 | 57th FIS, NAS Keflavik, Iceland           | F-4C         |
| 1977 | 43d TFS, Elmendorf AFB, Alaska            | F-4E         |
| 1978 | 49th FIS, Griffiss AFB, N. Y.             | F-106A/B     |
| 1979 | 32d TFS, Soesterberg AB, the Netherlands  | F-15A/B      |
| 1980 | 32d TFS, Soesterberg AB, the Netherlands  | F-15A/B      |
| 1981 | 12th TFS, Kadena AB, Japan                | F-15C/D      |
| 1982 | 44th TFS, Kadena AB, Japan                | F-15C/D      |
| 1983 | 67th TFS, Kadena AB, Japan                | F-15C/D      |
| 1984 | 318th FIS, McChord AFB, Wash.             | F-15A/B      |
| 1985 | 120th FIG (ANG), Great Falls IAP, Mont.   | F-106A/B     |
| 1986 | 67th TFS, Kadena AB, Japan                | F-15C/D      |
| 1987 | 57th FIS, NAS Keflavik, Iceland           | F-15C/D      |
| 1988 | 22d TFS, Bitburg AB, West Germany         | F-15C/D      |
| 1989 | 67th TFS, Kadena AB, Japan                | F-15C/D      |
| 1990 | 58th TFS, Eglin AFB, Fla.                 | F-15C/D      |
| 1991 | 58th TFS, Eglin AFB, Fla.                 | F-15C/D      |
| 1992 | 59th FS, Eglin AFB, Fla.                  | F-15C/D      |
| 1993 | 71st FS, Langley AFB, Va.                 | F-15C        |
| 1994 | 178th FS (ANG), Hector IAP, N. D.         | F-16A/B      |
| 1995 | 178th FS (ANG), Hector IAP, N. D.         | F-16A/B      |



# The Mackay Trophy

The Mackay Trophy was established by Clarence H. Mackay, an industrialist, philanthropist, commu-

nications pioneer, and aviation enthusiast. Presented by the National Aeronautic Association, the trophy

recognizes "the most meritorious flight of the year" by an Air Force member, members, or organization.

- 1912 2d Lt. Henry H. Arnold.  
 1913 2d Lt. Joseph E. Carberry and 2d Lt. Fred Seydel.  
 1914 Capt. Townsend F. Dodd and Lt. Shapler W. Fitzgerald.  
 1915 Lt. B. W. Jones.  
 1916-17 Inactive.  
 1918 Lt. Edward V. Rickenbacker.  
 1919 Lt. Belvin W. Maynard, Lt. Alexander Pearson, Jr., Lt. R. S. Worthington, Capt. John O. Donaldson, Capt. Lowell H. Smith, Lt. Col. Harold E. Hartney, Lt. E. H. Manzelman (posthumously), Lt. R. G. Bagby, Lt. D. B. Gish, and Capt. F. Steinle.  
 1920 Capt. St. Clair Streett, Capt. Howard T. Douglas, 1st Lt. Clifford C. Nutt, 2d Lt. Erik H. Nelson, 2d Lt. C. H. Crumrine, 2d Lt. Ross C. Kirkpatrick, Sgt. Edmond Henriques, Sgt. Albert T. Vierra, and Sgt. Joseph E. English.  
 1921 Lt. John A. Macready.  
 1922 Lt. John A. Macready and Lt. Oakley G. Kelly.  
 1923 Lt. John A. Macready and Lt. Oakley G. Kelly.  
 1924 Capt. Lowell H. Smith, 1st Lt. Leigh Wade, 1st Lt. Leslie P. Arnold, 1st Lt. Erik H. Nelson, 2d Lt. John Harding, Jr., and 2d Lt. Henry H. Ogden.  
 1925 Lt. Cyrus Bettis and Lt. James H. Doolittle.  
 1926 Maj. Herbert A. Dargue, Capt. Ira C. Eaker, Capt. Arthur B. McDaniel, Capt. C. F. Wolsey (posthumously), 1st Lt. J. W. Benton (posthumously), 1st Lt. Charles McRobinson, 1st Lt. Muir S. Fairchild, 1st Lt. Bernard S. Thompson, 1st Lt. Leonard D. Weddington, and 1st Lt. Ennis C. Whitehead.  
 1927 Lt. Albert F. Hegenberger and Lt. Lester J. Maitland.  
 1928 1st Lt. Harry A. Sutton.  
 1929 Capt. Albert W. Stevens.  
 1930 Maj. Ralph Royce.  
 1931 Maj. Gen. Benjamin D. Foulois.  
 1932 1st Lt. Charles H. Howard.  
 1933 Capt. Westside T. Larson.  
 1934 Brig. Gen. Henry H. Arnold.  
 1935 Maj. Albert W. Stevens and Capt. Orville Anderson.  
 1936 Capt. Richard E. Nugent, 1st Lt. Joseph A. Miller, 1st Lt. Edwing G. Simenson, 2d Lt. William P. Ragsdale, Jr., 2d Lt. Burton W. Armstrong, 2d Lt. Herbert Morgan, Jr., TSgt. Gilbert W. Olsen, SSgt. Howard M. Miller, and Corpsman 2d Class Frank B. Conner.  
 1937 Capt. Carl J. Crane and Capt. George V. Holloman.  
 1938 2d Bombardment Group (General Headquarters Air Force). All those in the 2d Bombardment Group at the time of the "Good Will" flight to Buenos Aires, Argentina, February 15-27, 1938, should be considered recipients.  
 1939 Maj. Caleb V. Haynes, Maj. William D. Old, Capt. John A. Samford, Capt. Richard S. Freeman, 1st Lt. Torgils G. Wold, MSgt. Adolph Cattarius, TSgt. Henry L. Hines, TSgt. William J. Heldt, TSgt. David L. Spicer, SSgt. Russel E. Junior, and SSgt. James E. Sands. Earthquake relief mission to Chile.  
 1940-46 Inactive.  
 1947 Capt. Charles E. Yeager. First supersonic flight.  
 1948 Lt. Col. Emil Beaudry. Rescue in Greenland.  
 1949 Capt. James G. Gallagher and crew of *Lucky Lady II*. First around-the-world, nonstop flight.  
 1950 27th Fighter Escort Wing. Transatlantic movement of 180 fighters.  
 1951 Col. Fred J. Ascani. Speed record, 635.686 mph.  
 1952 Maj. Louis H. Carrington, Jr., Maj. Frederick W. Shook, and Capt. Wallace D. Yancey. First nonstop, transpacific flight of RB-45 jet bomber.  
 1953 40th Air Division, SAC. Nonstop, refueled transatlantic movement of fighters.  
 1954 308th Bombardment Wing (M). "Leapfrog" intercontinental maneuver.  
 1955 Col. Horace A. Hanes. Speed record, 822.135 mph.  
 1956 Capt. Iven C. Kincheloe, Jr., Air Research and Development Command. Altitude record in Bell X-2.  
 1957 93d Bombardment Wing, SAC. Three B-52s, in first nonstop, around-the-world jet flight.  
 1958 TAC Composite Air Strike Force, X-Ray Tango. Rapid deployment to Far East.  
 1959 4520th Aerial Demonstration Team. Goodwill tour of Far East.  
 1960 6593d Test Squadron (Special). Aerial recoveries of space capsules.  
 1961 Lt. Col. William R. Payne, Maj. William L. Polhemus, and Maj. Raymond R. Wagener, 43d Bomb Wing, SAC. Carswell AFB, Tex.-to-Paris nonstop flight, two speed records.  
 1962 Maj. Robert G. Sowers, Capt. Robert McDonald, and Capt. John T. Walton. Three transcontinental speed records in B-58.  
 1963 Capt. Warren P. Tomsett, Capt. John R. Ordemann, Capt. Donald R. Mack, TSgt. Edsol P. Inlow, SSgt. Jack E. Morgan, and SSgt. Frank C. Barrett. Nighttime, under-fire evacuation of wounded in Vietnam.  
 1964 464th Troop Carrier Wing, TAC. Refugee airlift in Republic of Congo.  
 1965 YF-12A/SR-71 Test Force (Col. Robert L. Stephens, Lt. Col. Daniel Andre, Lt. Col. Walter F. Daniel, Maj. Noel T. Warner, and Maj. James P. Cooney). YF-12A flight that established nine speed and altitude records.  
 1966 Col. Albert R. Howarth. Courage and airmanship in southeast Asia.  
 1967 Maj. John J. Casteel, Capt. Dean L. Hoar, Capt. Richard L. Trail, and MSgt. Nathan C. Campbell. First emergency multiple air refuelings.  
 1968 Lt. Col. Daryl D. Cole. Conspicuous gallantry as C-130 pilot in southeast Asia.  
 1969 49th Tactical Fighter Wing, TAC. Deployment, with 504 air refuelings, of 72 F-4Ds from West Germany to New Mexico.  
 1970 Capt. Alan D. Milacek and AC-119K crew (Capt. James A. Russell, Capt. Roger E. Clancy, Capt. Ronald C. Jones, Capt. Brent C. O'Brien, TSgt. Albert A. Nash, SSgt. Adolfo Lopez, Jr., SSgt. Ronald R. Wilson, Sgt. Kenneth E. Firestone, and A1C Donnell H. Cofer). Destruction of targets with a severely damaged aircraft.  
 1971 Lt. Col. Thomas B. Estes and Lt. Col. Dewain C. Vick. SR-71 record-shattering flights.  
 1972 Capt. Richard S. "Steve" Ritchie, Capt. Charles B. DeBellevue, and Capt. Jeffrey S. Feinstein. USAF's Vietnam War aces.  
 1973 MAC aircrews. Operation Homecoming, POWs' return.  
 1974 Maj. Roger J. Smith, Maj. David W. Peterson, and Maj. Willard R. MacFarlane. Operation Streak Eagle (F-15) test pilots.  
 1975 Maj. Robert W. Undorf. Gallantry in *Mayaguez* incident.  
 1976 Capt. James A. Yule. Gallantry as instructor of B-52D flight.  
 1977 C-5 Aircrew, Mission AAM 1962-01 (Capt. David M. Sprinkel and crew). US-USSR energy research project.  
 1978 C-5 Aircrew, Mission AM 770021 (Lt. Col. Robert F. Schultz and crew and Capt. Todd H. Hohberger and crew, 435th Military Airlift Wing). C-5 airlift to Zaire.  
 1979 Maj. James E. McArdle, Jr. Rescue of 28 Taiwanese at sea.  
 1980 Crews S-21 and S-31, 644th Bombardment Squadron. Nonstop, around-the-world mission to locate Soviet Navy operating in Arabian Sea.



## The Mackay Trophy

- 1981** Capt. John J. Walters. Air rescue mission in Alaskan waters.
- 1982** B-52 Crew E-21, 19th Bombardment Wing. Successful emergency landing of B-52.
- 1983** Crew E-113, 42d Bombardment Wing, SAC. Emergency refueling and towing of an F-4E.
- 1984** Lt. Col. James L. Hobson, Jr. MC-130 assault in Grenada.
- 1985** Lt. Col. David E. Faught. Emergency KC-135 landing.
- 1986** KC-10 crew, 68th Air Refueling Group, SAC. Emergency transatlantic refueling of Marine A-4s.
- 1987** Det. 15, USAF Plant Representative Office, and B-1B SPO. 72 record B-1B flights.
- 1988** C-5 crew, 436th Military Airlift Wing. Mission to Semipalatinsk, USSR, as part of INF accord.
- 1989** B-1B crew, 96th Bombardment Wing. Emergency landing of B-1B.
- 1990** AC-130 crew, 16th Special Operations Squadron. Panama operations.
- 1991** MH-53 crew, 20th Special Operations Squadron. Rescue of downed Navy F-14 pilot inside Iraq during Persian Gulf War.
- 1992** C-130 crew (13 Air Combat Command members and one Air Force Intelligence Command member). Emergency landing of unarmed C-130 after incurring heavy damage from two Peruvian fighters in international airspace.
- 1993** B-52 crew, 668th Bomb Squadron, ACC. Successful emergency landing of B-52 after loss of four engines.
- 1994** HH-60G crew of Air Force Rescue 206 and 208, 56th Rescue Squadron, ACC, NAS Keflavik, Iceland. Rescue of six Icelandic sailors from foundered merchant vessel *Godinn*.
- 1995** Aircrew BAT-01, Dyess AFB, Tex., demonstrated the B-1B's endurance and speed by flying thirty-six hours, thirteen minutes, thirty-six seconds in an around-the-world flight from Dyess AFB.

## Proud Shield

Proud Shield is the Air Force's biennial long-range bombing and navigation competition. Begun by Gen. George C. Kenney, the first commander of SAC, the competition is run by Air Combat Command. The Gen. Muir S. Fairchild Trophy, named for the first commander of Air University, is awarded to the wing with the highest competition effectiveness. The next competition is scheduled for summer 1996.

## Fairchild Trophy Recipients

| Year    | Unit(s)   | Aircraft |
|---------|---|----------|
| 1948    | 43d BG, Davis-Monthan AFB, Ariz. <sup>a</sup>     | B-29     |
| 1949    | 93d BG, Castle AFB, Calif. <sup>a</sup>           | B-29     |
| 1950    | No competition                                    |          |
| 1951    | 97th BMW, Biggs AFB, Tex.                         | B-50D    |
| 1952    | 93d BMW, Castle AFB, Calif.                       | B-50D    |
|         | 97th BMW, Biggs AFB, Tex. (tie)                   | B-50D    |
| 1953    | 92d BMW, Fairchild AFB, Wash.                     | B-36D    |
| 1954    | 11th BMW, Carswell AFB, Tex.                      | B-36H    |
| 1955    | 320th BMW, March AFB, Calif.                      | YRB-47B  |
| 1956    | 11th BMW, Carswell AFB, Tex.                      | B-36H    |
| 1957    | 321st BMW, Pinecastle AFB, Fla.                   | B-47B    |
| 1958    | 306th BMW, MacDill AFB, Fla.                      | B-47E    |
| 1959    | 307th BMW, Lincoln AFB, Neb.                      | B-47E    |
| 1960    | 11th BMW, Altus AFB, Okla.                        | B-52E    |
| 1961    | 4137th SW, Robins AFB, Ga.                        | B-52G    |
| 1962    | No competition                                    |          |
| 1963    | 2d BMW, Barksdale AFB, La. <sup>b</sup>           | B-52F    |
| 1964    | 70th BMW, Clinton-Sherman AFB, Okla. <sup>b</sup> | B-52E    |
| 1965    | 454th BMW, Columbus AFB, Miss.                    | B-52F    |
| 1966    | 19th BMW, Homestead AFB, Fla.                     | B-52H    |
| 1967-68 | No competition                                    |          |
| 1969    | 319th BMW, Grand Forks AFB, N. D.                 | B-52H    |
| 1970    | 93d BMW, Castle AFB, Calif.                       | B-52F    |
| 1971    | 449th BMW, Kincheloe AFB, Mich.                   | B-52H    |
| 1972-73 | No competition                                    |          |
| 1974    | 380th BMW, Plattsburgh AFB, N. Y.                 | FB-111A  |
| 1975    | No competition                                    |          |
| 1976    | 380th BMW, Plattsburgh AFB, N. Y.                 | FB-111A  |
| 1977    | 380th BMW, Plattsburgh AFB, N. Y.                 | FB-111A  |
| 1978    | 380th BMW, Plattsburgh AFB, N. Y.                 | FB-111A  |
| 1979    | 509th BMW, Pease AFB, N. H.                       | FB-111A  |
| 1980    | 320th BMW, Mather AFB, Calif.                     | B-52G    |
| 1981    | 509th BMW, Pease AFB, N. H.                       | FB-111A  |
| 1982    | 509th BMW, Pease AFB, N. H.                       | FB-111A  |
| 1983    | 509th BMW, Pease AFB, N. H.                       | FB-111A  |
| 1984    | 380th BMW, Plattsburgh AFB, N. Y.                 | FB-111A  |
| 1985    | 97th BMW, Blytheville AFB, Ark.                   | B-52G    |
| 1986    | 92d BMW, Fairchild AFB, Wash.                     | B-52H    |
| 1987    | 379th BMW, Wurtsmith AFB, Mich.                   | B-52G    |
| 1988    | 5th BMW, Minot AFB, N. D.                         | B-52H    |
| 1989    | 28th BMW, Ellsworth AFB, S. D.                    | B-1B     |
| 1990-91 | No competition                                    |          |
| 1992    | 92d BW, Fairchild AFB, Wash.                      | B-52H    |
| 1994    | 27th FW, Cannon AFB, N. M.                        | F-111F   |

<sup>a</sup>Overall winner; Fairchild Trophy not yet developed.

<sup>b</sup>Trophy given for overall annual performance, not for scores in SAC bombing and navigation competition.



## Guardian Challenge

Guardian Challenge is the Air Force Space Command competition to determine the best space operations and missile teams in the Air Force. Held at Vandenberg AFB, Calif., it replaces Olympic Arena, the winner of which received a trophy named for former USAF Vice Chief of Staff Gen. William

H. Blanchard. Guardian Challenge awards the Blanchard Trophy to the best missile operations crew. AFSPC first awarded the Chennault Trophy (for best space operations crew) in 1994 and replaced it in 1995 with the O'Malley, Arnold, Schriever, and Aldridge Trophies. The Aldridge Trophy,

named for former USAF Secretary Edward C. "Pete" Aldridge, goes to the best satellite operations unit; the Schriever Trophy goes to the best space launch squadron; the O'Malley Trophy goes to the best space warning squadron; and the Arnold Trophy goes to the best space surveillance squadron.

### Blanchard Trophy Recipients

| Year, Unit(s)                                 | System    | Year, Unit(s)                               | System    |
|---|-----------|---|-----------|
| 1967 351st SMW, Whiteman AFB, Mo. ....        | Minuteman | 1982 44th SMW, Ellsworth AFB, S. D. ....    | Minuteman |
| 1968 No competition                           |           | 1983 381st SMW, McConnell AFB, Kan. ....    | Titan     |
| 1969 321st SMW, Grand Forks AFB, N. D. ....   | Minuteman | 1984 90th SMW, F. E. Warren AFB, Wyo. ....  | Minuteman |
| 1970 44th SMW, Ellsworth AFB, S. D. ....      | Minuteman | 1985 308th SMW, Little Rock AFB, Ark. ....  | Titan     |
| 1971 351st SMW, Whiteman AFB, Mo. ....        | Minuteman | 1986 341st SMW, Malmstrom AFB, Mont. ....   | Minuteman |
| 1972 381st SMW, McConnell AFB, Kan. ....      | Titan     | 1987 321st SMW, Grand Forks AFB, N. D. .... | Minuteman |
| 1973 90th SMW, F. E. Warren AFB, Wyo. ....    | Minuteman | 1988 91st SMW, Minot AFB, N. D. ....        | Minuteman |
| 1974 321st SMW, Grand Forks, N. D. ....       | Minuteman | 1989 351st SMW, Whiteman AFB, Mo. ....      | Minuteman |
| 1975 381st SMW, McConnell AFB, Kan. ....      | Titan     | 1990 341st SMW, Malmstrom AFB, Mont. ....   | Minuteman |
| 1976 341st SMW, Malmstrom AFB, Mont. ....     | Minuteman | 1991 341st SMW, Malmstrom AFB, Mont. ....   | Minuteman |
| 1977 351st SMW, Whiteman AFB, Mo. ....        | Minuteman | 1992 44th MW, Ellsworth AFB, S. D. ....     | Minuteman |
| 1978 91st SMW, Minot AFB, N. D. ....          | Minuteman | 1993 351st MW, Whiteman AFB, Mo. ....       | Minuteman |
| 1979 390th SMW, Davis-Monthan AFB, Ariz. .... | Titan     | 1994 742d MS, Minot AFB, N. D. ....         | Minuteman |
| 1980 381st SMW, McConnell AFB, Kan. ....      | Titan     | 1995 10th MS, Malmstrom AFB, Mont. ....     | Minuteman |
| 1981 351st SMW, Whiteman AFB, Mo. ....        | Minuteman |   |           |

### Chennault Trophy Recipients

| Year, Unit(s)                       | System   |
|-------------------------------------|----------|
| 1994 3d SLS, Patrick AFB, Fla. .... | Atlas II |

### O'Malley Trophy Recipients

| Year, Unit(s)                        | System    |
|--------------------------------------|-----------|
| 1995 8th SWS, Eldorado AS, Tex. .... | Pave Paws |

### Aldridge Trophy Recipients

| Year, Unit(s)                        | System |
|--------------------------------------|--------|
| 1995 6th SOPS, Offutt AFB, Neb. .... | DMSP   |

### Arnold Trophy Recipients

| Year, Unit(s)                       | System |
|-------------------------------------|--------|
| 1995 17th SPSS, RAF Edzell, UK .... | LASS   |

### Schriever Trophy Recipients

| Year, Unit(s)                              | System   |
|--|----------|
| 1995 1st SLS, Cape Canaveral AS, Fla. .... | Delta II |

## The William Tell Weapons Meet

The Air Force's William Tell air-to-air weapons meet, held at Tyndall AFB, Fla., includes events for pilots, weapons controllers, weapons loaders, and maintainers to provide a complete test for a unit in the air-to-air business. The next meet is scheduled for October 1996.

### William Tell Winners

| Year | Unit, Base  | Aircraft |
|------|---|----------|
| 1954 | 3550th FTW (Interceptor), Moody AFB, Ga. ....   | F-94C    |
| 1955 | 26th Air Division, Duluth MAP, Minn. ....<br>(Members of the 48th, 96th, and 332d FISs) | F-94C    |
| 1956 | 94th FIS, Selfridge AFB, Mich. ....   | F-86D    |
| 1958 | 465th FIS, Griffiss AFB, N. Y. ....   | F-89J    |
|      | 326th FIS, Richards-Gebaur AFB, Mo. ....  | F-102A   |
|      | 125th FIG (ANG), Jacksonville IAP, Fla. ....  | F-86D    |
| 1959 | 319th FIS, Bunker Hill AFB, Ind. ....   | F-89J    |
|      | 460th FIS, Portland IAP, Ore. ....  | F-102A   |
|      | 538th FIS, Larson AFB, Wash. ....   | F-104A   |



## The William Tell Weapons Meet

|         |   |         |
|---------|---|---------|
| 1961    | 445th FIS, Wurtsmith AFB, Mich. ....                    | F-101B  |
|         | 59th FIS, Goose Bay, Labrador, Canada .....             | F-102A  |
|         | 456th FIS, Castle AFB, Calif. ....                      | F-106A  |
| 1963    | 445th FIS, Wurtsmith AFB, Mich. ....                    | F-101B  |
|         | 146th FIS (ANG), Greater Pittsburgh IAP, Pa. ....       | F-102A  |
|         | 318th FIS, McChord AFB, Wash. ....                      | F-106A  |
| 1965    | 62d FIS, K. I. Sawyer AFB, Mich. ....                   | F-101B  |
|         | 32d FIS, Camp New Amsterdam, the Netherlands .....      | F-102A  |
|         | 71st FIS, Selfridge AFB, Mich. ....                     | F-106A  |
|         | 331st FIS, Webb AFB, Tex. ....                          | F-104A  |
| 1966-69 | No competition  |         |
| 1970    | 119th TFG (ANG), Hector Field, N. D. ....               | F-101B  |
|         | 148th TFG (ANG), Duluth IAP, Minneapolis, Minn. ....    | F-102A  |
|         | 71st FIS, Malmstrom AFB, Mont. ....                     | F-106A  |
| 1972    | 119th TFG (ANG), Hector Field, N. D. ....               | F-101B  |
|         | 115th TFG (ANG), Truax Field, Wis. ....                 | F-102A  |
|         | 460th FIS, Grand Forks AFB, N. D. ....                  | F-106A  |
| 1974    | 101st TFG (ANG), Bangor IAP, Me. ....                   | F-101B  |
|         | 124th FIG (ANG), Boise Air Terminal, Idaho .....        | F-102A  |
|         | 120th FIG (ANG), Great Falls IAP, Mont. ....            | F-106A  |
| 1976    | 142d FIG (ANG), Portland IAP, Ore. ....                 | F-101B  |
|         | 4th TFW, Seymour Johnson AFB, N. C. ....                | F-4E    |
|         | 120th FIG (ANG), Great Falls IAP, Mont. ....            | F-106A  |
| 1978    | 147th FIG (ANG), Ellington AFB, Tex. ....               | F-101B  |
|         | 86th TFW, Ramstein AB, West Germany .....               | F-4E    |
|         | 49th FIS, Griffiss AFB, N. Y. ....                      | F-106A  |
| 1980    | 147th FIG (ANG), Ellington AFB, Tex. ....               | F-101B  |
|         | 347th TFW, Moody AFB, Ga. ....                          | F-4E    |
|         | 144th FIW (ANG), Fresno ANGB, Calif. <sup>a</sup> ..... | F-106A  |
| 1982    | 409 Squadron, CFB Comox, British Columbia, Canada ..... | CF-101B |
|         | 18th TFW, Kadena AB, Japan <sup>a</sup> .....           | F-15C   |
|         | 49th FIS, Griffiss AFB, N. Y. ....                      | F-106A  |
|         | 57th FIS, NAS Keflavik, Iceland .....                   | F-4E    |
| 1984    | 33d TFW, Eglin AFB, Fla. <sup>a</sup> .....             | F-15C   |
|         | 142d FIG (ANG), Portland IAP, Ore. ....                 | F-4C    |
|         | 177th FIG (ANG), Atlantic City IAP, N. J. ....          | F-106A  |
| 1986    | 33d TFW, Eglin AFB, Fla. <sup>a</sup> .....             | F-15C   |
|         | 119th FIG (ANG), Hector Field, N. D. ....               | F-4D    |
| 1988    | 49th TFW, Holloman AFB, N. M. <sup>a</sup> .....        | F-15A   |
|         | 33d TFW, Eglin AFB, Fla. ....                           | F-15C   |
|         | 18th TFW, Kadena AB, Japan .....                        | F-15C   |
|         | 57th FIS, NAS Keflavik, Iceland .....                   | F-15C   |
| 1990    | No competition  |         |
| 1992    | 18th Wing, Kadena AB, Japan .....                       | F-15C   |
| 1994    | 119th FG (ANG), Fargo, N. D. ....                       | F-16A   |

<sup>a</sup>Overall competition winner. The naming of an overall winner began with William Tell 1980.

## William Tell Top Guns

| Year | Top Gun  | Aircraft |
|------|--|----------|
| 1954 | Crew of Capt. Clarence W. Lewis and 1st Lt. James R. Boone, 3550th FTW (Interceptor), Moody AFB, Ga. | F-94C    |
| 1955 | Crew of Col. B. H. King and Lt. F. S. Goad, 26th Air Division, Duluth MAP, Minn.                     | F-94C    |
| 1956 | Crew of Col. Donald W. Graham and 1st Lt. Billy R. Thomson, 66th FIS, Elmendorf AFB, Alaska          | F-89D    |
|      | 1st Lt. Robert B. Long, 94th FIS, Selfridge AFB, Mich.   | F-86D    |
| 1958 | Crew piloted by Col. Frank J. Keller, 465th FIS, Griffiss AFB, N. Y.                                 | F-89J    |
|      | Col. Roy B. Caviness, 482d FIS, Seymour Johnson AFB, N. C.   | F-102A   |
|      | Col. Robert E. Dawson, 125th FIG, Jacksonville IAP, Fla.   | F-86D    |
| 1959 | Crew of Capt. Billy S. Linebaugh and 1st Lt. Donald M. Burke, 319th FIS, Bunker Hill AFB, Ind.       | F-89J    |
|      | Capt. Frederick H. England, 460th FIS, Portland IAP, Ore.  | F-102A   |
|      | Maj. John T. Guice, 125th FIG, Jacksonville IAP, Fla.  | F-100A   |
| 1961 | Lt. Col. Frank R. Jones, 59th FIS, Goose Bay, Labrador, Canada                                       | F-102A   |
| 1963 | Lt. Col. J. W. Rogers, 317th FIS, Elmendorf AFB, Alaska  | F-102A   |
| 1965 | Crew of Capt. D. E. Libby and Capt. L. R. Livingston, 62d FIS, K. I. Sawyer AFB, Mich.               | F-101B   |
|      | Capt. J. McMichael, 326th FIS, Richards-Gebaur AFB, Mo.  | F-102A   |
|      | Lt. Col. Glendon P. Dunaway, 71st FIS, Selfridge AFB, Mich.  | F-106A   |
|      | Capt. J. D. Dunn, 319th FIS, Homestead AFB, Fla.   | F-104A   |



## The William Tell Weapons Meet

| Year    | Top Gun  | Aircraft |
|---------|--|----------|
| 1966-69 | No competition   |          |
| 1970    | Crew of Capt. James Reimers and Capt. Arthur Jacobson, 119th TFG (ANG), Hector Field, N. D.                          | F-101B   |
| 1972    | Crew of Capt. Lowell Butters and Capt. Douglas Danko, 425th All-Weather Fighter Squadron, Bagotville, Quebec, Canada | CF-101B  |
| 1974    | Maj. Ralph D. Townsend, 124th FIG (ANG), Boise Air Terminal, Idaho   | F-102A   |
| 1976    | Crew of Maj. Bradford A. Newell and Lt. Col. Donald R. Tonole, 142d FIG (ANG), Portland IAP, Ore.                    | F-101B   |
| 1978    | Crew of Earl G. Robertson and Capt. Brian J. Salmon, Canadian Forces Composite Group                                 | CF-101B  |
| 1980    | Crew of Lt. Col. Maurice Udell and Maj. David S. Miller, 147th FIG (ANG), Ellington AFB, Tex.                        | F-101B   |
| 1982    | Crew of Maj. Bob Worbets and Capt. Bill Ricketts, 409 Squadron, CFB Comox, British Columbia, Canada                  | CF-101B  |
|         | Lt. Col. Jere Wallace, 18th TFW, Kadena AB, Japan  | F-15C    |
|         | Lt. Col. Robert Boehringer, 144th FIW, Fresno ANGB, Calif.   | F-106A   |
|         | Crew of Capt. Tom Watson and Capt. Dave Pfeifer, 57th FIS, NAS Keflavik, Iceland                                     | F-4E     |
| 1984    | Capt. Scott H. Turner, 32d TFS, Camp New Amsterdam, the Netherlands  | F-15C    |
|         | Maj. Ron M. Moore and Maj. Bill C. Dejager, 142d FIG (ANG), Portland IAP, Ore.                                       | F-4C     |
|         | Maj. Lynn Robinson, 177th FIG (ANG), Atlantic City IAP, N. J.  | F-106A   |
| 1986    | Capt. John Reed (USAF Exchange Pilot), 425 Squadron, CFB Bagotville, Quebec, Canada                                  | CF-18A   |
| 1988    | Capt. Teddy Varwig, 49th TFW, Holloman AFB, N. M.  | F-15A    |
| 1990    | No competition   |          |
| 1992    | Capt. Jeffery Prichard, 18th Wing, Kadena AB, Japan  | F-15C    |
| 1994    | Capt. James Browne, 52d FW, Spangdahlem AB, Germany  | F-15C    |

## Gunsmoke

Gunsmoke is the USAF worldwide gunnery meet, run by Air Combat Command and held biennially at Nellis AFB, Nev. It tests the conventional air-to-surface capability of the combat air

forces, recognizing the best aircrews, maintenance teams, and munitions load teams. In 1993, bomber crews participated in Gunsmoke for the first time.

### Gunsmoke Top Guns and Top Bomber Crews

| Year    | Individual   | Aircraft | Unit, Base                                 |
|---------|--|----------|--|
| 1949    | Lt. Calvin K. Ellis  | F-80     | 4th FW, Langley AFB, Va.                   |
|         | Lt. William Crawford   | F-47     | 332d FW, Lockbourne Army Air Base, Ohio    |
| 1950    | Lt. John W. Roberts  | F-86     | 3525th FWS, Nellis AFB, Nev.               |
| 1951-53 | No competition   |          |  |
| 1954    | Capt. Charles C. Carr  | F-86     | 3595th TFW, Nellis AFB, Nev.               |
| 1955    | Maj. Frederick C. Blesse   | F-86     | 3596th CCTS, Nellis AFB, Nev.              |
| 1956    | Capt. Asa Whitehead  | F-86     | 3595th CCTW, Nellis AFB, Nev.              |
| 1958    | Maj. Jack F. Brown   | F-100    | 4520th CCTW, Nellis AFB, Nev.              |
| 1960    | Capt. Aubrey C. Edinburgh  | F-100    | 4520th CCTW, Nellis AFB, Nev.              |
| 1962    | Capt. Charles E. Tofferi   | F-104    | 479th TFW, George AFB, Calif.              |
| 1964-80 | No competition   |          |  |
| 1981    | Lt. Col. Wayne Schultz   | A-7      | 120th TFS (ANG), Buckley ANGB, Colo.       |
| 1983    | Lt. Col. Roy Niesz   | F-16     | 388th TFW, Hill AFB, Utah                  |
| 1985    | Capt. Mark Fredenburgh   | F-16     | 50th TFW, Hahn AB, West Germany            |
| 1987    | Maj. Danny Hamilton  | F-16     | 419th TFW, Hill AFB, Utah                  |
| 1989    | Capt. Patrick Shay   | F-16     | 944th TFG (AFRES), Luke AFB, Ariz.         |
| 1991    | Lt. Col. Roger G. Disrud   | A-10     | 442d TFW (AFRES), Richards-Gebaur AFB, Mo. |
| 1993    | Maj. Gregory Brewer  | F-16     | 140th FW (ANG), Buckley ANGB, Colo.        |
|         | Top Bomber Crew: Capt. Dwayne Stich (commander),<br>Capts. Barry Sebring, Steve Amato, David Conley,<br>and Vernon Moore | B-52     | 93d BW, Castle AFB, Calif.                 |
| 1995    | Pacific Air Forces Team*   |          |  |

\*In 1995, Gunsmoke was redesigned, and no individual trophies were awarded.



## Rodeo

Rodeo is US Transportation Command's biennial airlift and air refueling competition. Formerly an Air Mobility Command competition, Rodeo is still dominated by AMC teams. The week-long Rodeo '94 at McChord AFB, Wash., showcased the top USAF active-duty, Air National Guard, and Air Force Reserve aircraft and teams and those of allied nations. The next Rodeo is scheduled for June 1996. The trophy for the best overall wing is named after Gen. William G. Moore, Jr., the eighth commander in chief of Military Airlift Command, an AMC predecessor.

### Moore Trophy Recipients

| Year    | Unit(s)  |
|---------|--|
| 1962    | 1502d Air Transport Wing, Hickam AFB, Hawaii     |
| 1963    | 62d Air Transport Wing, McChord AFB, Wash.       |
| 1964    | 1608th Air Transport Wing, Charleston AFB, S. C. |
| 1965-68 | No competition                                   |
| 1969    | 21st Air Force (multiwing)                       |
| 1970    | 21st Air Force (multiwing)                       |
| 1971    | 22d Air Force (multiwing)                        |
| 1972    | 21st Air Force (multiwing)                       |
| 1973-78 | No competition                                   |
| 1979    | 443d MAW, Altus AFB, Okla.                       |
| 1980    | 317th TAW, Pope AFB, N. C.                       |
| 1981    | 314th TAW, Little Rock AFB, Ark.                 |
| 1982    | Italian airlift wing                             |
| 1983    | 314th TAW, Little Rock AFB, Ark.                 |
| 1984    | Italian airlift wing                             |
| 1985    | 94th TAW (AFRES), Dobbins AFB, Ga.               |
| 1986    | 145th TAG (ANG), Charlotte, N. C.                |
| 1987    | West German airlift wing                         |
| 1988    | No competition                                   |
| 1989    | Australian airlift wing                          |
| 1990    | 63d MAW, Norton AFB, Calif.                      |
| 1991    | No competition                                   |
| 1992    | 446th AW (AFRES Assoc.), McChord AFB, Wash.      |
| 1993    | 440th AW (AFRES), General Mitchell IAP, Wisc.    |
| 1994    | 19th ARW, Robins AFB, Ga.                        |

## The Gen. Thomas D. White USAF Space Trophy

The Gen. Thomas D. White USAF Space Trophy is named for the fourth Air Force Chief of Staff, a longtime champion of USAF's role in space. Sponsored by the National Geographic Society, the trophy is pre-

sent annually to Air Force individuals or organizations (civilian or military) who made the year's outstanding progress in the field of aerospace. There has been no awardee since General McPeak in 1993.

- 1961 **Capt. Virgil I. Grissom.** Mercury spacecraft *Liberty Bell 7* flight.
- 1962 **Maj. Robert M. White.** X-15 flight to 59.6 miles.
- 1963 **Maj. L. Gordon Cooper.** Twenty-two Earth orbits in Mercury spacecraft *Faith 7*.
- 1964 **Air Force Systems Command.** Reliable space-launch vehicles.
- 1965 **Lt. Col. Edward H. White II.** First US walk in space, Gemini 4.
- 1966 **Dr. Alexander H. Flax.** Direction of R&D programs.
- 1967 **Gen. John P. McConnell.** Promotion of use of aerospace vehicles.
- 1968 **Col. Frank Borman, Lt. Col. William A. Anders, Capt. James A. Lovell, Jr.** First manned moon orbit flight.
- 1969 **Neil A. Armstrong, Col. Edwin E. Aldrin, Jr., Col. Michael Collins.** Apollo 11 lunar landing.
- 1970 **Brig. Gen. Robert A. Duffy.** Advanced Ballistic Missile Reentry System program.
- 1971 **Lt. Gen. Samuel C. Phillips.** Space and missile R&D.
- 1972 **Hon. Robert C. Seamans, Jr.** Aeronautic and astronautic planning.
- 1973 **Lt. Col. Henry W. Hartsfield, Jr.** Skylabs 1, 2, 3, and 4 and parasol device for Skylab 1.
- 1974 **Col. William R. Pogue.** Third manned Skylab mission.
- 1975 **Maj. Gen. Thomas P. Stafford.** Apollo-Soyuz Test Project.
- 1976 **Gen. William J. Evans.** Development of space systems.
- 1977 **Fred W. Haise, Jr., Lt. Col. Charles G. Fullerton.** First test flight of space shuttle *Enterprise*.
- 1978 No award given.
- 1979 **Maj. Gen. John E. Kulpa, Jr.** Direction of Special Projects and Satellite Programs.
- 1980 **Gen. Lew Allen, Jr.** Operational military space support.
- 1981 **Col. Joe Henry Engle, USAF, Capt. Richard H. Truly, USN.** Second flight of orbiter *Columbia*.
- 1982 **Lt. Gen. Richard Charles Henry.** Military use of payload specialists on shuttle; established Air Force Space Command.
- 1983 **Gen. James V. Hartinger.** Strengthening national security through space operations.
- 1984 **Lt. Gen. Forrest S. McCartney.** Commander of Space Division, Air Force Systems Command.
- 1985 **Maj. Gen. Donald W. Henderson.** Commander of Air Force Space and Missile Test Organization.
- 1986 **Gen. Donald J. Kutyna.** Director of Space Systems and Command, Control, and Communications for the Deputy Chief of Staff.
- 1987 **Col. Victor Whitehead.** Restoring launch capacity after *Challenger* disaster and Titan 34D launch failures.
- 1988 **Dr. Robert R. Barthelemy.** X-30 hypersonic plane project.
- 1989 **Launch Systems Directorate, Space Systems Division.** Expendable launch boosters and satellite systems.
- 1990 **Lt. Gen. Donald L. Cromer, USAF (Ret.), Gen. John L. Piotrowski, USAF (Ret.).** Strengthening USAF space systems and forces.
- 1991 **Lt. Gen. Thomas S. Moorman, Jr.** Vice Commander of Air Force Space Command.
- 1992 **Maj. Gen. Nathan J. Lindsay, USAF (Ret.).** Director of the Office of Special Projects, Office of the Secretary of the Air Force, Los Angeles AFB, Calif.
- 1993 **Gen. Merrill A. McPeak.** Air Force Chief of Staff.





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Arlington VA 22209



# Gallery of USAF Weapons

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## Attack and Observation Aircraft

### A-10/OA-10 Thunderbolt II

Designed specifically for the close air support (CAS) mission, the **A-10A** has proved an effective weapon in support of recent allied operations. Its capabilities were exemplified during the Persian Gulf War when its ability to combine large military load, long loiter, and wide combat radius proved a vital asset in Operation Desert Storm. A-10s flew 8,100 sorties, with a mission capable rate of 95.7 percent; they launched 90 percent of the Maverick missiles used and achieved the only two air-to-air gun kills in the war. In a typical antiarmor CAS mission, the A-10, affectionately nicknamed "Warthog," can fly 150 miles and remain on station for an hour. It can carry up to 16,000 lb of mixed ordnance with partial fuel or 12,086 lb with full internal fuel. The 30-mm GAU-8/A gun provides a cost-effective weapon with which to defeat the whole array of ground targets encountered in the CAS role, including tanks. Equipment includes an inertial navigation system (INS), head-up display (HUD), night vision goggles (NVGs), the Low-Altitude Safety and Targeting Enhancement (LASTE) system (which provides ground collision avoidance), Pave Penny laser target identification pod, electronic countermeasures (ECM), target penetration aids, self-protection systems, and associated equipment for AGM-65 Maverick missiles and AIM-9 Sidewinder air-to-air missiles.

Delivery of 713 A-10s was completed in March 1984. The first operational squadron was activated at Myrtle Beach AFB, S. C., in June 1977 and achieved operational capability in October of that year. In October 1987, the first **OA-10s** entered service for use in the forward air control (FAC) mission, providing coordination for, and control of, CAS assets. These aircraft are A-10s that have been redesignated and are intended to be used for airborne forward air control of fighter aircraft, combat escort, search and rescue, and visual reconnaissance. The 30-mm GAU-8/A gun is retained, but underwing stores are normally restricted to canisters of white phosphorous rockets for target marking.

A/OA-10-equipped units include US Air Forces in Europe's 52d FW at Spangdahlem AB, Germany; Air Combat Command's 20th FW, Shaw AFB, S. C.; 23d Wing, Pope AFB, N. C.; 347th Wing, Moody AFB, Ga.; and 355th Wing, Davis-Monthan AFB, Ariz.; and Pacific Air Forces' 354th FW, Eielson AFB, Alaska, and



A-10A Thunderbolt II

51st FW, Osan AB, South Korea. The 57th Wing, Nellis AFB, Nev., has some A-10s. A-10s were the first first-line aircraft to be assigned to ANG and now equip the 103d, 104th, and 110th FWs, and 175th Wing, at Bradley IAP, Conn., Barnes MAP, Mass., W. K. Kellogg Airport, Mich., and Baltimore, Md., respectively. The latter two also have OA-10 aircraft, as has the 111th FG at Willow Grove ARS, Pa. AFRES units equipped with A/OA-10s include the 47th and 303d FSS at Barksdale AFB, La., and Whiteman AFB, Mo., respectively.

A/OA-10s are deployed to Aviano AB, Italy, where they are operated by active-duty, ANG, and AFRES personnel, currently in support of NATO operations in Bosnia-Herzegovina. In addition, a squadron of 24 A-10s, based permanently at Al Jaber AB in southern Kuwait, provides on-call airpower in that area, supplementing Operation Southern Watch. (Data for A-10.)  
**Contractor:** Fairchild Republic Company, Division of Fairchild Industries.

**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 ft 6 in, length 53 ft 4 in, height 14 ft 8 in.

**Weights:** empty 28,000 lb, max gross 52,000 lb.

**Performance:** combat speed at S/L, clean, 439 mph; range with 9,500 lb of weapons and 1.7 hr loiter, 20 min reserve, 288 miles.

**Armament:** one 30-mm GAU-8/A gun; eight underwing hardpoints and three under fuselage for up to 16,000 lb of ordnance, including various types of free-fall or guided bombs, Combined Effects Munition (CEM) dispensers, gun pods, up to six AGM-65 Maverick missiles, up to four AIM-9 Sidewinder missiles, and jammer pods. Chaff and flares carried internally to counter radar-directed or infrared-directed threats. The centerline pylon and the two flanking fuselage pylons cannot be occupied simultaneously.



### AC-130H/U Spectre

Two versions of the AC-130 Spectre gunship are currently in service with USAF following retirement of the AC-130A at the end of last year. Eight **AC-130Hs** are operated by Air Force Special Operations Command's 16th SOS, 16th SOW, at Hurlburt Field, Fla., each equipped with a digital fire-control computer, two fixed 20-mm Vulcan cannon, one trainable 40-mm cannon, and a trainable 105-mm howitzer. They employ electro-optical (EO) sensors and target-acquisition systems, including forward-looking infrared (FLIR) and low-light-level television (LLLTV), and are capable of in-flight refueling. Fire-control computers, navigation, communications, and sensor suites have been upgraded.

Twelve of 13 new **AC-130U**-configured gunship conversions by Rockwell International have been delivered to the 16th SOW's 4th SOS. These aircraft combine increased firepower, reliability, and superior accuracy, with the latest methods of target location. The AC-130U has the same 40-mm and 105-mm guns as the H model but replaces the two 20-mm cannons with one trainable 25-mm Gatling gun. All weapons can be slaved to the APQ-180 digital fire-control radar, FLIR, or all-light-level television (ALLTV) for true adverse weather ground-attack operations.

ECM on all versions of the gunship enhances survivability in a low-to-medium-threat environment. Other equipment includes a HUD, combined INS, Navstar Global Positioning System (GPS), and Spectra ceramic armor protection. Each model is capable of providing precise surgical firepower and of performing special operations and conventional missions, including escort, surveillance, armed reconnaissance/interdiction, CAS, and air base defense. (Data basically as for the C-130.)

## Bombers

### B-1 Lancer

Backbone of the long-range bomber fleet, the B-1's speed, superior handling qualities, and large payload capability make it an essential element of a composite strike force, in either a penetration or standoff role. Each of Air Combat Command's 95 B-1s possesses the flexibility to deliver a variety of nuclear munitions and Mk 82 conventional gravity bombs, mines, or other weapons, or to carry additional fuel, as required. However, the conventional lethality of the B-1 is being significantly enhanced by the ongoing Conventional Mission Upgrade Program (CMUP). Under the 1996 budget, \$156 million has been allocated for R&D, with a further \$126 million for procurement. CMUP will give the B-1 capability to carry the CBU-87 and -89 cluster munitions and the CBU-97 Sensor-Fuzed Weapon, with 30 CBUs accommodated in each weapons bay. Future phases of CMUP include installation of GPS receivers, a MIL-STD-1760 weapon interface, secure radios, and improved computers to support precision weapons, including, initially, the Joint Direct Attack Munition (JDAM), eight each on three modified bomb bay rotary launchers, followed by the Joint Standoff Weapon (JSOW) and the Joint Air-to-Surface Standoff Missile (JASSM).

The B-1 has a blended wing/body configuration with variable-geometry wings. The unswept wing setting permits rapid takeoff from shorter runways and less sophisticated airfields. The fully swept position is used in supersonic flight and for the primary role of high-subsonic, low-level penetration. The bomber's offensive avionics include a modern forward-looking radar and terrain-following radar (TFR), an extremely accurate INS, computer-driven avionics, strategic Doppler radar, and a radar altimeter.

The current defensive avionics package, built around the ALQ-161 ECM system, is supplemented by chaff and flares to protect against radar-homing and heat-seeking missiles. Aircraft structure and radar-absorption



AC-130H Spectre



materials reduce the aircraft's radar signature to approximately one percent of that of a B-52. CMUP includes an upgrade to the ECM system to enhance the survivability of the B-1 in the conventional environment.

Initial operational capability (IOC) for the B-1 was achieved at Dyess AFB, Tex., in September 1986, and deliveries were completed in April 1988. Current active-duty unit locations are at Ellsworth AFB, S. D., and Dyess AFB. Recent reductions in the number of B-1s funded for flying at these two wings will help fund the B-1 CMUP. The Kansas ANG accepted its first aircraft in July 1994 at McConnell AFB, Kan. Current plans include basing ANG B-1s at Robins AFB, Ga.

In 1987, a series of international speed and distance with payload records was set by the B-1. On July 4, a 2,000-km closed circuit was covered at a speed of 669.96 mph with a payload of 30,000 kg (66,140 lb). On September 17, a similar payload was carried around a 5,000-km circuit at 655.05 mph. In addition, the B-1B broke 12 world time-to-climb records in 1992; set 11 world speed records over a 10,000-km course in April 1994; and set an around-the-world eastbound (with refueling in flight) speed record in 1995.

In a six-month operational readiness assessment (ORA) directed by Congress in 1994, the B-1 was required to demonstrate its ability to sustain a 75 percent mission capable rate. Conducted by the 28th Bomb Wing at Ellsworth AFB, the ORA met or exceeded all requirements.

**Contractors:** Rockwell International, North American Aircraft; Eaton Corporation, AIL Systems; Boeing Military Airplanes; 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 ejection seats.

**Dimensions:** span spread 136 ft 8 1/2 in, fully swept 78 ft 2 1/2 in, length 147 ft 0 in, height 34 ft 0 in.

**Weights:** empty equipped 192,000 lb, max operating weight 477,000 lb.

**Performance:** max speed at low level high subsonic (supersonic at altitude); range intercontinental.

**Armament:** three internal weapons bays capable of accommodating in a nuclear role 24 B61 or B83 free-fall nuclear bombs; in a nonnuclear role up to 84 Mk 82 (500-lb) bombs or Mk 62 mines.

## B-2 Spirit

This wholly unique advanced technology aircraft was conceived as a highly survivable strategic bomber to supplement, and ultimately replace, the B-1 in its penetration role. However, current USAF operational planning focuses on the B-2's conventional capabilities, casting it as a lead weapon system used to bring about the early engagement and destruction of an enemy's warming assets and potential. The B-2 employs sophisticated canted technologies, notably low-observable (LO) stealth techniques, and the Hughes AN/APG-181 low-probability-of-intercept radar, to minimize the possibility of detection. This capability allows the B-2 to attack heavily defended targets and neutralize enemy defenses, allowing less stealthy systems to operate.

Procurement of 21 operational B-2s will enable the 509th Bomb Wing, Whiteman AFB, Mo., to field two squadrons, each with eight operational aircraft. IOC with the 393d Bomb Squadron is scheduled for 1997. Full operational capability (FOC) with the 715th BS should occur early in the next decade.

Of flying wing configuration, the B-2 has no vertical tail surfaces. The smoothly blended "fuselage" section accommodates a two-person flight crew, with room for a third person, and two large weapon bays side by side in the lower centerbody. These bays contain rotary launchers or bomb rack assemblies capable of carrying a total weapons load of 40,000 lb; however, about 25,000 lb of nuclear weapons would be normal under the nation's Single Integrated Operational Plan (SIOP). Mounted in pairs within the wing structure are four nonafterburning turbofans, with scalloped overwing intake ducts and shielded overwing trailing-edge nozzles. The aircraft has a quadruple-redundant fly-by-wire digital flight-control system, actuating moving surfaces at the wing trailing edges that combine aileron, elevator, and rudder functions. A landing gear track of 40 ft enables the B-2 to use any runway that can handle a Boeing 727 airliner.

B-2 production is in three blocks of capability. Block 10 aircraft (nos. two to 16, including those currently on duty at Whiteman AFB) can carry B83 nuclear bombs or 16 Mk 84 2,000-lb conventional munitions. Block 20 aircraft (nos. 17-19) will additionally carry the B61 nuclear bomb, GPS-Aided Targeting System/GPS-Aided Multicenter (GATS/GAM) to permit an "early, interim, near-precision" strike capability. Up to 16 GAMs can be carried on two rotary launcher assemblies. Upgrade of Block 10 aircraft to Block 20 standard is scheduled to begin this year. The last two aircraft (nos. 20 and 21) will be Block 30 standard, with full PGM capability, including up to 16 JDAMs on the rotary launcher as-



B-1B Lancer (Ted Carlson)



B-2A Spirit (Randy Jolly)



B-52H Stratofortress

semblies, and will carry the Mk 82 500-lb bomb, cluster munitions, including Sensor-Fuzed Weapons, the M117 750-lb bomb, and the Mk 62 aerial mine on a bomb rack assembly. Other Block 30 enhancements will include fully operational defensive and offensive avionics, a more sophisticated mission planning system, and additional operating modes for the synthetic aperture radar (SAR). All aircraft will be brought up to Block 30 capability.

The first (later retired) B-2 made its first flight from Air Force Plant 42 in Palmdale, Calif., to Edwards AFB, Calif., in July 1989. The second, which flew for the first time in October 1990, is instrumented for dynamic loads testing and is assigned to envelope expansion activities. The third and fourth B-2s, which flew in June 1991 and April 1992, respectively, are equipped with full mission avionics and are assigned to avionics and weapons testing. The fifth aircraft, which flew in October 1992, was used for climatic lab tests in 1994 and is undergoing LO trials. The sixth aircraft (and final developmental vehicle) flew in February 1993 and is assigned to operational, weapons, and terrain-following evaluation. First production aircraft was delivered to Whiteman AFB on December 17, 1993. First overseas mission took place on June 10, 1995, in a 12-hour, 4,900-mile flight between Whiteman and Paris Le Bourget, with a simulated bomb drop at a range in the Netherlands en route. The 1996 appropriations bill provides an extra \$493 million of unspecified funding for the B-2. It is expected to enable the first B-2 to be removed from storage and refurbished for service as an operational bomber by 2000.

**Prime Contractor:** Northrop Corporation, with Boeing, LTV, and General Electric as key members of the development team.

**Power Plant:** four General Electric F118-GE-100 turbofans; each estimated at 19,000 lb thrust.

**Accommodation:** basic crew of two, on ejection seats, with provision for a third person.

**Dimensions:** span 172 ft 0 in, length 69 ft 0 in, height 17 ft 0 in.

**Weights:** empty 100,000-110,000 lb, gross 376,000 lb.

**Performance:** approach speed 161 mph, ceiling 50,000 ft, typical estimated unrefueled range for a hi-lo-hi mission with 16 B61 nuclear free-fall bombs 5,000 miles, with one aerial refueling more than 11,000 miles.

**Armament:** in a nuclear role: up to 20 B61 nuclear bombs, or 16 B83 nuclear bombs, or a combination. In a conventional role: 80 Mk 82 500-lb bombs or various other conventional weapons, including sea mines and PGMs.

## B-52 Stratofortress

Despite its "mature" status within the bomber force, an ever-increasing weapons capability reflects the B-52's continuing ability to perform a wide variety of missions, including show of force, maritime interdiction, precision strikes, and defense suppression. One version remains in service, the B-52H, which introduced several improvements over earlier versions, including TF33 turbofans, providing increased unrefueled range, and improved defensive armament; a total of 106 were built, with deliveries beginning in May 1961; 94 remain operational in active and reserve units.

Improvements introduced in the early 1970s included an AN/ASQ-151 EO viewing system, using FLIR and LLLTV sensors to enhance their low-level flight capability; Phase VI avionics, including ALQ-122 SNOE (Smart Noise Operation Equipment) and AN/ALQ-155(V) advanced ECM; an Air Force satellite communications kit permitting worldwide communications via satellite; a Dalmo Victor ALR-46 digital radar warning receiver; Westinghouse ALQ-153 pulse-Doppler tail warning radar; and an improved ITT Avionics ALQ-172 ECM jamming system. A digital-based solid-state offensive avionics system with inertial guidance, TERCOM (terrain comparison) guidance, and microprocessors to upgrade their navigation and weapon delivery systems was also fitted.

Deployment of the B-1 and development of the B-2 led to a change in the primary role of the B-52 to ALCM (AGM-86) and, latterly, ACM (AGM-129) carrier. A typical profile envisaged multiple cruise missile launches at high altitude, often followed by B-52 low-level descent to attack additional targets using gravity weapons.

Under current plans, the conventional capabilities of the remaining B-52 fleet are being enhanced with a view to extending the bomber's service life well into the next century. A total combat-coded, AFRES, and training force of 66 B-52Hs is envisaged, with the bomber's ability to provide massive firepower in low-threat environments supplemented by a standoff attack capability. Upgrades include the installation of GPS terminals, secure radios, and MIL-STD-1760 interfaces; addition of a third AN/ALQ-172 EWS; weapons capability to include naval mines, precision guided weapons, such as Harpoon, AGM-142 Raptor, and AGM-86C CALCM (a conventional variant of the ALCM), and advanced weapons, such as JDAM, JSOW, Wind-Corrected Munitions Dispenser, and JASSM. Installation of a heavy stores adapter beam will standardize aircraft to carry all B-52-certified munitions. A universal bomb bay adapter will improve speed and safety in switching from nuclear to conventional weapons. A reengineering option is under consideration.

On August 26, 1995, a B-52H broke the world speed record for an aircraft weighing 440,000-550,000 lb, with a payload of 11,000 lb, flying unrefueled for more than 6,200 miles at 549 mph.

**Contractor:** Boeing Military Airplanes.

**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 0 in, length 160 ft 11 in, height 40 ft 8 in.

**Weight:** more than 488,000 lb.

**Performance (approx):** max level speed at high altitude 595 mph, ceiling 55,000 ft, range more than 10,000 miles.

**Armament:** eight nuclear free-fall bombs internally and 12 AGM-86B ALCMs or AGM-129A ACMs externally, with provision for eight more ALCMs or gravity weapons internally. Conventional weapons include AGM-86C CALCMs, bombs up to 2,000 lb, air-dropped mines, cluster bombs, and, on some aircraft, three to four AGM-142A Raptor missiles, or eight AGM-84 Harpoons in underwing clusters.

## Fighters

### F-15 Eagle

USAF's primary air-superiority fighter, the basic F-15 serves with ACC, PACAF, USAF, Air Education and Training Command (AETC), and ANG. The original single-seat F-15A and two-seat F-15B were followed in June 1979 by the F-15C and F-15D, respectively, with 2,000 lb of additional internal fuel and provision for carrying conformal fuel tanks (CFTs). Basic F-15 equip-



ment includes a Hughes Aircraft APG-63 or APG-70 lightweight X-band pulse-Doppler radar for long-range detection and tracking of small high-speed objects down to treetop level. An ongoing F-15 Multistage Improvement Program (MSIP) was initiated in February 1983, with the first production MSIP F-15C produced in 1985. Improvements include an upgraded central computer, a Programmable Armament Control Set allowing for advanced versions of AIM-7, AIM-9, and AIM-120A Advanced Medium-Range Air-to-Air Missile (AMRAAM), and an expanded Tactical Electronic Warfare System that provides improvements to the ALR-56C radar warning receiver and ALQ-135 countermeasures set; the final 43 include a major upgrade to the Hughes APG-63 radar. More than 350 F-15C/Ds are scheduled to have their APG-63 radar upgraded from the end of the decade. An F-15C SEAD capability has been under development using \$58.4 million appropriated in FY 1994-95. F-15C/Ds deployed to the Persian Gulf in support of Operation Desert Storm accounted for 36 of the 39 USAF air-to-air victories. They have since been deployed to southern Iraq in support of Operation Southern Watch and to Bosnia-Herzegovina, currently in support of NATO operations.

The F-15E is USAF's two-seat, dual-role, totally integrated fighter for all-weather air-to-air and deep interdiction missions. The rear cockpit is upgraded to include four multipurpose CRT displays for aircraft systems and weapons management, with 17 separate menu displays to choose from. Modifications to the front cockpit include redesigned controls, a wide-field-of-view HUD, and three CRT multipurpose displays. The F-15E is capable of carrying up to 24,500 lb of ordnance. The digital, triple-redundant Lear Siegler flight-control system permits coupled automatic terrain following, and navigational accuracy is improved by a Honeywell ring-laser gyro INS. For low-altitude, high-speed penetration and precision attack on tactical targets at night and in adverse weather, the F-15E carries a high-resolution Hughes APG-70 radar and LANTIRN (Low-Altitude Navigation and Targeting Infrared for Night) pods, with wide-field FLIR. GPS capability was scheduled for installation from 1995.

To accommodate the new avionics, internal fuel capacity was reduced slightly, but the F-15E is fitted with CFTs, adapted to carry ordnance tangentially to reduce drag. In addition to its primary load of guided and unguided bombs and other air-to-ground weapons, the F-15E retains its air-superiority performance and weapons. Armament options include AIM-7 Sparrow, AIM-9 Sidewinder, and AIM-120 AMRAAM, as well as EO, infrared (IR), and standard bombs; AGM-65 Maverick; dispenser munitions; and nuclear weapons. AGM-130 was integrated in 1993, and AGM-88 HARM capability is scheduled for this year. A new engine bay was developed by McDonnell Douglas to



**F-15C Eagle**



**F-15E**

An advanced experimental version of the F-15, the **F-15 short takeoff, landing, and maneuvering technology demonstrator (SMTD)**, has been used for research into advanced thrust-vectoring technology at the Air Force Flight Test Center at Edwards AFB, Calif. In testing, the aircraft demonstrated high maneuverability, in-flight thrust reversing, and reductions of 35 percent in takeoff distance and 65 percent in landing distance, as well as the ability to land autonomously at night and in poor weather. Tests begun in 1994 are to assess the performance and technology benefit of Pratt & Whitney's new axisymmetric, multidirectional, thrust-vectoring nozzle. (Data for F-15C, except where stated.)

**Contractor:** McDonnell Aircraft Company, Division of McDonnell Douglas Aerospace.

**Power Plant:** F-15C: two Pratt & Whitney F100-PW-220 turbofans; each approx 23,450 lb thrust, standard since 1985. F-15E: two Pratt & Whitney F100-PW-220; each approx 23,450 lb thrust, or F100-PW-229 turbofans; each approx 29,100 lb thrust.

**Accommodation:** pilot only in F-15A/C; two seats in

F-15B/D; crew of two in F-15E on zero/zero ejection seats.

**Dimensions:** span 42 ft 9 $\frac{3}{4}$  in, length 63 ft 9 in, height 18 ft 5 $\frac{1}{2}$  in.

**Weights:** empty 28,600 lb, gross 68,000 lb in F-15A/B/C/D; empty 32,000 lb, gross 81,000 lb in F-15E.

**Performance:** F-15C: max speed Mach 2.5, ceiling 60,000 ft, T-O run 900 ft, landing run without braking parachute 3,500 ft, ferry range with external fuel tanks more than 2,878 miles, with CFTs 3,570 miles. F-15E: max level speed at height Mach 2.5, max range 2,762 miles.

**Armament:** one internally mounted M61A1 20-mm six-barrel cannon; four AIM-9L/M Sidewinder and four AIM-7F/M Sparrow air-to-air missiles, or eight AIM-120 AMRAAMs, carried externally. Provision for carrying up to 24,500 lb of ordnance on weapon stations on F-15E.

### F-16 Fighting Falcon

Equipping units throughout ACC, USAF, PACAF, AETC, AFRES, and ANG, as well as the Thunderbirds team, the F-16 incorporated advanced technologies from the start, making the initial single-seat **F-16A** and two-seat **F-16B** versions two of the most maneuverable fighters ever built. Equipment includes a multimode radar with a clutter-free look-down capability, advanced radar warning receiver, a HUD, internal chaff/flare dispensers, and a 500-rd 20-mm internal gun.

The F-16 entered operational service with the 388th Tactical Fighter Wing at Hill AFB, Utah, in January 1979. Production of the F-16A and B for USAF ended in 1985, and most now belong to AFRES and ANG. However, USAF and NATO operators have cooperated in an operational capabilities upgrade. Under this program the radar, fire-control computer, stores-management computer, and avionics software are improved, giving F-16A/Bs the ability to use next-generation air-to-air and air-to-surface weapons. Reliability/maintainability improvements include a ring-laser gyro INS and installation of the upgraded F100-PW-220E turbofan.

A forward-looking plan for the aircraft, known as the Multinational Staged Improvement Program, was implemented by USAF in February 1980 to ensure the aircraft's ability to accept systems under development, thereby minimizing retrofit costs. All F-16s delivered since November 1981 have had built-in structural and wiring provisions and systems architecture that expand the single-seater's multitrole flexibility. Stage II was applicable to Block 25 improved **F-16C** (single-seat) and **F-16D** (two-seat) versions, with cockpit, airframe, core avionics changes, and Westinghouse APG-68 radar, with increased range and advanced electronic counter-countermeasures (ECCM), of which deliveries to USAF began in July 1984.

Stage III extends to Block 50/52 F-16C/Ds and includes selected retrofits back to Block 25. These aircraft have Stage II capabilities plus advanced cockpit displays including a wide-angle HUD. Weapons improvements include multitarget AMRAAM compatibility. Also introduced at Block 40/42 were systems improvements that include core avionics hardware, installation of a LANTIRN nav/attack system, GPS, enhanced-envelope gunsight, digital flight controls, automatic terrain following, increased T-O weight and maneuvering limits, an 8,000-hour airframe, and expanded envelope 9g capability. Follow-on systems include ALE-47 improved defensive countermeasures, ALR-56M advanced radar warning receiver, advanced programmable signal processor employing very-high-speed integrated circuit (VHSIC) technology in the APG-68(V5) fire-control radar, full HARM capability, a ring-laser gyro INS, and Increased Performance Engines (IPEs) supplied by Pratt & Whitney (F100-PW-229) and General Electric (F110-GE-129). F-16C/Ds, with interim HARM capability, have been used for defense suppression/destruction missions in conjunction with F-4G "Wild Weasels." IOC with the AN/ASQ-213 HARM Targeting System (HTS) that gives the F-16 Block 50/52 the autonomous capability to launch HARMs in the range-known mode was achieved in 1994. USAF plans to acquire more than 100 F-16 HTSs for use in conjunction with RC-135 Rivet Joint EW aircraft in the defense suppression role, replacing F-4Gs. A program was begun in 1994 to equip 125 AFRES F-16C/Ds with British Aerospace TERPROM (terrain profile matching) for ground collision avoidance. The 249 USAF F-16 multimission fighters deployed to the Persian Gulf theater flew more sorties than any other type during Operation Desert Storm, with 13,500 missions. F-16Cs are currently deployed to patrol the no-fly zones in southern Iraq, and to Bosnia-Herzegovina in support of NATO operations.

Of the original F-16A/Bs, 272 have been modified to **F-16 ADF** (air defense fighter) standard, under a contract awarded in October 1986, to replace F-106s and F-4s in 11 (now eight) ANG continental air defense units. Modifications include upgrade of APG-68 radar with AMRAAM data link, provisions for AIM-7 Sparrows, improved ECCM, and improved capability against



**F-16C Block 50 Fighting Falcon**

permit installation of improved turbofans. The 4th Wing at Seymour Johnson AFB, N. C., was the first operational F-15E wing. Forty-eight USAF F-15Es were deployed to the Persian Gulf, where they made a significant contribution to the realization of allied air supremacy. Operating mainly at night, they hunted Scud missile launchers and artillery sites using the LANTIRN system. They also forged a successful operational partnership with the Joint Surveillance and Target Attack Radar System (Joint STARS) aircraft. A total of 209 F-15Es were authorized between FY 1986 and FY 1992; \$311 million is included in the FY 1996 appropriations bill for six attrition reserve aircraft; 132 are in combat-ready status in 1996.



**F-16C Block 30**



cruise missiles. New equipment includes HF radio, an IFF interrogator, an ID light, a crash-survivable flight data recorder, and provisions for GPS. Armament includes the M61 gun and up to six missiles, including combinations of Sparrows, AMRAAMs, and Sidewinders. The F-16 ADF entered service in 1989; the program is now completed.

In addition, 229 Block 50/52 USAF F-16C/Ds are to be retrofitted with a new modular mission computer (MMC) being developed under an F-16 midlife update codevelopment and coproduction program with the European participating governments of the F-16 Multi-national Fighter Program.

Current proposals include the modification of 250 Block 40 F-16C/Ds as CAS/BAI aircraft in the late-1990s to early 2000s. Modifications include a new chaff and flare system and radar warning receiver, a missile warning system, night vision goggles with compatible cockpit lighting, and improved data modem. Meanwhile, ANG's 174th FW at Syracuse, N. Y., was the first unit to convert from A-10s to F-16As in the dedicated CAS/BAI role, with centerline GPU-5/A 30-mm gun pod.

No F-16s were procured for USAF in FY 1995, but \$159 million was appropriated in FY 1996 for six new F-16s. In January 1995, Lockheed completed flight testing an F-16C fitted with mock conformal fuel tanks, an internal FLIR, two 2,000-lb laser-guided bombs, two AMRAAMs, and two AIM-9 missiles to represent its new "enhanced strategic" F-16ES fighter. The new version would have a greatly extended range, with an unrefueled combat radius of more than 1,000 miles. Follow-on improvements to be considered as part of an MSIP Phase IV include Block 40 MMC, Joint Helmet Mounted Cueing System, AIM-9X, 600-gallon tanks, JTIDS, and improved weapons capabilities. (Data for F-16C.)

**Contractor:** Lockheed Martin Corporation.

**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. 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:** span over missiles 32 ft 9 3/4 in, length overall 49 ft 4 in, height 16 ft 8 1/2 in.

**Weights:** empty (F100-PW-220) 18,238 lb, (F110-GE-100) 19,020 lb; gross, with external load (Block 40/42) 42,300 lb.

**Performance:** max speed Mach 2 class, ceiling more than 50,000 ft, radius of action, Block 40 with two 2,000-lb bombs, two AIM-9 missiles, and external fuel, hi-lo-to-hi 852 miles.

**Armament:** one M61A1 20-mm multibarrel cannon, with 511 rounds, mounted in fuselage; wingtip-mounted IR missiles; seven other external stores stations for fuel tanks and air-to-air and air-to-surface munitions.

#### F-22A/B

In an advanced stage of development, the F-22A air-superiority fighter will penetrate high-threat enemy airspace and achieve air superiority with a first-look, first-kill capability against multiple targets. Designed as follow-on for the F-15, the F-22A combines a highly maneuverable airframe at both sub- and supersonic speeds with LO stealth technologies. It will cruise at supersonic speed without using its afterburners. Its fully integrated avionics and weapon systems will permit simultaneous engagement of multiple targets. A Hughes Common Integrated Processor (CIP) is being developed using VHSIC technology to tie together various avionics functions. The cockpit will feature six flat-panel displays with multifunction display (MFD) bezel buttons permitting pilot information-display choice.

The F-22's planned \$16 billion engineering and manufacturing development (EMD) program was modified in 1993 to include provision for ground-attack capability as a result of the Pentagon's Bottom-Up Review. Further mission capabilities are being explored, including strategic attack/interdiction, reconnaissance and surveillance, and lethal and nonlethal suppression of enemy air defenses (SEAD) missions. Projected armament includes an internal M61A2 20-mm gun, AIM-9 Sidewinders stored internally in the sides of the fuselage, air/or AIM-120 AMRAAMs in the main weapons bay; for ground attack, two 1,000-pound JDAMs will replace two AMRAAMs internally.

Two prototype YF-22s were built for competitive evaluation with two Northrop/McDonnell Douglas YF-23s. In April 1991, the Lockheed/Boeing/General Dynamics team (General Dynamics has since sold its aircraft business to Lockheed) was selected to build the production-configured F-22, with Pratt & Whitney chosen to develop, and more recently to study improvements to, the F119 engine for the aircraft. In August 1991, the F-22 successfully passed the Defense Acquisition Board Milestone 2 and commenced the EMD phase. In this phase, USAF is receiving nine



F-111F



F-117A (Ted Carlson)

aircraft, construction of which began in December 1993, comprising two two-seat F-22Bs and seven single-seaters for flight testing, plus two airframes for stress testing; 27 engines are being built. The preliminary design review of all aspects of the design was completed in April 1993. Two hundred thirty-one Critical Design Reviews of subsystems were completed before the start of air vehicle Critical Design Review in late February 1995. Subassembly and assembly of the first F-22 has begun. First flight of a development aircraft is due in 1997, and the first of a planned 442 aircraft is expected to achieve IOC in 2004. Funding totaling \$2.23 billion was authorized for FY 1996. (Data for F-22A.)

**Contractor:** Lockheed Martin Corporation, with Boeing and Pratt & Whitney as key members of the development team.

**Power Plant:** two Pratt & Whitney F119-PW-100 turbofans; each in 35,000 lb thrust class.

**Accommodation:** pilot only, on zero/zero ejection seat. **Dimensions:** span 44 ft 6 in, length 62 ft 1 in, height 16 ft 5 in.

**Weight:** empty 40,000-lb class; gross approx 60,000 lb.

**Performance (F-22A design target):** max level speed at S/L 900+ mph, ceiling above 50,000 ft, range more than 2,000 miles.

#### F-111

First variable-geometry aircraft to enter operational service, the F-111 retires at the end of 1996. Designed to maintain USAF's around-the-clock, long-range interdiction mission, its terrain-following radar (TFR) and high wing loading when its wings are fully swept contribute to its sophisticated low-altitude capability.

Only one of the four versions built remains in service following retirement of the F-111E at the beginning of this year. The F-111F, of which 106 were built, has uprated turbofans; a Pave Tack system carried in its weapons bay provides a day/night capability to acquire, track, and designate ground targets for laser, IR, and electro-optically guided weapons; it can employ GBU-12 and -15, as well as TV and IR precision guided weapons. The F-111F avionics modernization program, Pacer Strike, improved the aircraft's reliability. The program involved the removal of outdated subsystems and the installation of a ring-laser gyro INS, GPS receiver, and new cockpit displays. Delivery of the twenty-ninth and final Pacer Strike F-111F took place at Cannon AFB in February 1996.

The EF-111A is an ECM conversion of the F-111A (see p. 140).

**Contractor:** General Dynamics Corporation.

**Power Plant:** two TF30-P-111 turbofans; each approx 25,100 lb thrust with afterburning.

**Accommodation:** crew of two, side by side in zero/zero escape module.

**Dimensions:** span spread 63 ft 0 in, fully swept 31 ft 11 1/2 in, length 73 ft 6 in, height 17 ft 1 1/2 in.

**Weights (F-111F):** empty 47,481 lb, gross 100,000 lb.

**Performance (F-111F):** max speed at S/L Mach 1.2, max speed at altitude Mach 2.5, ceiling more than 49,000 ft, range with max internal fuel more than 2,925 miles.

**Armament:** up to four nuclear bombs on four pivoting wing pylons, and two in internal weapons bay. Wing pylons carry total external load of up to 25,000 lb of bombs, rockets, missiles, or fuel tanks.

#### F-117A

First production combat type designed to exploit LO technology, the F-117A has been operational with the 49th FW at Holloman AFB, N. M., since 1992. Development and manufacture began simultaneously in November 1978; 60 aircraft were built and 59 deployed initially with the 37th TFW, at Tonopah Test Range Airfield, Nev. The F-117A was not officially revealed until November 1988, previous operations being restricted mainly to night flying in order to maintain secrecy, although three aircraft were lost in much-publicized accidents. Their first operational deployment was to Panama in support of Operation Just Cause. During the Persian Gulf War, more than 40 F-117As undertook 1,270 missions, flying undetected and unmolested while attacking top-priority targets.

The F-117A embodies many components that were either transferred or modified from existing aircraft, in order to minimize the potential risks involved in the decision to proceed concurrently with full-scale development (FSD) and low-level production. Its designers at the Lockheed "Skunk Works" at Burbank, Calif., relied on the concept of faceting to give the aircraft its minimal radar signature. The skin panels of the arrowhead-shaped airframe (leading-edge sweep of about 67.5°) are divided into many small, perfectly flat surfaces, which reflect at a variety of angles all signals from probing hostile ground or airborne radars. Much of the aircraft's external surface is made of composite radar-absorbent materials, with the trailing-edge parts now fabricated out of a newly developed resin that is not only harder to damage but can withstand higher temperatures. The F-117A's dull black finish reflects little light. The engine air intakes and exhaust nozzles are above the wings and rear fuselage, respectively, to shield them from IR seekers below.

Two General Electric F404 nonafterburning turbofans give the aircraft low noise signature and high subsonic performance. Quadruple-redundant fly-by-wire flight controls and a state-of-the-art digital avionics suite, complemented by a specially developed automated mission planning system, are key features of the aircraft. A Pilot Activated Automatic Recovery System, which will recover a tumbling aircraft to straight and level flight, was delivered to Tactical Air Command (TAC, now ACC) in late 1990. Retractable radio antennas are located beneath the fuselage. High-precision INS is installed, with FLIR and DLIR (downward-looking infrared) housed in a steerable turret built into the underside of the aircraft, with a boresight laser designator and an autotracker, to ensure precision attack. Computer replacement began in 1984. Various major improvement programs have been under way since 1989, including installation of a "four-dimensional" flight management system and new cockpit instrumentation, featuring full-color multifunction displays and digital moving map; FLIR and DLIR upgrade (from 1994); and installation of GPS capability and ring-laser gyro INS (from 1991). A range of midlife improvements is being studied.

**Contractor:** Lockheed Martin Skunk Works.

**Power Plant:** two General Electric F404-GE-F1D2



nonafterburning turbojets; each 10,800 lb thrust.  
**Accommodation:** pilot only, on zero/ejection seat.  
**Dimensions:** span 43 ft 4 in, length 65 ft 11 in, height 12 ft 5 in.  
**Weights:** empty (estimated) 29,500 lb, max gross 52,500 lb.  
**Performance:** max level speed 646 mph, mission radius, unrefueled (5,000-lb weapon load) 656 miles.  
**Armament:** full internal carriage of what is described as a wide variety of tactical weapons, including laser-guided 2,000-lb munitions; alternatively, AGM-65 Maverick or AGM-88 HARM; provisions for AIM-9 Sidewinder.

## Helicopters

### HH-1H Iroquois

Used by Air Force Space Command (AFSPC) for missile site support duties, the HH-1H is a general-purpose military version of the Bell Model 205 helicopter, first ordered by USAF in 1970.  
**Contractor:** Bell Helicopter Textron Inc.  
**Power Plant:** one Textron Lycoming T53-L-13B turboshaft; 1,400 shp.  
**Accommodation:** two pilots and 12 passengers; or two crew and 2,400 lb of cargo.  
**Dimensions:** rotor diameter 48 ft 4 in, length of fuselage 42 ft 0 in, height 13 ft 0 in.  
**Weight:** gross 9,500 lb.  
**Performance:** max speed 120 mph, ceiling at mission gross weight 13,450 ft, range with max fuel 347 miles.

### UH-1N Iroquois

A twin-engine version of the UH-1 utility helicopter, 79 UH-1Ns were ordered for USAF, most of which remain in the inventory for missile site support duties with AFSPC and for administrative airlift. The UH-1N is also used by the 58th SOW at Kirtland AFB, N. M., for training purposes.  
**Contractor:** Bell Helicopter Textron Inc.  
**Power Plant:** Pratt & Whitney Canada T400-CP-400 Turbo "Twin-Pac," consisting of two PT6 turboshafts coupled to a combining gearbox with a single output shaft; flat-rated to 1,290 shp.  
**Accommodation:** two pilots and 14 passengers or cargo, or external load of 4,000 lb.  
**Dimensions:** rotor diameter (with tracking tips) 48 ft 2 1/4 in, length of fuselage 42 ft 4 3/4 in, height 14 ft 10 1/4 in.  
**Weight:** gross and mission weight 11,200 lb.  
**Performance:** max cruising speed at S/L 115 mph, ceiling 13,000 ft, max range, no reserves, 261 miles.  
**Armament (optional):** two General Electric 7.62-mm Miniguns or two 40-mm grenade launchers; two seven-tube 2.75-in rocket launchers.

### MH-53J Pave Low/TH-53A

In a program initiated in 1986 to upgrade the special operations forces (SOF), Sikorsky modified USAF's 41 remaining HH/CH-53B/C and MH-53H helicopters to MH-53J Pave Low III "Enhanced" standard. These sophisticated aircraft are equipped with a nose-mounted FLIR, an integrated digital avionics suite that includes Texas Instruments AN/APQ-158 terrain-following and terrain-avoidance radar, GPS, INS, Doppler, secure communications, armor plating, mounts for .50-caliber machine guns and/or 7.62-mm Miniguns, and an ECM suite consisting of AN/ALQ-162 continuous wave radar missile jammers, ALQ-157 IR missile jammers, ALE-40 flare/chaff dispensers, ALR-69 radar warning receivers, and AAR-47 missile launch detectors.

Programmed upgrades include the Integrated Defense Avionics System (IDAS)/multimission advanced tactical terminal (MATT) modification. The IDAS/MATT system blends on-board EW systems with off-board, over-the-horizon intelligence derived from national systems relayed through the MATT receiver and displayed graphically via a digital map on a NVG-compatible, color, multifunction cockpit display. Additionally, a Service Life Extension Program (SLEP) was scheduled for completion in August 1995, upgrading the aircraft's hydraulics, wiring, and basic airframe structure for increased gross weight, as well as a shipboard fold/compatibility modification. MH-53Js were used extensively in Operations Just Cause and Desert Storm, performing both SOF and combat rescue missions. Deliveries began in the summer of 1987 to the 20th SOS at Hurlburt Field, Fla., followed by the 21st SOS, now at RAF Mildenhall, UK. MH-53Js were also delivered to the 31st SOS at Osan AB, South Korea. The 542d CTW, now the 58th SOW, at Kirtland AFB, N. M., received four. This unit also uses six TH-53As, modified USMC CH-53As, as basic qualification trainers.



UH-1N Iroquois



MH-53J Pave Low



HH-60G Pave Hawk

Modifications include the installation of General Electric T64-GE-100 engines, air refueling probe, and some standard USAF equipment. (Data for MH-53J.)

**Contractor:** Sikorsky Aircraft, Division of United Technologies Corporation.  
**Power Plant:** two General Electric T64-GE-100 turboshafts; each 4,330 shp.  
**Accommodation:** crew of six.  
**Dimensions (HH-53B):** rotor diameter 72 ft 3 in, length of fuselage (without refueling probe) 67 ft 2 in, height 24 ft 11 in.  
**Weight:** gross 50,000 lb.

### NCH-53A

Two NCH-53As are operated by AFSOC's 16th SOW, based at Hurlburt Field, Fla.

### MH/HH-60G Pave Hawk

To meet combat search-and-rescue and SOF requirements, USAF modified 98 Black Hawk helicopters to MH/HH-60G Pave Hawk configuration. The 10 MH-60Gs operated by AFSOC's 16th SOW provide a wide variety of SOF mission capabilities, including infiltration/exfiltration and personnel recovery as a collateral SOF mission and humanitarian relief. The HH-60Gs, used by active-duty, AFRES, and ANG Air Rescue Service units, provide combat search and rescue and various mission support activities worldwide. MH-60Gs are also operated by the 58th SOW for training purposes. Configuration varies between aircraft, but both versions are equipped with an integrated navigation system using GPS, INS, and Doppler, with input to a flight path-vector FLIR. A weather/ground mapping radar, with beacon tracking and KG-10 map reader, completes the tactical navigation suite; both have unsecure VHF and secure FM, HF, UHF, and SATCOM for communications. Further modifications include an integral rescue hoist and window-mounted 7.62-mm

miniguns, with provisions for a .50-caliber machine gun and an external stores support system (ESSS) for weapons and additional fuel capability on SOF aircraft only. An air refueling system and removable long-range internal fuel tanks, combined with C-5 mobility modifications, make the MH/HH-60G extremely well suited for rapid-response, long-range/loiter mission profiles requiring a broad scale of payload possibilities. (Data for MH-60G.)

**Contractor:** Sikorsky Aircraft, Division of United Technologies Corporation.  
**Power Plant:** two General Electric T700-GE-700/701C turboshafts; each 1,560 shp.  
**Accommodation:** crew of three or four; 11-14 troops, up to six litters, or internal or external cargo.  
**Dimensions:** rotor diameter 53 ft 8 in, length of fuselage 50 ft 0 3/4 in, height 16 ft 10 in.  
**Weights:** empty 10,624 lb, max gross 22,500 lb.  
**Performance:** max speed 222 mph, ceiling 19,000 ft, max range, with reserves, 373 miles (internal fuel), 500 miles (auxiliary tank).

### CV-22 Osprey

This variant of the USMC MV-22 is expected to fulfill Air Force special operations forces' requirement for high-speed, long-range, V/STOL aircraft capable of low-visibility, clandestine penetration/extraction of denied areas in adverse weather. It is designed to carry 18 troops over a 575-mile combat radius at 265 mph, or 8,000 lb of internal cargo, with a capability to hover out of ground effect at 3,900 ft pressure altitude and 82° Fahrenheit. With less stringent mid-mission parameters, the range could exceed 865 miles. Self-deployment range will be 2,420 miles with one air refueling. The CV-22 will be shipboard compatible and air refueling capable. Equipment will include a fully integrated precision navigation suite, with GPS and INS; FLIR; terrain-following/terrain-avoidance radar; digital map display; and NVG-compatible cockpit displays. Electronic warfare suite will include radar and missile warning receivers, radar and infrared missile jammers, and flare/chaff dispensers. The communications suite will include secure UHF, VHF (AM and FM), and SATCOM radios.

The CV-22 is a tiltrotor, multimission aircraft, based on Bell's XV-15, designed to have the maneuverability and lift capability of a helicopter and the speed of a fixed-wing aircraft. A Bell/Boeing consortium is the prime contractor. Boeing has overall responsibility for the aircraft's tail unit, overwing fairings, and fuselage, while Bell provides the wing, nacelles, transmissions, and rotor hub assemblies. Under subcontracts, Textron Aerostructures is responsible for the design and manufacture of the V-22's tail unit and General Electric for the digital fly-by-wire flight-control system. Allison is supplying the aircraft's two turboshaft engines.

First flight of a V-22 Osprey was made in March 1989, and four full-scale development (FSD) aircraft had flown by the end of 1991. Flight testing resumed in April 1993, following the incorporation of numerous design changes, leading to a significant reduction in empty weight. The aircraft have demonstrated speed in excess of 400 mph, completed initial sea trials, formation flying, and cross country evaluations. CDR passed December 1994. First flight of an EMD aircraft is expected December this year.

USAF is acquiring 50 CV-22s. AFSOC is scheduled to receive its first aircraft in 2003, with IOC for 12 Ospreys in 2005. In addition, USMC will receive 425 MV-22s and USN 48 HV-22s  
**Power Plant:** two Allison T406-AD-400 turboshafts; each 6,150 shp.  
**Dimensions:** proprotor diameter 38 ft 0 in, width, rotors turning 83 ft 10 in, fuselage length 57 ft 4 in, height over tailfins 17 ft 7 3/4 in.  
**Weights:** normal mission weight, VTO 47,500 lb; gross, STO 60,500 lb.  
**Performance:** max cruising speed in helicopter mode 115 mph, in airplane mode 316 mph, ceiling 26,000 ft, range with internal auxiliary tanks 1,700 miles.

## Reconnaissance and Special-Duty Aircraft

### U-2R/RT/S/ST

The U-2 is a single-seat, single-engine, high-altitude reconnaissance aircraft. Current models are derived from the original version that was produced in various forms in the late 1950s. The U-2R, first flown in 1967, is significantly larger and more capable than the origi-



nal aircraft. A tactical reconnaissance version, the TR-1A, first flew in 1981. Designed for standoff tactical reconnaissance in Europe, the TR-1 was structurally identical to the U-2R. The last U-2 and TR-1 aircraft were delivered to USAF in October 1989. In 1992, all U-2s and TR-1s were consolidated under the designation U-2R. The entire fleet of aircraft (30 U-2R single-seat aircraft and four U-2RT two-seat trainers) is being reengineered with the General Electric F118-101 engine and redesignated U-2S/ST. A derivative of the engine used in the B-2, the GE F118-101 provides improved performance and supportability. Conversion is expected to be completed by 1998.

The U-2 provides critical intelligence to national decision-makers and theater commanders through all phases of conflict, including peacetime indications and warning, crisis, low-intensity conflict, and large-scale hostilities. It is capable of collecting multisensor photo, electro-optic, infrared, and radar imagery, as well as performing other types of intelligence functions. U-2s are based at Beale AFB, Calif., and support national and tactical requirements from four operational detachments throughout the world. Current upgrades to its sensors will make the U-2 a valuable reconnaissance aircraft well into the next century.

**Contractor:** Lockheed Corporation.

**Power Plant:** initially, one Pratt & Whitney J75-P-13B turbojet; 17,000 lb thrust; being reengineered with F118-GE-101 turbojet.

**Dimensions:** span 103 ft 0 in, length 63 ft 0 in, height 16 ft 0 in.

**Weight:** gross 40,000 lb.

**Performance:** max cruising speed at over 70,000 ft more than 430 mph, ceiling U-2R: more than 70,000 ft, U-2S: more than 73,500 ft, range U-2R: more than 3,000 miles, U-2S: more than 4,500 miles, max endurance U-2R: around 12 hr, U-2S: around 15 hr.

**Armament:** none.

#### SR-71 "Blackbird"

Three supersonic SR-71 "Blackbird" aircraft were reactivated in FY 1995 to provide wide-area reconnaissance and intelligence support. The refurbished aircraft are assigned to Edwards AFB, Calif. The SR-71 was retired originally in 1990.

**Contractor:** Lockheed Corporation.

**Power Plant:** two Pratt & Whitney JT11D-20B (J58) turbojet engines; each 34,000 lb thrust with afterburning.

**Accommodation:** crew of two in tandem, on ejection seats.

**Dimensions:** span 55 ft 7 in, length 107 ft 5 in, height 18 ft 6 in.

**Weights:** empty 60,000 lb, gross 172,000 lb.

**Performance:** max speed at 78,750 ft more than Mach 3, operational ceiling above 80,000 ft.

**Armament:** none.

#### F-4G Phantom II

Scheduled for retirement in Fiscal 1996, the F-4G "Advanced Wild Weasel" was developed from the F-4E with its gun replaced by AN/APR-47 EW equipment, capable of passing real-time target information to the aircraft's missiles prior to launch. Working in "hunter-killer" teams of two aircraft, such as F-4G and F-16C, the F-4G "hunter" can detect, identify, and locate enemy radars and then direct against them weapons for their destruction or suppression. The F-4G's effectiveness during the Persian Gulf War, against enemy surface-to-air missile batteries, led the Air Force to retain a single squadron of F-4Gs, the 561st FS at Nellis AFB, Nev. F-4Gs also equipped ANG's 124th FW at Boise, Idaho, until the end of last year. Primary armament includes HARM (AGM-88), F-4Gs deployed to Saudi Arabia were also equipped with ALQ-131 and ALQ-184 ECM pods. F-4Gs have been assigned to Operation Southern Watch. (Data for unmodified F-4E; F-4G similar.)

**Contractor:** McDonnell Aircraft Company, Division of McDonnell Douglas Corporation.

**Power Plant:** two General Electric J79-GE-17A turbojets; each 17,900 lb thrust with afterburning.

**Accommodation:** pilot and electronic warfare operator in tandem, on ejection seats.

**Dimensions:** span 38 ft 7½ in, length 63 ft 0 in, height 16 ft 5½ in.

**Weights:** empty 30,328 lb, gross 61,795 lb.

**Performance:** max speed at 40,000 ft Mach 2.0 class, range with typical tactical load 700 miles.

#### EC-130

Several variants of the basic C-130 have been produced for specialized missions, including the following:

The **EC-130E ABCCC**, used as an Airborne Battlefield Command and Control Center by the 42d ACCS at Davis-Monthan AFB, Ariz. Seven aircraft have been updated by Unisys to ABCCC III standard. EC-130s have been deployed in support of NATO operations in Bosnia-Herzegovina.

The **EC-130E "Commando Solo"** psychological operations broadcasting version operated by ANG's 193d



U-2R



F-4G Phantom II



EC-130E ABCCC (Maj. Michael Marston)



EC-130H "Compass Call" (Randy Jolly)



EC-135K (Ted Carlson)

SOW, Harrisburg, Pa. Lockheed Aircraft Service (LAS) is upgrading six Commando Solo aircraft to the worldwide color television (WWCTV) configuration. The 193d's EC-130Es conducted numerous "Radio Democracy" missions in support of Haitian operations.

The **EC-130H "Compass Call"** communications jammer, which played a vital role in disrupting Iraqi military communications at strategic and tactical levels during the Gulf War. EC-130Hs are operated by the 41st and 43d ECs at Davis-Monthan AFB, Ariz. Altogether, 14 EC-130Hs are in service. (Data basically as for C-130.)

#### EC-135, etc.

Several aircraft in the KC-135 Stratotanker series

were modified for specialized missions during production or at a later date. Thirty-nine are modified for strategic airborne command-and-control missions. Five KC-135A tankers were converted for Airborne Command Post use by Strategic Air Command (SAC) in 1960. Additional aircraft were modified in 1962, and 17 new-production KC-135B turbofan aircraft entered the system in 1965. Currently, **EC-135C/Y** aircraft are assigned to ACC, PACAF, and USAF. They are fitted with extensive communications equipment to support strategic command-and-control missions of their respective CINCs. On July 24, 1990, EC-135Cs ceased to be on continuous airborne alert, but at least one of these air refuelable aircraft flies a mission each day, accommodating a flight crew of four, a general officer, and a staff of 18. Twelve are in service and have been adapted to provide control of Minuteman ICBMs. ACC's 552d ACW at Tinker AFB, Okla., provides overseas deployment control of fighters with the **EC-135K**. Modifications to the EC-135 aircraft include continuation of the UHF line-of-sight system replacement, the initial Milstar transition satellite communications terminals, and the Peacekeeper upgrades to Airborne Launch Control Aircraft. Follow-on enhancements include full Milstar capability and improved low-frequency and very-low-frequency (LF/VLF) radios and antennas.

Five **EC-135A/E advanced range instrumentation aircraft (ARIA)** are operated by the Air Force Flight Test Center's 452d FTS, Edwards AFB, Calif., as telemetry and voice relay stations to supplement land and sea receiver stations for DoD, NASA, and NATO customers. The aircraft's distinctive bulbous nose houses the world's largest airborne steerable antenna.

Versions of the C-135 Stratolifter series used for reconnaissance include turbofan **RC-135Ss**, **RC-135Us**, **RC-135Vs**, **RC-135Ws**, and **RC-135Xs**, operated by ACC's 55th Wing, Offutt AFB, Neb., for specific reconnaissance tasks. RC-135s have operated in the Persian Gulf region since 1990. Rivet Joint RC-135s will help replace F-4Gs by loitering near battlefields and providing data on enemy air defense systems to crews of F-16 HTS aircraft. The 55th Wing also operates a modified version of the WC-135, designated **OC-135B**, with an infrared linescanner, synthetic aperture radar, and forward- and vertical-looking video cameras, to monitor the 1992 Open Skies Treaty; program requirement is for three aircraft.

To minimize the cost of retrofitting the special-purpose -135s with more efficient turbofan engines, USAF installed in some aircraft refurbished Pratt & Whitney JT3D-3Bs taken from Boeing 707-100B aircraft, purchased as surplus from commercial air carriers. Re-engineing of two more RC-135s was funded for FY 1996. (Data basically as for C-135.)



### EF-111A Raven

With the decision to consolidate the standoff jamming requirement of both the Air Force and the Navy into the USN's EA-6B Prowler aircraft, the EF-111A is to be phased out by the end of the decade. Developed for defense-suppression missions in worldwide support of US tactical strike forces, the EF-111A is a conversion of the basic General Dynamics F-111A airframe. Specialist equipment includes the ALQ-99E primary jammer, a derivative of the Navy ALQ-99, carried internally. This system's frequency coverage, reliability, and effective use of available jamming power enables the EF-111A to suppress extremely dense electronic defenses. Other equipment includes self-protection systems from the F-111 (ALQ-137, ALR-62). The cockpit was revised, and the ALQ-99E receivers were housed in a new vertical stabilizer. The AN/ALE-40 tactical countermeasures dispenser provides self-protection expendables. Other improvements under the avionics modernization program included upgrade of the TFR and installation of GPS equipment and a new INS.

Forty-two EF-111As were produced for missions that include barrier standoff jamming, degradation of acquisition radars during CAS operations, and close-in jamming and direct support for deep strike missions. Flight testing began in March 1977, and the first "production" EF-111s were delivered in late 1981 to the 366th TFW at Mountain Home AFB, Idaho, where they achieved IOC with the 390th ECS in December 1983. Second operational location, from February 1984, was the 42d ECS at RAF Upper Heyford, UK, from where Libyan targets were attacked in April 1986. During the Gulf War, EF-111 area jamming was crucial to the maintenance of coalition air supremacy, pouring electrons into Iraqi target-acquisition radars and rendering them useless. EF-111As are now consolidated in the 429th ECS at Cannon AFB, N. M.; of the remaining 40 aircraft, 24 will be retained through 1997, and 12 through 1999.

**Contractor:** Grumman Aerospace Corporation.

**Power Plant:** two Pratt & Whitney TF30-P-109 turbofans; each 19,600 lb thrust with afterburning.

**Accommodation:** crew of two, side by side in zero/zero escape module.

**Dimensions:** span spread 63 ft 0 in, fully swept 31 ft 11½ in, length 76 ft 0 in, height 20 ft 0 in.

**Weights:** empty 55,275 lb, gross 88,948 lb.

**Performance:** max combat speed 1,377 mph, ceiling with afterburning at combat weight 45,000 ft, combat radius with reserves 230-929 miles, according to mission.

**Armament:** none.

### E-3B/C Sentry (AWACS)

The E-3 Airborne Warning and Control System aircraft is a mobile, flexible, survivable, and jam-resistant surveillance and command, control, and communications (C<sup>3</sup>) system capable of all-weather, long-range, high- or low-level surveillance of all air vehicles, manned or unmanned, above all kinds of terrain. A modified Boeing 707-320B, AWACS carries an extensive complement of mission avionics, including computer, radar, IFF, communications, display, and navigation systems. The capability of AWACS is provided by its Westinghouse Electric Corp. look-down radar, which makes possible all-altitude surveillance over land or water, thus correcting a serious deficiency in earlier surveillance systems.

The E-3 serves a dual role within USAF: as a command-and-control center to support quick-reaction deployment and tactical operations and as a survivable early warning command-and-control center for identification, surveillance, and tracking of airborne enemy forces and for the command and control of NORAD forces over the continental US.

Deliveries of the basic production version, designated E-3A Sentry, began in March 1977, when the first aircraft was handed over to TAC's (now ACC's) 552d ACW at Tinker AFB, Okla. Twenty-four were built. Twenty-two of them, plus two prototypes, were upgraded to E-3B configuration. Improvements included much-enhanced computer capabilities, antijam communications, an austere maritime surveillance capability, additional radio communications, and five additional display consoles.

A US/NATO Standard E-3A configuration was introduced starting with the twenty-fifth production USAF Sentry, delivered in December 1981. In this version, the data-processing capability was improved and a maritime detection capability included. Nine were built for USAF, and one of the original E-3As was upgraded to this standard. The 10 US Standard E-3A aircraft were subsequently upgraded to E-3Cs, with additional command-and-control capability, in 1984-88. A further 18 Standard E-3As are operated by NATO as part of a cooperative program to upgrade the command and control of NATO's air defense forces.

The E-3 AWACS fleet is undergoing a major capabilities upgrade. All 33 USAF and 18 NATO E-3s are being equipped with the Joint Tactical Information Distribution System (JTIDS) for antijam digital communications. New



EF-111A Raven



E-3C Sentry



E-8C Joint STARS

passive detection systems, known as electronic support measures (ESM), will complement the active, beaming radar, enabling the aircraft to detect signals emitted by both hostile and friendly targets; trial installation was completed in 1995. Additional enhancements to US E-3s include upgrading of JTIDS to TADIL-J (Tactical Data Information Link-Joint) capability, central computer memory upgrade, and ability to employ GPS. Full-scale development (FSD) contracts for a major upgrade to the Westinghouse APY-1 and APY-2 radar, under the Radar System Improvement Program, were awarded in September 1989. This will enable the AWACS aircraft operating in the pulse-Doppler mode to detect much smaller radar cross section stealth targets. IOC for these improvements is scheduled for FY 1999, with contract completion after 2000.

E-3s assumed a continental US air defense role in January 1979, when NORAD personnel began augmenting TAC E-3 flight crews on all operational NORAD missions by the 552d ACW. Overseas units include the 961st and 962d Airborne Air Control Squadrons, based at Kadena AB, Japan, and Elmendorf AFB, Alaska, respectively. Deployments have been made to the Pacific, the Middle East, southwest Asia, the Mediterranean area, and Europe in support of Operations Desert Storm, Provide Comfort, and Southern Watch. AWACS aircraft are also used in support of the US drug enforcement program.

**Contractor:** Electronic Systems Division, Boeing Defense & Space Group.

**Power Plant:** four Pratt & Whitney TF33-PW-100/100A turbofans; each 21,000 lb thrust.

**Accommodation:** basic operational crew of 23, including 19 AWACS mission specialists.

**Dimensions:** span 145 ft 9 in, length 152 ft 11 in, height 41 ft 9 in.

**Weight:** gross 335,000 lb.

**Performance:** max speed 530 mph, ceiling above 29,000 ft, endurance six hr on station 1,000 miles from base.

### E-4B

Three E-4As were built initially to support the National Emergency Airborne Command Post (NEACP), now the National Airborne Operations Center (NAOC). Each had a modified Boeing 747 airframe and provided an interim capability by utilizing existing EC-135 C<sup>3</sup>

equipment. Four fully developed E-4B Airborne Command Post aircraft (three of them converted from E-4As) now support the NAOC mission. They are hardened against the effects of nuclear explosions, including electromagnetic pulse; are equipped for in-flight refueling; contain a 1,200-kVA electrical system designed to support advanced electronics; and have a wide variety of communications equipment. This includes an LF/VLF system, improved satellite communications system, and communications processing equipment. These systems will support operations in a nuclear environment over extended ranges. The E-4B system is capable of tying into commercial telephone and radio networks and could be used for radio broadcasts to the general population. Improvements have included a data-processing capability and more survivable C<sup>3</sup>, including initial Milstar modification. The first E-4B entered service with SAC in January 1980, and the first operational mission was flown in March of that year. ACC is now the Air Force's single-resource manager for the E-4 airborne command post aircraft, with the main operating base at 55th Wing, Offutt AFB, Neb.

**Contractor:** Boeing Aerospace Company.

**Power Plant:** four General Electric CF6-50E2 turbofans; each 52,500 lb thrust.

**Dimensions:** span 195 ft 8 in, length 231 ft 4 in, height 63 ft 5 in.

**Weight:** gross 800,000 lb.

**Performance:** unrefueled endurance in excess of 12 hr.

### E-8 Joint STARS

The USAF/US Army Joint Surveillance and Target Attack Radar System (Joint STARS) was developed to undertake ground surveillance, targeting, and battle management missions. However, USAF is expanding its role to include bomb-damage assessment, Suppression of Enemy Air Defenses (SEAD), and Theater Missile Defense, with emphasis on the detection of mobile missile launchers and their decoys, following the unexpected, but highly successful, demonstration of the Joint STARS prototype capabilities during Operation Desert Storm.

The original contract for FSD of the system was awarded to Grumman in September 1985. The company was made responsible for subsystems installation, integration, and flight testing of specialized equipment aboard two 707-300 airframes specially modified by Boeing for this purpose. The first modified airframe was delivered to Grumman in August 1987, followed by the second in November 1988. First flight of a fully Joint STARS-configured aircraft took place in December 1988. The second aircraft flew in August 1989 and became the primary test version, following the installation of additional equipment. Airborne equipment on the prototypes includes a Norden multimode side-looking radar antenna, some 25 ft long, faired into the belly of each aircraft. With a reported range in excess of 155 miles, this radar, which is integrated with GPS, operates in synthetic aperture radar mode to detect and locate stationary objects, such as parked tanks, and alternates between SAR and a Doppler-type mode to locate and track slow-moving targets. The Joint STARS then directs attack on the targets, in real time, via a jam-resistant, high-capacity, digital data link or radio. Sensor and signal-processing systems are being upgraded. The two E-8A prototypes have 10 operations consoles and two communications stations. An estimated 386,100 square miles can be covered in a single eight-hour sortie, cruising at 30,000-40,000 ft. Because new Boeing 707 airframes are no longer available, USAF is purchasing and modifying used 707s, rather than qualify another type of aircraft. Designated E-8C, these will be the production version and will carry a crew of USAF and Army specialists to man 18 operations-and-control consoles, two of them doubling as communications stations, that display color-coded images of radar data and information from AWACS aircraft of behind-the-lines terrain and of wheeled and tracked vehicles moving anywhere on it. The first E-8C flew in March 1994 and serves as the preproduction test-bed. The two E-8A test aircraft will be upgraded to C standard and will be the last to be delivered.

Joint STARS is the US candidate to satisfy the NATO Alliance Ground Surveillance System requirement. The prototype Joint STARS was deployed to the European theater for Eurostar 94. In December 1995, the two preproduction E-8s deployed to Rhein-Main AB, Germany, to support Operation Joint Endeavor by providing critical surveillance information to the NATO-led operations in Bosnia-Herzegovina. USAF plans to acquire 20 E-8s, with initial delivery due early this year and IOC scheduled for 1997. Funding for two E-8s was appropriated in FY 1996, with \$182 million more for R&D. (Data for E-8C.)

**Contractor:** Northrop Grumman Corporation.

**Power Plant:** four Pratt & Whitney JT3D-3B turbojets; each 18,000 lb thrust.

**Dimensions:** span 145 ft 9 in, length 152 ft 11 in, height 42 ft 6 in.

**Weights:** empty 171,000 lb, gross 336,000 lb.



**Performance:** max operating speed Mach 0.84, ceiling 42,000 ft, endurance with one in-flight refueling 20 hr.

#### E-9A

Two highly modified Boeing Canada (de Havilland) DHC-8 Dash 8M-100 aircraft are operated by the 475th Weapons Evaluation Group at Tyndall AFB, Fla., as airborne platform telemetry relay aircraft. Designated E-9A, each is equipped with a sensor suite that includes an AN/APS-128D sea surveillance radar in a ventral radome and a five-beam, electronically steerable, 75-square-foot, phased-array telemetry antenna in a starboard-side fuselage fairing. This is capable of automatically detecting, tracking, and relaying data simultaneously from five pairs of distinct sources traveling at speeds of Mach 5 or more. It is used for low-altitude, over-the-horizon data-gathering during missile tests and for sea surveillance in order to keep boats out of the Gulf Test Range during tests.

**Contractor:** de Havilland Inc.

**Power Plant:** two Pratt & Whitney Canada PW120A turboprops; each 1,800 shp. (No military designation on these engines.)

**Accommodation:** three: pilot, copilot, and systems operator.

**Dimensions:** span 85 ft 0 in, length 73 ft 0 in, height 24 ft 7 in.

**Weight:** gross 33,000 lb fully fueled.

**Performance:** max speed at 25,000 ft 245 mph, max operational altitude 25,000 ft, loiter time 5 hr.

#### EC-188/D

The EC-188 advanced range instrumentation aircraft (ARIA) is a modified former American Airlines Boeing 707-320 series transport, of which four replaced some of the EC-135 ARIAs operated by the Aeronautical Systems Center's 4950th TW at Wright-Patterson AFB, Ohio (now the 452d FTS, part of the 412th TW, Edwards AFB, Calif.). In common with the EC-135 ARIAs, the 707s are converted to house the world's largest airborne steerable antenna in a bulbous nose, with a probe antenna on each wingtip and a completely new cockpit configuration. Range, cabin space, and fuel efficiency are all increased to provide greater support for the expanding ARIA mission, including DoD and NASA space and missile programs. The aircraft can accommodate a crew of 16-24. Following conversion, the first EC-188B was flown for the first time in February 1985 and entered operational service in January 1986.

Two Boeing 707s have been modified by Chrysler Technologies Airborne Systems, Inc., for use as dedicated Cruise Missile Mission Control Aircraft. Specialized equipment includes an AN/APG-63 surveillance radar, telemetry receiver, and weather radar. Designated EC-18D cruise missile mission control aircraft (CMMCA), they are operated by the 452d FTS in support of USN and USAF missile testing. They are also capable of monitoring and controlling unmanned aerial vehicles.

**Contractor:** Boeing Military Airplanes.

#### WC-130/H

Modified C-130 Hercules transports, designated WC-130H, are equipped for weather reconnaissance duties, including penetration of tropical storms, to obtain data for forecasting storm movements. They are assigned to AFRES's 53d WRS at Keesler AFB, Miss. (Data similar to those for C-130.)

## Transports and Tankers

#### C-5A/B/C Galaxy

First flown in June 1968, this huge, long-range, air refuelable, heavy logistics transport remains a major asset to global airlift requirements, whether in a combat situation, as with the massive airlift of US forces to the Persian Gulf in the early stages of Operation Desert Shield, or in response to the many calls for humanitarian relief worldwide.

USAF took delivery of 81 basic C-5As between December 1969 and May 1973. Under a subsequent major modification program, Lockheed produced component kits to extend the service life of the C-5A's wings by 30,000 flight hours, without load restrictions. These kits replaced only the five main load-carrying wing boxes, to which other existing components were transferred. The use of 7175-T73511 aluminum alloy provided greater strength and resistance to corrosion. Modification of all 77 aircraft in the inventory took place between 1982 and 1987. Two AFRES squadrons and one ANG squadron are C-5A-equipped. Two C-5As,



E-9A

redesignated C-5C and assigned to Travis AFB, Calif., have been modified to carry outside space cargo by extending the cargo bay and modifying the aft doors.

Responding to an urgent need for additional heavy airlift capacity, USAF acquired 50 C-5Bs, generally similar to the C-5A but embodying all the improvements introduced since completion of C-5A production. These include the strengthened wings, General Electric TF39-GE-1C turbofans, and updated avionics, including Bendix color weather radar and Delco triple INS. The original MADAR (Malfunction Detection Analysis and Recording) instrument units were replaced by the more advanced MADAR II. The first C-5B flew for the first time in 1985 and was delivered to Altus AFB, Okla., in January 1986. Deliveries were completed in April 1989. C-5 units include AMC's 60th AMW at Travis AFB, Calif., the 436th AW at Dover AFB, Del., AFRES's 301st and 312th ASs (Assoc.) at Travis AFB, 326th and 709th ASs (Assoc.) at Dover AFB, 68th AS at Kelly AFB, Tex., 337th AS at Westover AFB, Mass., ANG's 105th AW at Stewart IAP, N.Y., and AETC's 97th AMW, at Altus AFB, Okla. The reliability and maintainability of the C-5A has been the focus of numerous AMC studies. Meanwhile, a program is in hand to upgrade the C-5A fleet with the avionics subsystems developed for the C-5B, including installation of MADAR II. All Galaxies are being fitted with new, safer interior panels. In addition, a prototype missile defense system, incorporating Tracor AN/ALE-40 flare dispensers and a Honeywell AN/AAR-47 missile warning system, has been installed on a number of C-5s by Lockheed Martin under the Pacer Snow project. (Data for C-5B.)

**Contractor:** Lockheed Martin Corporation.

**Power Plant:** four General Electric TF39-GE-1C turbofans; each 43,000 lb thrust.

**Accommodation:** crew of six, rest area for 15 (relief crew, etc.); seating for 75, and 36 standard 463L pallets or assorted vehicles, such cargo as two M60

tanks or three CH-47 Chinook helicopters, or a maximum of 340 passengers in an Airbus configuration.

**Dimensions:** span 222 ft 8½ in, length 247 ft 10 in, height 65 ft 1½ in.

**Weights:** empty 374,000 lb, max payload 261,000 lb, gross (for 2g) 837,000 lb.

**Performance:** max speed at 25,000 ft 571 mph, ceiling (at 615,000 lb) 35,750 ft, 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 6,469 miles.

#### C-9A/C Nightingale

A derivative of the DC-9 Series 30 commercial airliner, the C-9A aeromedical airlift transport has been in service since August 1968. Modifications include a special-care compartment with separate atmospheric and ventilation controls. Delivery of 21 to the former Military Airlift Command's (MAC's) 375th AAW, now redesignated (AMC's) 375th AW, was completed by February 1973; this unit is augmented by the 73d AS (Assoc.) of AFRES, collocated at Scott AFB, Ill. C-9As perform theater aeromedical evacuation in Europe and the Pacific, with four aircraft based at the 86th AW, Ramstein AB, Germany, and three at the 374th AW, Yokota AB, Japan. Because of the critical nature of its mission, the aircraft carries a flight mechanic and a small supply of spares. Three specially configured C-9Cs were delivered to the 89th AW at Andrews AFB, Md., in 1975 for presidential and other US governmental duties. (Data for C-9A.)

**Contractor:** Douglas Aircraft Company, Division of McDonnell Douglas Corporation.

**Power Plant:** two Pratt & Whitney JT8D-9 turbofans; each 14,500 lb thrust.

**Accommodation:** crew of three; 40 litter patients or 40 ambulatory patients, or a combination of both, plus five medical staff.

**Dimensions:** span 93 ft 3 in, length 119 ft 3 in, height 27 ft 6 in.

**Weight:** gross 108,000 lb.

**Performance:** max cruising speed at 25,000 ft 565 mph, ceiling 35,000 ft, range more than 2,000 miles.

#### C-12C/D Huron

Thirty military versions of the Beechcraft Super King Air 200 were delivered to USAF under the designation C-12A in support of attaché and military assistance advisory missions worldwide. These aircraft were subsequently refitted with PT6A-41 engines and redesignated C-12C. AMC uses two C-12Cs to train aircrews and to supplement support airlift. Six C-12D versions, with cargo door, high flotation landing gear, and provision for tip tanks, were delivered to USAF. PACAF uses five C-12s for the time-sensitive movement of people and cargo. (Data for original C-12A.)

**Contractor:** Beech Aircraft Corporation.

**Power Plant:** two Pratt & Whitney Canada PT6A-38 turboprops; each 750 shp.



C-5B Galaxy



C-9A Nightingale (Ted Carlson)

**Accommodation:** crew of two; up to eight passengers or 4,764 lb of cargo. Convertible to aeromedical evacuation configuration.

**Dimensions:** span 54 ft 6 in, length 43 ft 9 in, height 15 ft 0 in.

**Weight:** gross 12,500 lb.

**Performance:** max speed at 14,000 ft 301 mph, ceiling 31,000 ft, range at max cruising speed 1,824 miles.

#### C-17A Globemaster III

Initial operational capability of the first C-17 operational squadron was declared on January 17, 1995, at Charleston AFB, S.C. Developed to meet US force-projection requirements, the C-17A is a heavy-lift, air



refuelable cargo transport, designed to provide inter- and intratheater airlift of all classes of military cargo, including outside items, such as the Army's M1A2 tank. It is able to operate routinely into small, austere airfields (3,000 ft x 90 ft) previously restricted to C-130s and provides the first capability to air-land or air-drop outside cargo in the tactical environment. The C-17A not only enhances US airlift capability across the board but also provides much-needed force-structure modernization.

The C-17A made its first flight September 15, 1991, and completed its flight test program in June 1995. As of January 1996, 23 production aircraft had been delivered to the Air Force, with two squadrons operating at Charleston AFB. They have flown operational missions during Operation Vigilant Warrior in the Persian Gulf and in Bosnia, as well as providing humanitarian relief to the Virgin Islands following Hurricane Marilyn. The C-17 has set 22 world records for payload-to-altitude, time-to-climb, and short-takeoff and landing with payload. In this last category, an Edwards AFB C-17 took off and landed in less than 1,400 ft while carrying 44,000 lb of payload.

McDonnell Douglas was announced as the selected prime contractor in August 1981 and received a low-level R&D contract the following July. This was intended to cover C-17 technologies that would also benefit other airlift programs, while preserving the option to proceed to FSD work on the C-17. FSD was approved in February 1985. Initial procurement funding was authorized in the FY 1987 budget, together with continued R&D. Forty production aircraft have been approved through 1996, with an additional 80 agreed in November 1995 by the Defense Acquisition Board, after several analyses indicated that an all-C-17 fleet was more cost-effective than a mix of C-117s and commercial freighters. A purchase-rate decision is expected in the near future. USAF requested an acquisition rate of 15 per year. Total planned disposition of the C-17 includes 48 aircraft each to Charleston AFB, S. C., and McChord AFB, Wash., eight to a prospective AETC training unit at Altus AFB, Okla., and six to ANG's 172d AW at Jackson, Miss.; the remaining 10 aircraft will be used for backup.

The C-17 is the first military transport to feature a full digital fly-by-wire control system and two-crew cockpit, with two full-time, all-function HUDs and four multi-function electronic displays.

Subcontractors for the C-17 program include Beech Aircraft Corp. (composite winglets), Delco Electronics Corp. (mission computer and electronic display system), Northrop Grumman Corp. (ailerons, rudder, elevators, vertical and horizontal stabilizers, and engine nacelles), GEC-Marconi (advanced HUD), Honeywell Inc. (support equipment and air data computers), and Lockheed Martin (tailcone and electronic flight-control system).

**Prime Contractor:** McDonnell Douglas Aerospace, Division of McDonnell Douglas Corporation.

**Power Plant:** four Pratt & Whitney F117-PW-100 turbofans; each 41,700 lb thrust.

**Accommodation:** normal flight crew of two, plus loadmaster. Provisions for the full range of military airlift missions, including capacity for up to 154 passengers, 102 paratroops, or 48 litters; range of military cargo including tanks, Jeeps, and up to three AH-64A helicopters; air-drop capability for up to 60,000-lb single platforms or 110,000-lb multiple platforms.

**Dimensions:** span 165 ft 0 in, span at winglet tips 170 ft 0 in, length 174 ft 0 in, height 55 ft 1 in.

**Weights:** empty 277,000 lb, max payload (2.25g) 170,000 lb, gross 585,000 lb.

**Performance:** normal cruising speed at height 518 mph (Mach 0.77), ceiling 45,000 ft, range with 130,000 lb payload 3,200 miles.

#### C-20A/B/H Gulfstream III/IV

Ten off-the-shelf Gulfstream III transports, each with accommodation for five crew and 14 passengers, were acquired by USAF to replace aging, fuel-inefficient C-140Bs. Three C-20As and one C-20B, delivered to the 89th AW, Andrews AFB, Md., in FY 1983 and FY 1984 under a lease/purchase agreement, were subsequently purchased. Another six C-20Bs, with advanced mission communications equipment and revised interior, were ordered in January 1986. As these were delivered to Andrews AFB, the original three C-20As were transferred to Ramstein AB, Germany, in support of the 58th AS's special airlift mission in Europe. The C-20s provide the Special Air Mission (SAM) fleet with intercontinental range and ability to operate from short runways. Gulfstream IV aircraft, with advanced technology flight management systems and upgraded Rolls-Royce engines, were acquired by USAF to meet expanding SAM requirements. Designated C-20H, they are assigned to Andrews AFB. (Data for C-20A/B.)

**Contractor:** Gulfstream Aerospace Corporation.

**Power Plant:** two Rolls-Royce F113-RR-100 turbofans; each 11,400 lb thrust.

**Accommodation:** crew of five; 14-18 passengers.



C-17 Globemaster III



C-21A (Ted Carlson)



C-23A Sherpa (Ted Carlson)



C-27A Spartan (W. Van Winkle)

**Dimensions:** span 77 ft 10 in, length 83 ft 1 in, height 24 ft 4 1/2 in.

**Weight:** gross 69,700 lb.

**Performance:** max cruising speed 561 mph, ceiling 45,000 ft, range 4,050 miles.

#### C-21A

Seventy-nine C-21As are operated by active-duty and ANG units from nine US bases and four overseas locations. These aircraft are used to provide operational support airlift for time-sensitive movement of people and cargo throughout the US and the Pacific and European theaters, including aeromedical missions if required. The first C-21A was delivered to USAF in 1984. In 1987, ANG acquired four C-21s to replace its T-39s based at Andrews AFB, Md.

**Contractor:** Learjet Inc.

**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 ft 6 in, length 48 ft 8 in, height 12 ft 3 in.

**Weight:** empty, equipped 10,119 lb, gross 18,300 lb.

**Performance:** max level speed at 25,000 ft 542 mph, ceiling 41,000 ft, range with max passenger load 2,420 miles, with max cargo load 1,653 miles.

#### C-22B

Four Boeing 727 commercial transports were purchased and modified as C-22Bs for use by ANG on operational support airlift missions. Two of them have been further modified to accommodate an additional 1,100 gallons of fuel and landing gear rated for 170,000 lb gross landing weight.

#### C-23A Sherpa

Air Force Materiel Command (AFMC) operates two C-23A Sherpa light transport aircraft from Edwards AFB, Calif. The Sherpa, which originally entered USAF service with MAC (now AMC) in 1984, is an all-freight version of the Shorts 330 regional airliner, with a 6-ft-6-inch-square cabin section over an unimpeded hold length of 29 ft. Through loading is provided via a large forward freight door, a full-width hydraulically operated rear ramp door, and removable roller conveyors.

**Contractor:** Short Brothers PLC.

**Power Plant:** two Pratt & Whitney Canada PT6A-45R turboprops; each 1,198 shp.

**Accommodation:** crew of three; up to 7,000 lb of freight, including four LD3 containers, and engines the size of the F100 series.

**Dimensions:** span 74 ft 8 in, length 58 ft 0 1/2 in, height 16 ft 3 in.

**Weight:** gross 25,500 lb.

**Performance:** max cruising speed at 10,000 ft 218 mph, range 770 miles with 5,000 lb payload.

#### VC-25A

Based on the Boeing 747-200B airframe, the first VC-25A presidential transport was delivered to the 89th AW at Andrews AFB, Md., in August 1990, with a second four months later, replacing the former primary and backup "Air Force One" transports (C-137Cs). The VC-25As have a Bendix Aerospace EFIS-10 electronic flight instrument system and state-of-the-art on-board communications equipment. A pair of self-contained air-stairs are located on the left side and a built-in baggage loader on the right side. Together with a second auxiliary power unit, they allow the aircraft to be practically self-sufficient and reduce the need for ground-support equipment. Despite its long range, the VC-25A is air refuelable.

**Contractor:** Boeing Military Airplanes.

**Power Plant:** four General Electric F103-GE-102 turbofans; each 56,750 lb thrust.

**Accommodation:** crew of 23; up to 70 passengers.

**Dimensions:** span 195 ft 8 in, length 231 ft 10 in, height 63 ft 5 in.

**Weight:** long-range mission T-O weight 803,700 lb.

**Performance:** high speed cruise Mach 0.88-0.91, normal cruising speed Mach 0.84, unrefueled range 7,140 miles.

#### C-26A/B

Eleven Fairchild Metro III commuter transport aircraft were acquired by USAF, under the designation C-26A, to replace ANG C-131s. The first aircraft was delivered in March 1989 and was assigned to the 147th FIG at Ellington ANGB, Tex. The C-26As serve in the Air National Guard Operational Support Transport Aircraft role. They have a quick-change interior, enabling passenger seats to be replaced by a medevac or cargo-carrying configuration. In addition, 30 C-26Bs were ordered in 1991, with deliveries from January 1992. C-26Bs have TCAS II, GPS, and microwave landing systems. (Data for C-26A.)

**Contractor:** Fairchild Aircraft Corporation.

**Power Plant:** two AlliedSignal TPE331-11U-612G turboprops; each 1,100 shp.

**Accommodation:** crew of two; 19-20 passengers.

**Dimensions:** span 57 ft 0 in, length 59 ft 4 1/4 in, height 16 ft 8 in.

**Weights:** empty 9,494 lb, gross 16,000 lb.

**Performance:** max cruising speed at midcruise weight of 12,500 lb 321 mph, ceiling 26,700 ft, range with 19 passengers 1,224 miles.

#### C-27A Spartan

The C-27A short takeoff and landing (STOL) intratheater transport is a commercially available Alenia G222 medium airlifter modified by Chrysler, under contracts awarded in August 1990 and February 1991, to include new HF/VHF communications, autopilot, and INS. The 10 aircraft delivered provide rapid-response airlift of personnel and cargo to remote locations accessible primarily through unimproved airfields with short, unprepared landing surfaces. C-27As are assigned to Howard AFB, Panama.

**Contractor:** Chrysler Technologies Airborne Systems Inc.

**Power Plant:** two Fiat-built General Electric T64-GE-P4D turboprops; each 3,400 shp.

**Accommodation (C-27A):** crew of three; various configurations, including provision for 34 fully equipped troops or 14,850 lb cargo.

**Dimensions:** span 94 ft 2 in, length 74 ft 5 1/2 in, height 34 ft 8 1/4 in.



**Weights:** empty 35,500 lb, gross 56,878 lb.  
**Performance:** max cruising speed 288 mph, ceiling 22,000 ft, ferry range with max fuel 1,727 miles.

### C-130 Hercules

More than 2,100 C-130 Hercules transport aircraft have been delivered, to 64 nations, since the initial C-130A production model made its first flight in April 1955; production continues. C-130s operate throughout USAF, serving with ACC, theater commands, AFRES, and ANG, fulfilling a wide range of operational missions in both peace and war situations. Basic and specialized versions perform a diversity of roles, including airlift support, DEW Line and Arctic ice cap resupply, aeromedical missions, aerial spray missions, fire-fighting duties for the US Forest Service, and natural disaster relief missions. In recent years they have brought relief to stricken communities worldwide, including Haiti, Bosnia, Somalia, and Rwanda. Early C-130A, B, and D versions are now retired. The C-130E is an extended-range development of the C-130B, with large underwing fuel tanks; 389 were ordered for MAC (now AMC) and TAC (now ACC), with deliveries beginning in April 1962. A wing modification to correct fatigue and corrosion on USAF's force of C-130Es has extended the life of the aircraft well into the next century. Ongoing modifications include a Self-Contained Navigation System (SCNS) to enhance navigation capabilities, especially in the low-level environment. The SCNS incorporates an integrated communications/navigation management system that features the USAF standard laser gyro inertial navigational unit and the 1553B data bus; installation began in 1990. Other modifications include enhanced station-keeping equipment, 50 kHz VHF Omniscope/Instrument Landing System (VOR/ILS) receivers, secure voice capability, and GPS capability. Another major modification installs a state-of-the-art autopilot that incorporates a ground collision avoidance system.

Generally similar to the E model, the basic C-130H has updated T56-A-15 turboprops, a redesigned outer wing, updated avionics, and other, minor improvements; delivery began in July 1974. More than 350 C-130Hs and derivatives have been ordered for active and reserve units of the US services, with a further eight funded in FY 1996. Night Vision Instrumentation System introduced from 1993; TCAS II in new aircraft from 1994. ANG and AFRES C-130Hs are used in fire-fighting missions. Specifically modified aircraft are used by the 757th AS, AFRES, based at Youngstown/Warren AFS, Ohio, for aerial spraying, typically to suppress mosquito-spread epidemics. Six LC-130Hs, modified with wheel-ski gear, are operated by ANG's 109th AW in support of Arctic operations. While continuing to modernize through modification, the Air Force has budgeted to resume active-duty fleet enhancement through acquisition of the C-130J version, beginning this fiscal year. This new model features a two-crew-member flight system, 6,000 shp Allison AE 2100D3 engines and all-composite Dowty R391 propellers, digital avionics and mission computers, enhanced performance, and improved reliability and maintainability. First two C-130Js are to be evaluated by 314th AW at Little Rock AFB, Ark.

Other variants include HC-130N/P, MC-130E/H, AC-130H/U, and WC-130H, all described separately. Four HC-130Hs were modified as JC-130H with added equipment for aerial recovery of reentering space capsules, and two DC-130Hs are used for drone control duties, together with one DC-130A. ANG C-130s acquired a new role in 1987 when about 10 aircraft were assigned to ANG fighter wings and groups to provide support for jet fighter units on deployments. Authority for 354 C-130 aircraft passed from AMC to ACC, together with air rescue units, in 1993. (Data for C-130H.)

**Contractor:** Lockheed Martin Corporation.

**Power Plant:** four Allison T56-A-15 turboprops; each 4,503 ehp.

**Accommodation:** crew of five; up to 92 troops, 64 paratroops, 74 litter patients, or up to five 463L standard freight pallets, etc.

**Dimensions:** span 132 ft 7 in, length 97 ft 9 in, height 38 ft 3 in.

**Weights:** empty 76,469 lb, max payload 49,818 lb, gross 175,000 lb.

**Performance:** max cruising speed at 20,000 ft 374 mph ceiling (at 130,000 lb) 33,000 ft, T-O run 3,580 ft, landing run (at 130,000 lb) 1,700 ft, range with max payload 2,354 miles.

### MC-130E/H Combat Talon I and II

Fourteen C-130Es were modified to MC-130E (Combat Talon I) standard and equipped for use in night/adverse weather, low-level, deep-penetration missions. AFSOC's 8th SOS and 711th SOS (AFRES), based in North America, employ the Talon I in support of special operations forces worldwide. Nine are modified to conduct air-to-air refueling with special operations helicopters and have explosion-suppressant fuel tanks and a modified

cargo ramp area for high-speed aerial delivery. In addition, these aircraft have been modified to the Mod 90 configuration, which includes an improved APQ-122v(8) terrain-following radar; fully integrated navigation suite with dual INS, Doppler, and GPS; NVG head-up display; and new center wing. During Operation Desert Storm, the Combat Talon I proved a very adaptable and capable air delivery platform, particularly when called on to deliver the largest conventional weapon in the US arsenal, the 15,000-lb BLU-82.

Twenty-four MC-130H (Combat Talon II) aircraft have been acquired to supplement the Talon I. These are equipped with an in-flight refueling receptacle; explosion-suppressant fuel tanks; modified cargo ramp area for high-speed aerial delivery; Electronics & Space Co. AN/APQ-170 precision turning, terrain-following, and terrain-avoidance radar; dual radar altimeters; dual INS; integrated GPS receiver; flight stabilized

Infrared Detection Set; extensive communications suite; fully integrated glass cockpit; and improved infrared and electronic defensive countermeasures. The 1st, 7th, and 15th SOSs employ the Combat Talon II, supporting unconventional warfare units from their bases in Japan, Europe, and North America, respectively. The 58th SOW at Kirtland AFB, N. M., is responsible for operational aircrew training. (Data similar to those for C-130.)

### HC/MC-130N/P Combat Shadow/Tankers

Twenty-eight active-duty HC-130N/P Combat Shadow aircraft (recently redesignated MC-130P) are now dedicated to special operations missions. Nine are assigned to the 9th SOS, Eglin AFB, Fla. Five are assigned to the 17th SOS, Kadena AB, Japan, and to the 67th SOS, RAF Mildenhall, UK. The 5th SOS (AFRES), based at Duke Field, Fla., and the 58th SOW at Kirtland AFB, N. M., have five and four aircraft, respectively, the latter for training. All are modified with new secure communications, self-contained inertial navigation, and countermeasures systems, and NVG-compatible lighting. The aircraft's primary mission is to conduct single-ship or formation in-flight refueling of special operations helicopters in a no- to low-threat environment. These missions involve NVG low-level flights using minimal lighting and communications-out procedures. These SOF MC-130Ps are being further modified with advanced integrated navigation equipment, including digital scan radar, ring-laser gyro INS, FLIR, GPS, and dual nav stations. They are also receiving new missile warning systems and countermeasures for refueling missions in hostile environments. Fifteen have been fitted with an in-flight refueling receptacle to extend their range indefinitely.



C-130H Hercules



C-130J Hercules



MC-130E Combat Talon I (Ted Carlson)



HC-130N Combat Shadow (Ted Carlson)

Seven additional search-and-rescue HC-130 tanker aircraft are located with an active-duty unit at Patrick AFB, Fla.; 20 others are assigned to various AFRES and ANG units. (Data similar to those for C-130.)

### KC-135E/R/T Stratotanker

First flown in August 1956, the long-serving KC-135 forms the backbone of the USAF tanker fleet, meeting the aerial refueling requirements of USAF bomber, fighter, cargo, and reconnaissance forces, as well as the needs of the US Navy and Marines and allied nations. A total of 732 were built by 1966. During the Persian Gulf War, KC-135 aircraft made an invaluable contribution to the success of coalition operations, flying around-the-clock missions to maintain the operability of coalition warplanes. Subsequent deployments have included support for operations in Somalia, Bosnia, Rwanda, and Haiti. AMC controls all CONUS-based KC-135s. Others serve with ACC, AETC, PACAF, USAF, and with AFRES and ANG units. Although similar in size and appearance to commercial 707 aircraft, the KC-135 was designed to military specifications, incorporating different structural details and materials, and was designed to operate at high gross weights. The KC-135 fuel tankage is located in the "wet wings" and in fuel tanks below the floor in the fuselage.

Many of the 551 remaining in operational service have been modernized to later standards in three programs initiated to enhance the KC-135's capability and extend its operational utility well into the next century. First, the JT3D reengining program upgraded 163 AFRES and ANG KC-135As to KC-135E standard



with JT3D turbofans removed from surplus commercial 707s. Second, the 22,000-lb-thrust General Electric/SNECMA F108-CF-100 (CFM56) fuel-efficient engine was selected for retrofit of the KC-135 fleet in 1980. Reengineered aircraft are designated **KC-135R** and **KC-135T**, each with a gross weight of 322,000 lb. They embody modifications to major systems and subsystems and not only carry more fuel farther but have reduced maintenance costs, are able to operate from shorter runways, and meet Stage III requirements. The first KC-135R flight was in August 1982, and first deliveries to SAC were in July 1984; KC-135T aircraft retain the KC-135Q's ability to isolate two separate fuel types in order to refuel SR-71s; the program continues. Finally, the Life Extension Structural Modification provided for the renewal of the lower wing skin, enabling the fleet of KC-135s to remain fully operational past 2020. Several avionics upgrades are under way that will significantly improve systems reliability and maintainability. A multipoint aerial refueling system is being procured for a select number of KC-135Rs to enhance interoperability and support to the Navy, NATO, and other allied receiver aircraft. (Data for *KC-135R*.)

**Contractor:** Boeing Military Airplanes.

**Power Plant:** four CFM International F108-CF-100 turbofans; each 22,224 lb thrust.

**Accommodation:** crew of four; up to 80 passengers. **Dimensions:** span 130 ft 10 in, length 136 ft 3 in, height 38 ft 4 in.

**Weights:** empty 119,231 lb, gross 322,000 lb.

**Performance:** max speed at 30,000 ft 610 mph, ceiling 50,000 ft, range with 120,000 lb of transfer fuel 2,128 miles, ferry mission 11,192 miles.

### C-135 Stratolifter

Several C-135 transports and variants, without the KC-135's refueling equipment, remain operational within USAF. They were ordered originally to serve as interim jet passenger/cargo transports, pending delivery of C-141s. Three converted KC-135s were followed by 45 production Stratolifters in two versions: the **C-135A**, with J57-P-59W turbojets, and the **C-135B**, with Pratt & Whitney TF33-P-5 turbofans. Eleven Bs were retrofitted with revised interior for VIP transportation; others became **WC-135Bs** and **RC-135E/Ms**. ACC's 55th Wing, Offutt AFB, Neb., operates **TC-135B/S/W** variants. C-135s have been deployed in support of Bosnian operations. (Data similar to *KC-135*, except where indicated.)

**Dimensions:** length 134 ft 6 in.

**Weights (C-135B):** operating weight empty 102,300 lb, gross 275,500 lb.

**Accommodation (C-135B):** 60 passengers.

**Performance (C-135B):** max speed 600 mph, range with 54,000 lb payload 4,625 miles.

### C-137B/C Stratoliner

Five specially modified Boeing 707 transports are operated by AMC's 89th Airlift Wing from Andrews AFB, Md., for VIP duties. Four Boeing 707-320s are designated **C-137C**, and one smaller 707-120, **C-137B**. Two of the C-137Cs were the original "Air Force One" aircraft.

**Contractor:** The Boeing Company.

**Power Plant:** four Pratt & Whitney JT3D-3 turbofans; each 17,200 lb thrust.

**Dimensions:** C-137B: span 130 ft 10 in, length 144 ft 6 in, height 42 ft 0 in; C-137C: span 145 ft 9 in, length 152 ft 11 in, height 42 ft 5 in.

**Weights:** C-137B: gross 258,000 lb; C-137C: gross 329,100 lb.

**Performance (C-137C):** max speed 627 mph, ceiling 42,000 ft, range 5,150 miles.

### C-141A/B Starlifter

Mainstay of USAF's airlift fleet, the C-141 Starlifter was heavily relied on during Operations Desert Shield and Desert Storm and has since been deployed in support of UN peacekeeping missions. However, the 200-plus aircraft are approaching the end of their projected service life and all will retire by the year 2006. The **C-141A** entered service with MAC in April 1965, and 285 were built, some of which were structurally modified to accommodate the 82,207-lb Minuteman ICBM. Subsequently, USAF funded modification of the entire then-available force of 270 aircraft to **C-141B** standard (except four AFMC aircraft used for test purposes) in order to realize the aircraft's full payload potential. The fuselage was lengthened by 23 ft 4 in, and an in-flight refueling capability was added. Deliveries of B aircraft took place between December 1979 and June 1982. The modification significantly increased MAC's airlift capability, giving USAF the equivalent of 90 additional C-141A aircraft. Under the **Pave Center** program initiated in 1987, 118 aircraft were slated for a center wing structural modification, which, coupled with other structural upgrades, was expected to extend the C-141's original flying life by 15,000 hours. A program to install a state-of-the-art autopilot and all-weather landing system with enhanced flight display instrumentation is a major modification to enhance maintenance supportability. Improved airdrop systems for the C-141 are also in production. However, further proposed C-141 SLEPs have been ruled out. One C-141A has been greatly modified as an **Advanced Radar Test-Bed (ARTB)** for use as an airborne laboratory platform to test a wide range of sensors in a dynamic ECM environment. Modification of 13 437th AW C-141Bs is aimed at increasing their SOLL (Special Operations Low Level) capability and survivability. AETC also operates C-141 aircraft at Altus AFB, Okla.



**KC-135E Stratotanker** (Ted Carlson)



**KC-135R Stratotanker** (Ted Carlson)



**KC-10A Extender refueling a C-141B Starlifter** (SrA. Andrew Dunaway II)

As of January this year, 19 C-141s have attrited, and 27 have retired. C-141s have played a major role in intertheater medevac missions and are used frequently for humanitarian missions, transporting vital supplies to the many areas that, in recent years, have been devastated by natural disasters or civil conflict. AMC controls Air Force C-141s. (Data for *C-141B*.)

**Contractor:** Lockheed-Georgia Company.

**Power Plant:** four Pratt & Whitney TF33-P-7 turbofans; each 21,000 lb thrust.

**Accommodation:** crew of five; cargo on 13 standard 463L pallets. Alternative freight or vehicle payloads, 200 fully equipped troops, 155 paratroops, or 103 litter patients plus attendants.

**Dimensions:** span 159 ft 11 in, length 168 ft 3 1/2 in, height 39 ft 3 in.

**Weights:** operating 150,000 lb; max payload 68,725 lb normal, 89,000 lb emergency war planning; gross 325,000 lb normal, 344,900 lb emergency war planning.

**Performance:** max cruising speed 566 mph, range with max payload 2,170 miles without air refueling.

### KC-10A Extender

Developed to meet USAF requirements for an advanced tanker/cargo aircraft, the KC-10 is based on the commercial DC-10 Series 30CF. Modifications include fuselage fuel cells, a boom operator's station with aerial refueling boom and integral hose reel/drogue unit, a receiver refueling receptacle, and military avionics. In its primary role of enhancing worldwide air mobility, the KC-10A combines the tasks of tanker and cargo aircraft in a single unit. With this capability, the Extender supports fighter deployments, strategic airlift, strategic reconnaissance, and conventional operations and, as such, played a crucial role in deployment for the Persian Gulf War and in later humanitarian and UN peacekeeping missions. Because it has both types of tanker refueling equipment installed, the KC-10A can service US Air Force, Navy, and Marine Corps and allied aircraft on the same mission.

In many deployment situations, the KC-10A's refueling capabilities and long range permit it to dispense with the need for forward bases, leaving vital fuel supplies in the theater of operations untouched. Aircraft maintenance is performed under the contractor logistics support concept, where flight-line maintenance is provided by USAF while intermediate- and depot-level maintenance is supported by a contractor. In addition, extensive commonality with the commercial DC-10 allows USAF to capitalize on a worldwide network of spares and maintenance facilities.

First flight of a KC-10A took place in July 1980, with first SAC service mission in March 1981. The 59 aircraft in the inventory are operated by active and Associate Reserve units, under the control of AMC, whose major KC-10 operational bases are at McGuire AFB, N. J., and Travis AFB, Calif. The final production aircraft, delivered in April 1990, was used to test wing-mounted air refueling pods designed to supplement the standard fuselage hose reel/drogue unit and refueling boom. Plans called for 20 aircraft to be modified to accept the wing-mounted pods. An additional modification introduced an on-board loader that allowed pallet handling without repositioning wide-body cargo loading equipment and so permitted autonomous cargo operations at austere locations.

**Contractor:** Douglas Aircraft Company, Division of McDonnell Douglas Corporation.

**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; max 27 pallets; max cargo payload 169,409 lb.

**Dimensions:** span 165 ft 4 1/2 in, length 181 ft 7 in, height 58 ft 1 in.

**Weight:** gross 590,000 lb.

**Performance:** cruising speed Mach 0.825, ceiling 42,000 ft, range with max cargo 4,370 miles.

## Trainers

### T-1A Jayhawk

Acquired by AETC for specialized undergraduate pilot training (SUPT), the first T-1A was delivered to USAF in January 1992. As leader of the T-1A contractor team, McDonnell Douglas is responsible for system integration; Quintron is supplying flight simulators, Beech the aircraft. Designated Beechjet 400T, these are similar to the Beechjet 400A corporate transport. The flight deck is configured for a student in the left seat, an instructor in the right seat, and another student to the rear. Structural enhancements provide for a large number of landings per flight hour, increased birdstrike resistance, and an additional fuselage fuel tank. A



Rockwell Collins avionics package includes a five-tube EFIS, turbulence detection radar, digital autopilot, tactical air navigation with air-to-air capability, and a central diagnostics and maintenance system.

The total buy of 180 aircraft has been ordered; 129 had been delivered by January 1, 1996. Instructor pilot training at the 64th Flying Training Wing, Reese AFB, Tex., began in September 1992, with student training following in January 1993; this base will close in 1997. Jayhawks also equip the 12th, 14th, 47th, and 71st FTWs at Randolph AFB, Tex., Columbus AFB, Miss., Laughlin AFB, Tex., and Vance AFB, Okla., respectively. Pilots trained on the T-1A progress to transports, such as the C-5 and C-17, and tankers, such as the KC-10 and KC-135.

**Contractor:** Raytheon Aircraft Company.  
**Power Plant:** two Pratt & Whitney Canada JT15D-5B turbocfans; 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 (400A):** span 43 ft 6 in, length 48 ft 5 in, height 13 ft 11 in.

**Weights:** empty 5,200 lb, gross (400A) 16,100 lb.  
**Performance:** max speed at 27,000 ft 538 mph, max operating altitude 41,000 ft, range 2,222 miles.

### T-3A Firefly

Selected in April 1992 to replace the T-41 Mescalero, the fully aerobatic T-3A is used by AETC's 3d FTS at Hondo Municipal Airport, Tex., to screen prospective pilots prior to SUPT. Pilot training began in March 1994. The basic airframe is the Slingsby T67M260 Firefly built in the UK; Northrop Worldwide Aircraft Services is responsible for final assembly, test, delivery, and logistical support. Delivery of 113 T-3As was completed in January 1996, with 57 aircraft for AETC, and 56 for the US Air Force Academy's 557th FTS, where training began in January 1995.

**Contractors:** Slingsby Aviation Limited; Northrop Worldwide Aircraft Services Inc.

**Power Plant:** Textron Lycoming AEIO-540-D4A5 engine; 260 hp.

**Accommodation:** two, side by side.  
**Dimensions:** span 34 ft 9 in, length 24 ft 10 in, height 7 ft 9 in.

**Weights:** empty 1,780 lb, gross 2,525 lb.  
**Performance:** max level speed 175 mph, ceiling 19,000 ft, range with max fuel, 65 percent power at 8,000 ft 469 miles.

### T-37B Tweet

USAF's first purpose-built jet trainer, the T-37 is currently AETC's standard two-seat primary trainer. The original T-37A was superseded in November 1959 by the T-37B; all A models were later converted to B standard. A contract for the T-373 SLEP was awarded to Sabreliner Corp. in August 1989. This covers the design, testing, and production of kits to be installed by USAF, to modify or replace critical structural components of the entire fleet, thereby extending the capability of the T-37 into the next century. Almost 1,000 T-37s were built, and around 488 remain in USAF's active inventory, including a number with ACC and AMC. A distinctive dark blue and white finish is intended to help format on training and ease maintenance.

AETC plans to replace the T-37B with the new Joint Primary Aircraft Training System (JPATS), to be produced by Raytheon (see below) and delivered from FY 1999.

**Contractor:** Cessna Aircraft Company.  
**Power Plant:** two Continental J69-T-25 turbojets; each 1,025 lb thrust.

**Accommodation:** two, side by side, on ejection seats.  
**Dimensions:** span 33 ft 9/4 in, length 29 ft 3 in, height 9 ft 2/4 in.

**Weights:** empty 3,870 lb, gross 6,575 lb.  
**Performance:** max speed at 25,000 ft 426 mph, ceiling 35,100 ft, range at 360 mph with standard tankage 870 miles.

### T-38A and AT-38B Talon

Almost identical in structure to the F-5A export tactical fighter, the T-38A was the world's first supersonic trainer aircraft. First flown in April 1959, it was in continuous production from 1956 to 1972 and entered operational service in March 1961. Of 1,187 T-38s built, more than 1,100 were delivered to USAF, and more than 400 remain in service throughout the Air Force. Most are used by AETC for high-performance pilot training. A slightly different version, designated AT-38B, with a gunsight and practice bomb dispensers, is used by AETC for introduction to Fighter Fundamentals (IFF).

An ongoing program called Pacer Classic (the T-38 SLEP) is integrating 10 modifications, including major structural renewal, into one program, and a full avionics upgrade is planned. As a result, coupled with the reduction of the T-38's work load through introduction of the T-1A, the service life of the T-38s should extend to 2020.



T-3A Firefly



T-1A Jayhawk



T-38A Talon

**Contractor:** Northrop Corporation.

**Power Plant:** two General Electric J85-GE-5A turbojets; each 2,680 lb thrust dry, 3,850 lb thrust with afterburning.

**Accommodation:** student and instructor, in tandem, on ejection seats.

**Dimensions:** span 25 ft 3 in, length 46 ft 4 1/2 in, height 12 ft 10 1/2 in.

**Weights:** empty 7,164 lb, gross 12,093 lb.  
**Performance:** max level speed at 36,000 ft more than Mach 1.23 (812 mph), ceiling above 55,000 ft, range, with reserves, 1,093 miles.

### T-43A and CT-43

A navigation trainer first flown in April 1973, the T-43A was derived from the commercial Boeing Model 737-200 and was equipped with the same on-board avionics as the most advanced USAF operational aircraft of that time, including celestial, radar, and inertial navigation systems, a Long-Range Aid to Navigation (Loran) system, and other radio systems. Deliveries of the 19 aircraft ordered for ATC (now AETC) were completed in July 1974. Most remaining aircraft are in the AETC inventory; two others are assigned to the ANG; and two aircraft with VIP interiors are assigned to the 58th AS at Ramstein AB, Germany, and the 310th AS at Howard AFB, Panama (as CT-43).

**Contractor:** Boeing Aerospace Company.  
**Power Plant:** two Pratt & Whitney JT8D-9 turbofans; each 14,500 lb thrust.

**Accommodation:** crew of two, 12 students, five advanced students, and three instructors.

**Dimensions:** span 93 ft 0 in, length 100 ft 0 in, height 37 ft 0 in.

**Weight:** gross 115,500 lb  
**Performance:** econ cruising speed at 35,000 ft Mach 0.7, operational range 2,995 miles.

### Joint Primary Aircraft Training System (JPATS)

Announced winner of the Joint Primary Aircraft Training System (JPATS) competition on June 22, 1995, Raytheon's Beech Mk II is based on the Swiss Pilatus PC-9 aircraft, modified to include a strengthened fuselage, upgraded engine, more fuel, pressurized cockpit,

larger, bird-resistant canopy, and new digital avionics. The new aircraft will replace USAF's T-37Bs and USN's T-34Cs in training entry-level pilots, as well as supporting undergraduate naval flight officer and USAF navigator training. Delivery of a planned 372 operational aircraft for the Air Force is scheduled to begin in 1999 at Randolph AFB, Tex., followed by Laughlin AFB, Tex., Vance AFB, Okla., and Columbus AFB, Miss. IOC for the Navy's 339 aircraft is expected in 2002.

**Contractor:** Raytheon Aircraft Company.

**Power Plant:** one Pratt & Whitney Canada PT6A-68 turboprop; 1,708 shp.

**Accommodation:** student and instructor, in tandem, on zero/zero ejection seats.

**Dimensions:** span 33 ft 5/4 in, length 33 ft 4/4 in, height 10 ft 8/8 in.

**Weight:** empty (approx) 4,415 lb.  
**Performance:** max speed 368 mph.

### UV-18B Twin Otter

The UV-18B is a military version of the DHC-6 Twin Otter STOL utility transport. Two were procured in FY 1977 for use as parachute jump training aircraft at the US Air Force Academy.

**Contractor:** The de Havilland Aircraft of Canada Ltd.  
**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 0 in, length 51 ft 9 in, height 19 ft 6 in.

**Weight:** gross 12,500 lb.  
**Performance:** max cruising speed 210 mph, ceiling 26,700 ft, range with 2,500 lb payload 806 miles.

The US Air Force Academy also lists the following types in its training inventory: SGS 1-26E (TG-3A) sailplane, SGS 2-33A (TG-4A) glider, SGM 237 (TG-7A) motorized glider, ASK-21 (TG-9A) sailplane, L-23 Super Blanik (TG-10A) glider, and Stemme S-10 (TG-11A) motorized glider.

## Strategic Missiles

### LGM-30F/G Minuteman

A key element of the US strategic deterrent posture for more than three decades, Minuteman is a three-stage, solid-propellant ICBM, housed in underground silos for which an upgrade program was completed in 1980 to provide increased launch-facility protection. A depot-level maintenance refurbishment, known as Rivet Mile, has been in progress to correct existing, and retard future, age-related deterioration of facilities in Minuteman silos and launch control centers. Following withdrawal of the last Minuteman II in August last year, one version remains in service:

**LGM-30G Minuteman III:** Operational since 1970, the Minuteman III provides improved range, rapid re-targeting, and the capability to place three multiple independently targetable reentry vehicles (MIRVs) on three targets with a high degree of accuracy. A single reentry vehicle configuration has been demonstrated and planned for in accordance with strategic arms control negotiations. A total of 500 Minuteman IIIs will be based at Minot AFB, N. D.; F. E. Warren AFB, Wyo.; and Malmstrom AFB, Mont., when START II is ratified. The Air Force is currently consolidating the Minuteman III fleet by removing the 150 missiles at Grand Forks AFB and replacing them in converted Minuteman II launchers at Malmstrom AFB. This project, called Rivet Add, began in October 1995 and will be completed by October 1997.

Enhancements and modifications under way will maintain the viability of the Minuteman III force through 2020. On the missile itself, all three stages will be remanufactured. A guidance replacement program will ensure long-term supportability of the aging guidance system's electronic components. The Rapid Execution and Combat Targeting program is modifying the launch control center, enabling real-time status information on the weapons and communications nets, improving responsiveness to launch directives, and improving rapid re-targeting capability.

**Assembly and Checkout:** Boeing Aerospace Company.

**Power Plant:** first stage: Thiokol M-55 solid-propellant motor, 210,000 lb thrust; second stage: Aerojet-General SR19-AJ-1 solid-propellant motor, 60,300 lb thrust; third stage: Thiokol SR73-AJ-1 solid-propellant motor, 34,400 lb thrust.

**Guidance:** Autonetics Division of Rockwell International inertial guidance system.

**Warheads:** three Mk 12/12A MIRVs.

**Dimensions:** length 59 ft 10 in, diameter of first stage 5 ft 6 in.



**Weight:** launch weight (approx) 78,000 lb.

**Performance:** speed at burnout more than 15,000 mph, highest point of trajectory approx 700 miles, range with max operational load more than 7,000 miles.

#### LGM-118A Peacekeeper

Initial deployment of the Peacekeeper missile was made in response to the improved hardness of Soviet strategic forces. Emplacement of 50 Peacekeepers in existing Minuteman III silos near F. E. Warren AFB, Wyo., began in June 1986, reaching FOC with 50 missiles in December 1988. Political initiatives and changes within the former Soviet Union then altered US strategic imperatives. A statutory cap on deployment of only 50 (of a funded 114) of these missiles was approved in the FY 1990 budget, and development of a rail-garrison mode of Peacekeeper deployment was terminated.

Peacekeeper is a four-stage ICBM that carries up to 10 independently targetable reentry vehicles. It has many advantages over other missile systems. In particular, it is more accurate, carries more warheads, and has greater range than the Minuteman III. Its greater resistance to nuclear effects and its more capable guidance system provide Peacekeeper with a greatly improved ability to destroy very hard targets. These attributes, combined with its prompt response, provide a decisive deterrent. Peacekeeper will be scheduled for retirement under the provisions of START II, but no retirement action will occur until the treaty is ratified by the US and Russia and its terms come into force.

**Basing:** Boeing Aerospace and Electronics.

**Assembly and Test:** Martin Marietta, Denver, Aerospace.

**Power Plant:** first three stages solid-propellant, fourth stage storable liquid; by Thiokol, Aerojet, Hercules, and Rocketdyne, respectively.

**Guidance:** inertial; integration by Rockwell, inertial measurement unit by Northrop and Rockwell.

**Warheads:** 10 Avco Mk 21 MIRVs.

**Dimensions:** length 71 ft 0 in, diameter 7 ft 8 in.

**Weight:** approx 195,000 lb.

#### AGM-86B/C ALCM

The **AGM-86B** Air-Launched Cruise Missile (ALCM) is a small, unmanned, winged air vehicle capable of sustained subsonic flight following launch from a carrier aircraft. It has a turbofan engine and a nuclear warhead and is programmed for precision attack on surface targets. When launched in large numbers, each of the missiles would have to be countered, making defense against them both costly and complicated. Additionally, by diluting defenses, AGM-86Bs improve the ability of manned aircraft to penetrate to major targets. Small radar signature and low-level flight capability enhance the missile's effectiveness. The last of 1,715 production models were delivered in October 1986. AGM-86Bs currently arm B-52Hs, with 12 missiles fitted externally and eight on a bomb-bay CSRL. ALCM-equipped units are at Barksdale AFB, La., and Minot AFB, N. D.

A conventionally armed version (CALCM), designated **AGM-86C**, development of which began in 1986, has a high-explosive blast fragmentation warhead, and an inertial navigation unit as in the B model, but uses GPS for guidance. Range is reportedly less than that of the B. AGM-86C was first used operationally during the Persian Gulf War, when seven B-52Gs of the 2d BW, Barksdale AFB, La., launched 35 missiles against eight high-priority Iraqi targets from standoff ranges. (Data for AGM-86B.)

**Contractor:** Boeing Aerospace Company.

**Power Plant:** Williams International Corporation/Teledyne CAE F107-WR-100 turbofan; 600 lb thrust.

**Guidance:** inertial plus TERCOM, by Litton.

**Warhead:** W80-1 nuclear.

**Dimensions:** length 20 ft 9 in, body diameter 2 ft 0½ in, wingspan 12 ft 0 in.

**Weight:** 3,200 lb.

**Performance (approx):** speed 500 mph, range 1,555 miles.

#### AGM-129A (ACM)

Deployed on the B-52H, the AGM-129A Advanced Cruise Missile has improved range, accuracy, survivability, and targeting flexibility compared with the AGM-86B, notably through embodiment of LO technology. Developed by General Dynamics (now Hughes Missile Systems Co.), the ACM first flew in July 1985; in November 1987, McDonnell Douglas was awarded a contract for technology transfer leading to second-source capability for this advanced system. Delivery of production AGM-129As began in June 1990, the 410th BW at K. I. Sawyer AFB, Mich. (now closed), being the first operational unit; final delivery was in August 1993. Total acquisition of the ACM was 461 missiles.

**Contractor:** General Dynamics (Convair)/McDonnell Douglas Missile Systems.



LGM-30G



LGM-118A



AGM-129A (ACM)

**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 3¾ in, wingspan 10 ft 2 in.

**Weight:** 3,709 lb.

**Performance (approx):** range 1,865 miles.

## Airborne Tactical and Defense Missiles

#### AIM-7 Sparrow

Sparrow is a radar-guided air-to-air missile with all-weather, all-altitude, and all-aspect capability. Approximately 34,000 AIM-7C, D, and E versions were produced. A later version, the advanced solid-state AIM-7F, has a larger motor, Doppler guidance, improved ECM, and better capability over both medium and "dogfight" ranges. Approximately 5,400 were produced.

A monopulse version of Sparrow, designated **AIM-7M**, aimed at reducing cost and improving performance in the ECM and look-down clutter regions, entered production in FY 1980 and began operational service during FY 1983; this version equips USAF and USN F-14, F-15, F-16 (ADF), and F/A-18 aircraft. **AIM-7P/RIM-7P** has improvements to the fuze and electronics, aimed at increasing lethality against sea-skimming antiship missiles and cruise missiles. AIM-7s equipped with telemetry packages in place of warheads are used in a program initiated by the USAF Air Warfare Center then at Eglin AFB, Fla., and linked with industry, to develop passive missile-warning systems for USAF tactical aircraft. The **AIM-7R**, or missile homing improvement program, is designed to improve the missile's performance against sophisticated ECM by means of a new IR seeker added to the guidance and control section. (Data for AIM-7F.)

**Contractors:** Raytheon Company/Hughes Missile Systems Company.

**Power Plant:** Hercules Mk 58 Mod 0 boost-sustain rocket motor.

**Guidance:** Raytheon semiactive Doppler radar homing system.

**Warhead:** high-explosive, blast fragmentation, weighing 86 lb.

**Dimensions:** length 11 ft 10 in, body diameter 8 in, wingspan 3 ft 4 in.

**Weight:** launch weight 504 lb.

**Performance (estimated):** max speed more than Mach 3.5; range more than 25 miles.

#### AIM-9 Sidewinder

The AIM-9 Sidewinder is a close-range, air-to-air missile using IR guidance. Versions currently in the USAF inventory:

**AIM-9M:** improved version of third-generation AIM-9L Sidewinder with all-aspect intercept capability. This version has increased infrared counter-countermeasures (IRCCM) capability, improved background discrimination, and reduced-smoke rocket motor. Full production began in FY 1981 with an order for approximately 1,280 missiles.

**AIM-9M-9:** modification to improve IRCCM capability of early missiles.

Development of AIM-9 capability for the next century is continuing. The Navy and Air Force have jointly allocated \$99.1 million in FYs 1995-96 for development of the **AIM-9X**, an off-boresight missile that will be used, most probably, in association with a helmet-mounted sight to enhance target acquisition and tracking. Demonstration and validation tests conducted by Raytheon and Hughes have focused on demonstrating advanced infrared seekers and trackers in ground and captive-carry flight testing. The AIM-9X will also include airframe and warhead/fuze improvements; the shape will be modified to reduce drag and to permit internal and external carriage.

AIM-9 missiles, equipped with telemetry packages in place of warheads, are being used by the Air Warfare Center in an industry-linked program to develop passive missile warning systems for USAF's tactical aircraft. (Data for AIM-9M.)

**Contractor:** Raytheon Company/Loral Aeronautics.

**Power Plant:** Thiokol Mk 36 Mod 11 solid-propellant rocket motor.

**Guidance:** solid-state IR homing guidance.

**Warhead:** high-explosive, weighing 20.8 lb.

**Dimensions:** length 9 ft 5 in, body diameter 5 in, finspan 2 ft 1 in.

**Weight:** launch weight 191 lb.

**Performance:** max speed above Mach 2; range more than 10 miles.

#### AIM-120A (AMRAAM)

Intended as a replacement for the AIM-7 Sparrow, the Advanced Medium-Range Air-to-Air Missile has been developed to provide an all-weather, all-environment capability for USAF's F-15, F-16, and F-22 and the Navy's F-14 and F/A-18 fighters. Development began in December 1981.

Designated AIM-120A, AMRAAM has inertial mid-course guidance and active radar terminal homing that provide launch-and-maneuver capability. There are significant improvements in operational effectiveness over the AIM-7 Sparrow, including increased average velocity, reduced miss distance, improved fuzing, increased warhead lethality, multiple target engagement capability, improved clutter rejection in low-altitude environments, improved ECM capability, increased maximum launch range, reduced-smoke motor, and improved maintenance and handling.

A leader/follower program has been under way (Hughes/Raytheon), with the preproduction effort (producibility and qualification) in FY 1986 and low-rate initial production in FY 1987 (180 missiles). Subsequent lots have been competed for and, up to and including Lot 9, have been awarded to Hughes and Raytheon.

The first production **AIM-120A** was delivered by Hughes in 1988, when the 33d TFW at Eglin AFB, Fla., became the first operational unit to receive AMRAAMs. The **AIM-120B** and **AIM-120C** versions are currently in production; the latter has smaller control surfaces to permit increased internal carriage capability in the F-22. The missile is operational on F-15, F-16, and F/A-18 aircraft. The 200,000-hour captive-carry mark was passed in November 1994 because of the frequency of air patrols over Bosnia and southwest Asia. A Preplanned Product Improvement (P<sup>3</sup>I) program seeks to develop AMRAAM improvements, including software reprogrammability, advanced counter-countermeasures, and options for improved propulsion. The missile is in full-rate production. Funding has been approved for procurement of well over half of a proposed final total in excess of 12,000 AMRAAMs for USAF and USN.

**Contractors:** Hughes Missile Systems Company/Raytheon Company.

**Power Plant:** Gencorp Aerojet two-stage solid-propellant rocket motor.



**Guidance:** inertial midcourse, with active radar terminal homing.

**Warhead:** high-explosive directed fragmentation weighing 48 lb.

**Dimensions:** length 12 ft 0 in, body diameter 7 in, span of tail control fins 2 ft 1 in.

**Weight:** 345 lb.

**Performance:** cruising speed approx Mach 4, range approx 30 miles.

#### AGM-65 Maverick

The basic **AGM-65A** Maverick is a launch-and-leave, TV-guided, air-to-surface missile that enables the pilot of the launch aircraft to seek other targets or leave the target area once the missile has been launched. Production was initiated in 1971, following successful test launches over distances ranging from a few thousand feet to many miles and from high altitudes to treetop level. Maverick missiles were first employed by USAF in Vietnam. They currently equip the A-10, F-4G, F-111F, F-16, and F-15E, singly or in three-round underwing clusters, for use against such pinpoint targets as tanks and columns of vehicles. Maverick air-to-surface missiles were used extensively during Operation Desert Storm, with approximately 100 fired per day, 90 percent of them from A-10 CAS aircraft.

**AGM-65B** has a "scene magnification" TV seeker that enables the pilot to identify and lock on to smaller or more distant targets. Orders for AGM-65A/Bs totaled 19,000.

To overcome limitations of the TV Maverick, which can be used only in daylight clear-weather conditions, the following versions were developed:

**AGM-65D:** with imaging-infrared (IIR) seeker as well as a lower-smoke motor. The Air Force Operational Test and Evaluation Center and TAC (now ACC) conducted operational flight testing with 25 live launches from A-7, A-10, F-4E, F-4G, and F-16 aircraft at Nellis AFB, Nev., in September 1986, resulting in 24 direct hits on a variety of vehicles. IIR Maverick became operational on A-10s, then based at RAF Bentwaters, UK, in February 1986. This version is in production.

**AGM-65G:** uses the IIR seeker with an alternate 298-lb blast fragmentation warhead or use against hardened targets. Software has been modified to include options for targeting ships and arge land targets as well as mobile armor. This version also has a digital autopilot and a pneumatic, rather than hydraulic, actuation system. First successful launch took place in November 1987. This version is in production.

A total of 25,397 AGM-65D/Gs were ordered for USAF through FY 1991, with the final order awarded to Raytheon in 1991.

Hughes has proposed a new, longer-range version of the Maverick, featuring an off-the-shelf turbine engine that would triple the current AGM-65's range. The **Longhorn Maverick** could arm both fighters and helicopters and would be equipped with INS/GPS. (Data for AGM-65A/B.)

**Contractor:** Hughes Missile Systems Company/Raytheon Company.

**Power Plant:** Thiokol TX-481 solid-propellant rocket motor.

**Guidance:** self-homing, EO guidance system (IIR on D and G models).

**Warhead:** high-explosive, shaped charge.

**Dimensions:** length 8 ft 2 in, body diameter 1 ft 0 in, wingspan 2 ft 4 1/2 in.

**Weight:** launch weight (AGM-65A) 462 lb, (AGM-65G) 662 lb.

**Performance:** range 0.6 to 14 miles.

#### AGM-84A Harpoon

Originally acquired, under a cooperative memorandum of understanding with USN, to equip two squadrons of now-retired B-52G aircraft for maritime anti-surface warfare operations, the Harpoon all-weather antiship missile now arms conventional-mission B-52Hs. **Contractor:** McDonnell Douglas Missile Systems Company.

**Power Plant:** Teledyne CAE J402-CA-400 turbojet; 660 lb thrust.

**Guidance:** sea-skimming cruise monitored by radar altimeter, active radar terminal homing.

**Warhead:** penetration high-explosive blast type, weighing 488 lb.

**Dimensions:** length 12 ft 7 1/2 in, body diameter 1 ft 1 1/2 in, wingspan 3 ft 0 in.

**Weight:** 1,145 lb.

**Performance:** speed high subsonic, range more than 57 miles.

#### AGM-88 HARM

Introduction of the AGM-88 High-Speed Antiradiation Missile greatly enhanced the lethality of USAF's F-4G "Wild Weasel" aircraft against enemy ground radar. IOC was achieved in July 1990. The emphasis on high speed reflects experience gained in Vietnam, where Soviet-built surface-to-air missile radar systems sometimes detected the approach of first-generation Shrikes

and ceased operation before the missiles could lock on to them. HARM can cover a wide range of frequency spectrums through the use of programmable digital processors in both the aircraft's avionics equipment and the missile. As the last F-4Gs retire at the end of this year, HARM-equipped F-16s will assume the defense suppression role. Current production version is the **AGM-88C**, with a more lethal warhead, containing tungsten alloy cubes rather than steel, and the enhanced-capability Texas Instruments AGM-88C-1 guidance head. USAF is updating older AGM-88Bs with the new guidance seeker. Erasable Electronically Programmable Read-Only Memory has been retrofitted on USAF, PACAF, and ACC HARMs, permitting changes to missile memory in the field, a facility that proved invaluable against Iraqi radar and missiles during Desert Storm. Nearly 6,000 HARMs were delivered before the end of 1990. Texas Instruments' FY 1991 production contract was raised from 1,400 missiles to 3,481 to replenish the USAF/USN AGM-88 inventory, depleted by the Persian Gulf War. (Data for AGM-88A.) **Contractor:** Texas Instruments, Inc.

**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 ft 8 1/2 in, body diameter 10 in, wingspan 3 ft 8 1/2 in.

**Weight:** 807 lb.

**Performance:** cruising speed supersonic, altitude limits S/L to 40,000 ft, range more than 10 miles.

#### GBU-15 and AGM-130A/C

The **GBU-15** is an air-launched, cruciform-wing, glide bomb fitted with a guidance system designed to give it pinpoint accuracy from low or medium altitudes over short standoff ranges. This capability was exemplified in January 1991 when an F-111-launched GBU-15 attacked the pipelines leading to the Sea Island terminal in the Persian Gulf in an effort to minimize the environmental impact of oil flowing into the sea from the war-damaged plant.



AIM-120A (AMRAAM) (top), AIM-9 Sidewinder, AGM-88 (bottom) (Paul Kennedy)



AGM-65 Maverick



GBU-15



AGM-130

Development began in 1974, based on experience gained in Vietnam with the earlier Pave Strike GBU-8 HOB0 modular weapon program. The GBU-15 is intended for tactical use to suppress enemy defenses and to destroy heavily defended targets. The target-detecting device is carried on the front of the warhead. The control module, with autopilot and data link module, attaches to the rear.

The weapon offers two modes of attack. In direct attack, the weapon is locked on to the 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, using guidance updates provided through the data link. This profile uses a midcourse glide phase and extends standoff range. The GBU-15 is deployed with F-111 and F-15E aircraft. The GBU-15(V)1/B TV-guided variant qualified for operational service in 1983; production is complete. The GBU-15(V)2/B IIR version entered service in 1987. An improved version, the GBU-15-I, combines the accuracy of the GBU-15 with the penetration capability of the improved 2,000-lb BLU-109/B iron bomb.

The AGM-130 is a product improvement to the GBU-15, adding a rocket motor, a radar altimeter, and a digital control system. These improvements triple the standoff range of the GBU-15. Both the **AGM-130A** (with a Mk 84 warhead) and the **AGM-130C** (with the BLU-109/B penetrating warhead) are currently in production. Upgrades include a new solid-state TV seeker, an improved IR seeker, and INS/GPS guidance. These enhancements enable the weapon to operate in adverse weather and improve target acquisition. Deliveries to USAF began in November 1992. The AGM-130 is certified for use with both the F-111 and the F-15E. (Data for GBU-15.)

**Contractor:** Rockwell International Corporation.

**Guidance:** TV or IIR seeker.

**Warhead:** Mk 84 bomb (2,000-lb unitary), or BLU-109.

**Dimensions:** length 12 ft 10 1/2 in, body diameter 1 ft 6 in, wingspan 4 ft 11 in.

**Weight:** 2,450 lb.

**Performance:** cruising speed subsonic.

#### GBU-24A/B

The GBU-24A/B is a third-generation laser-guided bomb guidance kit, called Paveway III, integrated with a BLU-109 penetrating warhead. The kit consists of an advanced guidance section and high-lift airframe. It is extremely precise and highly effective against a broad



range of high-value hard targets. The system can be employed from low, medium, and high altitudes, providing operational flexibility through the use of an adaptive digital autopilot and large field-of-regard, highly sensitive scanning seeker. The GBU-24A/B adapts to conditions of release, flies an appropriate midcourse, and provides trajectory shaping for enhanced warhead effectiveness. The weapon is deployed on the F-111F, F-15E, and F-16. The GBU-24A/B was highly successful in the Gulf War and is in production.

**Contractor:** Texas Instruments, Inc.  
**Guidance:** semiactive laser.  
**Dimension:** length 14 ft 2 in.  
**Weight:** 2,350 lb.

#### GBU-27

To meet the unique requirements of the F-117A, the GBU-24A/B was adapted to GBU-27 standard, incorporating specific guidance features to accomplish this mission. The GBU-27 is extremely precise and was used to great effect in the Gulf War and is in production.

**Contractor:** Texas Instruments, Inc.  
**Guidance:** semiactive laser.  
**Dimension:** length 13 ft 11 in.  
**Weight:** 2,170 lb.

#### GBU-28

Under USAF's rapid response program, a new bunker-busting weapon was developed for Operation Desert Storm, for use against deeply buried, hardened command-and-control facilities. Four of the laser-guided GBU-28 4,700-lb weapons were used in the war: two for testing



**AGM-142 Raptor** (Erik Simonsen)



**AGM-154A Joint Standoff Weapon (JSOW)**



**GBU-24**

and two by F-111Fs against a bunker complex on February 27, 1991. The body design is based on the BLU-109/B penetrator, extended by 54 in to 152 in, and doubling the wall thickness to 2 1/4 in. Guidance is by a modified GBU-27 system. Flight tested on the F-15E and F-111F, the GBU-28 demonstrated the capability to penetrate more than 100 ft of dirt or 20 ft of concrete. One hundred and twenty-five have been built to date, with funds for an additional 160 included in the FY 1997 budget. All are to be upgraded with an improved fuze and guidance system. Advanced hard target munition concepts are being assessed under an ongoing concept exploration study leading to a follow-on to the GBU-28.

**Contractor:** National Forge and Texas Instruments,

#### Joint Direct Attack Munition (JDAM)

A weapon system currently being developed to meet USAF and USN requirements for highly accurate, autonomous, all-weather, conventional bombing capability, the JDAM program is composed of two parts: JDAM and JDAM Product Improvement Program (PIP). The JDAM adds an INS/GPS guidance kit to the 2,000-lb general-purpose Mk 84, the 2,000-lb BLU-109 penetrator, and the general-purpose 1,000-lb Mk 83. While still aboard the launch aircraft, JDAM can be continually updated with target information through the aircraft's avionics system. Once released, the inertial guidance kit will take over and, with periodic GPS updates, will guide the weapon to its target. JDAM PIP will improve JDAM accuracy to near precision through such features as GPS enhancements and reduced target location error. Initial fielding is expected in 1997-98. JDAM is intended for use on a variety of aircraft, including the B-1, B-2, B-52, F-15E, F-16, F-22, F-117A, and F/A-18.  
**Contractor:** McDonnell Douglas Aerospace.

#### AGM-142 Raptor

Under the new name Raptor, USAF is acquiring the Israeli-built Popeye medium-range, standoff missile. Initial operational test and evaluation launches were

glide weapons with a standoff capability. JSOW's modularity allows for the integration of several different submunition and unitary warheads, nonlethal payloads, various terminal sensors, and different modes of propulsion. The services are integrating JSOW with BLU-97 combined effects bomblets and BLU-108 Sensor-Fuzed Weapon submunitions for area and armored targets.

Development, under USN lead, began in 1992 on the BLU-97 variant, which flew for the first time on December 13, 1994. The BLU-108 variant, under USAF lead, has undergone demonstration/validation and entered EMD last year. The third variant, JSOW/Unitary, under USN lead, entered EMD in the middle of last year and integrates an IIR terminal seeker, the AWW-13 data link, and a 500-800-lb unitary warhead. Texas Instruments has also proposed and demonstrated a powered variant of the unitary version with an 800-lb warhead.

Testing completed to date includes F/A-18 jettison test series to the limits of the carriage envelope, static dispense tests of BLU-97, captive dispense tests of BLU-108, free flight and in-flight destruct (range safety), environmental flight tests on F-15E and F-16, and fit checks on F-15E, F-16, F-117A, F/A-18, A-6E, AV-8B, B-1, B-52, Tornado, and Jaguar.

**Contractor:** Texas Instruments.  
**Guidance:** AGM-154A and JSOW/BLU-108 tightly coupled INS/GPS; JSOW/Unitary tightly coupled INS/GPS midcourse, IIR terminal with data link.  
**Dimensions:** length 13 ft 4 in.  
**Weight:** 1,065-1,500 lb.  
**Performance:** range: low-altitude launch 17 miles, high-altitude launch 46 miles.

#### Joint Air-to-Surface Standoff Missile (JASSM)

Intended as a replacement for the canceled AGM-137 TSSAM, the Joint Air-to-Surface Standoff Missile (JASSM) is intended to be a stealthy, long-range weapon with a 2,000-lb-class warhead, able to strike a target with high accuracy.

#### Wind-Corrected Munition Dispenser (WCMD)

USAF plans to modify 40,000 standard tactical munition dispensers with guidance kits to compensate for wind drift on downward flight from high altitudes. WCMD kits will each have an INS guidance unit, movable tailfins that pop out in flight, and a signal processor. With a range of about eight miles, a WCMD will carry mines, cluster bomblets, or antiarmor submunitions. Carrier aircraft are expected to include B-1s, B-2s, B-52Hs, F-15Es, and F-16s.

#### Rapier

Under a decision confirmed by an initial contract for 32 fire units in February 1981, British-built Rapier missile systems were deployed at seven USAF bases then in the UK to protect Air Force installations. The last unit became operational in July 1986. Manned by RAF regiment personnel, the USAF version of Rapier is intended primarily for defense against fast (Mach 1+), maneuvering, low-flying targets by day and night. The four-round fire unit, Blindfire radar, and a trailer of reload missiles are towed by Land Rovers loaded with support equipment.

Under a similar agreement, the government of Turkey operates 14 US-owned fire units for the defense of US air bases in that country.

**Contractor:** British Aerospace plc, Dynamics Division.  
**Power Plant:** IMI two-stage solid-propellant rocket motor.

**Guidance:** Racal-Decca surveillance radar and command to line-of-sight guidance. Optional Marconi DN181 Blindfire radar or optical target tracking, depending on conditions.

**Warhead:** semi-armor-piercing, with impact fuze.  
**Dimensions:** length 7 ft 4 in, body diameter 5 in, wingspan 1 ft 3 in.

**Weight:** approx 94 lb.  
**Performance:** max speed more than Mach 2, range 4 miles.

#### FIM-92A Stinger

Stinger was developed originally as a man-portable, tube-launched, surface-to-air missile for the US Army, as a much-superior successor to the pioneer Redeye. It has been employed since 1984 by air personnel in South Korea to provide base defense against high-speed, low-level, ground-attack aircraft.

**Contractor:** Hughes Missile Systems Company/Raytheon Company.

**Power Plant:** Solid-propellant rocket motor.  
**Guidance:** IR homing guidance.

**Warhead:** high-explosive blast fragmentation, weighing 6.6 lb.  
**Dimensions:** length 5 ft 0 in, body diameter 2 1/4 in, wingspan 5 1/2 in.

**Weight:** launch weight 35.3 lb.  
**Performance:** range 1.85 miles.



**FIM-92A Stinger**

completed in May 1990, and a coproduction agreement was entered into between Rafael and Martin Marietta (now Lockheed Martin).

The purpose of Raptor, previously known as Have Nap, is to provide long-range bombers with a conventional precision strike capability in support of worldwide theater commanders. Primary carrier aircraft are conventional-mission B-52Hs.

**Contractor:** Rafael Armament Development Authority.

**Power Plant:** solid-propellant rocket motor.  
**Guidance:** inertial, with data link, TV, or IIR homing.

**Warhead:** high-explosive, 750-lb-class blast/fragmentation or penetrator.  
**Dimensions:** length 15 ft 11 in, body diameter 1 ft 9 in, wingspan 5 ft 9 in.

**Weight:** 3,005 lb.

**Performance:** range 50 miles.

#### AGM-154A Joint Standoff Weapon (JSOW)

The AGM-154A Joint Standoff Weapon (JSOW) is the first in a USN/USAF family of low-cost, highly lethal



# Launch Vehicles

## Atlas II

An upgraded version of the Atlas/Centaur vehicle, Atlas II has been developed to meet USAF's continuing medium launch vehicle (MLV II) requirement. The familiar "stage-and-a-half" configuration of the original ICBM is retained for the basic Atlas. Changes include lower-cost advanced avionics, an improved flight computer, booster engines with greater thrust, and longer propellant tanks. The engine and tank changes have been made to both the Atlas and Centaur stages. A total of nine Atlas II vehicles are to be procured. Primary DoD payload is the Defense Satellite Communications System (DSCS). The first Atlas II/DSCS launch took place from Cape Canaveral AFS, Fla., in February 1992; first Atlas II-Centaur configuration launched in January 1995; next launch is planned for FY 1998.

**Prime Contractor:** Lockheed Martin Corporation.  
**Power Plant:** updated Rocketdyne MA-5 propulsion system in Atlas stage, comprising central sustainer motor and two boosters; total thrust 488,000 lb. Latest Atlas IIAS adds four Thiokol Castor IVA solid rocket motors.

**Dimensions** (Atlas stage): length 81 ft 7 in, max body diameter 10 ft 0 in.

**Launch Weight:** 416,000 lb.

**Performance:** in latest Atlas IIAS configuration, capable of putting 19,050 lb into a low-Earth orbit (LEO) from Cape Canaveral AS, Fla. Range of payloads Atlas II through Atlas IIAS can lift into geosynchronous transfer orbit (GTO) from Cape Canaveral is 5,000-8,500 lb, and 12,200-15,700 lb to LEO from Vandenberg AFB, Calif.

## Titan II

Fourteen Titan II ICBMs have been refurbished and modified to provide expendable space launch capability. Five successful launches to date have included the launch of the space probe Clementine I toward the Moon in January 1994, marking the first US lunar mission since Apollo 17 in December 1972. Remaining refurbished Titan IIs will be used exclusively to place Defense Meteorological Satellite Program (DMSP) and National Oceanic and Atmospheric Administration (NOAA) satellites into polar orbit through the turn of the century.

**Prime Contractor:** Lockheed Martin Corporation.  
**Power Plant:** first and second stages: Aerojet liquid hypergolic propellant rocket engines; first stage 430,000 lb thrust; second stage 100,000 lb thrust. Strap-on solid rocket motors can be added to the first stage to increase payload capability.

**Guidance:** Delco inertial guidance system.  
**Dimensions:** first and second stages: height 110 ft 0 in, diameter 10 ft 0 in; payload fairing heights 20, 25, and 30 ft, diameter 10 ft 0 in.

**Launch Weight:** 408,000 lb.  
**Performance:** more than 4,200 lb to low-Earth polar orbit.

## Titan IV

Serving as USAF's primary heavy-lift launcher, Titan IV was selected originally in 1985 to augment the space shuttle and to allow greater flexibility in launching critical military payloads, including the Defense Support Program (DSP) and Milstar satellites. It is a growth version of the earlier Titan 34D, with stretched first and second stages, seven-segment solid boosters, and a 16 ft 8½ in diameter payload fairing. Titan IV is capable of placing a 31,000-lb payload into low polar orbit and 39,000 lb into low equatorial orbit. With a modified Centaur G-prime upper stage, it can place 10,000 lb into geosynchronous orbit. With an alternative Inertial Upper Stage (IUS), it can place 5,200 lb into geosynchronous orbit. The scheduled use of upgraded solid motors in 1997 will enhance performance by approximately 25 percent. Forty-one Titan IVs were ordered by 1990, and a follow-on buy of no more than six vehicles is planned. First launch took place from Cape Canaveral, Fla., in June 1989. Fifteen Titan IVs have been launched as of December 1995.

**Prime Contractor:** Lockheed Martin Corporation.  
**Power Plant:** Aerojet liquid hypergolic propellant rocket engines; first stage, two engines 551,200 lb thrust each; second stage 106,150 lb thrust; initially two United Technologies solid rocket boosters, each 1,403,000 lb peak thrust; later two Alliant (formerly Hercules) solid rocket boosters, each 1,800,000 lb peak thrust.

**Guidance:** Delco inertial guidance system, to be replaced by Honeywell digital avionics system on twenty-fourth vehicle and later.

**Dimensions:** first and second stages: height 119 ft 2½ in, diameter 10 ft 0 in.

**Launch Weight:** 1,900,000 lb.

**Performance:** see above.

## Centaur

Centaur was the first US high-energy upper stage and the first to use liquid hydrogen as a propellant. Its multiburn and extended coast capability were first used operationally during the 1977 Mariner Jupiter/Saturn missions. The D-1A version used with the Atlas demonstrated widely ranging applications and capabilities. The nose section of Atlas was modified to a constant 10-ft-diameter to accommodate the Centaur, which, in turn, provided most of the electronic command-and-control systems for the launch vehicle. A 10-ft-diameter fairing protected payloads for Centaur D-1A.

The D-2A, used with the Atlas II, has been stretched three feet to include more propellant and thus has increased thrust. Payload fairings of either 11-ft or 14-ft diameter can be used.

The modified Centaur G-prime upper stage, with high-energy cryogenic propellants and multiple restart capability, is used with the Titan IV, creating the greatest weight-to-altitude capability of any US launch ve-

hicle by placing a 10,000-lb payload into geosynchronous orbit. (Data for Centaur D-1A and G-prime, except where indicated.)

**Prime Contractor:** Lockheed Martin Corporation.  
**Power Plant:** two Pratt & Whitney liquid oxygen/liquid hydrogen rocket engines; D-1A: RL10A-4 engines, each with 20,500 lb thrust; G-prime: RL10A-3-3A engines, each with 16,500 lb thrust.

**Guidance:** inertial guidance system.  
**Dimensions:** D-2A: length 33 ft 0 in, diameter 10 ft 0 in; G-prime: length 29 ft 0 in, diameter 14 ft 2½ in.

**Launch Weight:** D-2A (approx) 45,000 lb; G-prime-mod (approx) 53,000 lb.

## Inertial Upper Stage (IUS)

Serving as an upper stage for the Titan IV for DoD, as well as with the shuttle for NASA, the highly reliable IUS was used for the first time in October 1982. Consisting of an aft skirt, an aft-stage solid rocket motor, an interstage, a forward-stage solid rocket motor, and an equipment support structure, it has the capability of boosting 5,200 lb into geosynchronous orbit when used on Titan IV or 5,350 lb with the Titan IV SRMU.

**Prime Contractor:** Boeing Defense and Space Group.  
**Power Plant:** aft-stage solid rocket motor 59,000 lb thrust, forward-stage solid rocket motor 25,000 lb thrust.

**Guidance:** inertial.  
**Dimensions:** length 17 ft 0 in, diameter 9 ft 6 in.  
**Launch Weight:** 32,600 lb.

## Delta II

A medium launcher selected by the Air Force in 1987 to launch the Navstar GPS satellites, the Delta II is slightly larger than McDonnell Douglas's earlier Delta rocket in order to satisfy USAF's medium-payload requirement. The first launch took place in February 1989, and, to date, 24 operational GPS satellites have been launched successfully.

Delta II is a three-stage booster surrounded by nine solid-propellant, graphite epoxy motors. For low-Earth orbit missions, the third stage is typically not used. In December 1995, a newly assigned vehicle, complete with new avionics, an increased expansion ratio on three of the graphite epoxy motors (GEMs), and a new launch control system, successfully placed a NASA payload into orbit. Delta II will continue to support GPS by replenishing aging satellites as they fail, and will support other DoD payloads as needed.

**Prime Contractor:** McDonnell Douglas Aerospace Company.  
**Power Plant:** first stage: Rocketdyne RS-27A liquid-propellant engine, 237,000 lb thrust; second stage: Aerojet AJ10-118K engine, 9,750 lb thrust; third stage: Thiokol STAR-48B solid-propellant motor, 14,920 lb thrust; strap-on GEM solid rocket motors, 100,270 lb thrust (sea level).

**Dimensions:** length 130 ft 0 in, diameter 8 ft 0 in; bulbous payload fairing, max diameter 10 ft 0 in.  
**Launch Weight:** 511,190 lb.  
**Performance:** 11,100 lb to low-Earth orbit, 4,010 lb to geosynchronous transfer orbit.

## Pegasus

USAF's smallest launcher, this three-stage, solid-propellant winged vehicle is air-launched from a B-52 and is designed for maximum operational flexibility in delivering 850-1,050-lb payloads to low-Earth orbit. Conceived in 1987, Pegasus was developed jointly by Orbital Sciences Corp. and Hercules Aerospace Co. as a private venture. The vehicle was under contract to the Defense Advanced Research Projects Agency for its initial two flights, the first of which took place in 1990 from Vandenberg AFB, Calif. In July 1991, it successfully placed seven minisatellites in orbit. Management of the Pegasus program has transferred to USAF. It will support the USAF space test program and the Ballistic Missile Defense Organization. First flight, in June 1994, of the enhanced-performance Pegasus XL, launched from a Lockheed L-1011 carrier aircraft, was unsuccessful, as was the second. (Data for basic Pegasus vehicle.)

**Prime Contractor:** Orbital Sciences Corporation and Hercules Aerospace Company/Alliant Techsystems.  
**Power Plant:** three solid-propellant motors developing 109,400 lb, 27,600 lb, and 7,800 lb thrust, respectively.

**Guidance:** inertial guidance.  
**Dimensions:** length 49 ft 0 in, wingspan 22 ft 0 in, diameter 4 ft 2 in.  
**Launch Weight:** 42,000 lb.

## Taurus

A more powerful version of the Pegasus space-launch vehicle, using an LGM-118 Peacekeeper missile first-stage addition and with the Pegasus wings removed, Taurus is ground-launched from regular launch complexes and will be used to test a quick-readiness, mobile launch facility. The first launch, on March 14, 1994, put two USAF and ARPA satellites into a 340-



Titan IV



Delta II



Inertial Upper Stage (IUS)



Pegasus





**Tier III Minus DarkStar** (Erik Simonsen)

mile polar orbit. Capable of lifting 3,200 lb to low-Earth orbit and 985 lb to geosynchronous transfer orbit.

### Evolved Expendable Launch Vehicle (EELV)

Program aimed at fostering the evolution of a current launcher into a family of rockets, with reduced launch costs, to replace current DoD medium and heavy launchers. The requirement is to place payloads of 2,500–45,000 lb into low-Earth orbit. Four contracts were awarded in August 1995, to Alliant Techsystems Inc., Boeing Defense and Space Group, Lockheed Martin Technologies Inc., and McDonnell Douglas Aerospace, covering the 15-month low-cost concept validation phase. IOC for the medium-lift version is planned for 2001 and 2002, respectively, from Vandenberg AFB, Calif., and Cape Canaveral AS, Fla.; planned IOC for the heavy-lift EELV is 2005 at Vandenberg, and 2006 at Cape Canaveral.

## Unmanned Aerial Vehicles

### "Tier II" Predator

Delivery of "Tier II" Predator medium-altitude endurance vehicles is scheduled to begin to the 11th RS at Nellis AFB, Nev., this summer. A small number have already demonstrated their capability during continuous 16-hour surveillance missions over Bosnia for US European Command. Equipped with 450-lb Versatron TV and IR sensors package, all 10 Predators built will be retrofitted with Loral Ku-band satellite data links allowing real-time transmissions of nearly full-time motion video to a ground station, upgrading the existing UHF satellite link, which permits only transmission of still images. Additional equipment includes an all-weather Westinghouse synthetic aperture radar (SAR). **Contractor:** General Atomics.

**Dimensions:** length 27 ft 0 in, span 49 ft 0 in.  
**Performance:** 24 hr loiter on station 575 miles from base at altitude of up to 25,000 ft, cruise speed 80 mph.

### Tier II Plus

A high-altitude endurance UAV scheduled to be flown for the first time at the end of this year. Fitted with a 2,000-lb payload, incorporating TV, IR, and SAR sensors under development by Hughes, Tier II Plus will be capable of flying up to 42 hours at a cruise speed of nearly 400 mph and at an altitude of 65,000 ft and will loiter on station 3,450 miles from base for 24 hours. To be deployed by the 11th RS at Nellis AFB, Nev. **Contractor:** Teledyne Ryan Aeronautical.

**Dimension:** span 116 ft 0 in.

### Tier III Minus DarkStar

Designed to complement Tier II Plus, DarkStar is a low-observable UAV, intended to operate in high-threat environments at altitudes in excess of 45,000 ft for at least eight hours, 575 miles from its base. It will be capable of monitoring a mission area of 14,000 square nm, using a recon/optical TV camera or a Westinghouse SAR. First flight was expected at Edwards AFB, Calif., early this year; DarkStar will be deployed at the 11th RS, Nellis AFB, Nev. **Contractor:** Boeing/Lockheed Martin.

**Dimension:** span 69 ft 0 in.  
**Payload:** 1,000 lb.

**Performance:** cruise speed 345 mph, flight endurance 12 hr.

## Aerial Targets and Decoys

### MQM-107D Streaker

The Air Force originally procured the MQM-107A in 1975. The third-generation D model is now in use. It is a recoverable, variable-speed target drone used at Tyndall AFB, Fla., for research, development, test, and evaluation (RDT&E) and the Weapon System Evaluation Program.

**Contractor:** Raytheon Aircraft Company.

**Power Plant:** one Teledyne CAE 373-8 engine; 960 lb thrust.

**Guidance and Control:** analog or digital, for both ground control and preprogrammed flight. High-g autopilot provisions.

**Dimensions:** length 18 ft 1 in, body diameter 1 ft 3 in, span 9 ft 10 in.

**Weight:** launch weight (incl booster) 1,090 lb.

**Performance:** operating speed 230–594 mph, operating height 50–40,000 ft, endurance 2 hr 18 min.

### MQM-107E Streaker

Follow-on to the MQM-107D, the improved-performance E model will be the Air Force's standard subscale target. It will be operational at Tyndall AFB, Fla., by February 1998.

**Contractor:** Tracor Flight Systems Inc.

**Power Plant:** Microturbo TRI 60-5 engine; 1,061 lb thrust.

**Guidance and Control:** Digital autopilot and remote control by the Gulf Range Drone Control Upgrade System (GRDCUS), a multifunction command-and-control multilateration system.



**MQM-107D Streaker**



**BQM-34A Firebee**

**Dimensions:** as D model.

**Weight:** as D model.

**Performance:** operating speed 207–631 mph, operating height 50–40,000 ft, endurance 2 hr 15 min.

### BQM-34A Firebee

More than 6,000 of these jet target vehicles have been delivered since initial development of the BQM-34A in the late 1950s. They are used to support weapon system and target RDT&E, quality assurance, training, and annual service practices by all three US services and by foreign governments.

Current BQM-34As with uprated General Electric J85-100 engine provide a thrust-to-weight ratio of one to one, enabling this version to offer higher climb rates and 6g maneuvering capability. A new microprocessor flight-control system provides a prelaunch and in-flight self-test capability. Since 1989, these targets have been used for weapon system evaluation at Tyndall AFB, Fla.

**Contractor:** Teledyne Ryan Aeronautical.

**Power Plant:** one General Electric J85-GE-100 turbojet.

**Guidance and Control:** remote-control methods include choice of radar, radio, active seeker, and automatic navigator developed by Teledyne Ryan; the current model of the BQM-34A is configured to accommodate the GRDCUS, which allows multiple targets to be flown simultaneously.

**Dimensions:** length 22 ft 10 $\frac{3}{4}$  in, body diameter 3 ft 1 $\frac{1}{4}$  in, span 12 ft 10 $\frac{3}{4}$  in.

**Weight:** launch weight 2,500 lb.

**Performance:** max level speed at 6,500 ft 690 mph, operating height range 20 ft to more than 60,000 ft, max range 796 miles, endurance (typical configuration) 30 min.

### BQM-74C

Built by Northrop Corp., BQM-74C target drones were used as decoys during the Persian Gulf War to draw the attention of Iraqi air defense radar, revealing locations of missile and gun sites.

### QF-4

The QF-4 is replacing the QF-106 as a joint-service full-scale aerial target (FSAT). Advantages of the QF-4 over the QF-106 are an improved flight-control system and greater payload. Approximately 300 F-4s will be converted to FSATs.

**Contractor:** Tracor Inc.

**Power Plant:** two Pratt & Whitney J79-GE-17 turbojets; each with approximately 17,000 lb thrust with afterburning.

**Guidance and Control:** remote control methods include the GRDCUS and the Drone Formation and Control System and will also accommodate the triservice Next-Generation Target Control System currently under development.

**Dimensions:** length 63 ft 0 in, height 16 ft 5 in, wingspan 38 ft 5 in.

**Weight:** mission operational weight 49,500 lb.

**Performance:** max speed Mach 2, ceiling 55,000 ft, range (approx) 500 miles.

### QF-106

The QF-106 replaced the QF-100 as USAF's FSAT. Advantages of the QF-106 over the QF-100 include higher supersonic speeds while under remote control and increased maneuverability. Approximately 194 F-106s were converted to FSATs, with the last target delivered in December 1994. QF-106s will be operational through FY 1997.

**Contractor:** Honeywell Inc.

**Power Plant:** one Pratt & Whitney J75-P-17 turbojet; 24,500 lb thrust with afterburning.

**Guidance and Control:** remote control methods include the GRDCUS and, for Holloman AFB, N. M., operations, both the Drone Formation and Control System (the US Army's predecessor to the GRDCUS) and the Drone Tracking and Control System (a microwave command guidance system scheduled for phaseout).

**Dimensions:** length 70 ft 8 in, height 20 ft 3 in, wingspan 38 ft 5 in.

**Weight:** mission operational weight 40,500 lb.

**Performance:** max speed Mach 2, ceiling 50–55,000 ft, range (approx) 400 miles.

## Satellite Systems

### Defense Support Program

Defense Support Program (DSP) satellites, a key part of North America's early warning system, detect missile launches, space launches, and nuclear detonations. Operated by AFSPC, the satellites feed warning



data to NORAD and US Space Command early warning centers at Cheyenne Mountain AS, Colo.

The first launch of a DSP satellite took place in the early 1970s, and, since that time, the satellites have provided an uninterrupted early warning capability to the US. The system's capability was demonstrated during the Persian Gulf War when the satellites detected the launch of Iraqi Scud missiles and provided warning to civilian populations and coalition forces in Israel and Saudi Arabia. A total of 17 DSP satellites were launched by USAF. Procurement will end with Number 23, canceling the further satellites originally planned. An advanced satellite constellation known as the Spacebased Infrared (SBIR) system is being developed to replace the DSP satellites.

**Prime Contractors:** TRW and Aerojet.

**Power Plant:** solar arrays generating 1,485 watts.

**Dimensions:** diameter 22 ft 0 in, height 32 ft 8 in, 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.

### Defense Meteorological Satellite Program

Defense Meteorological Satellite Program (DMSP) space vehicles, operated by AFSPC's 50th Space Wing, Falcon AFB, Colo., have been collecting weather data for US military operations for some two decades. Two operational DMSP Block 5D-2 satellites survey the entire Earth four times a day, using their primary sensor, the Operational Linescan System, to take visual and IR imagery of cloud cover. Military weather forecasters use this imagery to detect developing weather patterns anywhere in the world, helping to identify, locate, and determine the severity of thunderstorms, hurricanes, and typhoons.

DMSP satellites also have sensors that measure atmospheric moisture and temperature levels, X rays, and electrons that cause auroras. The satellites can locate and determine the intensity of auroras—electromagnetic phenomena that can interfere with radar operations and long-range communications. This information aids military commanders in making decisions. During the Persian Gulf War, DMSP satellites helped coalition planners provide efficient and safe air operations. Satellite weather systems operated by DoD, NASA, and NOAA are to be merged and managed by NOAA.

**Prime Contractor:** Lockheed Martin Corporation.

**Power Plant:** solar arrays generating 1,000 watts.

**Dimensions:** height 11 ft 6 in, width 4 ft 9 in, length 19 ft 3 in.

**Weight:** 1,750 lb.

**Performance:** DMSP satellites orbit Earth at about 500 miles altitude and scan an area 1,800 miles wide. Each system covers the Earth in about 12 hr.

### Defense Satellite Communications System

Defense Satellite Communications System (DSCS) satellites are superhigh-frequency systems capable of providing worldwide secure voice and data transmission. They provide an important part of the comprehensive plan to meet military communications needs. The system is used for high-priority communications, such as the exchange of wartime information between defense officials and battlefield commanders. The military also uses the DSCS to transmit data on space operations and early warning to various systems and users.

The Air Force began launching the DSCS Phase II satellites in 1971. These are equipped with antennas capable of providing low-gain, Earth-field-of-view coverage and steerable, high-gain area coverage. The first launch of the more advanced Phase III satellites was in 1982. These satellites are nuclear hardened and can resist jamming. Phase III spacecraft are capable of providing flexible coverage and nulling in addition to the Phase II's capabilities. They are operated by the 50th Space Wing.

**Prime Contractor:** Phase II, TRW; Phase III, Lockheed Martin Corporation.

**Power Plant:** Phase II: solar arrays generating 531 watts, decreasing to 418 watts after five years; Phase III: solar arrays generating 1,240 watts, decreasing to 930 watts after 10 years.

**Dimensions:** Phase II: cylindrical body 9 ft 0 in in diameter, 6 ft high (13 ft with antennas deployed); Phase III: rectangular body 6 ft x 6 ft x 7 ft; 38-ft span with solar arrays deployed.

**Weight:** Phase II 1,350 lb, Phase III 2,550 lb.

**Performance:** two Phase II and nine Phase III DSCS satellites are currently in geosynchronous orbit.

### Navstar Global Positioning System

The Navstar Global Positioning System (GPS), is a constellation of orbiting satellites providing navigation data to military and civilian users around the world. Operated by the 50th Space Wing, Falcon AFB, Colo.,



CF-4



QF-106



Navstar Global Positioning System



Defense Support Program

the constellation achieved FOC in July 1995. It consists of 24 satellites providing 24-hour navigation services. These include accurate, three-dimensional (latitude, longitude, and altitude) velocity and precise time; passive, all-weather operations; continuous real-time information; support to an unlimited number of users and areas; and support to civilian users at a slightly less accurate level.

Also benefiting from the GPS are such functions as mapping, aerial refueling and rendezvous, geodetic surveys, and search-and-rescue operations. Such capabilities were put to the test during Operations Desert Shield and Desert Storm. Coalition troops relied heavily

on GPS to navigate the featureless Saudi Arabian desert. Forward air controllers, pilots, and tank drivers used the system.

**Prime Contractors:** Rockwell International Corporation, Lockheed Martin Corporation, and Loral Fairchild Systems.

**Power Plant:** solar arrays generating 700 watts.

**Dimensions:** width 5 ft 0 in, length 17 ft 6 in, including solar array.

**Weight:** 1,860 lb in orbit.

**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 hour, and location to within a few feet. Receivers are used in aircraft, ships, and land vehicles and can also be handheld.

### Milstar Satellite Communications System

Milstar is a joint-service communications system that provides secure, jam-resistant EHF communications for all US armed services. Operated by the 50th Space Wing, the constellation will link command authorities with a wide variety of resources including ships, submarines, aircraft, and ground stations. The first Milstar satellite was launched in February 1994 and is fully operational. The second satellite was launched in November 1995 and is undergoing operational test and evaluation.

**Prime Contractor:** Lockheed Martin Corporation.

**Power Plant:** solar arrays generating 8,000 watts.

**Dimensions:** antenna array 52 ft 0 in in deployed; solar array 108 ft 0 in in deployed.

**Weight:** 10,000 lb.

**Performance:** The constellation will consist of four satellites in geosynchronous orbit at five degrees inclination. The spacecraft are three-axis stabilized, with design lifetime of 10 years.

### Fleet Satellite Communications

A constellation of five satellites used by the Air Force and Navy, as well as the presidential command network. Each satellite has 23 channels (12 for Air Force, 10 for Navy, one reserved for the national command authorities). Operational since 1978 in geostationary orbit, the FLTSATCOM system carries fleet-wide high-priority broadcasts and ship-to-ship and ship-to-shore communications.

### UHF Follow-On Satellites.

New generation of satellites with 39 channels, providing UHF communications to replace FLTSATCOM satellites. Compatible with the terminals used by the earlier systems. UFO-4 was the first in the series to include an EHF communications package, constituting an additional 11 channels, with enhanced anti-jam telemetry, command, broadcast, and fleet interconnectivity. Ten ordered. ■



AFA / Lance Sijan Chapter

# Outstanding Squadron Dinner and Associated Events

 **Saturday, May 25**  
**Outstanding Squadron Dinner**

AFA's 37th annual Outstanding Squadron Dinner will be held at The Broadmoor Hotel, Colorado Springs, Colo., on Saturday, May 25. The dinner honors cadets of the United States Air Force Academy for the 1995-96 school year. The price is \$80 per person.

 **Thursday, May 23**  
**Golf Tournament and Reception**

The golf tournament, open only to dinner or symposium attendees, will be held at 10 a.m. on the Broadmoor East Course. The price includes greens fees, golf cart, prizes, and reception. The fee for the reception only is \$35.

 **Friday, May 24**  
**Air Force Acquisition Symposium**

The sixth annual Air Force Acquisition Update, sponsored by the Lance Sijan Chapter of AFA, will focus on "Acquisition Reform: Progress to Date." The program is aimed at industry executives and government leaders. Overall acquisition strategy and policy will be discussed by top-level speakers.

**The following speakers have been invited:**

**Gen. Joseph W. Ashy**, Commander in Chief, North American Aerospace Defense Command; Commander in Chief, US Space Command; and Commander, Air Force Space Command

**Steven D. Dorfman**, President, Hughes Telecommunications and Space Company

**Gen. Charles A. Horner**, USAF (Ret.), Consultant

**Arthur L. Money**, Assistant Secretary of the Air Force (Acquisition)

**Lt. Gen. Lester L. Lyles**, Commander, Space and Missile Systems Center, AFMC

**Maj. Gen. Robert S. Dickman**, DoD Space Architect, Under Secretary of Defense for Acquisition and Technology

**Brig. Gen. Thomas J. Scanlan, Jr.**, Director, Special Projects, Office of the Secretary of the Air Force

**Brig. Gen. H. Marshal Ward**, Director of Requirements, AFSPC

**The 1996 USAF Acquisition Update will be held at The Broadmoor and will be unclassified.** The cost for the symposium is \$250 for AFA individual or Industrial Associate members. The registration fee includes coffee breaks, lunch, and a reception (Thursday evening, May 23) in honor of the speakers. Additional individual reception tickets are \$35 (spouses and individuals not registered for the Acquisition Update or golf tournament.)

**For hotel reservations at The Broadmoor**, call (800) 634-7711 and identify yourself as an attendee of the Air Force Association symposium or dinner.

"The Department of Defense finds this event meets the minimum regulatory standards for attendance by DoD employees. This finding does not constitute a blanket approval or endorsement for attendance. Individual DoD component commands or organizations are responsible for approving attendance of DoD employees based on mission requirements and DoD regulations."

 **For more information on all events including specific golf tournament fees**, call Barbara Coffey at AFA's special toll free number: (800) 727-3337, ext. 5805, or Andrea Schmeier at (719) 570-7000. Fax: (719) 570-1801. AFA's Fax reply number is (800) 232-3563.





# National Report

## Chapters Put Foundation Grants to Work

Aerospace Education Foundation President Thomas J. McKee described AEF's new Chapter Matching Grant Program as "an effort to put our national resources to work at the local level—the AFA chapter level. After all, that is where education really happens." In its first seven months, the program gave grants to twenty-three chapters, matching what the chapters spent on new aerospace education activities. The typical grant was \$1,000.

"The real value of this program," said Foundation Chairman Walter E. Scott, "is that chapters are able to reach more students. Chapters use these funds to start new programs and explore new ways of using aerospace education to excite students about math and science."

A grant to Delaware's AFA chapters helped outfit a special trailer to transport two flight simulators to the state's elementary schools. Led by the AFA state aerospace education vice president, Dr. Stephanie Wright, the program will reach more than 3,700 elementary students in 1996.

Grants to the General James R. McCarthy Chapter in Daytona Beach, Fla., and to the Tucson (Ariz.) Chapter helped put the Wright Flight program into local schools. Started by AFA member Robin Stoddard of Tucson, Wright Flight encourages students to raise their grades and learn about aviation. Students sign contracts promising to improve their grades and successfully complete the Wright Flight

*Dr. Stephanie Wright, Delaware AFA's aerospace education vice president, stands with the Boeing K-3 Classroom Flight Simulator and one of the volunteers who helped build it.*



aviation course. If they do, they receive a flight in a private aircraft.

David R. Cummock, president of the McCarthy Chapter and director of Florida Wright Flight, said teachers are enthusiastic about the program. "We had one boy who was so disruptive in class the teacher was considering throwing him out but decided to let him stay and try Wright Flight. His contract included better behavior. And it worked. He even met his contract with a C in Algebra."

A grant to the Golden Triangle Chapter in Mississippi enabled three teachers to design and present a program about using aerospace activities to enhance student learning at the

Mississippi Science Teachers Association meeting. The Colorado Springs/Lance Sijan Chapter in Colorado used its grant to send four teachers to the "Getting Comfortable Teaching with Space Course" at the Air Force Academy.

Other chapters used matching grants for field trips, science fairs, and space programs. The L. D. Bell-Niagara Frontier Chapter in New York sent students to Wright-Patterson AFB, Ohio, for a firsthand look at opportunities in Air Force research and development; and to see the Air Force Museum. The Montgomery (Ala.) Chapter used its grant to help Auburn University sponsor a statewide science competition for elementary students.



### Fighterology

AFA National President Gene Smith "flies" the F-22 Concept Demonstrator in Arlington, Va., under the guidance of Barry Barrineau of Lockheed Martin Corp. His checkout in the simulator was further background for an Air Force Association program on fighter technology scheduled for late April and early May on Capitol Hill.





By Frances McKenney, Assistant Managing Editor

## Medical Care for Honduras

First they flew into a military base at Soto Cano, Honduras. There, the entire unit made its way through customs. Next they flew to a remote Honduran Army Base. From there, they went out every day by helicopter to provide basic medical care to villages on the Mosquitia Coast of Honduras.

This was the annual training exercise for the 152d Medical Squadron, an Air National Guard unit based in Reno, Nev.

Majs. Mati Stephens and Kim Neiman and 1st Lt. Zola Ferguson described their unit's two-week, December 1995 exercise at a February luncheon meeting of the **Dale O. Smith (Nev.) Chapter**. The event was billed as "A Salute to Women in the Military."

An audience of more than fifty, including ANG personnel and women from local veterans organizations, viewed slides that the three speakers took in Honduras.

Major Stephens, a chapter member, is a social actions officer for the Nevada ANG in Reno. Major Neiman is chief nurse for the 152d MS and an infection-control and employee-health specialist at Carson-Tahoe Hospital in Carson City, Nev. Chapter member Lieutenant Ferguson is a physician's assistant at the VA Medical Center in Reno.

In Honduras, Lieutenant Ferguson conducted basic examinations of pregnant villagers and identified those who would face problems in delivering their babies. She said the ANG unit personnel also provided immunizations, helping the Honduran government's effort to protect the villagers against measles. They had no running water or electricity and only the medical supplies and equipment that they brought with them. The unit commander, Col. Richard Newbold, even got pressed into service as a dentist, performing what the Lieutenant called "jungle dental care"—pulling teeth.

In that part of Honduras, villagers spoke an Indian dialect that had to be translated into Spanish and then into English. Major Stephens served as an interpreter, and personnel from



At Air Force Magazine's annual foreign air attaché reception, Maj. Gen. Katsuhiko Iwasaki (center) said, "I have proudly been a life patron of the Air Force Association since 1979, when I was teaching military studies at the US Air Force Academy." Here, the dean of the air attaché corps poses with AFA National President Gene Smith (left) and Executive Director John Shaud.

Joint Task Force Bravo, based at Soto Cano, provided interpreters, too, as well as logistical support.

Noting that the unit does not always conduct its annual exercise in such a remote location, Major Neiman said, "We spend so much time in training that I thought it was great to put that training to work in a place where it really made a difference."

## Straight Talk

**Roanoke (Va.) Chapter** President George W. McKay said the presentation by the chapter's recent guest speaker reminded him of the dynamic speech delivered by Secretary of Veterans Affairs Jesse Brown at the AFA National Convention last fall.

Dr. Rajiv Jain, chief of staff of the Salem Department of Veterans Affairs Medical Center in Salem, Va., was "a forthright speaker," said Mr. McKay. "He told us what we wanted to know—and what we didn't want to know."

A native of India and specialist in hematology and oncology, Dr. Jain

spoke about the state of the VA medical system, hopes for expansion in southwestern Virginia, and upgrades completed at and planned for the medical center. He also described the facility's progress in handling more procedures on an outpatient basis and how it now assigns patients to specific doctors.

During a question-and-answer period at this dinner meeting in Salem, Mr. McKay, who had in the past been treated at Dr. Jain's facility, asked if he would be able to receive care there if he had a heart attack today. In an emergency, yes, the doctor replied, but Mr. McKay would otherwise have to meet a means test.

Mr. McKay, a veteran of World War II and Korea and a retired air traffic controller, said he appreciated the straightforward answers Dr. Jain gave to such questions. "He cared," said Mr. McKay.

## McPeak Speaks

When the **Eugene (Ore.) Chapter** invited Gen. Merrill A. McPeak, USAF



(Ret.), to speak at a joint meeting with the local Defense Education Committee, the former Air Force Chief of Staff had to fly back from Europe and drive down from Portland, Ore., to make the engagement. At the December 7 gathering that marked the anniversary of the attack on Pearl Harbor, General McPeak spoke about the Air Force and its success in carrying out its mission today, despite budget restrictions.

According to Chapter President Edward Kelly, the audience asked the General some tough questions about US operations in Bosnia-Herzegovina.

Also in Oregon, the **Klamath Basin Chapter** reported continued success in its method for gathering sponsors for the *USA Today/AEF* Visions of Exploration program that encourages youngsters to develop an interest in math and science.

State Vice President and Chapter President Richard P. Norton is an Air National Guard lieutenant colonel and the logistics group commander with the 173d Fighter Wing at Kingsley Field, Ore. He said that many military retirees live in the area and are supportive of chapter activities, but it took collaboration with a local chapter of the Ninety-Nines, International Women Pilots, for the Visions program to really take off. The female flyers have been highly successful in enlisting businesses to help the chapter sponsor Visions classrooms.

Klamath Basin has had as many as

thirty-four classrooms in the program, although this year, because of school district reorganization, the chapter has fifteen math and science classes on its Visions roster. Giving credit where it's due, Mr. Norton said, "We've had a tremendous impact on aerospace education in this area because of the Ninety-Nines."

The Ninety-Nines are a sixty-seven-year-old organization of female pilots who develop programs for schools and youth organizations as one element in their goal to foster understanding of aviation.

#### Tomorrow's Leaders

The **John W. DeMilly, Jr. (Fla.) Chapter** has also discovered how pilots can ignite interest in Visions of Exploration.

Last year, the chapter started the ten-week program for the first time in the Homestead, Fla., area. The fifth graders at Peskoe Elementary School, near Homestead ARS, enjoyed the experience so much that in January the chapter expanded the program, adding two more schools: Air Base and Leisure City Elementary Schools. Josie Podesta Soto, regional marketing manager for *USA Today* in south Florida, conducted the teacher orientations for the schools.

The chapter's vice president for Aerospace Education, David Schoch, said they targeted these schools because they are close to the base, so the children are accustomed to being near airplanes. He said the program

"solidifies the partnership between the base and the community."

But he admitted that the students really get fired up when he rounds up an F-15 pilot from Homestead and brings him into the classrooms.

"By the time we're through, everybody in the fifth grade wants to be a pilot," said Mr. Schoch.

#### State of the Unit Address

Just as the President delivers a State of the Union Address, so the **Eglin (Fla.) Chapter** has what Chapter President Thomas M. Rooney called "the state of the unit address."

He explained that each year, the group invites the key commanders at Eglin AFB, one by one, to chapter meetings, to speak about how their units are doing. In January, it was Brig. Gen. Ronald E. Keys's turn.

Commander of the former Air Warfare Center, now the 53d Wing, the General drew more than eighty people to the luncheon meeting for his speech, including local community leaders, civilian employees at the base, active-duty personnel, and chapter members. He spoke about the wing's future and how it will adjust to a smaller work force by operating more efficiently and intelligently.

Mr. Rooney said that he was able to get General Keys to be a guest speaker because they are both former F-4 pilots.

The chapter also used the meeting, held at Eglin's NCO Club, to recognize the contribution of several chapter supporters and members. Robert E. O'Connor received an AFA Exceptional Service Award for his leadership as chapter president for two terms. MSgt. Edna Green received an AFA Medal of Merit for outstanding service as the chapter's treasurer, 1994-95.

James D. Neilson, Jr., of the Destin, Fla., Chamber of Commerce and Clifford Long of the Fort Walton, Fla., Chamber of Commerce both received AFA Citations. Mr. Rooney said that Mr. Neilson and Mr. Long are chairmen of their respective organizations' military affairs committees and have been generous supporters of the Eglin military community for more than twenty years. They sponsor an annual banquet that gives members of the military and civilian sectors a chance to meet, and they also support some of the base's enlisted awards.

#### The Championship Drill

Florida State President William L. Sparks, State Vice President for Aero



**Billy Mitchell (Wis.) Chapter President Charles Marotske (left) and Wisconsin State President Gilbert Kwiatkowski (center) attended a memorial service for a 128th Air Refueling Wing (ANG) crew killed in a 1993 explosion at General Mitchell IAP/ARS, Wis. Wing Chaplain William Hower is at right.**



space Education Richard A. Ortega, and **General James R. McCarthy (Fla.) Chapter** President David R. Cummock turned out to support the first annual AFJROTC Falcon Drill Meet, hosted by Embry-Riddle Aeronautical University's AFROTC Det. 157 in Daytona Beach, Fla.

The chapter newsletter called the all-day event a "spectacular success," one of the largest AFJROTC competitions in the state. Twenty-two high schools from as far away as Miami—about a 300-mile round trip—and Panama City sent more than 600 cadets to the meet, held in January. The teams competed in seven events and an individual knockout drill, all staged at various sites on the Embry-Riddle campus.

"It was amazing what those kids did," commented Chapter Secretary Marguerite Cummock, pointing out that the ROTC cadets who organized and judged the competition were only a few years older than the high school students who participated. "That was the charm of it," she said.

The McCarthy Chapter donated the trophies for best overall color guard and best unarmed drill team and two of twenty-nine trophies awarded at the meet. Mr. Cummock presented them to the winners. Mr. Sparks presented the trophy for best overall school, and Mr. Ortega presented the second place award for best overall school.

#### Hard Work Has its Reward

It hasn't been easy keeping up membership for the **Henlopen Area (Del.) Chapter**. Malvin L. Larsen has twice taken on the challenge as chapter president and in February kicked off another membership drive, this time with an emphasis on recruiting Community Partners. Presently, the chapter has one, the Lamp Post Restaurant, where the chapter has gathered for meetings.

Mr. Larsen, a former Air Force pilot who enlisted in 1952 and retired as a major, recently received recognition for his efforts—an AFA Medal of Merit for 1995—at the annual Delaware state awards reception held at the Dover AFB Club, Del. The **Delaware Galaxy Chapter** hosted the event, attended by more than 200 guests.

**Diamond State (Del.) Chapter** President Howard G. Sholl, Jr., and chapter members Frank E. Mancuso and Norman H. Runge also received Medals of Merit. Arthur Ericson received an Exceptional Service Award, and fellow Delaware Galaxy members Richard B. Harper, CMSgt. Ray B. Nuckols, and Charlotte A. Storm received Citations.



*On behalf of Sen. Strom Thurmond (R-S. C.), Rep. Floyd Spence (R-S. C.) accepted the Distinguished American Award from Nation's Capital (D. C.) Chapter President Albert Barbero (right). Senator Thurmond had to return to South Carolina on short notice and was unable to attend the banquet.*

Also at the reception, Col. Walter I. Jones, support group commander at Dover AFB, accepted the Premier Salute award on behalf of Brig. Gen. Robert J. Boots, commander of the 436th Airlift Wing. Other top performers from the 436th AW and 512th AW also received recognition, as did University of Delaware AFROTC cadets Spiro M. Ballas and Aaron M. Pierce. AFJROTC cadets from six area high schools received awards as outstanding juniors or seniors.

Delaware State President Jack G. Anderson made the presentations. He noted that Mr. Larsen has "taken an intense interest" in fostering chapter growth. He also praised Mr. Ericson, who served as the Galaxy Chapter president in 1995, for building a strong Community Partner program and signing up new members.

#### Saluting a Senior Senator

In February, the **Nation's Capital (D. C.) Chapter** held its twentieth annual Distinguished American Award Banquet. This year, the chapter honored Sen. Strom Thurmond (R-S. C.), who chairs the Senate Armed Services Committee and is also on the Senate Veterans' Affairs and Judiciary Committees.

Senator Thurmond was unable to attend the award ceremony, but Rep. Floyd D. Spence (R-S. C.) accepted the honor on behalf of his colleague and longtime friend. Representative Spence, who won the award in 1995, is chairman of the House National Security Committee and is also on its Veterans' Affairs Committee.

Senator Thurmond, ninety-three years old, has served in the US Senate since 1955. He also served with the Army in World War II and became a major general in the Reserve. His military awards include a Legion of Merit with oak leaf cluster, Bronze Star with V, and a Purple Heart. The Senator's AFA award recognized his "outstanding leadership in preserving and protecting the traditions and values of the United States of America."

#### Happy Birthday, AFA

When AFA Executive Director Gen. John A. Shaud, USAF (Ret.), visited the **Tucson (Ariz.) Chapter** in February to mark the Association's fiftieth birthday, the group scheduled him for so many activities, he hardly had time to sit down.

The largest chapter in the state, with more than 2,000 members, the Tucson Chapter arranged a section of the Davis-Monthan AFB Officers Club as they would for a convention, with a room set aside for industry and AFA displays.

Special guests in the audience of 175 at the reception and luncheon included Vice Commander of 12th Air Force Maj. Gen. Nels Running, 355th Wing Vice Commander Col. Jim Montman, National Vice President (Far West Region) William A. Lafferty, National Directors R. L. Devoucoux, Nuel E. Sanders, and James M. Trail, and Arizona State President Sally R. Reid. Sixteen of the chapter's Community Partners, a contingent from the **Richard S. Reid (Ariz.) Chapter**, and local civic and busi-



ness leaders attended the luncheon, along with an entire class from the 355th Wing's Airman Leadership School at Davis-Monthan.

General Shaud presented a host of awards at this event. The 355th Wing's Senior NCO of the Year MSgt. Annette M. Cooper and SrA. Wallace J. Shank III, Airman of the Year, received AFA Citations, along with SrA. Charles G. Hayworth, Jr., the outstanding gradu-

ate from the wing's Airman Leadership School. Roger L. Hurt was recognized with a Citation for earning the 12th Air Force Civilian Supervisor of the Year honor. University of Arizona AFROTC cadet Mikal McDaniel received an AFA Silver Medal as a distinguished graduate from the 1995 AFROTC field training program. Philip Makanna, a renown photographer of World War II aircraft, received an Ex-

ceptional Service Award from the Far West Region. Chapter Action Officer Stewart R. Gable accepted the award on his behalf.

General Shaud was stationed at Davis-Monthan as a B-47 pilot with the 358th Bomb Squadron in 1957. Chapter President James I. Wheeler said, "Now many of his former flying comrades are retired in Tucson, and he had numerous delightful opportunities to trade 'There I Was' stories with his friends and the audience."

After the awards luncheon, the General toured the Pima Air and Space Museum. That evening, chapter members gathered for an informal dinner party back at the Officers' Club. Lt. Gen. James F. Record, 12th Air Force commander, attended the dinner, which concluded with a showing of AFA's new video, "The Force Behind the Force."

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\*Actual quotes from Air Force, Army and Navy Commendation Letters.

### Coming Events

May 3-4, **Tennessee State Convention**, Memphis, Tenn.; May 10-11, **South Carolina State Convention**, Charleston, S. C.; May 11-12, **Montana State Convention**, Great Falls, Mont.; May 17, **Maryland State Convention**, Andrews AFB, Md.; May 17-19, **New Jersey State Convention**, Absecon, N. J.; May 18, **Massachusetts State Convention**, Boston, Mass.; June 7-9, **Arizona/Nevada State Convention**, Las Vegas, Nev.; June 7-9, **Texas State Convention**, San Antonio, Tex.; June 14-15, **Arkansas State Convention**, Jacksonville, Ark.; June 21-22, **Alabama State Convention**, Mobile, Ala.; June 21-22, **Ohio State Convention**, Youngstown, Ohio; June 28-30, **New York State Convention**, Albany, N. Y.; July 6, **Mississippi State Convention**, Jackson, Miss.; July 13, **Georgia State Convention**, Robins AFB, Ga.; July 18-21, **California State Convention**, Fresno, Calif.; July 19-20, **Oklahoma State Convention**, Oklahoma City, Okla.; July 19-21, **Kansas State Convention**, McConnell AFB, Kan.; July 20, **Virginia State Convention**, Charlottesville, Va.; July 26-27, **Florida State Convention**, Daytona Beach, Fla.; July 26-28, **Pennsylvania State Convention**, Trevese, Pa.; August 2-3, **Missouri State Convention**, Kansas City, Mo.; August 9-10, **North Carolina State Convention**, Goldsboro, N. C.; August 9-11, **Iowa State Convention**, Cedar Rapids, Iowa; August 15-18, **Washington/Oregon State Convention**, Portland, Ore.; August 16-17, **Colorado State Convention**, Colorado Springs, Colo.; August 17, **Indiana State Convention**, Indianapolis, Ind.; September 16-18, **AFA National Convention and Aerospace Technology Exhibition**, Washington, D. C.



## More Chapter News

Altus, Okla., Mayor Don Johnson proclaimed February 4, 1996, as AFA Day in a ceremony attended by **Altus Chapter's** Dennis Lane, who was then president, and members Robert H. Ottman, Sandy A. Nichols, Dottie J. Bobo, Aaron C. Burleson, and Glenda F. Drake.

Bossier City, La., Mayor George Dement, an **Ark-La-Tex (La.) Chapter** Community Partner, declared February "Air Force Association Month," honoring AFA's fiftieth anniversary. Chapter members Jim Osborne, Albert L. Yantis, Jr., James E. Huggins, William F. Cocke, CMSgt. Chalma L. Sexton, Jr., and Chapter President Capt. Gilbert E. Petrino, USAF, attended the ceremony, along with Louisiana past President Ivan L. McKinney, and Jane H. Smith, an AFA Community Partner and superintendent of Bossier Parish Schools.

An AFA member since 1946, **Nassau Mitchel (N. Y.) Chapter's** Anthony R. Glaudino celebrates not only a fiftieth anniversary with the association this year but also attended a 100th birthday celebration in February for Roy Wiedersum, a World War I pursuit pilot and instructor. After the war, Mr. Wiedersum served in the Reserve, flying out of Mitchel Field, N. Y. ■

## Unit Reunions

**Air Rescue Ass'n.** October 23-27, 1996, in Orlando, Fla. **Contact:** Roy E. Jacobsen, P. O. Box 89640, Tucson, AZ 85752-9640. Phone: (602) 948-6660.

**Army Air Corps Enlisted Pilots Ass'n.** October 10-13, 1996, in Austin, Tex. **Contact:** Forrest D. Bruce, 3103 Stardust Dr., Austin, TX 78757-2046. Phone: (512) 453-0871.

**Burtonwood Ass'n.** October 8-12, 1996, in Little Rock, Ark. Civilian and military personnel who were stationed at RAF Burtonwood, England, are invited. **Contact:** James R. "Bob" Moddrell, 10 Desoto Cir., North Little Rock, AR 72116-8514. Phone: (501) 758-8742.

**Nagoya/Komaki AB Reunion Ass'n** (civilian and military personnel). June 20-23, 1996, in Manhattan, Kan. **Contacts:** CMSgt. John M. Campo, USAF (Ret.), 8212 E. 103d Terr., Kansas City, MO 64134-2101. Phone: (816) 763-6081. Melvin House, 219 N. 17th St., Manhattan, KS 66502. Phone: (913) 537-1200.

**P-38 National Ass'n.** May 15-19, 1996, at the Holiday Inn in Riverside, Calif. **Contacts:** P-38 National Ass'n, P. O. Box 1816, Burbank, CA 91507. Phone: (804) 625-6401 (Donna Lee). Fax: (804) 627-3807.

**P-51 Mustang Pilots Ass'n.** September 19-23, 1996. **Contacts:** Anthony Chardella, 511 Cresthaven Dr., Philadelphia, PA 15239-3609. Phone: (503) 591-9312 (Pete Hardiman) or (508) 658-9846 (Frank Grenon).

**Pacific Air Weather Squadrons.** October 3-6, 1996, in Charleston, S. C. **Contact:** Frank L. Whitmire, 2300 Oak Knoll Ct., Colleyville, TX 76034. Phone: (817) 283-8038.

**RAF Station Manston** (all units). June 2-8, 1996, at RAF Station Manston, England. **Contact:** Maj. Milton J. Torres, USAF (Ret.), 11200 S. W. 99th Ct., Miami, FL 33176. Phone: (305) 238-3342.

**Roswell Army Airfield/Walker AFB Veterans Ass'n** (civilian and military personnel). September 13-15, 1996, at the Roswell Inn in Roswell, N. M. **Contact:** TSgt. Alfred H. Wilbur, USAF (Ret.), P. O. Box 2744, Roswell, NM 88202.

**SAC Reconnaissance** forces who flew the RB-17, RB-29, RB-47, RB-50, RB-57, RC-135, U-2, and SR-71, and supported missions. September 4-7, 1996, in Omaha, Neb. **Contacts:** Bill Ernst, 410 Greenbriar Ct., Bellevue, NE 68005. Phone: (402) 292-1205. Harlon Hain, 212 Bellevue Blvd. N., Bellevue, NE 68005. Phone: (402) 293-1818.

**World War II Air Commando Ass'n, 2d and 3d Groups.** October 17-20, 1996, in Las Vegas, Nev. **Contact:** Col. W. Robert Eason, USAF (Ret.), 10031 Barnetts Ford Rd., Orange, VA 22960-2307. Phone: (540) 672-4074.

**3d Hospital Group/7510th USAF Hospital,** Wimpole Park, England. September 12-14, 1996, at the Voyageur Inn and Conference Center in Reedsburg, Wis. **Contact:** Rowland D. Garver, 182 E. Fifth St., Peru, IN 46970-2340. Phone: (317) 473-7184.

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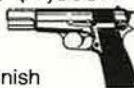
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## Unit Reunions

**8th Air Force Historical Society**, Pennsylvania Chapter. June 27-30, 1996, in State College, Pa. **Contact:** Lacey G. Lackey, P. O. Box 206, Lionville, PA 19353-0206. Phone or fax: (610) 524-8990.

**9th Bomb Wing**. July 11-15, 1996, in Boise, Idaho. **Contact:** Bibiana Nertney, 7726 W. Mooserun Ct., Boise, ID 83704. Phone: (208) 322-5145.

**11th, 12th Tactical Reconnaissance Squadrons and 616th Air Weather Reconnaissance Flight**, Korea (1950-54). May 28-31, 1996, at the US Air Force Museum in Dayton, Ohio. **Contact:** James J. Van Hare, 2517 Highpointe Dr., Kalamazoo, MI 49008-2076. Phone: (616) 342-8192.

**12th Tactical Fighter Wing** (Vietnam). August 8-11, 1996, at the St. Anthony Hotel in San Antonio, Tex. Members of the 12th Bomb Group and 12th Flying Training Wing are invited. **Contact:** Dave Hutchings, 781 McDonald Rd., Port Byron, NY 13140. Phone: (315) 776-8932.

**15th Air Depot Group** (World War II). September 22-24, 1996, in New Orleans, La. **Contact:** Joe B. Mitchell, 4706 Cambray Dr., San Antonio, TX 78229-5016. Phone: (210) 614-4026.

**15th Troop Carrier Squadron**, 61st Troop Carrier Group. September 19-21, 1996, at the Marriott Pavilion Hotel in St. Louis, Mo. **Contact:** Robert Shantz, 7814 Tanager Ct., St. Louis, MO 63119. Phone: (314) 962-4592.

**17th Bomb Wing, 47th Bomb Wing**, Pusan AB, South Korea, Miho AB, Japan, Hurlburt Field, Fla., and RAF Sculthorpe, England. October 17-20, 1996, in Fort Walton Beach, Fla. **Contact:**

Bob Mendonca, 513 Paddock Ln., Montgomery, AL 36109. Phone: (205) 271-1343.

**17th Photoreconnaissance Squadron**, 4th Photoreconnaissance Group, and other units of 13th Air Force. September 5-8, 1996, at the Galt Hotel in Louisville, Ky. **Contacts:** Ken Hyman, 4944 Lindell Blvd., St. Louis, MO 63108. Phone: (314) 361-9998. Fax: (314) 361-7417. John Rodolf, 2842 E. 32d Pl., Tulsa, OK 74105. Phone: (918) 747-6558.

**20th Air Depot Group**. August 22-25, 1996, at the Stouffer Renaissance Hotel in Dublin, Ohio. **Contact:** Scott C. Ide, Jr., 195 Patrice Terr., Williamsville, NY 14221. Phone: (716) 634-2197.

**23d Bomb Squadron**, 23d Strategic Reconnaissance Squadron. September 18-21, 1996, in Colorado Springs, Colo. **Contact:** Lindsey Boyd, 3904 24th Ave. W., Bradenton, FL 34205. Phone: (813) 746-5569.

**25th Bomb Group Reconnaissance Ass'n**. September 24-29, 1996, in Albuquerque, N. M. **Contact:** Donald E. Peterson, 2168 Forest Hills Rd., Muskegon, MI 49441-3440. Phone: (616) 759-7236.

**27th Fighter-Bomber Group**. September 4-7, 1996, at the Holiday Inn Union Square in San Francisco, Calif. **Contact:** Cedric S. Lussie, 777 Welch Rd., Suite E, Palo Alto, CA 94304. Phone: (415) 321-4053. Fax: (415) 321-1227.

**28th Bomb Wing Ass'n**, Ellsworth AFB, S. D. September 5-9, 1996, in Rapid City, S. D. **Contact:** Don Strachan, P. O. Box 3092, Rapid City, SD 57709-3092. Phone: (605) 348-4573 or (605) 341-6090.

**34th Air Depot Group** (World War II). August 22-25, 1996, in San Antonio, Tex. **Contacts:** Joe Kenney, 9092 Dillon Rd., Tremont, IL 61568. John McGill, 7717 Timber Top, Boerne, TX 78006.

**Aviation Cadet Class 42-I**. October 3-6, 1996, in Riverside, Calif. **Contact:** George S. Kutsher, 60 Presidio Pl., Palm Desert, CA 92260. Phone: (619) 340-1582.

**47th Bomb Squadron**, 41st Bomb Group, 7th Air Force (World War II). October 24-27, 1996, at the Holiday Inn Northwest in San Antonio, Tex. **Contact:** George Tolbert, 4538 E. 25th Pl., Tulsa, OK 74114. Phone: (918) 747-3127.

**Pilot Class 49-C**. September 26-29, 1996, at the Hilton East in Tucson, Ariz. **Contact:** Col. R. W. Dupras, USAF (Ret.), 3010 Lime Kiln Rd., San Marcos, TX 78666. Phone: (512) 396-2408. Fax: (512) 396-3122.

**Pilot Class 56-H**. October 4-6, 1996, in San Antonio, Tex. **Contacts:** Bill Schwoeble, 2714 Grennock Dr., Austin, TX 78745. Phone: (512) 444-6471. Dick Holland, 2561 Guntley Rd., Philo, CA 95466. Phone: (707) 895-2136.

**Pilot Classes 58-B, 58-C, and 58-D**. October 11-13, 1996, in San Antonio, Tex. **Contact:** Conrad H. McEachern Jr., 4436 Mill Run Rd., Dallas, TX 75244. Phone: (214) 239-6448. Fax: (214) 404-9944.

**60th Troop Carrier Group** (World War II). October 30-November 2, 1996, in Myrtle Beach, S. C. **Contact:** John Diamantakos, 3525 Lynngate Cir., Birmingham, AL 35216-5239. Phone: (205) 823-4747.



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# Bulletin Board

Seeking contact with **SSgt. Joe E. Chudeche**, Squadron I, Amarillo, Tex., 1945, who knew Cathleen "Jewel" Jay in the UK. His last known address was in Kirkland, Wash. **Contact:** Zelda M. Searle, Cherry Tree Cottage, 58 Quernmore Rd., Caton, Lancaster, Lancashire LA2 9NE, UK.

Seeking contact with **2d Lt. D. E. Duell, Cpl. Stanley L. Kieftyka, Pfc. Jesse J. Armell, and Pfc. Jack M. Koretzky**, whose B-24D crashed at the Miles City, Mont., airport May 13, 1944. **Contact:** Fred S. South, 311 Tree Lane, Prophetstown, IL 61277.

Seeking photos and memorabilia of **429th Fighter or Fighter-Bomber Squadron** aircraft or personnel. **Contact:** Lt. Bill Cahill, USAF, 801A Laurelwood Dr., Clovis, NM 88101.

Seeking contact with **James Hale, Jr.**, who flew a B-26 Martin Marauder in the 394th Bomb Group, 98th Bomb Wing, 9th Air Force. His last known address was in Ocean Park, Calif. **Contact:** Richard Hale, P. O. Box 672, West Lorne, Ontario N0L 2P0, Canada.

Seeking contact with **F-15** personnel from Eagle units, especially the 1st Fighter Wing, 33d FW, and 32d Fighter Squadron. **Contact:** Cornelius Tank, Georg von Lindern Weg 7, D-26209 Kirchhatten, Germany.

Seeking Lockheed **U-2** unit names, photos, missions, and patches. **Contact:** Gary McKeithen, 644438 Wynne Unit, Huntsville, TX 77349.

Seeking a subdued **patch** from Ehrling Bergquist

Strategic Hospital, Offutt AFB, Neb., or any other color or subdued USAF medical patch. **Contact:** Bob Mebane, 2506 Toron Ct., Alexandria, VA 22306-2538.

Seeking contact with an airman who sang "**Goodnight Irene**" on a bus and made an appeal for his daughter on British television in 1994. **Contact:** Linda Jones, 77 Tanfield Rd., East Didsbury, Manchester M20 0GE, UK.

Seeking photos, drawings, and diagrams of the **trapeze** system used with the XF-85 Goblin and B-29 mothership for parasite escort fighter programs. **Contact:** Capt. T. S. Martin, 124 Freeman Ave., Solvay, NY 13209.

Seeking the whereabouts of **John Coles**, stationed at RAF Woodbridge, UK, in 1965, who knew Bridget Wilkins. **Contact:** Lawrence Wilkins, 13 Coronation Rd., Aldershot, Hampshire GU11 3PY, UK.

Seeking the whereabouts of **Susan Miserque**, who visited Strip A87, 369th Service Squadron, 26th Service Group, 9th Air Force, in Charleroi, Belgium, in 1944. **Contact:** Joe H. De Soto, 7864 La Grange Ct., El Paso, TX 79915.

Seeking information on the history and location, since 1971, of **B-52G #92564** that was at Barksdale AFB, La. **Contact:** John Wheeler, 20146 Townsend Fd. Rd., Athens, AL 35611.

Seeking the whereabouts of **Richard Godwin and David Wolowitz**, 8th Air Force, Bassingbourne, UK, 1944. **Contact:** Joan Bartley, 3810 Schoolside Ct., Arlington, TX 76016.

Seeking to correspond with **airplane enthusiasts and airplane model enthusiasts**. **Contact:** Marian Nazimek, ul. Norwida 17d/7, 46-200 Kluczbork, Poland.

Seeking contact with anyone who ejected or witnessed **ejections** from military and test aircraft in trials, emergencies, or combat. **Contact:** Mike Bennett, 106 Main St., Clifton Campville, Tamworth, Staffordshire B79 0AP, UK.

Seeking the whereabouts of **Capt. John Randall Willingham**, Pilot Class 43-C, who flew P-47s in World War II. **Contact:** Starr K. Thompson, 1216 Calle Arroyo, Thousand Oaks, CA 91360.

Seeking contact with anyone who knew **Lt. Leroy Lutz**, a P-38 pilot from Lincoln, Neb., killed when his plane crashed in Germany, June 22, 1944. **Contact:** Adam Filbert, 4004 N. 20th St., Lincoln, NE 68521-1509.

Seeking the whereabouts of **Clinton Martin Pipkin**, stationed at RAF Martlesham Heath, UK, in 1944. **Contact:** L. M. Macdonald, 15 Sunfield Rd., Bury, Huntingdon, Cambridgeshire PE17 1NN, UK.

Seeking contact with a **464th Bomb Group** airman from Chicago, who parachuted from his aircraft over Hungary, July 1944, and was helped by Leslie Kovats. **Contact:** Leslie Kovats, 13629 Greenview Dr., Sun City West, AZ 85375-5439.

Seeking World War II-era **posters**, particularly of pilots manning their aircraft. **Contact:** P. D. Blackburn, 5025 E. Hwy. 80, P. O. Box 3989, Abilene, TX 79604.



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