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By John T. Correll, Editor in Chief

## The Destruction of National Defense

IT WAS a sign of the times March 23 when Senate Democrats overwhelmingly rejected an appeal from Sam Nunn (D-Ga.), chairman of the Armed Services Committee, to limit defense reductions to the level that President Bill Clinton campaigned on last fall. That irony, however, was eclipsed a week later when Secretary of Defense Les Aspin revealed the Clinton Administration's budget proposal.

The plan he announced March 27 roughly doubled the reductions mentioned in the campaign. It went deeper than a revised proposal Mr. Clinton floated in February. It also undercut both the Senate and House defense budget resolutions adopted in March.

Secretary Aspin laid out a five-year defense program \$254.2 billion below the baseline forecast by the 1990 budget summit—\$131.7 billion lower than the final projection of the Bush Administration. Mr. Aspin said his budgeteers were "treading water" until they could plumb for the real depths.

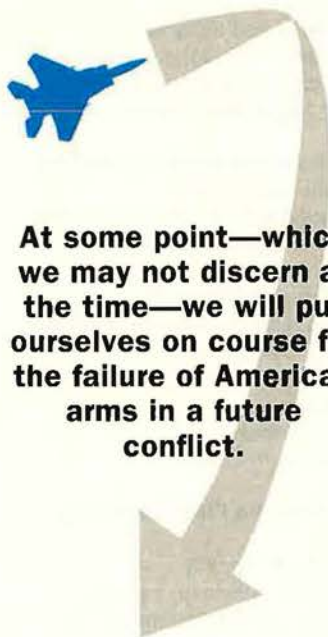
By Mr. Aspin's reckoning, defense spending will fall (after inflation) by forty-two percent between 1985 and 1997. In 1998, he says, defense outlays will drop to 3.0 percent of the Gross Domestic Product. We can assume this to be a ceiling, not a floor. The next proposal will be lower.

As Senator Nunn has complained, "We have been dealing with numbers grabbed out of the air. No one knows where these cuts are going to come from." The Clinton budget forecasts dollar reductions through 1998 but makes no detailed projection of force structure or personnel strength beyond 1994.

Those—such as House Armed Services Committee Chairman Ronald Dellums (D-Calif.)—who want deeper reductions see that as an opportunity rather than a problem. "The faster that we get to the issue of force structure, the more money we'll be able to save," Mr. Dellums said. The chance for that will come in the "Bottom-Up Review" that Secretary Aspin has ordered for defense needs and programs.

Mr. Dellums is hardly alone in calling for harsher cuts. The literary and

liberal communities are in full cry. The *New York Times* says Mr. Clinton's reductions do not go far enough. The Defense Budget Project (whose former boss, Gordon Adams, is now an official in the Clinton Administration) prescribes a troop level of 1.2



**At some point—which we may not discern at the time—we will put ourselves on course for the failure of American arms in a future conflict.**

million rather than the 1.4 million Mr. Clinton suggested in his election campaign.

That would give the United States parity in military manpower with North Korea, whose forces number 1.2 million. But why stop there? Deborah Shapley, writing in the *Washington Post*, scored the Clinton cuts as "incrementalism" and endorsed a proposal by William Kaufmann of the Brookings Institution to reduce the force to 1.1 million.

Sen. John McCain (R-Ariz.) is among those taking strong exception. "We are not cutting defense spending relative to today's force," he says, but "relative to a force that is already intended to be twenty-five percent smaller." He sees a "devastating impact" on US status as a world power as the force that won the Persian Gulf War erodes. Between 1991 and 1998, he estimates,

capabilities would shrink from twenty-eight Army divisions to fourteen, from thirteen carriers to eight, from 545 combat ships to 340, from fifteen carrier air wings to eight, from three Marine Expeditionary Forces to two, from thirty-six Air Force fighter wings to nineteen, and from 268 bombers to 141.

Senator Nunn points out that "the defense cuts proposed by the Administration make up eighty-five percent of all the net spending outlay reductions in the budget proposal" and come on top of substantial defense cuts made earlier. Such observations make Senator Nunn unpopular with Administration insiders. Twits in the media depict Nunn as obstructionist and petulant. A recent cartoon in the *Economist*, for example, dressed him in a diaper.

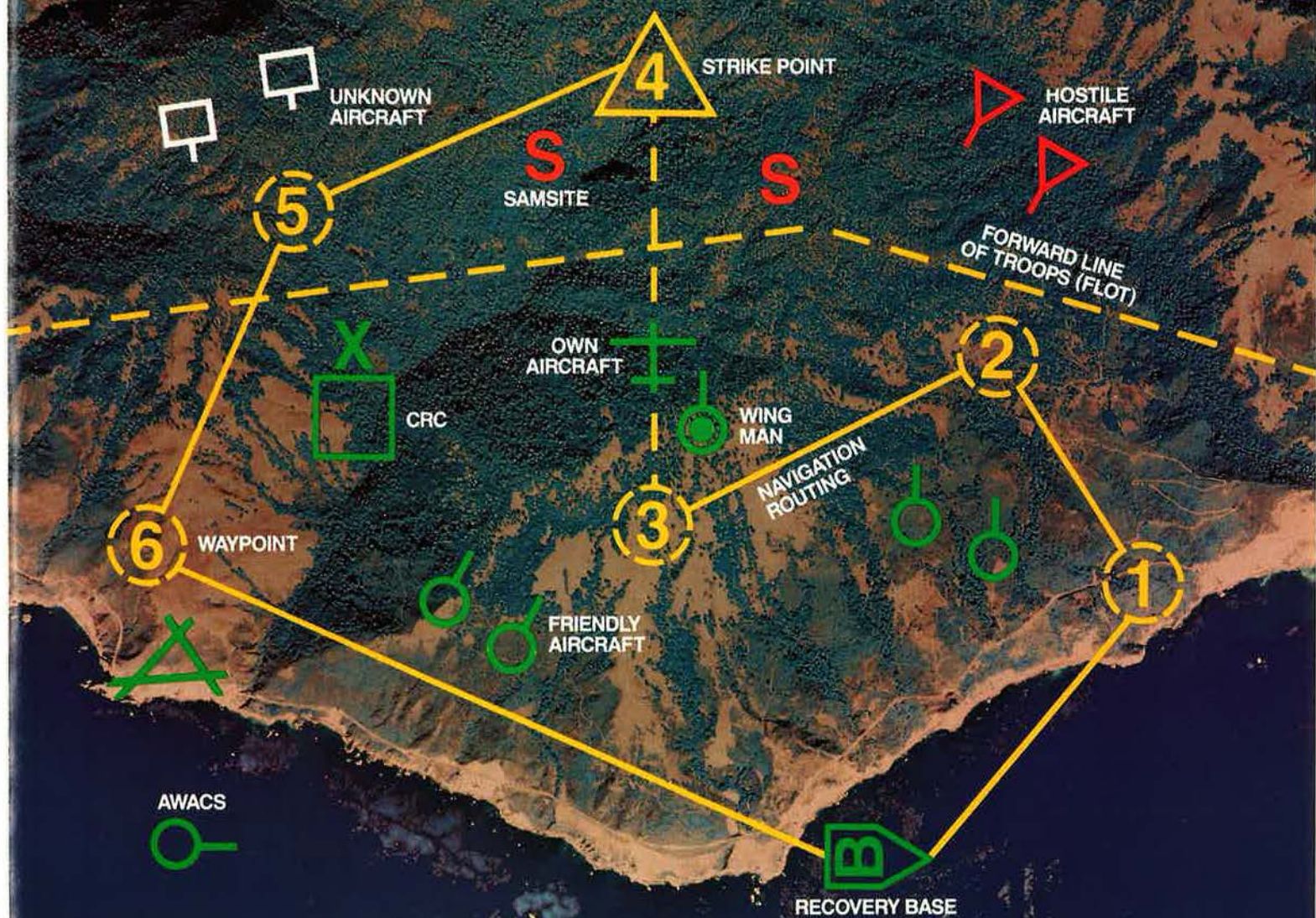
Senator Nunn is right. So is Senator McCain. The Clinton Administration and its supporters are hacking blindly. Neither we nor they know what the consequences will be. A half-dozen crises in progress or threatening in Europe, Asia, and the Middle East have not moderated the urge to cut.

The *New York Times* assures us our forces are adequate and, to boot, superbly equipped. "US weapon systems are unrivaled, so production of new tanks, planes, and ships can be put off for a decade or more," its editorial writers declare. Mark that.

These are the same weapon systems that have been subjected to unrelenting attack by the news media and the defense cutters at every point in design, development, testing, and introduction for the past twenty years. It is good to know at last that their quality is "unrivaled."

What we are witnessing here is nothing less than the destruction of national defense. At some point—and the latest budget projections might not be far from it—the United States will cease to be a superpower. At another point (perhaps not discernable at the time), we will put ourselves on a course toward the failure of American arms in some future conflict. ■

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## Intraservice Rivalry Returns?

Former Secretary Donald B. Rice's parting comments to the Air Force were most interesting to read [*"Check Twelve," March 1993, p. 22*]. However, I find some of what I read distressing. Since Dr. Rice signed "Global Reach, Global Power" in 1990, his definition of what it entails seems to have undergone a significant and unfortunate change.

In 1990, Dr. Rice saw Global Reach, Global Power as an expression of airpower for the rest of this century and into the next. Global Reach, Global Power gave the Air Force an articulate expression of the vision it has held for years but often had trouble explaining to those outside the service. It expressed a concept of invisible airpower, capable of reaching any point on the globe with the right kinds of forces to support the theater commander and the national command authorities in whatever the mission required. Dr. Rice's comments reflect how others within the Air Force have defined those terms since the writing of "Global Reach, Global Power."

The article describes Air Combat Command as providing the power and Air Mobility Command as providing the reach. This much more narrow view lays the groundwork for the same intraservice schism that Dr. Rice cites as the reason for "killing off" SAC, TAC, and MAC. An "us against them" atmosphere can only decrease the effectiveness of the Air Force in espousing the importance of airpower.

Defining Global Reach, Global Power solely in terms of ACC and AMC, as is now common in the Air Force, denigrates the contributions the rest of the Air Force makes in the development of effective airpower. If AMC and ACC provide the reach and the power, then what does Air Force Space Command do—or AFMC, AFSOCOM, or any other Air Force organization? Are they simply also-rans—not part of Global Reach, Global Power?

Dr. Rice speaks of adjusting our thinking about land, sea, and airpower to apply the realities of the present to the future. As a part of that, the Air Force needs to view airpower in the

broader sense, rather than succumbing to the myopic parochialism that too often hindered us in the past. It would be a shame to lose the well-thought-out vision provided by the best Air Force Secretary in many years.

How we define the Air Force today will follow us well into the next century. The broad perspective found in "Global Reach, Global Power" will serve us much better than asserting Majcom-specific claims to parts of that vision.

Lt. Col. Michael A. Kirtland,  
USAF  
Montgomery, Ala.

## The Historic A/F-X

The Air Force and the Navy recently made history by signing the joint operational requirements document for the A/F-X aircraft [*"Washington Watch: From the Sea," January 1993, p. 10*]. It will be a stealthy, carrier-suitable aircraft with excellent range and air-to-ground capabilities along with a credible self-defense capability. This is the first time an aircraft program has had joint USAF-Navy agreement on requirements prior to system development.

In this era of downsizing and doing more with less, the Air Force and the Navy are working together to support the A/F-X program. The logic is compelling. The A/F-X will augment the Air Force's interdiction capability, replacing the F-111, F-117, and F-15E with a state-of-the-art, low-observable aircraft. This would allow the Air Force to consolidate three platforms into one with a net gain in capability. The F-22

would still handle the air-superiority mission (as well as possibly some air-to-ground missions later in a conflict), and the Multirole Fighter would perform the close air support/battlefield air interdiction missions currently performed by the F-16 and A-10. The A/F-X could also be considered as a potential replacement for the EF-111 with evolutionary upgrades after it enters service.

In Navy terms, the A/F-X will replace the A-6/KA-6 directly and, in concert with the F/A-18E/F, replace the F-14. It could potentially replace the EA-6B (possibly with the side benefit of consolidating electronic warfare assets).

This consolidation of missions will lead to significant savings in terms of logistics and supportability. Training could also be consolidated.

The A/F-X is a perfect complement to the F-22 and is the most cost-effective method of modernizing the nation's tactical aviation program. Mission effectiveness will be increased through the ability of Air Force and Navy to operate more effectively together in the future.

Maj. Wade Mason,  
USAF  
Arlington, Va.

## When Diplomacy Fails

I became uneasy while reading John T. Correll's editorial "Tinkering With Deadly Force" [*January 1993, p. 2*] about the resurrection of the Limited Objectives doctrine. Must another generation of politicians learn at the expense of their military the shortcomings of piecemeal application of armed force? Mr. Correll's fears of history repeating itself are well founded, especially in light of our recent involvement in Somalia and Bosnia. Each new administration believes that the situation has changed, technology has changed, or the foe has changed enough to warrant a reconsideration of the legitimacy of the limited application of force to attain a political objective.

No amount of negative, historical rhetoric by military authorities will dissuade proponents of this approach. In

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## Letters

the end, they will dismiss the "all-or-nothing" school as too narrow-minded and, left with no alternative by their military planners, proceed to "cook up military operations in the back rooms of Washington."

Past mistakes need not be repeated if our military commanders recognize the inevitable and properly prepare for limited warfare. Chairman of the Joint Chiefs of Staff Gen. Colin L. Powell seemed keenly aware of this when he said recently that the military must train for peace as well as for war.

We all recognize that the most effective use of armed forces was demonstrated by the coalition in the Persian Gulf War, but such a response is often not politically acceptable. Given that the Limited Objectives school is on the rise, it is our duty to be prepared to provide our civilian leaders with a wide range of military options when diplomacy fails. Anything less demonstrates negligence toward the welfare and safety of our troops by relinquishing the responsibility for military planning to amateurs.

Capt. Ross E. Dueber,  
USAF  
Oxford, England

### The Hornet E/F's Merits

Art Hanley's curious commentary, "The Tomcat's Merits" [*Letters*, January 1993, p. 4], would have made for interesting reading had it contained more facts and fewer myths about the F/A-18E/F and the process by which it was selected. As a former F-14 squadron commander, I am quite familiar with the Tomcat and the emotionalism surrounding this issue. The F-14 is a fine fighter and has served the Navy well. But let there be no substitute for the facts with regard to the F/A-18E/F. Consider a few of these facts.

Research and development for the F/A-18E/F is \$4.88 billion (in FY 1990 dollars)—not \$5.5 billion to \$6 billion, as Mr. Hanley alleges. This \$4.88 billion estimate has been independently verified, and Congress has imposed a cost cap at that level.

The Navy is not purchasing 228 unplanned F/A-18C/Ds just "to keep the production line open until the E/F is ready." To the contrary, when the A-12 program was canceled in early 1991, the Navy presented a plan to purchase an additional 228 F/A-18C/Ds between FYs 1992 and 1997 to fill inventory requirements and supplement the A-6 until a replacement for the A-6 was fielded. Subsequent budget revisions have reduced this pro-

curement plan by more than 100 aircraft.

The modified F-14 variants Mr. Hanley so boldly promotes were considered by the Navy and Defense Department during evaluations that led to the selection of the F/A-18E/F. In a July 1992 letter to US senators, Under Secretary of Defense for Acquisition Donald Yockey explained the process that preceded Defense Acquisition Board approval for F/A-18E/F development. His letter stated:

"The decision to proceed was based on a year's worth of detailed analyses, including complete life-cycle costs. These analyses took account of all reasonable options. Two F-14 derivatives, the STC-21 and the Quick Strike, were addressed in detail and rejected. . . ."

The Navy and Defense Departments' evaluations that today's night-strike F/A-18C/D has more overall capability than the F-14D Quick Strike throws cold water on Mr. Hanley's proposition that this F-14 derivative would have "strike capability exceeding the F-15E's."

As to the E/F, no program in my memory has been so scrutinized from an analytical and programmatic standpoint. Without a complete understanding of the characteristics and capabilities of the E/F, no one can judge the relative merits of alternatives. The Navy knows what it's doing on this one, and its plan for E/F and then A/F-X makes great sense. It's time to quit chipping away without the facts and support the Navy in getting its program on track.

Gary Hakanson  
McDonnell Douglas  
Saint Louis, Mo.

### Relatively Evil

I would like to comment on "It Really Was An Evil Empire" [*February 1993, p. 79*].

I agree that the USSR was a terrible place to live, and we are learning more and more about how bad it was as documents emerge. However, as we look at history, we have to have a fair view and a sense of perspective.

For example, when you consider the assassinations that took place in the USSR, remember the US plans to kill Fidel Castro, how we assassinated political leaders in Vietnam, and how the CIA worked to maintain "pro-American" governments in South America, Central America, and Iran. We used murder and assassination all around the world and trained other people to do it. . . .

It was horrible that anthrax broke

out in the USSR. But is that really so different than the problems we have had in the US or the problems we caused around the world? We destroyed Bikini Atoll and dislocated hundreds of people from a homeland they can never return to. The USSR had Chernobyl, but we have made a mess of things with Three Mile Island and the dumping and pollution at Rocky Flats, Colo.

Yes, the Communists did some horrible things during their reign in the USSR. They hurt and killed many people and destroyed the environment. The bodies are still being dug up. What they did cannot be defended. However, we must also consider what we did in "defense of democracy" here in the US. Our history is full of many of the same things that happened in the USSR. Often we take our crimes abroad. We are more likely to murder in another country than murder at home, but it is still murder.

While the Communists did terrible things to maintain their dictatorship, I am much more horrified by what we did in the name of democracy.

It would be wonderful to see an Evil Empire article about the US written by Soviet Communists. They might point out our historical mistreatment of African-Americans and Indians and

the confinement of thousands of Americans in camps during World War II, because the loyal citizens had Japanese ancestry.

I liked your article, but I am smart enough to see it as a form of propaganda. Mild propaganda, but it shows only one side of the coin. By painting the USSR as badly as possible, it seems to make the US look great in comparison. This is just not true. . . .

Capt. Herman Reinhold,  
USAF  
Eglin AFB, Fla.

#### Prolonging the Issue

Kenneth Myers's letter, "Earning the Right" [*January 1993, p. 4*], pertaining to my letter about the "Photochart of USAF Leadership," affords me the opportunity to clarify my views. I did not advocate that women should be "senior commanders" of the flying commands. These positions rightly rest with the rated male force and should remain there until the rated female force has served for a sufficient time to be considered for command in the appropriate flying command. My concern is that the Air Force failed to promote any women line officers on at least two recent brigadier general boards and that the few serving women brigadiers have not succeeded to up-

per echelons in nonflying commands or agencies.

I do not advocate quotas. Rather, I advocate promotion based on potential. On this basis, some very highly qualified women line colonels, who began service during the Vietnam War and were successful in every assignment, have been shunted aside when their talents were most needed. While my hat is off to Captain Smellie and the other rated women now climbing the ladder, they are not the first, and waiting for them to be eligible for leadership is simply a way of prolonging the issue.

Col. Ruth Anderson,  
USAF (Ret.)  
Tacoma, Wash.

#### Maisey's Valor

I read "Valor: Hero of Bien Hoa" [*February 1993, p. 86*] with much interest. I was stationed at Bien Hoa a few years after Captain Maisey's action. I was part of the USAF Advisory Team to the Vietnamese Air Force. Some of the newer members of the Advisory Team were given a briefing by headquarters personnel at Bien Hoa.

During this briefing, we were told the story of Captain Maisey's actions that resulted in his receiving the Air

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Force Cross. Our briefer stated that Captain Maisey's actions were so outstanding and gallant that, had he been in the Army or Marines, he would have received the Medal of Honor.

My question is this: Do Air Force directives state that a person's gallant actions have to take place in the air for him to be considered for the Medal of Honor? . . .

CMSgt. Robert D. Brown,  
USAF (Ret.)  
Oak Harbor, Wash.

■ *Capt. Lance Sijan and Col. George Day received Medals of Honor for conspicuous gallantry as POWs during the Vietnam War. The first two USAAF Medal of Honor recipients in the European theater during World War II, Col. Demas Craw and Maj. Pierpont Hamilton, received theirs for gallantry on an amphibious diplomatic mission to French Morocco in 1942.*—THE EDITORS

**Lifting the Ban**

John T. Correll's excellent editorial in the March 1993 issue [*"Battle of the Ban," p. 2*] properly recognizes that goals of gay activists go well beyond open, patriotic military service.

If the ban were lifted, "discrimination" lawsuits would be expected unless "minimal" actions such as these were taken:

■ US laws and policies changed to officially recognize the gay lifestyle as natural, acceptable, and appropriate to the best interests of the nation. Any law or ordinance at lower levels of government to be amended to comply with this change of philosophy.

■ Same-sex marriages recognized with military-spousal benefits adjusted accordingly.

■ Mainline churches that provide chaplains to the services be required to ordain openly gay chaplains.

Is this a bad dream? Hardly. In Texas, an openly gay state representative has sponsored laws that would permit same-sex marriages and ban most discrimination against gays, lesbians, and bisexuals in such matters as employment, housing, and public accommodations.

With moral decadence credited for downfall of the Greek, Babylonian, Roman, and Persian empires, is it alarmist to suggest the US may not be immune?

Col. Paul C. Fritz,  
USAF (Ret.)  
Austin, Tex.

I would like to join what will be a long list of readers congratulating John T. Correll on his "Battle of the Ban"

editorial. The article puts our thoughts into a factual perspective. It makes excellent reading.

While reading the article, I couldn't help but empathize with members of the current active-duty leadership. Every managerial skill they possess will be called on under the present Administration. Good luck to them all!

MSgt. Jack L. Burris,  
USAF (Ret.)  
Roswell, N. M.

I have the opposite view regarding homosexuals in the military to the view held by Mr. Correll, military leaders, and the majority of others.

Most military members do not live in barracks, shower together, or reside in foxholes. You deal with gays and straights who share accommodations the same way you do with smokers and nonsmokers, drinkers and nondrinkers, etc. You accommodate the best you can and then get on with it. Don't forget that most problems in barracks or on ships are male-female.

Mr. Correll quotes military leaders stating that gays could affect troop morale and integrity. When I was in the Air Force (1952-79), our leaders told us gays could be compromised by the enemy. They found out that the ones being compromised were heterosexual. So now it's morale and integrity. Recall when our leaders were against African-Americans, Japanese-Americans, and women in the service. Where is the intolerance?

I believe conduct and performance are the issues. Why is everyone else rated on conduct and performance, whereas gays are rated on sexuality? Many conduct problems are heterosexual—rape, abuse, and harassment. Conduct is the basic tenet of discipline and breeds morale and integrity.

Some believe homosexuality is a moral problem. What about those thousands of babies GIs fathered all around the world, then left? Is this just boys being boys and girls being girls? I don't know, but these acts violate God's law and the Uniform Code of Military Justice.

A *Newsweek* article says that gays were discharged in fewer numbers during recent wars. If this is true, then it's acceptable for gays to die for their country, but if they live, "they're outta here." It's the same intolerant thinking that minorities and women experience in the service. It's also interesting to note that most of our allies allow gays while our foes don't.

Of course the majority of Americans are against gays in the military. Gays are outnumbered at least nine

to one in this country. If people like Mr. Correll and our uniformed leaders explained both sides of the issue, then a fair solution would be obtainable.

In President Bush's last speech to the military, he thanked them for their service and for being the world's finest military force. He didn't say, "Except for you gays."

Phillip V. Kenny  
Colorado Springs, Colo.

**Team Member Missing**

In the January 1993 issue, "Toward a New Launcher Lineup" [p. 48] names Aerojet and Rocketdyne as the only team members for the Space Transportation Main Engine, failing to mention Pratt & Whitney.

As a major contributor to the STME, P&W is proud of its membership and would appreciate acknowledgment.

David A. Quinlan  
Pratt & Whitney  
Huntsville, Ala.

**The Unforgettable F-15E**

The caption under the photograph on p. 19 of the February 1993 "Aerospace World" is incorrect.

Lockheed, even after the acquisition of the Tactical Military Aircraft portion of General Dynamics, is not the only contractor currently producing fighter aircraft for the Air Force.

How can anyone forget one of the best performers during the Gulf War, the F-15E Eagle, which is still being produced by McDonnell Douglas Corp.?

G. D. Andrus  
Douglas Aircraft Co.  
Long Beach, Calif.

**Misnamed Image**

In the interest of accuracy, the aircraft presented on p. 32 of "Images of Russia's Air Force" [*January 1993*] is an Il-76MD, not a "TD" as captioned. The aircraft is labeled as such below the copilot's window. The "M" stands for "modernizirovannyj," or "modernized." The "D" stands for "dalnij," or "long-range." My source is a Russian aircraft commander, on whose Il-76 I flew as an aircrew escort.

Lt. Col. Bill Smith,  
USAF  
Camp Smith, Hawaii

**Erratum**

In "Valor: One Definition of Valor" in the November 1992 issue, the name of flight engineer SSgt. R. A. Kirkland was misspelled. We regret the error.



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*Russell W. Meyer, Jr.  
Cessna Chairman and CEO*

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and CEO of Cessna, I guarantee that there isn't a company in the world more committed to the JPATS program."



**JPATS CitationJet**



**Cessna**

A Textron Company

By Brian Green, Congressional Editor

## The Defense Cut Doubles

President Clinton's defense cuts come to \$123 billion, not the \$60 billion he proposed in the election campaign.

**S**EN. SAM Nunn, chairman of the Senate Armed Services Committee (SASC), sharply criticized President Clinton's proposed defense budget cuts, arguing that his five-year reductions far exceeded the \$60 billion figure forecast in the 1992 presidential campaign. The Georgia Democrat claimed that the cuts effectively total nearly \$123 billion in outlays.

Senator Nunn said that the cuts were based on certain assumptions and that it was "pretty unlikely" that they would turn out to be accurate. Should they not pan out, he said, the basis for cutting the budget should be declared invalid and Congress should restore some of the excised funding. (Senator Nunn's figure—\$123 billion in actual defense program measured in outlays from 1993 to 1997—should not be confused with another figure frequently cited in the budget debate—the \$127 billion cut in 1994–98 budget authority.)

Despite his misgivings, Senator Nunn voted for the Senate budget resolution that embodied the Clinton defense cuts, but his support was highly conditional. He pointed out that President Bush had already administered significant cuts to the defense budget since 1990. The Senator calculated the \$123 billion figure by totaling these specific cuts in defense:

- \$60 billion, the amount promised by President Clinton in the campaign. Senator Nunn noted that the impact of this is still unclear since "we do not know now which programs are being cut to achieve this \$60 billion cut."

- \$7.4 billion, the amount Congress cut from the Pentagon's Fiscal 1993 budget. Senator Nunn said that Congress believed this would be counted as part of the \$60 billion cut but that the White House does not include it in its calculations.

- \$18 billion, the Pentagon's share of the President's proposed federal

pay freeze and reduced pay raises. According to Senator Nunn, "the Administration does not consider this to be a defense cut," though it will be taken out of the budget. Seven out of every ten federal employees work for the Defense Department.

- \$10 billion, a hedge to offset what the Administration believes will be higher-than-expected defense costs. The Bush Administration said management efficiencies would save \$70 billion over five years. The Clinton Administration does not believe such savings will be achieved. Rather than increasing the budget to accommodate the revised estimate, it is cutting defense to fit the projected budget.

- \$27 billion, caused by adjusting the last Bush budget baseline. Lower-than-expected interest and inflation rates allow a recalculation of outyear budgets. "In theory, we will be able to buy the same program for less money," said Senator Nunn, who then noted, "we have a sad history when it comes to forecasting inflation." He worried that if the inflation estimate proved too low, the services would be short of funds to complete their programs.

He expressed concern that the Pentagon could be hit with more reductions. An energy tax was an important part of the Clinton budget package. If DoD and the services have to pay the tax in full, the annual cost of operations would increase by up to \$700 million. The effect would be the same as absorbing another budget cut.

The overall Clinton federal budget proposal also exceeds the legal ceiling on discretionary spending imposed by the Budget Enforcement Act of 1990. Discretionary spending includes not only defense but also some popular domestic programs. The senator believes that some in Congress "will try to take the easy way out and lay that problem at the Pentagon's doorstep" by cutting defense spending to fund other programs and remain under the cap on spending.

Asked if he favored restoring some of the cuts, Senator Nunn said he was "not comfortable with where we are now." This discomfort was indicated by his support of an amendment sponsored

by Sen. Pete Domenici (R-N. M.) to boost defense spending to the level proposed by President Clinton during the campaign. The Republican amendment was defeated by a 58-41 vote; Senator Nunn was one of only four Democrats to support it.

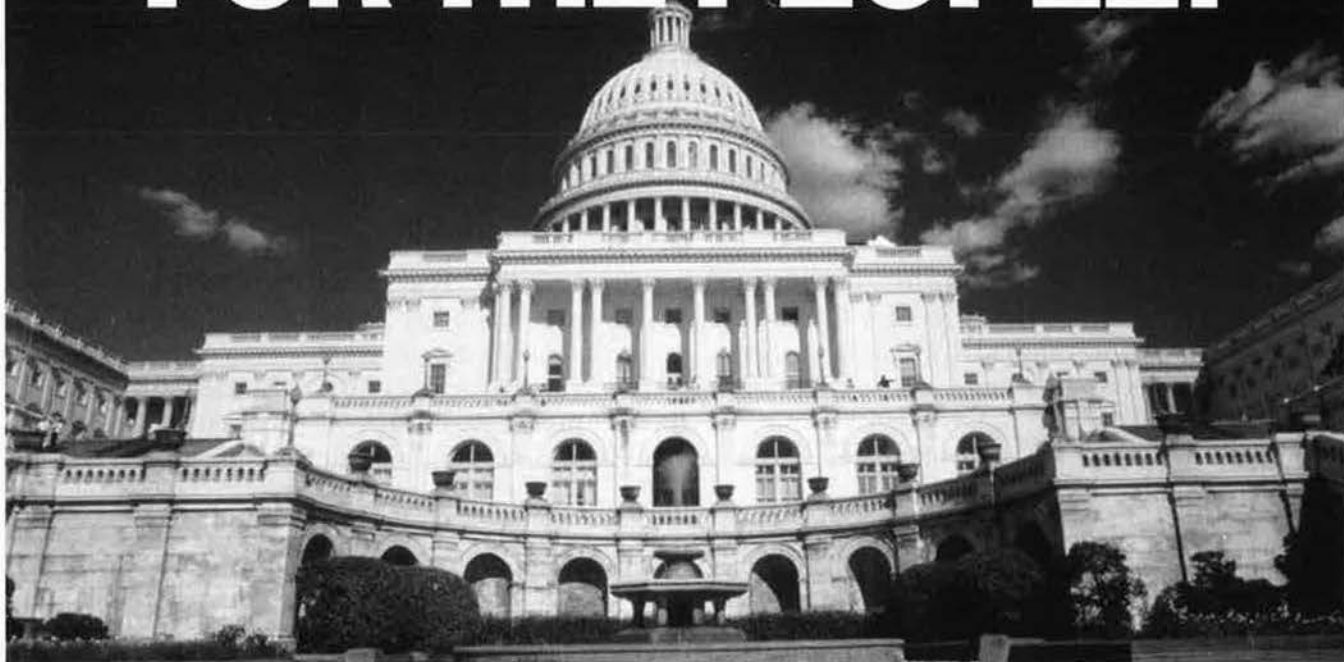
Senator Nunn also introduced two nonbinding "sense of the Senate" amendments of his own, intended to address some of the specific proposed reductions. One amendment, approved by a 69-30 vote, indicated Senate support for increasing the defense budget if inflation estimates used in the President's budget prove too low. It also stated that, if the pay freeze proposal were not approved, DoD budget levels should be raised to provide for a pay increase. The other amendment provided that, if defense spending were reduced below the level requested by the President, savings would go only to deficit reduction. It was approved 56-43.

The SASC Chairman argued strenuously that only the Defense Department has carried the burden of deficit reduction. In July 1990, the last cold war defense budget baseline, defense spending was pegged at \$1.8 trillion for 1993 to 1997. The most recent Clinton Administration proposal, added to earlier Bush reductions, lowers that figure by \$509 billion. Neither domestic discretionary spending nor entitlement spending has been brought under ceilings provided in the Budget Enforcement Act.

Others in Congress have expressed concern over the defense reductions and the lack of specifics needed to judge the reductions intelligently.

Sen. J. James Exon (D-Neb.) argued that the "absence of a detailed specific budget to support the 1994 request of \$264 billion makes it impossible for the Senate to pass a budget resolution with an appreciation of where the cuts are being proposed and not proposed." Rep. Floyd Spence (R-S. C.), ranking minority member on the House Armed Services Committee, noted that the Clinton cuts go much deeper than cuts envisioned by Secretary of Defense Les Aspin's preferred "Option C" force structure. ■

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A new and better way of testing missile target seekers is possible, now that an Air Force laboratory simulation system will use an advanced infrared image projector. Developed by Hughes Aircraft Company, this tactical infrared projection system (TIPS) is based on Hughes' liquid crystal light valve technology. TIPS projects TV-like images of changing infrared scenes, testing the target detection and tracking performance of seeker sensor systems. The high spatial and temperature resolution of these images provides capabilities not possible with current simulation systems. Using laboratory simulations rather than launching test missiles to test target seekers is expected to save the Air Force considerable money.

In troubleshooting electronic countermeasures, U.S. Air Force maintenance crews use simulators that rely on computer models of various aircraft subsystems. Now, a new software tool, developed by Hughes, makes it easier and faster to create simulation software, and makes the software more dependable and versatile. Hughes' "Model Builder™" automatically translates systems concepts into computer instruction. Armed with ready-made inventory, systems analysts can concentrate on solving simulation problems, rather than implementing software.

The U.S. Army has praised a fire sensing and suppression system, with specific accounts of its life-saving successes during Operation Desert Storm. The Automatic Fire Sensing and Suppression (AFSS) System, built by Hughes, is installed on the M1 Abrams Main Battle Tank and the M2/3 Bradley Fighting Vehicle. During the ground war, Iraqi tank rounds penetrated a number of M1 Abrams tanks, causing fires in the crew compartments. Instantly, the AFSS system sensed the fires and put them out, saving crews from sustaining serious burns or possibly losing their lives. Hughes' fire suppression technology is also being used on commercial buses.

Japan will benefit from expanded communications services, with two new satellites scheduled to be launched in 1994 and 1995. The satellites, built by Hughes, will be three-axis, body-stabilized HS 601 models — Hughes' latest satellite design. They will each carry 24 Ku-band transponders, providing greater data, telephone, and video transmission throughout Japan. The HS 601 model is an extremely high-power satellite developed for applications such as direct television broadcasting to small receiving antennas, very small aperture terminals for private business networks, and mobile communications.

Improved performance of infrared sensors will likely result from a new "superlattice" material structure developed by Hughes for next-generation focal plane arrays. This man-made crystalline molecular structure has distinct characteristics which include high optical absorption, making it highly sensitive to light, and reduced electronic background noise levels, which enable it to generate extremely high-quality images. The result: night vision systems that see farther and more clearly in the dark and earth observation satellites that pinpoint smaller features on the ground. Continuing studies by Hughes of the new crystalline superlattice materials may eventually lead to a new generation of high performance electronic devices.

For more information write to: P.O. Box 80032, Los Angeles, CA 90080-0032

**HUGHES**



# Aerospace World

By Frank Oliveri, Associate Editor

## Commands' Twenty-Year Plan

Air Force Chief of Staff Gen. Merrill A. McPeak has ordered USAF operational commands to prepare modernization plans covering the next twenty years. The effort is part of General McPeak's 1993 "Year of Equipping" initiative.

"These plans will define equipment requirements and lay out projected funding and time lines," he told the National Aviation Club in a February address. "We need to take a longer view in our planning so that equipping the force for the next century will be affordable."

Two major considerations exist in equipping the force: time and cost. General McPeak said that the most important technology in many of the new weapon systems is information processing, an area that turns over roughly every two years.

The service must find a way to shorten the acquisition cycle while doing a better job of making provisions to accommodate technological improvements that appear during development. General McPeak acknowledged that cost is playing an increasing role in the level of modernization.

General McPeak said that the Air Force will seek in 1993 to align requirements, technology, and the magnitude of threats facing the United States. He said that, while a number of systems have been canceled or curtailed, the service has yet to perform a zero-based review of conventional systems to make sure that the most relevant ones are fielded in the new operating environment.

"We need to make sure we have a process in place to adjust the threat-technology-requirement profile effectively over time," the General said.

## GPS Team Wins Collier Trophy

The Global Positioning System team has won the 1992 Robert J. Collier Trophy. The award is given annually to recognize the greatest achievement in aeronautics or astronautics with respect to improvement of the performance, efficiency, or safety of air or space vehicles.



*Spec. Brian M. Kearns, a US Army rigger from the 5th Quartermaster Detachment, Kaiserslautern, Germany, prepares an airdrop bundle of Norwegian-donated supplies for an upcoming Provide Promise delivery to Bosnia. His unit is deployed to Rhein-Main AB, Germany.*

USAF photo by SMSgt. Bob Wickley

The winner was announced in February. The GPS team includes the Air Force, the US Naval Research Laboratory, Aerospace Corp., Rockwell International Corp., and IBM Federal Systems Co.

## Troops Face Pay Freeze

In one of his first budget actions, President Clinton called in February for an across-the-board freeze in government pay. The move would eliminate a planned salary increase for armed forces personnel.

Service members had been expecting a 2.2 percent pay raise in Fiscal 1994, which begins October 1. If President Clinton gets his way, the troops will get no increase.

Under the Bush Administration plan, the Pentagon also would give service members pay raises of three percent

in Fiscal 1995, 2.7 percent in Fiscal 1996, and 2.6 percent in Fiscal 1997. These are primarily seen as cost-of-living increases. However, the Clinton plan calls for reducing these pay increases by one percentage point each year.

The Office of Management and Budget calculates the pay freeze will save a total of about \$26 billion over Fiscal 1994-98. Of this savings, \$18 billion would be attributable to elimination of military pay hikes. The other \$8 billion would come from all other federal employees.

Sen. Sam Nunn, the Georgia Democrat who chairs the Senate Armed Services Committee, said it was important to note the impact a pay freeze would have on service personnel. He suggested that the pay freeze should be viewed as a reduction of the Pen-

tagon budget, though "I know the Administration does not consider this to be a defense cut."

### **Aspin Recommends Base Closures, Realignments**

Kicking off a new base-closure controversy, Defense Secretary Les Aspin recommended that the US shut down thirty-one major military installations and realign twelve others. The Secretary's March proposal included a recommendation to close or curtail operations at seven major Air Force sites.

Secretary Aspin submitted his recommendations to the Independent Base Closure Commission. Targeted for closure in the proposal were Homestead AFB, Fla.; K. I. Sawyer AFB, Mich.; Newark AFB, Ohio; and O'Hare International Airport/ARS, Chicago, Ill.

The Secretary recommended realignment of McGuire AFB, N. J.; March AFB, Calif.; and Griffiss AFB, N. Y. Realignment means reductions or shifting of military offices and assets to other military sites.

This round of base closures and realignments will save about \$3.1 billion per year starting in 2000. The 1993 program, coupled with the previously approved 1988 and 1991 closures, will result in savings of \$5.6 billion annually, DoD said.

The action drew instant protests from members of Congress whose districts would be hard hit by the closures. Secretary Aspin, however, said that base closures have not



*At McKinley Climatic Laboratory, Eglin AFB, Fla., testing of the C-17A has included exposure to temperature extremes of -65° Fahrenheit. In more than 1,550 hours of cold-weather tests, the airlifter's engines idled to provide power for on-board systems, which were then tested for accuracy and reliability.*

kept pace with overall defense reductions. "Failure to close bases in line with reductions in budgets and personnel constitutes a double hit: Resources are drained into bases we don't need and therefore are not available to buy the things we do need," he said.

The Secretary acknowledged the pain this would cause local economies in communities around the bases. "These base closures are neces-

sary, but they hurt local economies," he said. "The Administration recognizes its responsibility for parallel efforts to stimulate economic growth in the affected communities."

### **New Roles and Missions Study**

This summer, the Department of Defense will submit to Congress a new, "bottom-up" roles and missions review of the entire military establishment. That is the word from Frank Wisner, the new under secretary of defense for Policy. Mr. Wisner made his remarks at a hearing of the Senate Armed Services Committee.

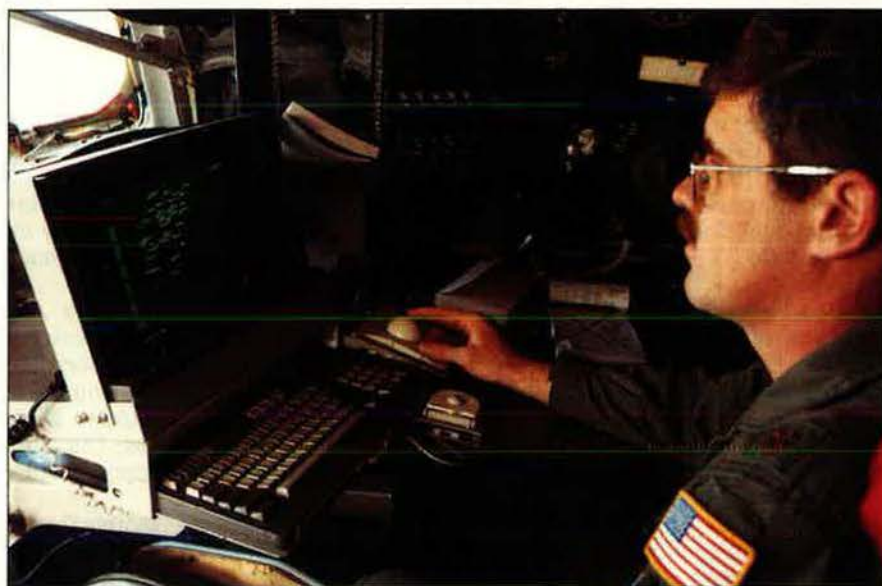
In response to questions from Chairman Sam Nunn, Mr. Wisner said the new study would require a team effort, involving much of DoD. Mr. Wisner said he would be directly involved in defining the strategic requirements the US faces.

Earlier this year, Gen. Colin L. Powell, Chairman of the Joint Chiefs of Staff, presented his own roles and missions study. Critics on Capitol Hill complained that the report did not go far enough to eliminate costly duplication of effort among the four services.

### **Aspin Gets Pacemaker**

Defense Secretary Les Aspin underwent surgery in March to receive a pacemaker and returned to work only days after the operation, the Pentagon said.

The Secretary suffers from obstructive hypertrophic cardiomyopathy, a



*Tankers regularly rely on voice communications for situational awareness during refueling, but tests of the Joint Tactical Information Distribution System during Red Flag exercises at Nellis AFB, Nev., allowed KC-135 Stratotanker navigator Maj. John Burd to monitor up to fifty friendly and hostile aircraft on his screen.*

thickening of the heart muscle that impedes the flow of blood. The condition had caused fluids to build up in his lungs. The pacemaker changes the way the heart contracts and can allow the blood to flow freely.

Because of his heart condition, Secretary Aspin was admitted to Georgetown University Hospital in Washington, D. C., on two occasions in recent months. Doctors had tried previously to control the condition with medication.

The effectiveness of the treatment will not be known for several months. Mr. Aspin was first diagnosed with the problem in 1991 during a ski trip.

#### **C-17 Production Improves**

There has been significant improvement in production of the C-17 aircraft, said a senior Air Force acquisition officer. He said that the latest aircraft is moving into the major-join phase of construction with a higher percentage of work completed than was the case with its predecessors.

The improvement has led to reduced costs, said Lt. Gen. John E. Jaquish, principal deputy assistant secretary of the Air Force for Acquisition.

General Jaquish said that "T-1," the first test aircraft, was thirty-two percent complete when it moved to major join. "P-9," the latest model, was ninety-four percent complete.

"As a result, we have also seen a reduction in aircraft completion time," said General Jaquish. "It took thirty-six months to assemble T-1. We reduced that by twenty-five percent to twenty-seven months for P-4, and we project P-7 will be reduced an additional fifteen percent to twenty-one months."

In testimony before the House Armed Services Committee's subcommittees on Military Acquisition and Oversight and Investigations, General Jaquish said the quality of hardware continues to improve, with rework and repair costs declining. He said that, despite problems, "the C-17 remains the most cost-effective solution to meet current and projected airlift requirements."

General Jaquish said the C-17's wing-load problems, which became apparent last year during tests, turned out to be less troublesome than had been feared. He noted that the Air Force had identified relatively simple fixes.

The issue of range and payload deficiency has also been heavily scrutinized. The aircraft is supposed to be able to fly 2,400 nautical miles carrying 160,000 pounds of cargo. General Jaquish said that, at present, the aircraft falls short of the specification by about six percent in cargo capacity. The General added that the Air Force has begun a low-risk, low-cost plan to reduce the cargo shortfall to approximately 1.3 percent.

#### **C-130 Crew Wins Mackay Trophy**

Thirteen Air Combat Command C-130 crew members and one airman from Air Force Intelligence Command won the Mackay Trophy in February. The award honors what the judges deem to be the most meritorious flight of the year.

According to the Air Force, on April 24, 1992, the crew was flying an unarmed C-130 in international airspace off Peru. The plane was intercepted and fired on by two Peruvian fighters. The C-130 sustained heavy damage.

The crew kept the aircraft under control, located an airfield, and made a safe emergency landing. MSgt. Joseph C. Beard, Jr., was killed on this mission.

The ACC crew members honored

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**A C-5 Galaxy from the 436th Airlift Wing, Dover AFB, Del., moves Pakistan Army troops and cargo into Somalia in February. In addition to delivery of US troops and supplies, Air Mobility Command airlifted some 2,000 foreign troops and 3,000 tons of cargo from nine countries into Somalia as part of Operation Restore Hope.**

were Maj. Christopher J. Duncan, Capt. Pete B. Eunice, Capt. Daniel G. Sobel, Capt. Robert K. Stith, Sergeant Beard, MSgt. Carl V. Wilson, TSgt. Charles G. Bolden, TSgt. Rory E. Calhoun, TSgt. Ray A. Fisher, TSgt. Peter J. Paquette, TSgt. Andrew W. Toth, TSgt. Darren R. Trexler, and SSgt. Ronald P. Hetzel.

The AFIC crew member was TSgt. John H. Armintrout.

#### **More Aid to Homestead Victims**

New federal legislation would make available more aid to individuals who were assigned to or employed by Homestead AFB, Fla., and whose homes were severely damaged by Hurricane Andrew.

Under the legislation, special assistance will be given to those facing a financial loss as a result of storm damage to their homes. Those eligible include service members, civilian employees, and nonappropriated-fund employees assigned to or employed at Homestead on or before August 24, 1992.

The aid is intended to help individuals who owned or occupied a home near the base and whose dwelling was damaged so severely that it was no longer salable.

To receive reimbursement, an owner must transfer ownership of the property to the US government.

#### **SERBs to Consider 3,000 Officers**

The Air Force will conduct Selective Early Retirement Boards this

month for about 900 captains and 1,200 majors. Thirty percent will be eligible for selection, the Air Force said. SERBs will also be held for 900 colonels.

End-strength requirements have made SERBs necessary to increase officer losses in Fiscal 1994. SERBs are expected to continue through 1995. The mandatory retirement date for all officers tapped for early retirement is January 1, 1994.

SERB retirements are considered involuntary, and officers selected for retirement by the board may be eligible for some transition benefits.

#### **Force Restores Hope**

After forty days of aerial refueling operations in support of Operation Restore Hope, Air National Guard and Air Force Reserve forces were relieved in February by active-duty troops. The Reservists and Guardsmen had conducted the largest humanitarian air refueling operation in history.

The Air Force was tasked with creating the 10,000-mile-long air bridge from the US into Somalia. Units with a Reserve air refueling mission flew day and night. Spain-based airmen launched more than 450 sorties and offloaded more than thirty-two million pounds of fuel to transiting C-141, C-5, and KC-10 aircraft bound for Somalia.

Gen. Ronald R. Fogleman, commander in chief of US Transportation Command and commander of Air

*The first intercept test of the Arrow anti-tactical ballistic missile (the fifth of the Arrow's tests) was successfully completed in March. The Arrow Continuation Experiments contract is jointly funded by the governments of the US and Israel.*



Mobility Command, said the task force, based at Morón AB, Spain, "gave new meaning to the doctrine of global reach and paved the way for contingency operations to support forces halfway around the world."

Before Restore Hope began, Morón AB was a forward staging base with forty-four active-duty personnel. At the height of operations, the Air Force population swelled to nearly 700, mostly Guardsmen and Reservists.

### Korean War POWs to Receive Compensation

Under the Fiscal 1992 and 1993 Defense Authorization Act, former Korean War prisoners of war are authorized additional compensation.

The Pentagon said that an outreach program is contacting former Korean War POWs to inform them about congressionally authorized payments as compensation for unused leave accrued during their captivity.

Applicants are eligible to receive a \$300 compensation payment. Former POWs who want to claim a larger amount must provide specific information about dates of captivity, highest grade held during captivity, and the number of lost leave days for which they want compensation. In such

cases, pay scales from 1952 will be used. Payments on behalf of deceased individuals are not authorized.

The Pentagon said interested parties should contact the Defense Finance and Accounting Service with full name, address, telephone number, service component, service number, Social Security number, and any other information pertinent to the claim. Claims should be sent to 7th Defense Finance and Accounting Service, Kansas City Center Debt Management Division Claims Branch, (FYC) Korean POW, Kansas City, MO 64197-0001.

All claims must arrive at the Kansas City address before September 24, 1993.

### New Dental Plan for Dependents

The Pentagon said in February that the dependents' dental plan has been improved by adding such benefits as fitting for dentures and braces.

Congressional legislation calls for development and implementation of the new dental plan to include all current benefits plus root canals, crowns, bridges, and oral surgery.

Monthly premiums for the new plan are \$9.65 for a single family member and \$19.30 for two or more members. Deductions began in March. The new

plan will require copayments and will impose annual maximum benefits per patient. There will also be a lifetime limit per patient for orthodontic care.

Enrollment in the new dental plan is automatic for all CONUS-based service members (and family members) who have at least twenty-four months left in service.

### Advisory Committee Gets New Members

The Pentagon has named fifteen new members for the Defense Advisory Committee on Women in the Services, DoD said in February.

Ellen Press Murdoch of Madison, Wis., chairs the committee. The new members are Mary Lou Austin, Atlanta, Ga.; David F. Demarest, Jr., Glen Ridge, N. J.; Jennifer A. Fitzgerald, McLean, Va.; Lisa V. Guillermin, San Francisco, Calif.; Carol B. Hallett, Alexandria, Va.; Allan B. Hubbard, Indianapolis, Ind.; Gregori Lebedev, Washington, D. C.; Lucia Rodarte Madrid, Chandler, Ariz.; Lynn M. Martin, Chicago, Ill.; John N. Parker, Virginia Beach, Va.; Doris F. Price, Houston, Tex.; Paula L. Shaw, Washington, D. C.; Dorrance Smith, Houston, Tex.; Sue Ann Tempero, Des Moines, Iowa; and Amy Lowitz Wishnick, Chicago.

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**JAS-39 Gripen production number 102 (the second series production JAS-39), shown here, will be the first of the fighters to be delivered to the Swedish Air Force later this spring. The government of Sweden has ordered a total of 140 Gripen fighters. Production number 101 is flying as a test aircraft.**

The committee has thirty-five civilian members, selected for achievement in business, professional, and civic affairs. Members are appointed by the Secretary of Defense for three years, without compensation, to advise on policies relating to the effective role of women in the services.

#### **USAF Reviews B-2 Pilot Instructors**

The Air Force accepted nominations in March for eight instructor pilots for the B-2 bomber formal training unit (FTU). The selected pilots will qualify as instructor pilots and mission commanders before becoming FTU instructors.

Each nominee has at least 1,500 bomber hours with one year's experience as a bomber instructor pilot, or 1,000 fighter hours with one year as a fighter instructor. A selection board of general officers reviewed the nominees in late March. Plans called for final selections to be announced in May.

Selected pilots will report to Whiteman AFB, Mo., in August. There they will meet the newly appointed commander of the recently activated 509th Bomb Wing, Col. (Brig. Gen. selectee) Ronald C. Marcotte. The General formerly served at Air Combat Command headquarters as assistant director for requirements.

#### **Warner Robins and Georgia, Inc.**

Warner Robins Air Logistics Center, Robins AFB, Ga., will work closely with Georgia to take on additional work from other military depots and com-

pete strongly for \$1.5 billion in funds appropriated by Congress in the Defense Conversion Act, said Maj. Gen. William P. Hallin, the Warner Robins ALC commander, in an address to the members of the state legislature.

General Hallin said there is overcapacity in the nation's military depots that must be reduced, but he maintained that Warner Robins ALC is in a "relatively solid position."

As an example, the General cited an initiative under way with the Georgia Institute of Technology, Mercer University, and Robins AFB to create a digital data regional center of excellence funded by the Defense Conversion Act.

The General called on the state to assist in supporting Robins. He described Warner Robins ALC as the "economic engine that drives middle Georgia." He said that the ALC has an economic impact of \$2 billion on the state.

#### **Air Force Pushing New CAS Plan**

USAF and the Defense Acquisition Board (DAB) are locked in debate over how the service should fill its close air support (CAS) requirements, Air Force officials said in February.

In 1990, the DAB instructed the Air Force to pursue a \$2.3 billion program to modify more than 300 Block 30 F-16s for night CAS. Additionally, the Air Force would designate one wing of Block 40 F-16s (without CAS modifications), and two wings of A-10s for the CAS mission.

However, times and threats have changed, and, while the 1990 program was supported by the Air Force at the time, the service has modified its thinking on CAS and has embarked on a campaign to convince the DAB to go with a much less expensive program.

The new Air Force plan would cost only \$700 million, according to Air Force officials. The plan would call for the modification of two wings of Block 40 F-16s for night CAS while designating two wings of Block 30 F-16s and two wings of A-10 fighters for day-only CAS.

Air Force officials said the Block 40 F-16 already sports the LANTIRN system. LANTIRN would be modified by adding the Laser Spot Tracker system, which would allow the aircraft to find targets designated by other ground or airborne platforms. Block 30 F-16s and A-10s would carry the Pave Penny laser detector.

The Block 30 and 40 F-16s would receive the improved data modem system, which would allow the aircraft to receive data bursts from the ground. Both groups of F-16s would also get very-high-frequency antijam radios.

A-10s would get GPS receivers. Both Block 40 F-16 and A-10 crews would use night vision goggles (NVGs) and terrain-avoidance avionics for low-altitude night operations. Cockpits in both Block 40 F-16s and A-10s would be modified with NVG lighting. Block 30 F-16s would receive a 30-mm gun pod. Block 40 F-16s would be outfitted with a missile warning system.

#### **Joint Aerospace Reserve Program Started**

The North American Aerospace Defense Command (NORAD) and US Space Command (USSPACECOM) Joint Aerospace Reserve Program was officially established in March at an activation ceremony at Peterson AFB, Colo.

The new Reserve program will provide augmentation support to NORAD and USSPACECOM active-duty forces. Reserve personnel will provide wartime, contingency, exercise, and surge operational support for space operations, aircraft and missile warning, and ballistic missile defense.

Initial strength will be 232 Army, Navy, Air Force, and Marine Corps Reservists.

#### **Medical Evacuations for War Victims**

The Air Force began providing aeromedical evacuation assets in February to Balkan refugees. The units will

help those in dire need of medical care to receive such help at Rhein-Main AB, Germany.

The 2d Aeromedical Evacuation Squadron and the 55th Aeromedical Airlift Squadron began pulling people out of the area for treatment on February 2. They will continue that mission as long as the aircrews can operate safely. After staying overnight at Landstuhl Army Regional Medical Center, near Ramstein AB, Germany, the patients are sent to Andrews AFB, Md. The medical treatment is free. This service is being provided at the request of the International Organization for Migration.

Numerous relief aircraft have taken fire while flying missions over the troubled region. The current plan is to fly two missions per month with at least ten patients on board.

### Two F-16s Crash

The Air Force lost two crew members in an F-16 accident in February. In another mishap, the pilot ejected safely.

On February 18, Capt. Glen S. Porter of the 18th Fighter Squadron, Eielson AFB, Alaska, and Maj. (Dr.) Robert D. Verdone, flight surgeon and chief of 343d Medical Group aeromedical services, were killed when

their two-seat F-16D crashed in a remote area about twenty miles east of Eielson. The F-16D was a part of a four-ship formation practicing close air support tactics during a joint air attack training mission.

Lt. James A. White from the Texas Air National Guard ejected safely from his F-16 before it crashed about seventy miles from San Antonio on February 19. Lieutenant White was a part of a four-ship formation conducting bombing range testing prior to the crash.

The aircraft was assigned to the 149th Fighter Group at Kelly AFB, Tex.

### USAF Promotes 2,430 to Major

The 1992 Central Major Board selected 2,430 captains for promotion to major, the Air Force announced.

■ Line officer promotion results: 2,915 considered in the promotion zone, 2,191 selected for a seventy-five percent selection rate; 314 considered above the promotion zone, twenty-four selected for an eight percent selection rate; and 6,363 considered below the promotion zone, 117 selected for a 1.8 percent selection rate.

■ Chaplain promotion results: fifty-six considered in the promotion zone, thirty-nine selected for a seventy per-

cent selection rate; three considered above the promotion zone, one selected for a thirty-three percent selection rate; and eighty-one considered below the promotion zone, none selected.

■ Judge advocate promotion results: sixty-four considered in the promotion zone, fifty-seven selected for an eighty-nine percent selection rate; eight considered above the promotion zone, one selected for a thirteen percent selection rate; and 168 considered below the promotion zone, none selected.

### Anders Steps Down

William A. Anders, the chief executive officer of General Dynamics, announced in March that he was stepping down from the firm after turning the formerly debt-laden defense giant into a smaller but cash-rich entity.

Mr. Anders engineered the sale of General Dynamics' missile and aircraft divisions to competing firms and returned the cash to stockholders, whose stock values nearly quadrupled during his tenure. GD retains the Electric Boat submarine-building unit, a tank-producing division, and a space-launch business.

Mr. Anders will remain chairman of the board at General Dynamics and will play a role in future planning.

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The Air National Guard announced in February the delivery of F-15 and F-16 Part Task Trainers at fourteen Air National Guard squadrons across the US. The trainer is a simulated cockpit device for training in air-to-air, air-to-ground, emergency airstart procedures, and instrument approaches.

**How Many Carriers Are Needed?**

A smaller, less costly aircraft carrier force could be maintained by relying more on highly capable surface combatants and amphibious assault ships or turning to a more flexible carrier deployment strategy.

That is the conclusion of a February General Accounting Office report, which claims that the Navy is embarking on several costly carrier-related programs. These include procurement of another *Nimitz*-class, big-deck car-

rier, refueling the reactors on existing nuclear carriers, and replacing and upgrading carrier-launched aircraft. GAO said that these programs will have substantial long-term impact on the cost, size, and capability of the carrier fleet.

GAO said that aircraft modernization alone, which includes the planned F/A-18E/F and the A/F-X fighter, could cost the Navy more than \$120 billion over the coming decades. Before another carrier is built, GAO said, Con-

gress and the Administration should explore the optimal size of the carrier fleet to counter likely future threats.

The agency said that, with naval strategy shifting from containment and possible destruction of the Soviet fleet to preparation for fighting regional wars, the Navy should look at alternatives to the current twelve-carrier force. These include shifting carriers between regions during deployment and using different types of forces in lieu of carriers. The Navy has about forty-five surface combatants that can launch Tomahawk land-attack cruise missiles at targets 650 miles away. Submarines also have Tomahawk capabilities.

**News Notes**

- Sleeve chevrons and collar insignia will be returning to Battle Dress Uniforms, according to the Air Force. Air Force Chief of Staff Gen. Merrill A. McPeak gave the go-ahead for the move in February. The mandatory date for adding the rank insignia is October 1, 1995.

- NASA scientists may have found a way to counter the fainting feelings that astronauts experience when they stand after returning to Earth from space, the agency said in February. Scientists believe they can prevent fainting by expanding the astronauts' plasma volume. Plasma is the fluid part of the blood, without blood cells. Without the pull of Earth's gravity, astronauts experience an upward shift of body fluids. The body responds to what it perceives as excess fluid and

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reduces the volume of circulating fluid by increasing urination.

- President Clinton directed NASA to redesign the space station and proposed \$2.3 billion in 1994 funding for a transition to a streamlined and cost-effective design.

- Climatic testing of the C-17A Globemaster III reached the halfway mark in late February at Eglin AFB, Fla., where it has been exposed to temperature extremes of -65° Fahrenheit. The aircraft has undergone 1,550 hours of cold-weather testing.

- Beech Aircraft and ejection seat manufacturer Martin-Baker recently completed certification testing in February for the escape system Beech will use in its Joint Primary Aircraft Training System entry, the PC-9 Mk. II.

- Lockheed Corp. completed its acquisition of the former General Dynamics Tactical Military Aircraft business in March. The new Lockheed Fort Worth Co. becomes part of the corporation's Aeronautical Systems

Group. The acquisition cost Lockheed \$1.5 billion.

- The JAS-39 Gripen number 102, the first production version of the Swedish fighter, completed its first flight in March. The flight lasted thirty-two minutes and was considered successful. The aircraft will be delivered to the Swedish Air Force in mid-1993, according to Saab Aircraft, which builds the fighter.

- Northrop announced in March that it would reduce its work force by about 2,400 during the rest of 1993. The company's current employment level is 33,000. The reductions are a result of cutbacks in work on the Boeing 747 jetliner, declining development work on the B-2 bomber, and efforts to slash overall costs.

#### Purchases

The Air Force awarded Northrop Corp. a \$17 million face-value increase to a fixed-price incentive firm target contract providing funding for Fiscal 1992-93 long-lead requirements for

B-2 curtailment activities. Expected completion: May 1996.

The Air Force awarded Raytheon Co. a \$294 million firm fixed-price/time and materials contract for the AIM-120 Advanced Medium-Range Air-to-Air Missile Lot VII production buy (1,463 missiles), 614 missiles to be supplied by Raytheon. Expected completion: February 1996.

The Air Force awarded Hughes Missiles Systems Co. the same type of contract worth \$333 million for 849 AMRAAM missiles. Expected completion: February 1996.

#### Obituaries

**Maj. Gen. George J. Keegan, Jr.**, USAF (Ret.), former Air Force assistant chief of staff for Intelligence, died in March after suffering a stroke earlier in the year. He was seventy-two.

General Keegan served in the Air Force for more than thirty years. He was well known for having vigorously contested the prevailing official estimates of Soviet strategic nuclear forces and other weapons during the 1970s. He took a much darker view of Soviet strategic developments, claiming that the USSR was preparing to fight and prevail in a nuclear conflict with the United States. The General flew fifty-six combat missions during World War II and served in numerous intelligence positions throughout his career.

General Keegan is survived by his mother, two daughters, a son, a brother, and two grandsons.

**Maj. Gen. Robert A. Rushworth**, USAF (Ret.), X-15 pilot and combat veteran of World War II and Vietnam, died at his home in Camarillo, Calif., last March. He was sixty-eight. General Rushworth flew C-47 and C-46 missions in the China-Burma-India theater during World War II. He was reactivated for the Korean War and began his career as a test pilot of experimental aircraft.

As an X-15 pilot, he was the second USAF officer to receive astronaut's wings for topping fifty miles. He received the Distinguished Flying Cross for successful recovery of his X-15 after its nose gear extended at near Mach 5, melting the tire to the rim. He flew 189 combat missions in F-4 Phantom IIs during the Vietnam War. All told, he flew more than 6,500 hours in fifty different types of aircraft.

General Rushworth received a special citation from AFA in 1966. He retired in 1981 as vice commander of Aeronautical Systems Division at Wright-Patterson AFB, Ohio. ■

## Senior Staff Changes

**RETIREMENTS:** M/G Donald J. Butz, B/G Francis R. Dillon.

**CHANGES:** M/G Harold N. Campbell, from Dir., Plans and Prgms., Hq. AFMC, Wright-Patterson AFB, Ohio, to Cmdr., Def. Fuel Supply Ctr., DLA, Cameron Station, Va. . . . B/G James S. Childress, from F-15 Sys. Prgm. Dir., Warner-Robins ALC, Robins AFB, Ga., to Dep. Ass't Sec'y, Mgmt. Policy and Prgm. Integration, OSAF, Washington, D. C., replacing M/G Stephen P. Condon . . . M/G Stephen P. Condon, from Dep. Ass't Sec'y, Mgmt. Policy and Prgm. Integration, OSAF, Washington, D. C., to Dir., Plans and Prgms., Hq. AFMC, Wright-Patterson AFB, Ohio, replacing M/G Harold N. Campbell . . . M/G Marvin S. Ervin, from Dir., Forces, DCS/Plans and Ops., Hq. USAF, Washington D. C., to Vice Cmdr., 15th Air Force, AMC, March AFB, Calif., replacing retired M/G James W. Meier . . . B/G Jerry D. Gardner, from Dep. Dir., Dental Services, Ofc. of the Surgeon General, Hq. USAF, Bolling AFB, D. C., to Dir., Dental Services, Ofc. of the Surgeon General, Hq. USAF, Bolling AFB, D. C., replacing retiring M/G Donald J. Butz . . . M/G William E. Jones, from Dir., Ops., Hq. AFSPACECOM, Peterson AFB, Colo., to Dir., Forces, DCS/Plans and Ops., Hq. USAF, Washington, D. C. replacing M/G Marvin S. Ervin . . . Col. (B/G selectee) Ronald C. Marcotte, from Ass't Dir., Requirements, Hq. ACC, Langley AFB, Va., to Cmdr., 509th BW, ACC, Whiteman AFB, Mo. . . . M/G Robert W. Parker, from Dir., On-Site Inspection Agency, OSD, Washington-Dulles IAP, Chantilly, Va., to Dir., Ops., Hq. AFSPACECOM, Peterson AFB, Colo., replacing M/G William E. Jones.

**SENIOR ENLISTED ADVISORS (SEA) CHANGES:** CMSgt. Nicholas S. P. Davis, to SEA, Hq. USAFA, Colorado Springs, Colo., replacing CMSgt. Charles C. Porter, Jr. . . . CMSgt. Thomas H. Sanford, to SEA, Hq. ATC, Randolph AFB, Tex., replacing CMSgt. George T. Moriarty . . . CMSgt. Otis Scott, to SEA, Hq. AFDW, Bolling AFB, D. C., replacing CMSgt. Thomas H. Sanford.

**SENIOR EXECUTIVE SERVICE (SES) CHANGES:** Dr. Robert R. Barthelemy, from Prgm. Dir., National Aerospace Plane, ASC, Hq. AFMC, Wright-Patterson AFB, Ohio, to Prgm. Dir., Training Sys., ASC, Hq. AFMC, Wright-Patterson AFB, Ohio . . . Samuel L. Croucher, from Dep. Dir., Contracting, ASC, Hq. AFMC, Wright-Patterson AFB, Ohio, to Dir., Contracting, Warner Robins ALC, AFMC, Robins AFB, Ga., replacing Stephen L. Davis . . . Stephen L. Davis, from Dir., Contracting, Warner Robins ALC, AFMC, Robins AFB, Ga., to Dep. Dir., Contracting, Hq. AFMC, Wright-Patterson AFB, Ohio . . . Jerome P. Sutton, from Prgm. Dir., Regional Sys., ASC, AFMC, Eglin AFB, Fla., to Exec. Dir., ASC, Hq. AFMC, Wright-Patterson AFB, Ohio. ■

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# The US Air Force in Facts and Figures

Edited by Tamar A. Mehuron, Associate Editor

*"Our mission is to defend the United States through control and exploitation of air and space"*  
—Air Force Chief of Staff Gen. Merrill A. McPeak

## 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 Office

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 di-

rect 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 Service and Its Early Leaders

Designation	Commander (at highest rank)	Dates of Service
<b>Aeronautical Division, US Signal Corps</b> Aug. 1, 1907 – July 18, 1914	<b>Chief, Aeronautical Division</b> Capt. Charles deForest Chandler Capt. Arthur S. Cowan	Aug. 1, 1907 – 1911 1911 – unknown
<b>Aviation Section, US Signal Corps</b> July 18, 1914 – May 20, 1918	<b>Chief, Aviation Section</b> Lt. Col. Samuel Reber Lt. Col. George O. Squier Lt. Col. John B. Bennet	July 18, 1914 – May 5, 1916 May 20, 1916 – Feb. 19, 1917 Feb. 19, 1917 – May 20, 1918
<b>Division of Military Aeronautics</b> May 20, 1918 – May 24, 1918	<b>Director of Military Aeronautics</b> Maj. Gen. William L. Kenly (Kept same title three months into absorption by Air Service)	May 20, 1918 – Aug. 1918
<b>Air Service</b> May 24, 1918 – July 2, 1926	<b>Director of Air Service</b> John D. Ryan Maj. Gen. Charles T. Menoher	Aug. 28, 1918 – Nov. 27, 1918 Jan. 2, 1919 – June 4, 1920
	<b>Chief of Air Service</b> Maj. Gen. Charles T. Menoher Maj. Gen. Mason M. Patrick	June 4, 1920 – Oct. 4, 1921 Oct. 5, 1921 – July 2, 1926
<b>Air Corps</b> July 2, 1926 – June 20, 1941	<b>Chief of Air Corps</b> Maj. Gen. Mason M. Patrick Maj. Gen. James E. Fechet Maj. Gen. Benjamin D. Foulois Maj. Gen. Oscar Westover Maj. Gen. Henry H. Arnold	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
<b>Army Air Forces</b> June 20, 1941 – Sept. 18, 1947	<b>Chief, Army Air Forces</b> Lt. Gen. Henry H. Arnold	June 20, 1941 – Mar. 9, 1942
	<b>Commanding General, AAF</b> Gen. of the Army Henry H. Arnold Gen. Carl A. Spaatz	Mar. 9, 1942 – Feb. 9, 1946 Feb. 9, 1946 – Sept. 26, 1947
<b>United States Air Force</b> Sept. 18, 1947	<b>Chief of Staff, USAF</b> Gen. Carl A. Spaatz	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.

## 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 the Department of Defense. The chairman and vice chairman of the JCS serve full-

time in their positions. The service chiefs are also the military heads of their respective services, although their 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 him.

Most units of the Air Force are assigned to one of the **major commands** (see p. 58). 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 they are increasingly under the command of generals. A USAF 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**.

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

### 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	449,900 <sup>a</sup>
1934	15,861	1964	855,802		
1935	16,247	1965	823,633		
1936	17,233	1966	886,350		

<sup>a</sup>Programmed

### USAF Educational Levels

(As of September 30, 1992)

#### Enlisted

Level	Number	Percent
Below high school	65	0.02
High school	73,015	19.44
Some college		
< 2 years	199,238	53.03
AA/AS degree	37,650	10.02
2-3 years college	51,068	13.59
Baccalaureate degree	12,728	3.39
Master's degree or higher	1,920	0.51
<b>Total</b>	<b>375,684</b>	<b>100.00</b>

#### Line Officers

Level	Number	Percent
Below baccalaureate/unknown	156	0.21
Baccalaureate degree	37,595	51.18
Master's degree	34,704	47.24
Doctoral and professional degrees	1,007	1.37
<b>Total</b>	<b>73,462</b>	<b>100.00</b>

### ICBMs and Spacecraft in Service

Type of system	FY 1986	FY 1987	FY 1988	FY 1989	FY 1990	FY 1991	FY 1992
Titan ICBM	7	0	0	0	0	0	0
Minuteman II ICBM	450	450	450	450	450	450	375
Minuteman III ICBM	548	540	504	500	500	500	500
Peacekeeper ICBM	2	10	46	50	50	50	50
<b>Total ICBMs</b>	<b>1,007</b>	<b>1,000</b>	<b>1,000</b>	<b>1,000</b>	<b>1,000</b>	<b>1,000</b>	<b>925</b>
DMSP satellite	2	2	2	2	2	2	2
DSCS satellite	10	9	9	8	10	10	12
DSP satellite (data classified)	—	—	—	—	—	—	—
GPS satellite	7	6	6	9	14	16	19
<b>Total satellites</b>	<b>19</b>	<b>17</b>	<b>17</b>	<b>19</b>	<b>26</b>	<b>28</b>	<b>33</b>

DMSP: Defense Meteorological Satellite Program    DSCS: Defense Satellite Communications System    DSP: Defense Support Program    GPS: Global Positioning System

### Active Force Demographics

(As of September 30, 1992)

Grade	Total	Blacks	Women	Other Minorities
<b>Officers</b>				
General	308	5	3	2
Colonel	4,588	86	150	82
Lieutenant Colonel	11,699	412	812	202
Major	17,600	1,263	2,484	370
Captain	40,417	2,586	6,286	1,269
First Lieutenant	8,965	498	1,686	431
Second Lieutenant	6,799	364	1,262	346
<b>Total</b>	<b>90,376</b>	<b>5,214</b>	<b>12,683</b>	<b>2,702</b>
<b>Airmen</b>				
Chief Master Sergeant	3,943	542	94	65
Senior Master Sergeant	7,879	1,319	524	171
Master Sergeant	37,649	7,112	3,234	1,153
Technical Sergeant	55,638	10,330	6,727	2,138
Staff Sergeant	86,582	17,160	10,919	3,949
Sergeant/Senior Airman	103,549	18,727	18,189	5,394
Airman First Class	47,894	5,882	9,531	1,978
Airman	18,684	1,958	3,671	661
Airman Basic	13,866	1,613	2,709	641
<b>Total</b>	<b>375,684</b>	<b>64,643</b>	<b>55,598</b>	<b>16,150</b>
<b>Total personnel</b>	<b>466,060</b>	<b>69,857</b>	<b>68,281</b>	<b>18,852</b>

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

### Active-Duty Force by Grade

(As of September 30, 1992)

Grade	Number
<b>Officers</b>	
General	11
Lieutenant General	33
Major General	110
Brigadier General	154
Colonel	4,588
Lieutenant Colonel	11,699
Major	17,600
Captain	40,417
First Lieutenant	8,965
Second Lieutenant	6,799
<b>Total</b>	<b>90,376</b>
<b>Airmen</b>	
Chief Master Sergeant	3,943
Senior Master Sergeant	7,879
Master Sergeant	37,649
Technical Sergeant	55,638
Staff Sergeant	86,582
Sergeant/Senior Airman	103,549
Airman First Class	47,894
Airman	18,684
Airman Basic	13,866
<b>Total</b>	<b>375,684</b>
Officers	90,376
Airmen	375,684
<b>Total strength</b>	<b>466,060</b>

### Armed Forces Manpower Trends

(Figures in thousands)

	FY 1987	FY 1988	FY 1989	FY 1990	FY 1991	FY 1992	FY 1993 <sup>a</sup>	FY 1994 <sup>a</sup>
<b>Active-duty military</b>								
Army	781	772	770	751	725	611	575	540
Navy	587	593	593	582	571	542	526	481
Marine Corps	200	197	197	197	195	185	182	174
Air Force	607	576	571	539	511	470	445	426
<b>Total</b>	<b>2,174</b>	<b>2,138</b>	<b>2,130</b>	<b>2,069</b>	<b>2,002</b>	<b>1,808</b>	<b>1,728</b>	<b>1,621</b>
<b>Selected Guard and Reserve</b>								
Army National Guard	452	455	457	437	441	426	423	410
Army Reserve	314	313	319	299	300	303	280	260
Naval Reserve	148	149	152	149	150	142	134	113
Marine Corps Reserve	42	44	44	45	44	42	42	37
Air National Guard	115	115	116	117	118	119	119	118
Air Force Reserve	80	82	83	81	84	82	82	82
<b>Total</b>	<b>1,151</b>	<b>1,158</b>	<b>1,171</b>	<b>1,128</b>	<b>1,137</b>	<b>1,114</b>	<b>1,080</b>	<b>1,020</b>
<b>Direct-hire civilian</b>								
Army <sup>b</sup>	358	337	347	327	317	334	308	290
Navy/Marine Corps	343	338	343	331	319	309	283	269
Air Force <sup>b</sup>	252	241	249	238	222	214	207	199
Defense agencies	96	95	98	101	116	149	167	161
<b>Total<sup>b</sup></b>	<b>1,049</b>	<b>1,011</b>	<b>1,037</b>	<b>997</b>	<b>974</b>	<b>1,006</b>	<b>964</b>	<b>919</b>

Numbers are rounded and may not sum to totals.

<sup>a</sup>Programmed manpower as of FY 1994 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

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

(DoD figures as of September 30, 1992)

	Military	Civilian	Total
<b>Major commands</b>			
Air Combat Command (ACC) .....	153,181	19,756	172,937
Air Force Intelligence Command (AFIC) .....	12,303	2,709	15,012
Air Force Materiel Command (AFMC) .....	33,009	88,292	121,301
Air Force Space Command (AFSPACECOM) .....	11,592	4,109	15,701
Air Force Special Operations Command (AFSOC) .....	6,428	149	6,577
Air Mobility Command (AMC) .....	73,801	13,947	87,748
Air Training Command (ATC) .....	52,059	11,479	63,538
Air University (AU) .....	5,607	1,490	7,097
Pacific Air Forces (PACAF) .....	35,299	8,731	44,030
United States Air Forces in Europe (USAFE) .....	46,839	8,789	55,628
<b>Total major commands</b> .....	<b>430,118</b>	<b>159,451</b>	<b>589,569</b>
<b>Field operating agencies (FOAs)</b>			
Air Force Audit Agency (AFAA) .....	63	736	799
Air Force Base Disposal Agency (AFBDA) .....	0	75	75
Air Force Center for Environmental Excellence (AFCEE) .....	44	223	267
Air Force Civil Engineering Support Agency (AFCESA) .....	293	302	595
Air Force Civilian Personnel Management Center (AFCPMC) .....	3	1,389	1,392
Air Force Combat Operations Staff (AFCOS) .....	186	16	202
Air Force Communications Command (AFCC) .....	4,317	2,462	6,779
Air Force Cost Analysis Agency (AFCAA) .....	32	67	99
Air Force Flight Standards Agency (AFFSA) .....	38	2	40
Air Force Frequency Management Agency (AFFMA) .....	22	20	42
Air Force Historical Research Agency (AFHRA) .....	15	43	58
Air Force Inspection Agency (AFIA) .....	189	35	224
Air Force Intelligence Support Agency (AFISA) .....	281	142	423
Air Force Legal Services Agency (AFLSA) .....	440	149	589
Air Force Logistics Management Agency (AFLMA) .....	70	0	70
Air Force Management Engineering Agency (AFMEA) .....	178	102	280
Air Force Medical Operations Agency (AFMOA) .....	32	0	32
Air Force Medical Support Agency (AFMSA) .....	56	262	318
Air Force Military Personnel Center (AFMPC) .....	1,310	490	1,800
Air Force Morale, Welfare, Recreation, & Services Agency (AFMWRSA) .....	39	55	94
Air Force News Agency (AFNEWS) .....	393	151	544
Air Force Office of Special Investigations (AFOSI) .....	1,733	435	2,168
Air Force Program Executive Office (AFPEO) .....	34	11	45
Air Force Real Estate Agency (AFREA) .....	0	14	14
Air Force Reserve (AFRES) .....	372	14,249	14,621
Air Force Review Boards Agency (AFRBA) .....	16	60	76
Air Force Safety Agency (AFSA) .....	103	79	182
Air Force Security Police Agency (AFSPA) .....	43	15	58
Air Force Studies and Analyses Agency (AFSAA) .....	96	34	130
Air Force Technical Applications Center (AFTAC) .....	1,206	5	1,211
Air National Guard Readiness Center (ANGRC) .....	41	26,497	26,538
Air Reserve Personnel Center (ARPC) .....	123	574	697
Air Weather Service (AWS) .....	1,067	254	1,321
Center for Air Force History (CAFH) .....	7	29	36
Joint Services Survival, Evasion, Resistance, and Escape Agency (JSSA) .....	22	39	61
7th Communications Group .....	705	263	968
<b>Total FOAs</b> .....	<b>13,569</b>	<b>49,279</b>	<b>62,848</b>
<b>Direct reporting units (DRUs)</b>			
Air Force District of Washington (AFDW) .....	1,613	1,189	2,802
Air Force Operational Test and Evaluation Center (AFOTEC) .....	489	200	689
United States Air Force Academy (USAFA) (excluding 4,335 cadets) .....	2,696	1,592	4,288
<b>Total DRUs</b> .....	<b>4,798</b>	<b>2,981</b>	<b>7,779</b>
<b>Total major commands, FOAs, DRUs</b> .....	<b>448,485</b>	<b>211,711</b>	<b>660,196</b>



### Specialties in the Enlisted Force

(As of January 1, 1993)

Code	Career Field	Assigned
10	First Sergeant	1,616
11	Aircrew Operations	7,729
12	Aircrew Protection	2,428
20	Intelligence	11,743
22	Geodetic	61
23	Visual Information	2,183
24	Safety	1,109
25	Weather	3,032
27	Command Control Systems Operations	14,143
30	Communications-Electronics Systems	17,782
31	Instrumentation	539
32	Precision Measurement	2,214
34	Training Devices	19
36	Wire Communications Systems Maintenance	3,812
39	Maintenance Management Systems	2,332
40	Intricate Equipment Maintenance	206
41	Missile Systems Maintenance	3,471
45	Manned Aerospace Maintenance	82,987
46	Munitions & Weapons	21,058
47	Vehicle Maintenance	4,830
49	Communications-Computer Systems	17,814
54	Mechanical/Electrical	8,109
55	Structural/Pavements	9,452
56	Sanitation	1,280
57	Fire Protection	5,629
59	Marine	43
60	Transportation	11,827
61	Commissary Services	945
62	Services	4,793
63	Fuels	5,568
64	Supply	18,338
65	Contracting	1,495
66	Logistics Plans	843
67	Financial	4,602
70	Information Management	16,487
73	Personnel	10,813
74	Morale, Welfare, & Recreation	1,255
75	Education & Training	2,734
79	Public Affairs	1,004
81	Security Police	28,549
82	Special Investigations	892
87	Band	941
88	Paralegal	780
89	Chaplain Management	570
90-92	Medical	24,723
98	Dental	3,273
99	Miscellaneous (Special Duty, Patients, Unclassified, etc.)	9,631

### Specialties in the Officer Force

(As of January 1, 1993)

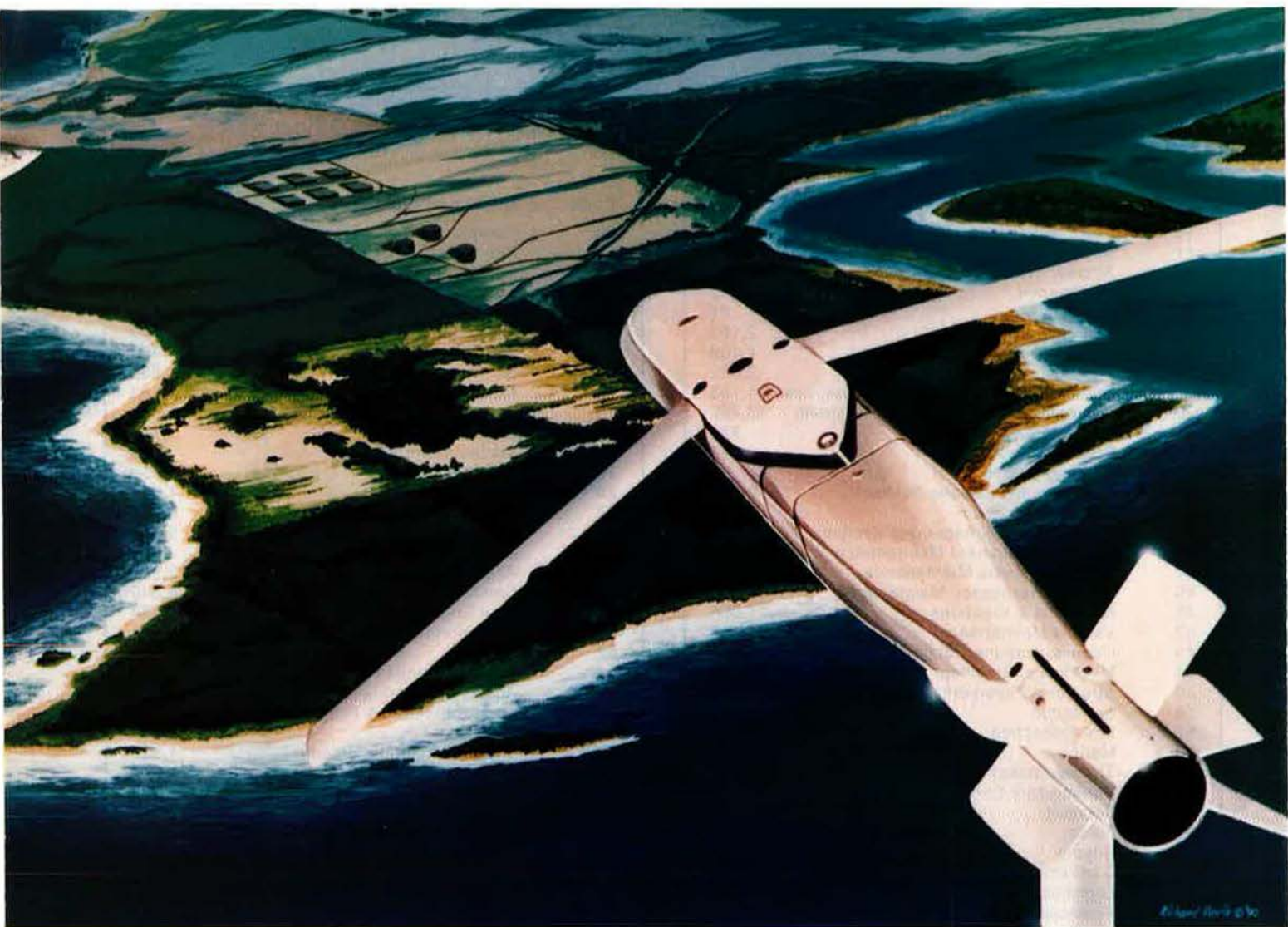
Code	Utilization Field Title	Assigned
00	Commanders and Directors	2,660
02	International Politico-Military Affairs	292
05	Disaster Preparedness	N/A
09	Special Duty	1,907
10-14	Pilot	15,891
15, 22	Navigator	6,890
16	Air Traffic Control	404
17	Air Weapons Director	1,855
18	Missile Operations	2,163
19	Operations Management	1,524
20	Space Operations	1,589
23	Visual Information	99
25	Weather	1,059
26	Scientific	1,424
27	Acquisition Program Management	2,642
28	Development Engineering	5,049
31	Missile Maintenance	271
40	Aircraft Maintenance & Munitions	2,891
49	Communications-Computer Systems	5,345
55	Civil Engineering	1,994
60	Transportation	913
62	Services	404
64	Supply Management	1,027
65	Acquisition Contracting/Manufacturing	1,348
66	Logistical Plans & Programs	919
67	Financial	1,186
70	Information Management	1,929
73	Personnel	1,207
74	Manpower Management	384
75	Education & Training	317
76	Mission Support	102
79	Public Affairs	449
80	Intelligence	3,039
81	Security Police	989
82	Special Investigations	480
87	Band	27
88	Legal	1,353
89	Chaplain	756
90	Health Services Management	1,259
91, 92, 99	Biomedical Sciences	2,618
93-96	Physician	4,358
97	Nurse	4,950
98	Dental	1,376

These figures do not include general officers or UPT/UNT/medical/law students.

### Air Force Installations

	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994
<b>Major installations</b>					
US and possessions <sup>a</sup>	102	102	101	99	89
Foreign	37	37	23	22	19
Worldwide	139	139	124	121	108
<b>Minor installations</b>					
US and possessions <sup>a</sup>	107	104	105	105	107
Foreign	14	14	17	14	9
Worldwide	121	118	122	119	116

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



# TI's JSOW – survivability plus growth

When U.S. aircrews are called to protect our nation's interests, their survival is at stake. JSOW, the Joint Standoff Weapon system from Texas Instruments, will increase an aircrew's survivability by allowing them to standoff significant distances while accurately attacking area and point targets. JSOW, which will replace many older weapon systems, does not require a direct threat flyover.

JSOW is an all-weather, day/night weapon system, designed to deliver BLU-97 Combined Effect Bomblets against a variety of targets – SAM sites, vehicles or troops in the field – from distances beyond most close-in air defenses. An antiarmor variant will deliver BLU-108B Sensor Fused Weapons against armored targets, also without overflight.

JSOW's design provides a direct path for growth through a Pre-Planned Product Improvement program. So, for years to come, JSOW will benefit from improvements and innovations in guidance packages, warheads and data links.

Constant contact and interaction with the ultimate user – pilots, weapon systems operators and ordnance loading crews – means TI will continue providing U.S. Armed Forces with high quality systems. Systems which will extend your reach through technology and teamwork.

**Texas Instruments Incorporated**  
**Defense Systems & Electronics Group**  
Dallas, Texas 75266



## Budget Terms Explained

Funding levels can be expressed in several ways. Totals are most frequently stated as **budget authority** (the value of new obligations, including some to be met in later years, which the government is authorized to incur) or **outlays** (actual expenditures, some of which are funded by budget authority from previous years).

Another difference concerns the value of money. When funding is in **constant** 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. 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.

## Defense Department Budget and Service Shares

(Constant FY 1993 \$ billions)

	FY '92	FY '93	FY '94	FY '95	FY '96	FY '97
<b>Total budget authority</b>	<b>292.4</b>	<b>259.1</b>	<b>256.2</b>	<b>250.4</b>	<b>241.8</b>	<b>237.5</b>
<b>Outlays</b>	<b>297.2</b>	<b>275.5</b>	<b>258.0</b>	<b>250.3</b>	<b>242.5</b>	<b>236.6</b>
<b>Service budget authority</b>						
Air Force	85.4	78.7	78.4	76.3	74.8	73.6
Army	76.3	63.6	61.7	60.3	57.5	54.7
Navy	93.7	82.6	78.9	80.8	78.1	75.4
Defense agencies	36.9	34.2	37.1	33.1	31.4	33.8
<b>Total</b>	<b>292.4</b>	<b>259.1</b>	<b>256.2</b>	<b>250.4</b>	<b>241.8</b>	<b>237.5</b>
<b>Percentages, budget authority</b>						
Air Force	29.2	30.4	30.6	30.5	30.9	30.9
Army	26.1	24.5	24.1	24.1	23.8	23.0
Navy	32.0	31.9	30.8	32.3	32.3	31.8
Defense agencies	12.6	13.2	14.5	13.2	12.9	14.2

Figures do not reflect changes made by the Clinton Administration.

## Air Force Budget—A Ten-Year Perspective

(Budget authority in \$ millions)

	FY '84	FY '85	FY '86	FY '87	FY '88	FY '89	FY '90	FY '91	FY '92	FY '93
<b>Current dollars</b>										
Military personnel	13,820	19,313	19,225	21,054	21,613	21,851	21,777	22,755	20,821	20,569
Operations and maintenance	20,369	21,846	21,249	21,682	23,040	24,973	25,160	29,061	22,121	21,797
Procurement	36,092	41,838	38,197	31,959	26,701	30,981	30,276	24,041	24,332	24,654
RDT&E	12,258	13,485	13,109	14,903	14,617	14,696	13,507	12,207	13,359	14,532
Military construction	1,610	1,752	1,757	1,426	1,414	1,445	1,453	1,117	1,133	1,345
Family housing	805	885	793	798	828	921	870	888	1,075	1,264
Rev. and mgmt. funds	1,289	549	752	202	452	187	121	1,672	n/a	n/a
Trust and receipts	-134	-246	-214	-399	-340	-369	-274	-485	-295	-303
<b>Total</b>	<b>86,109</b>	<b>99,422</b>	<b>94,868</b>	<b>91,625</b>	<b>88,325</b>	<b>94,685</b>	<b>92,890</b>	<b>91,256</b>	<b>82,546</b>	<b>83,858</b>
<b>Constant FY '93 dollars</b>										
Military personnel	19,997	25,227	24,225	25,787	25,479	24,943	24,475	24,511	21,749	20,569
Operations and maintenance	25,732	27,330	26,699	26,653	27,857	28,918	28,398	29,549	22,910	21,797
Procurement	48,885	54,975	48,609	39,265	31,609	35,334	33,364	25,634	25,128	24,654
RDT&E	16,585	17,699	16,767	18,475	17,469	16,868	14,926	12,994	13,802	14,532
Military construction	2,175	2,299	2,241	1,761	1,681	1,652	1,601	1,191	1,170	1,345
Family housing	1,065	1,139	999	979	989	1,057	962	940	1,111	1,264
Rev. and mgmt. funds	1,739	716	955	249	543	215	134	1,781	n/a	n/a
Trust and receipts	-181	-321	-272	-494	-408	-425	-303	-517	-305	-303
<b>Total</b>	<b>115,997</b>	<b>129,064</b>	<b>120,223</b>	<b>112,675</b>	<b>105,219</b>	<b>108,562</b>	<b>103,557</b>	<b>96,083</b>	<b>85,565</b>	<b>83,858</b>
<b>Percentage real growth</b>										
Military personnel	0.7	26.2	-4.0	6.4	-1.2	-2.1	-1.9	-0.1	-11.3	-5.40
Operations and maintenance	4.8	6.2	-2.3	-0.2	4.5	3.8	-1.8	4.1	-22.5	-4.90
Procurement	24.9	12.5	-11.6	-19.2	-19.6	11.8	-5.6	-23.2	-2.0	-1.90
RDT&E	11.1	6.7	-5.3	10.2	-5.5	-3.5	-11.5	-13.0	6.2	5.30
Military construction	-9.1	5.7	-2.5	-21.4	-4.6	-1.7	-3.1	-25.6	-1.8	15.00
Family housing	-14.6	7.0	-12.4	-2.0	1.0	6.9	-8.9	-2.3	18.3	13.80
<b>Total</b>	<b>13.5</b>	<b>11.3</b>	<b>-6.9</b>	<b>-6.3</b>	<b>-6.6</b>	<b>3.2</b>	<b>-4.6</b>	<b>-7.2</b>	<b>-11.0</b>	<b>-2.00</b>

### Allowances for Quarters and Subsistence

Pay Grade	Single Full Rate	Partial Rate	Married Full Rate			
O-10	\$714.90	\$50.70	\$879.60		<b>Cash/In Kind</b>	
O-9	714.90	50.70	879.60			
O-8	714.90	50.70	879.60	<b>Officers</b>	\$139.39/month	
O-7	714.90	50.70	879.60			
O-6	655.80	39.60	792.30			
O-5	631.50	33.00	763.50	<b>Enlisted Members</b>	<b>E-1</b>	
O-4	585.30	26.70	673.20		<b>&lt;4 Months</b>	<b>All Other Enlisted</b>
O-3	469.20	22.20	557.10	When on leave or authorized to mess separately	\$6.14/day	\$6.65/day
O-2	372.00	17.70	475.80			
O-1	313.20	13.20	425.10			
O-3E	506.40	22.20	598.50	When rations in-kind are not available	\$6.93/day	\$7.50/day
O-2E	430.50	17.70	540.00			
O-1E	370.20	13.20	498.90			
W-5	594.30	25.20	649.50	When assigned to duty under emergency conditions where no US mess facilities are available		
W-4	528.00	25.20	595.50			
W-3	443.70	20.70	546.00			
W-2	393.90	15.90	502.20		\$9.19/day	\$9.94/day
W-1	330.00	13.80	434.40			
E-9	433.80	18.60	571.50			
E-8	398.40	15.30	526.80			
E-7	339.90	12.00	489.30			
E-6	307.80	9.90	452.40			
E-5	283.80	8.70	406.50			
E-4	246.90	8.10	353.70			
E-3	242.40	7.80	329.10			
E-2	197.10	7.20	313.20			
E-1 >4 months	175.20	6.90	313.20			
E-1 <4 months	175.20	6.90	313.20			

Uniformed service members without dependents are due payment of these full rates of basic allowance for quarters. Partial rate payments are due uniformed service members without dependents who do not qualify for the full rate. Service Academy cadet pay is \$543.90 monthly, effective January 1, 1990.

### Annual Pay for Federal Civilians

(Effective January 1, 1993)

#### 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	\$11,903	\$12,300	\$12,695	\$13,090	\$13,487	\$13,720	\$14,109	\$14,503	\$14,521	\$14,891
GS-2	13,382	13,701	14,145	14,521	14,683	15,115	15,547	15,979	16,411	16,843
GS-3	14,603	15,090	15,577	16,064	16,551	17,038	17,525	18,012	18,499	18,986
GS-4	16,393	16,939	17,485	18,031	18,577	19,123	19,669	20,215	20,761	21,307
GS-5	18,340	18,951	19,562	20,173	20,784	21,395	22,006	22,617	23,228	23,839
GS-6	20,443	21,124	21,805	22,486	23,167	23,848	24,529	25,210	25,891	26,572
GS-7	22,717	23,474	24,231	24,988	25,745	26,502	27,259	28,016	28,773	29,530
GS-8	25,159	25,998	26,837	27,676	28,515	29,354	30,193	31,032	31,871	32,710
GS-9	27,789	28,715	29,641	30,567	31,493	32,419	33,345	34,271	35,197	36,123
GS-10	30,603	31,623	32,643	33,663	34,683	35,703	36,723	37,743	38,763	39,783
GS-11	33,623	34,744	35,865	36,986	38,107	39,228	40,349	41,470	42,591	43,712
GS-12	40,298	41,641	42,984	44,327	45,670	47,013	48,356	49,699	51,042	52,385
GS-13	47,920	49,517	51,114	52,711	54,308	55,905	57,502	59,099	60,696	62,293
GS-14	56,627	58,515	60,403	62,291	64,179	66,067	67,955	69,843	71,731	73,619
GS-15	66,609	68,829	71,049	73,269	75,489	77,709	79,929	82,149	84,369	86,589

#### Senior Executive Service

Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
\$92,900	\$97,400	\$101,800	\$107,300	\$111,800	\$115,700

### 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		

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

Phase I rates go to rated officers, flight surgeons, and other designated officers.

Phase II rates of \$250 per month apply to officers with more than twenty-five years of service at grades O-6 and below.

### Monthly Military Basic Rates of Pay

(Effective January 1, 1993)

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	\$6,655	\$6,889	\$6,889	\$6,889	\$6,889	\$7,154	\$7,154	\$7,550	\$7,550	\$8,090	\$8,090	\$8,632	\$8,632	\$8,632	\$9,170
O-9	5,898	6,053	6,182	6,182	6,182	6,339	6,339	6,602	6,602	7,154	7,154	7,550	7,550	7,550	8,090
O-8	5,342	5,502	5,633	5,633	5,633	6,053	6,053	6,339	6,339	6,602	6,889	7,154	7,330	7,330	7,330
O-7	4,439	4,741	4,741	4,741	4,953	4,953	5,240	5,240	5,502	6,053	6,469	6,469	6,469	6,469	6,469
O-6	3,290	3,615	3,852	3,852	3,852	3,852	3,852	3,983	3,983	4,612	4,848	4,953	5,240	5,418	5,684
O-5	2,631	3,089	3,303	3,303	3,303	3,303	3,403	3,587	3,827	4,113	4,349	4,481	4,637	4,637	4,637
O-4	2,218	2,701	2,881	2,881	2,935	3,064	3,273	3,457	3,615	3,773	3,878	3,878	3,878	3,878	3,878
O-3 <sup>b</sup>	2,061	2,305	2,464	2,726	2,856	2,959	3,119	3,273	3,353	3,353	3,353	3,353	3,353	3,353	3,353
O-2 <sup>b</sup>	1,797	1,963	2,358	2,438	2,488	2,488	2,488	2,488	2,488	2,488	2,488	2,488	2,488	2,488	2,488
O-1 <sup>b</sup>	1,561	1,624	1,963	1,963	1,963	1,963	1,963	1,963	1,963	1,963	1,963	1,963	1,963	1,963	1,963
<b>Commissioned Officers With More Than Four Years of Active-Duty Enlisted or Warrant Officer Service</b>															
O-3E	—	—	—	2,726	2,856	2,959	3,119	3,273	3,403	3,403	3,403	3,403	3,403	3,403	3,403
O-2E	—	—	—	2,438	2,488	2,567	2,701	2,804	2,881	2,881	2,881	2,881	2,881	2,881	2,881
O-1E	—	—	—	1,963	2,097	2,174	2,253	2,331	2,438	2,438	2,438	2,438	2,438	2,438	2,438
<b>Enlisted Members</b>															
E-9	—	—	—	—	—	—	2,443	2,498	2,555	2,613	2,672	2,723	2,866	2,978	3,145
E-8	—	—	—	—	—	2,049	2,107	2,163	2,219	2,278	2,330	2,387	2,527	2,640	2,809
E-7	1,430	1,544	1,601	1,657	1,714	1,768	1,825	1,882	1,967	2,023	2,079	2,106	2,247	2,359	2,527
E-6	1,231	1,341	1,397	1,457	1,511	1,565	1,623	1,707	1,760	1,817	1,845	1,845	1,845	1,845	1,845
E-5	1,080	1,175	1,233	1,286	1,371	1,427	1,483	1,538	1,565	1,565	1,565	1,565	1,565	1,565	1,565
E-4	1,007	1,064	1,126	1,213	1,261	1,261	1,261	1,261	1,261	1,261	1,261	1,261	1,261	1,261	1,261
E-3	949	1,001	1,041	1,082	1,082	1,082	1,082	1,082	1,082	1,082	1,082	1,082	1,082	1,082	1,082
E-2	913	913	913	913	913	913	913	913	913	913	913	913	913	913	913
E-1 <sup>c</sup>	815	815	815	815	815	815	815	815	815	815	815	815	815	815	815

Amounts have been rounded to the nearest dollar. Basic pay while serving as Chairman of the Joint Chiefs of Staff is \$10,117.50; 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 \$3,822.90, 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>Does not apply to commissioned officers who have been credited with more than four years' active service as an enlisted member or warrant officer.

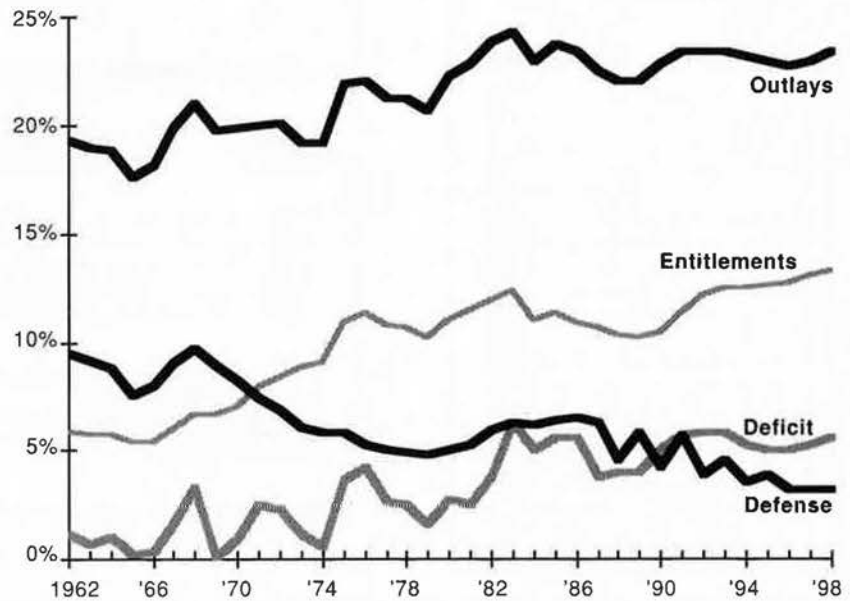
<sup>c</sup>Basic pay for E-1s with less than four months of service is \$753.60.

### Aircraft per Active-Duty USAF Squadron

(End FY 1992)

Aircraft Type	Number
A-10A	18
B-1B	11, 12, 16, or 17
B-52	10, 12-14, 16, or 19
C-5	11-18
C-9A	3-11
C-130	8, 10, 13, 14, or 16
AC-130	9
EC-130H	5
HC-130P	5, 6, or 10
MC-130	4 or 6
MH-53J	4, 5, or 15
MH-60G	9
KC-10A	9 or 10
C-135	11-19
C-141B	12-17
E-3	4 or 9
F-4	18
F-4G	18
RF-4	18
F-15	18 or 24
F-15E	18 or 24
F-16	18 or 24
F-111	18 or 24
EF-111A	24
F-117A	18

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



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	19.9	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	6.1
1989	22.1	4.0	10.2	5.9
1990	22.9	5.1	10.4	5.5
1991	23.5	5.7	11.3	5.7
1992	23.5	5.8	12.1	5.2
1993	23.5	5.8	12.5	4.6
1994	23.2	5.3	12.5	4.2
1995	23.0	5.1	12.6	3.9
1996	22.8	5.0	12.7	3.6
1997	23.0	5.3	13.0	3.2
1998	23.5	5.6	13.3	3.2

Figures derived from Congressional Budget Office and revised Fiscal 1994 DoD budget

### Federal Budget Categories, Constant Fiscal 1994 \$ Billion Expenditures

Year	Outlays	Deficit	Entitlements	Defense
1962	516.2	28.5	156.1	254.2
1963	532.7	19.1	160.8	257.0
1964	559.8	30.7	168.7	259.8
1965	551.2	7.5	168.4	237.8
1966	617.4	14.2	183.2	270.8
1967	702.6	56.2	211.4	321.2
1968	770.6	119.9	242.7	355.7
1969	762.4	2.1	254.1	343.4
1970	769.9	34.2	270.4	322.3
1971	782.7	97.2	307.9	294.2
1972	822.8	94.2	345.3	282.8
1973	849.2	53.2	387.8	266.5
1974	876.7	26.0	413.6	262.6
1975	974.2	162.1	482.0	256.8
1976	999.1	189.5	509.8	241.6
1977	1,039.4	126.5	524.8	247.6
1978	1,094.0	130.9	544.7	249.5
1979	1,116.0	84.7	550.1	258.9
1980	1,176.7	144.8	580.5	268.0
1981	1,190.0	129.8	597.6	277.2
1982	1,186.4	191.0	592.9	295.7
1983	1,210.9	311.6	616.5	314.4
1984	1,236.3	269.5	589.7	330.9
1985	1,317.0	308.5	626.2	352.2
1986	1,330.2	319.7	617.5	367.8
1987	1,323.3	223.2	619.8	372.4
1988	1,353.9	246.8	628.8	370.1
1989	1,397.3	250.8	643.2	371.6
1990	1,461.0	324.2	661.7	350.0
1991	1,464.8	356.0	701.8	353.8
1992	1,467.4	361.4	755.2	323.1
1993	1,496.6	371.8	793.1	299.4
1994	1,507.0	347.0	816.0	276.7
1995	1,532.5	341.5	842.6	263.6
1996	1,555.5	345.6	864.4	250.6
1997	1,596.4	370.3	906.4	227.4
1998	1,648.3	398.9	942.0	226.3

Figures derived from Congressional Budget Office and revised Fiscal 1994 DoD budget

### Inflation Rates

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

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## 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	1,381.8	340.3	711.2	304.3
1993	1,453.0	361.0	770.0	290.7
1994	1,507.0	347.0	816.0	276.9
1995	1,575.0	351.0	866.0	270.9
1996	1,643.0	365.0	913.0	264.7
1997	1,733.0	402.0	984.0	246.9
1998	1,839.0	445.0	1,051.0	252.5

Figures derived from Congressional Budget Office and revised Fiscal 1994 DoD budget

## The Civilian Force

(As of September 30, 1992)

General Schedule/Other		Wage Grade Positions		Wage Grade Leader Positions		Wage Grade Supervisory Positions		Air Force Civilian Personnel: Average Age and Length of Service
Grade	Force	Grade	Force	Grade	Force	Grade	Force	
1	41	1	119	1	1	1	25	Average length of service (overall) ..... <b>15 years</b> General schedule ..... <b>15 years</b> Federal wage system ..... <b>16 years</b>  Average age ..... <b>44 years</b>
2	197	2	834	2	18	2	39	
3	2,108	3	577	3	0	3	56	
4	8,778	4	308	4	2	4	104	
5	17,140	5	2,345	5	32	5	192	
6	8,806	6	1,749	6	32	6	301	
7	12,227	7	3,261	7	55	7	418	
8	1,870	8	5,959	8	125	8	745	
9	16,494	9	5,328	9	290	9	1,039	
10	1,031	10	17,194	10	858	10	1,537	
11	18,668	11	4,832	11	130	11	545	
12	21,307	12	2,164	12	40	12	271	
13	9,572	13	325	13	1	13	201	
14	3,917	14	139	14	0	14	296	
15	1,357	15	2	15	0	15	189	
16	0	<b>Total</b> .....	<b>45,136</b>	<b>Total</b> .....	<b>1,584</b>	16	108	
17	0					17	66	
18	0					18	3	
ST <sup>a</sup>	26					<b>Total</b> .....	<b>6,135</b>	
SES <sup>b</sup>	186							
<b>Total</b> ...	<b>123,725</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

### USAF Total Force

	FY 1987	FY 1988	FY 1989	FY 1990	FY 1991	FY 1992	FY 1993
<b>Air Force active-duty</b>							
Officers	107,300	105,100	103,700	100,000	96,600	90,400	84,968
Airmen	495,200	466,900	462,800	430,800	409,400	375,700	360,732
<b>Total, Air Force military</b>	<b>602,500</b>	<b>572,000</b>	<b>566,500</b>	<b>530,800</b>	<b>506,000</b>	<b>466,100</b>	<b>445,700</b>
Career reenlistments (second-term)	41,400	51,500	39,400	44,600	41,500	49,100	38,700
Rate	87%	86%	87%	82%	87%	88%	88%
First-term reenlistments	25,600	26,500	18,100	23,600	22,500	21,000	16,000
Rate	62%	50%	59%	51%	59%	59%	60%
<b>Civilian personnel</b>							
Direct hire (including technicians)	261,771	241,120	248,666	237,844	222,489	205,757	203,836
Indirect hire—foreign nationals	12,559	12,041	11,909	11,031	10,172	8,652	9,072
<b>Total, civilian personnel</b>	<b>274,330</b>	<b>253,161</b>	<b>260,575</b>	<b>248,875</b>	<b>232,661</b>	<b>214,409</b>	<b>212,908</b>
<b>Total, military and civilian</b>	<b>876,830</b>	<b>825,161</b>	<b>827,075</b>	<b>779,675</b>	<b>738,661</b>	<b>680,509</b>	<b>658,608</b>
<b>Technicians (included above as direct-hire civilians)</b>							
AFRES technicians	8,772	9,111	10,061	9,596	9,527	10,467	10,416
ANG technicians	23,221	23,409	23,644	24,119	24,703	24,675	25,424
<b>Guard and Reserve</b>							
Air National Guard, Selected Reserve	114,600	115,221	114,975	117,786	117,786	118,100	119,083
Air Force Reserve, paid	80,415	82,116	83,214	83,814	84,539	83,396	82,300
Air Force Reserve, nonpaid	43,783	51,658	49,553	68,714	75,002	74,330	107,006
<b>Total, Ready Reserve</b>	<b>238,798</b>	<b>248,995</b>	<b>247,742</b>	<b>270,314</b>	<b>277,327</b>	<b>275,826</b>	<b>308,389</b>
Standby	24,479	21,772	17,299	15,369	14,234	16,000	13,042
<b>Total, Guard and Reserve</b>	<b>263,277</b>	<b>270,767</b>	<b>265,041</b>	<b>285,683</b>	<b>291,561</b>	<b>291,826</b>	<b>321,431</b>

Numbers are rounded and may not sum to totals. FYs 1987-92 are actual figures; FY 1993 is an estimate.

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

	FY 1986	FY 1987	FY 1988	FY 1989	FY 1990	FY 1991	FY 1992
<b>Type of aircraft</b>							
Bomber	346	393	422	412	366	290	248
Tanker	572	576	567	578	555	539	478
Fighter/interceptor/attack	3,046	3,033	3,027	2,896	2,798	2,497	2,000
Reconnaissance/electronic warfare	394	432	424	416	346	303	238
Cargo/transport	855	848	859	825	824	812	794
Search & rescue (fixed wing)	37	35	33	35	36	32	56
Helicopter (includes rescue)	232	191	200	205	212	213	206
Trainer	1,643	1,595	1,543	1,540	1,535	1,415	1,313
Utility/observation/other	120	110	120	140	141	88	89
<b>Total active-duty</b>	<b>7,245</b>	<b>7,213</b>	<b>7,195</b>	<b>7,047</b>	<b>6,813</b>	<b>6,189</b>	<b>5,422</b>
Air National Guard total	1,782	1,732	1,730	1,735	1,719	1,793	1,694
Air Force Reserve total	467	502	491	497	500	528	524
<b>Total active-duty, ANG, AFRES</b>	<b>9,494</b>	<b>9,447</b>	<b>9,416</b>	<b>9,279</b>	<b>9,032</b>	<b>8,510</b>	<b>7,640</b>
Total aircraft, including foreign-government-owned	9,578	9,501	9,500	9,355	9,130	8,603	7,733
<b>Flying hours (000s)</b>							
USAF	2,905	2,883	2,752	2,830	2,760	2,551	2,195
Air National Guard	408	431	437	427	442	458	441
Air Force Reserve	143	149	151	155	164	157	154
<b>Total flying hours</b>	<b>3,456</b>	<b>3,463</b>	<b>3,340</b>	<b>3,412</b>	<b>3,366</b>	<b>3,166</b>	<b>2,790</b>

## Aircraft Type, Total, and Primary Aircraft Authorized

(As of December 31, 1992)

**Total:** Actual number of aircraft in operation. **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	Total	PAA	Type	Total	PAA
<b>Bomber</b>					
B-1	96	86	HH-60	17	16
B-2	4	5	TH-53	1	4
B-52	148	159	UH-1	68	55
<b>Total</b>	<b>248</b>	<b>250</b>	UH-60	18	0
<b>Cargo/transport</b>					
C-5	82	76	NCH-53	2	0
C-9	23	22	<b>Total</b>	<b>149</b>	<b>101</b>
C-12	72	72	<b>Reconnaissance/battle management/C<sup>3</sup>I</b>		
C-17	3	5	DC-130	1	1
C-18	1	1	E-3	34	29
C-20	13	13	E-4	4	3
C-21	79	80	E-8	2	3
C-23	3	3	E-9	0	2
C-27	6	9	EC-18	6	6
C-130	235	182	EC-130	23	16
C-135	10	9	EC-135	21	16
C-137	7	7	RC-135	19	15
C-141	237	223	RF-4	4	4
CT-39	1	1	TG-3	3	2
EC-137	1	1	TG-4	10	10
NC-130	4	4	TG-9	4	4
NC-131	1	1	MH-135	7	4
NC-135	1	0	<b>Total</b>	<b>138</b>	<b>115</b>
NC-141	4	4	<b>Special Operations Forces</b>		
NT-39	3	2	AC-130	12	11
VC-25	2	2	HC-130	35	30
<b>Total</b>	<b>788</b>	<b>717</b>	MC-130	24	23
<b>Electronic warfare/combat</b>					
F-4G	42	29	MH-53	41	29
EF-111	40	25	MH-60	16	15
<b>Total</b>	<b>82</b>	<b>54</b>	<b>Total</b>	<b>128</b>	<b>108</b>
<b>Fighter/attack</b>					
A-7	0	2	<b>Tanker</b>		
A-10	138	104	KC-10	59	57
OA-10	84	66	KC-135	413	373
NA-37	2	2	NKC-135	6	5
YA-7	0	2	<b>Total</b>	<b>478</b>	<b>435</b>
F-15	684	584	<b>Trainer</b>		
F-16	865	764	T-1	21	23
F-106	2	0	AT-38	47	36
F-111	192	162	T-37	504	426
F-117	56	47	T-38	638	519
NF-16	0	1	T-39	6	5
YF-15	4	4	T-41	100	47
YF-16	1	1	T-43	10	12
YF-22	1	0	CT-43	2	0
YF-117	3	0	NT-33	1	1
<b>Total</b>	<b>2,032</b>	<b>1,739</b>	TC-135	2	2
<b>Helicopter</b>					
CH-53	5	0	TG-7	9	9
HH-1	26	19	<b>Total</b>	<b>1,340</b>	<b>1,080</b>
HH-3	12	7	<b>Other</b>		
			U-26	1	0
			OA-37	2	2
			UV-18	2	2
			<b>Total</b>	<b>5</b>	<b>4</b>
			<b>Total, active-duty</b>	<b>5,389</b>	<b>4,603</b>

## USAF Personnel by Geographic Area

(As of September 30, 1992)

<b>Total military personnel</b>	<b>470,315</b>
<b>US territory and special locations</b>	<b>382,487</b>
<b>Total in foreign countries</b>	<b>87,828</b>
<hr/>	
<b>Western and southern Europe</b>	<b>56,736</b>
Germany	25,361
UK	17,319
Turkey	4,021
Italy	3,782
Spain	382
All other countries	5,871
<b>East Asia and Pacific</b>	<b>27,148</b>
Japan/Okinawa	15,344
South Korea	8,945
Guam	2,435
All other countries	424
<b>Africa, Near East, south Asia</b>	<b>330</b>
Saudi Arabia	175
Egypt	40
All other countries	115
<b>Western hemisphere</b>	<b>2,382</b>
Panama	2,178
Canada	108
All other countries	96
<b>Other areas</b>	<b>1,232</b>

## The Air National Guard Fleet

(Current as of September 30, 1992)

### Age in Years

	0-3	3-6	6-9	9-12	12-15	15-18	18-21	21-24	24+	Average	Total number
A-7	—	—	2	11	—	20	53	15	—	18.1	101
A-10	—	—	1	47	83	—	—	—	—	11.8	131
C-5	—	—	—	—	—	—	3	9	—	21.4	12
C-12	—	6	7	—	—	—	—	—	—	5.8	13
C-21	—	4	—	—	—	—	—	—	—	4.9	4
C-22	—	—	4	—	—	—	—	—	—	7.5	4
C-26	17	6	—	—	—	—	—	—	—	1.6	23
C-130	36	20	27	9	16	—	—	—	111	17.8	219
KC-135	—	—	—	—	—	—	—	—	160	32.9	160
C-141	—	—	—	—	—	—	—	—	12	26.2	12
HH-60	—	15	—	—	—	—	—	—	—	3.6	15
F-4	—	—	—	—	—	—	—	39	95	24.9	134
F-15	—	—	—	—	95	67	—	—	—	14.7	162
F-16	9	97	251	327	68	—	—	—	—	8.8	752
T-43	—	—	—	—	—	—	4	—	—	18.3	4
<b>Total</b>	<b>62</b>	<b>148</b>	<b>292</b>	<b>394</b>	<b>262</b>	<b>87</b>	<b>60</b>	<b>63</b>	<b>378</b>	<b>14.7</b>	<b>1,746</b>
<b>Percent<sup>a</sup></b>	<b>3</b>	<b>8</b>	<b>17</b>	<b>23</b>	<b>15</b>	<b>5</b>	<b>3</b>	<b>4</b>	<b>22</b>		<b>100</b>

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

## The Air Force Reserve Fleet

(Current as of December 21, 1992)

### Age in Years

	0-3	3-6	6-9	9-12	12-15	15-18	18-21	21-24	24+	Average	Total number
A-10	—	—	—	—	84	—	—	—	—	12.9	84
AC-130A	—	—	—	—	—	—	—	—	10	37.3	10
C-130A	—	—	—	—	—	—	—	—	1	36.0	1
C-130B	—	—	—	—	—	—	—	—	7	32.0	7
C-130E	—	—	—	—	—	—	—	—	55	29.2	55
C-130H	12	24	10	6	—	—	—	—	—	5.5	52
HC-130N	—	—	—	—	—	—	—	4	—	23.0	4
HC-130P	—	—	—	—	—	—	—	—	6	27.8	6
WC-130E	—	—	—	—	—	—	—	—	6	29.5	6
WC-130H	—	—	—	—	—	—	—	—	6	27.2	6
C-141B	—	—	—	—	—	—	—	—	15	26.6	15
KC-135E	—	—	—	—	—	—	—	—	30	33.9	30
KC-135R	—	—	—	—	—	—	—	—	10	32.3	10
F-16A/B/C/D	—	—	69	73	44	—	—	—	—	10.0	186
C-5A	—	—	—	—	—	—	—	22	10	23.7	32
M/HH-60G	25	—	—	—	—	—	—	—	—	2.4	25
<b>Total</b>	<b>37</b>	<b>24</b>	<b>79</b>	<b>79</b>	<b>128</b>	<b>—</b>	<b>—</b>	<b>26</b>	<b>156</b>	<b>16.3</b>	<b>529</b>
<b>Percent<sup>a</sup></b>	<b>7</b>	<b>5</b>	<b>15</b>	<b>15</b>	<b>24</b>	<b>—</b>	<b>—</b>	<b>5</b>	<b>29</b>		<b>100</b>

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

### 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.
Stylized waterfall	F-16A/B	107th FG, Niagara Falls IAP, N. Y.
Red stripe with "Happy Hooligans" logo	F-16A/B	119th FG, Hector Field, N. D.
Dark gray bison's skull against prairie/mountain profile	F-16A/B	120th FG, Great Falls IAP, Mont.
Red hawk with banner in talons	F-15A/B	123d FS (142d FG), Portland IAP, Ore.
White lightning bolt on blue field	F-16A/B	125th FG, Jacksonville IAP, Fla.
Black falcon with talons extended and "California" logo	F-16A/B	144th FW, Fresno Air Terminal, Calif.
Texas star on red/white jagged stripes	F-16A/B	147th FG, Ellington Field, Tex.
Stars of Little Dipper constellation and "Duluth" logo	F-16A/B	148th FG, Duluth IAP, Minn.
Black falcon with "Vermont" on gold stripe	F-16A/B	158th FG, Burlington, Vt.
Stylized "Jersey Devil" and "New Jersey" logo	F-16A/B	177th FG, Atlantic City Airport, N. J.
Dark gray and gold checkerboard	F-16A/B	191st FG, Selfridge ANGB, Mich.
<b>Air Defense Training Units (ANG)</b>		
Black eagle and "Oregon" logo	F-16A/B	114th FTS (142d FG), Kingsley Field, Ore.
Starburst state flag and "Arizona" logo	F-16A/B	162d FTS, Tucson, Ariz.
Dark gray jayhawk	F-16C/D	184th FG, McConnell AFB, Kan.

### USAF Flying Squadrons by Mission Type

	FY 1988	FY 1989	FY 1990	FY 1991	FY 1992	FY 1993 1st quarter
<b>Active forces</b>						
Strategic bomber	25	24	21	18	17	15
Air refueling	35	35	35	35	32	23
Strategic command & control	6	6	6	6	6	2
Intelligence	3	3	3	3	3	3
Strategic reconnaissance	1	1	0	0	0	0
Strategic interceptor	2	1	0	0	0	0
Fighter	79	79	79	70	61	61
Tactical reconnaissance	5	5	5	1	0	0
Tactical electronic warfare	4	4	4	2	3	3
Special operations forces	10	11	11	11	11	11
Tactical air command & control	3	3	3	3	9	9
Tactical air control	7	7	7	7	1	5
Weather	1	1	1	1	1	1
Rescue	6	7	7	7	8	8
Tactical airlift	13	12	12	12	12	12
Strategic airlift	19	20	21	21	21	21
Special mission	1	1	2	2	2	2
Aeromedical airlift	3	3	3	3	3	3
GLCM	5	3	2	0	0	0
ICBM	20	20	20	20	19	19
Space operations	3	3	4	6	8	8
Space communications	3	3	3	3	3	3
Space warning	7	7	7	7	7	7
Surveillance	4	5	8	8	9	9
Space launch	0	0	2	2	3	3
Range	0	0	0	3	3	3
<b>Total</b>	<b>265</b>	<b>265</b>	<b>267</b>	<b>251</b>	<b>242</b>	<b>231</b>
<b>Reserve forces</b>						
ANG selected reserve	91	91	91	92	91	92
Air Force Reserve	58	58	58	58	59	59
Space operations	0	0	0	0	0	1
<b>Total</b>	<b>149</b>	<b>149</b>	<b>149</b>	<b>150</b>	<b>150</b>	<b>151</b>
<b>Grand total</b>	<b>414</b>	<b>414</b>	<b>416</b>	<b>401</b>	<b>392</b>	<b>382</b>

## The Active-Duty Fleet

(Current as of September 30, 1992)

### Age in Years

	0-3	3-6	6-9	9-12	12-15	15-18	18-21	21-24	24+	Average	Total number
OA/A-10	—	—	14	166	29	13	—	—	—	11.2	222
OA-37	—	—	—	—	—	2	—	—	—	16.9	2
B-1	—	79	17	—	—	—	—	—	—	5.3	96
B-2	3	1	—	—	—	—	—	—	—	1.7	4
B-52	—	—	—	—	—	—	—	—	148	31.4	148
C-5	—	43	7	—	—	—	24	8	—	10.9	82
C-9	—	—	—	—	—	3	9	8	3	21.5	23
C-10 (KC-10)	1	11	30	17	—	—	—	—	—	7.7	59
C-12	—	—	45	—	1	26	—	—	—	11.1	72
C-17	3	—	—	—	—	—	—	—	—	0.6	3
C-18 <sup>a</sup>	—	—	—	7	—	—	—	—	—	10.4	7
C-20	—	10	2	1	—	—	—	—	—	6.1	13
C-21	—	—	79	—	—	—	—	—	—	7.7	79
C-23	—	—	3	—	—	—	—	—	—	7.9	3
C-25	2	—	—	—	—	—	—	—	—	1.9	2
C-27	6	—	—	—	—	—	—	—	—	0.7	6
C-130 <sup>b</sup>	17	13	9	—	1	50	24	53	167	21.9	334
C-131	—	—	—	—	—	—	—	—	1	37.5	1
C-135 <sup>c</sup>	—	—	—	—	—	—	—	—	479	30.9	479
C-137	1	—	2	—	—	—	1	—	4	20.5	8
C-141	—	—	—	—	—	—	—	—	241	26.1	241
E-3	—	—	3	8	14	9	—	—	—	12.9	34
E-4	—	—	—	—	—	2	2	—	—	18.3	4
E-8	2	—	—	—	—	—	—	—	—	1.7	2
F-4 <sup>d</sup>	—	—	—	—	—	—	—	42	4	22.7	46
F-15	121	120	105	144	163	31	4	—	—	8.3	688
F-16	401	343	75	27	19	1	—	—	—	3.7	866
F-22	1	—	—	—	—	—	—	—	—	1.0	1
F-106	1	—	—	—	—	—	—	—	1	17.0	2
F-111	—	—	—	—	—	12	82	106	32	21.5	232
F-117	56	—	—	—	—	—	—	—	—	1.4	56
G-3	3	—	—	—	—	—	—	—	—	1.6	3
G-4	1	1	—	3	5	—	—	—	—	10.7	10
G-7	—	4	1	4	—	—	—	—	—	7.0	9
G-9	—	4	—	—	—	—	—	—	—	5.6	4
H-1	—	—	—	—	—	—	26	68	—	21.1	94
H-3	—	—	—	—	—	—	—	6	6	23.3	12
H-53	1	7	—	—	—	1	4	28	8	19.4	49
H-60	32	9	2	8	—	—	—	—	—	3.6	51
T-1A	21	—	—	—	—	—	—	—	—	0.4	21
T-33	—	—	—	—	—	—	—	—	1	40.9	1
T-37	—	—	—	—	—	—	—	77	427	29.8	504
T-38	—	—	—	—	—	—	14	163	508	26.1	685
T-39	—	—	—	—	—	—	—	—	10	31.1	10
T-41	—	—	—	—	—	—	—	6	94	25.3	100
T-43	—	—	—	—	—	—	12	—	—	18.6	12
U-26	—	—	—	1	—	—	—	—	—	9.0	1
V-18	—	—	—	—	—	2	—	—	—	15.0	2
<b>Total</b>	<b>673</b>	<b>645</b>	<b>394</b>	<b>386</b>	<b>232</b>	<b>152</b>	<b>202</b>	<b>565</b>	<b>2,134</b>	<b>14.2</b>	<b>5,383</b>
<b>Percent<sup>e</sup></b>	<b>13</b>	<b>12</b>	<b>7</b>	<b>7</b>	<b>4</b>	<b>3</b>	<b>4</b>	<b>10</b>	<b>40</b>		<b>100</b>

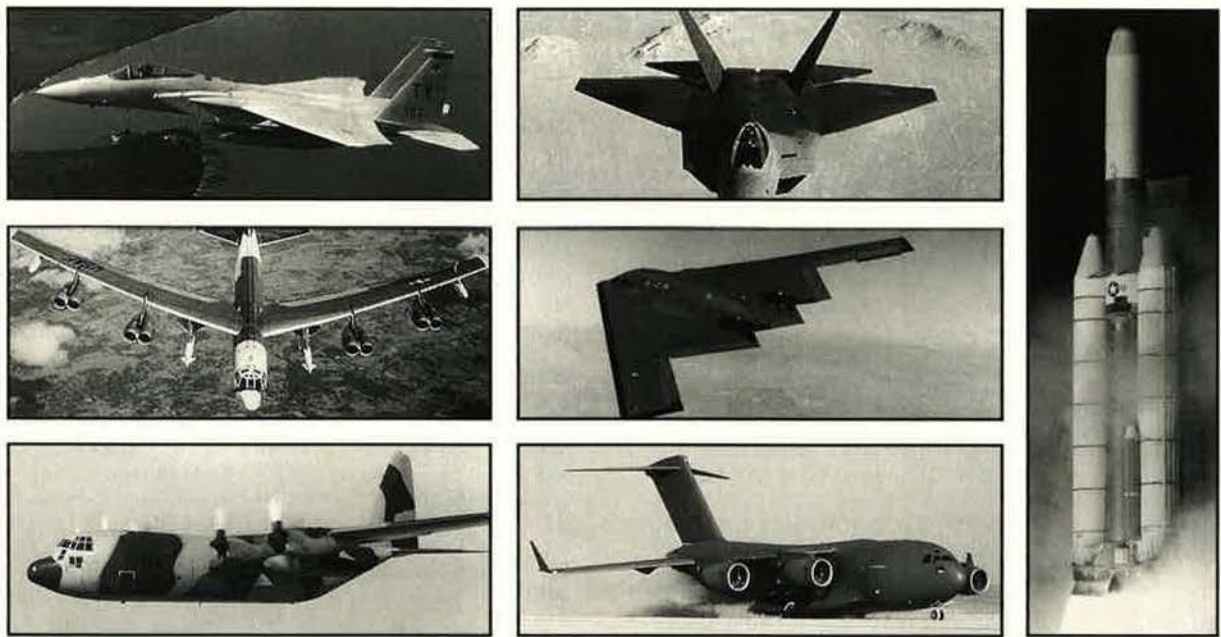
<sup>a</sup>Includes EC-18

<sup>b</sup>Includes all types of C-130

<sup>c</sup>Includes all types of C-135

<sup>d</sup>Includes all types of F-4

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



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## USAF Aircraft Tail Markings

As of April 1, 1993

Code	Aircraft	Unit, Location, and Command	Code	Aircraft	Unit, Location, and Command
AK	F-15C/D/E	3d Wing, Elmendorf AFB, Alaska (PACAF)	LZ	B-52G, KC-135R	42d BW, Loring AFB, Me. (ACC)
AK	F-16C/D, OA-10A	343d Wing, Eielson AFB, Alaska (PACAF)	MA	A-10A	104th FG, Barnes MAP, Mass. (ANG)
AL	F-16A/B	187th FG, Dannelly Field, Ala. (ANG)	MC	F-16C/D	56th FW, MacDill AFB, Fla. (ACC)
BB	U-2, KC-135Q, T-38	9th Wing, Beale AFB, Calif. (ACC)	MD	A-10A	175th FG, Baltimore, Md. (ANG)
BC	OA-10A/ A-10	110th FG, W. K. Kellogg Airport, Mich. (ANG)	MJ	F-16C/D	432d FW, Misawa AB, Japan (PACAF)
BD	A-10A	917th FW, Barksdale AFB, La. (AFRES)	MM	UH-1	341st MW, Malmstrom AFB, Mont. (ACC)
BH	RF-4C	117th RW, Birmingham Airport, Ala. (ANG)	MO	F-15C/E, F-16C, B-52G, KC-135R	366th Wing, Mountain Home AFB, Idaho (ACC)
BT	F-15C/D	36th FW, Bitburg AB, Germany (USAFE)	MT	B-52H UH-1	5th BW, Minot AFB, N. D. (ACC) 91st MW, Minot AFB, N. D. (ACC)
CA	B-52G, KC-135	32d BW, Castle AFB, Calif. (ACC)	MY	F-16C/D	347th FW, Moody AFB, Ga. (ACC)
CC	F-111E/F/G, EF-111A	27th FW, Cannon AFB, N. M. (ACC)	NM	F-16C/D	150th FG, Kirtland AFB, N. M. (ANG)
CO	F-16C/D	140th FW, Buckley ANGB, Colo. (ANG)	NO	F-15A/B F-16C/D	159th FG, NAS New Orleans, La. (ANG) 926th FG, NAS New Orleans, La. (AFRES)
CR	F-15A/B	32d FG, Soesterberg AB, the Netherlands (USAFE)	NT	T-43A, T-37B	323d FTW, Mather AFB, Calif. (ATC)
CT	A-10A	103d FG, Bradley IAP, Conn. (ANG)	NY	F-16A/B	174th FW, Hancock Field, N. Y. (ANG)
DC	F-16A/B	113th FW, Andrews AFB, Md. (ANG)	OF	Various	55th Wing, Offutt AFB, Neb. (ACC)
DM	A-10A, OA-10A, EC-130H	355th Wing, Davis-Monthan AFB, Ariz. (ACC)	OH	F-16C/D	178th FG, Springfield-Beckley MAP, Ohio (ANG)
DO	F-16A/B	906th FG, Wright-Patterson AFB, Ohio (AFRES)	OK	F-16C/D T-37, T-38	180th FG, Toledo Express Airport, Ohio (ANG) 138th FG, Tulsa IAP, Okla. (ANG) 71st FTW, Vance AFB, Okla.
DY	B-1B, KC-135A/Q	96th Wing, Dyess AFB, Tex. (ACC)	OH	F-15A/B	142d FG, Portland IAP, Ore. (ANG)
ED	Various	Air Force Flight Test Center, Edwards AFB, Calif. (AFMC)	OS	F-16C/D, OA-10	51st Wing, Osan AB, Korea (PACAF)
EG	F-15C/D	33d FW, Eglin AFB, Fla. (ACC)	OT	F-15A/B/C/E, F-16A/B/C/D/CG	USAFAWC, Eglin AFB, Fla. (ACC)
EL	B-1B UH-1	28th BW, Ellsworth AFB, S. D. (ACC) 44th MW, Ellsworth AFB, S. D. (ACC)	OZ	B-1B	384th BW, McConnell AFB, Kan. (ACC)
ET	Various	3246th Test Wing, Eglin AFB, Fla. (AFMC)	PA	OA-10A	111th FG, Willow Grove ARS, Pa. (ANG)
FC	B-52H, UH-1	92d BW, Fairchild AFB, Wash. (ACC)	PR	F-16A/B	156th FG, Muniz ANGB, Puerto Rico (ANG)
FE	UH-1	90th MW, F. E. Warren AFB, Wyo. (ACC)	PT	KC-135E	112th ARFG, Greater Pittsburgh IAP/ARS, Pa. (ANG)
FF	F-15C/D, UH-1	1st FW, Langley AFB, Va. (ACC)	RG	F-15B	Warner Robins ALC, Robins AFB, Ga. (AFLC)
FM	F-16A/B	482d FW, Homestead AFB, Fla. (AFRES)	RS	F-16C/D, CT-43, C-130, C-9, C-12, C-20, C-21, UH-1N	86th FW, Ramstein AB, Germany (USAFE)
FS	F-16A/B	188th FG, Fort Smith MAP, Ark. (ANG)	SA	F-16A/B	149th FG, Kelly AFB, Tex. (ANG)
FT	A/OA-10A, C-130E	23d Wing, Pope AFB, N. C. (ACC)	SC	F-16A/B	169th FG, McEntire ANGB, S. C. (ANG)
FW	F-16C/D	122d FW, Fort Wayne IAP, Ind. (ANG)	SD	F-16C/D	114th FG, Joe Foss Field, S. D. (ANG)
GA	F-15A/B	116th FW, Dobbins ARB, Ga. (ANG)	SH	F-16A/B	507th FG, Tinker AFB, Okla. (AFRES)
GF	B-1B UH-1	319th BW, Grand Forks AFB, N. D. (ACC) 321st MW, Grand Forks AFB, N. D. (ACC)	SI	F-16A/B	183d FG, Capital Municipal Airport, Ill. (ANG)
GR	B-52H	416th BW, Griffiss AFB, N. Y. (ACC)	SJ	F-15E, KC-10A	4th Wing, Seymour Johnson AFB, N. C. (ACC)
HA	F-16C/D	185th FG, Sioux Gateway Airport, Iowa (ANG)	SL	F-15A/B	131st FW, Lambert-St. Louis IAP, Mo. (ANG)
HAFB	F-16A, F-4E	Ogden ALC, Hill AFB, Utah (AFLC)	SM	F-111	337th Test Squadron, Sacramento ALC, McClellan AFB, Calif. (AFMC)
HI	F-16A/B	419th FW, Hill AFB, Utah (AFRES)	SP	F-4G, F-16C/D, A-10A/OA-10A	52d FW, Spangdahlem AB, Germany (USAFE)
HL	F-16C/D	388th FW, Hill AFB, Utah (ACC)	SW	F-16C/D, OA-10A	363d FW, Shaw AFB, S. C. (ACC)
HO	F-4E, F-117A	49th FW, Holloman AFB, N. M. (ACC)	TF	F-16C/D	301st FW, Carswell AFB, Tex. (AFRES)
HV	UH-1	310th T&TW, Vandenberg AFB, Calif. (ACC)	TH	F-16C/D	181st FG, Hulman RAP, Ind. (ANG)
HW	C-21, C-27, C-130, CT-43	24th Wing, Howard AFB, Panama (ACC)	TX	F-16A/B	924th FG, Bergstrom AFB, Tex. (AFRES)
IA	F-16C/D	132d FW, Des Moines IAP, Iowa (ANG)	TY	F-15A/B/C/D	325th FW, Tyndall AFB, Fla. (ACC)
IL	F-16A/B	182d FG, Greater Peoria Airport, Ill. (ANG)	VA	F-16C/D	192d FG, Byrd Field, Va. (ANG)
IN	A-10A	930th FG, Grissom AFB, Ind. (AFRES)	WA	Various	57th FW, Nellis AFB, Nev. (ACC)
IS	F-15C/D, HH-60	57th FS, NAS Keflavik, Iceland (ACC)	WI	F-16C/D	128th FW, Truax Field, Wis. (ANG)
KC	A-10A	442d FW, Richards-Gebaur AFB, Mo. (AFRES)	WM	UH-1	351st MW, Whiteman AFB, Mo. (ACC)
KI	B-52H, KC-135	410th BW, K. I. Sawyer AFB, Mich. (ACC)	WP	F-16C/D	8th FW, Kunsan AB, Korea (PACAF)
LA	B-52H, KC-135A/Q	2d Wing, Barksdale AFB, La. (ACC)	WW	F-4G	561st FS, Nellis AFB, Nev. (ACC)
LF	F-16C/D, F-15E	58th FW, Luke AFB, Ariz. (ACC)	ZZ	F-15C/D, E-3, KC-135	18th Wing, Kadena AB, Japan (PACAF)
LN	F-15E	48th FW, RAF Lakenheath, UK (USAFE)			
LR	F-16C/D	944th FG, Luke AFB, Ariz. (AFRES)			

Source: USAF and Maj. Wally Van Winkle, AFRES

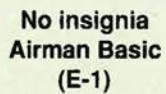


# USAF Grades and Insignia

## Officer



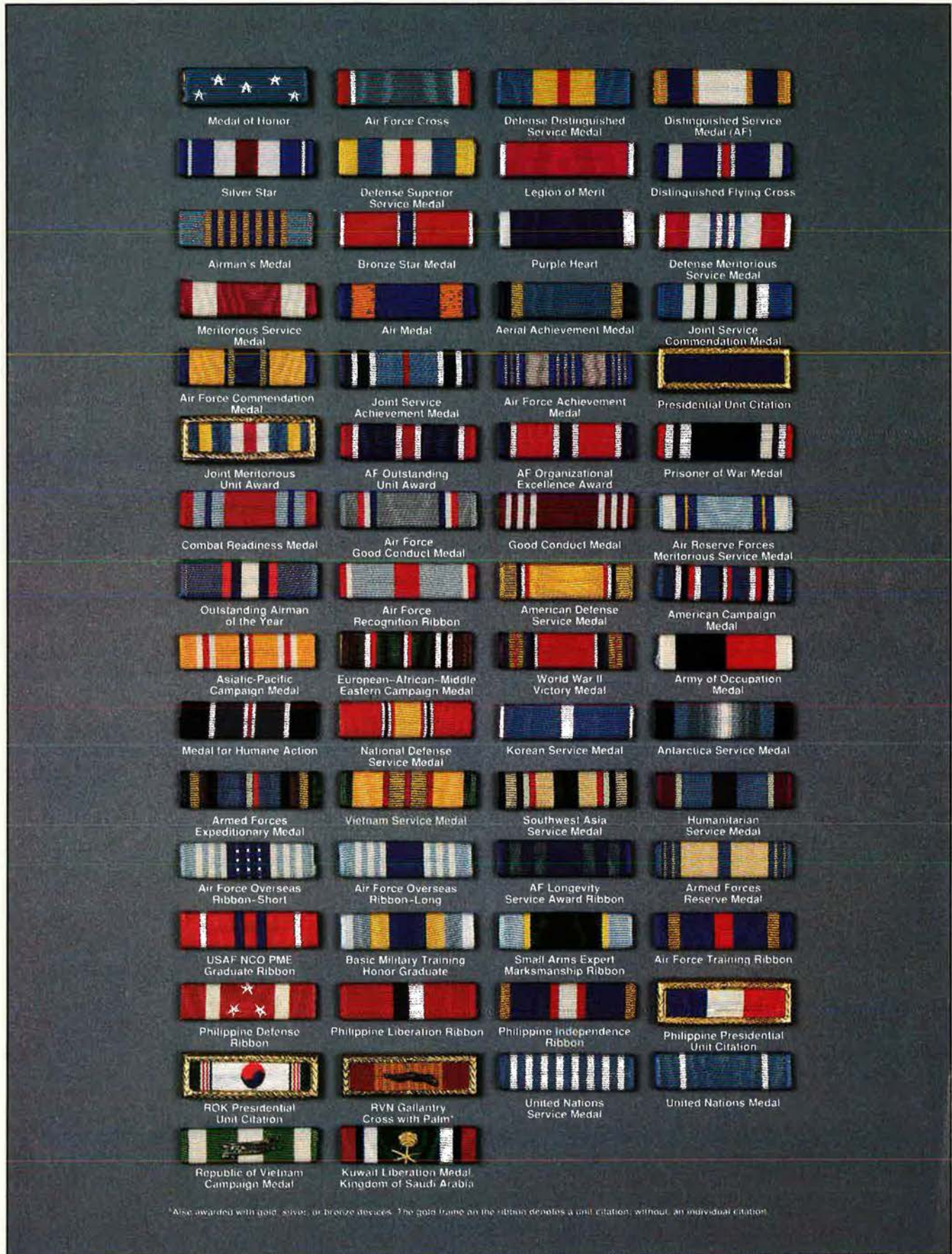
## Enlisted



\*After May 1, 1992, all promotions are to E-5 Staff Sergeant.

# 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 AFR 35-10 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.

# 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	

## 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	

## 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. Kislung	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. Pflugston	Aug. 1, 1990	

## Air Combat Command

Gen. John Michael Loh	June 1, 1992
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## 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

(Formally activates July 1, 1993)

Gen. Henry Viccellio, Jr. (nominated)	July 1, 1993
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## 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 a field operating agency.

## Air Force Intelligence Command

Maj. Gen. Gary W. O'Shaughnessy	Oct. 1, 1991
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## 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
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## 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
Maj. Gen. John J. Closner III	Nov. 1, 1990	

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).

## USAF Leaders Through the Years

### 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	

### Air Force Special Operations Command

Maj. Gen. Thomas E. Eggers	May 22, 1990	June 30, 1991
Maj. Gen. Bruce L. Fister	June 30, 1991	

### 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. H. T. Johnson	June 1, 1992	Aug. 22, 1992
Gen. Ronald R. Fogleman	Aug. 23, 1992	

### 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	

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. Josue	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

Merges 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. Merges 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.

**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. H. 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**

1. Gen. Ennis C. Whitehead	Dec. 30, 1945	Apr. 25, 1949
1. Gen. George E. Stratemeyer	Apr. 26, 1949	May 20, 1951
1. Gen. Earle E. Partridge (acting)	May 21, 1951	June 9, 1951
3en. O. P. Weyland	June 10, 1951	Mar. 25, 1954
3en. Earle E. Partridge	Mar. 26, 1954	May 31, 1955
3en. Laurence S. Kuter	June 1, 1955	July 31, 1959
3en. Emmett O'Donnell, Jr.	Aug. 1, 1959	July 31, 1963
3en. Jacob E. Smart	Aug. 1, 1963	July 31, 1964
3en. Hunter Harris, Jr.	Aug. 1, 1964	Jan. 31, 1967
3en. John D. Ryan	Feb. 1, 1967	July 31, 1968
3en. Joseph J. Nazzaro	Aug. 1, 1968	July 31, 1971
3en. Lucius D. Clay, Jr.	Aug. 1, 1971	Sept. 30, 1973
3en. John W. Vogt	Oct. 1, 1973	June 30, 1974
3en. Louis L. Wilson, Jr.	July 1, 1974	May 31, 1977
1. Gen. James A. Hill	June 1, 1977	June 14, 1978
1. Gen. James D. Hughes	June 15, 1978	July 1, 1981
1. Gen. Arnold W. Braswell	July 1, 1981	Sept. 30, 1983
3en. Jerome F. O'Malley	Oct. 8, 1983	Nov. 1, 1984
3en. Robert W. Bazley	Nov. 1, 1984	Dec. 16, 1986
3en. Jack I. Gregory	Dec. 16, 1986	July 22, 1988
3en. Merrill A. McPeak	July 22, 1988	Oct. 30, 1990
1. Gen. James B. Davis	Nov. 5, 1990	Feb. 19, 1991
3en. Jimmie V. Adams	Feb. 19, 1991	Jan. 25, 1993
3en. Robert L. Rutherford	Jan. 26, 1993	

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	

**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	

## USAF Medal of Honor Recipients

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

### Home Town

### Date and Place of Action

### Present Address or Date of Death

#### World War I

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

#### World War II

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	Carmel, Calif. (Ret. Gen.)
Erwin, SSgt. Henry E.	Adamsville, Ala.	Apr. 12, 1945, Koriyama, Japan	Leeds, Ala.
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	Belleair Bluffs, Fla. (Ret. Brig. Gen.)
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	Fairfield, Calif. (Ret. Lt. Col.)
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.)

#### Korea

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

#### Vietnam

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 Shau Valley, S. Vietnam	Kuna, Idaho (Ret. Col.)
Fleming, 1st Lt. James P.	Sedalia, Mo.	Nov. 26, 1968, Duc Co, S. Vietnam	Active-duty Col., NAS Dallas, 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
Levitow, 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

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# 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 contains

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.

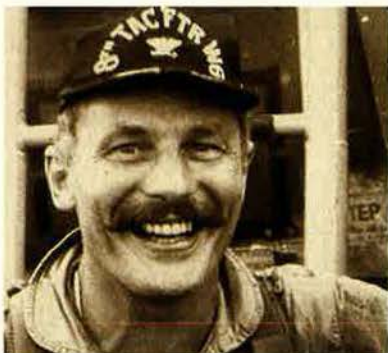
## American Aces of World War I



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 <sup>a</sup>	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 <sup>a</sup>	Johnson, Maj. Gerald W.	10.50
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 <sup>a</sup>	Peterson, Capt. Richard A.	15.50
Lynch, Lt. Col. Thomas J.	20	Whisner, Capt. William T., Jr.	15.50 <sup>a</sup>
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 <sup>a</sup>	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

Ranks are as of last victory in World War II.

<sup>a</sup>Aces who added to these scores by victories in the Korean War



**Maj. Richard I. Bong**

## 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
Marshal, 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

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# 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.

## Air Combat Command

**Headquarters** Langley AFB, Va.

**Established** June 1, 1992

**Commander** Gen. John Michael Loh

### MISSIONS

**Operate** USAF bombers and ICBMs (Day-to-day control of ICBMs passes to AFSPACECOM July 1, 1993)

**Operate** USAF's US-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 Authorized)

ICBMs (Minuteman II/III, Peacekeeper) ..... 925  
 Bombers (B-1B, B-52) ..... 201  
 Fighters (F-15A/C, F-16) ..... 698  
 Attack aircraft (A/OA-10, F-15E, F-111, F-117) ..... 373  
 EC/EW aircraft (F-4G, EF-111) .... 39  
 Aerial refuelers (KC-10, KC-135) ... 73  
 Other aircraft (all types) ..... 304

### FORCE STRUCTURE

Six numbered air forces: **1st**, Tyndall AFB, Fla.; **2d**, Beale AFB, Calif.; **8th**, Barksdale AFB, La.; **9th**, Shaw AFB, S. C.; **12th**, Bergstrom AFB, Tex. (transfers to Davis-Monthan AFB, Ariz., June 1, 1993); **20th**, Vandenberg AFB, Calif. (transfers to AFSPACECOM July 1, 1993).

Two direct reporting units: Air Warfare Center, Air Force Weapons and Tactics Center

Forty fighter, attack, bomber, composite, and missile wings

### PERSONNEL

Active-duty ..... 153,148  
 Officers ..... 21,546  
 Enlisted ..... 131,602  
 Reserve component ..... 84,000  
 ANG ..... 70,184  
 AFRES ..... 13,816  
 Civilian ..... 21,185  
**Total** ..... **258,333**

### OPERATIONAL ACTIVITY

Flying hours ..... 48,500 per month

### Major overseas deployments (partial list)

Bright Star (Central Command)  
 Cobra Gold (Pacific Command)  
 Crested Cap (European Command)  
 Ocean Venture (Atlantic Command)  
 Team Spirit (Pacific Command)

### Major training exercises

Green Flag, Nellis AFB, Nev.  
 Maple Flag, CFB Cold Lake, Canada  
 Red Flag I, Nellis AFB, Nev.  
 Red Flag II, Nellis AFB, Nev.  
 Red Flag III, Nellis AFB, Nev.

### UNIT

325th FW .....  
 9th Wing .....  
 55th Wing .....  
 552d ACW .....  
 2d Wing .....  
 5th BW .....  
 7th BW .....  
 27th FW .....  
 28th BW .....

### BASE

Tyndall AFB, Fla. (base transfers to AETC July 1, 1993).....  
 Beale AFB, Calif. ....  
 Offutt AFB, Neb. .... E-4B, RC-135S/U/V/W/X, TC-135S/W, EC-135C/E/J, KC-135E, C-135A/B, NKC-135A, WC-135B, T-38  
 Tinker AFB, Okla. .... E-3B/C, EC-135K, C-135E, EC-130E (at Keesler AFB, Miss.)  
 Barksdale AFB, La. .... B-52H, KC-135A/Q  
 Minot AFB, N. D. .... B-52H  
 Carswell AFB, Tex. (base becomes AFRES installation Oct. 1, 1993) .....  
 Cannon AFB, N. M. .... F-111E/F, EF-111A  
 Ellsworth AFB, S. D. .... B-1B

### WEAPONS

96th Wing .....	Dyess AFB, Tex. ....	B-1B, KC-135A/Q
319th BW .....	Grand Forks AFB, N. D. ....	B-1B
410th BW .....	K. I. Sawyer AFB, Mich. ....	B-52H
384th BW .....	McConnell AFB, Kan. ....	B-1B
509th BW .....	Whiteman AFB, Mo. ....	To get B-2
1st FW .....	Langley AFB, Va. ....	F-15C/D, UH-1
4th Wing .....	Seymour Johnson AFB, N. C. ....	F-15E, KC-10A
23d Wing .....	Pope AFB, N. C. ....	OA/A-10A, C-130A
31st FW .....	Homestead AFB, Fla. ....	F-16C/D (at MacDill AFB, Fla., and Shaw AFB, S. C.)
33d FW .....	Eglin AFB, Fla. ....	F-15C/D
42d BW .....	Loring AFB, Me. ....	B-52G
56th FW .....	MacDill AFB, Fla. ....	F-16A/B/C/D
347th FW .....	Moody AFB, Ga. ....	F-16C/D
363d FW .....	Shaw AFB, S. C. ....	F-16C/D, OA-10A
379th BW .....	Wurtsmith AFB, Mich. (base closes June 30, 1993) .....	—
416th BW .....	Griffiss AFB, N. Y. ....	B-52H
49th FW .....	Holloman AFB, N. M. ....	F-117A, AT-38A, F-4E, HH-60
58th FW .....	Luke AFB, Ariz. (base transfers to AETC July 1, 1993) .....	F-15E, F-16C/D
92d BW .....	Fairchild AFB, Wash. ....	B-52H, UH-1
93d BW .....	Castle AFB, Calif. ....	B-52G
24th Wing .....	Howard AFB, Panama .....	C-21, C-27, C-130, CT-43
355th Wing .....	Davis-Monthan AFB, Ariz. ....	OA/A-10A, EC-130H
366th Wing .....	Mountain Home AFB, Idaho .....	F-15C/E, F-16C, B-52G, KC-135R
388th FW .....	Hill AFB, Utah .....	F-16C/D
44th MW .....	Ellsworth AFB, S. D. ....	Minuteman II, UH-1
90th MW .....	F. E. Warren AFB, Wyo. ....	Minuteman III, Peacekeeper, UH-1
91st MW .....	Minot AFB, N. D. ....	Minuteman III, UH-1
310th Test & Training Wing .....	Vandenberg AFB, Calif. ....	Minuteman, Peacekeeper, UH-1
321st MW .....	Grand Forks AFB, N. D. ....	Minuteman III, UH-1
341st MW .....	Malmstrom AFB, Mont. ....	Minuteman II/III, UH-1
351st MW .....	Whiteman AFB, Mo. ....	Minuteman II, UH-1
57th FW .....	Nellis AFB, Nev. ....	A-10A, F-15C/D/E, F-16C, HH-60
99th Tactics & Training Wing .....	Ellsworth AFB, S. D. ....	—

USAF photo by MSgt. Mike Haggerty



**An F-117 Stealth fighter and AT-38B trainer pair up over New Mexico. Based at Holloman AFB, N. M., both belong to Air Combat Command, established June 1, 1992. The Air Force created ACC as successor to Tactical Air Command and Strategic Air Command and merged most of their assets and airpower.**

#### COMMAND NOTES

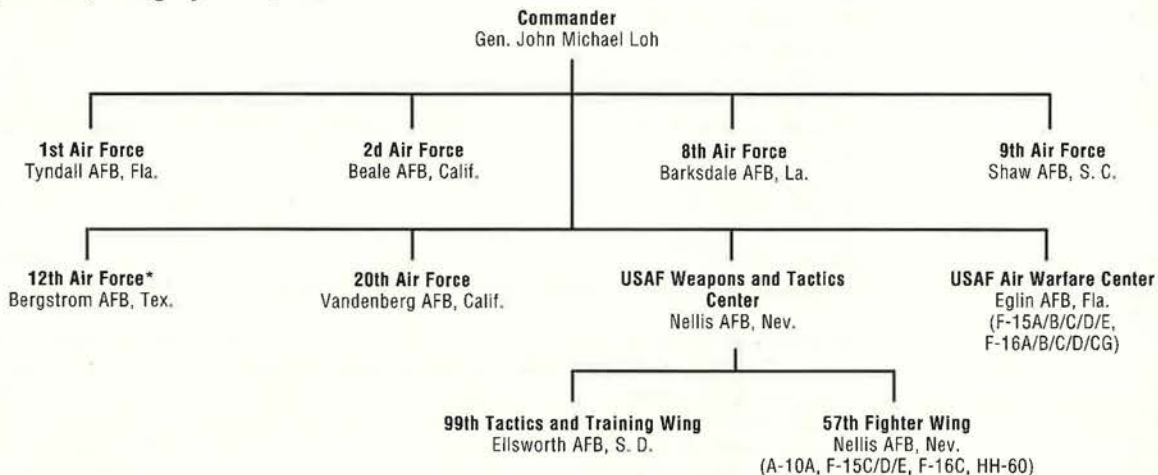
The ACC commander is also the commander in chief, US Air Forces Atlantic, and Air Force component commander of US Strategic Command. The term Tactical Fighter Wing is no longer used. A "wing" consists of two or more types of aircraft. A fighter

wing has one fighter type. Nomenclature for bombardment wings and missile wings has not changed. Composite wings feature mixes of fighters, bombers, tankers, transports, and other types of aircraft. Composite wings are located at Mountain Home AFB, Idaho, Seymour Johnson AFB, N. C., and

Pope AFB, N. C. Mountain Home's 366th Wing, an air intervention wing, is formed with air-combat and ground-attack fighters, B-52 bombers, reconnaissance aircraft, E-3 AWACS, and tankers. Some wings continue to use one aircraft type, such as the F-16s of the 347th FW at Moody AFB, Ga.

## Air Combat Command

Headquarters, Langley AFB, Va.



\*Transfers to Davis-Monthan AFB, Ariz., June 1, 1993

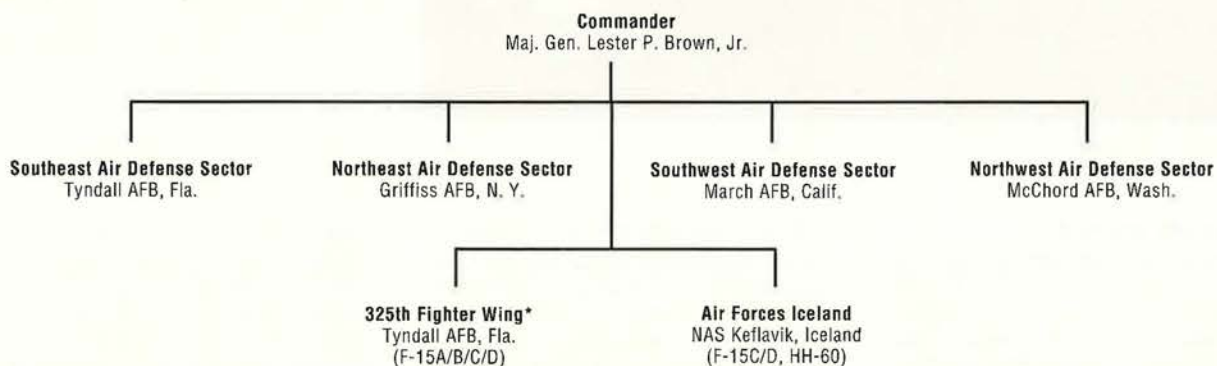


Staff photo by Guy Aceto

*This F-111F of the 27th Fighter Wing is ready for action at Cannon AFB, N. M., home of all Air Combat Command "Aardvarks" and their EF-111A electronic warfare cousins. Some ACC wings continue to use one aircraft type, but those with fighters only are no longer called Tactical Fighter Wings.*

## 1st Air Force (ACC)

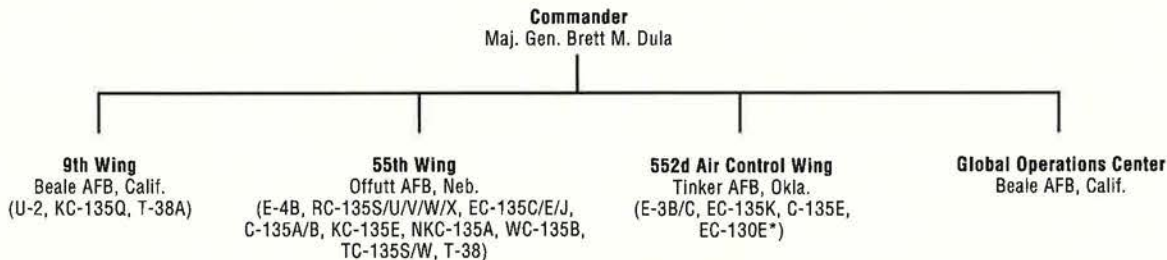
Headquarters, Tyndall AFB, Fla.



\*Transfers to AETC July 1, 1993

## 2d Air Force (ACC)

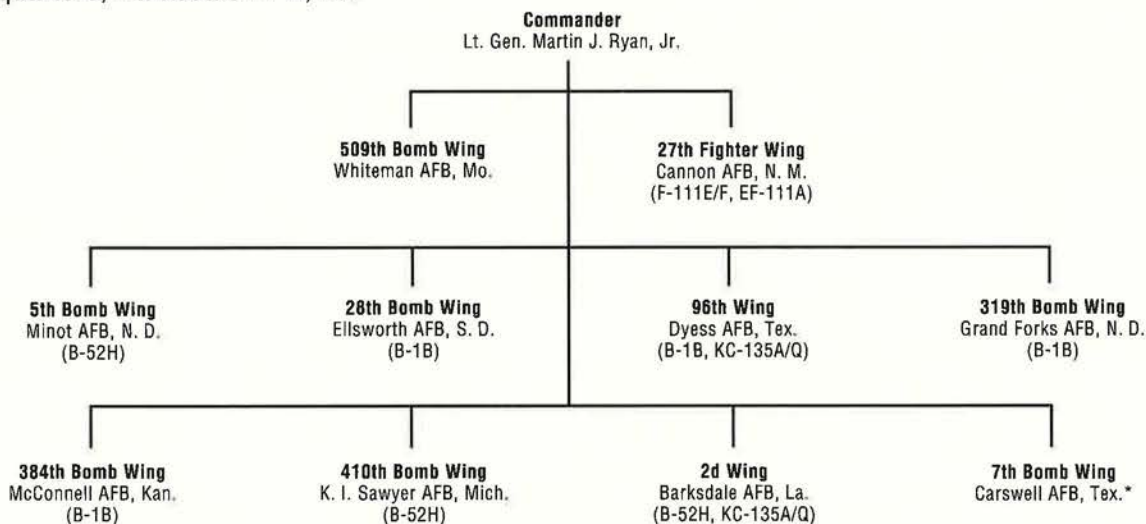
Headquarters, Beale AFB, Calif.



\*The 552d ACW's EC-130Es are at Keesler AFB, Miss.

## 8th Air Force (ACC)

Headquarters, Barksdale AFB, La.



\*Closes September 30, 1993

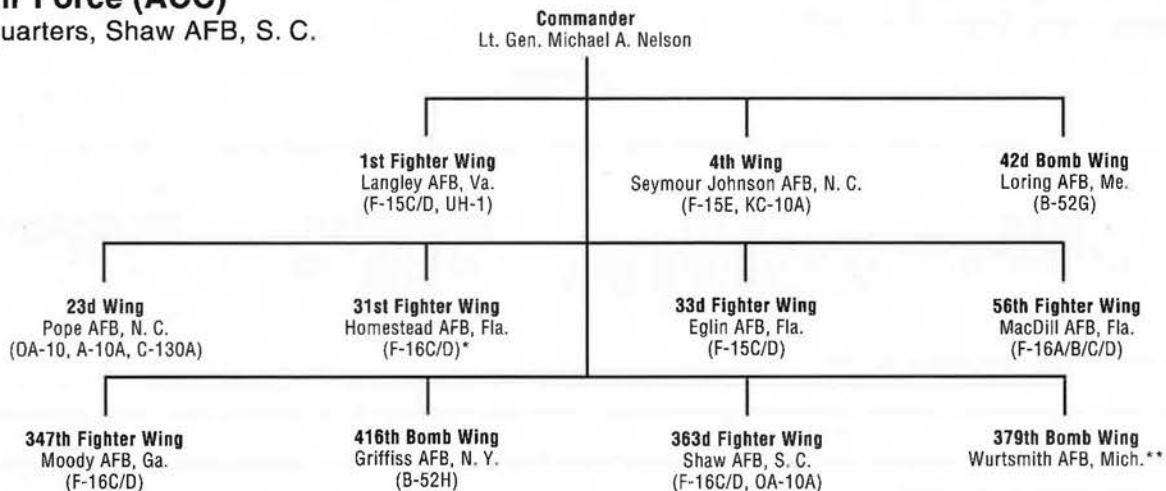
Photo by Randy Jolly / Arms Communications



*A KC-135 of the 366th Wing at Mountain Home AFB, Idaho, refuels an F-15C from the same wing. The 366th is ACC's prototype air intervention wing, a composite wing made up of diverse aircraft and ready to respond to crises around the globe. ACC also owns other types of composite wings.*

## 9th Air Force (ACC)

Headquarters, Shaw AFB, S. C.

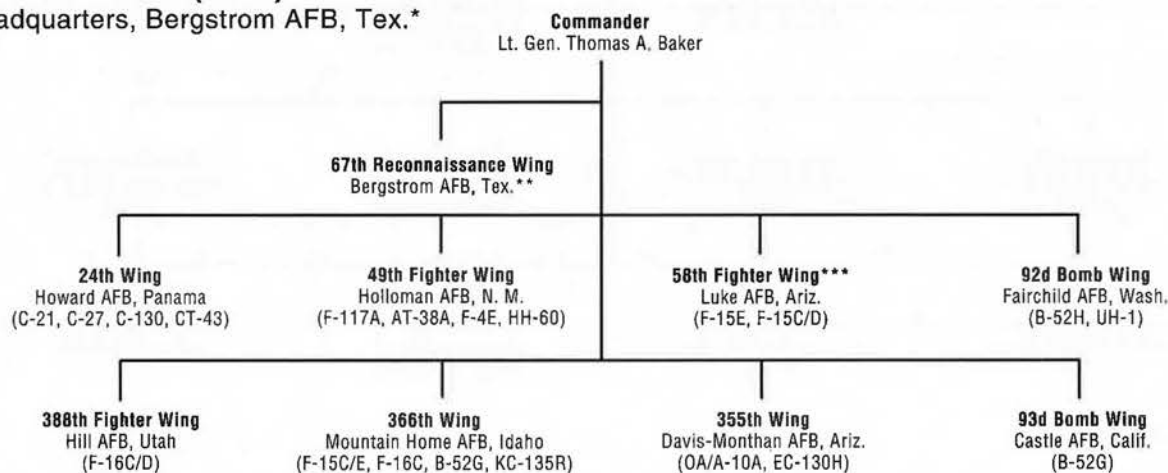


\*Aircraft at MacDill AFB, Fla., and Shaw AFB, S. C.

\*\*Closes June 30, 1993

## 12th Air Force (ACC)

Headquarters, Bergstrom AFB, Tex.\*



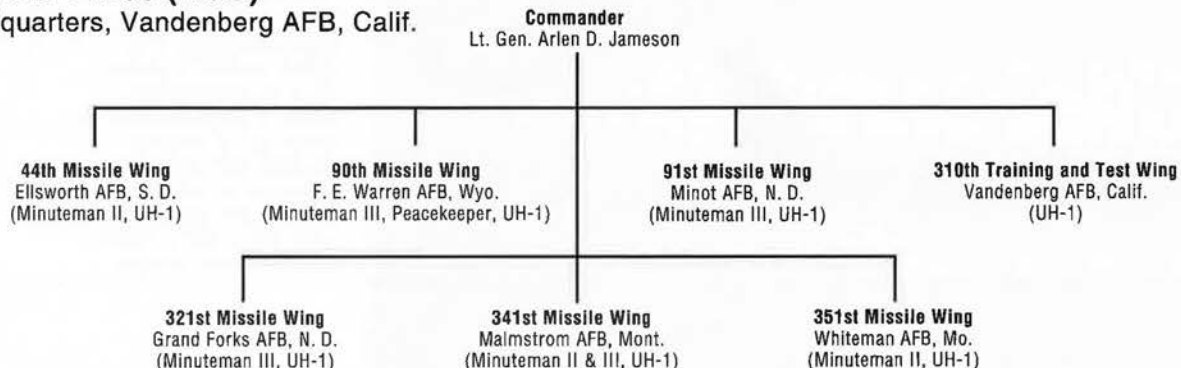
\*Transfers to Davis-Monthan AFB, Ariz., June 1, 1993

\*\*Closes September 30, 1993

\*\*\*Transfers to AETC July 1, 1993

## 20th Air Force (ACC)\*

Headquarters, Vandenberg AFB, Calif.



\*Transfers to AFSPACECOM July 1, 1993



# AETC

## Air Education and Training Command

Activates July 1, 1993

**Headquarters** Randolph AFB, Tex.

**Established** July 1, 1993

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

### MISSIONS

**Recruit**, access, commission, and train USAF enlisted and officer personnel

**Provide** basic military training, initial and advanced technical training, officer training, and flying training

**Provide** professional military, graduate, and professional education for officers, enlisted personnel, and civilians

### COROLLARY MISSIONS

**Conduct** joint training in intelligence, law enforcement, navigator training, fire fighting, and other areas

**Conduct** training for medical service, readiness, and security assistance

### OTHER RESPONSIBILITIES

**Recall** Individual Ready Reserve Mobility and contingency **tasking support** to combatant commands

### EQUIPMENT

Trainers (T-1A, T-37, T-38, T-41, T-43, AT-38) ..... 1,210  
 Fighters (F-15, F-15E, F-16) ..... 213  
 Transports and tankers (C-5, C-141, KC-135, HC/MC-130) ..... 53  
 Helicopters (MH-53J, TH-53A, UH-1, MH-60G) ..... 21

### FORCE STRUCTURE

Two numbered air forces:  
 one for technical training, Hq. at Keesler AFB, Miss.; one for flying training, Hq. at Randolph AFB, Tex.  
 Air University, Maxwell AFB, Ala.

### PERSONNEL

Active-duty ..... 45,555  
 Officers ..... 9,597  
 Enlisted ..... 35,958  
 Reserve component ..... 4,459  
 ANG ..... 3,594  
 AFRES ..... 865  
 Civilian ..... 14,700  
**Total** ..... **64,714**  
 Students ..... 654,765  
 Air Training  
 Command ..... 379,411  
 Air University ..... 275,354

### OPERATIONAL ACTIVITY

Flying Hours ..... 45,821 per month  
 (projected)

Major competitions ..... Top Flight,  
 Top Tech

### UNIT

#### Flying Training Wings (Active)

12th FTW ..... Randolph AFB, Tex.  
 14th FTW ..... Columbus AFB, Miss.  
 47th FTW ..... Laughlin AFB, Tex.  
 58th FTW ..... Luke AFB, Ariz.  
 64th FTW ..... Reese AFB, Tex.  
 71st FTW ..... Vance AFB, Okla.  
 80th FTW ..... Sheppard AFB, Tex.  
 97th AMW ..... Altus AFB, Okla.  
 325th FTW ..... Tyndall AFB, Fla.

#### Other Flying Training Units (Active)

336th CTG ..... Fairchild AFB, Wash.  
 1st FSS ..... Hondo Airport, Tex.  
 398th Ops. Group ..... Castle AFB, Calif.  
 542d CTW ..... Kirtland AFB, N. M.  
 557th FTS ..... US Air Force Academy, Colo.

#### Technical Training Units

Chanute TTC ..... Chanute AFB, Ill. (closes September 1993)  
 Goodfellow TW ..... Goodfellow AFB, Tex.  
 Keesler TW ..... Keesler AFB, Miss.  
 Lackland TW ..... Lackland AFB, Tex.  
 Lowry TC ..... Lowry AFB, Colo. (closes September 1994)  
 Sheppard TW ..... Sheppard AFB, Tex.  
 4315th CCTS ..... Vandenberg AFB, Calif.

#### USAF Recruiting Service

360th USAF Recruiting Group ..... Hanscom AFB, Mass.  
 367th USAF Recruiting Group ..... Robins AFB, Ga.  
 369th USAF Recruiting Group ..... Lackland AFB, Tex.  
 372d USAF Recruiting Group ..... Hill AFB, Utah  
 Wilford Hall USAF Medical Center ..... Lackland AFB, Tex.  
 338th Training Support Group ..... Randolph AFB, Tex.  
 Air Force Security Assistance Squadron ..... Randolph AFB, Tex.  
 Air University ..... units at Maxwell AFB, Ala.;  
 Lackland AFB, Tex.; Gunter Annex, Ala.;  
 Wright-Patterson AFB, Ohio

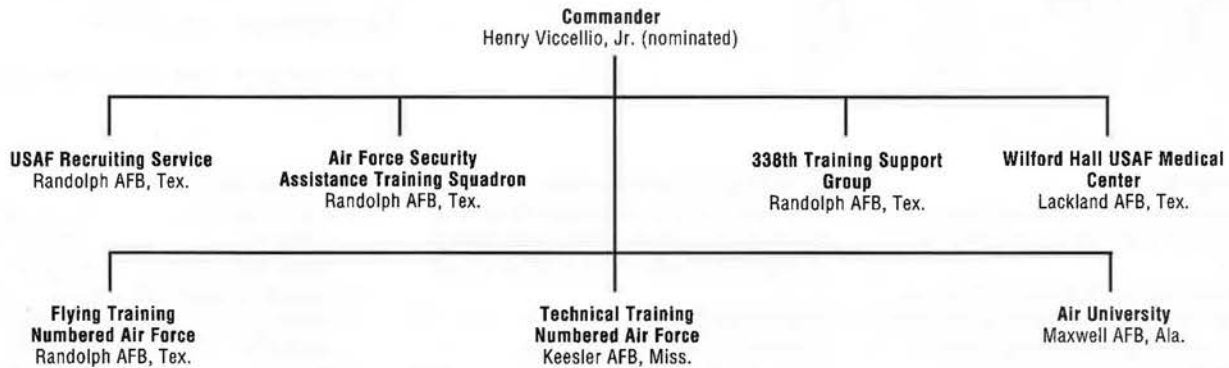
### BASE

### COMMAND NOTES

The Air Force's newest major command, AETC, activates July 1, 1993, integrating the missions of Air Training Command and Air University. The numbered air force at Randolph AFB, Tex., will manage flying training; the numbered air force at Keesler AFB, Miss., will manage technical training. Introduction to Fighter Fundamentals, long conducted at Holloman AFB, N. M., goes to AETC's pilot training bases. Also transferring to AETC are three ANG units: the 114th FTS, Klamath Falls IAP, Ore.; 162d FG, Tucson IAP, Ariz.; and 184th FG, McCannell AFB, Kan. USAF Recruiting Service brought 35,100 nonprior-service, active-duty enlistees, 201 physicians, and 429 nurses in the Air Force in Fiscal Year 1992. The FY 1993 goal for nonprior-service, active-duty Air Force recruits is 31,500.

## Air Education and Training Command

Headquarters, Randolph AFB, Tex.



## Flying Training Numbered Air Force

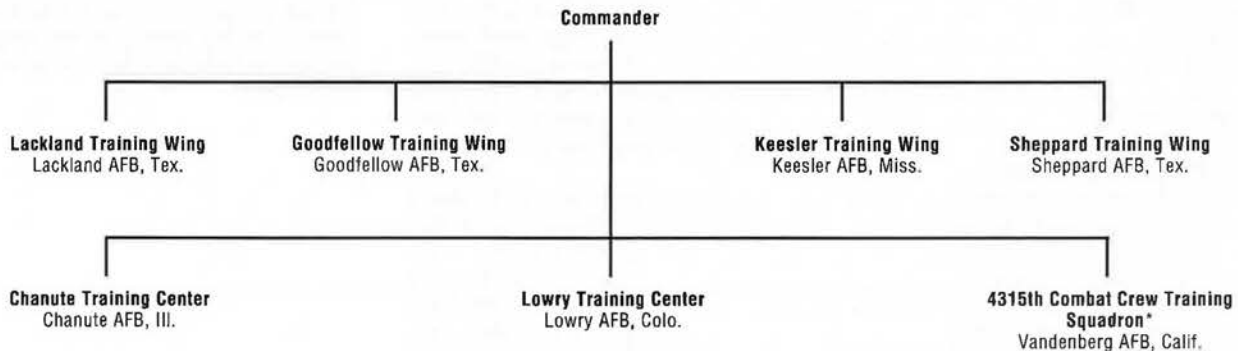
Headquarters, Randolph AFB, Tex.



\*Tenant unit

## Technical Training Numbered Air Force

Headquarters, Keesler AFB, Miss.



\*Tenant unit



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Lockheed Sanders leads the industry in state-of-the-art mission planning systems for all the Armed Forces.

Backed by Lockheed mission planners, pilots flying F-117 stealth fighters in Desert Storm rewrote the book on aerial warfare. Air Force Special Ops Forces also rely on Sanders expertise, using our strategic/tactical mission planning system. And, we have delivered upgrade kits for mission support systems for composite wings throughout the United States Air Force.

For the future, we're building the next generation mission support system (AFMSS) for the Air Force—the most sophisticated, flexible and effective mission planner ever conceived. We're also an integral part of the Air Force's F-22 team, with development of that 21st century fighter's mission support element already under way.

And, Sanders' Special Operations Forces Planning and Rehearsal System will enable Navy SEALs and Army Special Forces to apply the latest automation technology to their unique and intensely demanding missions.

Strengthened by 40 years of defense electronics experience, Sanders delivers innovative, affordable mission planning systems—land, sea and air. That's how we became the industry's preferred supplier; and how we intend to stay that way.

 **Lockheed Sanders**

# Air Force Intelligence Command

**Headquarters** Kelly AFB, Tex.

**Established** October 1, 1991

**Commander** Maj. Gen. Gary W. O'Shaughnessy

## MISSIONS

**Provide** direct intelligence, security, electronic combat, foreign technology, and treaty-monitoring support to national leaders and field air component commanders

**Provide** combat commanders data enabling them to decide when to exploit, jam, deceive, or destroy hostile military communications

## COROLLARY MISSIONS

**Provide** human intelligence and scientific and technical intelligence support to AFIC customers

**Provide** measurement and signature intelligence data collection, analysis, and exploitation support to AFIC customers

**Provide** nuclear intelligence production support (includes data collection, analysis, and exploitation) to AFIC customers

## EQUIPMENT

Four AN/FLR-9 antennas located in Alaska, England, Italy, and Japan

## FORCE STRUCTURE

Four wings; three centers

## PERSONNEL

Active-duty .....	12,738
Officers .....	1,654
Enlisted .....	11,084
Reserve component .....	189
ANG .....	98
AFRES .....	91
Civilian .....	2,733
<b>Total .....</b>	<b>15,660</b>

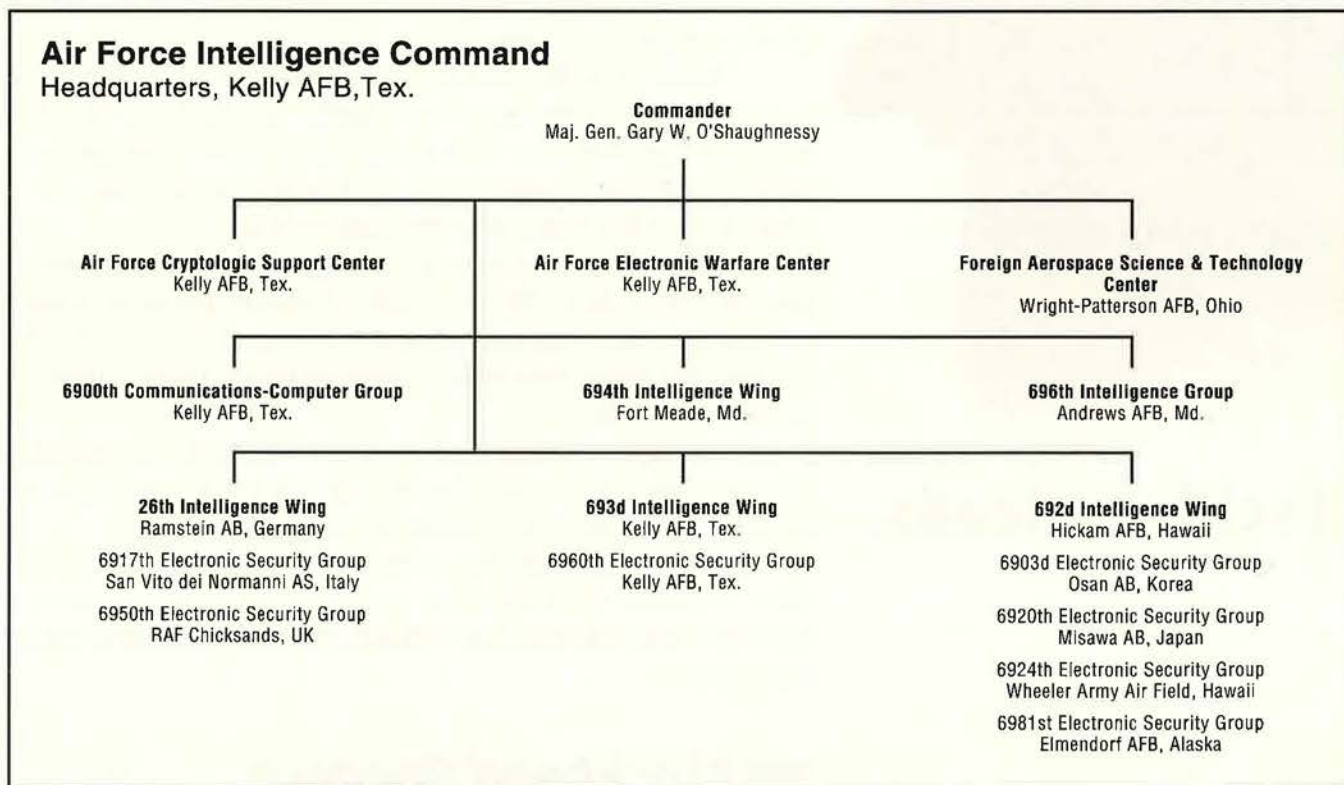
## UNIT (TENANT)

Air Force Cryptologic Support Center .....	Kelly AFB, Tex.
Air Force Electronic Warfare Center .....	Kelly AFB, Tex.
26th Intelligence Wing .....	Ramstein AB, Germany
692d Intelligence Wing .....	Hickam AFB, Hawaii
693d Intelligence Wing .....	Kelly AFB, Tex.
694th Intelligence Wing .....	Fort Meade, Md.
696th Intelligence Group .....	Andrews AFB, Md.
Foreign Aerospace Science & Technology Center .....	Wright-Patterson AFB, Ohio

## BASE

## COMMAND NOTES

AFIC was formed by integrating personnel and missions of the former Electronic Security Command, the Foreign Technology Division, the Air Force Special Activity Center, and elements of the Air Force Intelligence Agency.



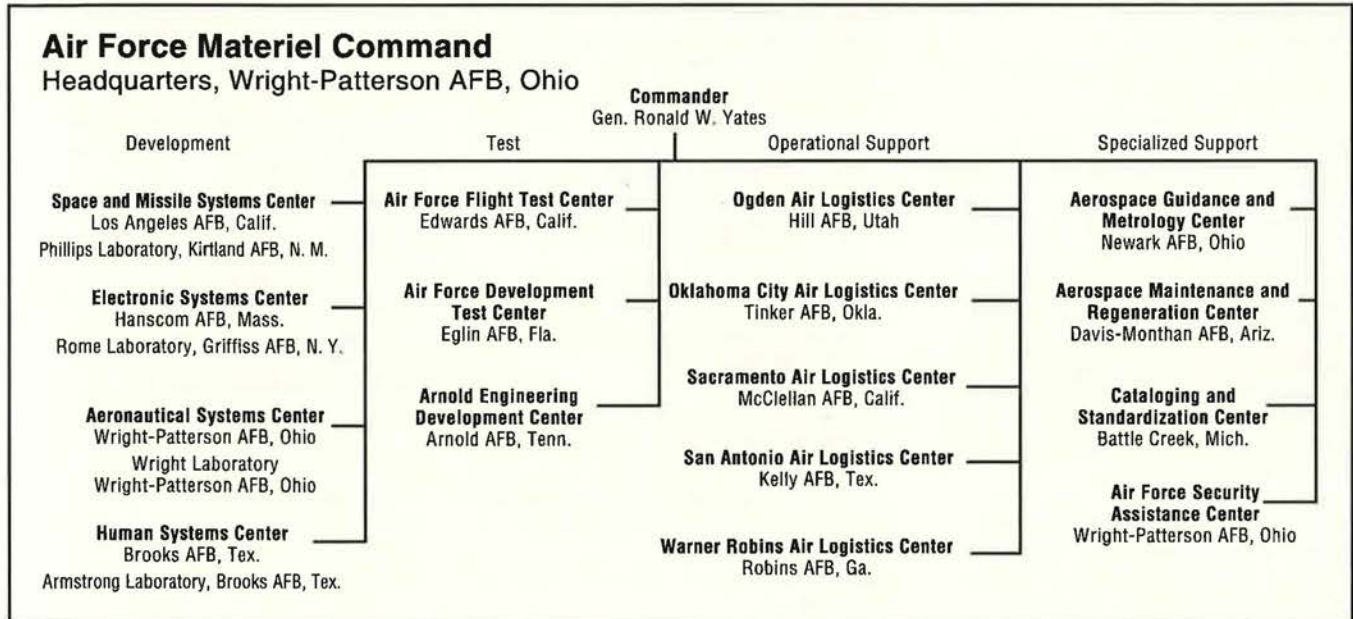
# AFMC

## Air Force Materiel Command

**Headquarters** Wright-Patterson AFB, Ohio

**Established** July 1, 1992

**Commander** Gen. Ronald W. Yates



### MISSIONS

**Integrate** the management of research, development, test, acquisition, and support 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 super laboratories

Three test centers

Five air logistics centers

Four specialized centers

### PERSONNEL

Active-duty .....	33,000
Officers .....	11,000
Enlisted .....	22,000
Reserve component .....	3,910
ANG .....	110
AFRES .....	3,800
Civilian .....	83,500
<b>Total .....</b>	<b>120,410</b>

### OPERATIONAL ACTIVITY

Flying hours ..... 3,300 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 .....	Griffiss AFB, 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.

### COMMAND NOTES

AFMC combined assets of Air Force Logistics Command and Air Force Systems Command. AFMC facilities span fourteen bases and two tenant bases. Four superlabs provide scientific and technical expertise to four product centers in the development and acquisition of weapon systems. AFMC tests and evaluates systems in three test centers. Maintenance and repair of weapon systems during their lifetime takes place at five air logistics

centers. Specialized centers handle other development and sustainment tasks. Aircraft and missiles are retired at the end of their life cycles to AFMC's Aerospace Maintenance and Regeneration Center, Davis-Monthan AFB, Ariz. The command operates more than seventy-five types of aircraft. It supports USAF's 10,000 aircraft and 32,000 engines. The command's investment in unique research, test, and manufacturing capability would cost more than \$32 billion to replace.

# AFSPACECOM

**Air Force Space Command**

**Headquarters** Peterson AFB, Colo.

**Established** September 1, 1982

**Commander** Gen. Charles A. Horner

## MISSIONS

**Provide** forces for

Ballistic missile offensive attack (as of July 1, 1993)  
 Ballistic missile warning  
 Space control (protection of US and allied space systems and negation of enemy space systems)  
 Satellite operations (ground control support for DoD satellites)  
 Spacelift (launch of DoD satellites)  
**Organize**, train, equip, operate, and sustain personnel, missile warning radar and infrared systems, space surveillance radar and optical systems, satellite command-and-control systems, and space-launch resources

## OTHER RESPONSIBILITIES

**Supply** information from surveillance and warning sensors for use by USSPACECOM to provide NORAD with surveillance and missile attack warning data  
**Integrate** space capabilities into Air Force operations  
**Provide** communications, computer, and base support to NORAD at Cheyenne Mountain AFB, Colo.

## EQUIPMENT

**Intercontinental Ballistic Missiles** (as of July 1, 1993):

Peacekeeper.....50  
 Minuteman III.....500  
 Minuteman II.....375

**Satellite systems** (USAF spacecraft in service as of February 1, 1993):

**Navstar Global Positioning System (GPS):**  
 Block I.....4  
 Block II.....17

**Defense Satellite Communications System:**

DSCS II.....6  
 DSCS III.....6

**Defense Meteorological Satellite Program**.....2

**Communications satellites** of NATO III and Fleet Satellite Communications System

**Boosters:** Delta II, Atlas E, 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, Cobra Dane radar, conventional radars

**Space surveillance systems:**

Mauui Optical Tracking Identification Facility, Ground-Based Electro-Optical Deep Space Surveillance System, Passive 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

Seven strategic missile wings (July 1, 1993)  
 Four space wings  
 Two space groups  
 Seven bases  
 Seven stations  
 More than 100 units worldwide

## PERSONNEL

Active-duty.....11,655  
 Officers.....2,875  
 Enlisted.....8,780  
 Civilian.....3,870  
 Contractor personnel.....14,500  
**Total**.....**30,025**

## UNIT

## BASE

21st Space Wing.....	Peterson AFB, Colo.....	Space- and ground-based early warning systems
30th Space Wing.....	Vandenberg AFB, Calif.....	Launch, tracking facilities for DoD, NASA, and commercial space launches; supports testing of DoD space and missile systems
45th Space Wing.....	Patrick AFB, Fla.....	Launch, tracking facilities for DoD, NASA, foreign government and commercial space launches; supports shuttle program and US Navy Trident tests
50th Space Wing.....	Falcon AFB, Colo.....	Command and control of DoD satellites
73d Space Group.....	Falcon AFB, Colo.....	Space surveillance
750th Space Group.....	Onizuka AFB, Calif.....	Worldwide network of satellite tracking and command stations

**The following wings will transfer to AFSPACECOM as of July 1, 1993:**

44th MW.....	Ellsworth AFB, S. D.....	Minuteman ICBM
90th MW.....	F. E. Warren AFB, Wyo.....	Minuteman and Peacekeeper ICBM
91st MW.....	Minot AFB, N. D.....	Minuteman ICBM
310th Test & Training Wing.....	Vandenberg AFB, Calif.....	Minuteman and Peacekeeper ICBM
321st MW.....	Grand Forks AFB, N. D.....	Minuteman ICBM
341st MW.....	Malmstrom AFB, Mont.....	Minuteman ICBM
351st MW.....	Whiteman AFB, Mo.....	Minuteman ICBM

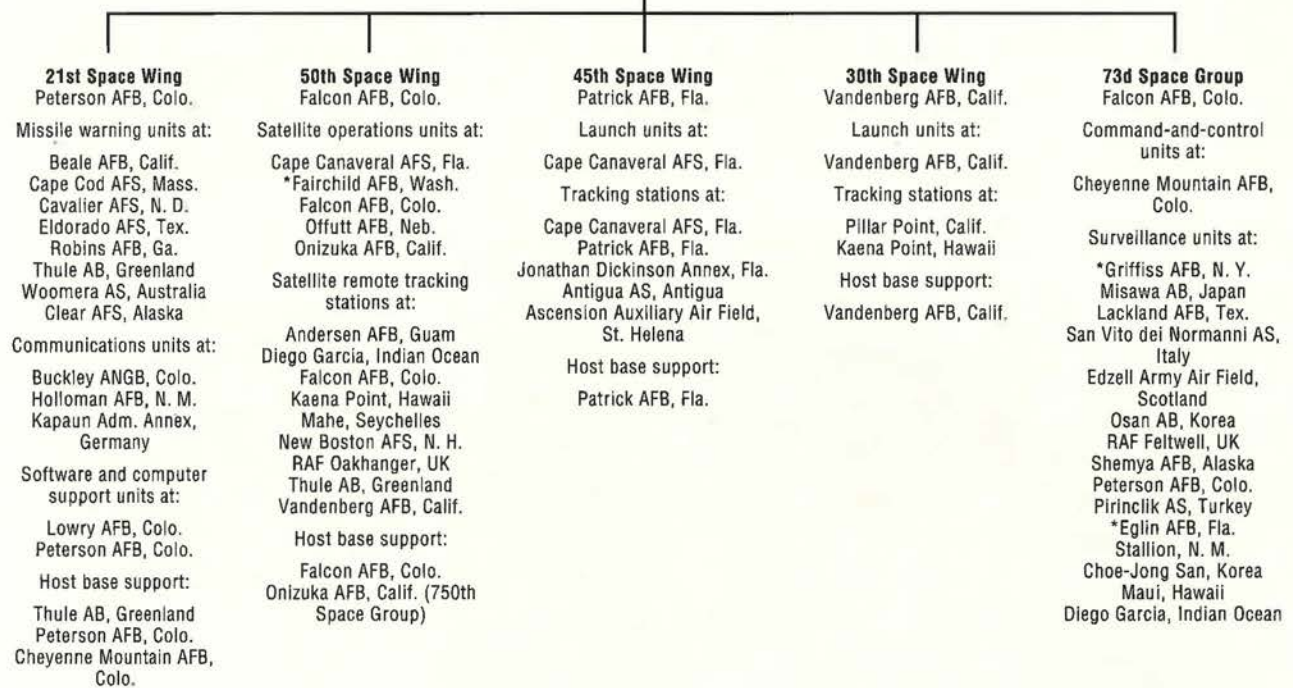
## COMMAND NOTES

Air Force Space Command is both an Air Force major command and USAF's component of United States Space Command, also headquartered at Peterson AFB, Colo. AFSPACECOM scans space for threats from satellites and keeps a catalog of more than 7,000 man-made space objects, launches dozens of US and allied satellites per year, and maintains their health and status to ensure they function flawlessly in support of warfighting operations.

## Air Force Space Command

Headquarters, Peterson AFB, Colo.

**Commander**  
Gen. Charles A. Horner



\*Tenant unit

# AFSOC

## Air Force Special Operations Command

**Headquarters** Hurlburt Field, Fla.

**Established** May 22, 1990

**Commander** Maj. Gen. Bruce L. Fister

### MISSIONS

**Serve** as the air 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

### EQUIPMENT

AC-130 Spectre gunships ..... 19  
MH-53 Pave Low helicopters ..... 36  
MH-60 Pave Hawk helicopters ..... 20

MC-130E Combat Talon I ..... 14  
MC-130H Combat Talon II ..... 8  
C-130A/E ..... 7  
EC-130 Volant Solo ..... 1  
HC-130 Combat Shadow ..... 22

### FORCE STRUCTURE

One special operations wing  
Two special operations groups  
One Special Operations School  
One Special Missions Operational Test and Evaluation Center  
One special tactics group  
One Reserve special operations wing  
One Reserve special operations group

### PERSONNEL

Active-duty ..... 7,707  
Officers ..... 1,163  
Enlisted ..... 6,544  
Reserve component ..... 2,808  
ANG ..... 1,053  
AFRES ..... 1,755  
Civilian ..... 417  
**Total** ..... 10,932

### OPERATIONAL ACTIVITY

Flying hours ..... 3,825 per month  
Many training exercises

**UNIT****BASE****WEAPONS**

1st SOW .....	Hurlburt Field, Fla. ....	MC-130E, AC-130H, MH-53J, HC-130N/P, MH-60G
352d SOG .....	RAF Alconbury, UK .....	MH-53J, HC-130N/P, MC-130E
353d SOG .....	Kadena AB, Japan .....	MC-130E, MH-53J (Osan AB), HC-130N/P

**COMMAND NOTES**

Two ANG and AFRES units augment AFSOC's operations. These are the Air National Guard's 193d SOG at Harrisburg, Pa., flying the EC-130E, and the Air Force Reserve's 919th SOW at Duke Field, Fla., flying the AC-130 Spectre. The 919th has a subordinate unit, the 71st SOS at Davis-Monthan AFB, Ariz. The Special Operations School, Special Missions Operational Test and Evaluation Center, and 720th Special Tactics Group report directly to AFSOC's commander.

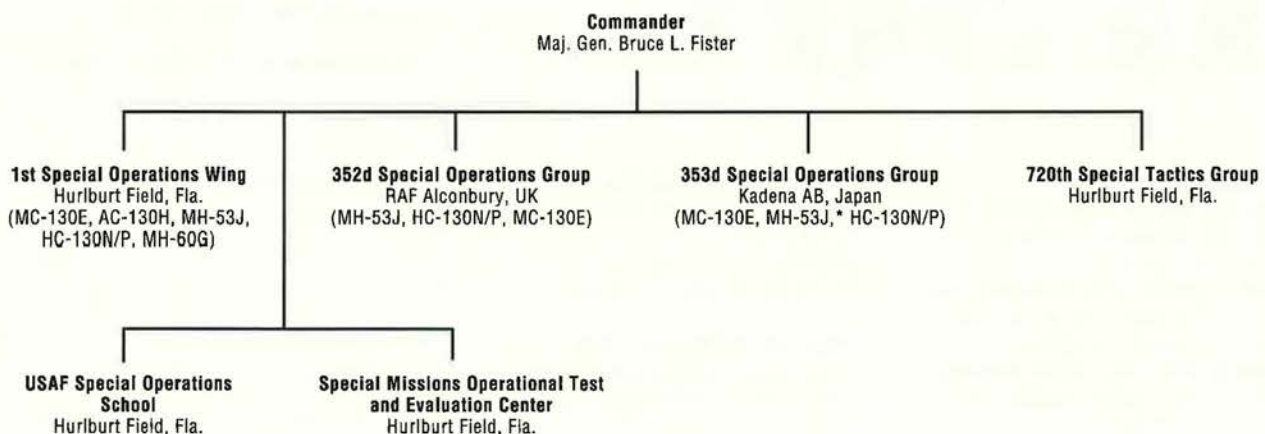
Staff photo by Guy Aceto



*An AC-130 of the 16th Special Operations Squadron at Hurlburt Field, Fla., moves out for a training exercise in applying ground-support firepower. Air Force Special Operations Command's operational training heavily involves Air National Guard and Air Force Reserve SOS units with active-duty forces.*

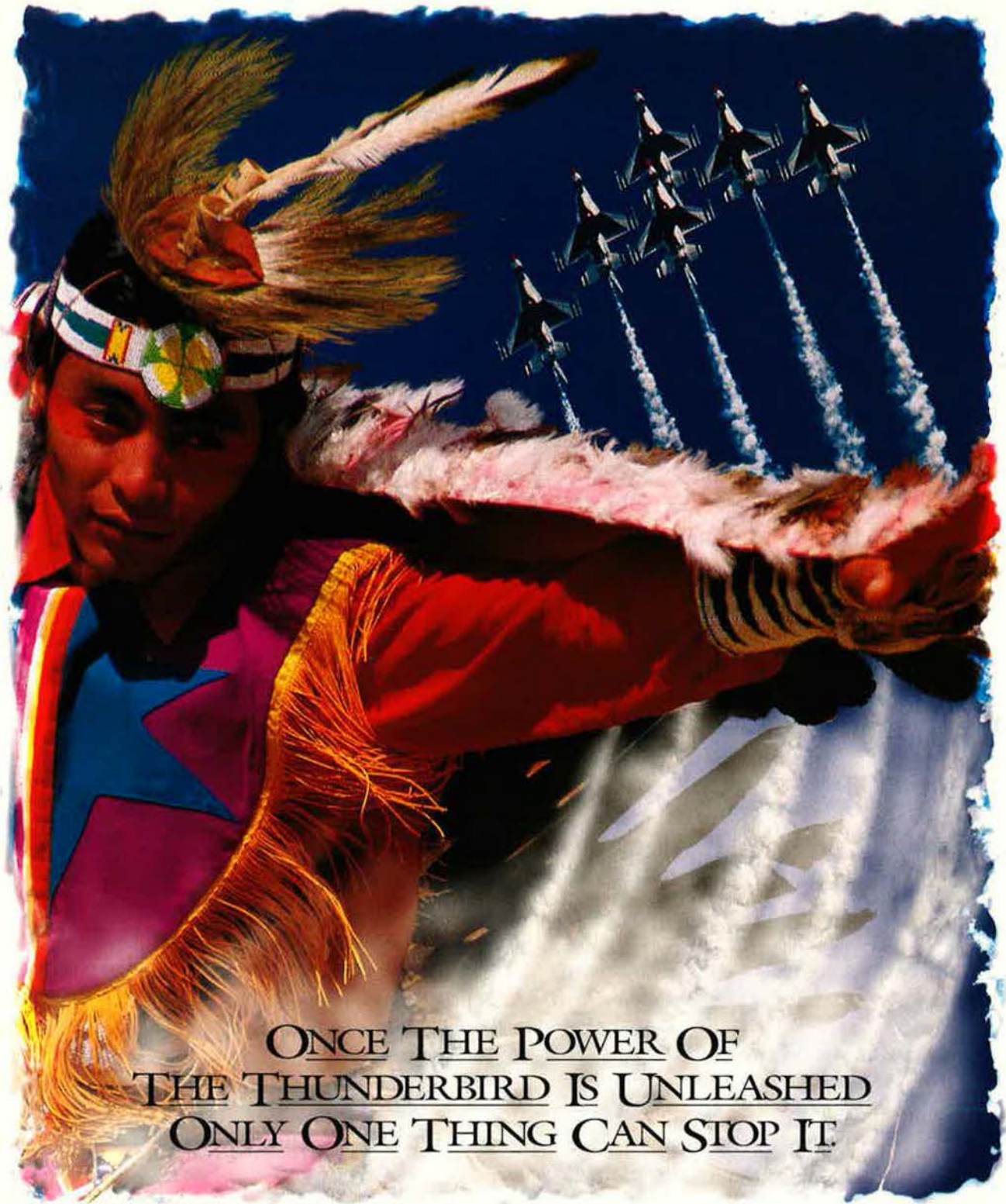
## Air Force Special Operations Command

Headquarters, Hurlburt Field, Fla.



\*The 353d SOG's MH-53Js are at Osan AB, Japan.





ONCE THE POWER OF  
THE THUNDERBIRD IS UNLEASHED  
ONLY ONE THING CAN STOP IT

Like their mystical Indian namesake, the Thunderbirds' F-16s wield a fearsome power, a power only a tough brake can tame. A lightweight brake that can handle high speed taxi stops and enhance performance on short, civilian runways. The legendary BFGoodrich SuperCarb™ carbon brake.

The BFGoodrich wheel & brake system derives its excellence from our exclusive SuperCarb™ carbon, our patented, field proven disc drive system, and the only wheels fully qualified for extended wear radial tires. BFGoodrich wheel and brake systems are designed for exceptional performance on all F-16 models, at a lower operating cost. Improved brake sensitivity, reduced vibration and superior stopping power along with high reliability are benefits available to all F-16 operators. So get more mission out of your F-16s with BFGoodrich wheels and carbon brakes, the system that masters the power of the Thunderbird.

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**BFGoodrich**

Aerospace

Aircraft Wheel & Brake Operations

# AMC

## Air Mobility Command

**Headquarters** Scott AFB, Ill.

**Established** June 1, 1992

**Commander** Gen. Ronald R. Fogleman

### 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  
**Provide** Stateside aeromedical evacuation missions

### EQUIPMENT

Mobility aircraft (C-5, C-141, C-130, KC-10, KC-135) ..... 784  
 Aeromedical evacuation (C-9) ..... 12  
 Other aircraft (C-9, C-12, C-20, C-21, VC-25, C-137, UH-1N, T-37, T-38) ..... 106

### FORCE STRUCTURE

Three numbered air forces:  
**15th**, March AFB, Calif.;  
**21st**, McGuire AFB, N. J.;  
**22d**, Travis AFB, Calif.  
 Nineteen wings (airlift, air refueling)

### PERSONNEL

Active-duty ..... 65,521  
 Officers ..... 11,619  
 Enlisted ..... 53,902  
 Reserve component ..... 87,164  
 ANG ..... 38,617  
 AFRES ..... 48,547  
 Civilian ..... 13,505  
**Total** ..... **166,190**

### OPERATIONAL ACTIVITY

Flying hours ..... 50,000+ per month

#### Major overseas deployments

Provide Comfort (Iraq)  
 Provide Promise (Bosnia)  
 Provide Hope II (former USSR)  
 Provide Relief (Somalia, Kenya)  
 Restore Hope (Somalia)

#### Major training exercises

Reforger, Dragon Hammer, Dynamic Guard, Battle Griffin (European Command)  
 Team Spirit, Cobra Gold (Pacific Command)  
 Ocean Venture, Carib series (Atlantic Command)  
 Intrinsic Action, Early Victor, Desert Star (Central Command)  
 Fuerzas Unidas, Fuerzas Caminos (Southern Command)

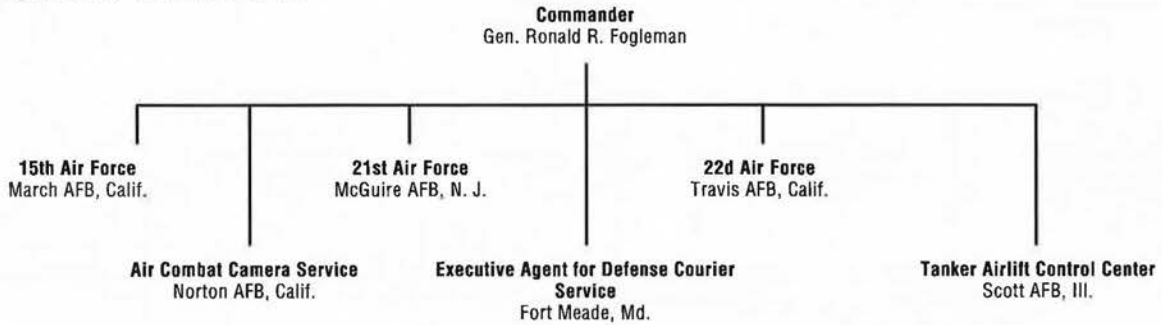


Photo by Geoffrey Pearce / Arms Communications

*An Air Mobility Command C-141B StarLifter gets a preflight physical exam. AMC's airlifters are constantly on the go around the world. AMC merges most assets of the former Military Airlift Command with some from the former Strategic Air Command. AMC's commander also heads US Transportation Command.*

UNIT	BASE	WEAPONS
19th ARW	Robins AFB, Ga.	KC-135
22d ARW	March AFB, Calif.	KC-10
43d ARW	Malmstrom AFB, Mont.	KC-135
305th ARW	Grissom AFB, Ind.	KC-135
380th ARW	Plattsburgh AFB, N. Y.	KC-135
65th SW	Lajes Field, Portugal (support)	—
89th AW	Andrews AFB, Md.	C-9, C-12, C-20, C-21, VC-25, C-135, C-137, UH-1
317th AW	Pope AFB, N. C.	C-130
436th AW	Dover AFB, Del.	C-5
437th AW	Charleston AFB, S. C.	C-141
438th AW	McGuire AFB, N. J.	C-141
60th AW	Travis AFB, Calif.	C-5, C-141
62d AW	McChord AFB, Wash.	C-141
63d AW	Norton AFB, Calif.	C-141
97th AMW	Altus AFB, Okla.	C-5, C-141, KC-135
314th AW	Little Rock AFB, Ark.	C-130
375th AW	Scott AFB, Ill.	C-9, C-12, C-21
463d AW	Dyess AFB, Tex.	C-130
542d CTW	Kirtland AFB, N. M.	UH-1N, HH-3, M/CH-53, TH-53A, M/HH-60, H/MC-130

**Air Mobility Command**  
Headquarters, Scott AFB, Ill.



**COMMAND NOTES**

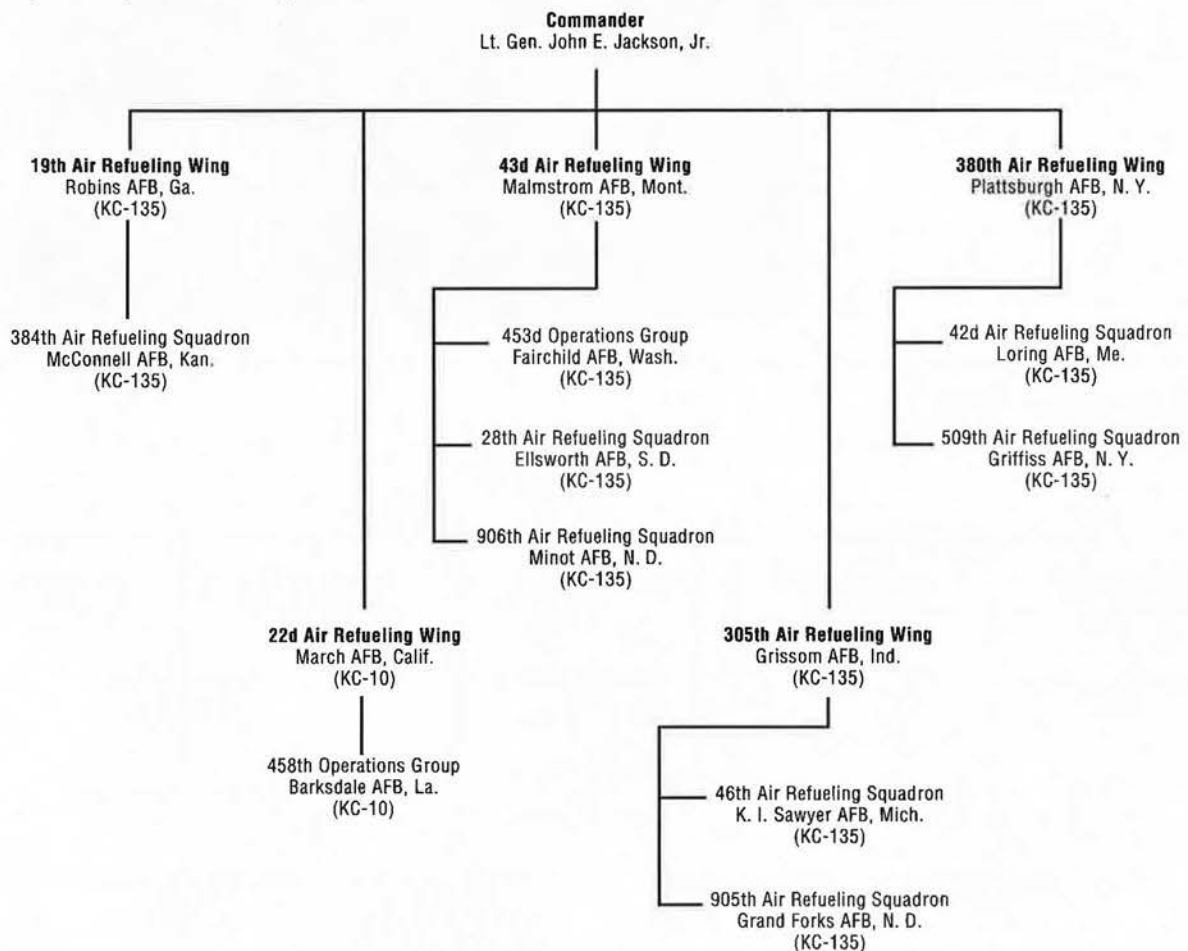
AMC combined most of the assets from the former Military Airlift Command with some from Strategic Air

Command. AMC has an annual operating budget of about \$5 billion. AMC's commander also serves as commander in chief of US Transportation

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

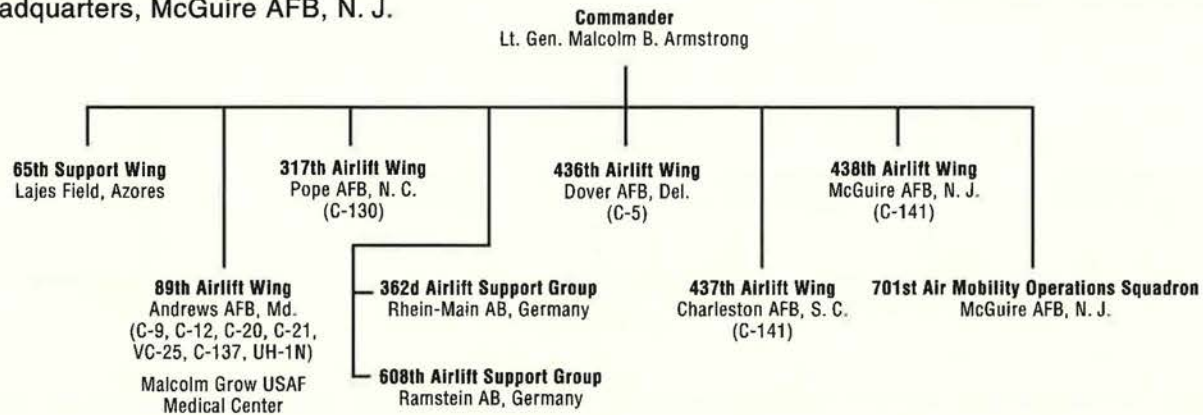
**15th Air Force (AMC)**

Headquarters, March AFB, Calif.



## 21st Air Force (AMC)

Headquarters, McGuire AFB, N. J.



*A C-5B engine undergoes inspection at Dover AFB, Del., home of AMC's 436th Airlift Wing. AMC becomes ever more important to the success of future US military operations as US units pull back from overseas bases and rely on airlift more heavily to respond to crises around the world.*

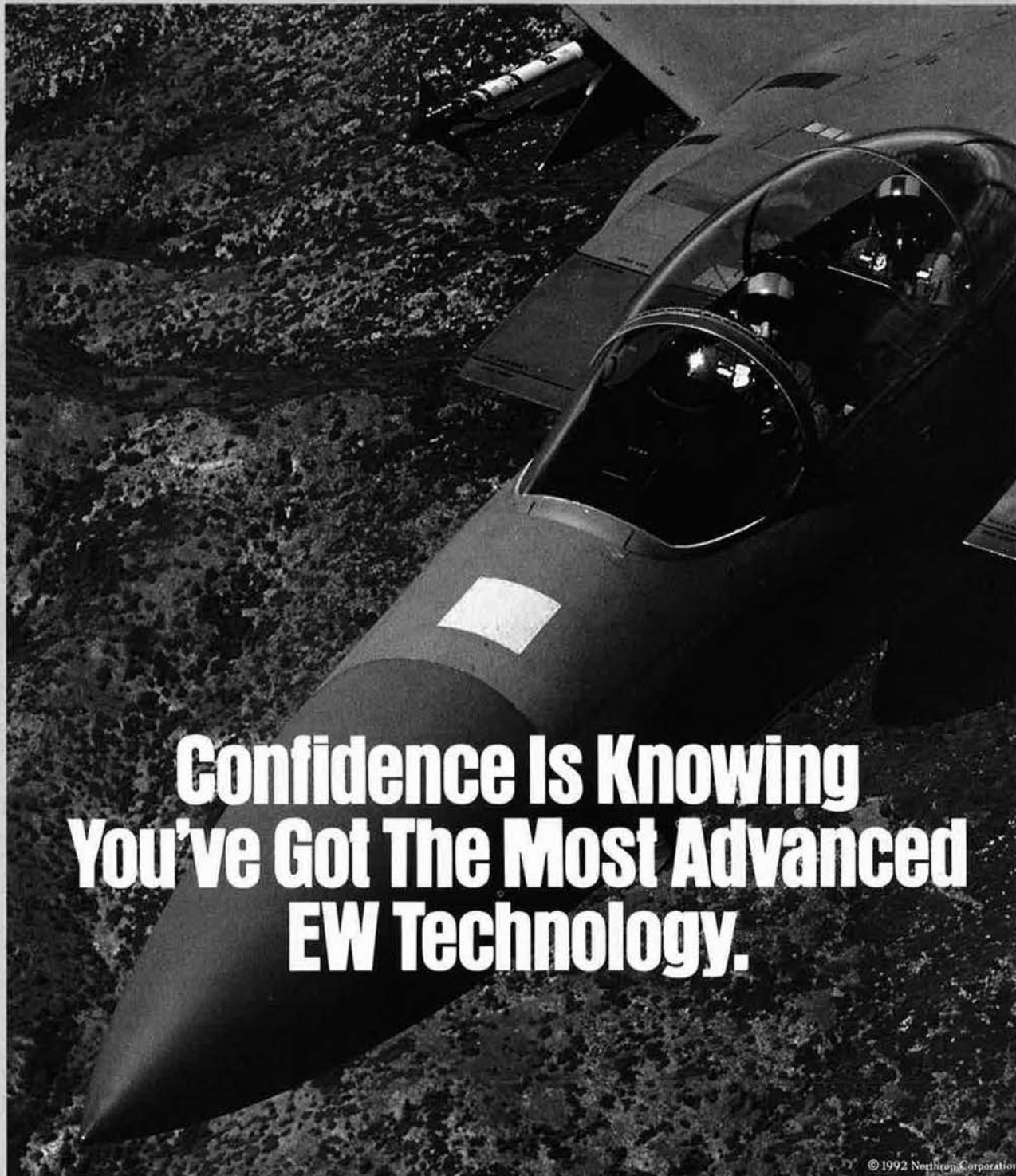


Photo by Paul Kennedy

## 22d Air Force (AMC)

Headquarters, Travis AFB, Calif.





# Confidence Is Knowing You've Got The Most Advanced EW Technology.

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It's no secret the F-15E Eagle is the most effective fighter in the world. No secret to anyone who's flown it. Or against it.

Equipped with AN/ALQ-135 radar jamming system, it's proven how tough it is to beat. The F-15E operates in the most hostile environments—where Northrop's AN/ALQ-135 is unparalleled

**THE AN/ALQ-135**

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**NORTHROP**

*We're Setting Our Sights Higher.*

The AN/ALQ-135: proven, and ready to take on whatever threats the future may bring.

# ATC

## Air Training Command

Deactivates July 1, 1993

**Headquarters** Randolph AFB, Tex.

**Established** April 15, 1946

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

### MISSIONS

**Recruit**, access, commission, and train USAF enlisted and officer personnel

**Provide** basic military training, initial and advanced technical training, officer training, and flying training to Air Force men and women, members of other US armed services, and members of allied nations' armed services

### COROLLARY MISSIONS

**Conduct** joint training in intelligence, navigator training, law enforcement, and fire fighting

**Conduct** training for medical services, security assistance, and readiness

**Operate** the Community College of the Air Force

### OTHER RESPONSIBILITIES

**Recall** of Individual Ready Reserve  
**Mobility** and contingency tasking support to combatant commands

### EQUIPMENT

T-1A trainers ..... 30  
T-37 trainers ..... 479  
T-38 trainers ..... 578  
T-41 trainers ..... 30  
T-43 trainers ..... 10

### FORCE STRUCTURE

Six training centers  
Eight training wings

### PERSONNEL

Active-duty ..... 31,346  
Officers ..... 7,319  
Enlisted ..... 24,027  
Reserve component ..... 664  
ANG ..... 8  
AFRES ..... 656  
Civilian ..... 11,728  
**Total** ..... **43,738**

### OPERATIONAL ACTIVITY

Flying hours ..... 36,133 per month

### Major overseas deployments

Operation Desert Storm  
Operation Southern Watch  
Operation Restore Hope

### Major competitions

Top Flight; Top Tech

### UNIT

12th FTW ..... Randolph AFB, Tex.  
14th FTW ..... Columbus AFB, Miss.  
47th FTW ..... Laughlin AFB, Tex.  
64th FTW ..... Reese AFB, Tex.  
71st FTW ..... Vance AFB, Okla.  
80th FTW ..... Sheppard AFB, Tex.  
82d FTW ..... Williams AFB, Ariz. (closes September 1993)  
323d FTW ..... Mather AFB, Calif. (closes September 1993)  
Chanute Technical Training Center ..... Chanute AFB, Ill. (closes September 1993)  
Goodfellow Training Center ..... Goodfellow AFB, Tex.  
Keesler Training Center ..... Keesler AFB, Miss.  
Lackland Training Center ..... Lackland AFB, Tex.  
Lowry Training Center ..... Lowry AFB, Colo. (closes September 1994)  
Sheppard Training Center ..... Sheppard AFB, Tex.

### BASE

### WEAPONS

T-37, T-38, T-41, T-43, T-1A  
T-37, T-38  
—  
T-37, T-38, T-1A  
T-37, T-38  
T-37, T-38  
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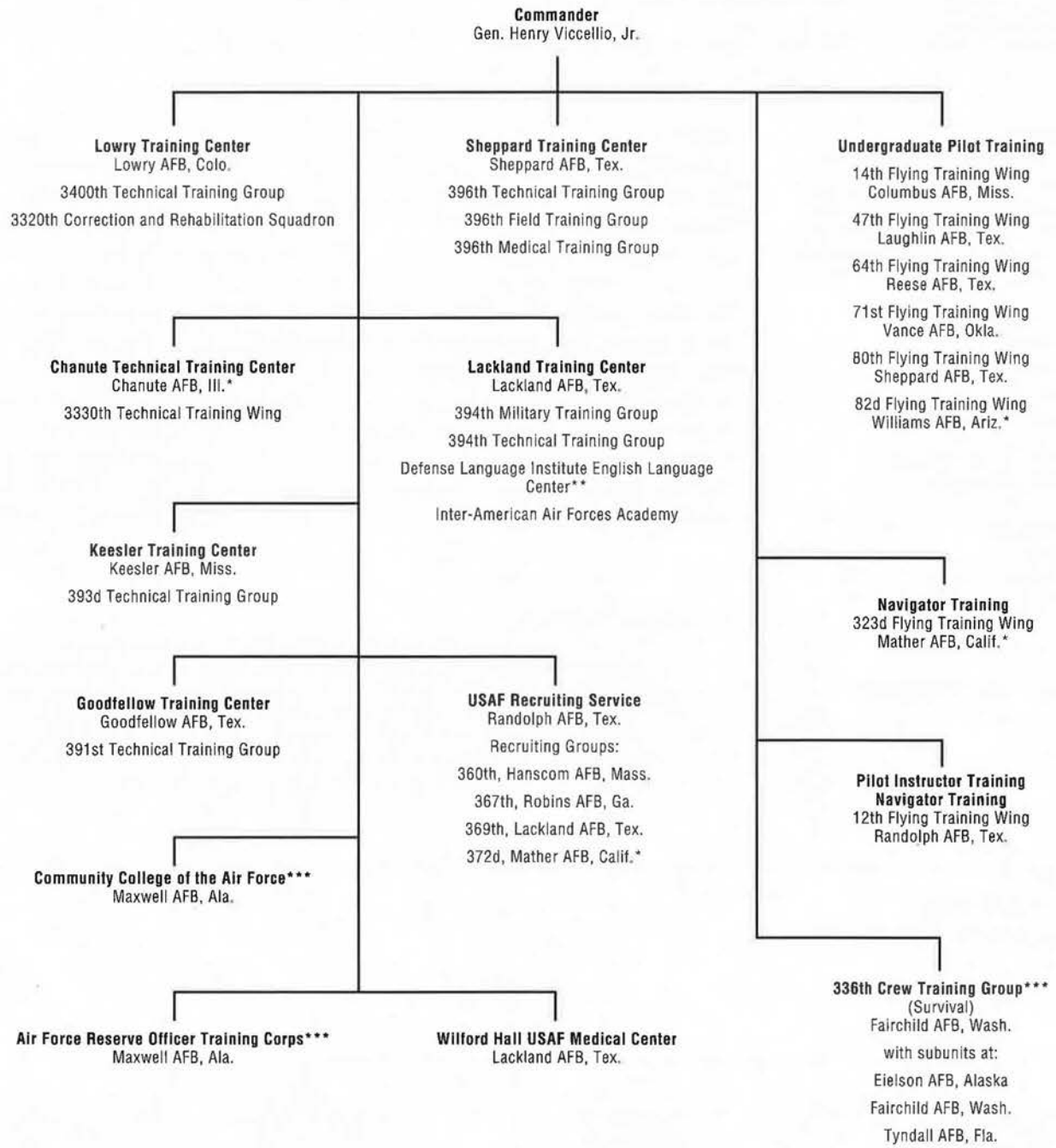
Photo by Randy Jolly / Arms Communications



*A student pilot and instructor pilot head for an advanced trainer at Sheppard AFB, Tex., home of Air Training Command's 80th Flying Training Wing. ATC is scheduled to give way on July 1, 1993, to the new Air Education and Training Command, incorporating ATC and Air University missions.*

# Air Training Command

Headquarters, Randolph AFB, Tex.



\*Base closes October 1, 1993.  
 \*\*DoD Executive Agent  
 \*\*\*Tenant unit

## COMMAND NOTES

The Air Force scheduled ATC to stand down on July 1, 1993, and to incorporate its missions (and those of Air University) into the new Air Education and Training Command, Randolph AFB, Tex. ATC's Air Force Recruiting Service recruited 35,100 nonprior-service, active-duty personnel in Fiscal 1992. In that year, ATC provided initial military training to more than 36,800 active-duty, ANG, and AFRES enlistees and commissioned 1,800 officers. ATC provided training in 1992 to 218,000 persons in 230 technical areas. ATC's undergraduate flying training programs graduated more than 1,900 pilots and 440 navigators.



**Headquarters** Maxwell AFB, Ala.

**Established** March 15, 1946

**Commander** Lt. Gen. Jay W. Kelley

**MISSIONS**

**Provide** professional military, graduate, and professional continuing education for officers, enlisted personnel, and civilians to prepare them for command, staff, leadership, and management responsibilities

**FORCE STRUCTURE**

- Nine schools
- Three centers
- Two institutes
- One library
- One wing
- One Hq. (Civil Air Patrol)
- One regional hospital

**PERSONNEL**

- Active-duty ..... 2,735
  - Officers ..... 1,038
  - Enlisted ..... 1,697
- Civilian ..... 1,520
- Total** ..... **4,255**

**STUDENT BREAKDOWN**

- Schools ..... 5,461
- Centers ..... 5,302
- Institutes ..... 264,591
- Total** ..... **275,354**

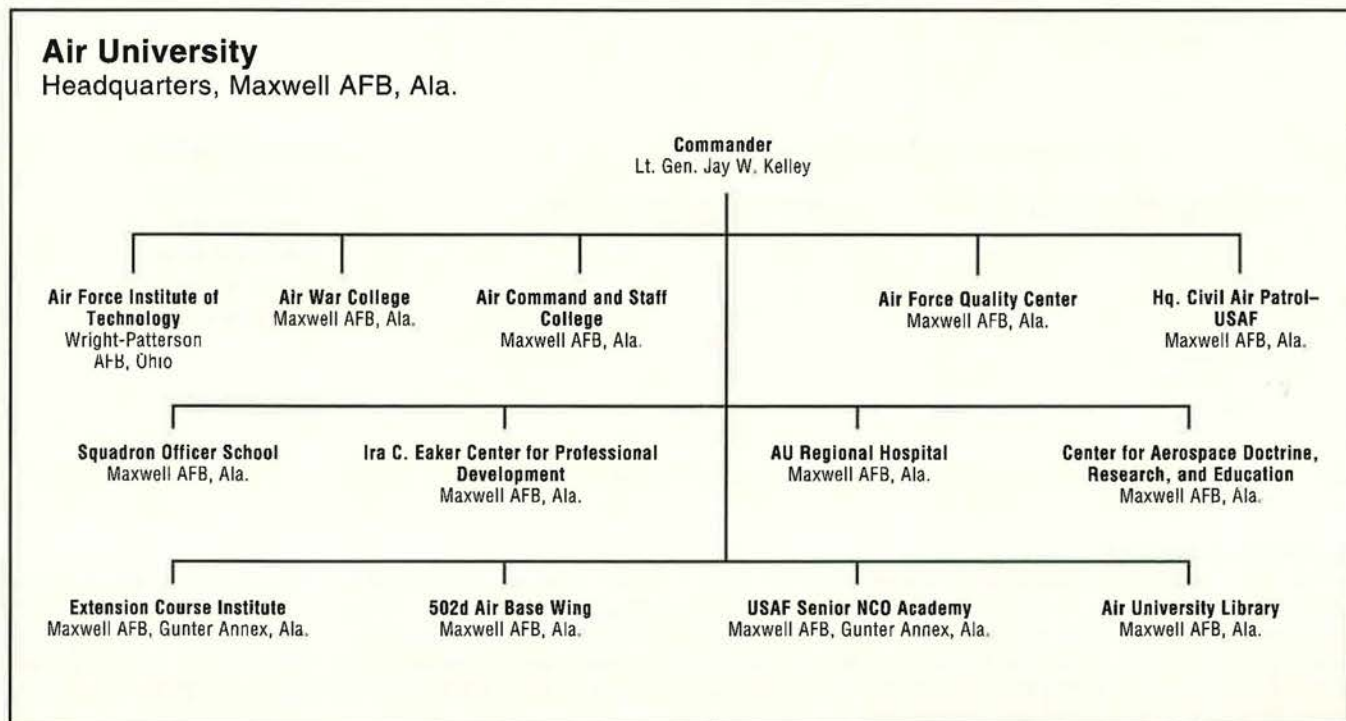
**UNIT**

- Air War College ..... Maxwell AFB, Ala.
- Air Command and Staff College ..... Maxwell AFB, Ala.
- Squadron Officer School ..... Maxwell AFB, Ala.
- USAF Senior NCO Academy ..... Maxwell AFB, Gunter Annex, Ala.
- Air Force Quality Center ..... Maxwell AFB, Ala.
- Center for Aerospace Doctrine, Research, and Education .. Maxwell AFB, Ala.
- Ira C. Eaker Center for Professional Development ..... Maxwell AFB, Ala.
- Air Force Institute of Technology ..... Wright-Patterson AFB, Ohio
- Extension Course Institute ..... Maxwell AFB, Gunter Annex, Ala.
- Air University Library ..... Maxwell AFB, Ala.
- Hq. Civil Air Patrol-USAF ..... Maxwell AFB, Ala.
- 502d Air Base Wing ..... Maxwell AFB, Ala.
- AU Regional Hospital ..... Maxwell AFB, Ala.

**BASE**

**COMMAND NOTES**

The Air Force scheduled AU to stand down on July 1, 1993, and to incorporate its missions (and those of Air Training Command) into the new Air Education and Training Command, Randolph AFB, Tex. Air University Library holds more than 511,000 military documents, 400,000 monographs and bound periodical volumes, 870,000 maps and charts, 150,000 current regulations and manuals, and 700,000 microforms. The Integrated Library System, which provides access to all books and most documents, is available to dial-in customers.





# PACAF

**Pacific Air Forces**

**Headquarters** Hickam AFB, Hawaii

**Established** July 1, 1957

**Commander** Gen. Robert L. Rutherford

## 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 (F-15C/D, F-15E, F-16C/D) .....252  
 OA-10 forward air controllers ..... 18  
 E-3 Airborne Warning and Control System aircraft ..... 4  
 KC-135 aerial refueling aircraft .... 13  
 Transport aircraft (C-9, C-12, C-21, C-130) ..... 47  
 Helicopters (UH-1, HH-3, HH-60) ..... 16

## FORCE STRUCTURE

Four numbered air forces:

- 5th**, Yokota AB, Japan;
- 7th**, Osan, South Korea;
- 11th**, Elmendorf AFB, Alaska;
- 13th**, Andersen AFB, Guam

Ten wings (five composite, two fighter, one airlift, two air base)

## PERSONNEL

Active-duty .....35,899  
     Officers ..... 4,073  
     Enlisted ..... 31,826  
 Reserve component .....3,700  
     ANG .....3,480  
     AFRES .....220  
 Civilian .....8,738  
**Total** .....**48,337**

## OPERATIONAL ACTIVITY

Flying hours ..... 116,000 per month

### Major overseas deployments

- Pitch Black
- Cope Sling
- Combat Archer
- Red Flag
- Green Flag

### Major training exercises

- Cope North
- Team Spirit



USAF photo by SMSgt. Bob Wickley

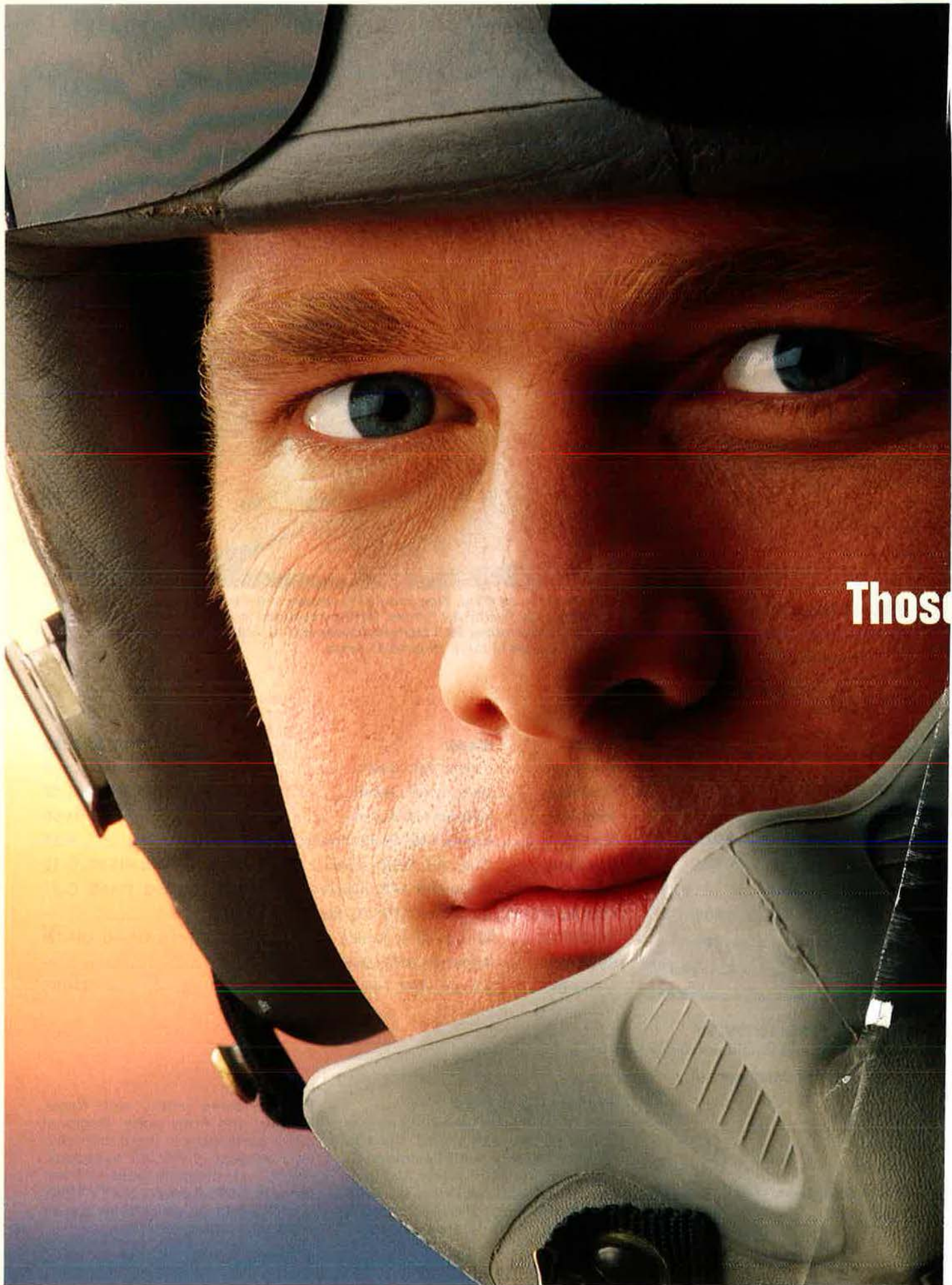
*F-15Cs of the 3d Wing, Elmendorf AFB, Alaska, are kept in top shape as part of combat-ready Pacific Air Forces. Having expanded to cover Alaska, PACAF last year acquired former SAC tankers, former MAC C-130 airlifters, and former TAC AWACS planes to form "objective" wings.*

UNIT	BASE	WEAPONS
374th AW	Yokota AB, Japan	UH-1N, C-130, C-21, C-9
18th Wing	Kadena AB, Japan	F-15, E-3, KC-135, HH-3, C-12
432d FW	Misawa AB, Japan	F-16, HH-60
8th FW	Kunsan AB, South Korea	F-16
51st Wing	Osan AB, South Korea	F-16, OA-10, HH-60, C-12
3d Wing	Elmendorf AFB, Alaska	F-15, C-130, E-3, F-15E, C-12
11th ACW	Elmendorf AFB, Alaska	—
343d Wing	Eielson AFB, Alaska	F-16, OA-10, UH-1N
633d ABW	Andersen AFB, Guam	—
15th ABW	Hickam AFB, Hawaii	C-135

## COMMAND NOTES

In 1992, PACAF acquired former Strategic Air Command KC-135 tankers, Military Airlift Command C-130 airlifters, and Tactical Air Command AWACS aircraft to form "objective" wings. PACAF conducts more than ninety percent of its train-

ing exercises jointly with Navy, Marine, and Army units. Regional allies participate in more than seventy percent of PACAF exercises. PACAF reenlistment rates for first-termers, at 66.3 percent in FY 1992, continued to be well above the Air Force average.



Those

**who give their best for America  
deserve to have only the best.**



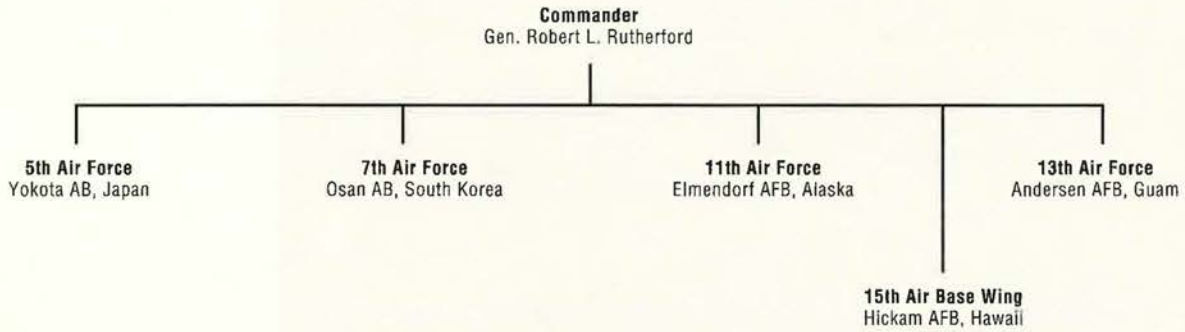
**PRATT & WHITNEY  
FOR JPATS**



**UNITED  
TECHNOLOGIES  
PRATT & WHITNEY**

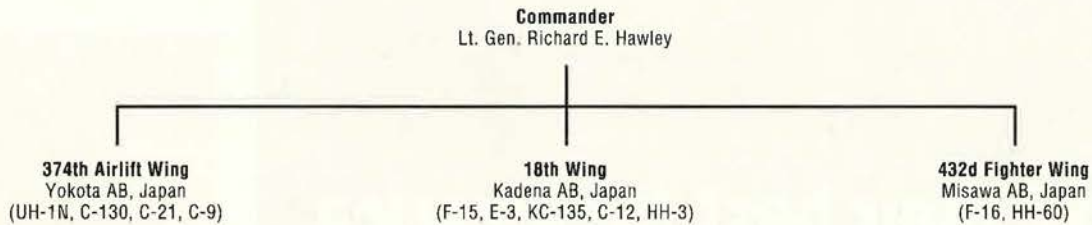
## Pacific Air Forces

Headquarters, Hickam AFB, Hawaii



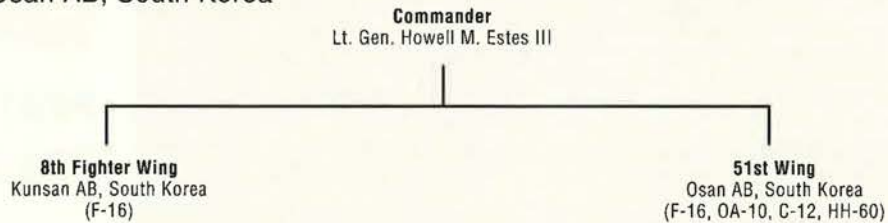
## 5th Air Force (PACAF)

Headquarters, Yokota AB, Japan



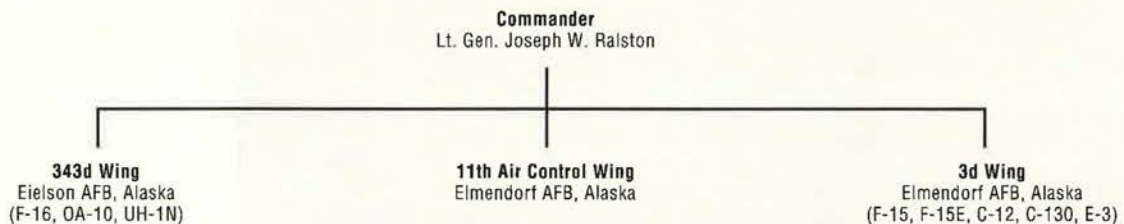
## 7th Air Force (PACAF)

Headquarters, Osan AB, South Korea



## 11th Air Force (PACAF)

Headquarters, Elmendorf AFB, Alaska



**13th Air Force (PACAF)**  
Headquarters, Andersen AFB, Guam

Commander  
Maj. Gen. H. Hale Burr, Jr.

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

**633d Air Base Wing**  
Andersen AFB, Guam

\*Tenant unit; base owned by Singapore government

# USAFE

## US Air Forces in Europe

**Headquarters** Ramstein AB, Germany

**Established** August 15, 1947

**Commander in Chief** Gen. Robert C. Oaks

### 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-4G, F-15A/B/C/D, F-16C/D) .....230  
Attack aircraft (A-10, OA-10, F-15E) ..... 108  
Other aircraft (tankers, transports, reconnaissance) .....50  
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 AB, Germany

**Thirteen wings** (eight fighter, two composite, one air refueling, one electronic combat, one control)

**Eight groups** (six air base, one fighter, one tactical)

**One squadron**

### PERSONNEL

Active-duty .....43,672  
Officers ..... 4,804  
Enlisted ..... 38,868



*SSgt. Mark Hatcher (right), a C-130 loadmaster with the 5th MAPS, RAF Mildenhall, UK, helps load supplies during an Operation Provide Hope mission to Moldova. USAFE joined other USAF commands in several humanitarian missions in 1992-93.*

Reserve component (ANG and AFRES) .....326  
Civilian .....8,108  
**Total** .....52,106

### OPERATIONAL ACTIVITY

Flying hours ..... 10,346 per month  
**Major training exercises:** Crested Cap, African Eagle, Ellipse Bravo, Med Flag, Diver Mist, Volant Partner, Direct Option/Digger Shift, Juniper Falcon, Sure Fire, Dragon Hammer, Center Enterprise, Display Determination, Exercise Teamwork, Wintex/

Cimex, Sola, Elder Forest, Busy Warrior, Salty Hammer, Oksboel, Baltops, Excalibur

### COMMAND NOTES

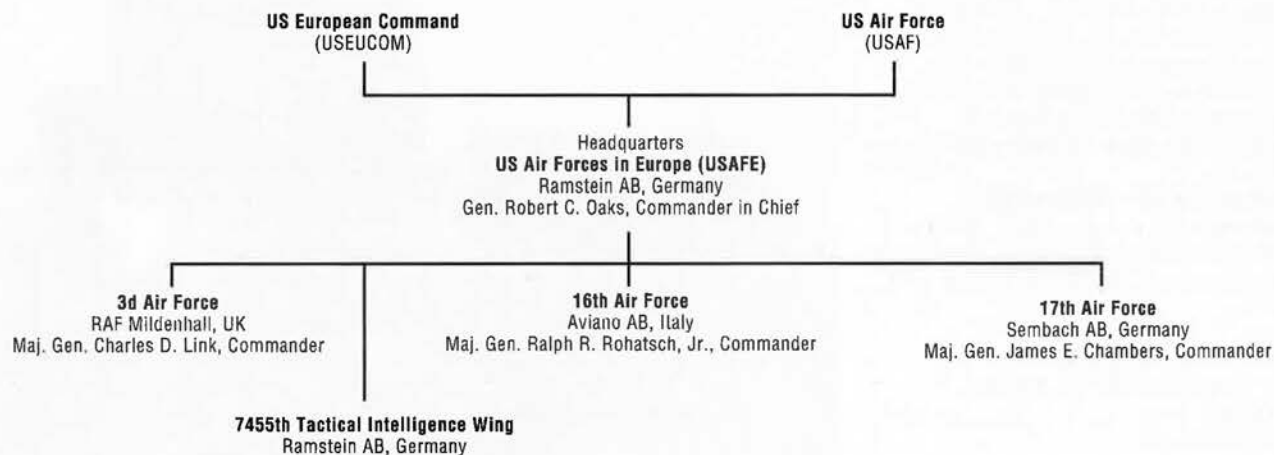
USAFE shares common systems, procedures, and training with Allied/NATO forces. Headquarters USAFE is collocated with Headquarters Allied Air Forces Central Europe (AAFCE), which operationally controls Immediate Reaction Forces, Rapid Reaction Forces, and Main Defense Forces of Allied nation air forces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

USAF photo by Capt. Andree Swanson

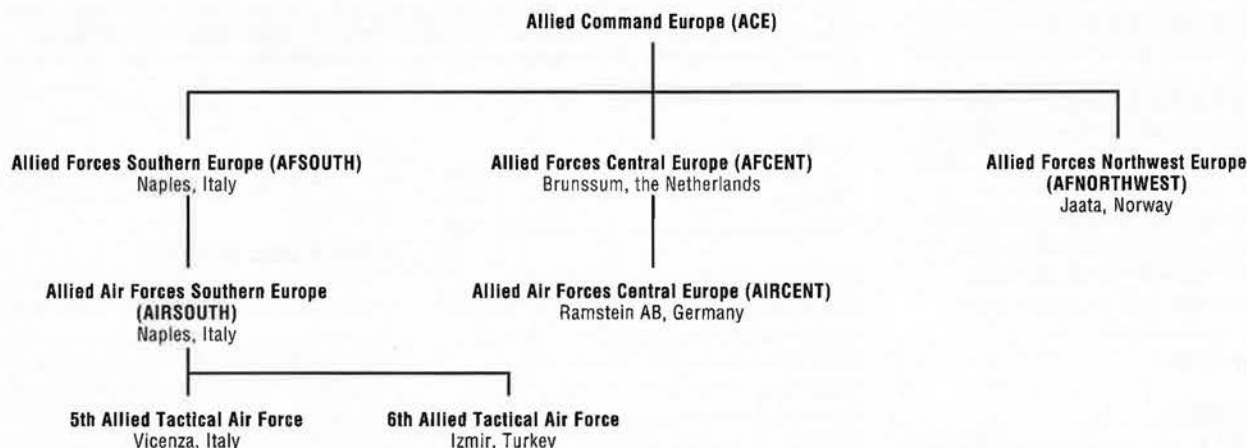
UNIT	BASE	WEAPONS
100th ARW	RAF Mildenhall, UK	KC-135
10th FW	RAF Alconbury, UK	U-2, MC-130, HC-130, MH-53
20th FW	RAF Upper Heyford, UK	F-15E
48th FW	RAF Lakenheath, UK	F-15E
81st FW	RAF Bentwaters, UK (inactivates September 1993)	
7274th ABG	RAF Chicksands, UK (communications)	—
401st FW	Aviano AB, Italy (rotational USAFE)	—
600th ABG	Torrejon AB, Spain	—
7276th ABG	Iraklion AB, Greece (communications)	—
7275th ABG	San Vito dei Normanni AS, Italy (communications)	—
39th TG	Incirlik AB, Turkey (rotational)	—
7241st ABG	Izmir AS, Turkey (communications)	—
7217th ABG	Ankara AS, Turkey (logistics)	—
601st Support Wing	Sembach AB, Germany (C <sup>3</sup> I)	—
32d FG	Soesterberg AB, the Netherlands	F-15C/D
52d FW	Spangdahlem AB, Germany	F-4G, A-10, OA-10, F-16C/D
435th AW	Rhein-Main AB, Germany	C-130E
36th FW	Bitburg AB, Germany	F-15C/D
86th FW	Ramstein AB, Germany	F-16C/D, C-9, C-12, C-20, C-21, T-43, UH-1N
7100th CSW	Lindsey AS, Germany (C <sup>3</sup> I)	—
7455th TIW	Ramstein AB, Germany	—

## US Air Forces in Europe

Headquarters, Ramstein AB, Germany

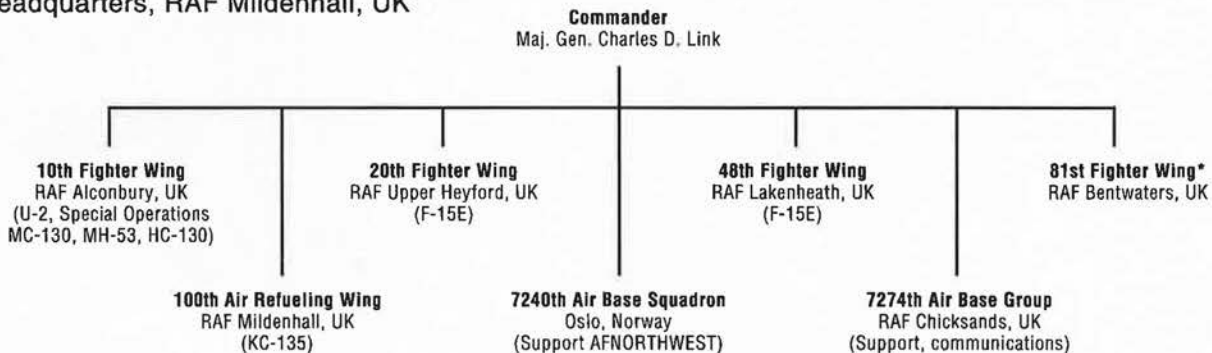


The USAFE organizational chart above shows peacetime lines of command. The chart below shows the NATO wartime command lines of authority.



### 3d Air Force (USAFE)

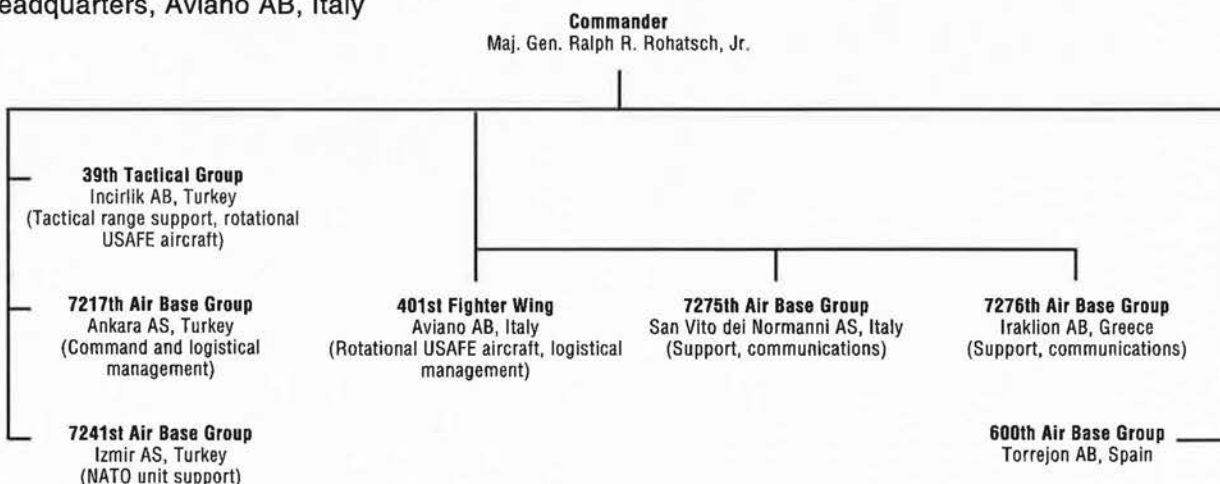
Headquarters, RAF Mildenhall, UK



\*Inactivates September 1993

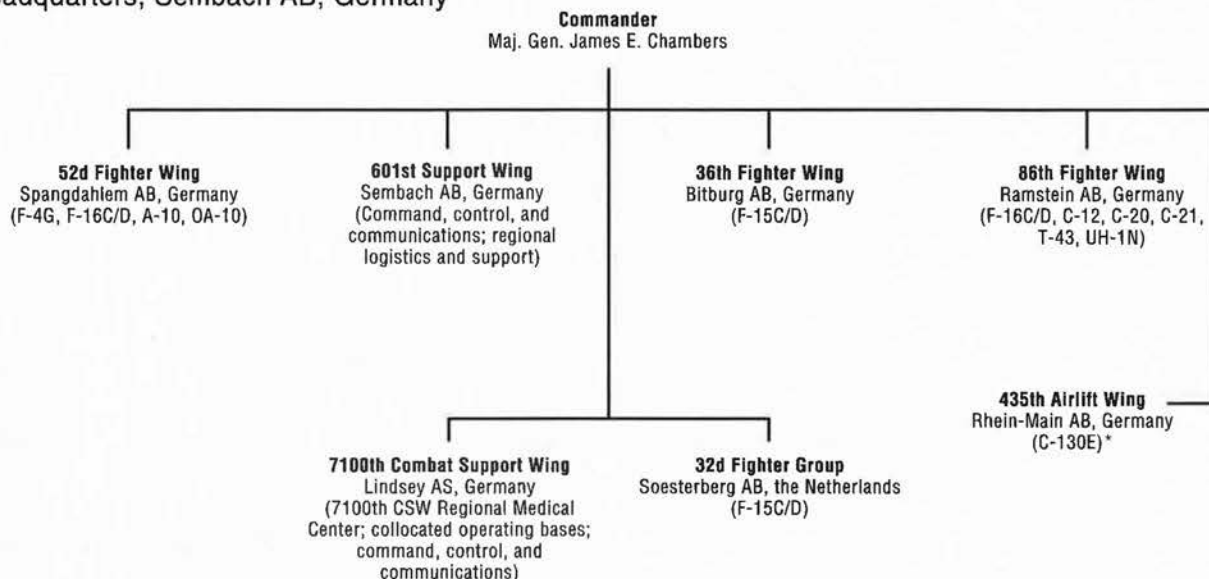
### 16th Air Force (USAFE)

Headquarters, Aviano AB, Italy



### 17th Air Force (USAFE)

Headquarters, Sembach AB, Germany



\*Effective July 1993, C-9As from the 435th Airlift Wing transfer to the 86th Wing.

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## Reports from the 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

The Air Force Audit Agency, headquartered in Washington, D. C., provides independent evaluations of managerial responsibilities (financial, operational, and support). Reports of audit evaluate the effectiveness, efficiency, and economy of Air Force program management.

The Auditor General of the Air Force, Jackie R. Crawford, reports directly to the Secretary of the Air Force. This enables AFAA to assess independently the activities and functions it audits.

The Auditor General and the staff directorates—Operations and Resource Management—are located in Washington, D. C.

AFAA's line operations are undertaken through three directorates.

The Acquisition and Logistics Audit Directorate, located at Wright-Patterson AFB, Ohio, directs the development and management of multisite

audits related to acquisition, weapon systems, supply, maintenance, transportation, foreign military sales, material financial management, and the computer systems of Air Force Materiel Command. The directorate is also responsible for the Materiel Audit Region at Wright-Patterson, which supervises its eleven area audit offices.

The Financial and Support Audit Directorate is currently located at Norton AFB, Calif., but will relocate to March AFB, Calif., during the last quarter of Fiscal Year 1993. This directorate oversees the development and management of multisite audits related to financial management; personnel; support services; command, control, communications, and computer systems; and morale, welfare, and recreation.

The Field Activities Directorate, located in Washington, D. C., manages

installation-level audit work at forty-five area audit offices (AAOs). In recognition of the restructuring of the Air Force major commands, this directorate was realigned July 1, 1992, to exercise supervision of the AAOs through three regional offices: the Eastern Audit Region, Langley AFB, Va.; the Central Audit Region, Scott AFB, Ill.; and the Western Audit Region, Randolph AFB, Tex.

AFAA has nearly 800 people. Implementation of the 1990 decision to convert all military positions to civilian positions in 1991-94 has resulted in a current civilian-to-military ratio of about twenty to one. Of the auditors assigned, ninety-nine percent have at least one college degree and forty-two percent have graduate degrees. Twenty-seven percent of the agency's auditors are certified public accountants, certified internal auditors, and/or certified information system auditors.

### Air Force Base Disposal Agency

The Air Force Base Disposal Agency was activated by the Secretary of the Air Force on November 15, 1991. Headquartered in Washington, D. C., the new field operating agency is attached to the Office of the Assistant Secretary of the Air Force for Manpower, Reserve Affairs, Installations, and Environment. AFBDA serves as the federal real property disposal agent and provides integrated execution management for Air Force bases in the US as they are closed under the delegated authorities of the Base Closure and Realignment Act of 1988 and the Defense Base Closure and Realignment Act of 1990. The major air commands are responsible for running their installations and terminating or shifting military missions to other units, up to the base closure date. Thereafter, in-

stallations are transferred to AFBDA for final disposition.

AFBDA works closely with state and local reuse commissions, committees, and special authorities created to develop viable reuse opportunities to minimize the economic impact of base closings.

AFBDA comprises an Office of the Director, a professional services staff, executive services specialists, program managers, and base operating locations. The professional and executive services staffs are designed to make AFBDA self-sufficient, with expertise in environmental and real estate law, real and personal property, environmental cleanup and compliance, resource management, facility maintenance, operations management, public affairs, legislative liai-

son, civilian personnel and manpower, and information systems.

Program managers (PMs) are responsible for all aspects of cleanup, installation management, and disposal of several bases. They are aligned along standard regional lines adopted by the federal government to facilitate cooperation and coordination among various agencies involved in base closings, particularly the Environmental Protection Agency. Reporting to the PMs are base-level operating locations that have been established to coordinate environmental cleanup, reuse planning with local communities, caretaker responsibilities, and property disposal both before and after closure.

When it closed Pease AFB, N. H., on March 31, 1991, USAF became

the first service to close an installation under the new base closure laws. The base has been maintained, operated, and managed by AFBDA since

April 1, 1991, following its transfer from Strategic Air Command. Eaker AFB, Ark., England AFB, La., and George AFB, Calif., were closed in

1992. Seven bases are scheduled to close in 1993, seven in 1994, and the last base on the current closure lists in 1995.

## Air Force Center for Environmental Excellence

Established July 23, 1991, at Brooks AFB, Tex., the Air Force Center for Environmental Excellence brought together environmental activities, resources, and Air Force expertise to handle environmental cleanup and compliance. AFCEE also provides management support for military construction projects and promotes good quality in the design of Air Force installations and facilities.

The center is directed by a member of the Senior Executive Service. He heads a work force of about 345 military and civilian personnel—primarily professionals in the scientific and technical fields.

AFCEE has three operational directorates.

Environmental Services' responsibilities are remediation, compliance, pollution prevention, and environmental planning. The directorate fulfills its critical mission with a team of experts in a wide variety of technical and scientific disciplines, from hydrology and geology to chemistry and

engineering. The largest AFCEE directorate, Environmental Services consists of the Base Closure Restoration, Consultant Operations, Defense Environmental Restoration Account, Environmental Data Management, Environmental Planning, Execution Support, Pollution Prevention, and Technology Transfer divisions.

Construction Management is responsible for design and construction management of the military construction program for designated Air Force commands, the Air Force Reserve, and all Air Force wastewater treatment and medical facilities. The directorate provides design and construction services for military family housing projects as requested by the major commands.

Achieving excellence in facility design is the mission of the Air Force Design Group. The directorate provides commanders with a variety of professional services, including architectural design, interior design, and

base comprehensive planning. The directorate's specialized assistance teams make recommendations on issues ranging from base master planning and architectural compatibility to landscape design.

In addition to its operational directorates, AFCEE is assisted by the Contract Support Directorate, which provides the center with dedicated environmental contracting. Using innovative contracting strategies, Contract Support helps the center respond quickly to the needs of its customers, no matter where the job is or what it entails.

In Fiscal Year 1992, AFCEE issued more than 200 delivery orders, obligating \$157 million against existing contracts.

AFCEE maintains regional compliance offices in Atlanta, Dallas, and San Francisco. These offices represent the Air Force before federal, state, and local regulatory agencies in Environmental Protection Agency Regions I through X.

## Air Force Civil Engineering Support Agency

The Air Force Civil Engineering Support Agency, headquartered at Tyndall AFB, Fla., is responsible for providing civil engineering technical and professional support to the Air Force.

AFCEA reports directly to the Office of the Civil Engineer at Hq. USAF and provides its customers with products and processes dealing with readiness, fire protection, maintenance, systems engineering, communications-computer systems, construction cost management, and executive services.

The Readiness Directorate establishes the standards for the wartime and peacetime management of civil engineering contingency operations involving personnel from Prime BEEF (Base Emergency Engineering Force)

and RED HORSE (Rapid Engineer Deployable, Heavy Operational Repair Squadron, Engineer) units and explosive ordnance disposal and disaster preparedness personnel.

The Fire Protection Directorate provides fire-fighting and operational personnel with improved, environmentally safe, and economical firefighter training methods, innovative and more effective extinguishing agents, and professional firefighter certification.

The Maintenance Directorate has a civil engineering maintenance, inspection, and repair team that provides mission-critical power production assistance and support services; a pavements team that takes its specialized equipment around the globe to perform critical airfield evaluations;

and a birdstrike hazard team that performs accident investigations and other services.

The Systems Engineering Directorate's infrastructure responsibilities combine systems operations and maintenance with design and construction standards. It develops standards for integrated engineering graphics systems and for electrical, mechanical, and civil engineering and implements the Air Force Energy Program.

The Construction Cost Management Directorate produces independent cost analyses on major weapon systems acquisition programs and develops cost models for environmental recovery. It streamlined estimating capabilities by developing and patenting the Construction Cost Management Analysis System and will soon imple-

ment the Triservice Automated Cost Engineering System.

The Communications-Computer Systems Directorate supports field activi-

ties by developing and maintaining computer systems software and managing the worldwide AMMUSNET telecommunications network.

The Executive Services and Quality Improvement Directorates provide internal staff support and advice on unit productivity, respectively.

## Air Force Civilian Personnel Management Center

The mission of the Air Force Civilian Personnel Management Center, Randolph AFB, Tex., is to manage, operate, and support Air Force civilian personnel programs and systems. These affect more than 214,000 civilian employees, including foreign nationals, at Air Force installations worldwide. AFCPMC, formerly the Office of Civilian Personnel Operations, was established in 1986. It is organized into two divisions: Integrated Systems Management and Career Management. Each plays an integral role in the personnel life-cycle management of the civilian resource.

The Integrated Systems Management Division is the Air Force's focal point for civilian personnel systems management. It determines civilian personnel requirements and ensures that they are met, either by developing systems in-house or arranging for their development and maintenance by other organizations. It oversees civilian personnel systems manage-

ment staff worldwide. It keeps abreast of changing technology to plan and improve civilian personnel management support.

The Career Management Division helps identify civilian executive positions that need to be centrally managed for job referral and training. It provides a pool of career employees with strong skills in professional, technical, management, and administrative fields.

In addition to managing the white-collar employee pool through career programs, the Career Management Division formulates and administers three recruiting programs to develop future civilian leaders in the Air Force. The Palace Acquire program recruits and trains recent college graduates with degrees in a variety of technical or managerial disciplines for duty in most occupations used by the Air Force. The Palace Knight program recruits and trains scientists and engineers capable of assuming research

and development leadership roles in the increasingly technical Air Force. The Copper Cap program recruits and trains individuals for contract management and oversight roles in the procurement process.

The Career Management Division interacts with the Air Staff in developing and administering Air Force civilian education and training budgets. It helps civilian personnel managers find the right school or course for employees' educational needs.

Twelve Career Management Division programs are now in effect: Financial Management; Civil Engineering; Public Affairs; Logistics; Manpower and Personnel, which includes education, technical training, and family matters; Morale, Welfare, Recreation, and Services; Contracting and Manufacturing; Communications-Computer Systems; Safety, Security, and Special Investigations; Information Management; Scientist and Engineer; and Acquisition Program Management.

## Air Force Combat Operations Staff

The Air Force Combat Operations Staff is a field operating agency commanded by a colonel who reports to the USAF Director of Operations (AF/XOO). Its readiness-oriented, combat-related staff structure supports the Chief of Staff of the Air Force and the deputy chief of staff for Plans and Operations (AF/XO) in their roles as member, Joint Chiefs of Staff (JCS), and Air Force operations deputy to the JCS, respectively.

AFCOS keeps a twenty-four-hour watch on current operations and the world situation and handles emergency actions through the Air Force Operations Support Center (AFOSC), in constant contact with the JCS National Military Command Center, USAF major commands, and other FOAs. This group forms the permanent nucleus of a centralized, responsive,

and integrated combat support structure, the Hq. USAF Crisis Action Team.

AFCOS provides facilities, policy, procedures, and staffing during crises, contingencies, and exercises. During such times, the Chief of Staff, AF/XO, or AF/XOO can direct the AFCOS commander to activate the Crisis Action Team. The team then operates around-the-clock, providing rapid reaction staffing of Chief of Staff taskings and of requests by USAF major commands providing forces for unified or specified command operations.

The Crisis Action Team normally operates from dedicated facilities in the AFOSC, although in the event of imminent attack on the US, AFCOS could move to alternate sites for survivability and continuity of essential headquarters functions. The Crisis

Action Team was activated for the entire seven months of Operations Desert Shield and Desert Storm.

AFCOS also provides management and staffing for many other activities. A situation and combat readiness reporting capability tracks the status of all Air Force combat and combat support forces. AFCOS develops USAF counterdrug policy, guides counterdrug program management, and regulates counterdrug operations. It manages programming and policy for Air Force wargaming and for participation in JCS exercises. It maintains the Chief of Staff's briefing team. It provides operational weather support for the White House and the joint staff as well as several other Washington-area federal agencies.

A total of 254 personnel in the AFCOS and ten Air Staff functions

can be called on in peacetime or wartime to meet AFCOS support requirements for the Chief of Staff. Those Air Staff functions are represented by the AFCOS directors of

Operations, Plans, Logistics, Manpower and Personnel, Intelligence, Civil Engineering, Security Police, and Information-Systems Management. The chiefs of the Medical Readiness

Division and the Chaplain Response Forces are also members of AFCOS. The Air Force Reserve and Air National Guard are fully integrated into AFCOS.

## Air Force Communications Command

Air Force Communications Command, Scott AFB, Ill., harnesses the technologies of computers and communications systems to support the Air Force. It is responsive to the Air Force deputy chief of staff for Command, Control, Communications, and Computers. AFCC is commanded by Maj. Gen. John S. Fairfield.

AFCC obtains standard communications and computer systems, develops guidelines for their use, and ensures their integration and interoperability. AFCC is the life-cycle manager for USAF-wide standard automation systems, including computer hardware and software, and manages the standard contracts for off-the-shelf products.

The Standard Systems Center at Maxwell AFB, Gunter Annex, Ala., is the primary Air Force organization for the development, acquisition, and

life-cycle support of standard computer systems. It manages nearly 200 programs. Aircraft maintenance, command and control, weather, security police, supply, and transportation are a few of the Air Force functions using systems developed by the Standard Systems Center.

The Communications Systems Center at Tinker AFB, Okla., is the Air Force's single manager for engineering and installing communications and air traffic control systems and facilities around the world. Its systems telecommunications engineering managers evaluate and interpret major command C<sup>4</sup> systems templates and develop blueprints of and for C<sup>4</sup> infrastructures for Air Force bases. Security systems, navigational aids, weather systems, modern telecommunications systems, and computer networks are a few enhancements that the Com-

munications Systems Center has provided customers through its eight active-duty units and nineteen Air National Guard units.

The Base Information Digital Distribution System program, managed by the center's Communications Systems Program Office at Scott AFB, is replacing outdated telephone switching systems and base distribution systems. This program is aimed at improving the most frequently used service at any base: the telephone.

The Telecommunications Certification Office at Scott AFB purchases more than \$400 million worth of telecommunications services from commercial companies to meet the Air Force's annual long-distance needs. It combines leased transmission services with purchased networking equipment to improve service and keep operating costs down.

## Air Force Cost Analysis Agency

The Air Force Cost Center was established in 1986 to analyze, estimate, and validate the cost of executing the Air Force's total program. In 1991, it was redesignated the Air Force Cost Analysis Agency. The agency, located in Arlington, Va., near the Pentagon, reports directly to the assistant secretary of the Air Force (Financial Management and Controller).

AFCAA's primary mission is to conduct Air Force Component Cost Analyses (CCAs), formerly Independent Cost Estimates, for major defense weapon system acquisition programs and major automated information systems as required by public law and DoD directives. Major Air Force systems include aircraft, space, missile, booster, munitions, communications, information, and electronic programs. These analyses are used for individual

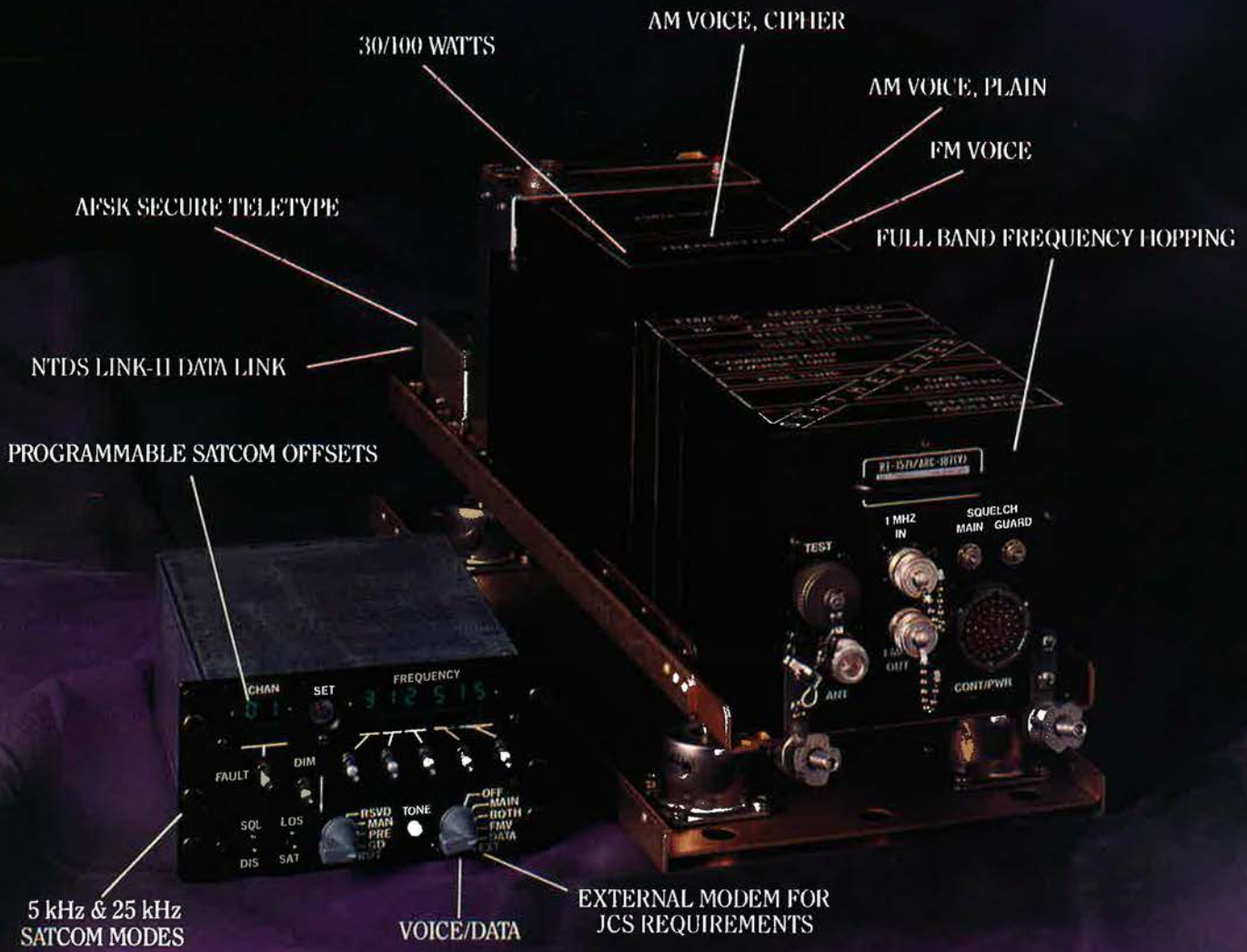
system program decisions and, collectively, to postulate and advocate major force mix plans.

A CCA is a complete life-cycle cost estimate of a program, separate from the program office estimate and using different cost-estimating methodologies. These independent cost estimates are compared to the estimates prepared by field program offices to establish the Air Force's official position on program costs for Defense Acquisition Board consideration and subsequent budget requests to Congress.

AFCAA consists of five divisions organized predominantly along weapon system product lines. The Space Programs Division; Aircraft Programs Division; C<sup>3</sup>I Programs Division; and Boosters, Missiles, and Munitions Programs Division perform CCAs. The Program Control Division adminis-

ters the agency's budget and contracts, develops and monitors the agency's cost-research program supporting CCA mission requirements, and maintains the agency's cost-research library.

AFCAA also conducts cost analyses for the Office of the Secretary of Defense, the Secretary of the Air Force, the Air Force Acquisition Executive, Program Executive Officers, and other senior executives in support of Defense Department planning, programming, and budget execution. The agency also participates in the development and implementation of cost analysis policies and procedures USAF-wide. AFCAA maintains a viable cost-research program and develops and distributes to all Air Force activities cost models, methodologies, and databases necessary to ensure credible cost estimates and analyses.



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## Air Force Flight Standards Agency

The Air Force Flight Standards Agency was activated October 1, 1991, as a field operating agency reporting to the Director of Operations, Hq. USAF. It manages the interoperability of civil and military airspace and air traffic control (ATC) systems to ensure worldwide combat and peacetime capabilities. Through its various components, the agency develops and maintains standards and procedures for flight operations, ATC, aeronautical information, flight planning, Notice to Airmen, and navigation and landing systems worldwide. In addition, the agency facilitates the development of common civil and military airspace.

The following components are part of AFFSA: a headquarters element, Federal Aviation Administration (FAA) liaison, Instrument Flight Center, Flight Inspection Center, and Air Traffic Services Center.

The headquarters element at the

Pentagon directs and coordinates the agency's activities. It works with the other services and civil aviation organizations both nationally and internationally to provide Air Force input on issues affecting military flight operations.

At FAA headquarters in Oklahoma City, Okla., the FAA liaison component maintains continuous contact among the Air Force, other services, Hq. FAA, and nine FAA regional offices.

The Instrument Flight Center at Randolph AFB, Tex., serves as the focal point and authority for all USAF instrument flight functions.

The Flight Inspection Center at FAA headquarters maintains combat-ready aircrews and operates various FAA aircraft to conduct global flight inspection of navigation systems, airfields, and instrument-approach procedures.

The Air Traffic Services Center at Scott AFB, Ill., serves as the Office of

Primary Responsibility for all air traffic services and airfield management, including guidance, standardization and integration for procedures, systems management, training, and mission support.

AFFSA is the Air Force's Office of Primary Responsibility for awareness of technological, organizational, and regulatory change proposals in other services, the FAA, the International Civil Aviation Organization, and foreign ATC systems. It consolidates major commands' airspace planning documents for DoD and interagency review and maintains flight standard regulations and instrument procedures for approval of the Air Force Director of Operations. The agency also assists the major commands and the National Guard Bureau in coordinating with the FAA on major exercises, special-use airspace, and military training routes.

## Air Force Frequency Management Agency

The Air Force Frequency Management Agency implements USAF's use of the radio frequency electromagnetic spectrum. AFFMA develops and implements procedures pertinent to frequency spectrum use on a national, international, and government-to-government basis within the scope of established rules and regulations as well as bilateral and international agreements. AFFMA represents the Air Force in various national and international forums concerning the radio-frequency spectrum.

On October 1, 1991, AFFMA was realigned organizationally as an FOA. AFFMA is commanded by Lt. Col. William A. Belote, Jr., and has twelve officers, twelve enlisted, and twenty civilians authorized. AFFMA operates the Interservice Radio Frequency

Management School at Keesler AFB, Miss.

The Command Section's Technical Director is USAF's representative to both the Interdepartment Radio Advisory Committee and the US National Committee of the International Radio Consultative Committee. The Special Assistant for International Affairs represents USAF at World Radio Conferences and the NATO Allied Radio Frequency Agency joint civil/military meetings, among other duties.

The Plans Division works to ensure that Air Force spectrum management policy, operational plans, program management directives, and operational requirement documents can be supported within the framework of established DoD, national, and international frequency management regulations.

The Systems Engineering Division provides technical solutions to a wide variety of complex spectrum management policy problems. Systems Engineering Division personnel advise Air Force personnel on portions of the spectrum available for new systems to use. They quantify mutual electromagnetic compatibility between Air Force systems and other military and civilian telecommunication systems worldwide.

The Technical Services Division directly supports users of the operational radio frequency spectrum by obtaining and documenting all frequency assignments used to support Air Force operations worldwide. The division consists of an Assignments Branch and a Special Operations Branch.

## Air Force Historical Research Agency

The Air Force Historical Research Agency is the repository for Air Force historical documents. It is collocated

with the Air University Library and has research facilities for professional military education students, faculty,

visiting scholars, and the general public. The agency's Contemporary Historical Evaluation of Current Opera-

tions team can deploy worldwide to record Air Force activities and microfilm documents.

The agency's collection, begun in Washington, D. C., during World War II, moved to Maxwell AFB, Ala., in 1949. It comprises more than sixty million pages devoted to the history of the service and constitutes the largest and most valuable specialized collection of documents on US military aviation in the world. Materials in the agency's collection cover topics ranging from the use of balloons in the Civil War through the record of Air Force activities in World War II, Korea, Vietnam, and the Operation Desert Storm air campaign.

About three-fourths of the agency's documents are US Air Force unit histories. Special collections, some dat-

ing back to the early 1900s, complement the unit histories. Among them are historical monographs and studies, more than 2,000 oral history interviews, end-of-tour reports of major overseas commanders, course materials of the Air Corps Tactical School from the 1930s, and working papers of key Army Air Forces staff offices, the British Air Ministry, and the German Air Force during World War II. Extensive Persian Gulf War documentation—approximately 1.7 million pages—has recently been added to the agency's holdings. This includes chronologies, working papers, message traffic, and oral history transcripts, as well as unit histories and Contingency Historical Reports for the Gulf War period. More than 400 collections of personal papers of retired

Air Force civilian and military officials are also available to researchers.

In addition to being a repository for Air Force historical documents, the agency performs research and other historical services. The agency's staff answers requests for historical information from official sources and the general public, prepares historical reference works, conducts the Air Force's oral history program, maintains the record of the status of the Air Force organizations and aircraft, processes Air Force unit emblems, and verifies the lineage and honors of Air Force units.

The entire collection is recorded on microfilm, with copies at the National Archives and Records Administration, Washington, D. C., and Center for Air Force History, Bolling AFB, D. C.

## Air Force Inspection Agency

Commanded by Col. Thomas J. Callanan, the Air Force Inspection Agency at Norton AFB, Calif., reports to the Inspector General, Office of the Secretary of the Air Force. AFIA, comprising four inspection directorates, is charged with assessing Air Force fighting capability and resource management effectiveness and making appropriate recommendations for improving Air Force mission capability. The agency also conducts special reviews and inquiries as directed by the Air Force Secretary, Chief of Staff, and Inspector General (IG). More than 200 persons are currently assigned to AFIA.

The Field Inspection Directorate provides independent assessments of USAF capability at major commands, FOAs, and direct reporting units. Field inspectors accompany major command IG teams to maintain contact with field units. The inspectors also look into items of spe-

cial concern in accordance with the statutory obligation of the Air Force IG to "inquire into and report upon the discipline, efficiency, and economy of the Air Force."

Two directorates, Management Inspection and Acquisition Inspection, were formed in late 1991 to execute a new approach to management inspections. With completely revised formats, functional management and acquisition management reviews replaced functional management and system acquisition management inspections. The reviews assess specific aspects of a process or program, rather than analyzing programs or systems on a broad scale as the inspections had done. The reviews stress owner responsibility for development and implementation of corrective action.

The Medical Inspection Directorate continues rigorous oversight of the Air Force Medical Service, performing health-services inspections of

active-duty, Air Force Reserve, and Air National Guard medical treatment facilities. Medical inspectors use a new and streamlined approach, emphasizing outcome and performance and incorporating data from many sources to provide commanders with the most effective assessments possible. The directorate has enhanced its capability to perform medical functional management reviews and conduct more realistic evaluation of medical readiness in conjunction with major command Quality Air Force Evaluations and Operational Readiness Inspections.

With the upcoming closure of Norton AFB, AFIA is planning and executing its August 1993 move to Kirtland AFB, N. M. The new location will provide a modern facility tailored to AFIA's mission and incorporate state-of-the-art communications and information processing capabilities to improve the efficiency of the organization.

## Air Force Intelligence Support Agency

The Air Force Intelligence Support Agency analyzes and assesses the application of all-source intelligence and supports the Air Staff and combatant commands. Under the command of Col. Thomas A. Stevenson, this FOA

reports directly to the Office of the Assistant Chief of Staff for Intelligence.

More than 400 active-duty, Reserve, and civilian intelligence professionals process, disseminate, and apply accurate and timely intelligence for Air

Force commanders during peace, war, and contingency situations. Headquartered at Fort Belvoir, Va., AFISA is composed of four major directorates.

The Directorate of Assessments is responsible for estimative and warn-

ing intelligence. The directorate works closely with the Office of the Assistant Secretary of the Air Force for Acquisition and Air Force Materiel Command to determine the threat to USAF weapon systems posed by current and projected foreign weapon systems. It also provides intelligence briefings to the Secretary of the Air Force and the Chief of Staff and provides products to the joint-service Daily Intelligence Digest and Defense Intelligence Network.

The Directorate of Assessments also acts as the executive agent for the assistant chief of staff for Intelligence in the national intelligence process by developing Air Force posi-

tions in National Intelligence Estimates, Defense Intelligence, the Air Force Planning Guide, and other assessments used by plans and operations staffs.

The Targets Directorate recommends and implements Air Force targeting and mapping, charting, and geodesy policy; provides peacetime and contingency targeting support to the Air Staff; and assists in research, development, and acquisition of weapon systems. The directorate also develops specialized data requirements for USAF-wide operational use and for systems under development.

The Security and Communications Management Directorate manages the

worldwide Air Force Special Security Office system, implementing Sensitive Compartmented Information (SCI) policy and procedures and providing management and oversight for the Air Force SCI Security program. The directorate also manages the Hq. Air Force Special Security Office and the Central Adjudication Division, located in Rosslyn, Va., the focal point for all security clearance determinations.

The Directorate of Intelligence Systems manages intelligence data-handling systems requirements, planning, resources, and security. It promotes efficient, cost-effective standardization and interoperability to meet Air Force and joint operations needs.

## Air Force Legal Services Agency

The Air Force Legal Services Agency, headquartered in Washington, D. C., provides civil and military legal services to the Air Force and its members around the world.

AFLSA provides specialized legal services in military justice, claims for and against the Air Force, tort litigation, legal assistance, and labor, environmental, acquisition, and preventive law. It handles all Air Force patent, copyright, and other intellectual property matters, provides judges and counsel for courts-martial, and reviews

trial results. AFLSA provides computer support and database management for the Office of The Judge Advocate General.

The Air Force Court of Military Review, a directorate in AFLSA, reviews all courts-martial that result in a punitive discharge or confinement of one year or more.

The Judiciary Directorate has six divisions: the Military Justice Division, the Trial Judiciary Division, the Appellate Defense Division, the Defense Services Division, the Government

Trial and Appellate Counsel Division, and the Clemency, Corrootions, and Officer Review Division.

The Civil Law and Litigation Directorate consists of seven divisions: Legal Assistance, Claims and Tort, Environmental Litigation, General Litigation, Contract Law, Patents, and General Claims.

The Air Force Legal Information Services Directorate operates and maintains The Judge Advocate General's Department computer research and data management systems.

## Air Force Logistics Management Agency

The Air Force Logistics Management Agency, located at Maxwell AFB, Gunter Annex, Ala., is a logistics problem-solving entity. Its mission is to increase Air Force readiness and combat capability by conducting studies and developing, analyzing, testing, evaluating, and recommending new or improved concepts, methods, systems, or procedures to enhance logistics efficiency and effectiveness. AFLMA was established in late 1975 to solve problems affecting base-level logisticians, with a view toward USAF- and DoD-wide application.

While the agency's main thrust is to solve problems and improve Air Force logistics war-winning capability, it is also firmly committed to shaping tomorrow's logistics environment. It

makes itself available to every logistcian in the Air Force.

AFLMA is assigned to Hq. USAF for Logistics. Broad program guidance is provided by a twenty-two-member Logistics Board of Advisors, chaired by the deputy chief of staff for Logistics, and composed of senior logisticians from the Air Staff and major commands.

AFLMA is organized into five functional and two support directorates. The functional directorates provide expertise in Logistics Plans, Maintenance and Munitions, Contracting, Supply, and Transportation, reflecting the primary logistics disciplines at the wing level. Each functional directorate is tasked to analyze problems, concepts, or ideas and develop viable solutions to improve the capabilities of base-

level logistics to support worldwide operations. The two support directorates, Logistics Analysis and Plans and Programs, bring scientific, technical, and administrative expertise to the functional directorates.

A collateral AFLMA mission is publication of the *Air Force Journal of Logistics*, a quarterly review representing the entire USAF logistics community that provides an open forum for logisticians who provide support to operational forces.

Operating with a total annual budget of under \$7 million (including military and civilian pay), AFLMA recommends improvements and solutions that save more than \$600 million annually, representing a substantial return on investment for the Air Force.



## Air Force Management Engineering Agency

The Air Force Management Engineering Agency is located at Randolph AFB, Tex., and reports directly to the Air Force Director of Manpower and Organization, Washington, D. C. AFMEA's commander is Col. Charles F. Dibrell, Jr.

AFMEA's primary mission is to provide the Air Force and Department of Defense the best possible means to determine manpower requirements and manage manpower resources and to provide commanders and functional managers with technical expertise and process improvement techniques to enhance mission effectiveness.

The agency oversees the implementation of technical and procedural guidance for Air Force Management Engineering and Productivity Programs. It develops and maintains manpower determinants and programming tools, provides informa-

tion systems support for management engineering and productivity programs, and works with major commands and operational units to apply quality improvement engineering techniques. AFMEA also performs special studies and analyses for the Air Staff on subjects relating to resource management and organizational analysis.

AFMEA administers productivity programs capitalizing on technological advances and new ideas to increase productivity and free manpower for other priorities. These programs include the Air Force Suggestion Program and Commercial Activities (A-76) Program.

The agency includes seven functional management engineering teams, located at bases throughout the US. These teams use process analysis and work-measurement techniques to assist functional leaders in improving pro-

ductivity. The teams also provide cost-effective consultant services and develop determinants for flights and squadrons common to Air Force installations. Air Force manpower determinants specify, by grade and skill, the correct number of people necessary to perform each unit's mission.

AFMEA serves as the executive agent for the development of DoD medical manpower determinants through the Joint Health-Care Management Engineering Team, which develops manpower determinants for medical functions common to the Navy, Army, and Air Force. AFMEA also directs the Air Force Wartime Manpower and Personnel Readiness Team, which supports the execution of contingency plans, and the Air Force Manpower Systems Office, which provides automated support to various Air Staff offices for manpower management.

## Air Force Medical Operations Agency

The Air Force Medical Operations Agency has its headquarters at Bolling AFB, D. C. Its commander serves on the staff of the Air Force Surgeon General.

AFMOA assists the Air Force Surgeon General in formulating plans, policies, and programs for the Air Force Medical Service, aerospace medicine, clinical investigations, quality assurance, health promotion, family advocacy, bioenvironmental engineering, military public health, and radioactive material management. The agency is organized into four divisions and one secretariat.

The Aerospace Medicine Division formulates plans, practices, and procedures and oversees all aspects of the Aerospace Medicine Program (aerospace physiology, aircrew physical standards, bioenvironmental engineering, military public health, and flight, hyperbaric, occupational, and preventive medicine), as well as the Air Force Fitness Program and the Air Force Weight Management Program.

The Clinical Quality Management Division, using information derived from its quality-service function, develops policies and plans, programs resources, and educates and evaluates health-

***A nurse ministers to newborns at an Air Force Medical Operations Agency hospital. Made up of four divisions and a secretariat, the agency works closely with the Air Force Surgeon General, other Air Staff directorates, and major commands in furtherance of medical practices and policies.***



USAF photo by SMSgt. Bob Wickley

care delivery, using access, clinical outcome, and cost as benchmarks.

The Health Promotion Division develops, coordinates, and evaluates the USAF Health Promotion Program, which enhances personal and organizational well-being through self-care, health improvement, and avoidance of modifiable disease risks. Primary components are tobacco cessation/prevention, physical fitness, stress

management, nutrition, chronic disease prevention, and substance abuse prevention.

The Family Advocacy Division manages, monitors, and coordinates policy and guidance of the Air Force Exceptional Family Member Program and the Air Force Child and Spouse Abuse Program.

The USAF Radioisotope Committee Secretariat coordinates the ad-

ministrative and regulatory aspects of licensing, possession, use, storage, handling, and disposal of all radioactive material used by the Air Force.

AFMOA works directly on a daily basis with the Air Force Surgeon General, other Air Staff directorates, major commands, and other federal agencies in support of medical operational policies and practices.

## Air Force Medical Support Agency

The Air Force Medical Support Agency has its headquarters at Brooks AFB, Tex. Its commander reports to the Director of Medical Support, Office of the Surgeon General.

AFMSA assists the Air Force Surgeon General in developing programs, policies, and practices relating to Air Force health care in peace and war. The office is organized into the Directorate of Medical Support. AFMSA develops plans, programs, and management guidance through four divisions.

The Patient Administration Division develops and implements plans to manage medical administrative functions for patients and medical records.

The Health Facilities Division serves as a consultant for the design, construction, and maintenance of medical facilities.

The Medical Information Systems Division monitors development, acquisition, installation, and application of computer-based medical information-handling and -retrieval systems.

The Medical Logistics Division develops plans and policies concerning medical materiel, supply, and equipment; biomedical equipment maintenance repair; facility management; and service contracts.

AFMSA works directly on a daily basis with the Office of the Air Force Surgeon General, other Air Staff directorates, major commands, and other federal agencies in support of health-care operational policies and practices.

## Air Force Military Personnel Center

The Air Force Military Personnel Center at Randolph AFB, Tex., manages personnel programs and policies affecting Air Force members. Its primary mission is ensuring that the right number of people in the right grades and skills are available to perform the missions of unit commanders worldwide. Closely aligned with this task is caring for Air Force people and their families and managing programs for individual career development.

AFMPC's responsibilities include overseeing performance evaluations, promotions, retirements, separations, awards and decorations, uniforms, education, personnel procurement, disability processing, and the Air Force's voting program; planning for contingencies; maintaining personnel records; providing transition assistance; and providing support to Air Force retirees.

AFMPC's staff consists of 1,800 officers, enlisted members, and civilians from every career area in the Air Force.

A new enlisted assignment system was tested and implemented this year. It gives enlisted members a better chance to match with an assignment of their choice. AFMPC activated an acquisition personnel management office to serve as the focal point for the many personnel issues associated with the Defense Acquisition Work Force Improvement Act. Improvements to the USAF Selection Board Secretariat's work area expanded the center's ability to conduct boards.

The center employed a wide range of voluntary and involuntary tools to achieve congressionally mandated personnel end strengths. Voluntary measures included the most expansive officer early release program in

Air Force history—the Voluntary Separation Incentive offered to many officers and enlisted members and relaxed retirement restrictions for colonels, lieutenant colonels, and prior-enlisted officers. Involuntary measures included Selective Early Retirement Boards for colonels, lieutenant colonels, majors, and captains; a Reduction in Force Board for officers with Reserve commissions; and a date-of-separation rollback for enlisted members.

In an effort to upgrade its records storage capability, AFMPC began installing equipment that will allow it to transfer microfiche copies of master personnel records to optical disk. Scheduled to be operational in the winter of 1993, the Automated Records Management System will incorporate state-of-the-art technology enabling the center to greatly improve retrieval speed and capability.





## Guide to Air Force Installations Worldwide

# USAF ALMANAC 1993

### Major Installations

**Altus AFB**, Okla. 73523-5000; within Altus city limits. Phone (405) 482-8100; DSN 866-1110. AMC base. As of July 1, 1993, becomes an AETC base. 97th Air Mobility Wing; Field Training Det. 403; 71st Flying Training Wing, OLK ACE Det. (ATC), T-37 aircraft operations. Base activated Jan. 1943; inactivated May 1945; reactivated Jan. 1953. Area 4,694 acres, plus 818 leased. Runway length NA. Altitude 1,376 ft. Military 3,013; civilians 791; approx. 200-300 TDY students (officer and enlisted) in training per month. Payroll \$118.1 million. Housing: 143 officer, 657 NCO, 382 VAQ, 160 VOQ, 10 transient family units. 15-bed hospital.

**Andersen AFB**, Guam, APO AP 96542-5000; 2 mi. N of Yigo. DSN 366-1110. PACAF base. Hq. 13th Air Force. Host unit: 633d Air Base Wing. No aircraft assigned. Tenant unit: 605th Military Airlift Support Sqdn. Det. 1, 909th Air Refueling Sqdn. (PACAF); 44th Aerial Port Sqdn. (AFRES); 254th Air Base Gp. (ANG); Det. 5, 750th Space Gp.; Det. 815, Air Force Audit Agency; Det. 4203, Air Force Office of Special Investigations. Navy VRC-50 Fleet Logistics Support Sqdn., C-130, S-3, C-2 operations. Andersen serves as a logistic support and staging base for aircraft operating in the Pacific and Indian Oceans. Base activated late 1944; named for Gen. James Roy Andersen, lost at sea between Kwajalein and Hawaii Feb. 26, 1946. General Andersen was the Chief of Staff, Hq. Army Air Forces, Pacific Ocean Areas. Area: 20,504 acres. Runway length NA. Altitude: 612 ft. Military 2,500; civilians 1,000. Payroll \$101.6 million. Housing: 249 officer, 1,501 enlisted. Unaccompanied housing: 23 officer, 1,048 enlisted. Transient housing: 110 VOQ, 54 VAQ, 18 TLF. One USAF clinic and one Navy hospital on island.

**Andrews AFB**, Md. 20331-5000; 11 mi. SE of Washington, D. C. Phone (301) 981-1110; DSN 858-1110. AMC base. Home of Air Force One and gateway to the nation's capital. Host Wing is 89th Airlift Wing. Responsible for Presidential support and base operations. It supports all branches of service, several major commands, and federal agencies. The wing also hosts the 457th Airlift Sqdn.; Air National Guard Readiness Center (ANGRC); 113th Fighter Wing (D. C. ANG); 459th Airlift Wing (AFRES); Det. 9, Combat Camera (1st CTCS); Naval Air Facility; Marine Aircraft Gp. 49, Det. A. 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 (incl. easements). Runways 9,300 ft. and 9,755 ft. Altitude 281 ft. Military 10,009; civilians 3,201. Payroll \$402.8 million. Housing: 361 officer,

1,721 NCO, 209 mobile home spaces, 974 unaccompanied enlisted, 326 transient (incl. 69 temporary living quarters for incoming personnel, 21 DV suites, 180 VOQ, 56 VAQ). 235-bed hospital.

**Arnold AFB**, Tenn. 37389; approx. 7 mi. SE of Manchester. Phone (615) 454-3000; DSN 340-5011. AFMC base. Site of Arnold Engineering Development Center, the nation'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. H. H. "Hap" Arnold, wartime Chief of the AAF. Area 40,118 acres. Runway 6,000 ft. Altitude 1,100 ft. Military 137; civilians 370; contract employees 3,040. Payroll \$157.4 million. Housing: 23 officer, 17 NCO, 45 transient. Medical aid station.

**Aviano AB**, Italy, APO AE 09601; adjacent to Aviano, 50 mi. N of Venice, Italy. Phone (commercial, from CONUS) 011-39-434-667111; DSN 632-1110. USAF base. 401st Fighter Wing manages this USAF main operating base in support of USAF and NATO. Although no aircraft are permanently assigned, host unit would exercise command and control of a variety of deployed weapon systems in case of a war in Europe. It also provides administrative and logistical support to 50 off-base units at 31 locations throughout Italy. Aviano is the only USAF tactical air base in Italy. Originally an Italian flying school, which opened in 1939; the Air Force began operation in 1954. The 401st Fighter Wing transferred from Torrejon AB, Spain, on May 1, 1992, replacing the 40th Support Wing, which had been the host US unit since Apr. 1966. Area 1,140 acres. Runway length NA. Altitude 319 ft. Military 2,000; civilians 715. Payroll \$76 million. No on-base or govt. leased housing. 490 billeting spaces (including contracted spaces), 496 dorm bed spaces. Clinic.

**Barksdale AFB**, La. 71110-5000; in Bossier City. Phone (318) 456-2252; DSN 781-1110. ACC base. Hq. 8th Air Force; 2d Wing, B-52H, KC-135, and T-37 operations; 458th Operations Gp. (AMC); KC-10 operations; 1st Electronic Combat Range Gp.; Det. 1, 307th Civil Engineering Sqdn. RED HORSE; Det. 3, 458th Airlift Sqdn. (AMC), C-21 operations; 49th Test Sqdn.; 98th Air Refueling Gp. (AFRES), KC-10 operations; 917th Fighter Wing (AFRES), A-10 operations. Also home of 8th Air Force Museum. Base activated Feb. 2, 1933; named for Lt. Eugene H. Barksdale, WW I airman killed Aug.

1926 in crash near Wright Field, Ohio. Area 22,000 acres (18,000 acres reserved for recreation). Runway length NA. Altitude 166 ft. Military 7,428; civilians 1,193. Payroll \$327 million. Housing: 105 officer, 324 NCO, 27 transient. 40-bed hospital.

**Beale AFB**, Calif. 95903-5000; 13 mi. E of Marysville. Phone (916) 634-3000; DSN 368-1110. ACC base. Hq. 2d Air Force; 9th Wing; 7th Missile Warning Sqdn. (AFSPACCOM). Aircraft include U-2 reconnaissance aircraft, KC-135 Stratotankers, and T-38 Talon trainers. Originally US Army's Camp Beale. Became Air Force installation Apr. 1948; became AFB 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 3,442; civilians 1,363. Payroll \$98.5 million. Housing: 206 officer, 1,503 enlisted, 18 transient. 25-bed hospital.

**Bergstrom AFB**, Tex. 78743-5002; 7 mi. SE of downtown Austin. Phone (512) 369-1110; DSN 685-1110. ACC base. 67th Reconnaissance Wing; Hq. 10th Air Force (AFRES); 924th Fighter Gp. (AFRES), F-16A fighter operations; ACC NCO Academy West. Base activated 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. Area 4,050 acres. Runway 12,250 ft. Altitude 541 ft. Military 1,000; civilians 200. Payroll \$122 million. Housing: 75 officer, 644 enlisted, 408 transient (88 VOQ, 120 VAQ, 200 TLF). Base scheduled to become a minor installation Oct. 1, 1993.

**Bitburg AB**, Germany, APO AE 09132-5000; 15 mi. N of Trier, Germany. Phone (commercial, from CONUS) 011-49-6561-61-1110; DSN 453-1110. USAF base. 36th Fighter Wing with two fighter squadrons flying F-15C/D Eagles. Base activated 1952. Area 1,735 acres. Runway length NA. Altitude 1,228 ft. Military 4,300; civilians 1,220. Payroll \$168 million. Housing: 75 officer, 1,237 NCO, 32 VOQ, 194 VAQ, 70 TLF. 40-bed hospital.

**Bolling AFB**, D. C. 20332-5000; 3 mi. S of US Capitol. Phone (202) 545-6700; DSN 227-0101. Air Force District of Washington. 1100th Air Base Gp.; 1100th National Capital Region Support Gp. (Pentagon); 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; Center for Air Force History; Hq. Air Force Office of Special Investigations; Defense Intelligence Agency. Activated Oct. 1917; named for Col. Raynal C. Bolling, first high-ranking Air Service officer killed in WW I. Area 604 acres.



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The center tests and evaluates equipment used over the entire spectrum of Air Force missions, including aircraft, strategic missiles, munitions, space systems, flight simulators, intelligence systems, and command, control, and communications systems. The center is currently conducting tests that involve the B-2 Stealth bomber, the C-17 transport plane, Cheyenne Mountain upgrades,

and the Consolidated Space Operations Center.

AFOTEC has nearly 700 persons assigned to its headquarters at Kirtland AFB, N. M., four detachments, and operating locations. The center has detachments at Eglin AFB, Fla., Edwards AFB, Calif., Peterson AFB, Colo., and Scott AFB, Ill.

AFOTEC personnel form the management cadre for test programs, while

the major commands supply the test teams with the majority of their members. There are approximately 2,000 individuals under the center's operational control. The additional personnel provide current operational experience to ensure that the evaluation reflects the needs of the ultimate users of the system—operators, maintainers, and support and training specialists.

## US Air Force Academy

The primary mission of the United States Air Force Academy is to develop and inspire future service leaders. The Academy's core values ensure that the primary focus remains on producing dedicated officers and leaders. Nearly sixty percent of the Academy's nearly 26,000 graduates remain on active duty today.

During the Academy's thirty-eight-year history, thirty cadets have earned Rhodes Scholarships and nearly 200 others have become Guggenheim or National Science Foundation Fellows, earned Marshall or Fulbright-Hays Scholarships, or accepted scholarships to attend Harvard University's John F. Kennedy School of Government.

Cadets completing four years of study earn a bachelor of science degree. The Academy emphasizes academics, military training, athletic conditioning, and spiritual and ethical development. Academics include classes in the basic sciences, engineering, humanities, and social sciences. All cadets complete a core curriculum of ninety-one semester hours. They can specialize in any of twenty-five academic majors.

Military development is central to the Academy experience and distinguishes it from other institutions of higher learning. Four primary areas are stressed: professional military studies, theoretical and applied leadership experiences, aviation science and airmanship programs, and military training. The intent is to provide the cadets the knowledge, skills, values, and behavior patterns necessary to meet leadership challenges.

Most cadets complete the soaring program, about half earn parachutist badges, and all cadets planning to become pilots complete training in T-41s.

*Cadet First Class Michael Lightner, Class of 1990 (now a lieutenant), holds Glacier, the Academy's only white falcon. As at many other institutions of higher learning, the job of working with the mascots is highly coveted, but the Academy is unique in its emphasis on military development.*



USAF photo by CMSgt. Don Sutherland

Graduates who enter pilot training incur an active-duty service commitment of eight years after earning their wings. Graduates not attending flying training incur a five-year active-duty service commitment. Those in the Class of 1996 and subsequent years will incur a six-year commitment. The Academy will send approximately 225 of its 1993 graduates to undergraduate pilot training.

Few universities have such an extensive athletic program. The Acade-

my's program includes intercollegiate sports, intramurals, and physical education. Seventeen men's and women's intercollegiate teams compete nationally. Each of the forty cadet squadrons fields a team in twenty intramural sports.

All cadets take a formal course in ethics and receive honor and ethics instruction. In the Cadet Honor Code, cadets pledge, "We will not lie, steal, or cheat, nor tolerate among us anyone who does."



## Reports From the 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 District of Washington

The Air Force District of Washington is the single manager for support of USAF activities in the National Capital Region. It is commanded by Col. Stevan B. Richards. Although its headquarters is at Bolling AFB, D. C., AFDW has operating locations at the Pentagon in Arlington, Va., Andrews AFB, Md., and Fort Meade, Md.

AFDW comprises the 1100th Air Base Group (ABG) and the 1100th National Capital Region Support Group (NCR SPTG).

The 1100th ABG provides the necessary support for the day-to-day operations of Bolling. Supporting 3,128 military members and 1,603 civilians, the group provides housing for 295 officers and 1,100 noncommissioned officers. It has 165 transient quarters and

a payroll of \$126 million. Its support functions serve many of Bolling's tenant units, including the Air Force Office of Scientific Research, Air Force Office of Special Investigations, and Center for Air Force History. The Surgeon General and the Chief of Chaplains are also among Bolling's Air Staff tenants.

The 1100th NCR SPTG provides broad support to organizations in the region, including the Office of the Secretary of Defense and its agencies, the Joint Staff, Hq. USAF, headquarters of USAF direct reporting units and field operating agencies, and the Air Force Civilian Personnel Management Center. It provides personnel, operations, comptroller, accounting and finance, and recreation services for AFDW assets. The Hq. USAF Se-

curity Force manages physical, personal, electronic, and information security within the Pentagon.

AFDW is responsible for Air Force ceremonial events in the nation's capital. Two of its most visible elements are the US Air Force Honor Guard and the US Air Force Band, both based at Bolling.

The Honor Guard represents the Air Force at arrival and departure ceremonies for visiting dignitaries at the White House, the Pentagon, and Andrews AFB. It also participates in military funerals at Arlington National Cemetery and memorial ceremonies at the Tomb of the Unknowns. The Air Force Band performs around the world in support of Air Force community relations programs.

### Air Force Operational Test and Evaluation Center

The Air Force Operational Test and Evaluation Center is the Air Force's independent test agency responsible for operational testing of new or modified weapon systems and components being developed for Air Force and multiservice use.

AFOTEC's commander, Maj. Gen. Marcus A. Anderson, reports directly to the Chief of Staff of the Air Force. The primary purpose of operational test and evaluation is to reduce risk in the acquisition process by determining how well systems perform when operated and maintained by USAF personnel in a realistic operational environment. Results from the center's tests are used at all levels of the Air Force and DoD to support program decisions that lead to the production and fielding of systems. The center focuses on evaluating the operational effectiveness and suitability of the Air Force's future weapon systems and support equipment.



*AFOTEC is currently conducting tests with the B-2 Stealth bomber, the C-17 transport (above, in flight test), upgrades to systems at Cheyenne Mountain AFB, Colo., and the Consolidated Space Operations Center.*

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On November 15, 1991, Air Force Operations assumed responsibility and established JSSA as an FOA.

Under its E&E charter, JSSA is responsible for working E&E operational matters with command planners and operators to ensure that tactics, procedures, equipment, and training are adequate and consistent with Joint Chiefs of Staff policy. JSSA support to Operation Desert Storm included mobile training teams; production of a Mideast SERE guide, evasion charts, blood chits, E&E aids, and SERE update materials; assistance to CENTCOM and the Rescue Coordination Center in Saudi Arabia with E&E planning and coordination; help for the Joint Staff in analyzing evasion and recovery information; and manage-

ment of the debriefings of returned American POWs.

In the past year, JSSA has developed SERE products for USEUCOM's use in Yugoslavia and USCENTCOM's in Somalia and is developing SERE products and training programs for USSOUTHCOM's use in counterdrug operations. JSSA has responded to numerous requests for assistance and information by the Senate Select Committee on POW/MIA Affairs.

JSSA has a special training division, with nineteen personnel, responsible for providing advanced instruction and running exercises for selected high-risk-of-capture personnel in the Army, Navy, and Air Force. This program includes in-depth hostage survival courses for Defense Intelligence

Agency military attachés and enlisted support staffs. The training division instructs personnel in residence and via mobile teams worldwide. It also interviews selected returnees and hostages to improve DoD training programs, policies, and guidelines.

DoD has tasked the Air Force with inspecting the five approved SERE schools, researching training and SERE experiences to recommend improved training, and maintaining a DoD library and archives of Code of Conduct and Prisoner of War materials.

The assistant secretary of defense for International Security Affairs tasked the Air Force (and JSSA) to be the DoD Executive Agent for the drafting and coordination of a DoD Directive on POW/MIA Affairs.

## 7th Communications Group

The 7th Communications Group, located in the Pentagon, is an FOA under the Office of the Deputy Chief of Staff for Command, Control, Communications, and Computers. It comprises nearly 1,000 military and civilian personnel and provides twenty-four-hour communications and computer support to high-level customers in the Office of the Secretary of Defense (OSD), the Joint Staff, the Office of the Secretary of the Air Force, and the Air Staff.

The 7th CG's wide range of support encompasses voice and data communications operations, maintenance, and security; computer hardware operations, maintenance and security; software applications development and maintenance; and communications-computer requirements, acquisition, installation, and integration. The 7th CG provides mobile secure communications support to the Secretary of Defense and Chairman of the Joint Staff during trips away from Washington, D. C.

The 7th CG manages more than 2,500 leased circuits and 9,000 telephone lines. It operates and maintains six major switching networks supporting high-quality conferencing capability for the National Military Command Center (NMCC), the OSD Crisis Coordination Center, and the Air Force Operations Center. The 7th CG installs and maintains more than 6,000 administrative telephone units and 3,000 secure telephone units located throughout the Pentagon. It also manages one of the largest communications security key management ac-



**Sgt. Julie Shaw, a computer and switching systems specialist, checks voltages in a projector. She belongs to the 7th Communications Group, which provides computer and communications support to uniformed and civilian leaders at the Pentagon.**

counts in the Air Force, with more than 2,100 keys issued on a monthly basis.

To provide mission support for its customers, the 7th CG operates and maintains fifteen centralized mid- and large-scale computer systems supporting OSD, Joint Staff, and Hq. USAF general-purpose and scientific data-processing needs.

The 7th CG controls more than 20,000 separate items, valued at \$250 million, primarily located in the 30,000-square-foot Central Computer Facility. Connected to the seventy-five-

mile USAF local area network (LAN), the 7th CG serves 6,000 Air Force customers and another 5,000 OSD users of the OSD LAN and video teleconferencing system.

For command-and-control systems, the 7th CG engineers, installs, operates, and maintains systems for emergency actions dissemination, missile warning and display, and automated decision-making tools supporting the operational missions of the NMCC, the OSD Crisis Coordination Center, and the Air Force Operations Center.

tiveness and efficiency. One of these is the Automated Weather Distribution System (AWDS). Already installed at more than 100 military weather facilities around the globe, AWDS revolutionizes the reception, storage, display, and dissemination of weather

data. AWDS helps forecasters rapidly manipulate weather data and deliver customer-oriented products.

AWS has been working closely with the National Weather Service and the Federal Aviation Administration on a Doppler weather radar program called

NEXRAD. The Doppler radar network will significantly increase the field's capability to detect damaging storms and will reduce the number of false alarms by two-thirds. The initial deployment of radars and remote workstations began in 1992.

## Center for Air Force History

Established as an FOA in October 1991, the Center for Air Force History (formerly the Office of Air Force History) is one of two FOAs operating under the policy guidance of the Air Force Historian. The center has two basic missions: to research, write, and publish books and other studies on the history of the Air Force and to provide historical support through the Air Force Historian to Hq. USAF.

The center maintains a dynamic, long-term publishing program. Books are researched and written by center historians, on contract, or by scholars at large. Books published by CAFH help the Air Force formulate strategy, plans, and doctrine; conduct operations; and educate Air Force students at professional military schools, providing them with the knowledge and perspective to lead the Air Force. These books also provide scholars with research and teaching materials and inform the public about the role of the Air Force and airpower in national security. Center personnel also research and write short monographs and studies to support the Air Staff and other government agencies.

The book-publishing program of CAFH consists of several series. The *USAF at War* series comprises narrative histories of the Air Force in combat. The *General Histories* series analyzes the institutional development of the Air Force and the evolution of broad Air Force functions in peace and war. The *Special Studies* series addresses more narrow, discrete issues in war-

fare or the development of Air Force policies, operations, or institutions. Books in the *Reference* series provide information, usually in dictionary or encyclopedia form, for use by Air Force members, scholars, and the public. CAFH also makes available reprints of classic works in the development of airpower, airpower and military history memoirs, bibliographies of air histories, and lineage histories.

CAFH provides a wide range of his-

torical support, through the Air Force Historian, to Hq. USAF. It conducts research and provides historical information, analyses, and staff studies as needed to support planning, policy development, and decision-making. It maintains a library and a microfilm document collection relating to the history of the Air Force for the use of its personnel and the Air Staff at large, as well as other scholars and the general public.



*The Center for Air Force History's library and microfilm collection contains unique and valuable documents relating to the history of the Air Force. Its resources are available to all military scholars and the general public.*

## Joint Services SERE Agency

The Joint Services Survival, Evasion, Resistance, and Escape (SERE) Agency is headquartered at Fort Belvoir, Va. The commander of this sixty-six-person FOA reports to the Director of Operations, Hq. USAF. JSSA serves as the Department of Defense's

executive agent for three areas: JCS Operational Evasion and Escape matters, DoD Code of Conduct/SERE training, and the DoD POW/MIA program.

Shortly after the start of the Korean War, the JCS tasked the Air Force to

be the DoD Executive Agent for Operational Evasion and Escape (E&E) matters. These E&E responsibilities were divided among Air Staff operations, intelligence, and plans officers until 1983, when these functions were centralized in Air Force Intelligence.

## Air Reserve Personnel Center

The Air Reserve Personnel Center, located in Denver, Colo., is an FOA assigned to the Office of the Air Force Reserve. ARPC provides personnel services and administrative support to members of the Air Force Reserve and the Air National Guard. This includes numerous categories of Reservists: retirees, Individual Mobilization Augmentees (IMAs), Individual Ready Reservists (IRR), and unit reservists.

Nearly 700 military and civilian ARPC associates provide worldwide services to Reservists in a myriad of personnel-assistance activities. These include assignments, promotions, discharges, retirements, school selections, orders, pay, airline tickets, vet-

erans' entitlements, Servicemen's Group Life Insurance, the Defense Enrollment/Eligibility Report System, the Reserve Component Survivor Benefit Plan, and Presidentially activated mobilizations. ARPC holds two of the three central selection boards to consider Air Force Reserve officers for promotion.

Since the center's inception in March 1954, its associates have activated Reservists for five national emergencies—the Berlin crisis in 1961, the Cuban missile crisis in 1962, the USS *Pueblo* incident and Vietnam in 1968, and the Persian Gulf War in 1990–91. During Operations Desert Shield and Desert Storm, ARPC associates single-handedly provided the support for

mobilizing 2,566 IMAs, 911 IRRs, and 142 regular retirees.

ARPC associates also run centrally managed programs for nearly 1,900 medical, 800 legal, and 470 chaplain Reservists. These programs also support 2,100 medical students in USAF-sponsored scholarship programs, twenty-five legal interns, and 230 chaplain degree candidates.

With the active-duty drawdown in the form of the Voluntary Separation Incentive and the Special Separation Benefit, ARPC has seen the IRR increase by 25,000. The IRR will continue to grow as the defense budget decreases. ARPC is at the forefront and prepared to manage this influx of personnel records in the coming years.

## Air Weather Service

The Air Weather Service, Scott AFB, Ill., provides centralized weather support to all levels of the Air Force and Army and serves as USAF's technical center of weather expertise.

AWS's major subordinate units include Air Force Global Weather Central (AFGWC), Offutt AFB, Neb.; the Air Force Environmental Technical Applications Center (AFETAC) at Scott; and the Air Force Space Forecast Center (AFSFC), Falcon AFB, Colo.

These units provide centralized weather, climatological, and space support to Air Force and Army operations, while the headquarters provides technical advice, develops standardized procedures, and fields standard systems and new technology for the integrated weather support system.

AFGWC, the largest center, is the weather-processing hub for the Air Force and Army. The center gathers thousands of observations and provides hundreds of products daily to its customers.

AFETAC provides centralized climatological support by assessing the natural environment from a historical perspective. It stores historical weather information and conducts climatological studies of weather effects on weapon systems and operations.

AFSFC, which became operational in October 1992, also provides centralized support. It is responsible for

monitoring solar activity that can adversely affect surveillance and warning systems, high-frequency communications, and spacecraft. AFSFC uses data from sites around the world to monitor the sun and its effects on near-Earth space.

At its headquarters, AWS develops standardized weather and space environmental support procedures that

apply across the integrated weather support system. This minimizes training for weather personnel, whether they deploy to the tactical arena from widely scattered sites or move from one conventional weather station to another.

AWS is working on several key initiatives to help weather personnel of the major commands increase effec-



*Up-to-the-minute Air Weather Service data and forecasts facilitate flight operations of planes like this C-5 airlifter. AWS and its many subordinate units support the Air Force and the Army with a wide variety of weather information.*

## The Air National Guard by Major Command Assignment

(as of April 1, 1993)

### Air Mobility Command

#### C-5A transport

105th Airlift Group Newburgh, N. Y.

#### C-130 transport

118th Airlift Wing Nashville, Tenn.  
 123d Airlift Wing Louisville, Ky.  
 133d Airlift Wing Minneapolis-St. Paul, Minn.  
 136th Airlift Wing NAS Dallas, Tex.  
 137th Airlift Wing Oklahoma City, Okla.  
 146th Airlift Wing Channel Islands, Calif.  
 109th Airlift Group Schenectady, N. Y.  
 130th Airlift Group Charleston, W. Va.  
 135th Airlift Group Baltimore, Md.  
 139th Airlift Group St. Joseph, Mo.  
 143d Airlift Group Quonset State Airport, R. I.  
 145th Airlift Group Charlotte, N. C.  
 153d Airlift Group Cheyenne, Wyo.  
 165th Airlift Group Savannah, Ga.  
 166th Airlift Group Wilmington, Del.  
 167th Airlift Group Martinsburg, W. Va.  
 179th Airlift Group Mansfield, Ohio  
 189th Airlift Group<sup>a</sup> Little Rock, Ark.

#### C-141B transport

164th Airlift Group Memphis, Tenn.  
 172d Airlift Group Jackson, Miss.

#### EC-130E special operations aircraft

193d Special Operations Group Harrisburg, Pa.

#### KC-135 tanker

101st Air Refueling Wing Bangor, Me.  
 108th Air Refueling Wing McGuire AFB, N. J.  
 121st Air Refueling Wing Rickenbacker ANGB, Ohio  
 126th Air Refueling Wing Chicago, Ill.  
 141st Air Refueling Wing Fairchild AFB, Wash.  
 171st Air Refueling Wing Pittsburgh, Pa.  
 112th Air Refueling Group Pittsburgh, Pa.  
 128th Air Refueling Group Milwaukee, Wis.  
 134th Air Refueling Group Knoxville, Tenn.  
 151st Air Refueling Group Salt Lake City, Utah  
 157th Air Refueling Group Portsmouth, N. H.  
 160th Air Refueling Group Rickenbacker ANGB, Ohio  
 161st Air Refueling Group Phoenix, Ariz.  
 170th Air Refueling Group McGuire AFB, N. J.  
 186th Air Refueling Group Meridian, Miss.  
 190th Air Refueling Group Topeka, Kan.

### Pacific Air Forces

#### F-15A/B fighter

154th Composite Group<sup>b</sup> Hickam AFB, Hawaii  
 176th Composite Group<sup>c</sup> Anchorage, Alaska  
 168th Air Refueling Group Eielson AFB, Alaska

### Air Combat Command

#### A-7D/K attack aircraft

138th Fighter Group Tulsa, Okla.  
 178th Fighter Group Springfield, Ohio

#### A-10A attack aircraft

103d Fighter Group Windsor Locks, Conn.  
 104th Fighter Group Westfield, Mass.  
 110th Fighter Group<sup>d</sup> Battle Creek, Mich.  
 175th Fighter Group<sup>d</sup> Baltimore, Md.

#### F-4G Wild Weasel

124th Fighter Group Boise, Idaho

#### F-15A/B fighter

116th Fighter Wing Dobbins ARB, Ga.  
 131st Fighter Wing St. Louis, Mo.  
 159th Fighter Group NAS New Orleans, La.

#### F-15A/B fighter-air defense

102d Fighter Wing Otis ANGB, Mass.  
 142d Fighter Group Portland, Ore.

#### F-16A/B/C/D fighter

113th Fighter Wing Andrews AFB, Md.  
 122d Fighter Wing Fort Wayne, Ind.  
 127th Fighter Wing Selfridge ANGB, Mich.  
 128th Fighter Wing Madison, Wis.  
 132d Fighter Wing Des Moines, Iowa  
 140th Fighter Wing Buckley ANGB, Colo.  
 174th Fighter Wing Syracuse, N. Y.  
 114th Fighter Group Sioux Falls, S. D.  
 149th Fighter Group Kelly AFB, Tex.  
 150th Fighter Group Kirtland AFB, N. M.  
 156th Fighter Group San Juan, Puerto Rico  
 162d Fighter Group<sup>e</sup> Tucson, Ariz.  
 169th Fighter Group McEntire ANGB, S. C.  
 180th Fighter Group Toledo, Ohio  
 181st Fighter Group Terre Haute, Ind.  
 182d Fighter Group Peoria, Ill.  
 183d Fighter Group Springfield, Ill.  
 184th Fighter Group<sup>e</sup> McConnell AFB, Kan.  
 185th Fighter Group Sioux City, Iowa  
 187th Fighter Group Montgomery, Ala.  
 188th Fighter Group Fort Smith, Ark.  
 192d Fighter Group Richmond, Va.

#### F-16A/B fighter-air defense

144th Fighter Wing Fresno, Calif.  
 107th Fighter Group Niagara Falls, N. Y.  
 119th Fighter Group Fargo, N. D.  
 120th Fighter Group Great Falls, Mont.  
 125th Fighter Group Jacksonville, Fla.  
 147th Fighter Group Ellington Field, Tex.  
 148th Fighter Group Duluth, Minn.  
 158th Fighter Group Burlington, Vt.  
 177th Fighter Group Atlantic City, N. J.  
 191st Fighter Group Selfridge ANGB, Mich.

#### HC-130/HH-60G special operations aircraft

106th Rescue Group Suffolk, N. Y.  
 129th Rescue Group NAS Moffett Field, Calif.

#### OA-10A observation aircraft

111th Fighter Group Willow Grove ARS, Pa.

#### RF-4C reconnaissance aircraft

117th Reconnaissance Wing Birmingham, Ala.  
 152d Reconnaissance Group Reno, Nev.  
 155th Reconnaissance Group Lincoln, Neb.  
 163d Reconnaissance Group March AFB, Calif.

On June 1, 1992, all units assigned to MAC, SAC, and TAC were reassigned to Air Combat Command, Air Mobility Command, Pacific Air Forces, or US Air Forces in Europe.

<sup>a</sup>Aircrew CCTU

<sup>b</sup>Includes 203d Air Refueling Squadron with KC-135R aircraft

<sup>c</sup>Includes 210th Air Rescue Squadron with HC-130 and HH-60G aircraft

<sup>d</sup>Also OA-10A aircraft

<sup>e</sup>Formal Training Unit (FTU)

# Air National Guard

The Air National Guard has both a state and a federal mission. ANG units in a nonmobilized status are commanded by the governors of the fifty states, Puerto Rico, Guam, and the Virgin Islands and the Commanding General of the District of Columbia. Each governor is represented in the state or territory chain of command by an adjutant general.

Units may be called to federal service by the President, Congress, or both to enforce federal authority, to suppress insurrection, or in the national defense. During peacetime, Air Guard units are assigned to gaining major commands, which provide advisory assistance and evaluate unit training, safety, and readiness programs.

Air Guard units from all mission areas participate annually in training deployments, both within the US and overseas. Every day, ANG units work beside their active-duty counterparts.

Today the ANG has more than 119,000 members. They provide 100 percent of the fighter-interceptor force, 100 percent of the RF-4C force, thirty-one percent of the tactical air support, thirty-nine percent of the tactical airlift, thirty-two percent of the air-rescue capability, thirty-one percent of the tactical fighters, twenty-eight percent of the KC-135 air refueling capability, and seven percent



**Engineers from the Florida Air National Guard's 202d RED HORSE Civil Engineering Squadron helped restore power in the aftermath of Hurricane Andrew. ANG units from all mission areas join active-duty units in training deployments.**

of the strategic airlift capability of the total Air Force. The ANG also has six percent of USAF's special operations aircraft.

ANG F-15 and F-16 air defense units perform a twenty-four-hour alert mission along the coasts and borders of the US. The Hawaiian F-15 unit is responsible for the entire air defense

of that state. Also in Hawaii, a new KC-135 air refueling squadron was activated in January 1993 with four aircraft.

In 1993, ANG fighter units will continue modernization through conversions to the F-16 and upgrades in the airlift and refueling missions. A-7s, F-4Es, and OA-37s will be completely phased out by the end of the year. Three A-10A units and four A-7 units convert to F-16s in 1993. Also this year, one fighter unit will convert to the air refueling mission and receive ten KC-135R aircraft.

Last year, ANG units flew more than 400 sorties and nearly 1,400 tons of material in support of hurricane emergency relief operations in Florida, Louisiana, Hawaii, and Guam.

Overseas, ANG units took part in Operation Provide Hope in the former USSR and flew nearly 700 tons of food and medical supplies into Split, Zagreb, and Sarajevo in the former Yugoslavia as part of Operation Provide Promise. During Operation Provide Relief, the ANG airlifted nearly 2,500 tons of emergency supplies to Somalia through Kenya. About 600 ANG volunteers took part in Operation Restore Hope in Somalia.

About 7,000 ANG engineering personnel deployed for Prime BEEF exercises. Half the deployments were to such overseas locations as Latin America, Israel, Europe, and the Caribbean.

Photo © Geoffrey Pearce



**Guardsmen like crew chief TSgt. Walt Cannon and Col. Thomas Griffin, 177th Fighter Group, New Jersey ANG, bring a wealth of experience to USAF's total force. The 119,000-member ANG contributes to the force in many mission areas.**

The Directorate of Physical Security supports the Air Staff in managing the physical security and air base defense programs. This directorate also tracks new technologies pertaining to physical security systems. The Directorate of Law Enforcement

and Training provides functional expertise for law enforcement and training programs, including protection, antiterrorism, combat arms training and maintenance, and security police technical training. The Directorate of Safeguarding protects classi-

fied information within the Air Force and industry. This directorate assists in implementing Air Staff policies for personnel security, classification management, safeguarding, industrial security, and security education and training.

## Air Force Studies and Analyses Agency

The Air Force Studies and Analyses Agency helps the Secretary of the Air Force, the Chief of Staff of the Air Force, and other Air Force decision-makers address issues concerning resource allocation, force structure, weapon systems acquisition and employment, and arms reductions proposals, as well as explaining to senior leaders the effects of their analyses on the implementation of national security policy.

AFSAA advises the Air Force Secretary and Chief of Staff on responses to congressional inquiries and requests for testimony. The agency serves as the configuration manager for a variety of simulation models used within the Air Force, by other agencies within the Department of Defense, and by civilian contractors.

It also has liaison responsibilities with various DoD and professional analytical organizations and professional societies.

Reporting to the Air Force Director of Programs and Evaluation, AFSAA is the lead organization in providing the simulation modeling tools and analytical assessments of the Air Force's portion of the Program Objectives Memorandum.

The Power Projection Division's analytical efforts include analyses and evaluation of the effectiveness of air-to-air and air-to-surface aircraft and munitions, aircraft survivability, force integration, electronic combat systems effectiveness, effectiveness of force structure options and mixes, and different force employment options in multiple regional conflicts.

The Nuclear Deterrence Division's analyses cover many deterrence issues, including nuclear-capable bomber and ballistic missile force structures; arms-control impact on operations, war-planning, and international deterrence; nuclear weapon system capabilities; comparisons of different strategic force models; and the impact of technology proliferation on the global balance.

The Space and C<sup>3</sup>I Division's analytical efforts include assessments of how space and C<sup>3</sup>I systems affect the Air Force's peacetime and wartime operational objectives.

The Global Mobility Division conducts comprehensive analyses to evaluate the effectiveness of special operations forces, air refueling, and strategic/tactical airlift programs.

## Air Force Technical Applications Center

The Air Force Technical Applications Center is a specialized agency whose primary mission is to monitor compliance with several important nuclear treaties.

AFTAC operates and maintains the US Atomic Energy Detection System, a worldwide system of sensors to detect explosions underground, underwater, in the atmosphere, and in space. This network of seismic and hydro-acoustic sensors, satellite instrumentation, and airborne and ground-based samplers is used by AFTAC analysts to determine if explosions are nuclear in origin and to report them to the national command authorities.

Headquartered at Patrick AFB, Fla., AFTAC has one major subordinate unit, ten detachments, three operating locations, and more than seventy unmanned equipment locations worldwide. Its largest subordinate unit is the Technical Operations Division at McClellan AFB, Calif. The division includes the McClellan Central Laboratory—AFTAC's primary analysis fa-

cility—and AFTAC's centralized engineering, maintenance, and supply functions. The division also trains airborne special equipment operators and conducts atmospheric sampling operations aboard WC-135 aircraft operated by the Air Rescue Service.

AFTAC is unique in that it translates nuclear monitoring requirements into system requirements, acquires the systems to satisfy those requirements, and operates and supports those systems—all with its own resources.

AFTAC supports US Space Command with nuclear detonation information obtained from sensors on all Global Positioning System satellites. AFTAC detachments within US Space Command facilities manage these sensors, process data, and assess any nuclear events detected. AFTAC also supports NASA's manned flights by warning of any potential nuclear radiation exposure to astronauts. AFTAC can track nuclear debris from accidents in a number of possible scenarios, such as satellites reentering

the atmosphere with nuclear materials on board or a nuclear reactor accident like the 1986 disaster at Chernobyl. Such information would be used to change aircraft routing and to warn the general populace in a nuclear emergency.

With the signing of the protocols to the Threshold Test Ban and Peaceful Nuclear Explosions treaties, AFTAC specialists began applying their special skills to assist the On-Site Inspection Agency (OSIA) in monitoring compliance with these historic agreements. AFTAC technicians helped evaluate Soviet seismic equipment and traveled to the former Soviet Union as members of the seismic station inspection teams. AFTAC technicians also helped develop special radiation monitoring equipment to support OSIA inspections under the Intermediate-Range Nuclear Forces Treaty and traveled as members of those teams.

AFTAC employs approximately 1,200 military and civilian personnel.

## Air Force Review Boards Agency

The Air Force Review Boards Agency was established in 1982 to manage various military and civilian appellate processes for the Secretary of the Air Force. The deputy for Air Force review boards directs the operations of the organizations that make up AFRBA, develops overall policy, and acts for the Secretary of the Air Force in deciding individual cases before the various boards. The deputy reports to the Office of the Assistant Secretary of the Air Force for Manpower, Reserve Affairs, Installations, and Environment.

The Air Force Personnel Council reviews a broad range of military personnel issues by seven component boards: the Air Force Personnel Board, Physical Disability Appeal Board, Board of Review, Discharge Review Board, Decorations Board, Clemency and Parole Board, and DoD Civilian/Military Service Review Board. The DoD Civilian/Military Service Review

Board acts as DoD's executive agent in the review of group requests that service by a civilian or contract worker be considered active-duty service.

The Air Force Civilian Appellate Review Agency processes discrimination complaints and grievances filed by Air Force civilian employees. Its Appellate Examining Division provides on-site investigators and grievance examiners to investigate and make recommendations on discrimination complaints and employee grievances to the local commander. The Appellate Review Office analyzes grievances and complaints and recommends a final Air Force decision to the Secretary of the Air Force.

The Air Force Board for Correction of Military Records (AFBCMR) is a statutory board of civilians that examines requests for correction of military records submitted by service members, veterans, or their heirs. Air Force civilian executives are appointed by

the Secretary of the Air Force to serve as members of the board as a collateral duty. The board meets several times each week to consider a broad range of military personnel issues: evaluation reports, discharges, benefits and allowances, and any other issue related to military personnel records. Because it renders the final administrative decision, AFBCMR is known as the "Supreme Court" of the Air Force.

The deputy for Air Force review boards is responsible for rendering final decisions for the Secretary of the Air Force regarding remissions of indebtedness for enlisted members and waivers for officers and civilian personnel. He also coordinates cases having Presidential, congressional, Secretarial, or other interests concerning individual cases, inquiries, or complaints affecting Air Force members or civilian employees and their families.

## Air Force Safety Agency

The Air Force Safety Agency, headquartered at Norton AFB, Calif., is responsible for executing Air Force Safety and Nuclear Surety policies, plans, and programs USAF-wide as directed by the Chief of Safety. AFSA will relocate to Kirtland AFB, N. M., during the summer of 1993. Col. John R. Clapper is the AFSA commander.

The agency comprises eight directorates and a command section. The command section provides legal, budget, personnel, and administrative support. The agency has four mission directorates—Flight Safety, Ground Safety, Weapons and Space Safety (WSS), and Nuclear Surety—and four support directorates, which are Sys-

tem Safety and Engineering, Life Sciences, Safety Education, and Computer Systems.

AFSA oversees all USAF mishap-prevention programs. Strong emphasis is placed on investigating and reporting mishaps, both on and off duty. AFSA makes and tracks recommendations that would prevent further mishaps. The Flight Safety Directorate leads the Air Force's mishap-prevention efforts for manned aircraft. The Ground Safety Directorate concentrates on ensuring a safe work environment. WSS personnel ensure safe handling of explosives, with particular attention to ammunition transportation and storage. Missile and

Space Safety (a subdivision of WSS) specialists oversee mishap-prevention programs for ballistic missiles, remotely piloted vehicles, and satellites. The Directorate of Nuclear Surety is responsible for managerial oversight of the Air Force nuclear weapons surety programs.

The System Safety and Engineering Directorate plays an important role in ensuring safety in the engineering concepts applied to USAF aerospace systems. Emphasis on lessons learned ensures that new systems are engineered to eliminate built-in hazards. Once a system is fielded, systems safety processes follow-up on modifications to upgrade equipment safety.

## Air Force Security Police Agency

The Air Force Security Police Agency at Kirtland AFB, N. M., is commanded by Col. John E. Killeen. It provides the USAF Chief of Security Police a center of expertise for the security of nuclear weapons and weapon systems, infor-

mation security, law enforcement, air base defense, antiterrorism, and combat arms marksmanship and training programs. The agency conducts the annual Peacekeeper Challenge competition involving Air Force and allied

nation security police teams. The agency comprises fifty-five civilian and military personnel organized into three directorates: Physical Security, Law Enforcement and Training, and Safeguarding.

## Air Force Reserve Flying Wings and Assigned Units

Wing Hq.	Group	Squadron	Aircraft	Location	Gaining Command <sup>a</sup>
<b>4th Air Force • Hq. McClellan AFB, Calif. • Maj. Gen. James E. Sherrard III, Commander</b>					
939th RQW		304th RQS	HC-130P, HH-60G	Portland IAP, Ore.	ACC
		301st RQS	HC-130N, HH-60G	Patrick AFB, Fla.	ACC
919th SOW		711th SOS	AC-130A, C-130A	Eglin AFB, Fla. (Aux. 3)	AFSOC
		71st SOS	MH-60G	Davis-Monthan AFB, Ariz.	AFSOC
349th AW (Assoc.)		301st AS (Assoc.)	C-5A/B	Travis AFB, Calif.	AMC
		312th AS (Assoc.)	C-5A/B	Travis AFB, Calif.	AMC
		708th AS (Assoc.)	C-141B	Travis AFB, Calif.	AMC
		710th AS (Assoc.)	C-141B	Travis AFB, Calif.	AMC
433d AW		68th AS	C-5A	Kelly AFB, Tex.	AMC
302d AW		731st AS	C-130E	Peterson AFB, Colo.	AMC
	934th AG	96th AS	C-130E	Minneapolis-St. Paul IAP/ARS, Minn.*	AMC
440th AW		95th AS	C-130H	General Mitchell IAP ARS, Wis.*	AMC
	928th AG	64th AS	C-130H	O'Hare IAP/ARS, Ill.*	AMC
	910th AG	757th AS	C-130H	Youngstown MAP/ARS, Ohio	AMC
445th AW (Assoc.)		729th AS (Assoc.)	C-141B	Norton AFB, Calif.	AMC
		730th AS (Assoc.)	C-141B	Norton AFB, Calif.	AMC
	943d AG	303d AS	C-130B	March AFB, Calif.	AMC
446th AW (Assoc.)		97th AS (Assoc.)	C-141B	McChord AFB, Wash.	AMC
		313th AS (Assoc.)	C-141B	McChord AFB, Wash.	AMC
		728th AS (Assoc.)	C-141B	McChord AFB, Wash.	AMC
	932d AAG (Assoc.)	73d AAS (Assoc.)	C-9A	Scott AFB, Ill.	AMC
<b>10th Air Force • Hq. Bergstrom AFB, Tex. • Maj. Gen. David R. Smith, Commander</b>					
301st TFW		457th FS	F-16C/D	Carswell AFB, Tex.	ACC
	924th FG	704th FS	F-16A/B	Bergstrom AFB, Tex.	ACC
	926th FG	706th FS	F-16C/D	NAS New Orleans, La.	ACC
419th FW		466th FS	F-16A/B	Hill AFB, Utah	ACC
	507th FG	465th FS	F-16A/B	Tinker AFB, Okla.	ACC
	944th FG	302d FS	F-16C/D	Luke AFB, Ariz.	ACC
434th Wing		72d ARS	KC-135E	Grissom AFB, Ind.	ACC
		74th ARS	KC-135E	Grissom AFB, Ind.	ACC
	916th ARG	77th ARS	KC-10A	Seymour Johnson AFB, N. C.	ACC
	927th AG	63d ARS	KC-135E	Selfridge ANGB, Mich.	AMC
	930th Opns. Gp.	45th FS	A-10A	Grissom AFB, Ind.	ACC
442d FW		303d FS	A-10A	Richards-Gebaur AFB, Mo.*	ACC
917th FW		47th FS	A-10A	Barksdale AFB, La.	ACC
		46th FTS	A-10A	Barksdale AFB, La.	ACC
452d ARW		336th ARS	KC-135E	March AFB, Calif.	AMC
		79th ARS	KC-10A	March AFB, Calif.	AMC
	940th ARG	314th ARS	KC-135E	Mather AFB, Calif.	AMC
	98th ARG	78th ARS	KC-10A	Barksdale AFB, La.	AMC
482d FW		93d FS	F-16A/B	Patrick AFB, Fla.	ACC
	906th FG	89th FS	F-16A/B	Wright-Patterson AFB, Ohio	ACC
<b>14th Air Force • Hq. Dobbins AFB, Ga. • Brig. Gen. Wallace W. Whaley, Commander</b>					
94th AW		700th AS	C-130H	Dobbins ARB, Ga.*	AMC
	911th AG	758th AS	C-130H	Greater Pittsburgh IAP/ARS, Pa.*	AMC
	914th AG	328th AS	C-130H	Niagara Falls IAP/ARS, N. Y.*	AMC
315th AW (Assoc.)		300th AS (Assoc.)	C-141B	Charleston AFB, S. C.	AMC
		701st AS (Assoc.)	C-141B	Charleston AFB, S. C.	AMC
		707th AS (Assoc.)	C-141B	Charleston AFB, S. C.	AMC
		317th AS (Assoc.)	C-17A	Charleston AFB, S. C.	AMC
403d AW		815th AS	C-130E	Keesler AFB, Miss.	AMC
		815th WS	WC-130E/H	Keesler AFB, Miss.	AMC
	908th AG	357th AS	C-130H	Maxwell AFB, Ala.	AMC
	913th AG	327th AS	C-130E	Willow Grove ARS, Pa.*	AMC
439th AW		337th AS	C-5A	Westover ARB, Mass.*	AMC
459th AW		756th AS	C-141B	Andrews AFB, Md.	AMC
	907th AG	356th AS	C-141B	Rickenbacker ANGB, Ohio	AMC
512th AW (Assoc.)		326th AS (Assoc.)	C-5A/B	Dover AFB, Del.	AMC
		709th AS (Assoc.)	C-5A/B	Dover AFB, Del.	AMC
514th AW (Assoc.)		335th AS (Assoc.)	C-141B	McGuire AFB, N. J.	AMC
		702d AS (Assoc.)	C-141B	McGuire AFB, N. J.	AMC
		732d AS (Assoc.)	C-141B	McGuire AFB, N. J.	AMC

* AFRES Base	<b>ARS</b> Air Refueling Squadron	<b>FW</b> Fighter Wing
<b>AAG</b> Aeromedical Airlift Group	<b>ARW</b> Air Refueling Wing	<b>FTS</b> Fighter Training Squadron
<b>AAS</b> Aeromedical Airlift Squadron	<b>AS</b> Airlift Squadron	<b>RQS</b> Rescue Squadron
<b>AG</b> Airlift Group	<b>Assoc.</b> Associate	<b>RQW</b> Rescue Wing
<b>ANGB</b> Air National Guard Base	<b>AW</b> Airlift Wing	<b>SOS</b> Special Operations Squadron
<b>ARB</b> Air Reserve Base	<b>FG</b> Fighter Group	<b>SOW</b> Special Operations Wing
<b>ARG</b> Air Refueling Group	<b>FS</b> Fighter Squadron	<b>WS</b> Weather Squadron

<sup>a</sup>All units assigned to MAC, TAC, and SAC bases were reassigned to Air Combat Command, Air Mobility Command, Air Force Materiel Command, or Air Force Intelligence Command in summer 1992. Some AFRES units were assigned to new composite wings.



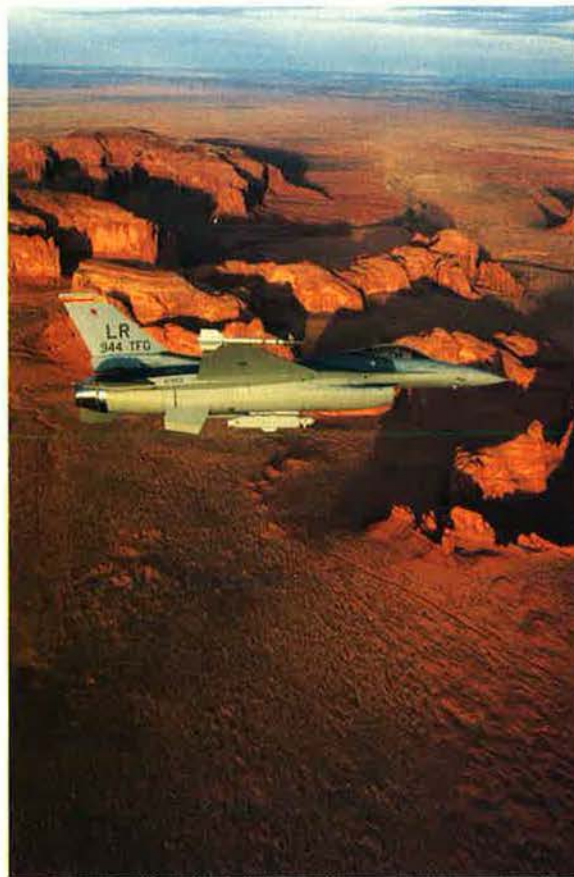
## Air Force Reserve

The Air Force Reserve had its busiest year in peacetime history in 1992. Reserve F-16 crews flew missions over Iraq in Operation Provide Comfort. Hundreds of Reservists volunteered for duty in Operation Restore Hope in Somalia. The majority of AFRES support is in the airlift and tanker arenas. Reservists were integral to the transportation of tons of relief supplies to Bosnia as part of Operation Provide Promise. They also look part in Operation Provide Hope II, a major airlift of food and medicine to nations of the former Soviet Union.

Reservists were busy at home after Hurricane Andrew struck southern Florida and Louisiana. Storm trackers from the Reserve flew into the eye of the hurricane sixty-eight times, relaying valuable information to the National Hurricane Center. AFRES personnel took part in rescue operations, working around-the-clock and providing medical support. Two AFRES spray-configured C-130s provided insect control in southern Florida. Reserve civil engineers helped erect tent cities.

***Air Force Reserve squadrons fly top-of-the-line combat aircraft like this F-16C of the 944th Fighter Group at Luke AFB, Ariz. Last year, the busiest in AFRES history, saw the creation of the first AFRES composite wing: the 434th Wing of A-10s and KC-135s at Grissom AFB, Ind.***

Photo © Joe Towers



***Air Force Reservists played a big part in Operation Restore Hope in Somalia and numerous other relief operations at home and abroad. AFRES's three numbered air forces were remodeled to resemble their active-force counterparts.***

Maj. Gen. John J. Closner, chief of Air Force Reserve, hosted a meeting to exchange information about prob-

lems that surfaced in the mobilization for Operation Desert Storm. Thirty-six participants from across the nation, representing a range of industrial, medical, and government organizations, took part.

In the reorganization and restructuring arena, the Air Force Reserve's numbered air forces (4th, 10th, and 14th) were streamlined to mirror their active-duty counterparts. They are now combat-oriented operational headquarters with operations, safety, and logistics functions. Other numbered air force functions were transferred to AFRES headquarters and wings. The Reserve's first composite wing was formed at Grissom AFB, Ind., when its KC-135 and A-10 units joined to become the 434th Wing.

Recognizing the active-duty Air Force's success with family issues, the Reserve increased its emphasis on family support in 1992. A Family Support Office was established at AFRES headquarters. Eventually all AFRES-owned bases will have a director of family support. At the other bases, unit-level family support functions are handled by career advisors.

A growing responsibility for the Air Force Reserve is the mounting need to support national counter-narcotics efforts. The Reserve flies Drug Enforcement Agency officers and equipment and provides special operations training to law enforcement agencies.

espionage, terrorism, sabotage, economic crime, and other crimes that may threaten Air Force resources. AFOSI commanders work closely with local Air Force commanders.

Local AFOSI detachments have on-call specialists to assist them. Electronics, computer, forensic, and behavioral-science specialists routinely deploy worldwide to protect Air Force people and resources. AFOSI's polygraph examiners provide valuable investigative support.

AFOSI has about 2,200 personnel, of whom two-thirds are special agents. Eighty-eight percent of the special agents are military, and twelve per-

cent are civilian. AFOSI recruits, selects, and trains its special agents, who come from almost every Air Force specialty and many civilian occupations. Each year, new special agents are trained at the USAF Special Investigations Academy, also at Bolling AFB. Almost 400 Individual Mobilization Augmentees or Reservists provide a wealth of civilian experience through AFOSI's Reserve program.

Investigating such major crimes as drug trafficking, murder, theft, rape, and assault consumes the largest portion (about forty percent) of AFOSI man-hours. These are AFOSI's most visible efforts and most directly affect

USAF discipline. Fighting fraud at all levels is one of AFOSI's priorities, particularly in major weapon system procurement where inferior parts can affect flight safety, false accounting can cost taxpayers millions of dollars, and corruption can degrade the integrity of the government procurement system.

Foreign intelligence service activities and terrorist threats directed against Air Force people and resources remain high-priority concerns for AFOSI. AFOSI's counterintelligence analysts are recognized within DoD as experts on active worldwide terrorist organizations.

## Air Force Program Executive Office

Air Force Program Executive Officers manage and are directly accountable for the execution (cost, schedule, and performance) of major and selected Air Force acquisition programs. There are six PEOs, each managing a portfolio of mission-area programs assisted by a small military and civilian staff.

The PEO structure was established as a direct reporting unit of the Office of the Air Force Acquisition Executive/Assistant Secretary for Acquisition in February 1990, based on recommendations of the Packard Commission and the Defense Management Review, and is now an FOA. The structure streamlines the chain of command between the program directors and the Air Force Acquisition Executive. The PEOs' only responsibilities are the programs in their portfolios.

Maj. Gen. Richard M. Scofield is the Bombers, Missiles, and Trainers PEO. His programs include the B-1B,

B-2, Silo-Based ICBM, and Joint Primary Aircraft Training System.

The Conventional Strike Systems PEO is Maj. Gen. Stephen M. McElroy. His programs include the Advanced Medium-Range Air-to-Air Missile, Sensor-Fuzed Weapon, Joint Surveillance and Target Attack Radar System, Powered GBU-15, Triservice Standoff Attack Missile, Joint Standoff Weapon, and Joint Direct Attack Munition.

The Tactical and Airlift Systems PEO, Maj. Gen. Charles E. Franklin, manages the F-15, F-16, F-22, and C-17 programs.

John M. Gilligan is the Information Systems PEO. His portfolio includes the Air Mobility Command C<sup>2</sup> Information Processing System, Combat Ammunition System, the Integrated Computer-Aided Software Engineering, Requirements Data Bank, Reliability and Maintainability Information System, Navy Super Minicomputer,

Depot Maintenance Management Information System, Contingency Technical Air Control System, Automated Planning System, and Air Force Wing Command and Control System.

Programs under Maj. Gen. Garry A. Schnelzer, PEO for Space Systems, include the Defense Support Program, Defense Satellite Communications System, Follow-On Early Warning System, Titan IV, Milstar, and Global Protection Against Limited Strikes (Brilliant Eyes and Brilliant Pebbles).

Command, Control, and Communications (C<sup>3</sup>) Systems PEO Maj. Gen. Kenneth R. Israel handles the E-3A Airborne Warning and Control System, Cheyenne Mountain Upgrade, Peace Shield, Follow-On Tactical Reconnaissances, and International Joint STARS.

The PEO structure will continue to be refined and improved to meet the evolving needs of today's Air Force.

## Air Force Real Estate Agency

On August 1, 1991, the Air Force Real Estate Agency was established as a new field operating agency attached to the Office of the Assistant Secretary of the Air Force for Manpower, Reserve Affairs, Installations, and Environment.

AFREA works directly with the Office of the Deputy Assistant Secretary for Installations on a daily basis to acquire, manage, and dispose of real property worldwide for the Air Force. The agency maintains a complete land and facilities inventory,

establishes Air Force Directives in the 87 series (Real Property Management), and implements Air Force Instructions in the AFI 870100 series.

AFREA is located at Bolling AFB, D. C.

## Air Force Morale, Welfare, Recreation, and Services Agency

The Air Force Morale, Welfare, Recreation, and Services Agency is responsible to the Director of Air Force Morale, Welfare, Recreation, and Services. This Air Staff organization is responsible to the Air Force Chief of Staff for policy development, resource advocacy, and program oversight for all Air Force morale, welfare, recreation, and services (MWRS) activities.

AFMWRSA is commanded by Col. David F. Honeycutt and headquartered at Randolph AFB, Tex. Its mission is to support Air Force people by developing procedures, providing technical guidance, fielding new initiatives, and managing selected central programs that promote MWR and services programs and policies.

AFMWRSA was created in 1991 by integrating the Air Force Services and

Air Force Morale, Welfare, and Recreation communities. Services functions were part of the Air Force Civil Engineering and Services Agency until the October 1991 integration of MWR and Services. This combined strength improves service to customers and provides greater opportunities for personal and professional growth.

The agency's responsibilities include developing and disseminating procedures to implement policy, preparing and coordinating responses to congressional and other high-level inquiries, providing technical assistance to the field, and developing new programs that support major command and installation activities. The agency manages Air Force nonappropriated central funds and operates central systems for field support, such as

banking, investments, purchasing, data flow, insurance and benefit programs, and the nonappropriated-fund personnel system. In addition, the agency supports the Air Force Morale, Welfare, and Recreation Advisory Board and interacts with other agencies and armed services in areas affecting MWRS.

AFMWRSA provides technical support, guidance, and consultant services to Air Staff, major command, and base-level MWRS managers in support of fitness centers, lodging, dining facilities, mortuary affairs, child-development centers, youth programs, sports, entertainment programs, arts and crafts, fine and casual dining, outdoor recreation, and membership programs, such as aero, rod and gun, scuba, and audio clubs.

## Air Force News Agency

The Air Force News Agency is the source of leadership communications for the Air Force (members—active-duty, civilian, Guard, and Reserve—families, and the American public). AFNEWS gathers, packages, and disseminates electronic and printed news and information products during wartime and peacetime.

AFNEWS is commanded by Col. Ted G. Tilma, who reports to the director, Secretary of the Air Force Office of Public Affairs. AFNEWS has three mission elements: the Air Force Internal Information Directorate, the Army and Air Force Hometown News Service, and the Air Force Broadcasting Service.

Air Force Internal Information provides news and information through print and electronic products and ser-

vices. Among these are *Airman* Magazine, the Air Force Policy Letter, Air Force Television News, and Air Force Radio News. The Air Force News Service provides information to 270 base newspapers with an estimated readership of 2.9 million Air Force people worldwide.

The Army and Air Force Hometown News Service reports on the individual accomplishments of active-duty and reserve component members and certain DoD civilians. More than 13,000 newspapers and radio and television stations subscribe.

The Air Force Broadcasting Service operates all USAF-managed Armed Forces Radio and Television Service (AFRTS) outlets, manages all mini-TV outlets, and provides programming guidance for command-

er's cable access channels overseas. AFRTS is the world's largest radio and television network. Its 160 outlets reach an estimated audience of one million. More than 600 airmen, soldiers, sailors, Marines, and civilian employees serve in the broadcast operation.

AFNEWS is the executive agent for DoD work-force standards, wartime planning for AFRTS, and wartime planning and support for Air Force Public Affairs. The agency also operates the Air Force Public Affairs Network, a computer network that connects all public affairs offices and provides access to a central resource library, and manages and operates the Air Force Hotline. AFNEWS operates with a staff of nearly 400 military members and more than 150 civilian employees.

## Air Force Office of Special Investigations

The Air Force Office of Special Investigations has been the Air Force's major investigative service since August 1, 1948. Headquartered at Bolling AFB, D. C., it is commanded by Brig.

Gen. Francis R. Dillon, who will be replaced as commander by Col. (Brig. Gen. selectee) Robert A. Hoffmann early in May.

AFOSI provides criminal investiga-

tive and counterintelligence information and services to commanders throughout the Air Force. AFOSI seeks to identify and prevent criminal activity, including homicide, drug abuse,



## Our Pledge

I pledge allegiance to the flag  
of the United States of America  
and to the republic for which it stands,  
one nation  
under God,  
indivisible,  
with liberty  
and justice for all.



**E-SYSTEMS**

The science of systems.

Military 3,128; civilians 1,603. Payroll \$126 million. Housing: 295 officer, 1,100 NCO, 165 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; 648th Support Gp. Associate units include 615th School Sqdn. (Systems Acquisition School); Air Force Medical Support Agency; 6906th Electronic Security Sqdn.; Air Force Center for Environmental Excellence; Medical Systems Implementation & 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 1,830; civilians 1,395. Payroll \$98 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, EF/F-111F/G fighter operations. Base activated 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. Main runway 10,400 ft., secondary runway 8,000 ft. Altitude 4,295 ft. Military 5,200; civilians 496. Payroll \$126.1 million. Housing: 143 officer, 1,217 enlisted, 81 transient (20 VAQ, 30 VOQ, 31 TLF). 20-bed hospital.

**Carswell AFB, Tex.** 76127-5000; 7 mi. WNW of downtown Fort Worth. Phone (817) 782-5000; DSN 739-1110. ACC base. 7th Bomb Wing; 301st Fighter Wing (AFRES); aircraft include AFRES F-16s. Base activated Aug. 1942; named Jan. 30, 1948, for Maj. Horace S. Carswell, Jr., native of Fort Worth, WW II B-24 pilot, and posthumous Medal of Honor recipient. Area 3,274 acres. Runway length NA. Altitude 650 ft. Military 2,100; civilians 1,200. Payroll \$484.2 million. Housing: 79 officer, 93 NCO, 40 VOQ, 18 TLF, 41 VAQ, 14 VIP. Hospital scheduled to close June 30, 1993; care limited to active-duty and their family members only. Base scheduled to become an AFRES installation Oct. 1, 1993.

**Castle AFB, Calif.** 95342-5000; 7 mi. NW of Merced. Phone (209) 726-2011; DSN 347-1110. ACC base. 93d Bomb Wing; 398th Operations Group (AMC). Conducts training of all ACC B-52 and AMC KC-135 aircrews. Site of Castle Air Museum. Base activated Sept. 1941; named for Brig. Gen. Frederick W. Castle, WW II B-17 pilot and Medal of Honor recipient. Area 2,700 acres. Runway length NA. Altitude 188 ft. Military 4,731; civilians 492. Payroll \$145.9 million. Housing: 92 officer, 841 NCO, 392 transient (incl. 88 VAQ, 272 VOQ, 12 family quarters, 20 DVQ). 25-bed hospital. Base scheduled to close Oct. 1, 1995.

**Chanute AFB, Ill.** 61868-5000; 14 mi. N of Champaign at Rantoul, Ill. Phone (217) 495-1110; DSN 862-1110. ATC base. Host unit, 3330th Technical Training Wing, deactivates June 30, 1993. Base activated May 1917; named for Octave Chanute, aeronautical engineer and glider pioneer who died in 1910. Area 2,174 acres. Runway length NA. Altitude 735 ft. Payroll, housing data NA. Base scheduled to close Oct. 1, 1993.

**Charleston AFB, S. C.** 29404-5000; located 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, 107th Fighter Gp.; Det. 17, Site Activation Task Force; Field Training Det. 317; Det. 719, Air Force Office of Special Investigations; 1st Combat Camera Sqdn. Base activated Oct. 1942; inactivated March 1946; reactivated Aug. 1953. Area 6,235 acres (incl. auxiliary airfield). Runway length NA. Altitude 45 ft. Military 7,733 (incl. AFRES); civilians 1,946. Payroll \$163 million. Housing: 127 officer, 850 NCO, 1,636 dormitory spaces, 75 trailer spaces, 535 transient (7 DV suites, 128 VOQ, 400 VAQ). Medical clinic.

**Cheyenne Mountain AFB, Colo.** 80914-5515; 6 mi. S of Colorado Springs. Phone (719) 473-4010; DSN 268-1011. AFSPACCOM base. Host unit: 21st Space Wing (AFSPACCOM). 721st Space Group, North American Aerospace Defense Command (NORAD) Command Center, and US Space Command operations center. Base activated 1966. Area 451 acres. Runway length NA. Altitude 7,200 ft. More than 1,400 people representing US Army, Navy, and Air Force; Canadian Forces; and civilian

technicians. No housing or transient quarters. Medical aid station.

**Columbus AFB, Miss.** 39701-5000; 10 mi. NNW of Columbus. Phone (601) 434-7322; DSN 742-1110. ATC base. As of July 1, 1993, becomes an AETC base. 14th Flying Training Wing, undergraduate pilot training. Base activated 1941 for pilot training. Area 6,015 acres. Runway length NA. Altitude 214 ft. Military 2,000; civilians 550. Payroll \$53 million. Housing: 357 officer, 448 NCO, 60 transient. 7-bed hospital.

**Davis-Monthan AFB, Ariz.** 85707-5000; within the city limits of Tucson. Phone (602) 750-3900; DSN 361-1110. ACC base. 355th Wing; Hq. 12th Air Force (transfers from Bergstrom AFB, Tex., June 1, 1993); A-10 combat crew training; OA-10 and FAC training, operations, and management of 12th Air Force Air Operations Gp.; 41st and 43d Electronic Combat Sqdns., EC-130H electronic operations; 71st Special Operations Sqdn. (AFRES), MH-60G Pave Hawk helicopter operations; Det. 1, 120th Fighter Gp. (Mont. 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 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 5,155; civilians 1,369. Payroll \$174.1 million. Housing: 133 officer, 1,106 enlisted, 518 transient (334 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 1946; reactivated Feb. 1951. Area 3,908 acres. Runway length NA. Altitude 28 ft. Military 7,243; civilians 1,302. Payroll \$111.4 million. Housing: 108 officer, 1,448 enlisted, 616 transient (451 VAQ, 151 VOQ, 14 TLF). 20-bed hospital.

**Dyess AFB, Tex.** 79607-1960; WSW border of Abilene. Phone (915) 696-0212; DSN 461-1110. ACC base. 96th Wing, two B-1B squadrons (one operational, one training), one KC-135 squadron; 463d Airlift Wing, two C-130 squadrons; 12th Flying Training Wing ACE Det. OLC. First base to activate an operational B-1B wing. Conducts all B-1 combat crew training for the Air Force. First B-1B arrived June 1985; wing met initial operational capability Oct. 1986. Base activated Apr. 1942; deactivated 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., Dec. 1943. Area 6,405 acres. Runway 13,500 ft. Altitude 1,789 ft. Military 5,060; civilians 589. Payroll \$200 million. Housing: 120 officer, 870 NCO, 179 VAQ/VOQ, 40 TLF. 20-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 Lab's Astronautics Directorate, US Army Aviation Engineering Flight Activity, NASA's Ames Dryden Flight Research Facility, Jet Propulsion Laboratory's test facility, and secondary landing site for space shuttle missions. Base activities began in Sept. 1933. Originally Muroc Army Air Field; renamed for Capt. Glen W. Edwards, killed June 5, 1948, in crash of a YB-49 "Flying Wing." Area 301,000 acres. Twenty-one runways from 4,000 to 39,000 ft. Altitude 2,302 ft. Military 4,229 (incl. associate units); government and contract civilians 10,439. Payroll \$616.4 million (incl. associate units and contractors). Housing: 536 officer (incl. BOQ), 2,455 enlisted (incl. 765 dormitory spaces and 191 BNCOQ), 196 transient (60 VAQ, 70 VOQ, 5 SNOQ, 10 VIP/VOQ, 51 TLF), 188 mobile home spaces, 15-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 land area, 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; Air Warfare Center; Hq. 646th Communications-Computer Systems Gp.; 919th Special Operations Wing (AFRES); 20th Space Surveillance Sqdn.; 55th Special Operations Sqdn.; 9th Special Operations Sqdn.; 655th Special Operations Maintenance Sqdn.; 728th Tactical Control Sqdn.; US Army Ranger Training Battalion; a US Navy Explosive Ordnance Disposal School; Air Force Armament Museum. Base activated 1935; named for Lt. Col. Frederick I. Eglin, WW I flyer killed in aircraft accident Jan. 1, 1937. Area 463,452 acres. Runway length NA. Altitude 85 ft. Military 9,175; civilians 4,823 (excl. Hurlburt Field). Payroll \$452.4 million (excl. Hurlburt Field). Housing: 235 officer, 2,099 enlisted, 226 trailer spaces (officer and enlisted), 87 family transient. 120-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: 343d Wing, F-16C/D fighter operations and OA-10 forward air control operations. Cope Thunder exercises assigned in 1992 increased the base population by 126 permanent party military and civilians and 2,000 temporary duty members. Arctic Survival School (ATC); 168th Air Refueling Gp. (ANG). Base activated Oct. 1944; named for Carl Ben Eielson, Arctic aviation pioneer who died Nov. 1929. Area 23,500 acres. Runway length NA. Altitude 534 ft. Military 3,500; civilians 1,384. Payroll \$135.1 million. Housing: 140 officer, 1,227 enlisted. Unaccompanied housing: 2 officer, 767 enlisted, 118 VOQ, 152 VAQ. Clinic.

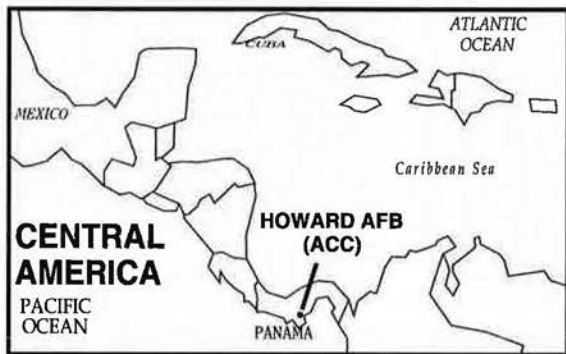
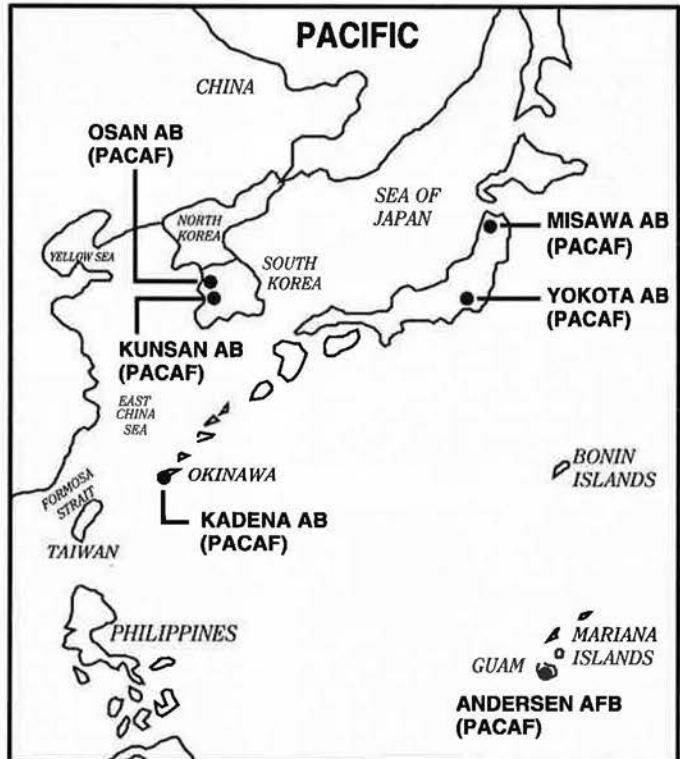
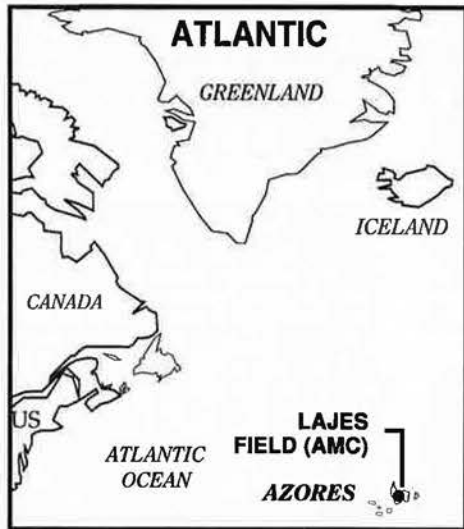
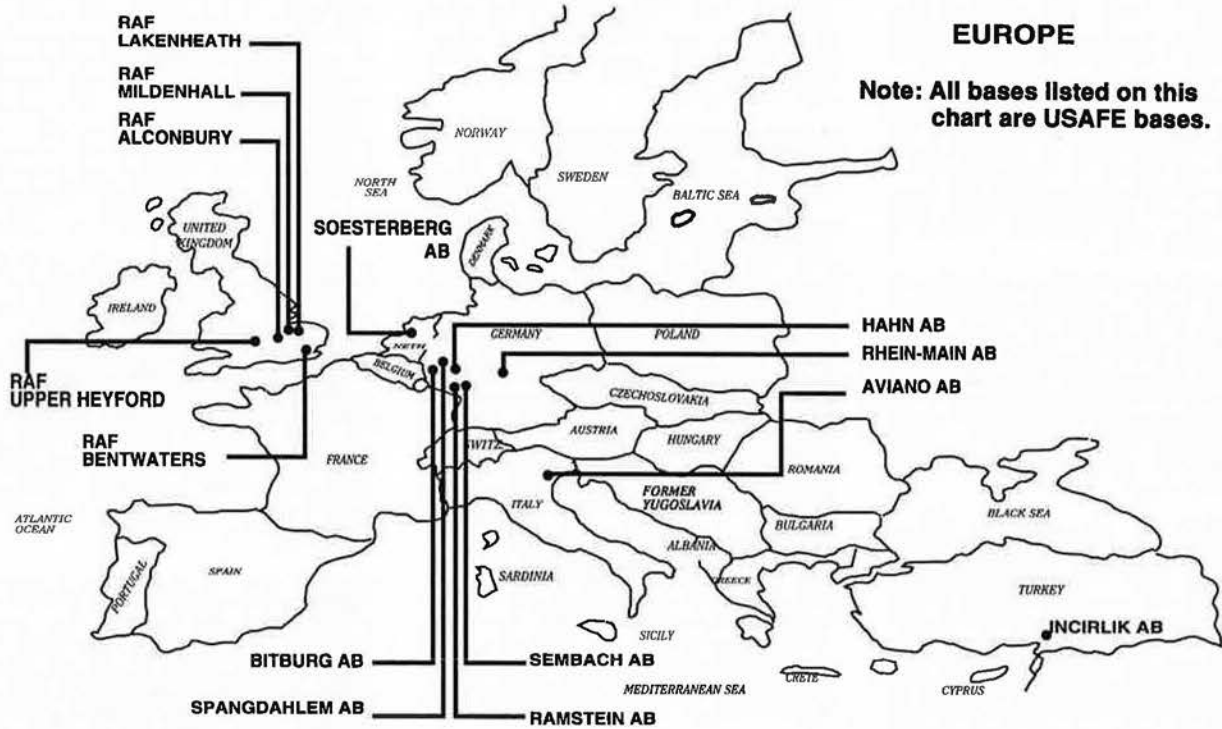
**Ellsworth AFB, S. D.** 57706-5000; 12 mi. ENE of Rapid City. Phone (605) 385-1000; DSN 675-1000. ACC base. Host unit: 28th Bomb Wing, two B-1B squadrons. Associate units: 44th Missile Wing, inactivating Minuteman II operations by 1995, UH-1; 99th Tactics and Training Wing, Air Force's focal point for strategic tactics development and bomber crew training. AMC's 28th Air Refueling Squadron, KC-135R; home of South Dakota Air and Space Museum. Base activated July 1942 as Rapid City Army Air Base; 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 6,055; civilians 588. Payroll \$158 million. Housing: 364 officer, 1,722 enlisted, 216 transient units (7 DV, 70 VOQ, 61 VAQ, 48 Tactics and Training Center crew quarters, 30 TLF). 25-bed hospital.

**Elmendorf AFB, Alaska** 99506-5000; bordering Anchorage. Phone (907) 552-1110; DSN (317) 552-1110. PACAF base. Hq. Alaskan Command; Hq. 11th Air Force (PACAF); Hq. Alaskan NORAD Region. Host unit: 3d Wing, F-15/F-15E fighter and C-130, C-12 airlift operations, E-3 airborne warning and control operations, and 3d Medical Center. Tenant units: 11th Air Control Wing (PACAF); Alaskan NORAD Region Operations Control Center; Rescue Coordination Center (ANG); 6981st Electronic Security Gp. (AFIC); 616th Airlift Support Sqdn. (AMC); plus varied US Army, Navy, and Marine activities. Base activated 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. Runway length NA. Altitude 118 ft. Military 6,300; civilians 2,425. Payroll \$225 million. Housing: 243 officer, 1,473 NCO, 94 temporary lodging units, 94 VOQ, 301 VAQ. Unaccompanied housing: 1,300 enlisted. 75-bed hospital.

**Fairchild AFB, Wash.** 99011-5000; 12 mi. WSW of Spokane. Phone (509) 247-1212; DSN 657-1212. ACC base. 92d Bomb Wing; 366th Crew Training Gp. (ATC); 141st Air Refueling Wing (ANG); 453d Operations Gp. (AMC); Det. 24, 37th Air Rescue Sqdn. (AMC); Det. 1, 6th Satellite Operations Sqdn. (AFSPACCOM). Base activated Jan. 1942; named for Gen. Muir S. Fairchild, USAF Vice Chief of Staff at his death in 1950. Area 4,551 acres. Runway length NA. Altitude 2,462 ft. Military 4,344; civilians 2,048. Payroll \$113.8 million. Housing: 184 officer, 1,327 NCO, 8 temporary lodging facilities, 40-bed hospital.

**Falcon AFB, Colo.** 80912-5000; 10 mi. E of Colorado Springs. Phone (719) 550-4113; DSN 560-1110. AFSPACCOM base. Host unit: 50th Space Wing. Tenant units: 73d Space Gp.; Air Force Space Forecast Center; Strategic Defense Initiative National Test Facility. Base activated Sept. 26, 1985. Area 3,840 acres. Runway length NA.

# USAF's Major Installations Overseas



Altitude 6,267 ft. Military active-duty 1,900; civilians 300; 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. ACC base. As of July 1, 1993, becomes an AFSPACECOM base. 90th Missile Wing, UH-1; 37th Air Rescue Sqdn. 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, plus 50 Peacekeeper and 150 Minuteman III missile sites distributed over 12,600 sq. mi. in Wyoming, Colorado, and Nebraska. Runway length NA. Altitude 6,142 ft. Military 3,295; civilians 671. Payroll \$127 million. Housing: 114 officer, 717 enlisted, 36 transient. 20-bed hospital.

**Goodfellow AFB**, Tex. 76908-5000; 2 mi. SE of San Angelo. Phone (915) 654-3231; DSN 477-3231. ATC base. As of July 1, 1993, becomes an AETC base. Goodfellow Training Center provides technical training for all Air Force people entering intelligence career fields and also provides cryptologic training for members of the other military services, civilian intelligence agencies, and foreign military services. Major units include 391st Technical Training Gp. (ATC); 8th Space Warning Sqdn. (AFSPACECOM) at nearby Eldorado AFS, the location of Southwest Pave Paws radar site; Goodfellow NCO Academy; 344th Military Intelligence Battalion (Army); Naval Technical Training Center Detachment; Marine Corps Detachment. Base activated Jan. 1941; named for Lt. John J. Goodfellow, Jr., WW I fighter pilot killed in combat Sept. 14, 1918. Area 1,136 acres. Runway length NA. Altitude 1,877 ft. Military 3,134; civilians 622. Payroll \$97 million. Housing: 35 officer, 264 NCO, 934 transient (734 VAQ, 170 VOQ, 30 TLF). Clinic.

**Grand Forks AFB**, N. D. 58205-5000; 16 mi. W of Grand Forks. Phone (701) 747-3000; DSN 362-1110. ACC base. 319th Bomb Wing (KC-135R and B-1B); 321st Missile Wing (Minuteman III, UH-1); 409th Field Training Det. (ATC); Det. 3, 37th Air Rescue Sqdn. Base activated 1956; named after the city of Grand Forks, whose citizens bought the property for the Air Force. Area 5,422 acres. Missile complex covers an additional 7,500 sq. mi. Runway 12,350 ft. Altitude 911 ft. Military 4,893; civilians 589. Payroll \$132 million. Housing: 384 officer, 1,887 NCO, 136 transient. 15-bed hospital.

**Griffiss AFB**, N. Y. 13441-5000; 1 mi. NE of Rome. Phone (315) 330-1110; DSN 587-1110. ACC base. 416th Bomb Wing; Rome Laboratory (AFMC); 485th Engineering Installation Gp.; Northeast Air Defense Sector; 509th Air Refueling Sqdn. (AMC). Base activated Feb. 1, 1942; named for Lt. Col. Townsend E. Griffiss, killed in aircraft accident Feb. 15, 1942 (the first US airman to lose his life in Europe during WW II while in the line of duty). Area 3,896 acres. Runway 11,820 ft. Altitude 504 ft. Military 4,523; civilians 2,630. Payroll \$297.2 million. Housing: 169 officer, 566 NCO, 50 trailers, 109 transient. 25-bed hospital.

**Grissom AFB**, Ind. 46971-5000; 7 mi. S of Peru. Phone (317) 688-5211; DSN 928-1110. AMC base. As of Oct. 1, 1994, becomes a Reserve base. 305th Air Refueling Wing; 434th Wing (AFRES). Activated Jan. 1943 for Navy flight training; reactivated June 1954 as Bunker Hill AFB; renamed May 1968 for Lt. Col. Virgil L. "Gus" Grissom, killed Jan. 27, 1967, at Cape Kennedy, Fla., with astronauts Edward White and Roger Chaffee in Apollo capsule fire. Area 3,181 acres. Runway 12,500 ft. Altitude 800 ft. Military 2,308; civilians 1,357. Payroll \$88.9 million. Housing: 144 officer, 972 NCO, 133 transient. Clinic, outpatient care only.

**Gunter AFB**, Ala. 36114; see Maxwell AFB, Gunter Annex.

**Hahn AB**, Germany, APO AE 09122-5000; 2 mi. from Sohren, approx. 70 mi. W of Frankfurt. Phone (commercial, from CONUS) 011-49-6543-51-1110; DSN 450-1110. USAF base. 583d Air Base Gp. Base activated in 1951; USAF began operations in 1953. Base returns to host nation control by Oct. 1, 1993. Area 1,920 acres. Runway length NA. Altitude 1,560 ft. Military 978; civilians 450. Payroll \$42.3 million. Housing: 672 apts., 302 US govt. leased housing. Billeting: 22 officer, 86 enlisted, 19 TLF. Clinic.

**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>3</sup>I systems. Also site of Geophysics Directorate of Phillips Lab (AFMC), center for research and exploratory development in the terrestrial, atmospheric, and space environments, as well as 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 2,391; civilians 2,398. Payroll \$214 million. Housing: 387 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; subordinate unit 10th Defense Gp. Major tenant units include 154th Composite Gp. (ANG); 619th Airlift Support Gp. (AMC). Base activated 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 length NA. Altitude sea level. Military 5,077; civilians 1,627. Payroll \$233.4 million (incl. Hickam and Fort Kamehameha). Housing: 569 officer, 1,940 enlisted. Unaccompanied housing: 24 officer, 1,016 enlisted, 266 VOQ, 234 VAQ. Clinic.

**Hill AFB**, Utah 84056-5990; 8 mi. S of Ogden. Phone (801) 777-7221; DSN 458-1110. AFMC base. Hq. Ogden Air Logistics Center. Contributes to Integrated Weapon System Management and logistics support for silo-based ICBMs (Minuteman and Peacekeeper); F-4, 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 545th Test Gp. (AFMC), which manages the Utah Test and Training Range; 388th Fighter Wing (ACC); and 419th Fighter Wing (AFRES). Hill AFB Aerospace Museum. Base activated Nov. 1940; named for Maj. Ployer P. Hill, killed Oct. 30, 1935, test-flying the first B-17. Area 6,698 acres; manages 962,076 acres. Runway 13,500 ft. Altitude 4,788 ft. Military 4,900; civilians 13,105. Payroll \$587 million. Housing: 179 officer, 966 NCO, 45 transient. 35-bed hospital.

**Holloman AFB**, N. M. 88330-5000; 8 mi. SW of Alamogordo. Phone (505) 479-6511; DSN 867-1110. ACC base. 49th Fighter Wing, F-117 operations (415th, 416th, and 417th Fighter Sqdns.); AT-38B Basic Fighter Transition (49th Training Sqdn., 7th and 8th Fighter Sqdns.); F-4E aircrew training (9th Fighter Sqdn. and 1st German Air Force Training Sqdn.); MH-60 helicopters (rescue and recovery), Taiwanese aircrew training. Det. 1, 475th Weapons Evaluation Gp., QF-106 drone operations; 83d Air Control Sqdn.; 46th Test Gp. (AFMC). Twenty other associate units located at Holloman, including 4th Space Warning Sqdn. (AFSPACECOM) and the Balloon Branch of Phillips Laboratory. Base activated 1942; named for Col. George Holloman, guided-missile pioneer, killed in B-17 crash on Formosa Mar. 19, 1946. Area 57,000 acres. Runways 10,575 ft., 12,131 ft., and 8,054 ft. with 7,044 ft. overrun. Altitude 4,093 ft. Military 4,500; civilians 1,700. Payroll \$203 million. Housing: 191 officer, 1,360 NCO, 483 transient (239 VAQ, 194 VOQ, 50 TLF). 20-bed hospital.

**Homestead AFB**, Fla. 33218-0001; 5 mi. NNE of Homestead. Phone (305) 254-7023; DSN 791-7023. ACC base. 31st Fighter Wing. Base was devastated by Hurricane Andrew in Aug. 1992 and is in caretaker status. No billeting or medical facilities available. Area 3,345 acres. Runway length NA. Altitude 7 ft.

**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, Bergstrom AFB, Tex. (Davis-Monthan AFB, Ariz., after June 1, 1993). Major tenants: 617th Airlift Support Sqdn., 6933d Electronic Security Sqdn. Howard established in 1928 as a military post, known as Bruja Point Military Reservation; later named for Maj.

Charles Harold Howard. Military 2,130; civilians 618. Payroll \$44.4 million. Housing: 256 officer, 918 enlisted.

**Hurlburt Field**, Fla. 32544-5000; 5 mi. W of Fort Walton Beach. For information, DSN 579-1110. AFSOC base. Home of Air Force Special Operations Command, the focal point for all USAF special operations matters. Major tenant: 1st Special Operations Wing, equipped with MC-130E (Combat Talon), AC-130H (Spectre Gunship), and MH-53J (Pave Low) aircraft located at Hurlburt Field. Also part of 1st SOW are the HC-130 and MH-60G (Pave Hawk) aircraft located at Eglin AFB. Other tenants include USAF Special Operations School; 720th Special Tactics Gp.; 23d Special Tactics Sqdn.; Det. 4, Air Weather Service; 834th Operations Support Sqdn.; 41st Training Gp.; Det. 1, 3400th Technical Training Gp. (ATC); Joint Warfare Center; 327th Field Training Det.; Det. 14, 1600th Management Engineering Sqdn.; Special Missions Operational Test and Evaluation Center; 505th Air Control Gp., which includes USAF Air Ground Operations School and 727th Air Control Sqdn.; 823d Civil Engineering Sqdn. RED HORSE; Det. 8, 1361st Combat Camera Sqdn. Base activated 1943; named for Lt. Donald W. Hurlburt, WW II pilot killed Oct. 1, 1943, in a crash on Eglin reservation. Area NA. Runway length NA. Altitude 38 ft. Military 5,800; civilians 753. Payroll \$150 million. Housing: 36 officer, 344 NCO, transient 258 VOQ/VAQ, 24 TLF. Medical clinic only at Hurlburt, but 145-bed hospital at Eglin Regional Hospital 12 mi. away.

**Incirlik AB**, Turkey, APO AE 09824; 10 mi. E of Adana. Phone (commercial, from CONUS) 011-90-71-221774 through 221780; DSN 676-1110. USAF base. Host unit: 39th Tactical Gp., supports rotational weapons training deployments for USAF fighter aircraft. Also home for 628th Airlift Support Sqdn., 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 length NA. Altitude 240 ft. Military 2,094; civilians 2,055. Payroll \$31.2 million. Housing: 950 units, 50 TLF, 212 VAQ, 315 VOQ, 419 dorm rooms, 59 BOQ, 243 TLF will be added during 1993. Regional hospital.

**Kadena AB**, Japan, APO AP 96368-5000; 15 mi. N of Naha, Okinawa. Phone (commercial, from CONUS) 011-81-98938-1111; DSN 630-1110. PACAF base. Host organization: 18th Wing, F-15C-D operations; 909th Air Refueling Sqdn. (PACAF), KC-135 operations; 6990th Electronic Security Sqdn. (AFIC); 961st Airborne Warning and Control Sqdn. (PACAF), E-3 operations; 603d Airlift Support Gp.; 33d Air Rescue Sqdn., HH-3 operations; 353d Special Operations Gp. (AFSOC), C-130 and HC-130 operations; Western Pacific Rescue Coordination Center; 13th Airlift Sqdn., C-12F operations; 82d Reconnaissance Sqdn. Base named for city of Kadena, Japan. Area 12,547 acres. Military 7,097; appropriated fund civilians 3,558; non-appropriated fund civilians, including contractors, 14,010. Payroll \$276.3 million. Housing: 1,909 officer, 6,231 enlisted, 2 temporary lodging units. Unaccompanied housing: 186 officer, 2,562 enlisted, 320 VOQ, 700 VAQ. Clinic. US Naval Hospital at Camp Lester.

**Keesler AFB**, Miss. 39534-2568; located in Biloxi. Phone (601) 377-1110; DSN 597-1110. ATC base. As of July 1, 1993, becomes an AETC base. Keesler Training Center (avionics, communications, electronics, radar systems, computer and command-and-control systems, personnel, weather, and administrative courses); Keesler Medical Center. Hosts AFRES weather reconnaissance units; AFRES airlift unit; ACC airborne command-and-control squadron; AFCC engineering installation group; ATC NCO Academy; ATC PME Center; USAF First Sergeant Academy. Base activated June 12, 1941; named for 2d Lt. Samuel R. Keesler, Jr., WW I aerial observer killed in action Oct. 9, 1918, near Verdun, France. Area 3,546 acres. Runway length NA. Altitude 26 ft. Military 7,073; civilians 2,155. Payroll \$297 million. Housing: 287 officer, 1,666 NCO, 49 trailer spaces, 2,122 transient (366 VOQ, 1,756 VAQ). 350-bed hospital.

**Keflavik Air Station**, Iceland, APO AE 09725; 3 miles SW of Keflavik. Phone 011-354-25-2000, DSN 450-2000. ACC station. Air Forces Iceland reactivated the 35th Wing from George AFB, Calif., which closed Dec. 1992. In Jan. 1993. 56th Air Rescue Sqdn., 57th Fighter Sqdn., 932d Air Control Sqdn. As the only permanent USAF presence in the North Atlantic, AFI's composite force of F-15

fighters, KC-135 tankers, and HH-60 Pave Hawk helicopters provide air defense for Iceland and air superiority for NATO's western flank as the air component of the Icelandic Defense Force, a subunit of command, which reports to USCINCLANT. Area 21,322 acres. Runway 6,963 ft. Altitude 171 ft. Military 1,308, civilians 66. 17-bed Naval 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 distribution support for such USAF aircraft as the C-5A and C-5B, C-17, C-9, QF-106, OV-10A, T-37, T-38, T-41, and T-43. As a specialized heavy repair activity, SA-ALC modernizes and performs heavy depot maintenance on the entire USAF fleet of C-5s and various engines, including the TF39, T56, F100, and Air Force nonaircraft engines. SA-ALC also manages 75 percent of the Air Force's engine inventory, all fuels and lubricants used by the Air Force and NASA, and the Air Force's inventory of boats and ships. Other major units include Hq. Air Force Intelligence Command; Air Force Electronic Warfare Center; Air Force Cryptologic Support Center; Joint Electronic Warfare Center; Air Force News Agency; 433d Airlift Wing (AFRES); 149th Fighter Gp. (ANG); 1827th Electronics Installation Sqdn.; Defense Reutilization and Marketing Office; Air Force Audit Agency Office. 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 in a military aircraft, killed May 10, 1911. Area 3,996 acres. Runway 11,550 ft. Altitude 689 ft. Military 4,850; civilians 16,342. Payroll \$654 million. Housing: 45 officer, 368 NCO. Clinic.

**Kirtland AFB, N. M.** 87117-5000; SE quadrant of Albuquerque. Phone (505) 844-0011; DSN 244-0011. AFMC base. Hq. 377th ABW. Major agencies and units include 542d Crew Training Wing; Air Force Operational Test and Evaluation Center; Phillips Laboratory; 150th Fighter Gp. (New Mexico ANG); Field Command's Defense Nuclear Agency; Sandia National Laboratories; Lovelace Biomedical and Environmental Research Institute; Department of Energy's Albuquerque Operations Office; AFMCO Academy; 3098th Aviation Depot Sqdn.; Air Force Security Police Agency; Air Force Directorate of Nuclear Surety; Interservice Nuclear Weapons School. These agencies furnish nuclear and laser research, development, and testing; advanced helicopter training and search-and-rescue operations; pararescue training; and operational test and evaluation. Other major units include AFMC Nuclear Support Office, Albuquerque Seismological Laboratory, University of New Mexico Civil Engineering Research Facility. Base activated 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 5,710; civilians 13,646. Payroll \$850 million. Housing: 2,122 homes, VAQ/VOQ, 130 officer, 180 enlisted. Air Force/Veterans Administration joint medical center located outside base gates.

**K. I. Sawyer AFB, Mich.** 49843-5000; 21 mi. S of Marquette. Phone (906) 372-6511; DSN 472-6511. ACC base. 410th Bomb Wing; Naval Communications Unit, Marquette; 46th Air Refueling Sqdn. (AMC); Defense Reutilization and Marketing Office; Det. 512, AFOSI. Base activated 1956; named for Kenneth Ingalls Sawyer, former mayor and county commissioner of Marquette, who proposed site for county airport, died 1944. Area 5,202 acres. Runway 12,370 ft. Altitude 1,220 ft. Military 3,300; civilians 600. Payroll \$97.3 million. Housing: 271 officer, 1,398 NCOQ, 9 SNCOQ, 199 trailer spaces, 754 single-room BNCOQ, 18 BOQ, 112 transient (incl. 35 fully furnished TLFs, 35 VAQ, 30 VOQ, 3 DVQ, 9 SNCO DV), 15-bed hospital.

**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 Fighting Falcon in Sept. 1981, making it the first active overseas F-16 wing. Base built by Japanese in 1938. Area 2,174 acres. Runway length NA. Altitude 29 ft. Military 2,631; US civilians 52; local nationals 592. Payroll \$31.4 million. Unaccompanied housing: 263 officer, 3,697 enlisted, 46 VOQ, 120 VAQ, 6-bed hospital.

**Lackland AFB, Tex.** 78235-5000; 8 mi. SW of San Antonio. Phone (210) 671-1110; DSN 473-1110.

ATC base. As of July 1, 1993, becomes an AETC base. Lackland Training Center provides basic military training for all enlisted Air Force members. The base also provides officer training and advanced technical training and hosts the Inter-American Air Forces Academy and Defense Language Institute English Language Center. Wilford Hall USAF Medical Center, the Air Force's largest medical facility, with 1,000 beds, conducts medical education and clinical research. Base activated 1941; named for Brig. Gen. Frank D. Lackland, early commandant of Kelly Field flying school, died 1943. Area 6,726 acres (incl. 3,973 acres at Lackland Training Annex). Runway length NA. Altitude 745 ft. Military 6,896; civilians 3,442; students 6,900. Payroll \$300 million. Housing: 103 officer, 621 NCO, 2,340 transient, plus 158 TLF units.

**Lajes Field, Azores, Portugal,** APO AE 09720-5000; Terceira Island, 900 mi. W of Portugal. DSN 725-1410. AMC base. Host unit: 65th Support Wing. Support base for aircraft crossing the Atlantic. Tenant units: US Forces Azores; Army 1324th Medium Port Command Azores; Naval Security Gp. Activity Azores; Det. 3, Air Force European Broadcasting Sqdn. Base provides en route support for AMC, USAF, USN, USMC, third nation, and other authorized aircraft crossing the Atlantic. US operations began at Lajes Field in 1946. Area 1,148 acres. Runway length NA. Altitude 180 ft. Military 1,179; civilians 1,435. Payroll \$35.2 million. Housing: 99 officer, 390 enlisted, 30 TLF, 178 VOQ, 701 VAQ, 6 DVQ, 4 senior NCO. Nine-bed hospital.

**Langley AFB, Va.** 23665-5000; 3 mi. N of Hampton. Phone (804) 764-9990; DSN 574-1110. ACC base. Hq. Air Combat Command. Host unit: 1st Fighter Wing, F-15 fighter operations. Associate units: 2d Aircraft Delivery Gp. (ACC); 480th Air Intelligence Gp. (ACC); 1912th Computer Systems Gp. (ACC); Air Combat Command Heritage of America Band; Det. 1, 156th Fighter Gp. (ANG); US Army TRADOC Flight Det.; Army/USAF Center for Low-Intensity Conflict. 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 5,411 acres. Runway length NA. Altitude 10 ft. Military 9,162; civilians 3,427. Payroll \$467 million. Housing: 384 officer, 1,250 NCO, 270 transient (92 VAQ, 78 VOQ, 100 TLF). 70-bed hospital.

**Laughlin AFB, Tex.** 78843-5000; 6 mi. E of Del Rio. Phone (210) 298-3511; DSN 732-1110. ATC base. As of July 1, 1993, becomes an AETC base. 47th Flying Training Wing, undergraduate pilot training. Base activated Oct. 1942; named for 1st Lt. Jack T. Laughlin, Del Rio native, B-17 pilot killed over Java on Jan. 29, 1942. Area 5,239 acres. Runway length NA. Altitude 1,080 ft. Military 1,630; civilians 1,060. Payroll \$69.1 million. Housing: 600 units, 54 mobile home sites, 62 transient, 24 TLF. 20-bed 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. AMC base. 314th Airlift Wing, only C-130 training base in DoD, training crew members from all branches of service and some foreign countries. Tenants include Hq. Joint Readiness Training Center, US Army Center (JRTC moves to Fort Polk, La., in June 1993); Ark. ANG; 96th Mobile Aerial Port Sqdn.; 3548th USAF Recruiting Sqdn. Base activated 1955. Area 11,372 acres. Runway length NA. Altitude 310 ft. Military 5,248; civilians 540. Payroll \$159 million. Housing: 182 officer, 1,352 enlisted, 12 single-occupancy dormitories house 908 people, 290 transient (72 VAQ, 218 VOQ), 25-bed hospital.

**Loring AFB, Me.** 04751-5000; 4 mi. W of Limestone. Phone (207) 999-1110; DSN 920-1110. ACC base. 42d Bomb Wing was activated here Feb. 25, 1953, as Limestone AFB; renamed for Maj. Charles J. Loring, Jr., F-80 pilot killed Nov. 22, 1952, in North Korea and posthumously awarded Medal of Honor. Area 11,165 acres. Runway length NA. Altitude 756 ft. Military 2,700; civilians 1,100. Payroll \$85 million. Housing: 303 officer, 1,457 NCO, 122 transient, 4 VIP, 20-bed hospital. Base scheduled to close Oct. 1, 1994.

**Los Angeles AFB, Calif.** 90009-2960; located in South Bay Los Angeles, city of El Segundo, 3 mi. S of Los Angeles IAP. Phone (310) 363-1110; DSN 833-1110. AFMC base. Headquarters of AFMC's

Space and Missile Systems Center, which manages the design, development, acquisition, launch, and on-orbit checkout of DoD's space program and shares rocket booster launch with Air Force Space Command. Support unit is 6592d Air Base Gp. Area 96 acres at Los Angeles AFB and 96 acres at Fort MacArthur Annex and Crest/Heights housing areas. Runway length NA. Altitude 95 ft. Military 1,872; civilians 1,363. Payroll \$150 million. Housing at Fort MacArthur Annex: 574 townhouses, 56 senior enlisted quarters, 29 VOQ, 4 DVQ, 22 TLF. Clinic, commissary, child-care center, and Air Force Family Support Center.

**Lowry AFB, Colo.** 80230-5000; on border between Denver and Aurora. Phone (303) 676-1110; DSN 926-1110. ATC base. As of July 1, 1993, becomes an AETC base. Lowry Training Center conducts training in avionics, space operations, munitions, logistics, and combat camera fields. Other major organizations on the base include the Defense Finance and Accounting Service-Denver Center; Air Reserve Personnel Center; 3320th Correction and Rehabilitation Sqdn. Base activated Oct. 1, 1937; named for 1st Lt. Francis B. Lowry, killed in action Sept. 26, 1918, near Crepon, France, while on a photo mission. Area 2,089 acres. Runway length NA. Altitude 5,400 ft. Military 5,866; civilians 5,064. Payroll \$235.7 million. Housing: 87 officer, 780 NCO, 542 VOQ, 773 VAQ, 40 TLF. USAF clinic on base, with Fitzsimons Army Medical Center 15 minutes away. Base scheduled to become a minor installation Oct. 1, 1994.

**Luke AFB, Ariz.** 85309-5000; 20 mi. WNW of downtown Phoenix. Phone (602) 856-7411; DSN 853-1110. ACC base. As of July 1, 1993, becomes an AETC base. 58th Fighter Wing, F-15E and F-16 operations; 944th Fighter Gp. (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-15E and 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 6,200; civilians 1,400. Payroll \$171 million. Housing: 95 officer, 779 enlisted, 301 transient (137 VOQ, 124 VAQ, 40 TLF). 40-bed hospital.

**MacDill AFB, Fla.** 33608-5000; adjacent to Tampa city limits. Phone (813) 830-1110; DSN 968-1110. ACC base. 56th Fighter Wing, F-16 training operations; Hq. US Special Operations Command; Hq. US Central Command; Joint Communications Support Element; 71st Air Control Sqdn. 56th Fighter Wing conducts training of USAF pilots in the F-16. Base activated Apr. 15, 1941; named for Col. Leslie MacDill, killed in an aircraft accident Nov. 8, 1938, near Washington, D. C. Area 5,631 acres. Runway length NA. Altitude 6 ft. Military 6,920; civilians 2,032. Payroll \$289 million. Housing: 58 officer, 746 enlisted, 357 transient (175 VAQ, 158 VOQ, 24 TLF). 65-bed hospital. Scheduled to become a minor installation Apr. 1, 1994, with transfer of F-16 operations to Luke AFB, Ariz.

**Malmstrom AFB, Mont.** 59402-5000; 1.5 mi. E of Great Falls. Phone (406) 731-1110; DSN 632-1110. AMC base. 43d Air Refueling Wing; 341st Missile Wing. Base activated Dec. 15, 1942; named for Col. Einar A. Malmstrom, WW II fighter commander killed in air accident Aug. 24, 1954. Site of SAC's first Minuteman wing. Area 3,573 acres, plus about 23,000 sq. mi. of missile complex. Runway length NA. Altitude 3,525 ft. Military 4,187; civilians 550. Payroll \$161.6 million. Housing: 258 officer, 1,148 NCO, 105 transient. Clinic.

**March AFB, Calif.** 92518-5000; 9 mi. SE of Riverside. Phone (909) 655-1110; DSN 947-1110. AMC base. Hq. 15th Air Force; 22d Air Refueling Wing; Southwest Air Defense Sector; 22d Medical Gp.; Det. 1, 144th Fighter Wing (ANG); 452d Air Refueling Wing (AFRES); 943d Airlift Gp. (AFRES); 163d Reconnaissance Gp. (Calif. ANG); Customs Aviation Operations Center West. Base activated Mar. 1, 1918; named for 2d Lt. Peyton C. March, Jr., who died in Texas of crash injuries Feb. 18, 1918. Area 6,848 acres. Runway 13,300 ft. Altitude 1,530 ft. Military 6,824; civilians 1,676. Payroll \$164 million. Housing: 107 officer, 803 NCO, 172 transient. 80-bed hospital.

**Mather AFB, Calif.** 95655-5000; 12 mi. ESE of Sacramento. Phone (916) 364-1110; DSN 674-



1110. ATC base. Host unit is the 323d Flying Training Wing (undergraduate navigator training moves to Randolph AFB, Tex.), inactivates Sept. 30, 1993. Base activated 1918; named for 2d Lt. Carl S. Mather, killed in midair collision Jan. 30, 1918, in Texas. Area 5,845 acres. Runway length NA. Altitude 96 ft. Base scheduled to close Oct. 1, 1993.

**Maxwell AFB, Ala.** 36112; 1 mi. WNW of Montgomery. Phone (205) 953-1110; DSN 493-1110. AU base. As of July 1, 1993, becomes an AETC base. 502d Air Base Wing; Hq. Air University, professional military education center for USAF; Air War College; Air Command and Staff College (ACSC); Air Force Quality Center; Center for Aerospace Doctrine, Research, and Education; Ira C. Eaker Center for Professional Development; Squadron Officer School; USAF Historical Research Center; Hq. Air Force ROTC (ATC); Hq. Civil Air Patrol-USAF; Community College of the Air Force (ATC); 908th Airlift Gp. (AFRES). ACSC also directs the School of Advanced Aerospace Studies, which develops professional officers as aerospace strategists of the future and educates them in airpower theory, doctrine, planning, and execution. Base activated 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 2,821; civilians 1,654. Payroll \$315 million. Housing: 299 officer, 549 NCO, 1,374 transient (1,253 VOQ, 91 VAQ, 30 TLF). 60-bed hospital.

**Maxwell AFB, Gunter Annex, Ala.** 36114; 4 mi. NE of Montgomery. Phone (205) 416-1110; DSN 596-1110. AU base. As of July 1, 1993, becomes an AETC base. Standard Systems Center; Air Force Logistics Management Center; USAF Extension Course Institute; USAF Senior NCO Academy. Activated Aug. 27, 1940; named for William A. Gunter, longtime mayor of Montgomery and airpower advocate, died 1940. Area 368 acres. Runway length NA. Altitude 220 ft. Military 1,526; civilians 903. Payroll included in Maxwell entry. Housing: 104 officer, 220 NCO, 470 transient (107 VOQ, 360 VAQ, 3 TLF).

**McChord AFB, Wash.** 98438-5000; 8 mi. S of Tacoma. Phone (206) 984-1910; DSN 984-1110. AMC base. Host unit is 62d Airlift Wing. Major tenants include: 446th Airlift Wing (AFRES Assoc.); Northwest Air Defense Sector; 354th Fighter Sqn., flying A-10 Thunderbolt II. The 62d AW operates the C-141 StarLifter and is responsible for strategic airlift of personnel and cargo worldwide, on short notice, in support of national objectives. Base is located 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 length NA. Altitude 332 ft. Military 4,661; civilians 1,708. Payroll \$131.1 million. Housing: 122 officer, 859 NCO, 520 transient. Dispensary on base. Madigan Army Medical Center is the newest regional DoD hospital, located 4 mi. SE, with 414 beds.

**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, A-10, C-12, and F-117A Stealth fighter weapon systems. It will also be the support center for the F-22 (Advanced Tactical Fighter). 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 1849th Electronics Installation Sqn. (AFCC); 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 crash May 25, 1936. Area 3,755 acres. Runway 10,600 ft. Military 2,799; civilians 14,600. Payroll \$555 million. Housing: 132 officer, 343 enlisted, 21 transient. 652d Medical Gp. clinic also controls 652d Medical Group Hospital located at Mather AFB.

**McConnell AFB, Kan.** 67221-5000; 5 mi. SE of Wichita. Phone (316) 652-6100; DSN 743-1110. ACC base. 384th Bomb Wing; 184th Fighter Gp. (ANG). First B-1B arrived Jan. 1988. Base activated June 5, 1951; named for Capt. Fred J.

McConnell, WW II B-24 pilot who died in 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 attack on Bougainville. Area 3,113 acres. Runway length NA. Altitude 1,371 ft. Military 3,568; civilians 331. Payroll \$106 million. Housing: 123 officer, 364 NCO, 71 transient (17 VOQ, 30 VAQ, 24 TLF).

**McGuire AFB, N.J.** 08641-5000; 18 mi. SE of Trenton. Phone (609) 724-1100; DSN 440-1100. AMC base. 438th Airlift Wing; Hq. 21st Air Force; N. J. ANG; N. J. Civil Air Patrol; 170th Air Refueling Gp. (ANG); 514th Airlift Wing (AFRES Assoc.); AMC NCO Academy East. 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 10,148 (incl. AFRES and ANG); civilians 1,771. Payroll \$202 million. Housing: 193 officer, 1,560 NCO, 962 transient (210 VOQ, 752 VAQ). 250-bed hospital at Fort Dix.

**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) and 906th Air Refueling Sqn./Air Mobility Command (KC-135); 91st Missile Wing, Minuteman III operations; 5th Operations Support Sqn.; ACE training branch, T-38 operations; Det. 7, 37th Air Force Rescue Sqn. (HH-1H). Base activated Jan. 1957; named after the city of Minot, whose citizens donated \$50,000 toward purchase of the land for the Air Force. Area 5,085 acres, plus additional 19,324 acres for missile sites. Runway length NA. Altitude 1,668 ft. Military 4,624; civilians 790. Payroll \$102 million. Housing: 480 officer, 1,682 enlisted, 299 junior enlisted. 45-bed hospital.

**Misawa AB, Japan,** APO AP 96319-5000; within Misawa city limits. Phone (commercial, from CONUS) 011-81-176-53-5181. DSN 226-1110. PACAF base; joint service base. Host unit: 432d Fighter Wing, F-16C/D and HH-60G operations. Tenant units: 6920th Electronic Security Gp. (AFIC); Naval Air Facility (USN); Naval Security Gp. Activity (USN); US Army field station; Company "E" US Marine Support Battalion. Base occupied by US forces Sept. 1945. Area 3,865 acres. Runway length NA. Altitude 119 ft. Military 5,529 (total US forces); US civilians 296; local nationals 892. Payroll \$182 million. Housing: 325 officer, 1,704 enlisted, 16 temporary lodging units. Unaccompanied housing: 114 officer, 1,556 enlisted, 233 transient (149 VOQ, 64 VAQ). Unaccompanied Navy housing: 108 officer (transient), 776 enlisted (336 perm. party, 440 transient). 15-bed hospital.

**Moody AFB, Ga.** 31699-5000; 10 mi. NNE of Valdosta. Phone (912) 333-4211; DSN 460-1110. ACC base. 347th Fighter Wing, F-16C/D (LANTIRN-equipped) fighter operations, 3536th USAF Recruiting Sqn., OSI Det. 717, Field Training Det. 322. Base activated June 1941; named for Maj. George P. Moody, killed May 5, 1941, while test-flying Beech AT-10. Area 6,050 acres. Runway length NA. Altitude 233 ft. Military 4,040; civilians 800. Payroll \$98.3 million. Housing: 36 officer, 268 enlisted, 79 transient (34 VAQ, 33 VOQ, 12 TLF), 39 trailer spaces. 30-bed hospital.

**Mountain Home AFB, Idaho** 83648-5000; 10 mi. SW of Mountain Home. Phone (208) 828-2111; DSN 857-2111. ACC base. 366th Wing, USAF's first air intervention composite wing, with F-16C attack, F-15E interdiction, F-15C air-superiority, B-52G bomber, KC-135R air refueling, and E-3C surveillance aircraft prepared to deploy rapidly worldwide and perform composite air intervention operations. Det. 5, 1st Combat Evaluation Gp. (geographically separated tenant unit, Wilder AFB, Idaho). Base activated Aug. 1943. Area 9,112 acres. Runway length NA. Altitude 3,000 ft. Military 3,347 (returning to 4,500 with composite wing personnel buildup); civilians 1,006. Payroll \$91 million. Housing: 246 officer, 1,275 enlisted, 253 transient (154 VAQ, 61 VOQ, 38 TLF). 20-bed hospital.

**Myrtle Beach AFB, S. C.** Closed March 31, 1993.

**Nellis AFB, Nev.** 89191-5000; 8 mi. NE of Las Vegas. Phone (702) 652-1110; DSN 682-1110. ACC base. USAF Weapons and Tactics Center, A-10, F-15, F-15E, F-111, HH-60, and F-16; 57th Fighter Wing; USAF Weapons School; USAF Air Demonstration Sqn. (Thunderbirds); 57th Operations Gp.; 414th Composite Training Squadron

(Red Flag); 549th Joint Training Sqn. (Air Warrior); 57th Test Gp., including 422d Test and Evaluation Sqn.; 57th Logistics Gp.; 66th Air Rescue Sqn.; 554th Medical Group; 554th Support Group; 820th Civil Engineering Sqn. RED HORSE; 896th Aviation Depot Sqn. Base activated July 1941 as an Army Air Forces 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. Range restricted area 3.5 million acres plus 12,000 square miles of airspace. Runways 10,051 ft. and 10,119 ft. Altitude 1,868 ft. Military 6,318; civilians 913. Payroll \$273 million. Housing: 107 officer, 1,275 enlisted, 100 trailer spaces, 737 transient (193 VOQ, 484 VAQ, 60 TLF). 35-bed hospital.

**Newark AFB, Ohio** 43057-5990; 1 mi. SW of Newark. Phone (614) 522-2171; DSN 346-2171. AFMC base. Aerospace Guidance and Metrology Center repairs inertial guidance and navigation systems for most of the Air Force's 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 130 precision measurement equipment laboratories at bases around the world. Four tenant units. Activated as an Air Force station Nov. 7, 1962. Military 80; civilians 2,000. Payroll \$78 million.

**Norton AFB, Calif.** 92409-5000; 60 mi. E of Los Angeles, within San Bernardino corporate limits. Phone (909) 382-1110; DSN 876-1110. AMC base. 63d Airlift Wing; Hq. Air Force Safety Agency; Air Combat Camera Service; Ballistic Missile Organization (AFMO); 445th Airlift Wing (AFRES Assoc.); AMC NCO Academy West. Base activated Mar. 2, 1942; named for Capt. Leland F. Norton, native of San Bernardino, WW II A-20 attack bomber pilot, killed in action May 27, 1944, near Amiens, France. Area 2,431 acres. Runway length NA. Altitude 1,156 ft. Military 7,615 (incl. AFRES); civilians 2,638. Payroll \$242 million. Housing: 653 transient (40 TLQ, 439 VAQ, 174 VOQ), 1,492 dormitory beds, 19 full hook-up trailer lots, 20 trailer sites. Clinic. Scheduled to close Apr. 1, 1994.

**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; 1st Aerospace Communications Gp.; 6th Space Operations Sqn. (AFSPACECOM); 6949th Electronic Security Sqn. (AFIC); National Emergency Airborne Command Post (NEACP); Air Combat Command Heartland of America Band. Base activated 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 1,914 acres (incl. housing area and off-base sites). Runway length NA. Altitude 1,048 ft. Military 10,400; civilians 1,400. Payroll \$400 million. Housing: 513 officer, 2,167 enlisted, 134 VAQ, 169 VOQ, 62 TLF. 93-bed hospital.

**Onizuka AFB, Calif.** 94088-3430; 37 mi. S of San Francisco at Sunnyvale. Phone (408) 752-3110; DSN 561-3110. AFSPACECOM base. Host unit: 750th Space Gp. Tenant units: Dets. 2 and 6, Space and Missile Systems Center (AFMC). Base activated Dec. 2, 1959, as Sunnyvale AFS, renamed for Lt. Col. Ellison S. Onizuka, killed Jan. 28, 1986, in the space shuttle *Challenger* accident. Area 20 acres. Runway length NA. Altitude 34 ft. Military 704; civilians 222; contractors 2,000. Housing: 20 officer, 80 NCO (located at NAS Moffett Field). Unaccompanied housing: 72 enlisted (located at NAS Moffett Field). No transient housing.

**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 Wing, F-16C/D, C-12, HH-60G, and OA-10 operations. Tenant units: 6903d Electronic Security Gp. (AFIC); 611th Airlift Support Sqn.; 554th Civil Engineering Sqn. RED HORSE (PACAF). Originally designated K-55; runway opened 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 length NA. Altitude 38 ft. Military 5,241; US civilians 230; local nationals 1,046. Payroll \$131.1 million. Housing: 203 officer, 84 enlisted, 16 TLF. Unaccompanied housing: 353

officer, 5,296 enlisted, 141 VOQ, 468 VAQ. 30-bed hospital.

**Patrick AFB, Fla.** 32925-5000; 2 mi. S of Cocoa Beach. Phone (407) 494-1110; DSN 854-1110. AFSpaceCOM base. Operated by the 45th Space Wing in support of DoD, NASA, and other agency missile and space programs. Major tenants are Defense Equal Opportunity Management Institute; Air Force Technical Applications Center; 41st Air Rescue Sqdn.; 71st Air Rescue Sqdn.; 301st Rescue Sqdn. (Florida ANG); 741st Consolidated Aircraft Maintenance Sqdn.; 2d Combat Communications Gp., and the Joint Task Force for Joint STARS at Melbourne Regional Airport, Fla. Besides host responsibilities for Patrick AFB and Cape Canaveral AFS, 45th Space Wing 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 1940. Base 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 length NA. Altitude 9 ft. Military 3,900; civilians 2,100. Payroll \$163.5 million (military, Civil Service). Housing: 144 officer, 1,219 NCO. 15-bed hospital.

**Peterson AFB, Colo.** 80914-5000; at eastern edge of Colorado Springs. Phone (719) 556-7321; DSN 834-7011. AFSpaceCOM base. Hq. Air Force Space Command. Host unit: 21st Space Wing (AFSPACECOM). Provides support to Hq. North American Aerospace Defense Command; Hq. US Space Command; Hq. Army Space Command; 302d Airlift Wing (AFRES). Base activated 1942; named for 1st Lt. Edward J. Peterson, killed Aug. 8, 1942, in aircraft crash at the base. Area 1,277 acres. Runway length NA. Altitude 6,200 ft. Military active-duty 3,100; reserves 1,350; civilians 1,700. Payroll \$206 million. Housing: 107 officer, 384 NCO, 217 transient (75 VOQ, 102 VAQ, 40 TLF). Clinic. Home of Edward J. Peterson Air & Space Museum.

**Plattsburgh AFB, N. Y.** 12903-5000; adjacent to Plattsburgh. Phone (518) 565-5000; DSN 689-5000. AMC base. 380th Air Refueling Wing, tanker operations with KC-135; Det. 203, OLA 373d Field Training Sqdn. Oldest active military installation in the US, established 1814; AFB since 1955. Area 4,879 acres. Runway length NA. Altitude 235 ft. Military 2,184; civilians 814. Payroll \$68.6 million. Housing: 218 officer, 1,421 NCO, 132 transient (60 VAQ, 49 VOQ, 23 TLF). 8-bed hospital.

**Pope AFB, N. C.** 28308-5000; 12 mi. NNW of Fayetteville. Phone (919) 394-0001; DSN 486-1110. ACC base. 23d Wing. 317th Airlift Wing (AMC); USAF Mobility Center; 1st Aeromedical Evacuation Sqdn.; 624th Combat Control Sqdn.; 53d Mobile Aerial Port Sqdn. (AFRES); Det. 3, MACOS (Combat Control School); 215th Field Training Detachment (ATC); 18th Air Support Gp.; 1724th Special Tactics Sqdn. (AFSOTC). 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 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 length NA. Altitude 218 ft. Military 4,700; civilians 719. Payroll \$212 million. Housing: 459 units, 1,208 dormitory spaces, 268 transient (148 officer, 112 enlisted, 8 TLF). Clinic.

**RAF Alconbury, United Kingdom, APO AE 09470;** 3 mi. NW of Huntingdon; 60 mi. N of London. Phone (commercial, from CONUS) 011-44-480-82-3000; DSN 223-1110. Royal Air Force base. 10th Fighter Wing (USAFE) is host unit and maintains tribase complex; 352d Special Operations Gp. (AFSOTC) flies MC-130 Combat Talon, HC-130 Combat Shadow tanker, and MH-53J Pave Low helicopter; 95th Reconnaissance Sqdn. (ACC) flies U-2; Joint Analysis Center (EUCOM) provides intelligence to US and NATO leaders from base at nearby RAF Molesworth. Initially activated in 1938; first used by US forces in Sept. 1942. Area 2,954 acres. Runway length NA. Altitude 160 ft. Military 3,000; civilians 1,250. Payroll \$122 million. Housing: 79 officer, 767 enlisted, 250 leased units (enlisted only), 1,187 dorm spaces. Clinic.

**RAF Bentwaters, United Kingdom, APO AE 09497;** 90 mi. NE of London. Phone (commercial, from CONUS) 011-44-394-433000; DSN 225-1110. Royal Air Force base. 81st Fighter Wing (USAFE) operates the base. The base will be returned to the

British Ministry of Defence by Sept. 1993, at which time the 81st FW will be inactivated. Twin bases (RAF Woodbridge has been returned) opened by RAF in 1944 and 1943, respectively, and reactivated by the US in 1951 and 1952. Bases named after local landmark and nearby town, respectively. Area 2,068 acres. Runway length NA. Altitude 86 ft. Military 2,300; civilians 310. Payroll \$28.4 million. Housing: 156 officer, 1,295 enlisted, 985 dorm spaces, 192 transient quarters. Clinic.

**RAF Lakenheath, United Kingdom, APO AE 09464-5000;** 70 mi. NE of London; 25 mi. from Cambridge. Phone (commercial, from CONUS) 011-44-638-52-3000; DSN 226-1110. Royal Air Force base. 48th Fighter Wing (USAFE) flies the F-15E 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 2,290 acres. Runway length NA. Altitude 32 ft. Military 4,480; civilians 1,603. Payroll \$160 million. Housing: 651 units, 1,085 US govt. leased housing, 295 billeting spaces. Regional medical center. Department of Defense high, middle, and elementary schools.

**RAF Mildenhall, United Kingdom, APO AE 09459-5000;** 30 mi. NE of Cambridge. Phone (commercial, from CONUS) 011-44-638-51-1110; DSN 238-1110. 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 627th Airlift Support Sqdn. (AMC), 922d Reconnaissance Sqdn. (ACC), 6988th Electronic Security Sqdn. (AFIC), Naval Air Facility (USN). Base activated in 1934; US presence began in July 1950. Named after nearby village. Area 1,121 acres. Runway length NA. Altitude 33 ft. Military 2,858; civilians 1,094. Payroll \$54.2 million. Housing: 43 officer, 137 enlisted; 779 BAQ; US govt. leased housing shared with RAF Lakenheath; 966 transient (40 TLF, 240 VOQ, 686 VAQ). Medical annex.

**RAF Upper Heyford, United Kingdom, APO AE 09466;** 13 mi. N of Oxford. Phone (commercial, from CONUS) 011-44-869-232331; DSN 263-1110. Royal Air Force base. 20th Fighter Wing (USAFE) provides long-range, all-weather fighter sorties for NATO. Associate units include 2130th Communications Gp., 317th Contingency Hospital, 7520th Air Base Sqdn., 870th Contingency Hospital, 2119th Communications Sqdn. Activated during WW I; 20th FW began operations here in Dec. 1969. Named after local village. The base will be placed in standby status by Oct. 1994, and the 20th FW will inactivate. Area 1,221 acres. Runway length NA. Altitude 412 ft. Military 5,141; civilians 2,323. Payroll \$178 million. Housing: 273 officer, 1,157 enlisted, 50 enlisted. US govt. leased housing. 50 TLF, 8 BOQ, 26 VOQ, 104 senior enlisted, 1,970 junior NCO/airman BEQ, 72 VEQ. In billeting, 34 BOQ, 7 VIP, 62 enlisted, 8 senior enlisted, Small hospital.

**Ramstein AB, Germany, APO AE 09094-5000;** adjacent to Ramstein; 10 mi. W of Kaiserslautern. Phone (commercial, from CONUS) 011-49-6371-47-113; DSN 480-1110. USAF base. Hq. USAF; Hq. Allied Air Forces Central Europe (NATO). Host unit: 86th Fighter Wing, which flies the F-16C/D, C-12/20/21, T-43, UH-1N, and C-9. The wing commander also serves as commander of the Kaiserslautern Military Community, the largest concentration of US citizens outside the United States. Base activated and US presence began in 1953. Area 5,292 acres. Runway length NA. Altitude 782 ft. Military 8,246; civilians 3,954. Payroll \$394.6 million. Housing: 5,891 units, 713 US govt. leased units, 5,394 billeting units. Clinic. The 2d Aeromedical Evacuation Sqdn. and 55th Aeromedical Evacuation Sqdn. will transfer from Rhein-Main AB to Ramstein AB, Germany, July 1, 1993.

**Randolph AFB, Tex.** 78150-5000; 17 mi. ENE of San Antonio. Phone (210) 652-1110; DSN 487-1110. ATC base. As of July 1, 1993, becomes an AETC base. Hq. Air Training Command; 12th Flying Training Wing, T-37 and T-38 pilot instructor training, undergraduate navigator training (beginning Apr. 1, 1993), and T-41 flight screening at Hondo, Tex.; Air Force Military Personnel Center; Hq. Air Force Management Engineering Agency; Hq. Air Force Morale, Welfare, Recreation, and Services Agency; USAF Occupational Measurement Sqdn.; Air Force Civilian Personnel Management Center; Hq. USAF Recruiting Service; USAF Instrument Flight Center. Base activated 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. Runway length NA. Altitude 762 ft. Military 4,849; civilians 4,861. Payroll \$274.4 million. Housing: 254 officer, 765 NCO, 580 transient. Clinic.

**Reese AFB, Tex.** 79489-5000; adjacent to Lubbock. Phone (806) 885-4511; DSN 838-1110. ATC base. 64th Flying Training Wing, undergraduate pilot training. Base activated 1942; named for 1st Lt. Augustus F. Reese, Jr., P-38 fighter pilot killed during a train-strafing mission at Cagliari, Sardinia, May 14, 1943. Area 3,953 acres. Runway length NA. Altitude 3,338 ft. Military 1,198; civilians 428. Payroll \$69.4 million. Housing: 109 officer, 289 NCO, 63 transient (25 TLF, 19 VOQ, 19 VAQ). 14-bed hospital.

**Rhein-Main AB, Germany, APO AE 09097-5000;** 5 mi. S of Frankfurt. Phone (commercial, from CONUS) 011-49-69-699-1110; DSN 330-1110. USAF base. Host unit: 435th Airlift Wing. Largest combined cargo and passenger terminal in the Air Force. Shares runways with the busiest commercial airport on the Continent. The 37th Airlift Sqdn. flies C-130E aircraft in support of DoD and European theater airlift requirements. Other major units include On-Site Inspection Agency-Europe; Army's 21st Replacement Battalion. Base activated July 1936; US Forces began operations Mar. 1945. Named after the confluence of the Rhein and Main rivers west of Frankfurt. Area 923 acres. Runway length NA. Altitude 365 ft. Military 4,279; civilians 2,472. Military payroll \$107.6 million. Housing, on-base, government-owned: 152 officer, 490 enlisted; off-base, government-owned: 12 officer, 145 enlisted; off-base, government-leased: 10 officer, 290 enlisted; 268 rooms/531 beds at base hotel, 176 rooms/278 beds VAQ. USAF clinic.

**Robins AFB, Ga.** 31098; 15 mi. SSF 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 LANTIRN system, JTIDS, E-3 AWACS 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. Warner Robins is the lead ALC for the National Aerospace Plane technology and demonstration program. In Apr. 1991, Robins AFB was selected as the US main operating base for the E-8 Joint STARS aircraft. Other major units include Hq. Air Force Reserve (AFRES); 653d Support Gp.; 19th Air Refueling Wing; 5th Combat Communications Gp. (ACC); 653d Communications-Computer Systems Gp. (AFMCC); 9th Space Warning Sqdn. (AFSPACECOM). Base activated 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 approx. 4,400; civilians approx. 14,500. Payroll \$763.5 million. Housing: 245 officer, 1,151 NCO, 40 TLF, 145 VOQ. 20-bed hospital.

**Sawyer AFB (see K. I. Sawyer AFB).**

**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 Command; Hq. Air Force Communications Command (an FOA); Hq. US Transportation Command; Hq. Air Weather Service; Acquisition Management Organization; Environmental Technical Applications Center; USAF Medical Center, Scott; 932d Aeromedical Airlift Gp. (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 one of the Wright B Flyers at College Park, Md. Area 3,000 acres. Runway 7,061 ft. Altitude 453 ft. Military 8,600; civilians 5,224. Payroll \$335 million. Housing: 309 officer, 1,392 NCO, plus 111 spaces for privately owned trailers, 300 transient. 130-bed hospital; 100-bed aeromedical staging facility.

**Sembach AB, Germany, APO AE 09130-5000;** 9 mi. NE of Kaiserslautern. Phone (commercial, from CONUS) 011-49-6302-67-113; DSN 496-1110. USAF base. Hq. 17th Air Force (USAFE). Host unit: 601st Support Wing. Major associate units include USAF Air Ground Operations School; 601st Communications Sqdn.; 1st Combat Communications Sqdn.; 6914th Electronic Security

Sqdn. (AFIC). Base activated 1930; US presence began July 1953. Named after a nearby farming community. Area 862 acres. Runway length NA. Altitude 1,037 ft. Military 2,617; civilians 600. Payroll \$72.8 million. Housing: 74 officer, 420 enlisted. Billeting: 73 officers, 330 enlisted, 4 chief master sergeant suites. Clinic. Base scheduled for partial return to host government September 1995 and will become a minor installation.

**Seymour Johnson AFB**, N. C. 27531-5000; within city limits of Goldsboro. Phone (919) 736-5400; DSN 488-1110. ACC base. 4th Wing, F-15E fighter and KC-10 tanker operations; 916th Air Refueling Gp. (AFRES), KC-10 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 109 ft. Military 4,641; civilians 1,194. Payroll \$140.6 million. Housing: 154 officer, 1,544 enlisted, 138 transient (65 VAQ, 46 VOQ, 27 TLF). 20-bed hospital.

**Shaw AFB**, S. C. 29152-5000; 10 mi. WNW of Sumter. Phone (803) 668-8110; DSN 965-1110. ACC base. 363d Fighter Wing, F-16 fighter operations and A/OA-10 FAC 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 on July 9, 1918, when his Bristol fighter was shot down during a reconnaissance mission. Area 3,363 acres; supports another 8,353 acres. Runways 10,000 ft. and 8,000 ft. Altitude 244 ft. Military 5,865; civilians 1,100. Payroll \$167 million. Housing: 170 officer, 1,534 enlisted, 294 transient (164 VAQ, 90 VOQ, 40 TLF). 40-bed hospital.

**Shemya AFB**, Alaska (APO AP 96512-5000); located at western tip of the Aleutian Islands chain, midway between Anchorage, Alaska, and Tokyo, Japan. Phone (907) 392-3000; DSN 317-392-3000. PACAF base. Host unit: 673d Air Base Gp. (PACAF). Tenant units: 16th Surveillance Sqdn. (AFSPACECOM); Det. 1, 55th Reconnaissance Gp. (ACC). Base activated 1943. Shemya was used as a bomber base in WW II. The International Date Line has been bent around Shemya so that the local date is the same as elsewhere in the US. Island area about 11.25 sq. mi. Runway length NA. Altitude 270 ft. Military 466; civilian contract employees 122; seasonal civilian construction workers 170. Payroll \$14.5 million. Unaccompanied housing: 70 officer, 977 enlisted, 173 VOQ, 79 VAQ. Dispensary. Scheduled to become a minor installation and renamed Eareckson AFS, after Col. William O. Eareckson, a WW II hero of the Aleutian campaign, May 23, 1993.

**Sheppard AFB**, Tex. 76311-5000; 4 mi. N of Wichita Falls. Phone (817) 676-2511; DSN 736-1001. ATC base. As of July 1, 1993, becomes an AETC base. Sheppard Training Center conducts flying and technical training. The 80th Flying Training Wing conducts the Euro-NATO Joint Jet Pilot Training Program, providing T-37 and T-38 undergraduate pilot training and instructor pilot training for 12 NATO nations. The 396th Technical Training Gp. provides courses in aircraft maintenance, civil engineering, communication, comptroller, and instructor training. The 396th Medical Training Gp. handles physician assistant training as well as biomedical sciences, dentistry, health-service administration, medical readiness, and medicine and nursing curricula. The 396th Field Training Gp. provides training on weapon systems at 74 locations worldwide. The 396th Medical Gp. operates a 105-bed hospital, which includes the psychiatric center for the Air Force. Base activated June 14, 1941; named for US Sen. Morris E. Sheppard of Texas, who died Apr. 9, 1941. Area 5,480 acres. Runway length NA. Altitude 1,015 ft. Military 6,594; civilians 3,277. Payroll \$247 million. Housing: 199 officer, 1,087 NCO, 262 VOQ, 1,294 VAQ, 50 TLF, 151 UOQ, 624 UEQ.

**Soesterberg AB**, the Netherlands, APO AE 09719; 3 mi. from Zeist; 26 mi. from Amsterdam. Phone (commercial, from CONUS) 011-31-3463-58199; DSN 363-8199. Royal Netherlands air base. 32d Fighter Gp. (USAFE) prepares for and conducts all-weather operations in intercept, identification, and air-superiority roles in support of NATO, using the F-15. Base activated 1913; US presence began 1954. Area 515 acres. Runway length NA. Altitude 66 ft. Military 1,433; civilians 270. Payroll \$34.6 million. Housing: 40 officer, 190 leased units (incl. 14 officer), 140 govt.-owned units (incl. 26 officer), 383 dorm spaces, 33 VAQ, 6 VOQ, 26 Clinic.

**Spangdahlem AB**, Germany, APO AE 09126-5000; 8 mi. E of Bitburg; 20 mi. NE of Trier. Phone (commercial, from CONUS) 011-49-6565-61-1110; DSN 452-1110. USAF base. 52d Fighter Wing is the only "Wild Weasel" base in USAF. The wing flies F-16s, F-4Gs, and A-10s. Base activated and US presence began in 1953. Named after local town. Area 1,282 acres. Runway length NA. Altitude 1,196 ft. Military 4,350; civilians 900. Payroll \$110 million. Housing: 43 officer, 615 enlisted, 500 US govt. leased units, 1,110 billeting spaces. Clinic.

**Tinker AFB**, Okla. 73145-5990; 8 mi. SE of Oklahoma City. Phone (405) 732-7321; DSN 884-1110. AFMC base. Hq. Oklahoma City Air Logistics Center furnishes logistics support for bombers, jet engines, instruments, and electronics. Other major units include 552d Air Control Wing; 507th Fighter Gp. (AFRES); Navy Strategic Communications Wing ONE. Base activated 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 4,885 acres. Runway length NA. Altitude 1,291 ft. Military 7,269; civilians 13,306. Payroll \$693 million. Housing: 108 officer, 622 NCO. 30-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. 22d Air Force; 60th Airlift Wing; 349th Airlift Wing (AFRES Assoc.); David Grant Medical Center; Air Force Band in Blue. Primary mission of 60th AW is strategic airlift. Base activated May 17, 1943; named for Brig. Gen. Robert F. Travis, killed Aug. 5, 1950, in a B-29 accident. Area 7,580 acres. Runway length NA. Altitude 62 ft. Military 12,900; civilians 3,600. Payroll \$305 million. Housing: 294 officer, 2,171 enlisted, 3,546 enlisted dormitory spaces, 704 transient (100 TLF, 165 VOQ, 439 VAQ). 298-bed hospital (acute care), 75 aeromedical staging flight beds, and 52 dental treatment rooms.

**Tyndall AFB**, Fla. 32403-5000; 12 mi. E of Panama City. Phone (904) 283-1113; DSN 523-1113. ACC base. As of July 1, 1993, becomes an AETC base. 325th Fighter Wing, F-15 operations. The 325th FW provides training of F-15 pilots and centralized training for all F-15 maintenance personnel. ACC units include Hq. 1st Air Force; Southeast Air Defense Sector; 475th Weapons Evaluation Gp.; 4484th Test Sqdn.; and ACCNCO Academy Tyndall. Tenant units include Air Force Civil Engineering Support Agency (AFCEA) and 331st Technical Training Sqdn. (ATC). Base activated Dec. 7, 1941; named for 1st Lt. Frank B. Tyndall, WW I fighter pilot killed July 15, 1930, in crash of P-1 near Mooresville, N. C. Area 29,115 acres. Runway length NA. Altitude 18 ft. Military 4,723; civilians 1,760. Payroll \$140 million. Housing: 137 officer, 932 enlisted, 1,143 transient (864 VAQ, 239 VOQ, 40 TLF). 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. First class entered Lowry AFB, Colo., July 1955. Moved to permanent location Aug. 1958. Tenant units include 1876th Communications Gp.; Frank J. Seiler Research Lab (AFMC); DoD Medical Exam Review Board. Aircraft flown: T-41, Cessna 150 (cadet flying team), UV-18 (Det. 1, Peterson AFB), 126E (sailplane), ASK-21 (sailplane), SGS-2-33A (glider), and TG7A (motor glider). Area 18,455 acres. Runway length NA. Altitude 7,280 ft. Military 2,481; cadets 4,200; Preparatory School students 208; civilians 1,720. Payroll \$200 million. Housing: 620 officer, 609 enlisted, 78 transient, 25 temporary family quarters. 65-bed hospital.

**Vance AFB**, Okla. 73705-5000; 3 mi. SSW of Enid. Phone (405) 237-2121; DSN 940-7110. ATC base. As of July 1, 1993, becomes an AETC base. 71st Flying Training Wing, undergraduate pilot training. Base activated 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. Runway length NA. Altitude 1,007 ft. Military 1,285; civilians 1,427 (1,200 contract employees). Payroll \$95.2 million. Housing: 131 officer, 98 enlisted, 36 transient, 10 TLF. Clinic.

**Vandenberg AFB**, Calif. 93437-5000; 8 mi. NNW of Lompoc. Phone (805) 734-8252 (ext. 6-1611); DSN 276-1110. AFSPACECOM base. 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. The 30th SPW furnishes facilities and essential services to more than 60 aerospace contractors on base. The major associate unit is Hq. 20th Air Force, the ACC numbered Air Force responsible for ICBM operations. As of July 1, 1993, 20th Air Force transfers to AFSPACECOM. Its associate unit, the 310th Test and Training Wing, trains ACC's ICBM crews in the Minuteman and Peacekeeper weapon systems and conducts ICBM operational testing and evaluation. Originally Army's Camp Cooke. Activated 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 3,349; civilians 1,294; civilian contractors 3,835. Payroll \$126.4 million (military and civilians); \$132.4 million (contractors). Housing: 494 officer, 1,499 NCO, 172 mobile 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. 351st Missile Wing, UH-1; Det. 509 was activated in 1990. Whiteman AFB is responsible for 150 Minuteman II ICBMs and is scheduled to receive the first B-2 bombers when they become operational in the 1990s. Base activated 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, plus missile complex of about 10,000 sq. mi. Runway 12,400 ft. Altitude 869 ft. Military 3,090; civilians 431. Payroll data NA. Housing: 195 officer, 775 enlisted, 137 transient (incl. 12 3-bdrm. guesthouses, 53 VAQ, 68 VOQ, 4 DVQ). 30-bed hospital.

**Williams AFB**, Ariz. 85240-5000; 10 mi. E of Chandler. Phone (602) 988-2611; DSN 474-1011. ATC base. As of July 1, 1993, becomes an AETC base. Host unit: 82d Flying Training Wing, inactivates Sept. 30, 1993. Base activated July 1941; named for 1st Lt. Charles L. Williams, killed in aircraft crash near Fort DeRussy, Hawaii, July 6, 1927. Area 5,398 acres. Runway length NA. Altitude 1,385 ft. Base scheduled to close Oct. 1, 1993.

**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); Air Force Institute of Technology; USAF Medical Center; 645th Air Base Wing (AFMC); 906th Fighter Gp. (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 recently became part of the Aviation Heritage National Historic Park and is open to the public. Area 8,145 acres. Runway 12,600 ft. Altitude 824 ft. Military 9,578; civilians 17,316; contracted service and contractor employees 6,000. Payroll \$986 million. Housing: 732 officer, 1,629 NCO. 301-bed hospital.

**Wurtsmith AFB**, Mich. 48753-5000; 3 mi. NW of Oscoda. Phone (517) 739-2011; DSN 623-1110. ACC base. 379th Bomb Wing. Base activated 1924 as Camp Skeel, gunnery camp for Selfridge Field; became Oscoda Army Air Field during WW II; renamed in 1953 for Maj. Gen. Paul B. Wurtsmith, killed Sept. 13, 1946, in a B-25 crash. Area 5,221 acres. Runway length NA. Altitude 634 ft. Military 1,288; civilians 297, plus 25 contractors. Payroll data NA. Housing: 224 officer, 1,118 NCO, 33 TLF units, 8 UOQ, 18 VOQ, 24 VAQ. Clinic. Base scheduled to close June 30, 1993.

**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. Host unit: 374th Airlift Wing (PACAF), C-130, UH-1N, C-12, C-9, and C-21 operations. Primary aerial port in Japan. Base opened as Tama Army Air Field by Japanese in 1940. Area 1,750 acres. Runway length NA. Altitude 457 ft. Military 4,412; US civilians 901; local nationals 1,424. Payroll \$156 million. Housing: 540 officer, 1,725 enlisted, 53 temporary lodging facility units. Unaccompanied housing: 232 officer, 1,359 enlisted, 229 VOQ, 190 VAQ. 30-bed hospital.

# Minor Installations

In addition to the installations listed above, the Air Force has a number of minor installations. These Air Force stations (AFS) and air stations (AS) 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. When an installation can be reached by a general-purpose DSN number, that number is listed. In some cases, the designation air base (AB) is used.

<b>Ankara AS</b> (Turkey), APO AE 09822 (USAFE) (returns to host nation control in December 1993)	DSN 672-1110	<b>Indian Springs Air Force Auxiliary Field</b> , Nev. 89018-5000 (ACC)	DSN 682-6201
<b>Avon Park AFS</b> , Fla. 33825 (ACC)	DSN 968-1110	<b>Iraklion AB</b> (Crete, Greece), APO AE 09846 (USAFE)	DSN 668-1110
<b>Cape Canaveral AFS</b> , Fla. 32925-5000 (AFSPACECOM)	DSN 467-1110	<b>Izmir AS</b> (Turkey), APO AE 09821 (USAFE)	DSN 675-1110
<b>Cape Cod AFS</b> , Mass. 02561-9314 (AFSPACECOM)	DSN 557-2202	<b>King Salmon Airport</b> (Alaska), APO AP 96513 (PACAF)	cmcl. 907-721-3301
<b>Cavalier AFS</b> , N. D. 58220-5000 (AFSPACECOM)	DSN 330-3292	<b>Lindsey AS</b> (Germany), APO AE 09196 (USAFE)	DSN 339-1110
<b>Clear AFS</b> (Alaska), APO AP 99704 (AFSPACECOM)	DSN 585-6416	<b>New Boston AFS</b> , N. H. 03031-5000 (AFSPACECOM)	DSN 881-1550
<b>Decimomannu AB</b> (Italy), APO AE 09606 (USAFE)	DSN 621-9267	<b>Pirinclik AS</b> (Turkey), APO AE 09825 (USAFE)	DSN 679-1110
<b>Duke Field AFS</b> , Fla. 32542-6005 (AFSOC)	DSN 872-1110	<b>Pruem AS</b> (Germany), APO AE 09207 (USAFE)	DSN 453-1110
<b>Eldorado AFS</b> , Tex. 76936-5000 (AFSPACECOM)	DSN 477-4220	<b>RAF Chicksands</b> (UK), APO AE 09465-5000 (USAFE)	DSN 234-1110
<b>Galena Airport</b> (Alaska), APO AP 96510 (PACAF)	cmcl. 907-446-3311	<b>RAF Croughton</b> (UK), APO AE 09494 (USAFE)	DSN 236-1110
<b>Gila Bend Air Force Auxiliary Field</b> , Ariz. 85337-5000 (ACC)	DSN 853-5220	<b>RAF Falford</b> (UK), APO AE 09456 (USAFE)	DSN 247-1110
<b>Hessisch-Oldendorf AS</b> (Germany), APO AE 09205 (USAFE)	DSN 331-1110	<b>Richards-Gebaur AFB</b> , Mo. 64030-5000 (ACC)	DSN 463-1110
<b>High Wycombe AS</b> (UK), APO AE 09471 (USAFE)	DSN 232-1110	<b>San Vito dei Normanni AS</b> (Italy), APO AE 09605 (USAFE)	DSN 622-1110
		<b>Thule AB</b> (Greenland), APO AE 09704-5000 (AFSPACECOM)	DSN 834-1211 (ask for Thule operator)
		<b>Woomera AS</b> (Australia), APO AP 96552 (AFSPACECOM)	DSN 626-1636

# ANG and AFRES Bases

Note: This section of the Guide consolidates major Air National Guard (ANG) and Air Force Reserve (AFRES) 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 that are located on active-duty bases. These may be found in the "Major Installations" section above.

**Allen C. Thompson Field**, Miss. 39208-0810; 7 mi. E of Jackson. Phone (601) 939-3633; DSN 731-9210. 172d Airlift Gp. (ANG). ANG area 106 acres. Altitude 346 ft. Military 1,198, full-time personnel 316. Payroll \$16.4 million. Six-bed dispensary.

**Alpena County Regional Airport**, Mich. 49707; 7 mi. W of Alpena. Phone (517) 354-6291; DSN 741-3500. Training site detachment. Facilities used by ANG and AFRES units for annual field training and by ARNG and Marine Reserve for special training. Area 2,708 acres. Altitude 689 ft. Military 69, civilian full-time support 69. Payroll \$2.2 million. Housing: 1,500 personnel. 14-bed hospital. Dispensary.

**Anchorage**, Alaska (Kulis ANG Base at Anchorage International Airport) 99502. Phone (907) 249-1208; DSN 626-1208. 176th Composite Gp. (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. Altitude 124 ft. Military 1,094, full-time personnel 422. Payroll \$19.3 million. Six-bed hospital.

**Atlanta**, Ga. (McCullum ANG Station, Kennesaw, Ga.) 30144; 27 mi. N of Atlanta, 10 mi. from Dobbs ARB. Phone (404) 422-2500; DSN 925-2500. 129th Control Sqdn. and 118th Control Sqdn. (ANG). Area 13 acres. Altitude 1,060 ft. Military 355, full-time personnel 47. Payroll disbursed through Dobbs ARB.

**Atlantic City Airport**, N. J. 08232-9500; 10 mi. W of Atlantic City. Phone (609) 645-6000; DSN 455-

6000. 177th Fighter Gp. (ANG). Area 268 acres. Altitude 76 ft. Military 1,015, full-time support 383. Payroll \$14.3 million.

**Baltimore**, Md. (Martin State Airport) 21220-2899; 8 mi. E of Baltimore. Phone (301) 687-6270; DSN 243-6210. 175th Fighter Gp. (ANG); 135th Airlift Gp. (ANG). Area 175 acres. Altitude 24 ft. Military 1,890, full-time personnel 520. Payroll \$20.1 million. Clinic.

**Bangor International Airport**, Me. 04401-3099; 4 mi. NW of Bangor. Phone (207) 990-7700; DSN 698-7700. 101st Air Refueling Wg. (ANG); 776th Radar Sqdn. (ACC). Area 300 acres. Altitude 192 ft. Military 1,026, full-time personnel 385, Title 5 civilians 25. Payroll \$16.2 million. Small BX.

**Barnes Municipal Airport**, Mass. 01085; 3 mi. N of Westfield. Phone (413) 568-9151; DSN 636-1210/11. 104th Fighter Gp. (ANG). Area 133 acres. Altitude 270 ft. Military 1,046, full-time personnel 309. Payroll \$14.3 million.

**Birmingham Airport**, Ala. 35217. Phone (205) 841-9200; DSN 694-2210. 117th Reconnaissance Wg. (ANG). Area 86 acres. Altitude 650 ft. Military 1,204, full-time personnel 344. Payroll \$17.6 million.

**Boise Air Terminal**, Idaho (Gowen Field) 83707; 6 mi. S of Boise. Phone (208) 389-5011; DSN 941-5011. 124th Fighter Gp. (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. Altitude 2,858 ft. Military 1,511, full-time personnel 537. Payroll \$16.2 million. Limited transient facilities available during Army National Guard camps.

**Bradley International Airport**, Windsor Locks, Conn. 06026-5000; 15 mi. N of Hartford at East Granby. Phone (203) 623-8291; DSN 636-8310. 103d Fighter Gp. (ANG); Army National Guard aviation battalion. Base named for Lt. Eugene M. Bradley, killed in P-40 crash in Aug. 1941. Area

198 acres. Altitude 173 ft. Military 996, full-time personnel 310. Payroll \$14.1 million.

**Buckley ANG Base**, Colo. 80011; 8 mi. E of Denver. Phone (303) 366-5363; DSN 877-9011. 140th Fighter Wg. (ANG); 154th Tactical Control Gp.; Hq. Colorado ANG; 227th Air Traffic Control Flt. (ANG); and 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 3,328 acres. Altitude 5,663 ft. Military 1,436, full-time personnel 364, Title 5 civilians 257. Payroll \$26.8 million. Dispensary.

**Burlington International Airport**, Vt. 05401; 3 mi. E of Burlington. Phone (802) 658-0770; DSN 220-5210. 158th Fighter Gp. (ANG). Area 241 acres. Altitude 371 ft. Military 995, full-time personnel 398. Payroll \$14.3 million.

**Capital Municipal Airport**, Ill. 63707-5000; 2 mi. NW of Springfield. Phone (217) 753-8850; DSN 892-8210. 183d Fighter Gp. (ANG). Area 91 acres. Altitude 592 ft. Military 1,168, full-time personnel 336. Payroll \$14.1 million. Dispensary.

**Channel Islands ANG Station**, Point Mugu, Calif. 93041-4001. Phone (805) 986-8000; DSN 893-7000. 146th Airlift Wg. (ANG). Area 86 acres. Altitude 12 ft. Military 1,506, full-time personnel 369. Payroll \$18.2 million.

**Charlotte/Douglas International Airport**, Charlotte, N. C. 28208. Phone (704) 391-4100; DSN 583-9210. 145th Airlift Gp. (ANG). Area 79 acres. Altitude 749 ft. Military 1,284, full-time personnel 332. Payroll \$17.1 million. Clinic.

**Cheyenne Municipal Airport**, Cheyenne, Wyo. 82001. Phone (307) 772-6201; DSN 943-6201. 153d Airlift Gp. (ANG). Area 71 acres. Altitude 6,156 ft. Military 1,025, full-time personnel 266. Payroll \$11.7 million.

**Dannelly Field**, Ala. 36196; 7 mi. SW of Montgomery. Phone (205) 284-7210; DSN 742-9210. 187th Fighter Gp. (ANG). Base hosts 232d Combat Communications Sqdn. Field named for Ens. Clarence Dannelly, Navy pilot killed at Pensacola, Fla., during WW II. Area 51 acres. Altitude 221 ft. Military 1,053, full-time personnel 346. Payroll \$18.1 million. Dispensary.

**Des Moines International Airport**, Iowa 50321; in city of Des Moines. Phone (515) 287-9210; DSN 939-8210. 132d Fighter Wg. (ANG). Area 113 acres. Altitude 957 ft. Military 1,091, full-time personnel 344. Payroll \$14.2 million.

**Dobbins ARB**, Ga. (Marietta) 30069-5000; 16 mi. NW of Atlanta. Phone (404) 421-5000; DSN 925-1110. AFRES base. Hq. 14th Air Force (AFRES); 94th Airlift Wg. (AFRES); 116th Fighter Wg. (ANG); 151st Military Intelligence Battalion (ARNG); 345th Medical Company (USAR). Base activated 1943. Named for Capt. Charles Dobbins, WW II pilot killed in action near Sicily. Area 1,656 acres (ANG 55 acres). Altitude 1,068 ft. AFRES: active-duty 50, civilians 1,050, Reservists 2,011. Payroll \$87 million. ANG: military 1,213, full-time personnel 134. Payroll \$4.2 million. USAR: active-duty 16, Reservists 69. Housing: 5 NCO, VOQ, VAQ. Dispensary. NAS Atlanta, Lockheed Aeronautical Systems Co./Defense 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 Gp. (ANG). Area 409 acres. Altitude 1,429 ft. Military 1,009, full-time personnel 379 (plus 24 civilians). Payroll \$16.3 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 Gp. (ANG). Area 420 acres. Altitude 556 ft. Military 1,269, full-time personnel 295. Payroll \$13.8 million. Dispensary.

**Ellington Field**, Tex. 77034-5586; a City of Houston Airport 17 mi. SE of downtown Houston. Phone (713) 929-2221; DSN 954-2221. 147th Fighter Gp. (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 197 acres. Altitude 40 ft. Military 1,025, full-time personnel 418. Payroll \$18.1 million.

**Forbes Field**, Kan. 66619-5000; 2 mi. S of Topeka. Phone (913) 862-1234; DSN 720-1234. 190th Air Refueling Gp. (ANG). Area 245 acres. Altitude 1,079 ft. Military 978, full-time personnel 346 (plus 40 civilians). Payroll \$14.7 million.

**Fort Smith Municipal Airport**, Ark. 72906. Phone (501) 648-5210; DSN 962-8210. 186th Fighter Gp. (ANG). Area 98 acres. Altitude 468 ft. Military 1,048, full-time personnel 301. Payroll \$12.2 million.

**Fort Wayne International Airport**, Ind. 46809-5000; 5 mi. SSW of Fort Wayne. Phone (219) 478-3210; DSN 786-1210. 122d Fighter Wg. (ANG). Area 139 acres. Altitude 800 ft. Military 1,328, full-time personnel 365. Payroll \$15.7 million.

**Francis S. Gabreski Airport**, Westhampton Beach, N. Y. 11978-1294. Phone (516) 288-7300; DSN 456-7410. 106th Rescue Gp. (ANG). Named for Col. Francis S. Gabreski, third leading USAAF/USAF ace of all time. Area 70 acres. Altitude 67 ft. Military 793, full-time personnel 270. Payroll \$12.7 million.

**Fresno Air Terminal**, Calif. 93727-2199; 5 mi. NE of Fresno. Phone (209) 454-5155; DSN 949-9210. 144th Fighter Wg. (ANG). Area 127 acres. Altitude 332 ft. Military 1,004, full-time personnel 395. Payroll \$16 million.

**General Mitchell International Airport/ARS**, Wis. 53207-6299; 3 mi. S of Milwaukee. AFRES base. Altitude 723 ft. ANG and AFRES have separate telephone lines and facilities. ANG (414) 747-4410; DSN 580-8410. 128th Air Refueling Gp. (ANG). ANG area 111 acres. Military 999, full-time personnel 334. Payroll \$14.6 million. AFRES phone (414) 482-5000; DSN 950-5000. 440th Airlift Wg. (AFRES). AFRES area 103 acres. Full-time personnel and civilians 369, Reservists 1,203. Payroll \$18.9 million.

**Greater Peoria Airport**, Ill. 61607-1498; 7 mi. SW of Peoria. Phone (309) 633-3000; DSN 724-4210. 182d Fighter Gp. (ANG). Area 386 acres. Altitude

624 ft. Military 1,018, full-time personnel 266. Payroll \$10.9 million. Dispensary.

**Greater Pittsburgh International Airport/ARS**, Pa. 15108-4403; 15 mi. NW of Pittsburgh. Altitude 1,203 ft. AFRES base. ANG and AFRES have separate phones and facilities. 171st Air Refueling Wg. (ANG); phone (412) 269-8402; DSN 277-8402. 112th Air Refueling Gp. (ANG); phone (412) 269-8441; DSN 277-8441. ANG area 94 acres. Military 1,881, full-time personnel 517. Payroll \$21.2 million. AFRES phone (412) 269-8000; DSN 277-8000. 911th Airlift Gp. (host unit). AFRES area 176 acres. Military 26, full-time personnel 142, civilians 222, Reservists 1,302. Payroll \$20 million. Base activated 1943. Housing: 24 VOQ, 230 enlisted qtrs. Limited BX; no on-base housing.

**Great Falls International Airport**, Mont. 59401-5000; 5 mi. SW of Great Falls. Phone (406) 727-4650; DSN 279-2301. 120th Fighter Gp. (ANG). Area 139 acres. Altitude 3,674 ft. Military 1,019, full-time personnel 392. Payroll \$17.1 million. Dispensary.

**Gulfport-Biloxi Regional Airport**, Miss. 39501; within city limits of Gulfport. Phone (601) 868-6200; DSN 363-8200. Training site; also host to 255th Tactical Control Sqdn. (ANG); Army National Guard Transportation Repair Shop; and 173d Civil Engineering Flt. An air-to-ground gunnery range is located 70 mi. N of site. Area 226 acres. Altitude 28 ft. ANG military 513, full-time personnel 50. Payroll \$4.4 million. Two-bed dispensary.

**Hancock Field**, N. Y. 13211-7099; 5 mi. NE of Syracuse. Phone (315) 470-6100; DSN 587-9100. 174th Fighter Wg. (ANG). Base operations for Hancock ANG Base. 152d Tactical Control Gp.; 108th and 113th Tactical Control Sqdns. (ANG). Area 376 acres. Altitude 421 ft. Military 1,433, full-time personnel 378. Payroll \$15.1 million. Dispensary.

**Harrisburg International Airport**, Pa. 17057; 10 mi. E of Harrisburg. Phone (717) 946-2201; DSN 454-9201. 193d Special Operations Gp. (ANG). ANG area 36 acres. Altitude 310 ft. Military 1,125, full-time personnel 319. Payroll \$20.7 million.

**Hector International Airport**, Fargo, N. D. 58105-5536. Phone (701) 237-6030; DSN 362-8110. 119th Fighter Gp. (ANG). Area 209 acres. Altitude 900 ft. Military 1,154, full-time personnel 400. Payroll \$18.6 million.

**Hulman Regional Airport**, Ind. 47803-5000; 5 mi. E of Terre Haute. Phone (812) 877-5210; DSN 724-1210. 181st Fighter Gp. (ANG). Area 279 acres. Altitude 585 ft. Military 1,170, full-time personnel 321. Payroll \$13.9 million. Five-bed dispensary.

**Jacksonville International Airport**, Fla. 32229; 15 mi. NW of Jacksonville. Phone (904) 741-7150; DSN 460-7150. 125th Fighter Gp. (ANG). Area 332 acres. Altitude 26 ft. Military 1,007, full-time personnel 405. Payroll \$17.7 million. Five-bed dispensary.

**Joe Foss Field**, Sioux Falls, S. D. 57104; N side of Sioux Falls. Phone (605) 333-5700; DSN 939-7210. 114th Fighter Gp. (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 South Dakota ANG. Area 224 acres. Altitude 1,428 ft. Military 962, full-time personnel 291. Payroll \$12 million.

**Key Field**, Meridian, Miss. 39302-1825; located at municipal airport near Hwys. 20 and 59. Phone (601) 484-9000; DSN 694-9210. 186th Air Refueling Gp. (ANG); host to 238th Combat Communications Sqdn. (ANG). Area 116 acres. Altitude 297 ft. Military 1,272, full-time personnel 368. Payroll \$15.2 million. Dispensary.

**Klamath Falls International Airport**, Ore. 97603-0400; 5 mi. SE of Klamath Falls. Phone (503) 883-6350; DSN 830-6350. 114th Fighter Training Sqdn. (ANG); 142d OLAD (ANG). Area 425 acres. Altitude 4,000 ft. Military 406, full-time personnel 375, Title 5 civilians 16. Payroll \$40.1 million. Clinic.

**Lambert-St. Louis International Airport**, Bridgeton, Mo. 63145; 3 mi. E of St. Louis. Phone (314) 263-6200; DSN 693-6200. 131st Fighter Wg. (ANG). Area 49 acres. Altitude 589 ft. Military 1,551, full-time personnel 375. Payroll \$22.8 million.

**Lincoln Municipal Airport**, Neb. 68524-1897; 1 mi. NW of Lincoln. Phone (402) 473-1326; DSN

720-1352. 155th Reconnaissance Gp. (ANG). Also hosts Army National Guard unit. Area 175 acres. Altitude 1,207 ft. Military 1,117, full-time personnel 342. Payroll \$12.9 million. Tactical clinic.

**Mansfield Lahm Airport**, Ohio 44901-5000; 3 mi. N of Mansfield. Phone (419) 521-0100; DSN 696-6210. 179th Airlift Gp. (ANG). Airport named for nearby city and aviation pioneer Brig. Gen. Frank P. Lahm. Area 224 acres. Altitude 1,296 ft. Military 945, full-time personnel 259. Payroll \$10.8 million. Clinic. Limited dependent ID card service. Coast Guard exchange.

**McEntire ANG Base**, S. C. 29044; 12 mi. E of Columbia. Phone (803) 776-5121; DSN 583-8201. 169th Fighter Gp. (ANG). Also host to 240th Combat Communications Sqdn. (ANG) and Army Guard aviation unit. Base named for ANG Brig. Gen. B. B. McEntire, Jr., killed in an F-104 accident in 1961. Area 2,473 acres. Altitude 250 ft. Military 1,356, full-time personnel 383. Payroll \$14.9 million. Dispensary.

**McGhee Tyson Airport**, Tenn. 37901; 10 mi. SW of Knoxville. Phone (615) 985-3210; DSN 588-3210. Host unit is 134th Air Refueling Gp. (ANG). Tenants include 228th Combat Communications Sqdn. and ANG's I. G. Brown Professional Military Education Center. Area 287 acres. Altitude 980 ft. Military 1,162, full-time personnel 354. Payroll \$16.4 million. Dispensary.

**Memphis International Airport**, Tenn. 38181-0026; within Memphis city limits. Phone (901) 369-4111; DSN 966-8111. 164th Airlift Gp. (ANG). ANG occupies 103 acres. Altitude 332 ft. Military 949, full-time personnel 263. Payroll \$11.7 million. Clinic.

**Minneapolis-St. Paul International Airport/ARS**, Minn. 55450-5000; in Minneapolis, near confluence of the Mississippi and Minnesota Rivers. AFRES base. Altitude 840 ft. ANG and AFRES have separate phones and facilities. ANG phone (612) 725-5011; DSN 825-5552. 133d Airlift Wg. (ANG). ANG area 128 acres. Military 1,439, full-time personnel 300. Payroll \$16.2 million. AFRES phone (612) 725-5011; DSN 825-5110. 934th Airlift Gp. (AFRES) flies C-130s. AFRES area 300 acres. Reservists 1,200, full-time personnel 138, civilians 199. Payroll \$19.6 million. Other units include 210th Engineering and Installation Sqdn. (ANG); 237th Air Traffic Control Flt. (ANG); Navy Readiness Comd., Region 16; Naval Air Reserve Center; Marine Wg. Support Gp. 47, Det. A; USAF-CAP/NCLR and CAP MNLO; Rothe Development Inc. (AFRES); Billiting and BX available.

**Nashville Metropolitan Airport**, Tenn. 37217-0267; 6 mi. SE of Nashville. Phone (615) 361-4600; DSN 446-6210. 118th Airlift Wg. (ANG). Area 85 acres. Altitude 597 ft. Military 1,392, full-time personnel 372. Payroll \$19 million.

**Naval Air Station Dallas (Hensley Field)**, Tex. 75211. Phone (214) 266-6111; DSN 874-6111. 136th Airlift Wg. (ANG). Area 49 acres. Altitude 495 ft. Military 961, full-time personnel 255. Payroll \$13.1 million.

**Naval Air Station Moffett**, Calif. 94035; 2 mi. N of Mountain View. ANG phone (415) 404-9129; DSN 494-9129. 129th Rescue Gp. (ANG). Area 13 acres. Altitude 34 ft. Military 749, full-time personnel 263. Payroll \$15.4 million.

**Naval Air Station New Orleans (Alvin Callender Field)**, La. 70143-5400; 15 mi. S of New Orleans. Altitude 3 ft. ANG and AFRES have separate phones and facilities. ANG phone (504) 391-8618; DSN 457-8618. 159th Fighter Gp. (ANG). ANG military 1,215, full-time personnel 426. Payroll \$18 million. AFRES phone (504) 393-3011; DSN 363-3011. 926th Fighter Gp. (AFRES). Military 986, full-time personnel 303. Payroll \$15 million. NAS New Orleans was the first joint Air Reserve Training Facility. Field named for Alvin A. Callender, who served with the British Royal Flying Corps during WW I and was shot down over France in 1918. Area 3,245 acres (ANG 19 acres). Dispensary.

**New Castle County Airport**, Del. 19720; 5 mi. S of Wilmington. Phone (302) 323-3500; DSN 445-3360. 166th Airlift Gp. (ANG); Army National Guard aviation company. Area 57 acres. Altitude 80 ft. Military 1,010, full-time personnel 261. Payroll \$10.8 million. Two-bed dispensary.

**Niagara Falls International Airport/ARS**, N. Y. 14304-5000; 6 mi. E of Niagara Falls. Phone

(716) 236-2000; DSN 238-3011. AFRES base. 914th Airlift Gp. (AFRES); 107th Fighter Gp. (ANG). Base activated Jan. 1952. Area 979 acres (ANG 104 acres). Altitude 590 ft. AFRES: Reservists 1,200, civilians 255. Payroll \$23 million. ANG: military 995, full-time personnel 375. Payroll \$20.5 million.

**O'Hare IAP/ARS**, Ill. 60666-5010; 22 mi. NW of Chicago's Loop. Phone (312) 825-6000; DSN 930-6000. AFRES base. 928th Airlift Gp. (AFRES); 126th Air Refueling Wg. (ANG); Defense Contract Management District North Central, Fort Dearborn (US Army Reserve). Base activated 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 349 acres (ANG 36 acres). Altitude 643 ft. Reservists 1,559, full-time personnel and civilians (all units) 419, Illinois ANG 1,403, full-time personnel 351. Payroll for total facility \$74.5 million.

**Ontario International Airport**, Ontario, Calif. 91761. Phone (714) 984-2705; DSN 947-3559. 148th Combat Communications Sqn. (ANG); 210th Weather Flt. (ANG). Area 11 acres. Altitude 900 ft. Military 154, full-time personnel 26. Payroll \$1.1 million.

**Otis ANG Base**, Mass. 02542-5001; 7 mi. NNE of Falmouth. Phone (508) 968-1000; DSN 557-4003. 102d Fighter Wg. (ANG); 567th USAF Band (ANG); 101st and 202d Weather Flts. (ANG). Adjacent installations and organizations include Cape Cod AFS (6th Missile Warning Sqn., 2165th Communications Sqn.); US Coast Guard Air Station Cape Cod; Camp Edwards Army National Guard Training Site; 26th Aviation Brigade (ARNG); 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 3,849 acres. Altitude 132 ft. ANG military 1,149, ANG full-time personnel 417 (plus 318 Title 5 civilian employees). Payroll \$27.8 million.

**Pease ANG Base**, Portsmouth, N. H. 03803-6505. Phone (603) 430-2453; DSN 852-2453. 157th Air Refueling Gp. (ANG). Area 229 acres. Altitude 101 ft. ANG military 1,170, ANG full-time personnel 370. Payroll \$12 million.

**Portland International Airport**, Portland, Ore. 97218-2797. Phone (503) 335-4000; DSN 638-4000. 142d Fighter Gp. (ANG); 244th Combat Communications Sqn. (ANG); 272d Combat Communications Sqn. (ANG); 12th Special Forces Gp. (USAR); Oregon Wg., CAP. Also host to 939th Rescue Wing (AFRES) and 83d Aerial Port Sqn. (AFRES). Area 245 acres. Altitude 26 ft. Military 1,773, full-time personnel 621 (plus 100 civilians). Payroll \$20.5 million.

**Puerto Rico International Airport** (Muniz ANG Base), Puerto Rico 00914; E of San Juan. Phone (809) 253-5100; DSN 860-9210. 156th Fighter Gp. (ANG). Base named for Lt. Col. José A. Muniz, killed in an aircraft accident July 4, 1960. Area 86 acres. Military 969, full-time personnel 300. Payroll \$15.7 million.

**Quonset State Airport**, R. I. 02852; 20 mi. S of Providence. Phone (401) 886-1200; DSN 476-3210. 143d Airlift Gp. (ANG). Area 79 acres. Altitude 9 ft. Military 996, full-time personnel 270. Payroll \$15.1 million.

**Reno-Cannon International Airport** (May ANG Base), Nev. 89502; 5 mi. SE of Reno at 1776 ANG Way. Phone (702) 788-4500; DSN 830-4500. 152d Reconnaissance Gp. (ANG). Base named for Maj. Gen. James A. May, Nevada Adjutant General. Area 64 acres. Altitude 4,411 ft. Military 1,104, full-time personnel 334. Payroll \$13.5 million. Dispensary.

**Richmond IAP** (Byrd Field), Va. 23150; 4 mi. SE of downtown Richmond. Phone (804) 222-8884; DSN 274-8884. 192d Fighter Gp. (ANG). Field named for Adm. Richard E. Byrd, famous Arctic and Antarctic explorer. Area 143 acres. Altitude 167 ft. Military 1,089, full-time personnel 337. Payroll \$13.9 million.

**Rickenbacker ANG Base**, Ohio 43217-5887; 13 mi. SSW of Columbus. Phone (614) 492-8211; DSN 950-1110. Base transferred from SAC to ANG Apr. 1, 1980. 121st Fighter Wg. (ANG); 907th Airlift Gp. (AFRES); 160th Air Refueling Gp. (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, died July 23, 1973. Area 2,016 acres. Altitude 744 ft. ANG military 1,940, full-time personnel 583, Title 5 civilians 299. Payroll \$32.7 million. AFRES 1,176, full-time personnel 238. Payroll \$11.1 million. Base scheduled to close September 1994.

**Rosecrans Memorial Airport**, Mo. 64503; 4 mi. W of St. Joseph. Phone (816) 271-1300; DSN 720-9210. 139th Airlift Gp. (ANG). Area 207 acres. Altitude 724 ft. Military 916, full-time personnel 264. Payroll \$11.5 million.

**Roslyn ANG Station**, N. Y. 11576-2399; 27 mi. E of New York City. Phone (516) 299-5214; DSN 456-5201. 274th Combat Communications Sqn. (ANG); 213th Engineering Installation Sqn. (ANG). Also hosts two Army National Guard units. Area 50 acres. Altitude 320 ft. Military 399, full-time personnel 42. Payroll through Stewart IAP, Newburgh, N. Y.

**Salt Lake City International Airport**, Utah 84116; 3 mi. W of Salt Lake City. Phone (801) 595-2200; DSN 790-9210. 151st Air Refueling Gp. (ANG); 169th Electronic Security Sqn. (ANG). Also hosts ANG's 130th Engineering Installation Sqn. and 106th and 109th Tactical Control Flts. Area 135 acres. Altitude 4,220 ft. Military 1,585, full-time personnel 409 (plus 41 civilians). Payroll \$20.2 million. Dispensary.

**Savannah International Airport**, Ga. 31402; 4 mi. NW of Savannah. Phone (912) 964-1941; DSN 860-8210. 165th Airlift Gp. (ANG). Also field training site. Area 232 acres. Altitude 50 ft. Military 1,176, full-time personnel 330. Payroll \$17.7 million. Housing: 156 officer, 736 enlisted. Three-bed dispensary.

**Schenectady Airport**, Scotia, N. Y. 12302-9752; 2 mi. N of Schenectady. Phone (518) 381-7300; DSN 974-9221. 109th Airlift Gp. (ANG). Area 106 acres. Altitude 378 ft. Military 1,102, full-time personnel 258. Payroll \$11.6 million. Dispensary.

**Selridge ANG Base**, Mich. 48045-5046; 3 mi. NE of Mount Clemens. Phone (313) 466-4011; DSN 273-0111. 127th Fighter Wg. (ANG); 191st Fighter Gp. (ANG); 927th Air Refueling Gp. (AFRES). Also hosts Air Force, Navy Reserve, Marine Air 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. Selridge, 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 3,679 acres. Altitude 583 ft. ANG military 2,070, ANG full-time personnel 581 (plus 530 civilians). Payroll \$44.6 million. Dispensary.

**Sioux Gateway Airport**, Iowa 51110; 7 mi. S of Sioux City. Phone (712) 255-3511; DSN 939-6210. 185th Fighter Gp. (ANG). Area 112 acres. Altitude 1,098 ft. Military 937, full-time personnel 294. Payroll \$13.4 million. Dispensary.

**Sky Harbor International Airport**, Phoenix, Ariz. 85034. Phone (602) 244-9841; DSN 853-9072. 161st Air Refueling Gp. (ANG). Area 58 acres. Altitude 1,230 ft. Military 1,076, full-time personnel 342. Payroll \$16.6 million.

**Springfield-Beckley Municipal Airport**, Ohio 45501-1780; 5 mi. S of Springfield. Phone (513) 323-8653; DSN 346-2311. 178th Fighter Gp. (ANG); 251st Combat Communications Gp. (ANG); 269th Combat Communications Sqn. (ANG). Area 114 acres. Altitude 1,052 ft. Military 1,205, full-time personnel 333. Payroll \$15.9 million. Six-bed dispensary.

**Standford Field**, Louisville, Ky. 40213. Phone (502) 364-9400; DSN 989-4400. 123d Airlift Wg. (ANG); 223d Communications Sqn. (ANG). Area 65 acres. Altitude 497 ft. Military 1,121, full-time personnel 317. Payroll \$13.5 million.

**Stewart International Airport**, Newburgh, N. Y. 12550-0031; 15 mi. N of USMA (West Point). Phone (914) 563-2000; DSN 247-2000. Hq. New York ANG; 105th Airlift Gp. (ANG); USMA subpost airport. Stewart AFB until 1969; acquired by state of New York in 1970. ANG area 304 acres. Altitude 491 ft. ANG military 1,757, full-time personnel 672. Payroll \$18 million. Dispensary. Most military services available through West Point or subpost.

**Toledo Express Airport**, Swanton, Ohio 43558; 14 mi. W of Toledo. Phone (419) 868-4078; DSN 580-4078. 180th Fighter Gp. (ANG). Area 84 acres. Altitude 684 ft. Military 1,040, full-time personnel 297. Payroll \$14.3 million. Four-bed clinic.

**Truax Field** (Dane County Regional Airport), Wis. 53704-2591; 2 mi. N of Madison. Phone (608) 241-6200; DSN 273-8210. 128th Fighter Wg. (ANG). Activated June 1942 as AAF base; taken over by Wis. ANG in Apr. 1968. Named for Lt. T. L. Truax, killed in a P-40 training accident in 1941. Area 155 acres. Altitude 862 ft. Military 1,006, full-time personnel 310. Payroll \$12.2 million. Housing: 7 transient. Dispensary.

**Tucson International Airport**, Ariz. 85734; within Tucson city limits. Phone (602) 573-2210; DSN 853-4210. 162d Fighter Gp. (ANG). Area 86 acres. Altitude 2,650 ft. Military 1,583, full-time personnel 862. Payroll \$24.3 million.

**Tulsa International Airport**, Okla. 74115. Phone (918) 832-8300; DSN 956-5297. 138th Fighter Gp. (ANG); 219th Electronic Installation Sqn. Area 82 acres. Altitude 676 ft. Military 1,148, full-time personnel 310. Payroll \$13 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. Base and field named for Lt. Jerome A. Volk, first Wisconsin ANG pilot killed in the Korean War. Area 2,273 acres. Altitude 910 ft. Military 74, full-time personnel 74. Payroll \$2.1 million. Six-bed dispensary.

**W. K. Kellogg Airport**, Battle Creek, Mich. 49015-1291. Phone (616) 963-1596; DSN 580-3210. 110th Fighter Gp. (ANG). Area 315 acres. Altitude 941 ft. Military 951, full-time personnel 254. Payroll \$10.6 million.

**Westover ARB**, Mass. 01022-5000; 5 mi. NE of Chicopee. Phone (413) 557-1110; DSN 589-1110. AFRES base. 439th Airlift Wg. (AFRES). Also home of Army, Navy, and Marine Corps Reserve and Massachusetts Army National Guard. 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. Altitude 244 ft. Reservists 2,446, full-time personnel (AFRES and tenant units) 533, civilians 587. Payroll \$61 million. Housing: 360 VAQ (656 beds), 50 VOQ (80 beds).

**Willow Grove ARS**, Pa. 19090-5203; 14 mi. N of Philadelphia. Altitude 356 feet. ANG and AFRES have separate phones and facilities. ANG phone (215) 443-1500; DSN 991-1500. 111th Fighter Gp. (ANG). ANG area 39 acres. Military 1,147, full-time personnel 292. Payroll \$11.2 million. AFRES phone (215) 443-1100; DSN 991-1100. 913th Airlift Gp. (AFRES). AFRES area 162 acres. Reservists 1,000, full-time personnel 140, civilians 164. Payroll \$17.5 million. Other units include Army, Navy, and Marine Corps Reserve, Defense Contract Administration Services Region, Philadelphia; 92d Aerial Port Sqn. off-base tenant. Base activated Aug. 1958. Navy transient quarters available but limited.

**Will Rogers World Airport**, Okla. 73169-5000; 7 mi. SW of Oklahoma City. Phone (405) 686-5210; DSN 956-8210. 137th Airlift Wg. (ANG). Area 134 acres. Altitude 1,290 ft. Military 1,253, full-time personnel 254. Payroll \$14.2 million.

**Yeager Airport**, W. Va. 25311-5000; 4 mi. NE of Charleston. Phone (304) 341-6210; DSN 366-9210. 130th Airlift Gp. (ANG). Airport named for Brig. Gen. Charles "Chuck" Yeager, first man to break the sound barrier. Area 76 acres. Altitude 981 ft. Military 942, full-time personnel 249. Payroll \$11.1 million. Dispensary, clinic.

**Youngstown Municipal Airport/ARS**, Ohio 44473-5000; 16 mi. N of Youngstown. Phone (216) 392-1000; DSN 346-1000. AFRES base. 910th Airlift Gp. (AFRES); 757th Airlift Sqn. (AFRES). Other units include 76th Mobile Aerial Port Sqn. (AFRES); Defense Contract Administration Services OLC; Naval Reserve, REDCOM 5; Marine Corps Reserve, H&S Co., H&S Bn., 4th FSSG; Army Corps of Engineers, Louisville District; Federal Aviation Administration Area Office. Base activated 1952. Area 403 acres. Altitude 1,196 ft. Reservists 1,053, full-time personnel 161, civilians 230. Payroll \$21 million.



## Records, Trophies, and Competitions

# USAF ALMANAC 1993

### 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 Washington, D. C., 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 Jeana Yeager	<i>Voyager</i> experimental aircraft	Edwards AFB, Calif., to Edwards AFB, Calif.	December 14–23, 1986
Great circle distance without landing: 24,986.727 miles (40,212.139 kilometers)	Richard Rutan and Jeana Yeager	<i>Voyager</i> experimental aircraft	Edwards AFB, Calif., to Edwards AFB, Calif.	December 14–23, 1986
Distance in a closed circuit without landing: 24,986.727 miles (40,212.139 kilometers)	Richard Rutan and Jeana Yeager	<i>Voyager</i> experimental aircraft	Edwards AFB, Calif., to Edwards AFB, Calif.	December 14–23, 1986
Altitude: 123,523.58 feet (37,650.00 meters)	Alexander Fedotov	E-266M, a modified MiG-25 "Foxbat"	Podmoskovnoye, USSR	August 31, 1977
Altitude in an aircraft launched from a carrier airplane: 314,750.00 feet (95,935.99 meters)	Maj. Robert M. White, USAF	North American X-15 No. 3 research aircraft	Edwards AFB, Calif.	July 17, 1962
Altitude in horizontal flight: 85,068.997 feet (25,929.031 meters)	Capt. Robert C. Helt, USAF	Lockheed SR-71A "Blackbird" reconnaissance aircraft	Beale AFB, Calif.	July 28, 1976
Speed over a straight course: 2,193.16 mph (3,529.56 kph)	Capt. Eldon W. Joersz, USAF	Lockheed SR-71A "Blackbird" reconnaissance aircraft	Beale AFB, Calif.	July 28, 1976
Speed over a closed circuit: 2,092.294 mph (3,367.221 kph)	Maj. Adolphus H. Bledsoe, Jr., USAF	Lockheed SR-71A "Blackbird" 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 publisher,

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. Lawrence.** 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.** Biengined, 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.** Round-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, 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 **USAF, 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, 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.



## The Robert J. Collier Trophy

- 1983 **US Army, Hughes Helicopters, industry team.** AH-64A Apache helicopter.
- 1984 **NASA, Martin Marietta, 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 **Jeana 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.

## Rodeo

Rodeo is Air Mobility Command's annual airlift and air refueling competition. It was held under different names by AMC's predecessor commands. The week-long Rodeo '92 at Pope AFB, N. C., showcased the top USAF active-duty, Air National Guard, and Air Force Reserve aircraft and teams and those of allied nations. Since 1980, the trophy for the best overall wing has been named after Gen. William G. Moore, Jr., the eighth commander in chief of MAC.

### Recipients of the Moore Trophy

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.

## 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	58th TFS, Eglin AFB, Fla.	F-15C/D

# The Mackay Trophy

The Mackay Trophy was established by Clarence H. Mackay, an industrialist, philanthropist, communications

pioneer, and aviation enthusiast. Presented by the National Aeronautic Association, the trophy recognizes "the

most meritorious flight of the year" by an Air Force person, persons, 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 Street, 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** Second Bombardment Group (General Headquarters Air Force). All those in the Second 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, 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, 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, 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, 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, 436th MAW). C-5 airlift to Zaire.

## The Mackay Trophy

- 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.
- 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.

## Proud Shield

Proud Shield was SAC's annual Bombing and Navigation Competition. The Gen. Muir S. Fairchild Trophy, named for the first commander of Air University, was awarded to the SAC bomber-tanker wing with the highest competition effectiveness.

## Recipients of the Fairchild Trophy

Year	Unit(s)	Aircraft
1951	97th BMW, Biggs AFB, Tex.	B-50D
1952	93d BMW, Castle AFB, Calif.	B-50D
	97th BMW, Biggs AFB, Tex. (tie)	B-50D
	92d BMW, Fairchild AFB, Wash.	B-36D
1953	11th BMW, Carswell AFB, Tex.	B-36H
1954	320th BMW, March AFB, Calif.	YRB-47B
1955	11th BMW, Carswell AFB, Tex.	B-36H
1956	321st BMW, Pinecastle AFB, Fla.	B-47B
1957	306th BMW, MacDill AFB, Fla.	B-47E
1958	307th BMW, Lincoln AFB, Neb.	B-47E
1959	11th BMW, Altus AFB, Okla.	B-52E
1960	4137th BMW, Robins AFB, Ga.	B-52G
1961	No competition	
1962	2d BMW, Barksdale AFB, La. <sup>a</sup>	B-52 <sup>b</sup>
1963	70th BMW, Clinton-Sherman AFB, Okla. <sup>a</sup>	B-52 <sup>b</sup>
1964	454th BMW, Columbus AFB, Miss.	B-52F
1965	19th BMW, Homestead AFB, Fla.	B-52H
1966	No competition	
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-52 <sup>b</sup>
1986	92d BMW, Fairchild AFB, Wash.	B-52 <sup>b</sup>
1987	379th BMW, Wurtsmith AFB, Mich.	B-52G
1988	5th BMW, Minot AFB, N. D.	B-52 <sup>b</sup>
1989	28th BMW, Ellsworth AFB, S. D.	B-1B
1990	No competition	
1991	No competition	
1992	92d BMW, Fairchild AFB, Wash.	B-52H

<sup>a</sup>Trophy given for overall annual performance, not for scores in SAC bombing and navigation competition

<sup>b</sup>No model listed in official standings.

## Olympic Arena

Olympic Arena was Strategic Air Command's annual competition to determine the top strategic missile wing. It was held at Vandenberg AFB, Calif. Each ICBM wing competed in operations, maintenance, security police, civil engineering, and communications. The winner of Olympic Arena received a trophy named for former Air Force Vice Chief of Staff Gen. William H. Blanchard.

### Recipients of the Blanchard Trophy

Year, Unit(s)	System
1967 351st SMW, Whiteman AFB, Mo.	Minuteman
1968 No competition	
1969 321st SMW, Grand Forks AFB, N. D.	Minuteman
1970 44th SMW, Ellsworth AFB, S. D.	Minuteman
1971 351st SMW, Whiteman AFB, Mo.	Minuteman
1972 381st SMW, McConnell AFB, Kan.	Titan
1973 90th SMW, F. E. Warren AFB, Wyo.	Minuteman
1974 321st SMW, Grand Forks, N. D.	Minuteman
1975 381st SMW, McConnell AFB, Kan.	Titan
1976 341st SMW, Malmstrom AFB, Mont.	Minuteman
1977 351st SMW, Whiteman AFB, Mo.	Minuteman
1978 91st SMW, Minot AFB, N. D.	Minuteman
1979 390th SMW, Davis-Monthan AFB, Ariz.	Titan
1980 381st SMW, McConnell AFB, Kan.	Titan
1981 351st SMW, Whiteman AFB, Mo.	Minuteman
1982 44th SMW, Ellsworth AFB, S. D.	Minuteman
1983 381st SMW, McConnell AFB, Kan.	Titan
1984 90th SMW, F. E. Warren AFB, Wyo.	Minuteman
1985 308th SMW, Little Rock AFB, Ark.	Titan
1986 341st SMW, Malmstrom AFB, Mont.	Minuteman
1987 321st SMW, Grand Forks AFB, N. D.	Minuteman
1988 91st SMW, Minot AFB, N. D.	Minuteman
1989 351st SMW, Whiteman AFB, Mo.	Minuteman
1990 341st SMW, Malmstrom AFB, Mont.	Minuteman
1991 341st SMW, Malmstrom AFB, Mont.	Minuteman
1992 44th MW, Ellsworth AFB, S. D.	Minuteman

## 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.

### William Tell Winners

Year	Unit, Base	Aircraft
1954	3550th FTW (Interceptor), Moody AFB, Ga.	F-94C
1955	26th Air Division, Duluth MAP, Minn. (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
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, 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-106A1
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
1984	57th FIS, NAS Keflavik, Iceland	F-4E
	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

<sup>a</sup>Overall competition winner. The naming of an overall winner was instituted 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, 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
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. Davis 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

Gunsmoke

Gunsmoke was Tactical Air Command's air-to-ground fighter gunnery competition, held biannually at Nellis AFB, Nev. Gunsmoke tested the capabilities of the tactical air forces and recognized the best aircrews, maintenance teams, and munitions load teams.

Gunsmoke Top Guns

Year	Individual	Aircraft	Unit, Base
1949	Unknown	F-86A	4th FIW, Langley AFB, Va.
1950	Unknown	Unknown	Unknown, Nellis AFB, Nev.
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.
1964-1980	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

## 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 presented annually to Air Force individuals or organizations (civilian or military) who made the year's outstanding progress in the field of aerospace.

- 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., and 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, and 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.), and 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.

## The Reconnaissance Air Meet

Tactical Air Command's Reconnaissance Air Meet (RAM), held every two years, focused on procedures and techniques used by allied reconnaissance units. Teams came from Australia, Germany, the UK, and the US, among other nations.

### Winners of the RAM Competition

Year	Unit, Location
1986	152d TRG (ANG), Reno, Nev.
1988	26th TRW, Zweibrücken AB, West Germany
1990	152d TRG (ANG), Reno, Nev.
1992	No competition



# Gallery of USAF Weapons

By Susan H. H. Young

Edited by John W. R. Taylor

## Bombers

### B-1B Lancer

To meet the changing demands of global defense, the B-1B Lancer is to undergo a major enhancement to its conventional capability while retaining its nuclear capacity. The aircraft's advanced aerodynamic technology and improved engine performance already permit it to carry a considerably greater weapons load than the older and larger B-52, which it partners in the USAF long-range heavy bomber force. Each of the Air Force's 96 B-1Bs possesses the flexibility to deliver a variety of short-range nuclear air-to-surface missiles, nuclear and conventional gravity bombs, mines, other weapons, or additional fuel, as required. Under the 1993 budget, \$86 million has been allocated to the B-1B for R&D, with a further \$218 million for modifications and procurement. This will be used to fund the development of an organic maintenance capability and for upgrades to the bomber's electronic countermeasures (ECM) to compensate for deficiencies in the present ALQ-161 ECM system. Future plans include the installation of Global Positioning System (GPS) receivers, a MIL-STD-1760 data bus, secure radios, and improved computers in preparation for the introduction of advanced precision guided munitions. These will include the Joint Direct Attack Munition (JDAM), the Joint Standoff Weapon (JSOW), and the Triservice Standoff Attack Missile (TSSAM) within the next eleven years.

The B-1B 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 and terrain-following radar, an extremely accurate inertial navigation system, new computer-driven avionics, strategic Doppler radar, and a radar altimeter. The efficiency of these systems was first demonstrated in November 1989 when an operational B-1B flew the type's first low-level night sortie over terrain that varied greatly in altitude, using the fully automatic terrain-following equipment.

The defensive avionics package, built around the ALQ-161 ECM system, is supplemented by such expendables as chaff and flares to protect against radar-homing and heat-seeking missiles. Radar-absorption materials are used to reduce the aircraft's radar signature, which is only one percent that of a B-52. Modifications will include an ECM upgrade, integration of both precision and standoff conventional munitions, stability enhancement function upgrades, and installation of fire detection and suppression systems in the aircraft's overwing fairing.

IOC for the B-1B was achieved at Dyess AFB, Tex., in September 1986 and deliveries were completed in April 1988, with Dyess having 28 aircraft; Ellsworth AFB, S. D., 24; and Grand Forks AFB, N. D., and McConnell AFB, Kan., each 16 B-1Bs. The fleet is now part of Air Combat Command.

In 1987, a series of international speed and distance with payload records was set by the B-1B. 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 eight world time-to-climb records in its class and set marks in three new categories in February 1992.

**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 operators (offensive and defensive).

**Dimensions:** span spread 136 ft 8½ in, fully swept 78 ft 2½ in, length 147 ft, height 34 ft.



B-1B Lancer (Guy Aceto)



B-2A

**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 AGM-69 short-range attack missiles (SRAMs), 12 B28 or 24 B61 or B83 free-fall nuclear bombs; in a nonnuclear role up to 84 Mk 82 (500-lb) bombs or Mk 36 (500-lb) mines.

### B-2A

This wholly unique advanced technology aircraft was conceived as a highly survivable strategic bomber to supplement, and ultimately replace, the B-1B in its penetration role. However, current plans for USAF's bomber force, designed to reflect the changing world order, emphasize the B-2's conventional capabilities, casting it as the "pivotal tool" in bringing about the rapid destruction of an enemy. Employing sophisticated technologies, notably low-observable stealth techniques, to minimize the possibility of detection, and including the Hughes AN/APG-181 low-probability-of-intercept covert strike radar, the B-2 is expected to lead the bomber offensive on the first nights of a war, attacking the most heavily defended targets and neutralizing enemy defenses with its precision guided weapons, to allow less stealthy systems to operate.

Funding authorized in the FY 1993 budget provides \$2.7 billion for the procurement of a final four aircraft, as well as \$1.3 billion for R&D. This will enable USAF to field two squadrons, each of eight operational aircraft. Original plans had envisaged a total buy of 132 B-2s. The Air Force intends to certify the bomber to satisfy FY 1993 budget authorization requirements that the B-2 should demonstrate specific performance characteristics before \$1 billion in FY 1992 funding is obligated for the 16th aircraft. However, the integrated offensive and defensive avionics will not have been test flown in the aircraft.

Of flying wing configuration, the B-2A has no vertical tail surfaces. The smoothly blended "fuselage"

section accommodates a two-person flight crew, with room for a third person, and with two large weapons bays side by side to the rear. These contain rotary launchers capable of carrying a total weapons load of between 40,000 and 75,000 lb; but about 25,000 lb of nuclear weapons would be normal under the nation's Single Integrated Operational Plan (SIOP). From FY 1996, the B-2A will also carry the conventional TSSAM, currently in full-scale development, followed a year later by the JDAM I. 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 movable surfaces at the wing trailing edges, which combine aileron, elevator, and flap functions. A landing gear track of 40 ft enables the B-2A to use any runway that can handle a Boeing 727 airliner. In flight, the bomber is reported to be near neutrally stable. It is claimed to have almost 50 percent better fuel efficiency than the B-1B and to require less than half the latter's air refueling support to accomplish SIOP missions. A typical unrefueled range of 5,182 miles is estimated for a hi-lo-hi mission carrying 16 B61 nuclear free-fall bombs. Planned future enhancements include a new, deployable mission planning system for specialized stealth route planning and advanced weapons targeting.

The first B-2A made its first flight from Air Force Plant 42 in Palmdale, Calif., to Edwards AFB, Calif., in July 1989. Since then, the aircraft has entered a program of flight tests that expanded the flight envelope and included day- and nighttime aerial refuelings. Deficiencies detected during critical low-observability (LO) testing in July 1991 are to be corrected in a "set of treatments" to edges and surfaces at different points of the aircraft, which will have the additional benefit of reducing the B-2A's signature across the whole frequency range. This will only apply to advanced Block 30 aircraft, but all B-2s are expected to be configured to Block 30 standard by the end of the decade. The second B-2A, which flew for the first time in October 1990, is instrumented for dynamic loads testing. The third and fourth B-2As (flown in June 1991 and April 1992, respectively) are designed with full avionics and are assigned to low-observability and weapons testing. The fifth aircraft (flown last October) is conducting climatic, weapons and low-observables trials, and the sixth will be assigned to operational test and evaluation.

Whiteman AFB, Mo., is scheduled to receive the first operational B-2As at the end of this year, with IOC expected by the middle of the decade.

**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, with provision for 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 400,000 lb.

**Performance:** approach speed 161 mph, service ceiling 50,000 ft, unrefueled range 7,255 miles.

**Armament:** in a nuclear role: up to 20 B61 nuclear bombs, or B83 nuclear bombs, or a combination. In a conventional role: 80 x 500-lb bombs or various other conventional weapons, including sea mines. There are no plans to carry the AGM-129A advanced cruise missile (ACM) on the B-2A.

### B-52G/H Stratofortress

Constituting a substantial element in the bomber inventory, the B-52 has a heavy payload capability, with a wide range of weapons that can be used against many types of targets, including overflight weapons and standoff missiles. Apart from their nuclear mission, B-52s are employed in important conventional roles, including show of force, maritime interdiction, precision strikes, and defense suppression. The versatility of the B-52 was ably demonstrated during Operation Desert Storm, when conventionally armed B-52s flew 1,624 missions, delivering 25,700 tons of weapons, including a conventionally armed version of the AGM-86 ALCM, against both tactical and strategic targets. A mission capable rate of 81 percent, better than peacetime rate, was achieved. Their long range has suited them to other collateral missions in recent years, including sea surveillance flights, aerial minelaying and antisurface warfare operations in cooperation with the US Navy, and support for NATO Allies.

Two versions are still in service: the B-52G, which introduced a redesigned wing containing integral fuel tanks, fixed underwing external tanks, a tailfin of reduced height and broader chord, and a remotely controlled tailgun turret that allowed the gunner to be repositioned with the rest of the crew; deliveries began in February 1959; 193 were built, of which about 80 remain operational; and the B-52H, which switched to TF33 turbofans, providing increased unrefueled range, and which had improved defensive armament, including a 20-mm Vulcan multibarrel tailgun; 102 were built, with deliveries beginning in May 1961; 95 remain operational.

During the early 1970s, all B-52Gs and Hs were modified to carry AGM-69A SRAMs. Additionally, all Gs and Hs were equipped with an AN/ASQ-151 electro-optical viewing system, using forward-looking infrared (FLIR) and low-light-level TV sensors to improve their low-level flight capability, and were updated with Phase VI avionics. These include ALQ-122 SNOE (smart noise operation equipment) and AN/ALQ-155(V) advanced ECM; an AFSATCOM kit permitting worldwide communications via satellite; a Dalmio 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. The G/Hs have also been fitted with a digital-based solid-state offensive avionics system (OAS) that includes inertial guidance, Tercom (terrain comparison) guidance, and microprocessors to upgrade their navigation and weapons delivery systems.

Deployment of the B-1B and development of the B-2A led to a change in the primary role of the B-52 to ALCM (AGM-86) carrier. A typical profile envisaged multiple ALCM launches at high altitude, often followed by B-52 low-level descent to attack additional



**B-52H (Geoffrey Pearce)**

targets using gravity weapons or SRAMs (currently grounded). USAF originally deployed AGM-86s on 98 on-line B-52Gs and 95 B-52Hs, each with 12 external cruise missiles, but all the remaining strategic nuclear B-52Gs will be retired by the end of FY 1993. The Common Strategic Rotary Launcher (CSRL) will permit internal carriage of eight additional AGM-86s in the B-52H, allowing a total ALCM offensive weapon load of 20 cruise missiles. Full operational capability for this system is scheduled for later this summer. B-52Hs are also being equipped with the AGM-129A ACM, which offers greater range and employs low-observable (LO) technology. Initial operational capability was expected at ACC's 410th Bomb Wing, K. I. Sawyer AFB, Mich., last year.

Plans for the future role of the B-52 emphasize the bomber's conventional capabilities. All B-52 crews train to drop conventional weapons, and B-52Gs have been assigned to support conventional operations by employing airpower over great distances at short notice on behalf of theater CINCs, as well as naval antisurface warfare operations, with 30 of the aircraft modified for Harpoon deployment; one full squadron is based at Loring AFB, Me., for Atlantic operations.

Under current proposals, all remaining conventional B-52Gs will be retired gradually and 47 of the newer, more highly powered and cost-efficient "H" models will receive new conventional capabilities. The bomber's ability to provide massive firepower in low-threat environments will be supplemented by a stand-off attack capability. Upgrades include the installation of GPS terminals, secure radios, and MIL-STD-1760 interfaces. Weapons capability will include naval mines, and precision guided weapons such as the AGM-84 Harpoon antiship missile, and a version of the TSSAM and JDAM I in 1996 and 1998, respectively. (Data for B-52G, except where noted.)

**Contractor:** Boeing Military Airplanes.



**F-15C (Nathan Leong)**

**Power Plant:** G model: eight Pratt & Whitney J57-P-43WB turbojets; each 13,750 lb thrust; H model: eight Pratt & Whitney T33-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:** G/H models gross more than 488,000 lb.

**Performance (approx):** max level speed at high altitude 595 mph, service ceiling 55,000 ft, range: more than 7,500 miles (G model), more than 10,000 miles (H model).

**Armament:** G/H models carry eight SRAMs and nuclear free-fall bombs internally and 12 AGM-86B ALCMs instead of SRAMs externally. Provision for eight more ALCMs instead of SRAMs or gravity weapons internally on H model. Alternatively, G and H models can carry conventional weapons including bombs up to 2,000 lb, air-dropped mines, cluster bombs, and, on some B-52G aircraft, AGM-142A Have Nap missiles or eight to 12 Harpoons in underwing clusters.

## Fighters

### F-15 Eagle

The basic F-15 is USAF's primary air-superiority fighter, in service with ACC, PACAF, USAF, 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 equipment 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. Under ongoing contracts, first funded in February 1983, the F-15 is undergoing a Multistage Improvement Program (MSIP). Improvements include a Programmable Armament Control Set, an expanded tactical electronic warfare system that provides improvements to the ALR-56C radar warning receiver and ALQ-135 countermeasures set, a major upgrade to the Hughes APG-63 radar to APG-70 standard, and provision for AIM-120A Advanced Medium-Range Air-to-Air Missile (AMRAAM). F-15C/Ds deployed to the Persian Gulf in support of Operation Desert Storm accounted for thirty-six of the thirty-nine USAF air-to-air victories. They have since been deployed to southern Iraq in support of Operation Southern Watch.

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 head-up display, 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.

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-120A AMRAAM, as well as electro-optical (EO), infrared (IR), and standard bombs; air-to-ground missiles; dispenser munitions; and nuclear weapons. A new engine bay was developed by McDonnell Douglas to 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 STARS aircraft. The FY 1992 budget reversed an earlier decision to terminate F-15E production in FY 1991, following acquisition of the 200th aircraft. The production line was to be kept open, and a further nine aircraft were authorized. A total of \$54 million has been authorized for F-15 R&D in FY 1993.



**F-15E (Guy Aceto)**



An advanced one-off experimental version of the F-15, the **F-15 Short Takeoff and 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 thirty-five percent in takeoff distance and sixty-five percent in landing distance, as well as the ability to land autonomously at night and in poor weather.

A further version of the F-15, with HARM capability and precision direction finding, is proposed to fulfill USAF's requirement for a Follow-On Wild Weasel defense suppression aircraft to replace the current F-4G. (Data for F-15C, except where stated.)

**Contractor:** McDonnell Aircraft Company, Division of McDonnell Douglas Corporation.

**Power Plant:** F-15C: two Pratt & Whitney F100-PW-100 or F100-PW-220 turbofans; each approx 23,450 lb thrust. F-15E: two Pratt & Whitney F100-PW-220 or F100-PW-229 turbofans.

**Accommodation:** pilot only in F-15A/C; two seats in F-15B/D; crew of two in F-15E.

**Dimensions:** span 42 ft 9 3/4 in, length 63 ft 9 in, height 18 ft 5 1/2 in.

**Weights:** empty 28,600 lb, gross 68,000 lb in F-15A/B/C/D; empty 32,500 lb, gross 81,000 lb in F-15E.

**Performance:** F-15C: max speed Mach 2.5, service ceiling 60,000 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 2,765 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 AMRAAMs, carried externally. Provision for carrying up to 24,500 lb of ordnance on weapon stations on F-15E.

### F-16 Fighting Falcon

The F-16 was developed to replace F-4s in the active-duty force and to modernize the air reserve forces. Advanced technologies incorporated from the start in the single-seat **F-16A** and two-seat **F-16B** versions made them 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 head-up display, internal chaff/flare dispensers, and a 500-round 20-mm internal gun.

The F-16 entered operational service with ACC's 388th FW at Hill AFB, Utah, in January 1979. Production of the F-16A and B for USAF ended in 1985. 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. Scheduled 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 (MSIP), 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 multirole flexibility. MSIP II was applicable to the improved **F-16C** (single-seat) and **F-16D** (two-seat) versions, of which deliveries to USAF began in July 1984. These aircraft have a Westinghouse APG-68 multimode radar, with increased range and advanced ECCM, and advanced cockpit displays including a wide-angle head-up display. Weapons improvements include multitarget AMRAAM compatibility. Also introduced were systems improvements that include installation of a LANTIRN nav/attack system, GPS, enhanced-envelope gunsight, digital flight controls, automatic terrain following, advanced identification, friend or foe (IFF), increased T-O weight and maneuvering limits, an 8,000-hour airframe, and 9g capability. Follow-on systems include ALE-47 improved defensive countermeasures, ALR-56M advanced radar warning receiver, advanced programmable signal processor employing VHSIC technology in the APG-68(V5) fire-control radar, HARM/Shrike capability, a ring-laser gyro INS, and increased performance engines supplied by Pratt & Whitney (F100-PW-229) and General Electric (F110-GE-129). F-16C/Ds, with interim HARM/Shrike capability, have been used for defense suppression/destruction missions in conjunction with F-4G Wild Weasels based at Spangdahlem AB, Germany—a partnership that proved highly successful during the Gulf War. In all, the 249 USAF F-16 multimission fighters deployed to the Gulf theater flew more sorties than any other type during Operation Desert Storm, with 13,500 missions. F-16Cs have also been deployed to patrol the "no-fly" zone in southern Iraq.



**F-16C (Nathan Leong)**

A sophisticated research variant of the F-16, known as the **AFTI/F-16**, was modified for use at Edwards AFB, Calif., to demonstrate new technologies for next-generation close air support/battlefield air interdiction (CAS/BAI) aircraft. Systems tested and evaluated include a digital flight-control system, pilot/vehicle interface, automated maneuvering attack system, digital terrain management and display system, LANTIRN, head-steerable FLIR, integrated night vision helmet, Automatic Target Handoff System (ATHS), and Pave Penny.

USAF uses a modified F-16D as a variable stability in-flight simulator test aircraft (VISTA). Developed to replace the older NT-33, the **NF-16D** first flew in April 1992 and is used for in-flight testing of advanced control systems.

Two hundred seventy of the original F-16A/Bs 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 eleven ANG continental air defense squadrons. Modifications include upgrade of APG-66 radar with AMRAAM data link, provisions for AIM-7 Sparrows, improved ECCM, and improved capability against 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, 223 Block 50 USAF F-16C/Ds are to be retrofitted with a new modular mission computer being developed under an F-16 midlife upgrade codevelopment and coproduction program with the European participating governments of the F-16 Multinational Fighter Program.

Current proposals include the modification of 400 F-16C/Ds as CAS aircraft in the mid- to late-1990s. Modified F-16s will be equipped with improved data modem (formerly ATHS), VHF antijam radio, and a laser spot tracker; and a 30-mm gun, night vision goggles, or a missile warning system in selected production blocks. Meanwhile, ANG's 174th FW at Syracuse, N. Y., was first to convert from A-10s to F-16As in the dedicated CAS/BAI role, with centerline GPU-5/A 30-mm gun pod. The Air Force is also considering modifying 150 F-16C/Ds for day/night, under-the-weather, low-level reconnaissance missions. Equipped with ATARS, these aircraft would replace the RF-4C.

F-16s are standard equipment throughout ACC, USAF, PACAF, AFRES and ANG. F-16Cs also equip USAF's Thunderbirds. A further 72 aircraft have been approved in FYs 1992-93. The total F-16 program involves the US Navy, as well as 17 foreign nations, more than 50 distinct aircraft configurations, and extensive foreign coproduction. (Data for F-16C.)

**Contractor:** Lockheed Aeronautical Systems Company.

**Power Plant:** one augmented turbofan, General Electric F110-GE-100 (27,600 lb thrust) and Pratt & Whitney F100-PW-220 (23,450 lb thrust) are alternative standard engines. Increased Performance Engines (IPEs) in aircraft delivered from late 1991: Block 50: F110-GE-129 (29,000 lb thrust); Block 52: F100-PW-229 (29,100 lb thrust).

**Accommodation:** pilot only.

**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 42,300 lb.

**Performance:** max speed Mach 2 class, service ceiling more than 50,000 ft, ferry range more than 2,000 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-22

The F-22 program will produce the next-generation air-superiority fighter. As the follow-on to the F-15, it will ensure air superiority is maintained beyond the

turn of the century. F-22 was designed to penetrate high-threat enemy airspace and achieve air superiority with a first-look, first-kill capability against multiple targets. It combines a highly maneuverable airframe at both sub- and supersonic speeds with low-observable stealth technologies. The F-22 will cruise at supersonic speed without using its afterburners. Its integrated avionics and weapon systems will permit simultaneous engagement of multiple targets. Common signal processors are being developed using very-high-speed integrated circuit (VHSIC) technology to tie together various avionics functions. Projected armament includes the AIM-9 Sidewinder and AMRAAM, as well as an internal gun. Program emphasis from the outset has been on achieving a proper balance of reliability, supportability, affordability, survivability, and performance.

Two prototypes (YF-22 and YF-23) were built for competitive evaluation. 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 their F119 engine for the aircraft. In July 1991, the F-22 successfully passed the Defense Acquisition Board Milestone 2 and commenced the engineering and manufacturing development (EMD) phase. In this phase, USAF will receive eleven aircraft, nine for flight testing and two for stress testing; 27 engines are to be built. The external design of the aircraft was completed in February 1992. The program has recently been rephased, with the Critical Design Review rescheduled to the second half of 1994; first flight of a development aircraft due in June 1996, and initial low-rate production deliveries in 1998; and a high-rate production decision scheduled for mid-2001.

**Contractor:** Lockheed Aeronautical Systems Company, 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.

**Dimensions:** span 44 ft 6 in, length 62 ft 0 1/2 in, height 16 ft 6 in.

**Weight:** gross approx 60,000 lb.

**Performance** (F-22A design target): max level speed at sea level 921 mph.

### F-111

Described as the "workhorse" of the Persian Gulf War, the F-111 flew 4,000 sorties against armored formations, bridges, C<sup>3</sup>I sites, aircraft shelters, and weapons production facilities, achieving a mission capable rate of eighty-five percent. Four versions of this pioneer variable-geometry tactical aircraft were built, to maintain USAF's around-the-clock long-range, interdiction mission. Deliveries of production **F-111As** to the first operational wing began in October 1967, and 141 were built. This version served with distinction in southeast Asia in 1972-73. The A was superseded in production by the **F-111E**, with modified air intakes that improved engine performance above Mach 2.2; 94 were built. Replacement of their analog bombing and navigation systems with digital equipment, begun in 1989, is due to be completed this year. This will enable F-111E aircraft to handle the latest munitions and advanced sensors, as well as such systems as GPS. The **F-111D** was designed with advanced avionics, offering improvements in navigation and air-to-air weapon delivery; 96 were built. The **F-111F**, of which 106 were built, has upgraded turbofans and carries in its weapons bay the Pave Tack system, which provides a day/night capability to acquire, track, and designate ground targets for laser, IR, and electro-optically guided weapons. The F-111F is capable of employing the GBU-15, as well as TV and IR precision guided weapons. The sixty combat-coded F-111F aircraft are assigned to the 27th FW at Cannon AFB, N. M. Under the Pacer Strike program, F-111 aircraft are undergoing an avionics modernization designed to extend the aircraft's life to the year 2010. The program involves the removal of outdated subsystems and the installation of a ring-laser gyro INS, GPS receiver, and new cockpit displays. The program also includes new computer software, integration and test of prototype models, and production of conversion kits. Flight testing of the new equipment in USAF aircraft began last July, and delivery of production kits should begin later this year.

Production of the F-111 was completed in 1976. Its EW capabilities are being updated with the ALQ-131/184 ECM pod system, and future improvements will include AIM-9L/M self-defense capability.

In addition to its nuclear and conventional bombing capability, the F-111 can carry up to twelve French Durandal parachute-retarded, rocket-boosted, runway attack bombs for low-altitude high-speed delivery, and Gator, USAF's first air-delivered mine system. Future armament may include the JDAM.

The **EF-111A** is an ECM conversion of the F-111A (see p. 138).



F-111F (Guy Aceto)

**Contractor:** General Dynamics Corporation.  
**Power Plant:** F-111A/E: two Pratt & Whitney TF30-P-103 turbofans; each 18,500 lb thrust with afterburning, F-111D: two TF30-P-109 turbofans; each 19,600 lb thrust with afterburning, F-111F: two TF30-P-111 turbofans; each approx 25,100 lb thrust with afterburning.  
**Accommodation:** crew of two, side by side in escape module.  
**Dimensions:** span spread 63 ft 0 in, fully swept 31 ft 11½ in, length 73 ft 6 in, height 17 ft 1½ 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, service 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 weapon bay. Wing pylons carry total external load of up to 25,000 lb of bombs, rockets, missiles, or fuel tanks.

#### F-117A

The existence of the F-117A had been rumored since it became operational in 1983, but it was not revealed officially until November 1988. Until then, these precision attack aircraft were restricted mainly to night flying, in order to maintain secrecy, although three had been lost in much-publicized accidents. Development and manufacture of operational F-117As had begun ten years earlier, in November 1978, and the first flight took place in June 1981. Public acknowledgment of their existence permitted the aircraft to operate in daylight and facilitated their integration into operational planning and exercises. Their first operational deployment was to Panama in support of Operation Just Cause. During the Gulf War, more than 40 F-117As undertook 1,270 missions, flying undetected and unmolesated while attacking top-priority targets. Until last year, the F-117As were deployed exclusively with the 37th TFW, at Tonopah Test Range Airfield, Nev.; they are now operational with the 49th FW at Holloman AFB, N. M.

The F-117A was the first production combat type designed to exploit low-observables technology. It 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 famous 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 degrees) 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 and has a dull black finish that 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.

F-117As can be carried on board C-5 Galaxy transports with their wings removed. 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 (PAARS), which will recover a tumbling aircraft to straight and level flight, was delivered to TAC (now ACC) in late 1990. Re-



F-117A

tractable radio antennas are located beneath the fuselage. High precision INS is installed, with FLIR and DLIR (downward-looking infrared) housed in a retractable, 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. Plans to restart F-117A production, following the success of the aircraft during the Gulf conflict, were not realized in the FY 1992 appropriations bill, but \$42 million was made available for F-117A modifications. Various improvements have been under way since 1989, including a "four-dimensional" flight management system and new cockpit instrumentation, featuring full-color multifunction displays and digital moving map. Planned improvements also include installation of GPS capability, INS, and an advanced turret-mounted infrared acquisition and designation sensor.

**Contractor:** Lockheed Advanced Development Company (LADC).

**Power Plant:** two General Electric F404-GE-F1D2 nonafterburning turbojets; 10,800 lb thrust.

**Accommodation:** pilot only.

**Dimensions:** span 43 ft 4 in, length 65 ft 11 in, height 12 ft 5 in.

**Weight:** max gross 52,500 lb.

**Performance:** max level speed 646 mph, mission radius, unrefueled (5,000 lb weapon load) 691 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.

## Attack and Observation Aircraft

#### A-7D/K Corsair II

All remaining A-7s serving with the ANG are due to be phased out by the end of this year. The A-7D Corsair II is a single-seat, subsonic, close air support and interdiction aircraft, of which 459 were delivered between 1968 and 1976. Thirty-one A-7K combat-capable two-seat training models were delivered from April 1981. The A-7D's outstanding target kill capability, first demonstrated in southeast Asia, was achieved with the aid

of a continuous-solution navigation and weapon-delivery system, including all-weather radar bomb delivery. Pave Penny laser target-identification pods were installed on 383 A-7Ds. Eighty-three A-7D/Ks were modified for low-altitude night attack capability.

**Contractor:** LTV Corporation (formerly Vought Corporation).

**Power Plant:** one Allison TF41-A-1 nonafterburning turbofan; 14,500 lb thrust.

**Accommodation:** pilot only.

**Dimensions:** span 38 ft 9 in, length 46 ft 1½ in, height 16 ft 0¾ in.

**Weights:** empty 19,781 lb, gross 42,000 lb.

**Performance:** max speed at S/L 698 mph, ferry range with external tanks 2,871 miles.

**Armament:** one M61A1 20-mm multibarrel gun; up to 15,000 lb of air-to-air or air-to-surface missiles, bombs, Gator mines, rockets, or gun pods on six underwing and two fuselage attachments.

#### A-10/OA-10 Thunderbolt II

Designed specifically for the close air support (CAS) mission, the A-10A's 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. Five aircraft were lost. In a typical antiarmor close air support 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, head-up display, the Low-Altitude Safety and Targeting Enhancement system (which provides ground collision avoidance), Pave Penny laser target identification pod, 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.

Units equipped with A-10s include USAF's 503d FS at Spangdahlem AB, Germany, and ACC's 23d Wing and 354th FW (aircraft being retired or redistributed from these two units during 1992-93) and 355th FW, The 57th FW, Nellis AFB, Nev., has some A-10s.

A-10s were the first first-line aircraft to be assigned to the ANG; they equip the 128th FW and the 103d, 104th, 110th, and 175th FGs, A-10s also equip the 442d and 917th FWs, the 926th and 930th FGs, and the 46th FTS of AFRES.

Current analysis of requirements of the CAS/BAI mission will determine the future balance and investment plans for USAF's A-10/F-16 fleet.

In October 1987, the first of 18 operational and two backup OA-10s entered the inventory of the 23d Tactical Air Support Squadron 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 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. (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.

**Dimensions:** span 57 ft 6 in, length 53 ft 4 in, height 14 ft 8 in.

**Weights:** empty 24,959 lb, max gross 50,000 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, six AGM-65 Maverick missiles, or four AIM-9 Sidewinder missiles, and jammer pods. Chaff and flares carried internally to counter radar-directed or IR-directed threats. The centerline pylon and the two flanking fuselage pylons cannot be occupied simultaneously.

#### AC-130A/H/U Spectre

Two versions of the AC-130 Spectre gunship are currently in service with USAF. Nine AC-130Hs are operated by the Air Force Special Operations Command, 1st SOW, 16th SOS, at Hurlburt Field, Fla.; a tenth aircraft was a combat loss during Operation

Desert Storm. Ten AC-130As are operated by Air Force Reserve's 711th SOS at Duke Field, Fla. The AC-130H is equipped with a digital fire-control computer, two fixed 20-mm Vulcan cannon, one trainable 40-mm cannon, and a trainable 105-mm howitzer. The A model is equipped with an analog fire-control computer, two fixed 20-mm cannon, and two fixed 40-mm cannon and is capable of employing two 7.62-mm Miniguns. Both models use EO sensors and target-acquisition systems, including FLIR and low-light-level TV. The H model is capable of in-flight refueling and has been undergoing modification and modernization of its fire-control computer, navigation, communications, and sensor suites.

With a need to replace the increasingly unsupportable AC-130A, twelve new C-130H airframes were procured and are being modified to AC-130U configuration. The AC-130U is currently undergoing its test phase; delivery has become subject to delay. This model will combine increased firepower, reliability, and superior accuracy, with the latest methods of target location. The AC-130U will have the same 40-mm and 105-mm guns as the H model but replaces the two 20-mm cannon with one trainable 25-mm cannon. All weapons can be slaved to the sensors, including the AN/APG-80 fire-control radar, which permits night or adverse weather operations.

ECM on all versions of the gunship will enhance survivability in a low-to-medium-threat environment. Other equipment includes HUD, combined INS, and GPS/Navstar. All models are capable of providing precise surgical firepower and of performing special operations and conventional missions, including escort, surveillance, armed reconnaissance/interdiction, close air support, and air base defense. Both the AC-130H and U models are being evaluated for standoff weapons capability.

As the AC-130U is delivered to the 16th SOS, AC-130Hs will transfer to the Reserve and the A models will be retired. (Data basically as for the C-130.)

## Reconnaissance and Special-Duty Aircraft

### U-2R/RT

The last U-2R and TR-1 high-altitude reconnaissance aircraft were delivered to USAF in October 1989, marking completion of a contract awarded ten years earlier as a follow-on to U-2 production. The U-2R and TR-1 programs are now consolidated. The TR-1 designation was deleted, and all aircraft are designated as U-2s.

Production of the original U-2, in various forms, began in the late 1950s. These were followed by the U-2R, a version with much-increased span and length. The U-2R is now the only operational version of the U-2, following retirement of the last U-2C in 1989.

All U-2s have essentially been powered gliders, with high-aspect-ratio wings and lightweight structure, designed to perform strategic reconnaissance for long periods at very high altitudes. "Superpods" can be fitted to the wings, containing specialized equipment appropriate to individual mission demands. This versatility has enabled Air Force U-2s to perform important nonmilitary missions, including flights for the Department of Agriculture land management and crop estimate programs; photographic work in connection with flood, hurricane, and tornado damage; data gathering for a geothermal energy program; and search missions for missing boats and aircraft.

The TR-1A (now U-2R) single-seat tactical reconnaissance version was structurally identical to the U-2R and was designed for high-altitude standoff surveillance missions. It was first flown in 1981, and pilot training at Beale AFB, Calif., began later that year. Currently, U-2Rs and U-2RT trainers are based at Beale AFB and RAF Alconbury in the UK. U-2s can be equipped with electronic sensors to provide continuously available, day or night, all-weather surveillance of the battle area or potential battle area in direct support of US and allied ground and air forces during peace, crisis, and war. The sensors include an advanced synthetic aperture radar system in side-looking airborne radar form and modern ECM.

The U-2 aircraft fleet is being reengined with the General Electric F101-GE-F29 engine. A derivative of the F118 engine used in the Northrop B-2, the new engine is in the 19,000-lb-thrust class and has the dual benefit of enhancing all-around performance of the aircraft while providing much-improved supportability

over the current engine, which is used in no other USAF operational aircraft. (Data for U-2R.)

**Contractor:** Lockheed Corporation.

**Power Plant:** one Pratt & Whitney J75-P-13B turbojet; 17,000 lb thrust (being reengined).

**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 90,000 ft, range more than 3,000 miles.

**Armament:** none.

### RF-4C

A multisensor version of the F-4C Phantom II, designed for day/night, all-weather reconnaissance operations, the RF-4 was the first tactical aircraft equipped with a forward-looking radar capable of simultaneous terrain-following and low-altitude navigation. The basic aircraft is configured with conventional optical cameras for day operations and IR sensors for night. Both the radar and the camera systems are housed in a modified nose, which increases the length of the aircraft by 33 inches compared with the fighter version. Other equipment includes the ARN-101 digital avionics system for improved navigation accuracy and greater reconnaissance capability, supplemented by a new navigation and weapons delivery system and improved-accuracy ring-laser gyro. The flexibility and responsiveness of the RF-4Cs proved vital assets during Operation Desert Storm, when bad weather and oil fires hampered tactical intelligence gathering. (Data similar to those for F-4.)

### F-4G Phantom II

The F-4G "Advanced Wild Weasel" is a version of the now-retired F-4E with its gun replaced by AN/APR-47 electronic warfare 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 effectiveness of this technique during the Gulf War, against enemy surface-to-air missile batteries, has led the Air Force to retain a single squadron of F-4Gs until a suitable replacement has been developed; the 561st FS will form at Nellis AFB, Nev., this year. Primary armament includes Shrike (AGM-45) and HARM (AGM-88). F-4Gs deployed to Saudi Arabia were also equipped with ALQ-131 and ALQ-184 ECM pods. (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 weapon systems operator in tandem.

**Dimensions:** span 38 ft 7 1/2 in, length 63 ft 0 in, height 16 ft 5 1/2 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 7th Airborne Command and Control Squadron at Keesler AFB, Miss., a geographically separated unit of the 552d Air Control Wing, Tinker AFB, Okla. Eight aircraft have been updated by Unisys to ABCCC III standard.

The EC-130E "Commando" psychological operations broadcasting version operated by ANG's 193d Special Operations Group, Harrisburg, Pa.

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 Electronic Combat Squadrons at Davis-



AC-130H (Guy Aceto)



U-2R



EC-130H

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 SAC in 1960. Additional aircraft were modified in 1962, and 17 new production KC-135B turboprop aircraft entered the system in 1965. Currently, EC-135C/E/J/P/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 provides overseas deployment control of fighters with the EC-135K. Modifications to the EC-135 aircraft include continuation of the ultrahigh-frequency line-of-sight system replacement, the initial Milstar transition satellite communications terminals, and the Peacekeeper upgrades to Airborne Launch Control Aircraft. Future enhancements include full Milstar capability and improved low- and very-low-frequency radios and antennas.

Three EC-135N Advanced Range Instrumentation Aircraft (ARIA) are operated by ASC's 4950th Test Wing as telemetry and voice relay stations to supplement land and sea receiver stations for DoD and NASA space and missile programs. 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 for specific reconnaissance tasks. RC-135s were stationed in Saudi Arabia in support of military operations in that theater. WC-135Bs, converted C-135Bs operated by AMC, provide atmospheric sampling capability. Under the Milstar program, an NKC-135 will collect data to assist airworthiness certification of the radome installation on the EC-135.

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. (Data basically as for C-135.)

#### EF-111A Raven

The EF-111A Raven is a conversion of the basic General Dynamics F-111A airframe, fitted with mainly off-the-shelf components that enable it to accomplish important defense-suppression missions in worldwide support of US tactical strike forces. Its ALQ-99E primary jammer is a derivative of the Navy ALQ-99 and is 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 is revised, and a new vertical stabilizer houses the ALQ-99E receivers. An upgrade program for the EF-111A is currently being developed, with improvements to the ALQ-99E that will enable the system to counter advanced electronic defenses into the next century. Other improvements under the avionics modernization program include upgrading the terrain-following radar and installing GPS equipment and a new inertial navigation system.

Forty-two EF-111As were produced for missions that include barrier standoff jamming, degradation of acquisition radars during close air support 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 Wing at Mountain Home AFB, Idaho, where they achieved initial operational capability with the 390th Electronic Combat Squadron in December 1983. Second operational location was at RAF Upper Heyford in the UK, from February 1984, with the 42d ECS. Aircraft from this unit took part in the attack on Libyan targets in April 1986. EF-111 area jamming was crucial to allied air supremacy in the Gulf War, pouring electrons into Iraqi target-acquisition radars and rendering them useless. All EF-111As will be consolidated in the 430th ECS at Cannon AFB, N. M., by the end of this year.

**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 escape module.

**Dimensions:** span spread 63 ft 0 in, fully swept 31 ft 11 1/2 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, service 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)

AWACS 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 by ACC units, 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 Air Control Wing at Tinker AFB, Okla. Twenty-four were built. Twenty-two of them, plus two prototypes, have been upgraded to E-3B configuration. Improvements include much-enhanced computer capabilities, antijam communications, an austere maritime surveillance capability, additional radio communications, and five additional display consoles. The first E-3B was redelivered to the 552d ACW in July 1984.

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 ten US Standard E-3A aircraft were, subsequently, upgraded to E-3Cs, with additional command-and-control capability, in 1984-88. In addition, a further sensor was added to USAF E-3B/C aircraft under Project Snoopy, to facilitate operations in the Gulf War. 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. Saudi Arabia has five E-3s; Britain's Royal Air Force and the French Air Force have also acquired AWACS aircraft.

A \$425 million MSIP for the E-3 was initiated by ESD (now ESC), phased over five years. All USAF and NATO E-3s are to be equipped with the Joint Tactical Information Distribution System (JTIDS) for antijam digital communications. As a first step, Boeing was awarded a contract in May 1987 for E-3 improvements that include full-scale development and integration into US and NATO aircraft of the Quick Look ESM system that detects signals emitted by both hostile and friendly targets. Additional enhancements to US E-3s will include upgrading of JTIDS to TADIL-J (tactical digital information link-J) capability, central computer memory upgrade, and ability to employ GPS (planned IOC scheduled for this year). Full-scale development 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 to detect much smaller radar cross-section targets. IOC for these improvements is scheduled for FY 1996, with contract completion by 2000.

E-3s assumed a US continental air defense role in January 1979, when NORAD personnel began aug-

menting TACE-3 flight crews on all operational NORAD missions by the 552d ACW from Tinker AFB. E-3s will form part of the new composite wing at Mountain Home AFB, Idaho. Overseas units include the 961st and 962d AWACS 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 and, more recently, 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:** Boeing Military Airplanes.

**Power Plant:** four Pratt & Whitney TF33-PW-100/100A turbofans; each 21,000 lb thrust.

**Accommodation:** basic operational crew of 22, including 18 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, service ceiling above 29,000 ft, endurance six hr on station 1,000 miles from base.

#### E-4B

ACC is the Air Force's single-resource manager for the E-4 airborne command post aircraft, the main operating base for which is Offutt AFB, Neb. Three E-4As were built initially to support the National Emergency Airborne Command Post (NEACP). 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 NEACP mission. They are hardened against the effects of nuclear explosions, including electromagnetic pulse; are equipped for in-flight refueling; contain a 1,200kVA 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.

**Contractor:** Boeing Aerospace.

**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 hours.

#### E-8 Joint STARS

Operation Desert Storm provided an unexpected and highly successful opportunity for the USAF/US Army Joint Surveillance and Target Attack Radar System (Joint STARS) to prove its capability.

The original contract for full-scale development of the system was awarded to Grumman in September 1985. The company was made responsible for sub-systems installation, integration, and flight testing of specialized equipment aboard two 707-320 airframes specially modified by Boeing for this purpose. Airborne equipment on the prototypes includes a Norden multi-mode 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 operates in synthetic aperture radar (SAR) 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 system then directs attack on the targets, in real time, via data link or radio. To facilitate this process, each production E-8 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 behind-the-lines terrain and of wheeled and tracked vehicles moving anywhere on it. Existing E-8A prototypes have ten operations consoles and two communications stations. An estimated 386,100 sq miles can be covered in a single eight-hour sortie, cruising at 30,000-40,000 ft.

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. A third aircraft, contracted to Grumman in November 1990, will serve as the preproduction example. The system was deployed to Europe in 1990, where it successfully demonstrated its capabilities in a



EF-111A (Guy Aceto)



E-3B Sentry (AWACS)



E-8 Joint STARS

NATO environment before being sent to Saudi Arabia, where the two E-8As served as USAF's 4411th Joint STARS Squadron. They logged 535 combat hours and flew 49 missions, with great success, linking with such aircraft as the E-3 AWACS and the F-15E: one E-8A was airborne every night of the war. USAF plans to acquire at least 20 E-8s; four production aircraft have been authorized to date, with delivery to begin in 1996 and IOC scheduled for 1997. Because new Boeing 707 airframes are no longer available, USAF has decided to purchase and modify used 707s, rather than qualify another type of aircraft. These will be designated E-8C. The two E-3A test aircraft will be upgraded to C standard and will be the last to be delivered.

**Contractor:** Grumman Corporation.

#### E-9A

Under this designation, two highly modified Boeing Canada (de Havilland) DHC-8 Dash 8M aircraft are operated by the USAF Air Defense Weapons Center at Tyndall AFB, Fla., as airborne platform telemetry relay aircraft. Each is equipped with a sensor suite developed by the Sierra Research Division of LTV, including 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 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-18B/D

The EC-18B Advanced Range Instrumentation Aircraft (ARIA) is a modified former American Airlines Boeing 707-320 series transport, of which four have replaced some of the EC-135N ARIAs operated by ASC's 4950th Test Wing. 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-18B was flown for the first time in February 1985 and entered operational service in January 1986. A sonobuoy missile impact location system of the kind fitted on some USN P-3s is currently under development for the EC-18B.

A \$49 million contract was awarded to Chrysler Technologies Airborne Systems, Inc., to modify two Boeing 707s 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, they are operated by the 4950th TW at Wright-Patterson AFB, Ohio, in support of USN and USAF missile testing. They are also capable of monitoring and controlling unmanned aerial vehicles.

**Contractor:** Boeing Military Airplanes.

#### WC-130E/H

Modified C-130 Hercules transports, designated WC-130E and H, are equipped for weather reconnaissance duties, including penetration of tropical storms, (such as last year's Hurricane Andrew), to obtain data for forecasting storm movements. They are assigned to the 815th AS of AFRES. (Data similar to those for C-130.)

#### X-29A Forward Swept Wing Demonstrator

Flight testing of the unique X-29A Forward Swept Wing (FSW) multitechnology demonstrator has been under way at NASA's Dryden Flight Research Center at Edwards AFB, Calif., since December 1984. A re-examination of the FSW principle was made both practical and feasible by the introduction of advanced lightweight composite materials that eliminate many of the problems encountered with conventional metal construction. Day-to-day management of the program was handed over to NASA following acceptance of the aircraft by USAF's Aeronautical Systems Division in March 1985. USAF managers flight test support.

The two X-29 demonstrators were built by Grumman. A standard Northrop F-5A forward fuselage and nose landing gear and many off-the-shelf components, such



E-9A

as F-16 main landing gear and control surface actuators, were utilized on each aircraft to reduce costs. Integrated with a triplex fly-by-wire flight-control system, the X-29's forward-swept wings, made of strong, lightweight graphite composites, and its stubby canards, which act as its main control surfaces, combine to enhance lift and reduce drag. In flight, the wings' trailing edges change shape continuously to match flight conditions. The canards, flaperons, and strake flaps at the tail work together to enhance maneuverability.

The early phase of the flight program, following the installation of an improved backup flight-control system in the fall of 1985, was aimed at testing stability and control loads, flutter, and wing divergence up to 40,000 ft and at speeds up to Mach 1.5. The first supersonic flight took place in December 1985, when preliminary data showed Mach 1.03 airspeed at an altitude of 40,000 ft. This phase ended in December 1986 after 104 flights. Before commencement of the second phase, a calibrated engine with two thrust-measuring systems for performance data, a NASA noseboom calibrated for air data measurements, and upgraded instrumentation were installed. In June 1988, this first X-29 made its 200th flight, a record for a single X-series aircraft. Performance and asymmetric load testing were completed after a total of 242 flights, during which a maximum speed of Mach 1.52 at 51,000 ft had been recorded. The aircraft was grounded in 1988 but was subsequently restored to flight status for public display.

Work on design modification and installation of flight test instrumentation and an antispin parachute on the second X-29 began in the summer of 1987, with delivery in October 1988. First flight took place in May 1989. Since then, the aircraft has completed flight test of the low-speed, high-angle-of-attack (AOA) portion of the flight envelope. During these tests, the aircraft was pitch pointed up to 67 degrees AOA and maneuvered in all axes up to 45 degrees AOA. The forward swept wing and other integrated technologies of the X-29 were shown to provide superb roll rate performance, 70 degrees per second at 30 degrees AOA. In addition, the 120 high-AOA flight tests completed at Edwards AFB have yielded significant agility and military utility data.

The second aircraft was modified for use last year as a test-bed for a vortex flow control experiment, with the aim of providing valuable data on nose positioning and control of flight at high AOA, with application to current aircraft modifications and future fighter aircraft.

**Contractor:** Grumman Corporation.

**Power Plant:** one General Electric F404-GE-400 turbofan; 16,000 lb thrust class.

**Accommodation:** pilot only.

**Dimensions:** span 27 ft 2 1/2 in, length overall 53 ft 11 1/4 in, height 14 ft 3 1/2 in.

**Weights:** empty 13,800 lb, gross 17,800 lb.

**Performance:** max level speed approx Mach 1.6.

#### NASP/X-30A

The National Aerospace Plane (NASP) research program, initiated jointly by DoD and NASA, is intended to develop the technology for hypersonic cruise and single-stage-to-orbit aircraft/spacecraft able to take off from and land on conventional runways. Such vehicles could place payloads in orbit at costs far below those of current expendable launch vehicles or the space shuttle. They could also point the way to future military transatmospheric vehicles able to leave and return to orbital flight on surveillance missions. The program is jointly managed by DoD and NASA, with USAF designated as lead agency.

In April 1986, DoD and NASA announced the award of contracts for propulsion and airframe development. During the following year, two of the airframe contractors were eliminated, leaving General Dynamics, McDonnell Douglas, and Rockwell International to proceed into a three-year preliminary design phase on the airframe, with Rocketdyne and Pratt & Whitney continuing their propulsion work. (Lockheed has since taken over General Dynamics' airframe work.) By late

1989, it had been decided to stretch the NASP program to reduce both cost uncertainties and technical risks in the long term. The five prime contractors engaged in the program have formed a national contractor team to pool resources and develop the vehicle jointly; formal operations began in February 1991. The NASP National Contractor Office is located at Palmdale, Calif.

A decision is expected in the near future on whether to proceed to the construction and flight testing of two X-30A vehicles. These would be used to develop and demonstrate NASP technologies throughout the flight envelope for hypersonic cruise and acceleration to low-Earth orbit. The X-30 features a lifting body design with small wings and twin stabilizers. A titanium ceramic fiber composite has been specially developed for the airframe, combining lightweight/high temperature strength and rigidity; power will be provided by three to five scramjets in an underfuselage pod, plus a single booster rocket in the 50,000-75,000 lb thrust class for entry into orbit and reentry; the lower surface of the fuselage will be contoured to condition the inflows for the scramjets at speeds above Mach 6. The X-30 is expected to be approximately 170-200 feet long, with a gross weight of about 325,000 lb; it will accommodate two persons, side by side. First flight is anticipated around 2000.

## Transports and Tankers

#### C-5A/B Galaxy

The huge capacity of this long-range, air refuelable, heavy logistics transport is a major asset to airlift requirements worldwide, 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 for humanitarian relief, with recent missions stretching from the Pacific to the former Soviet Union.

The prototype flew in June 1968, and 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. Six AFRES squadrons and one ANG squadron are C-5A-equipped. Two C-5As have been modified to carry outside space cargo by extending the cargo bay and modifying the aft doors.

To meet 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 turboprops, and updated avionics, including Bendix color weather radar and Delco triple INS. The original MADAR (MAltitude 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-5B units include the 60th AW at Travis AFB, Calif., the 436th AW at Dover AFB, Del., AFRES's 301st and 312th ASs (Assoc.), also at Travis AFB, and the 97th AMW, formed at Altus AFB in October 1992, as the first AMC wing to combine airlift and refueling assets. 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 C-5s 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 two C-5s by Lockheed under the Pacer Snow project. Testing is being undertaken at Eglin AFB, Fla., and Holloman AFB, N. M., by the Air Force Special Missions Operations Test and Evaluation Center. A program to repaint all USAF C-5s flat gray is under way. Air Mobility Command has control of all USAF C-5s. (Data for C-5B.)

**Contractor:** Lockheed Aeronautical Systems Company.

**Power Plant:** four General Electric TF39-GE-1C turboprops; 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, service ceiling (at 615,000 lb) 35,750 ft, range with max payload 3,434 miles, range with max fuel 6,469 miles.

#### C-9A/C Nightingale

Derived from the DC-9 Series 30 commercial airliner, the C-9A is an aeromedical airlift transport, in service since August 1968. Modifications include a special-care compartment with separate atmospheric and ventilation controls. Delivery of 21 to the former MAC's 375th Aeromedical Airlift Wing, now redesignated (AMC's) 375th Airlift Wing, was completed by February 1973; this unit is augmented by the 73d AAS (Assoc.) of AFRES, collocated at Scott AFB, Ill. These also perform overseas theater aeromedical evacuation missions in Europe, with four C-9As based at Rhein-Main AB, Germany, and in the Pacific, with three C-9As based at 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 Airlift Wing 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-12 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 have subsequently been refitted with PT6A-41 engines and are redesignated C-12C. AMC uses two C-12As to train aircrews and to supplement support airlift. Six C-12D versions, with cargo door, high flotation landing gear, and provision for tiptanks, were delivered to USAF.

USAF uses 39 passenger/cargo-capable Super King Air B200Cs (C-12Fs) at eight bases throughout CONUS, PACAF, and USAF for the time-sensitive movement of people and cargo. The C-12Fs, along with the C-21, replaced the CT-39 fleet. Seven C-12Fs were delivered to the ANG, which also has six C-12Js (military versions of the 19-passenger Beechcraft 1900C). The first of the C-12Js was delivered in September 1987, and they serve as mission support aircraft. (Data for original C-12A.)

**Contractor:** Beech Aircraft Corporation.

**Power Plant:** two Pratt & Whitney Canada PT6A-38 turboprops; each 750 shp. (C-12F: 850 shp PT6A-42s.)

**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, service ceiling 31,000 ft, range at max cruising speed 1,824 miles.

#### C-17A

The McDonnell Douglas C-17A airlifter made its first flight on September 15, 1991. The test program now includes five flight test aircraft and two ground test articles (for static and durability testing). As of January 19, 1993, the five test aircraft had flown 267 missions and more than 930 hours. The program, which is now in initial operational testing, has accomplished many major test events, including aerial refueling, short-field landings, and formation flight, and has established 14 new world records for payloads flown to specific altitudes for particular aircraft weight classes.

The C-17A was developed to meet US force-projection requirements. It is a heavy-lift, air refuelable cargo transport, designed to provide inter- and intratheater airlift of all classes of military cargo, including outside. It will be able to operate routinely into small, austere airfields (3,000 ft x 90 ft) previously restricted to C-130s and will provide the first capability to airdrop/extract outside cargo in the tactical environment. The C-17A will not only enhance US airlift capability across the board but will also provide much-needed force structure modernization. It will be based at active-duty locations.



C-5B Galaxy



C-17A



C-21A

McDonnell Douglas was announced as the selected prime contractor in August 1981 and received a low-level research and development 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. Twenty production aircraft have been funded between FYs 1988 and 1993, and \$250.9 million in advance procurement has also been approved for a further eight aircraft. A buy of 120 C-17s is planned.

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 multifunction electronic displays.

Subcontractors for the C-17 program include Beech Aircraft Corp. (composite winglets), Delco Electronics Corp. (mission computer and electronic display system), Grumman Aircraft Systems (ailerons, rudder, and elevators), GEC Avionics (advanced HUD), LTV Aircraft Products (vertical and horizontal stabilizers, engine nacelles), Honeywell Inc. (support equipment and air data computers), Martin Marietta (tail-cone), and General Electric (electronic flight-control system).

The 437th AW at Charleston AFB, S. C., has been designated as the first C-17 unit, with IOC scheduled for FY 1994.

**Prime Contractor:** Douglas Aircraft Company, Division of McDonnell Douglas Corporation.

**Power Plant:** four Pratt & Whitney F117-PW-100 turbofans; each 40,000 lb thrust, on early aircraft.

**Accommodation:** normal flight crew of two, plus loadmaster. Provisions for the full range of military airlift missions.

**Dimensions:** span 171 ft 3 in, length 174 ft 0 in, height 55 ft 1 in.

**Weights:** max payload (2.25g) 172,200 lb, gross 580,000 lb.

**Performance (estimated):** normal cruising speed at height 518 mph (Mach 0.77), range with 160,000 lb payload 2,765 miles.

#### C-20A/B/H Gulfstream III

The Air Force acquired ten off-the-shelf Gulfstream III transports, each with accommodation for five crew and 14 passengers, for VIP duties, to replace aging,

fuel-inefficient C-140Bs. Three C-20As and one C-20B, delivered to the 89th Airlift Wing 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, Md., 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 Airlift Mission (SAM) fleet with intercontinental range and ability to operate from short runways. An additional C-20, designated C-20H, with advanced technology flight management systems and upgraded Rolls-Royce engines, is being acquired by USAF to meet expanding SAM requirements.

**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.

**Dimensions:** span 77 ft 10 in, length 83 ft 1 in, height 24 ft 4½ in.

**Weight:** gross 69,700 lb.

**Performance:** max cruising speed 561 mph, service ceiling 45,000 ft, range 4,050 miles.

#### C-21A

Eighty-three C-21As are operated by active-duty and ANG units from twelve US bases and three overseas locations. Together with the C-12Fs, 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 Corporation.

**Power Plant:** two Garrett 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:** gross 16,300 lb.

**Performance:** cruising speed Mach 0.81, service ceiling 45,000 ft, range with maximum passenger load 2,420 miles, with maximum cargo load 1,653 miles.

#### C-22B

Under the designation C-22B, four Boeing 727 commercial transports have been purchased and modified 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

Eighteen Sherpa light transport aircraft, previously operated by MAC (now AMC) to ferry aircraft engines and spares to bases throughout Europe, have been transferred to Air Force Materiel Command (four aircraft, operated from Edwards AFB, Calif.), the US Army (six aircraft), and the US Forest Service (eight aircraft).

The Sherpa, which entered the USAF inventory in 1984, is an all-freight version of the Shorts 330 regional airliner, with a 6 ft 6 in 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 0½ 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

The first of two Boeing VC-25A Presidential transports was delivered to the 89th Airlift Wing at Andrews AFB, Md., in August 1990, followed by the second four months later. Based on Boeing 747-200B airframes, they replaced 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 is 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

USAF acquired 11 Fairchild Metro III commuter transport aircraft to replace ANG C-131s, under the designation C-26A. 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 ANGOSA (Air National Guard Operational Support Aircraft) role. They have a quick-change interior, enabling passenger seats to be replaced by a medevac or cargo-carrying configuration. An additional 22 C-26Bs complement the C-26As in the National Guard Bureau. C-26Bs have TCAS II, GPS, and microwave landing systems. (Data for C-26A.)

**Contractor:** Fairchild Aircraft Corporation.

**Power Plant:** two Garrett 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, service ceiling 26,700 ft, range with 19 passengers 1,224 miles.

#### C-27A Spartan

Under contracts awarded in August 1990 and February 1991, Chrysler Technologies Airborne Systems is delivering ten C-27A STOL intratheater transports for use by US Southern Command, with options for a further eight aircraft. The C-27As are commercially available Alenia G222 medium airlifters, modified by Chrysler to include new communications and navigation avionics. The aircraft will provide rapid response airlift of personnel and cargo to remote locations accessible primarily through unimproved airfields with short, unprepared landing surfaces. The first C-27A is 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, service ceiling 22,000 ft, ferry range with max fuel 1,727 miles.

#### C-130 Hercules

More than 2,000 of these remarkable transport aircraft have been built by Lockheed, for more than 60 nations, spanning four decades of production. C-130s operate throughout USAF, serving with AMC, theater commands, and new, specially designed, composite wings, demonstrating wide operational capabilities 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, natural disaster relief missions, aerial spray missions, and fire-fighting duties for the US Forest Service. Most especially, this year, they have been used to bring relief to stricken communities worldwide, including nighttime airdropping of aid to isolated areas in Bosnia. The initial production model was the C-130A, first flown in April 1955, with 3,750 ehp Allison T56-A-11 or -9 turboprops; 219 were ordered, and deliveries began in December 1956. Two DC-130As (originally GC-130As) were built as drone launchers/directors for ARDC (now AFMC), carrying up to four drones on underwing pylons. All special equipment was removable, permitting the aircraft to be used as freighters, assault transports, or ambulances, as required. The C-130B introduced 4,050 ehp Allison T56-A-7 turboprops; the first of 134 entered USAF service in April 1959. C-130Bs are used in aerial fire-fighting missions by ANG and AFRES units. Six C-130Bs were modified in 1961 for airsnatch recovery of classified USAF satellites by the 6593d Test Squadron at Hickam AFB, Hawaii. Twelve C-130Ds were modified C-130As for use in the Arctic, with wheel-ski landing gear, increased fuel capacity, and provision for JATO (jet-assisted takeoff) rockets. 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 corro-



C-26 (Guy Aceto)



C-130



HC-130N Combat Shadow (Guy Aceto)

sion on USAF's current force of C-130B/Es 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, 50kHz VOR/ILS receivers, secure voice capability, replacement radar for the adverse weather aerial delivery system, and GPS capability. Eleven were scheduled for an extensive modification to enhance their Special Operations Low Level (SOLL) capability. Another major modification installs a state-of-the-art autopilot that incorporates a ground collision avoidance system. Specifically modified aircraft are used by the 757th AS, AFRES, based at Youngstown MAP/ARS, Ohio, for aerial spraying, typically to suppress mosquito-spread epidemics.

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 April 1975. More than 350 C-130Hs and derivatives have been ordered for the US services. Four LC-130Hs, modified with wheel-ski gear, were acquired by ANG. Additionally, as a partial response to the "overwhelming role" played by the tactical airlift fleet in Operation Just Cause and in the Persian Gulf War, Congress approved the procurement of more C-130Hs to replace aging Es. These will be equipped with new monopulse precision ground-mapping radars.

Other variants include HC-130N/P, MC-130E/H, AC-130A/H/U, and WC-130E/H, all described separately. Four HC-130Hs were modified as JC-130H with added equipment for aerial recovery of reentering space capsules, and the DC-130H is used for drone control

duties. ANG C-130s acquired a new role in 1987 when about ten aircraft were assigned to ANG fighter wings and groups to provide support for jet fighter units on deployments. (Data for C-130H.)

**Contractor:** Lockheed Aeronautical Systems Company.

**Power Plant:** four Allison T56-A-15 turboprops; each 4,508 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 42,673 lb, gross 175,000 lb.

**Performance:** max cruising speed at 20,000 ft 374 mph, service ceiling (at 130,000 lb) 33,000 ft, range with max payload 2,356 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 low-level deep-penetration tactical missions by the 1st, 7th, and 8th Special Operations Squadrons based in the Pacific, Europe, and North America, respectively, and now part of Air Force Special Operations Command (AFSOC). Six of these aircraft are modified to conduct air-to-air refueling with special operations helicopters. In addition, ten of the fourteen aircraft are modified with the Fulton Recovery System. Operation Desert Storm proved the Combat Talon I to be a very adapt-

able and capable air delivery platform, particularly when called upon to deliver the largest conventional weapon in the US arsenal, the 15,000 lb BLU-82. The MC-130E is being supplemented by the improved, night/adverse weather, low-level MC-130H (Combat Talon II). Twenty-four aircraft are being acquired, equipped with an in-flight refueling receptacle; explosion-suppressive fuel tanks; a modified cargo ramp area for the high-speed, low-level aerial delivery system; Emerson Electric AN/APQ-170 precision terrain-following and terrain-avoidance radar; dual radar altimeters; dual inertial navigation systems; and provision for a GPS receiver. The Combat Talon II defensive avionics suite is much improved over the Combat Talon I. Deliveries of the Combat Talon II aircraft began in mid-1991 and will continue into the near future. Combat Talon II operational training is located at the 542d Crew Training Wing at Kirtland AFB, N. M. (Data similar to those for C-130.)

#### HC-130N/P Combat Shadow/Tankers

Twenty-eight active duty HC-130N/P Combat Shadow tanker aircraft are now dedicated to special operations missions. Eight primary aircraft are assigned to the 9th SOS, Eglin AFB, Fla. Six further aircraft each are assigned to the 17th SOS, Kadana AB, Japan, and the 67th SOS, RAF Alconbury, UK. Others are assigned to the 542d Crew Training Wing at Kirtland AFB, N. M. All are modified with new communications, navigation, and countermeasures systems, and night vision goggle (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 minimum lighting and minimum communications. These SOF HC-130s are being modified with universal receiving ports for air-to-air refueling and a self-contained inertial navigation system and will receive self-protection

aids for refueling missions in hostile environments. Air Rescue Service maintains additional search-and-rescue/tanker HC-130 aircraft. Four rescue aircraft are located with an active-duty unit at Patrick AFB, Fla.; 14 others are assigned to various AFRES and ANG units. (Data similar to those for C-130.)

#### KC-135 Stratotanker

Another veteran component of the USAF inventory, the KC-135 tanker fleet made an invaluable contribution to the success of Operation Desert Storm, flying around-the-clock missions to maintain the operability of allied warplanes. KC-135s are assigned to AMC, theater commands, and new, composite wings, forming the backbone of the USAF tanker fleet, and 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. Although similar in size and appearance to commercial 707 aircraft, the KC-135 was designed to military specifications, incorporates 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. First flight of the KC-135A was in August 1956, and by 1966 a total of 732 had been built. Many of the 600 remaining in operational service have been modified 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 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 have a gross weight of 322,000 lb. They embody modifications to 25 major systems and subsystems and not only carry more fuel farther but also have reduced maintenance costs, are able to operate from shorter runways, and are less pollution-prone. The first KC-135R flight was in August 1982, and first deliveries to SAC (now ACC) were in July 1984; the 269th reengineered aircraft was delivered in December 1991, with approval in the FY 1992 budget for the reengineering of a further 26 aircraft. A three-point aerial refueling system is under development. Second, the JT3D reengineering program has upgraded 163 KC-135As serving in 13 ANG and three AFRES units to KC-135E standard with JT3D turbofans removed from surplus commercial 707s. 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. An avionics upgrade is being evaluated that would significantly improve systems reliability and maintainability. (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, service ceiling 50,000 ft, range with 120,000 lb of transfer fuel 2,128 miles, ferry mission 11,192 miles.

#### C-135A/B 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 retro-

fitted with revised interior for VIP transportation; others became WC-135Bs and RC-135E/Ms. Additionally, two C-135s belonging to ASC's 4950th Test Wing were permanently modified as Laser Communications Airborne Test-Beds for the Have Lace program. (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.

#### VC-137B/C Stratoliner

Seven specially modified Boeing 707 transports are operated by AMC's 89th Airlift Wing from Andrews AFB, Md., for VIP duties. There are four VC-137Cs, which are Boeing 707-320s, and three smaller 707-120s, currently designated VC-137B. Two of the VC-137Cs were the original "Air Force One" aircraft.

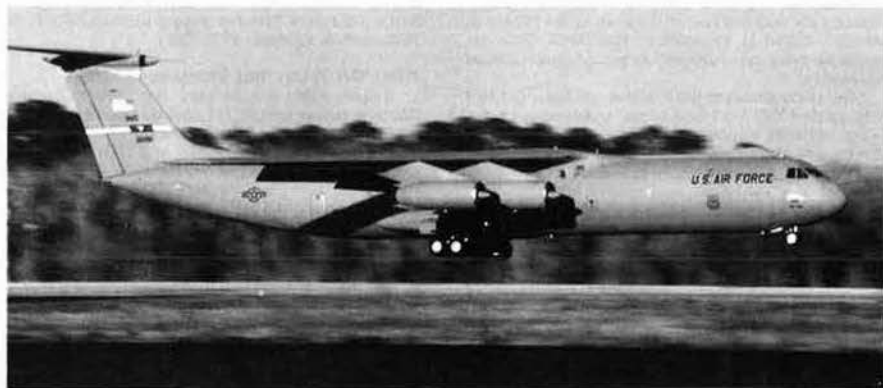
**Contractor:** The Boeing Company.  
**Power Plant:** four Pratt & Whitney JT3D-3 turbofans; each 17,200 lb thrust.  
**Dimensions:** VC-137B: span 130 ft 10 in, length 144 ft 6 in, height 42 ft 0 in; VC-137C: span 145 ft 9 in, length 152 ft 11 in, height 42 ft 5 in.  
**Weights:** VC-137B: gross 258,000 lb; VC-137C: gross 322,000 lb.  
**Performance (VC-137C):** max speed 627 mph, service ceiling 42,000 ft, range 5,150 miles.

#### C-141A/B StarLifter

Plans for the long-term operational future of the C-141 have yet to be fixed. The massive movement of troops and equipment to the Persian Gulf for Operations Desert Shield and Desert Storm relied heavily on the capabilities of 227 C-141 StarLifters, but the type is currently operating under restrictions dictated by fatigue cracks, most notably in the wings, which restrict payload and aerial refueling, and at the cockpit posts, which restrict altitude. 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 available force of 270 (now 253) 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, a center wing structural modification is under way, which, coupled with other structural upgrades, extends the C-141's original flying life by 15,000



KC-135R Stratotanker



C-141B StarLifter (Guy Aceto)

hours. Plans call for 118 aircraft to receive this modification. Other C-141 modification plans include installation of 50kHz VOR/LIS receivers, secure voice capability on UHF and HF radios, permanently mounted SATCOM antennas, and a digital display fuel-quantity-indicating system. 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. Under provisions in the FY 1993 budget, USAF is to examine possible further service life extension programs (SLEPs) for the C-141, pending introduction of the C-17. 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. In addition, thirteen 437th AW C-141Bs are scheduled for modifications to increase their SOLL capability and survivability.

Since 1986, AFRES and ANG have received C-141s transferred from the active force; 64 aircraft are scheduled for transfer by 1997. These C-141s play a major role in intertheater medevac missions and are used frequently for humanitarian missions, transporting vital supplies to areas that, in recent years, have been devastated by natural disasters. AMC controls Air Force C-141s, all of which are due to be painted flat gray. (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 3/8 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

The KC-10 was conceived to meet USAF requirements for an Advanced Tanker/Cargo Aircraft. It is based on the commercial DC-10 Series 30CF, modified to 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 the Persian Gulf deployment. Since it has both types of tanker refueling equipment installed, the KC-10A can service USAF, USN, USMC, and allied aircraft on the same mission.

For deployment, the KC-10A's refueling capabilities and long range will, in many situations, dispense with the need for forward bases while 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.

The KC-10A made its first flight in July 1980, and the first service usage by SAC (now ACC and AMC) took place in March 1981. USAF units equipped with KC-10As include the 6th and 9th ARS at March AFB, Calif., the 2d and 32d ARS at Barksdale AFB, La., and the 344th and 911th ARS at Seymour Johnson AFB, N. C. AFRES also crews the aircraft under the Associate Reserve concept. Associate units include the 79th ARS at March AFB, the 78th ARS at Barksdale AFB, and the 77th ARS at Seymour Johnson AFB.

Fifty-nine KC-10As are in the USAF inventory. 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, currently in production, introduced an on-board loader that allows pallet handling without repositioning wide-body cargo loading equipment, and so permits 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 4½ in, length 181 ft 7 in, height 58 ft 1 in.

**Weight:** gross 590,000 lb.

**Performance:** cruising speed Mach 0.825, service ceiling 42,000 ft, range with max cargo 4,370 miles.

## Trainers

### T-1A Jayhawk

USAF took delivery of its first T-1A Jayhawk in January 1992, under a contract awarded in February 1990 for provision of the T-1A for use in specialized undergraduate pilot training (SUPT). As leader of the 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.

One hundred eighteen Jayhawks have been ordered to date, with a possible eventual buy of 180. Instructor pilot training at the 64th FTW, Reese AFB, Tex., began in September 1992, with student training following in January 1993. Pilots trained on the T-1A will progress to transports, such as the C-5 and C-17, and tankers, such as the KC-10 and KC-135.

**Contractor:** Beech Aircraft Corporation.

**Power Plant:** two Pratt & Whitney Canada JT15D-5B turbofans; each 2,900 lb thrust.

**Accommodation:** two side by side and one to the rear; rails are fitted to accommodate an extra four seats to permit use as a personnel transport.

**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 (400A):** max speed at 27,000 ft 538 mph, ceiling 45,000 ft, range 2,222 miles.

### T-3A Enhanced Flight Screener

Selected in April 1992 to meet USAF's Enhanced Flight Screener requirement, the T-3A will be used by ATC and the Air Force Academy to screen prospective pilots prior to SUPT. 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. Deliveries are scheduled to be completed by autumn 1995.

**Contractors:** Slingsby Aviation Limited; Northrop Worldwide Aircraft Services Inc.

**Power Plant:** Development of 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 1,714 lb, gross 2,500 lb.

**Performance:** max level speed 184 mph, service ceiling 15,000 ft, range with max fuel 575 miles.

### T-37B Tweet

USAF's first purpose-built jet trainer, the T-37 is ATC'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 was awarded in August 1989 to Sabreliner Corp. for the T-37B SLEP. The contract included the design, testing, and production of kits, to be installed by USAF, to modify or replace critical structural components for the entire fleet, extending the capability of the T-37 into the next century. Delivery of production kits continues into this year. Almost 1,000 T-37s were built, and around 550 remain in USAF's inventory. All are being repainted in a distinctive dark blue and white to help formation training and to ease maintenance. ATC plans to replace the T-37B with a new Joint Primary Aircraft Training System (JPATS) from the fourth quarter of FY 1996, provided an RFP is issued in FY 1993.

**Contractor:** Cessna Aircraft Company.

**Power Plant:** two Continental J69-T-25 turbojets; each 1,025 lb thrust.

**Accommodation:** two, side by side.

**Dimensions:** span 33 ft 9¼ in, length 29 ft 3 in, height 9 ft 2¼ in.

**Weight:** empty 3,870 lb, gross 6,575 lb.

**Performance:** max speed at 25,000 ft 426 mph, service ceiling 35,100 ft, range at 360 mph with standard tankage 870 miles.



T-1A Jayhawk (Randy Jolly)



T-38A Talon

### T-38A and AT-38B Talon

Almost identical in structure to the F-5A export tactical fighter, the T-38A lightweight twin-jet advanced trainer is capable of flying well above supersonic speed in level flight. 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 700 remain in service throughout the Air Force. Most are used by ATC for high-performance pilot training; others fly with ACC and with AMC, which uses a slightly different version, designated AT-38B, with a gunsight and practice bomb dispensers, for Introduction to Fighter Fundamentals. This program will transfer to Air Education and Training Command in the first quarter of FY 1994.

An ongoing program called Pacer Classic (the T-38 SLEP) is integrating ten modifications, including major structural renewal, into one program. As a result, the service life of the T-38s should extend to 2010. Additionally, introduction of the T-1A is significantly relieving the T-38's training work load.

**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.

**Dimensions:** span 25 ft 3 in, length 46 ft 4½ in, height 12 ft 10½ 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), service ceiling above 55,000 ft, range, with reserves, 1,093 miles.

### T-41A/C Mescalero

The T-41A trainer is a standard Cessna Model 172 light aircraft acquired by USAF for use in the generalized preliminary flight screening program for USAF pilot candidates. An initial order for 170 aircraft in 1964 was supplemented by a further 34 in 1967. More powerful T-41Cs, based on the Cessna Model R172E, are used for cadet flight training at the USAF Academy. Around 100 T-41s remain in USAF service, but these will be replaced with the T-3A Enhanced Flight Screener from FY 1994. (Data for T-41A.)

**Contractor:** Cessna Aircraft Company.

**Power Plant:** one Continental O-300-C piston engine; 145 hp (210 hp Continental O-360-D in T-41C).

**Accommodation:** crew of two, side by side.

**Dimensions:** span 35 ft 10 in, length 26 ft 11 in, height 8 ft 9½ in.

**Weights:** empty 1,285 lb, gross 2,300 lb.

**Performance:** max speed at S/L 139 mph, service ceiling 13,100 ft, range 720 miles.

### T-43A

Derived from the commercial Boeing Model 737-200, the T-43A navigation trainer first flew in April 1973 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 LORAN (Long-Range Aid to Navigation) system, and other radio systems. Deliveries of the 19 aircraft ordered for ATC were completed in July 1974. Most remain in the ATC inventory; four others are assigned to the ANG; and two T-43As with VIP interior are assigned to the 58th AS at Ramstein AB, Germany, and the 310th AS at Howard AFB, Panama. The aircraft are being repainted in an all-white paint scheme.

**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.

### 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 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, service ceiling 26,700 ft, range with 2,500 lb payload 806 miles.

## Helicopters

### HH-1H Iroquois

Basically a military version of the Bell Model 205, the HH-1H is a general-purpose helicopter first ordered by USAF in 1970 and used for missile site support duties.

**Contractor:** Bell Helicopter Textron Inc.

**Power Plant:** one Textron Lycoming T53-L-13B turbo-shaft; 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, service ceiling at mission gross weight 13,450 ft, range with max fuel 347 miles.

### UH-1N Iroquois

The UH-1N is a twin-engine version of the UH-1 utility helicopter. Seventy-nine were ordered for USAF, most of which remain in the inventory for missile site support duties and administrative airlift. The UH-1N is also used by the 542d CTW 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, service 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.

### CH-3E

This twin-engine amphibious transport helicopter, based on the US Navy's SH-3A Sea King, incorporates important design changes that permit speedier cargo handling and ease of maintenance, with built-in equipment for the removal and replacement of all major components in remote areas. The initial version was the CH-3C. Introduction of uprated engines led to the designation CH-3E in February 1966, applicable to 42 new production aircraft and 41 reengineered CH-3Cs, of which 50 were adapted subsequently as HH-3Es (see below). CH-3 missions include rescue duty, natural disaster relief, and evacuation.

**Contractor:** Sikorsky Aircraft, Division of United Technologies Corporation.

**Power Plant:** two General Electric T58-GE-5 turboshafts; each 1,500 shp.

**Accommodation:** crew of two or three; 25 fully equipped troops, 15 litters, or 5,000 lb of cargo.

**Dimensions:** rotor diameter 62 ft 0 in, length of fuselage 57 ft 3 in, height 18 ft 1 in.

**Weights:** empty 13,255 lb, gross 22,050 lb.

**Performance:** max speed at S/L 162 mph, service ceiling 11,100 ft, max range, with 10 percent reserve, 465 miles.

**Armament:** none.

### HH-3E Jolly Green Giant

Modified version of the CH-3E for USAF's Air Rescue Service, originally to facilitate penetration deep into North Vietnam on rescue missions. Additional equipment includes self-sealing fuel tanks, armor, defensive armament, a rescue hoist, and a retractable in-flight refueling probe. HH-3Es are now assigned primarily to rescue units of the Air Rescue Service, AFRES, and ANG. (Data basically similar to those for CH-3E, above.)

### MH-53J/Pave Low/TH-53A

In a program initiated in 1986 to upgrade the Special Operations Forces, Sikorsky modified the 41 remaining HH/CH-53B/C and MH-53H helicopters. Designated MH-53J, these Pave Low III "Enhanced" 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, secure communications, titanium armor plating, mounts for .50-caliber machine guns and/or 7.62-mm Miniguns, and an ECM/ECCM suite consisting of AN/ALQ-162 continuous wave radar missile jammers, ALQ-157 IR missile jammers, ALR-40 flare/chaff dispensers, and ALR-69 missile warning receivers.

Programmed upgrades include the ALQ-136 radar missile jammer, AAR-47 missile plume detector, and the Integrated Defense Avionics System, which manages all ECM/ECCM automatically through the 1553 multiplex databus. Additionally, the aircraft is completing a SLEP to upgrade hydraulics, wiring, and basic airframe structure, 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 had begun in the summer of 1987 to the 20th SOS at Hurlburt Field, Fla., followed by the 21st SOS, now at RAF Alconbury, UK, in 1988. A further four were delivered to the 542d Crew Training Wing at Kirtland AFB, N. M. This unit also uses four TH-53As, modified USMC CH-53As, as basic qualification trainers. Modifications include the installation of General Electric T64-GE-416 engines, air refueling probe, and some standard USAF equipment. Two more CH-53As for conversion were expected to be delivered by last year. (Data for MH-53J.)

**Contractor:** Sikorsky Aircraft, Division of United Technologies Corporation.

**Power Plant:** two General Electric T64-GE-7A turboshafts; each 4,325 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.

### MH/HH-60G/Pave Hawk

USAF modified 98 Black Hawk helicopters (97 remaining) to the Pave Hawk configuration to meet combat search-and-rescue and SOF requirements. The MH-60G, used by USAF's SOF, provides a wide variety

of SOF mission capabilities, including infiltration/exfiltration and personnel recovery as a collateral SOF mission, and humanitarian relief. The HH-60G, used by active-duty, AFRES, and ANG Air Rescue Service units, provides combat search-and-rescue and various mission support activities worldwide. Both aircraft are equipped with an integrated navigation system using GPS, INS, and Doppler. Additionally, the SOF aircraft's navigation suite provides inputs to a flight path vector FLIR. A weather/ground mapping radar, with beacon tracking and KG-10 map reader, completes the tactical navigation suite for both aircraft. Both are equipped with unsecure VHF and secure FM, HF, and UHF satcom for communications. Further modifications to the basic Black Hawk include an integral rescue hoist and window-mounted 7.62-mm miniguns, with provisions for a .50-caliber machine gun 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 two or three; 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 192 mph, service ceiling 19,000 ft, max range, with reserves, 373 miles (internal fuel), 500 miles (auxiliary tank).

### V-22A Osprey

Despite the DoD decision in 1990 to terminate the V-22 program, Congress continues to support and fund development of the project, directing the manufacture of four production representative aircraft in FY 1992, and authorizing a further \$755 million for R&D in FY 1993.

Following on from the US government's Joint Services Advanced Vertical Lift Aircraft (formerly JVX) proposal, a contract was awarded in May 1986 to Boeing Helicopters and Bell Helicopter Textron as prime contractors in a seven-year FSD program for the V-22 Osprey. USN and USAF were to have participated in the program, with the former as executive service. This tiltrotor, multimission aircraft, based on Bell's XV-15, is designed to have the maneuverability and lift capability of a helicopter and the speed of a fixed-wing aircraft. 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, Grumman is responsible for the design and manufacture of the V-22's tail unit, General Electric the digital fly-by-wire flight-control system, LASC the wing control surfaces and fixed trailing edge, and Menasco of Canada and Dowty of Canada, respectively, the nose and main landing gear. Allison supplies the aircraft's two 6,000 shp T406-AD-400 turboshaft engines.



MH-53J Pave Low (Guy Aceto)



MH-60G Pave Hawk (Guy Aceto)

The Marines have a stated requirement for 552 aircraft, the Navy for 50 aircraft, and USAF Special Operations Forces for 55. The SOF (CV-22A) version was expected to carry 12 troops or up to 2,880 lb of internal cargo over a 500-mile combat radius at 288 mph, with capability to hover OGE (out of ground effect) at 4,000 ft at 95° Fahrenheit. With less demanding midmission parameters, the V-22 is intended to exceed an 800-mile combat radius.

First flight of the V-22 Osprey was made in March 1989, and four full-scale development aircraft had flown by the end of 1991, before two were destroyed in crashes. On September 14, 1989, the Osprey first achieved full conversion from helicopter mode to airplane mode while in flight. The aircraft had also demonstrated a speed of 345 knots TAS, made 531 flights, and accumulated 631 hours flying time by early 1992.

**Dimensions:** rotor diameter (each) 38 ft 0 in, fuselage length 57 ft 4 in, height over tailfins 17 ft 4 in.

**Weights:** normal mission weight: VTO 47,500 lb, STO 60,700 lb.

**Performance:** max cruising speed in helicopter mode 115 mph, in airplane mode 316 mph, service ceiling 26,000 ft, range VTO 1,382 miles, STO 2,073 miles.

## Strategic Missiles

### LGM-30F/G Minuteman

For nearly three decades, Minuteman has represented a key element of the US strategic deterrent posture. It 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. Current versions:

**LGM-30F Minuteman II:** Similar in configuration to the original Minuteman I, Minuteman II features increased range, targeting coverage, accuracy, and payload capacity. Operational since 1965, it is based at Malmstrom AFB, Mont.; Ellsworth AFB, S. D.; and Whiteman AFB, Mo. In the late summer of 1986, Minuteman IIs at Malmstrom and Whiteman AFBs were equipped with a command data buffer capability to permit remote targeting, as in Minuteman III. As part of the planned strategic weapons drawdown, the first Minuteman II was removed from its silo at Malmstrom AFB in November 1991.

**LGM-30G Minuteman III:** Third-stage motor with fluid-injection thrust vector control gives longer range and, allied to MIRV capability, enables this version to place warheads on three targets with a high degree of accuracy. First test launch was made in 1968. Minuteman III is operational at Minot AFB, N. D.; F. E. Warren AFB, Wyo.; Grand Forks AFB, N. D.; and Malmstrom AFB, Mont. A command data buffer system permits rapid missile retargeting.

Of the original force of 450 Minuteman IIs and 550 Minuteman IIIs, 50 have been displaced by Peacekeeper missiles. However, enhancements and modifications under way will maintain the viability of the force well beyond the year 2010. On the missile itself, the second-stage motors are being washed out and repaired, and third-stage motors on Minuteman III are being remanufactured. A major effort is in hand to demonstrate an environmentally acceptable propellant replacement that has minimum impact on the Minuteman III system. The Rapid Execution and Combat Targeting (REACT) Program will ensure long-term supportability of the aging electronics components and will modify the launch control center, enabling real-time status information on the weapons and communications nets to correct operability problems, improve responsiveness to launch directives, and provide rapid retargeting capability.

**Assembly and Checkout:** Boeing Aerospace.

**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: LGM-30F: Hercules, Inc., solid-propellant motor; LGM-30G: Thiokol SR73-AJ-1 solid-propellant motor: 17,000 lb thrust (LGM-30F), 34,400 lb thrust (LGM-30G).

**Guidance:** Autonetics Division of Rockwell International inertial guidance system.

**Warheads:** LGM-30F: one nuclear; LGM-30G: three Mk 12A MIRVs.

**Dimensions:** length LGM-30F 55 ft 10 in; LGM-30G 59 ft 10 in, diameter of first stage 5 ft 6 in.

**Weights:** launch weight (approx) LGM-30F 73,000 lb; LGM-30G 78,000 lb.

**Performance:** speed at burnout more than 15,000 mph, highest point of trajectory approx 700 miles.

range with max operational load LGM-30F more than 6,000 miles; LGM-30G more than 7,000 miles.

### LGM-118A Peacekeeper

Deployment of 50 Peacekeeper missiles in existing Minuteman III silos near Ft. E. Warren AFB, Wyo., began in June 1986, and full operational capability with 50 missiles was achieved by December 1988. Initial deployment was made in response to the improved hardness of Soviet strategic forces, but political initiatives and the changes within the former Soviet Union have altered US strategic imperatives. Altogether, 114 Peacekeepers were funded during FYs 1984-91. However, the FY 1990 budget approved a statutory cap on deployment of only 50 of these missiles, and development of the rail-garrison mode of Peacekeeper deployment was terminated.

Peacekeeper is a four-stage ICBM that carries up to ten independently targetable reentry vehicles. It has many advantages over other missile systems currently in the US inventory. In particular, it is more accurate, carries more warheads, and has greater range than the Minuteman missiles. Its greater resistance to nuclear effects and its more capable guidance system provide Peacekeeper with a much-improved ability to destroy very hard targets. The prompt retaliation made possible by these factors would provide a decisive deterrent to any hostile first strike.

**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, IMU by Northrop and Rockwell.

**Warheads:** ten Avco Mk 21 MIRVs.

**Dimensions:** length 71 ft, diameter 7 ft 8 in.

**Weight:** approx 195,000 lb.

### AGM-69A SRAM

The number of AGM-69A Short-Range Attack Missiles in the USAF inventory is being reduced prior to retirement. Additionally, all SRAMs arming the former SAC bomber fleet sitting on ground alert were ordered to be removed in June 1990 because of doubts as to their safety. This defense suppression and primary attack missile was deployed initially with the B-52Gs of the 42d Bombardment Wing (Heavy) at Loring AFB, Me., in 1972, and 1,500 AGM-69As were delivered to USAF, equipping 17 B-52 wings and two FB-111 wings at 18 bases before completion in July 1975.

Armed with a nuclear warhead, the supersonic air-to-surface SRAM was designed to attack and neutralize enemy terminal defenses, such as surface-to-air missile sites. An inertial guidance system makes the missile impossible to jam. ACC B-1Bs can carry 24 AGM-69As internally; B-52Gs/Hs can carry eight AGM-69As on a rotary dispenser in the aft bomb bay, together with up to four nuclear bombs.

**Contractor:** Boeing Aerospace Company.

**Power Plant:** Lockheed Propulsion Company LPC-415 restartable solid-propellant two-pulse rocket engine.

**Guidance:** General Precision/Kearfott inertial system, permitting attack at high or low altitude and dogleg courses.

**Warhead:** W69 nuclear.

**Dimensions:** length 14 ft 0 in, body diameter 1 ft 5 1/2 in.

**Weight:** launch weight approx 2,230 lb.

**Performance:** speed up to Mach 2.5, range 100 miles at high altitude, 35 miles at low altitude.

### AGM-86B/C ALCM

The AGM-86B air-launched cruise missile 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. USAF completed deployment of AGM-86s on 85 on-line B-52Gs in 1984, with 12 missiles fitted externally to each aircraft. B-52Hs have been similarly converted and are intended to be modified further to have a bomb-bay common strategic rotary launcher (CSRL) for eight more ALCMs, eight SRAMs, or a mix of both. ALCM-equipped units are at Griffiss AFB, N. Y.; Fairchild AFB, Wash.; Barksdale AFB, La.; and Minot AFB, N. D.

A conventionally armed version, 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 both Tercom



AGM-86B ALCM

and 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 Bomb Wing 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 0 1/2 in, wingspan 12 ft.

**Weight:** 3,200 lb.

**Performance (approx):** speed 500 mph, range more than 1,500 miles.

### AGM-129A (ACM)

Developed by the Convair Division of General Dynamics to arm the B-1B and the B-52H, the AGM-129A advanced cruise missile (ACM) first flew in July 1985. McDonnell Douglas was awarded a contract in November 1987 for technology transfer leading to second-source capability for this advanced system and has flight tested its first missiles. The ACM has improved range, accuracy, survivability, and targeting flexibility compared with the AGM-86B, notably through embodiment of low-observability technology. Delivery of production AGM-129As began in June 1990, and it was expected to enter service last year. Total acquisition of the ACM will be 460 units. There are no current plans to deploy them on the B-1B.

**Contractor:** General Dynamics (Convair)/McDonnell Douglas Missile Systems.



LGM-30G



LGM-118A



AIM-7 Sparrow

**Power Plant:** Williams International F112-WR-100 turbofan.

**Guidance:** inertial, with midcourse terrain update.

**Warhead:** nuclear.

## 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. The AIM-7E was intended primarily for use by the F-4 Phantom II. The AIM-7E-2 and E-3 are improved versions that provide better maneuverability and "dogfight" capability. A later version is the advanced solid-state AIM-7F, with larger motor, Doppler guidance, improved ECM, and better capability over both medium and "dogfight" ranges; this version equips USAF and USN F-14, F-15, F-16 (ADF), and F/A-18 aircraft. Approximately 5,400 AIM-7Fs 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 1990 and began operational service during FY 1993. AIM-7P/RIM-7P introduces 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 being used in a program initiated by the Air Warfare Center 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 (MHIP) is designed to improve the missile's performance against sophisticated ECM. A new IR seeker added to the guidance and control section aims at improving terminal-phase operation. (Data for AIM-7F.)

**Contractors:** Raytheon Company/General Dynamics Pomona Division.

**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 AIM-7E 14 miles; AIM-7F 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-9P:** improved version of the AIM-9J, produced by Ford Aerospace by converting existing AIM-9Es and -9Js. Increased target-acquisition envelope, solid-state electronics, and increased lethality due to seeker improvements.

**AIM-9P-3:** improved version of AIM-9P, with increased lethality as a result of fuze improvements and a new rocket motor, providing reduced smoke and increased range.

**AIM-9P-4:** improved version of AIM-9P-3 developed by Ford Aerospace. A new guidance-control unit provides an increased target acquisition envelope. The AIM-9P-4 is for foreign military sales.

**AIM-9L:** third-generation Sidewinder for USAF and USN, with all-aspect intercept capability. Improvements include new motor, double-delta nose fins for improved inner boundary performance and maneuverability, AM-FM conical scan for increased seeker sensitivity and improved tracking stability, annular blast fragmentation warhead and active optical fuze for increased lethality, and low susceptibility to countermeasures. This version arms USAF F-15 and F-16 aircraft and offers self-defense capability for A-7s, A-10s, and F-111s.

**AIM-9M:** improved version of AIM-9L, with increased IRCCM capability, improved background discrimination, and reduced-smoke rocket motor. Full production began in FY 1981 with an order for approximately 1,850 missiles.

**AIM-9M-9:** scheduled to begin retrofit in the current FY. This modification will improve IRCCM capability of early missiles.

**AIM-9R:** development of AIM-9M with improved control and guidance section for greater target acquisition range and better resistance to ECM.

\$62.3 million was allocated to the AIM-9 program in FY 1992; \$13.5 million for development of the **AIM-9M Plus**, and \$5 million for development of the **AIM-9X**, a Sidewinder for the year 2000. Features of the latter will include seeker, airframe, and warhead/fin improvements; the shape will be modified to reduce drag and to permit carriage, internally and externally, on stealth aircraft.

AIM-9 missiles, equipped with telemetry packages in place of warheads, are being used by USAF's 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/Ford Aerospace and Communications Corporation.

**Power Plant:** Thiokol Hercules 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, wingspan 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 has been under way since December 1981.

Designated AIM-120A, AMRAAM has inertial mid-course guidance and active radar terminal homing that provide launch-and-manuever 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 ECCM 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 Lot VII, have been awarded to Hughes and Raytheon. The first production AIM-120A was delivered by Hughes in 1988, with the 33d FW at Eglin AFB, Fla., becoming the first operational unit to receive AMRAAMs. The missile is now operational on F-15 and F-16 aircraft. A preplanned product improvement (P<sup>2</sup>) program seeks to develop AMRAAM improvements, including rapid reprogramming, advanced counter-countermeasures, and options for smart ordnance packages and dual-mode fuzing. Funding for more than 1,000 AMRAAMs was approved in FY 1992, and a further 1,015 were authorized in FY 1993; the missile is now in full-rate production, with a proposed final total of 13,000 AMRAAMs.

**Contractors:** Hughes Aircraft Company/Raytheon Company.

**Guidance:** inertial midcourse, with active radar terminal homing.

**Dimensions:** length 12 ft, body diameter 7 in, span of tail control fins 2 ft 1 in.

**Weight:** 340 lb.

**Performance:** cruising speed approx Mach 4, range approx 31 miles.

#### AGM-45A Shrike

Twelve versions of this supersonic air-to-surface missile were produced for USAF and USN, differing primarily in the frequency coverage of the front end detachable seeker sections. Designed to home automatically on enemy radar installations, the AGM-45 entered operational service in Vietnam during 1965. Thereafter, it played an important part in the US air offensive, becoming a standard penetration aid on US tactical aircraft. More than 13,000 were delivered to USAF between 1965 and 1978, and Shrikes continue to equip "Wild Weasel" F-4Gs and defense suppression F-16Cs. Upgrading under the Shrike gravity bias modification program resulted in improved capabilities at low altitude.

**Contractor:** Naval Weapons Center.

**Power Plant:** Rocketdyne Mk 39 Mod 7 or Aerojet Mk 53 solid-propellant rocket motor.

**Guidance:** passive homing head by Texas Instruments.

**Warhead:** high-explosive fragmentation, weighing 145 lb.

**Dimensions:** length 10 ft 0 in, body diameter 8 in, span 3 ft 0 in.

**Weight:** launch weight 400 lb.

**Performance (estimated):** range more than 3 miles.



AIM-9L Sidewinder



AIM-120A AMRAAM (Guy Aceto)



AGM-65A Maverick

#### AGM-65 Maverick

Maverick air-to-air missiles were used extensively during Operation Desert Storm, with approximately 100 fired per day, 90 percent of them from A-10 close air support aircraft.

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 down to treetop level. Maverick missiles were first employed by USAF in Vietnam and are now carried by 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.

**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 have been developed:

**AGM-65D:** with imaging infrared (IIR) seeker as well as a new lower-smoke motor, AFOTEC 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 at RAF Bentwaters, UK, in February 1986.



AGM-88 HARM (Guy Aceto)

**AGM-65G:** uses the IIR seeker with an alternate 298 lb blast fragmentation warhead for use against hardened targets. Software has been modified to include options for targeting ships and large 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 now 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. A program is currently under way to integrate a millimeter-wave seeker with the AGM-65. This will provide a totally autonomous, all-weather, day/night, lock-on-after-launch, standoff weapon to attack mobile ground forces. A demonstration/validation program has been completed at Eglin AFB, Fla.

In addition, 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.)

**Contractor:** Hughes Missile Systems Group/Raytheon Company.

**Power Plant:** Thiokol TX-481 solid-propellant rocket motor.

**Guidance:** self-homing, EO guidance system (IIR on D/G).

**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

USAF initiated a cooperative memorandum of understanding with USN to equip two 15-aircraft B-52G squadrons with the Harpoon all-weather antiship missile in support of maritime antisurface warfare operations. Compatibility testing began in the spring of 1983, and full operational capability was achieved that October. Currently, one full squadron of modified aircraft is located at Loring AFB, Me., for Atlantic operations. Each B-52G can carry eight to 12 missiles. Under USAF proposals, 19 B-52Gs would be Harpoon-equipped as B-52Gs retire.

**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.

**Weight:** 1,145 lb.

**Performance:** speed high subsonic, range more than 57 miles.

#### AGM-88 HARM

The lethality of USAF's F-4G "Wild Weasel" against enemy ground radar is greatly enhanced by the availability of AGM-88 HARM (High-Speed Antiradiation Missile), a fact amply demonstrated during Operation Desert Storm. 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. An integration program is ongoing to equip F-16s in the defense suppression role with HARM. The missile is also suitable for adaptation to the EF-111A and F-15. Current production version is the **AGM-88C**, with tungsten alloy cubes in the warhead rather than steel. 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. By the end of 1990, nearly 6,000 HARMs had been delivered. Texas Instruments' FY 1991 production contract was raised from 1,400 missiles to 3,481 to replenish the AGM-88 inventory, depleted by the Gulf War. A decision regarding the exact nature of future AGM-88 HARM procurement is awaited. (Data for AGM-88A.)

**Contractor:** Texas Instruments, Inc.

**Power Plant:** Thiokol smokeless, dual-thrust, solid-propellant rocket motor, Hercules second source.

**Guidance:** passive homing guidance system, using seeker head that homes on enemy radar emissions.

**Warhead:** high-explosive.

**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 SL to 40,000 ft, range more than 10 miles.

#### GBU-15 and AGM-130A

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 demonstrated to great effect 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.

Development began in 1974, based on experience gained in Vietnam with the earlier Pavé Strike GBU-8 HOBOM 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** rocket-powered version of the GBU-15 is now in production. A simplified seeker, with a silicon charge-coupled device camera, correlation tracker, and rate stabilization platform, is under development to improve target detection. Warheads are the Mk 84 or BLU-109/B. The AGM-130 is certified for use with the F-111 and is undergoing certification on 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-24/27

In a move to replace laser-guided weapons expended in the Persian Gulf War, USAF is purchasing 7,728 **GBU-24** and **GBU-27** laser bomb kits to replace GBU-10s and GBU-12s. During development the new kits were known as Paveway III LLLGBs (low-level laser-guided bombs). High-lift wings and improved seekers permit very-low-altitude launch over standoff ranges.

#### 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 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. Thirty were built, and an additional 100 are planned. Advanced versions are being studied.

**Contractor:** Lockheed Missiles and Space Systems.

#### AGM-137 TSSAM

FSD of the Triservice Standoff Attack Missile (TSSAM) is in progress. USAF is heading the joint-service effort to produce a subsonic 2,300 lb stealthy missile with a range of less than 375 miles for the air-launched AGM-137 and 310 miles for the ground-launched MGM-137 variant. The missile is being developed by Northrop, with Boeing as second source, and completed a successful test flight in June 1992. It will arm USAF B-1s, B-2s, B-52s, and F-16s, as well as USN A-6s and F/A-18s. Production for all services is expected to be 7,450 missiles, with IOC by 2000.

#### Joint Direct Attack Munition (JDAM) and Joint Standoff Weapon (JSOW)

Two weapon systems are currently being developed to meet USAF/USN requirements for highly accurate, autonomous, all-weather, conventional bombing capability.

The **Joint Direct Attack Munition (JDAM)** consists of a general-purpose Mk 84 bomb or tactical munitions dispenser linked with an inertial guidance kit in a modified tailcone. Initial fielding is expected in 1996-97. JDAM is intended for use on a variety of aircraft, including the B-1, B-2, F-15E, F-16, F-111, and F/A-18.

The folding-wing **Joint Standoff Weapon (JSOW)** system will share many features with JDAM, including a common advanced seeker and INS/GPS. It is being developed by a Texas Instruments-led team.

#### AGM-142 Have Nap

Under the Have Nap program, USAF began acquisition of the Israeli-built Popeye medium-range, inertial/TV-guided standoff missile. Initial operational test and evaluation launches were completed in May 1990, and a coproduction agreement was entered into between Rafael and Martin Marietta.

The purpose of Have Nap is to provide long-range bombers with a conventional precision strike capability in support of worldwide theater commanders. Primary carrier aircraft will be the conventionally dedicated B-52G, although under USAF proposals AGM-142s may also equip B-52Hs.

**Contractor:** Rafael Armament Development Authority.

**Power Plant:** solid-propellant rocket motor.

**Guidance:** inertial, with EO or IIR homing.

**Warhead:** high-explosive, weighing 1,975 lb.

**Dimensions:** length 18 ft 8 1/2 in, body diameter 1 ft 8 1/2 in, wingspan 5 ft 1 in.

**Weight:** 3,300 lb.

**Performance:** range 50 miles.

#### Rapier

Rapier is unusual in that US landbased anti-aircraft missiles are normally operated by the Army. 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 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, according to 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.



AGM-130



AGM-142A Have Nap

## Launch Vehicles

#### Atlas E

Atlas E is a modified ICBM, used to launch various USAF and NOAA satellites. Four vehicles remain available for launch at Vandenberg AFB, Calif., with the last launch currently scheduled for FY 1994.

**Prime Contractor:** General Dynamics Corporation, Space Systems Division.

**Power Plant:** Rocketdyne MA-3 propulsion system, comprising central sustainer motor and two boosters; total thrust 387,000 lb.

**Dimensions (Atlas stage):** length 61 ft 8 in, body diameter 10 ft 0 in.

**Launch Weight:** 275,000 lb.

**Performance:** capable of putting 1,750 lb into a 100 nm polar orbit.

#### Atlas II

Atlas II is an upgraded version of the Atlas/Centaur vehicle, 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. Ten Atlas II vehicles will be procured. Primary DoD payload is the Defense Satellite Communications System (DSCS). The first Atlas II/DSCS launch took place from Cape Canaveral AFS in February 1992; two further launches are planned for FY 1993.

Since their initial operation in 1957, Atlas and Atlas/Centaur vehicles have achieved a 90th percentile success rate for more than 500 launches of military and commercial satellites, as well as manned spacecraft.

**Prime Contractor:** General Dynamics Corporation, Space Systems Division.

**Power Plant:** updated Rocketdyne MA-5 propulsion system in Atlas stage, comprising central sustainer motor and two boosters; total thrust 488,000 lb.

**Dimensions (Atlas stage):** length 81 ft 7 in, max body diameter 10 ft 0 in.

**Launch Weight:** 412,000 lb.

**Performance:** capable of putting 8,000 lb into a low-Earth orbit and 6,400 lb into a geosynchronous transfer orbit.

#### Centaur

Centaur was the first US high-energy upper stage and the first to utilize 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.

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 vehicle by placing a 10,200 lb payload into geosynchronous orbit. (Data for Centaur D-1A and G-prime, except where indicated.)

**Prime Contractor:** General Dynamics Corporation, Space Systems Division.

**Power Plant:** two Pratt & Whitney RL 10A-3A liquid oxygen/liquid hydrogen rocket engines; each 16,500 lb thrust.

**Guidance:** inertial guidance system.

**Dimensions (Centaur D-2A only):** length 33 ft 0 in, diameter 10 ft 0 in.

**Launch Weight:** (D-2A, approx) 45,000 lb; (G-prime-mod, approx) 53,000 lb.

#### Scout

Scout was designed to enable NASA and DoD to conduct space, orbital, and reentry research at comparatively low cost, using off-the-shelf major components where available. The basic current version, with fourth stage improved over earlier vehicles, was launched successfully for the first time in August 1965. In addition to increasing the payload, this version can be maneuvered in yaw and can send a 100 lb payload more than 16,000 miles into space. Using the Algol IIIA first-stage motor, Scouts can put 377 lb payloads into a 310-mile polar orbit and have been used to launch many unmanned spacecraft, including satellites, for DoD, NASA, and international groups. Only two Scouts remain in the inventory.

**Prime Contractor:** LTV Missiles & Electronics Group (a unit of LTV Corporation).  
**Power Plant:** first stage: CSD Algol IIIA, 109,000 lb thrust; second stage: Thiokol Castor IIA solid-propellant motor, 64,000 lb thrust; third stage: Thiokol Antares IIIA solid-propellant motor, 18,700 lb thrust; fourth stage: Thiokol Altair IIIA solid-propellant motor, 5,800 lb thrust.  
**Guidance:** simplified Honeywell gyro guidance system.  
**Dimensions:** height overall 75 ft 5 in, max body diameter 3 ft 9 in.  
**Launch Weight:** 47,619 lb.

#### Titan II

Fourteen Titan II ICBMs are being modified to provide additional expendable launch capability. Three had been launched successfully by April 1992.  
**Prime Contractor:** Martin Marietta Space Launch Systems.  
**Power Plant:** first and second stages: Aerojet liquid hypergolic propellants: 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

Titan IV was selected originally in 1985 to augment the space shuttle and to allow greater flexibility in launching critical military payloads. It is a growth version of the earlier Titan 34D, with stretched first and second stages, seven-segment solid boosters, a 16 ft 8½ in diameter payload fairing, and a modified Centaur G-prime upper stage, enabling it to place a 10,200 lb payload into geosynchronous orbit, 32,000 lb into low polar orbit, or 39,000 lb into low equatorial orbit. With an alternative Inertial Upper Stage (IUS), it can place 5,200 lb into geosynchronous orbit. It may also be flown with no upper stage. The addition of upgraded solid rocket motors this year will enhance performance by approximately 25 percent. USAF's original requirement of ten Titan IVs had increased to firm orders for 41 vehicles by mid-1989. First launch took place from Cape Canaveral, Fla., in June 1989; all six launches to date have been successful.

**Prime Contractor:** Martin Marietta Space Launch Systems.  
**Power Plant:** first and second stages: Aerojet liquid hypergolic propellants; first stage 551,200 lb thrust; second stage 106,150 lb thrust; initially two United Technologies solid rocket boosters, each 1,394,000 lb thrust, later two Hercules solid rocket boosters, each 1,700,000 lb thrust.  
**Guidance:** Delco inertial guidance system, to be replaced by Honeywell digital avionics system on 24th vehicle and later.  
**Dimensions:** first and second stages: height 119 ft 2½ in, diameter 10 ft.  
**Launch Weight:** approx 1.9 million lb.

#### Inertial Upper Stage (IUS)

Used for the first time in October 1982, the highly reliable IUS serves as an upper stage for the Titan IV for DoD, as well as with the shuttle for NASA. Consist-



Titan IV



Delta II

ing 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.

**Prime Contractor:** Boeing Aerospace.  
**Power Plant:** aft-stage solid rocket motor 41,611 lb thrust, forward-stage solid rocket motor 17,629 lb thrust.  
**Guidance:** inertial, plus star tracker.  
**Dimensions:** length 17 ft, diameter 9 ft 2¼ in.  
**Launch Weight:** 32,500 lb.

#### Delta II

Selected by USAF 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, 18



MQM-107D Streaker (Guy Aceto)



BQM-34A Firebee (Guy Aceto)

operational GPS satellites have been launched successfully. The current schedule calls for Navstar launches to take place at approximately two-month intervals, with the program being completed this year. The full Navstar constellation will consist of 21 operational satellites and three on-orbit spares, providing US and allied forces with worldwide, three-dimensional position and velocity information.

Delta II is a three-stage booster surrounded by nine solid-propellant, graphite epoxy motors (GEMs). The GEMs were not available for the first nine GPS flights, which employed a modified version of the original Delta's Castor IV engine, the Castor IVA. Delta II differs from the earlier version in having a twelve-foot stretch in the first-stage tanks and, from flight number ten, an increased expansion ratio on the first-stage engine.

**Prime Contractor:** McDonnell Douglas Space Systems Company.  
**Power Plant:** first stage: Rocketdyne RS-27A liquid-propellant engine, 237,000 lb thrust; second stage: Aerojet IT1P liquid-propellant engine, 9,400 lb thrust; third stage: Morton Thiokol SGS II derivative, 15,400 lb thrust; strap-on GEM solid rocket motors, 143,235 lb thrust.  
**Dimensions:** length 130 ft, diameter 8 ft; bulbous payload fairing, max diameter 10 ft.  
**Lift-off Weight:** 509,000 lb.  
**Performance:** 11,110 lb to 100 nm.

#### Spaceflitter

A full-scale system development effort is under way for a new family of launch vehicles and infrastructure that will embrace the range of DoD mission requirements and the medium- to heavy-lift requirements of NASA.

#### Pegasus

This three-stage, solid-propellant winged vehicle is air-launched from a B-52 and is designed for maximum operational flexibility in delivering 500-800 lb payloads to low-Earth orbit. Conceived in 1987, Pegasus was developed jointly by Orbital Sciences Corporation and Hercules Aerospace Company as a private venture. The vehicle was under contract to the Defense Advanced Research Projects Agency (DARPA) 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 will transfer fully to USAF prior to the third DoD mission. It will support the USAF space test program and SDIO. (Data for basic Pegasus vehicle.)

**Prime Contractor:** Orbital Sciences Corporation and Hercules Aerospace Company.  
**Power Plant:** three Hercules 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 is being developed, using an LGM-118 Peacekeeper missile first-stage addition. Taurus will be ground-launched from regular launch complexes and will be used to test a quick-readiness, mobile launch facility.

## Aerial Targets and Decoys

#### MQM-107D Streaker

The Air Force originally procured the MQM-107A in 1975. This target is now in its third generation as a D model, with a fourth generation E model being tested. It is a recoverable, variable-speed target drone, currently in use at Tyndall AFB, Fla., for research, development, test, and evaluation (RDT&E) instructor training and the Weapon System Evaluation Program.  
**Contractor:** Beech Aircraft Corporation.

**Power Plant:** one Teledyne CAE 373-B 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.

### BQM-34A Firebee

Since initial development of the BQM-34A in the late 1950s, more than 6,000 of these jet target vehicles have been delivered to support weapon system and target research, development, test, evaluation, quality assurance, training, and annual service practices by all three US services and by foreign governments. The BQM-34s deployed at Tyndall AFB, Fla., are used in the testing and evaluation of air-to-air missiles.

New, reengineered BQM-34As are becoming USAF's standard subscale target drones. The uprated General Electric J85-100 engine provides 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 pre-launch and in-flight self-test capability. Since 1989, these targets have been used for weapon system evaluation at Tyndall AFB.

**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 new Gulf Range Drone Control Upgrade System (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 350 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:** automatic flight control system with digital backup.

**Dimensions:** length 63 ft 0 in, height 15 ft 5 in, wingspan 38 ft 5 in.

**Weight:** mission operational weight 49,500 lb.

**Performance:** max speed Mach 2, service 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 slated for conversion to FSATs.

**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, a multifunction command and control digital multilateration system, and the Drone Tracking and Control System (DTCS), a microwave command and guidance system.

**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, service ceiling 50-55,000 ft, range (approx) 400 miles.

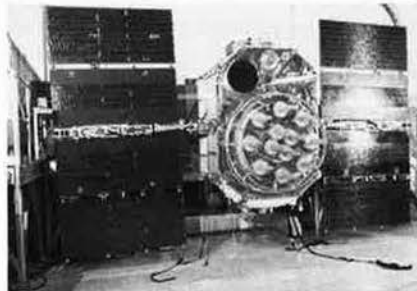
## Unmanned Aerial Reconnaissance System

### Unmanned Aerial Reconnaissance System

The Unmanned Aerial Reconnaissance System (UARS), developed under a USAF/USN agreement, will provide a real-time/near-real-time unmanned reconnaissance complement to current and projected manned reconnaissance platforms. The UARS consists of the medium-range unmanned aerial vehicle



Defense Support Program



Navstar Global Positioning System

(UAV-MR), being built by Teledyne Ryan Aeronautical, and the Advanced Tactical Airborne Reconnaissance System (ATARS) sensor payload, being developed by Martin Marietta Electronic Systems. The UAV-MR, designated BQM-145A, is capable of being air- or ground-launched and will carry interchangeable mission payloads up to 700 nm at high subsonic speeds. The vehicle first flew in October 1988. The ATARS payload will consist of interchangeable EO and IR sensors, recorder, and data link. The first production system is scheduled for delivery in FY 1997.

**Contractors:** Teledyne Ryan Aeronautical/Martin Marietta.

**Power Plant:** one Teledyne CAE 382-10 turbofan.

**Dimensions:** length 18 ft 0 in, span 10 ft 6 in.

## Satellite Systems

### Defense Support Program

Defense Support Program satellites, a key part of North America's early warning system, detect missile launches, space launches, and nuclear detonations. Operated by Air Force Space Command, the satellites feed warning data to NORAD and US Space Command early warning centers at Cheyenne Mountain AFB, Colo.

The first launch of a DSP satellite took place in the early 1970s. Since that time, DSP satellites have provided an uninterrupted early warning capability to the United States. 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.

**Prime Contractor:** TRW.

**Power Plant:** solar arrays generating 1,485 watts.

**Dimensions:** diameter 22 ft, height 32 ft 8 in, with solar paddles deployed.

**Weight:** 5,000 lb (approximate).

**Performance:** orbits at approximately 22,000 miles altitude; uses IR sensors to sense heat from missile and booster plumes against the Earth's background.

### Defense Meteorological Satellite Program

Defense Meteorological Satellite Program (DMSP) space vehicles have been collecting weather data for US military operations for some two decades. Two operational DMSP Block 5D-2 satellites orbit the Earth, 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 in identifying, locating, and determining 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 also 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 enabled allied planners to provide efficient and safe air operations.

**Prime Contractor:** General Electric Astro Space.

**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 the Earth at about 500 miles altitude and scan an area 1,800 miles wide. Each system covers the Earth in about 12 hours.

### 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 communication 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 more advanced DSCS Phase II satellites in 1982. These have single, multiple-beam antennas that provide more flexible coverage than their predecessors. The single steerable dish antenna provides an increased power spot beam that can be tailored to suit the needs of different size user terminals. Phase III satellites can resist jamming and are expected to operate twice as long as Phase II's.

**Prime Contractor:** Phase II, TRW; Phase III, GE Astro Space.

**Power Plant:** Phase II: solar arrays generating 535 watts, decreasing to 358 watts after five years; Phase III: solar arrays generating 1,100 watts, decreasing to 837 watts after five years.

**Dimensions:** Phase II: cylindrical body 9 ft in diameter, 9 ft high (13 ft with antennas deployed); Phase III: rectangular body 6 ft x 6 ft x 7 ft; 38-foot span with solar arrays deployed.

**Weight:** Phase II 1,350 lb, Phase III 2,500 lb.

**Performance:** four Phase II and six 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. When fully operational in 1994, the constellation will comprise 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. Allied troops relied heavily on the GPS to navigate the featureless Saudi Arabian desert. Forward air controllers, pilots, and tank drivers used the system.

**Prime Contractor:** Rockwell International.

**Power Plant:** solar arrays generating 700 watts.

**Dimensions:** width 5 ft, length 17 ft 6 in, including solar array.

**Weight:** 1,860 lb in orbit.

**Performance:** GPS satellites orbit the Earth every 12 hours emitting continuous navigation signals. The signals are so accurate that time can be figured to within a 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. ■

By John L. Frisbee, Contributing Editor

## Pearl Harbor and Beyond

2d Lt. George Welch's four victories at Pearl Harbor were harbingers of an extraordinary combat career.

**S**UNDAY morning—a time to sleep in, browse through the papers, tee off for an early round of golf. This Sunday, all that was not to be. The place, Pearl Harbor; the time, 7:55 a.m., December 7, 1941. A script for the greatest disaster in US military history was unfolding just as Billy Mitchell had predicted seventeen years earlier.

At Wheeler Field, 2d Lts. George Welch and Kenneth Taylor were awakened by the scream of aircraft engines and the sound of exploding bombs. Running outside, they saw smoke rising over Pearl Harbor and Japanese planes diving on their targets.

It requires some imagination to envision the shock and confusion created by the holocaust that was unfolding before the eyes of military personnel and civilians. The possibility of war with Japan was recognized, but Army commanders had ruled out an attack on Hawaii as impossible. The only threat, they thought, was minor sabotage. The reality of the attack left many—in and out of uniform—dazed and bewildered.

Lieutenants Welch and Taylor were less than a year out of pilot training, and, like all at Pearl Harbor, neither was psychologically prepared for a shooting war. Nevertheless, Taylor immediately called the grass strip at Haleiwa, ten miles from Honolulu, where the 47th Pursuit Squadron had been sent for target practice. He told the ground crews to have two P-40s fueled and armed for combat.

Driving at top speed to Haleiwa, they survived a strafing attack and found the strip untouched. Without permission or knowledge of the enemy situation, they took off, only their .30-caliber guns loaded. Near the Marine airfield at Ewa, they attacked a formation of "Kate" dive bombers that was strafing the field. With three of his four guns firing, Welch shot

down one "Kate," as did Taylor. Turning to get behind another, Lieutenant Welch's P-40 was hit by an enemy tailgunner. He ducked into a cloud to check his plane. Then both lieutenants returned to the Pearl Harbor area, where each man downed another "Kate."

Low on ammunition, the two landed at Wheeler to rearm. As they prepared to take off, a wave of enemy bombers escorted by Zeros swept toward the field. Flying into the enemy formation, Lieutenant Welch shot a Zero off the wounded Lieutenant Taylor's tail, was again hit by enemy fire, then nailed another attacking plane before returning once more to Haleiwa to rearm. By the time Welch was airborne for his third sortie, the Japanese armada of some 350 aircraft had departed for their carriers, leaving the US Pacific Fleet in ruins and having destroyed most of the US military aircraft parked wingtip-to-wingtip as a safeguard against sabotage. Only the 46th and 47th Pursuit Squadrons had been able to get fighters into the air.

Lieutenant Welch is generally credited with shooting down the first Japanese aircraft in the Pacific War, followed seconds later by Lieutenant Taylor's initial victory. Both pilots were awarded the Distinguished Service Cross. Later, Welch was honored by President Roosevelt at a White House ceremony. Welch's four confirmed victories in his first combat experience were an illustrious start for a distinguished war record as a fighter pilot that was to span the next two years in the Pacific.

In 1942, George Welch was assigned to the 36th Fighter Squadron, 8th Group, flying P-39s in New Guinea. Lacking maneuverability, rate of climb, and altitude capability, the P-39 was no one's choice for air combat. Despite those handicaps, Welch shot down a Zero and two "Val" dive bombers on December 7, 1942, the anniversary of Pearl Harbor.

Better things were to come. For his third combat tour, Welch joined the 8th Group's 80th Fighter Squadron, equipped with P-38s. On June



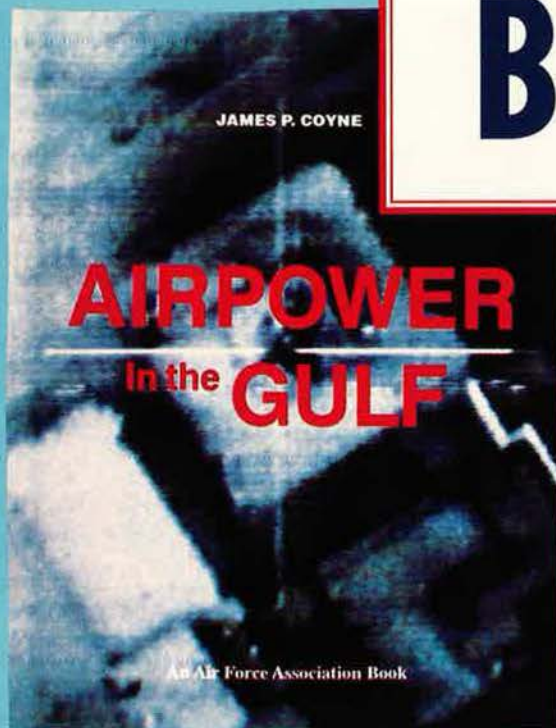
*Even after a night of dancing and poker, Lieutenant Welch had the wherewithal to get his P-40 airborne and down four Japanese planes.*

21, 1943, he destroyed two "Zeke" fighters over Lae, then, two months later, downed three "Tony" fighters near Wewak. Now a captain, Welch was moved to 8th Fighter Group Hq. His biggest day came on September 2, 1943, when he dropped three Zeros and a "Dinah" bomber. With sixteen victories, George Welch ended his combat career among the top thirty-five Army Air Forces aces of World War II and stood tenth among aces in the Pacific. He was one of the few pilots to score victories flying three different fighters.

After the war, George Welch served as a test pilot at Edwards AFB, Calif. On October 12, 1954, he was killed testing an F-100 Super Sabre. He will be remembered by many only as the first Air Force pilot to shoot down an enemy plane in the Pacific War—one of the great heroes of Pearl Harbor. Fewer know of his later combat tours, marked by the same courage, skill, and determination he displayed as an untested pilot during his country's first hour of World War II. ■



# A BOLT From The BLUE



**C**loaked by darkness and stealth, more than 400 allied aircraft crossed the border into Saddam Hussein's Iraq in the early morning hours of January 17, 1991, and struck a blow from which the Iraqi armed forces never recovered. It was the beginning of the most impressive air campaign in history.

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By Daniel M. Sheehan, Assistant Managing Editor

## Central Florida Does It Again

In a celebration of Florida's aerospace achievements, this year's Air Forces Gala raised \$30,000 for the Aerospace Education Foundation [see "AFA/AEF Report," April 1993, p. 82]. The **Central Florida Chapter** hosted more than 900 AFA supporters at the annual event, which also saw the presentation of three AEF fellowships.

Dr. Steven Siwa, president of Embry-Riddle Aeronautical University, accepted an Ira C. Eaker Fellowship in honor of the school's contributions to worldwide aerospace education. Norman Glass, executive director of the Greater Orlando Aviation Authority, also accepted an Eaker Fellowship for his organization's leadership in guiding local commercial and civil aviation. A Jimmy Doolittle Fellowship was presented to Gen. Bernard A. Schriever, USAF (Ret.), the "father of the intercontinental ballistic missile," to honor his leadership in securing US preeminence in space exploration during his tenure as commander of Air Force Research and Development Command and Air Force Systems Command (1959-66). Each fellowship represents a donation of \$1,000 to AEF.

Chapter President Richard Ortega, USAF Chief of Staff Gen. Merrill A. McPeak, and Air Combat Command Commander Gen. John Michael Loh presented the fellowships. AEF President Gerald Hasler, AEF Chairman of the Board James M. Keck, and Gala Chairman Thomas M. Churan also attended the event.

The audience at the gala was treated to a video presentation tracing the history of Florida's aerospace activities in civilian and military aviation, aerospace developments, and aerospace education from the early years of this century to the space shuttle flights.

In addition to its generous contribution to AEF, the gala also supports the ROTC program at the University of Central Florida, Junior ROTC programs at six local high schools, a Civil Air Patrol group, and educational outreach programs at local schools from elementary grades through high school.



*National Vice President (Southeast Region) Stanley Hood (left) presents an Exceptional Service Award to Charles Myers. Mr. Myers was honored at a Swamp Fox (S. C.) Chapter meeting for his service as South Carolina President. At the same meeting, Col. William Rider, 9th Air Force's deputy chief of staff for Logistics, accepted the Thomas P. Gerrity Award for his contributions in logistics.*

## McKellar Receives Award

Indiana State President Don McKellar recently accepted a Special Citation for a career of dedication to AFA. National Vice President (Great Lakes Region) Harold Henneke presented the citation as Indiana Vice President Ted Eaton, Indiana Secretary Bill Wilhelm, and Indiana Treasurer Allen Feedback looked on.

Mr. McKellar was honored for his work in reviving the **Terre Haute-Wabash (Ind.) Chapter** and his service as president of the **Gus Grissom (Ind.) Chapter**. Once the Terre Haute Chapter was reestablished, Mr. McKellar turned his attention to the Grissom Chapter, making sure it was a leader in both the "Visions of Exploration" program and AEF's Eagle Plan scholarship program. He also established a newsletter, *The Leader*, to help keep chapter members informed.

## Chapter News

The **Dale O. Smith (Nev.) Chapter** continued its support of the total force with its annual scholarship award to

an outstanding student member of the Nevada Air National Guard. Chapter President Susan Worts and Vice President Roger Austin presented this year's \$600 award to A1C Joshua M. Flatley of the Nevada ANG's 152d Consolidated Aircraft Maintenance Squadron. Airman Flatley attends the University of Nevada-Reno, majoring in mechanical engineering.

The **Mobile (Ala.) Chapter** held a luncheon in honor of former Pacific Air Forces Commander in Chief Gen. Jimmie V. Adams, who hails from nearby Prichard, Ala. The General's mother, Verlie Adams, Chapter President William Divin, Vice President Steven Hester, State President William Voigt, and National Director Frank Lugo turned out for the tribute.

The Mobile Chapter has ambitious programs for growth on several fronts. Board Chairman John Dyas's growth goal program has already netted the chapter thirty-nine new members. Under "Visions of Exploration" Program Coordinator (now vice president) Hester, the chapter tripled its partici-

pation in the "Visions" effort, which seeks to increase students' awareness of world events. Thirty Mobile County classrooms now receive *USA Today* newspapers and other educational materials through Mobile Chapter sponsorship. Mr. Hester was recognized with a Medal of Merit from AFA for his service to the chapter.

The chapter also elected a new slate of officers. In addition to President Divin and Vice President Hester,

members of the **Florida Highlands Chapter** have taken it upon themselves to remedy some of the small-scale damage. Among the casualties of the hurricane was the 31st Fighter Wing's model airplane collection, which included every type of airplane flown by the 31st FW since its activation with P-43s at Selfridge Field, Mich., in 1940.

After the hurricane, the 31st's personnel discovered that the two most

#### Have AFA/AEF News?

Contributions to "AFA/AEF Report" should be sent to Dave Noerr, AFA National Headquarters, 1501 Lee Highway, Arlington, VA 22209-1198. ■

### Coming Events

May 7-9, **North Carolina State Convention**, Seymour Johnson AFB, N. C.; May 14, **Maryland State Convention**, Andrews AFB, Md.; May 14-16, **New Jersey State Convention**, Atlantic City, N. J.; May 14-16, **South Carolina State Convention**, Clemson, S. C.; May 21-22, **Tennessee State Convention**, Nashville, Tenn.; May 21-22, **Washington State Convention**, Spokane, Wash.; June 4-5, **Alabama State Convention**, Montgomery, Ala.; June 4-6, **Arizona/Nevada State Convention**, Tucson, Ariz.; June 8, **Utah State Convention**, Ogden, Utah; June 11-13, **Louisiana State Convention**, New Orleans, La.; June 12, **Massachusetts State Convention**, Boston, Mass.; June 18-20, **New York State Convention**, Griffiss AFB, N. Y.; June 18-20, **Ohio State Convention**, Mansfield, Ohio; June 25-27, **Oklahoma State Convention**, Oklahoma City, Okla.; July 9-10, **Illinois State Convention**, Quad Cities, Ill.; July 9-11, **Georgia State Convention**, Columbus, Ga.; July 9-11, **Missouri State Convention**, Whiteman AFB, Mo.; July 16-17, **Arkansas State Convention**, Jacksonville, Ark.; July 16-18, **Pennsylvania State Convention**, Trevese, Pa.; July 16-18, **Texas State Convention**, College Station, Tex.; July 23-24, **Kansas State Convention**, Wichita, Kan.; July 30-August 1, **Florida State Convention**, Cypress Gardens, Fla.; August 5-7, **California State Convention**, Sacramento, Calif.; August 13-14, **Colorado State Convention**, Colorado Springs, Colo.; August 20-21, **Mississippi State Convention**, Jackson, Miss.; September 13-15, **AFA National Convention and aerospace exhibition**, Washington, D. C.

Photo by Sgt. Nancy Gentry



*Henry Boardman, representing the John C. Stennis (Miss.) Chapter, presents a \$250 Eagle Grant Scholarship to Sgt. Lisa Karns at a Keesler AFB, Miss., Community College of the Air Force graduation ceremony. Eagle Grants are awarded by the Aerospace Education Foundation to more than 200 outstanding CCAF graduates each year.*

the chapter will be led by Secretary Joseph H. Nix and Treasurer John Jordan. Rear Adm. J. Lloyd Abbot, Jr., USN (Ret.), Vivian Beckerle, Col. William E. Callender, USAF (Ret.), Robert A. Gutham, Walter L. Hovell, and Scott Hunter will serve on the chapter's board of directors.

Hurricane Andrew wrought damage to Homestead AFB, Fla., on both a large scale and a small scale. Mem-

recent aircraft, the Vietnam-era F-100 and the current F-16, were missing. Florida Highlands Chapter President Roy P. Whitton and former Chapter President Leo Gomez volunteered to replace the aircraft and last February presented the completed models to Col. Will Rudman, commander of the 31st FW, and Col. Victor Tucker, vice commander of the 31st FW and one of the organizers of the chapter.

## Unit Reunions

#### Air Force Photo Mapping Ass'n

Air Force Photo Mapping personnel will hold a reunion September 9-12, 1993, in Savannah, Ga. **Contact:** Paul C. Ailiff, P. O. Box 628, Guyton, GA 31312-0628. Phone: (912) 772-3169.

#### Air Weather Recon Ass'n

Veterans of Air Force Weather Reconnaissance organizations will hold a reunion September 23-

26, 1993, at the Marriott Hotel in Overland Park, Kan. **Contact:** Glen Sharp, 306 Sunset Ln., Belton, MO 64012. Phone: (816) 331-2039.

#### Air Weather Recon Squadrons

Veterans of the 56th/512th/514th Weather Recon Squadrons will hold a reunion August 26-29, 1993, at the Holiday Inn-Express in Nashville, Tenn. **Contact:** Russell H. Conant, 89 Forest St., Middleboro, MA 02346-2019. Phone: (508) 946-0845.

#### Amarillo AFB Personnel

All current/former officers, enlisted members, and civilian personnel who were stationed at Amarillo AFB or Amarillo Technical Training Center, Tex., between 1942 and 1968 are invited to attend a reunion May 21-22, 1993, in Amarillo, Tex. Veterans of the 461st Bomb Wing are also invited. **Contact:** Doug Griggs, 3013 Clayton St., Duncan, OK 73533. Phone: (405) 255-7771.

## Unit Reunions

### **BAD 2 Ass'n**

Veterans of Base Air Depot 2 who were stationed in Warton, England (World War II), will hold a reunion October 28-30, 1993, in Anaheim, Calif. **Contact:** Ralph Scott, 228 W. Roosevelt Ave., New Castle, DE 19720-2565.

### **Canberra Ass'n**

Members of the Canberra Association will hold a reunion September 16-19, 1993, in Hampton, Va. **Contact:** Henry G. Mohr, HCR 75, Box 220, Mobjack, VA 23118. Phone: (804) 725-7185.

### **"Coconut Heads"**

Veterans who served on Christmas Island in the central Pacific (World War II) will hold a reunion September 16-18, 1993, in Springfield, Ill. **Contact:** Ernest Garrels, 402 Linn St., Benson, IL 61516. Phone: (309) 394-2273.

### **Foster/Aloe Fields**

Military and civilian personnel stationed at Foster and Aloe Fields (Matagorda Gunnery Range), Tex., during the 1940s and 1950s will hold a reunion June 11-13, 1993, in Victoria, Tex. **Contacts:** Paul A. Knebllick, 601 Cambridge, Rte. 6, Victoria, TX 77901. Phone: (512) 575-5840 or (512) 575-7560 (Helen K. Welch).

### **Kenyon Veterans**

Army Air Forces veterans who studied pre-meteorology in 1943 at Kenyon College will hold a reunion June 18-20, 1993, in Kenyon, Ohio. **Contact:** George W. James, 350A Pine Ridge Dr., Whispering Pines, NC 29327. Phone: (919) 949-3400.

### **RAAF/WAFB Veterans Ass'n**

Veterans stationed at Roswell Army Air Field/Walker AFB, N. M., between 1941 and 1967 will hold a reunion September 17-19, 1993, at the Roswell Inn in Roswell, N. M. **Contact:** Frank Trasp, 3419 S. Union Ave., Roswell, NM 88201.

### **SAC Data Systems**

Strategic Air Command Data System personnel will hold a reunion September 10-12, 1993, at Offutt AFB, Neb. **Contact:** Col. Robert A. Wicklund, USAF (Ret.), 602 Martin Dr., Bellevue, NE 68005. Phone: (402) 291-4690.

### **3d Strategic Air Depot**

Veterans of the 3d Strategic Air Depot, 8th Air Force, who served in Watton, England, between 1943 and 1945 will hold a reunion August 11-15, 1993, in Albuquerque, N. M. **Contact:** Wiley Noble, 7266 Goodwood Ave., Baton Rouge, LA 70806. Phone: (504) 925-8454.

### **8th Fighter Group Ass'n**

Veterans of the 8th Fighter Group, which included the 33d, 35th, 36th, and 80th Fighter Squadrons, will hold a reunion September 9-11, 1993, in Bozeman, Mont. **Contact:** Art Shaw, 1209 W. Koch, Bozeman, MT 59715. Phone: (406) 586-9136.

### **15th/20th Weather Squadron Ass'n**

Veterans of the 15th and 20th Weather Squadrons will hold a reunion September 9-12, 1993, at the Warwick Hotel in Seattle, Wash. **Contact:** Irwin J. Lecocq, 733 Fieldston Rd., Bellingham, WA 98225. Phone: (206) 671-3039.

### **17th/71st Special Operations Squadrons**

Veterans of the 17th and 71st Special Operations Squadrons will hold a reunion September 9-12, 1993, at the Air Force Museum in Dayton, Ohio. **Contact:** Earl W. Scott, 1939 S. 100 E., Greenfield, IN 46140. Phone: (317) 462-4130.

### **22d Bomb Squadron Ass'n**

Veterans of the 22d Bomb Squadron (World War II) will hold a reunion October 14-16, 1993, in Seattle, Wash. Members of the 341st Bomb Group

and attached squadrons are invited. **Contact:** David K. Hayward, 6552 Crista Palma Dr., Huntington Beach, CA 92647. Phone: (714) 842-8478.

### **43d Bomb Group Ass'n**

Veterans of the 43d Bomb Group, 5th Air Force, will hold a reunion September 27-October 3, 1993, at the Red Lion Hotel in Omaha, Neb. **Contacts:** Dale F. Barr, Sr., 2622 S. 87th Ave., Omaha, NE 68124. Lloyd Boren, 102 Beechwood, Universal City, TX 78148. Phone: (512) 658-5978.

### **Class 45-B**

Members of Class 45-B (Luke Field, Ariz.) will hold a reunion August 5-8, 1993, in Dayton, Ohio. **Contact:** Earl J. Turner, 1119 N. E. 107th Pl., Portland, OR 97220. Phone: (503) 257-3626.

### **51st Fighter Group**

Veterans of the 51st Fighter Group, which included the 16th, 25th, 26th, and 449th Fighter Squadrons, will hold a reunion September 27-29, 1993, in San Antonio, Tex. **Contacts:** Robert G. Haines, 1720 13th Ave., Belle Fourche, SD 57717. Phone: (605) 892-4623. Tom W. Wilson, P. O. Box 462, Uvalde, TX 78801. Phone: (210) 278-5275.

### **Class 58-B/C/D**

Members of Class 58-B/C/D are planning to hold a reunion October 9-11, 1993, in Houston, Tex. **Contacts:** Bob Symmes, P. O. Box 472, Pass Christian, MS 39571. Phone: (601) 868-2776. Col. Ben J. Welch, Jr., USAF, McGuire AFB, NJ 08641. Phone: (609) 723-0591 or DSN 440-3293.

### **65th Troop Carrier Squadron**

Veterans of the 65th Troop Carrier Squadron will hold a reunion August 4-8, 1993, in Fort Wayne, Ind. **Contact:** George Bishop, 7647 Auburn Rd., Fort Wayne, IN 46825. Phone: (219) 489-5002.

### **72d/86th Air Service Squadron**

Veterans of the 72d/86th Air Service Squadron will hold a reunion September 9-11, 1993, at the Marriott Hotel in Minneapolis, Minn. **Contact:** Armond Beghun, 1803 Woodland Ave., Eau Claire, WI 54701.

### **86th Fighter-Bomber Group**

Veterans of the 86th Fighter-Bomber Group, which included the 525th, 526th, and 527th Fighter-Bomber Squadrons, will hold a reunion September 16-18, 1993, in Dallas, Tex. **Contact:** Gilbert Hurt, 4920 Montcrest Dr., Chattanooga, TN 37416. Phone: (615) 344-6077.

### **90th Bomb Group**

Veterans of the 90th Bomb Group will hold a reunion October 20-24, 1993, at the Green Oaks Inn in Fort Worth, Tex. **Contact:** Warren Owens, 3512 Allison Ct., Irving, TX 75062. Phone: (800) 992-0038 or (214) 255-2457.

### **93d Troop Carrier Squadron**

Veterans of the 93d Troop Carrier Squadron, 439th Troop Carrier Group, will hold a reunion

September 15-19, 1993, at the Sheraton Hotel in Charleston, S. C. **Contact:** Lt. Col. Thomas L. Morris, USAF (Ret.), 456 St. George's Ct., Satellite Beach, FL 32937. Phone: (407) 773-6960.

### **94th Bomb Group Ass'n**

Veterans of the 94th Bomb Group stationed at Rougham Airfield, England, will hold a reunion September 28-October 3, 1993. **Contact:** Col. Frank N. Halm, USAF (Ret.), 433 N. W. 33d St., Corvallis, OR 97330-5036. Phone: (503) 752-1845.

### **98th Bomb Group Ass'n**

Veterans of the 98th Bomb Group "Pyramidiers" will hold a reunion September 7-11, 1993, in Omaha, Neb. **Contact:** Sam Wareham, 639 Mulder Dr., Lincoln, NE 68510. Phone: (402) 488-5548.

### **111th Tactical Recon Squadron**

Veterans of the 111th Tactical Reconnaissance Squadron will hold a reunion September 9-11, 1993, at the Carlton Lodge in Fort Wayne, Ind. **Contact:** Jesse E. Williams, 4051 Daner Rd., Fort Wayne, IN 46815. Phone: (219) 485-9370.

### **163d Retiree Ass'n**

Veterans of the 163d Group and 196th Squadron (Calif. ANG) will hold a reunion June 4-5, 1993, at March AFB, Calif. **Contact:** CMSgt. James D. Rodgers, USAF (Ret.), 4710 Mt. Vernon Ave., Chino, CA 91710-3318. Phone: (909) 628-5631.

### **246th Signal Operations Co.**

Veterans of the 246th Signal Operations Company (World War II) will hold a reunion August 5-7, 1993, in Nashville, Tenn. **Contact:** Marie Huggins, 30031 S. W. 169th Ave., Homestead, FL 33030. Phone: (305) 247-0150.

### **305th Bomb Group Ass'n**

Veterans of the 305th Bomb Group, 8th Air Force, will hold a reunion September 8-12, 1993, in Salt Lake City, Utah. **Contact:** Ridgely D. Kemp, 572 Fairway Dr., Novato, CA 94949. Phone: (415) 883-5792.

### **306th Bomb Group Ass'n**

Veterans of the 306th Bomb Group, 8th Air Force, will hold a reunion September 9-12, 1993, at the Red Lion Hotel in Seattle, Wash. **Contact:** Russell A. Strong, 5323 Cheval Pl., Charlotte, NC 28205. Phone: (704) 568-0153.

### **316th Fighter Squadron**

The 316th Fighter Squadron, 324th Fighter Group, will hold a reunion June 10-12, 1993, at the Holiday Inn Fisherman's Wharf Hotel in San Francisco, Calif. **Contact:** Douglas K. Pearson, 684 Gisler Way, Hayward, CA 94544.

### **316th Troop Carrier Squadron**

Veterans of the 316th Troop Carrier Squadron will hold a fiftieth-anniversary reunion September 11-13, 1993, in Billings, Mont. **Contact:** Wally Crain, 314 Serenade, San Antonio, TX 78216. Phone: (512) 342-8760.

### **317th CAMS**

Veterans of the 317th Consolidated Aircraft Maintenance Squadron stationed at Lockbourne AFB, Ohio, between 1964 and 1969 will hold a reunion July 3-5, 1993, in Washington, D. C. **Contact:** Jim Vaigi, 5104 Jumprock Ct., Waldorf, MD 20603. Phone: (301) 870-5445.

### **329th Air Service Squadron**

Veterans of the 329th Air Service Squadron, 440th Sub-Depot, and 861st Air Engineering Squadron (World War II) assigned to RAF Alconbury, England, will hold a reunion with the 8th Air Force Historical Society September 28-October 4, 1993, at the Hyatt Regency Hotel in Rosemont, Ill. **Contact:** Peter F. Ardizzi, P. O.

Readers wishing to submit reunion notices to "Unit Reunions" should mail their notices well in advance of the event to "Unit Reunions," AIR FORCE Magazine, 1501 Lee Highway, Arlington, VA 22209-1198. Please designate the unit holding the reunion, time, location, and a contact for more information.

Box 482, Warminster, PA 18974-0482. Phone: (215) 675-9194.

#### 344th Bomb Group Ass'n

Veterans of the 344th Bomb Group will hold a reunion October 4-8, 1993, in Orlando, Fla. **Contact:** Lambert Austin, 5747 Darnell St., Houston, TX 77096. Phone: (713) 774-3030.

#### 367th Fighter Group

Veterans of the 367th Fighter Group, 9th Air Force (World War II), will hold a reunion September 9-12, 1993, at the Flamingo Hilton Hotel in Laughlin, Nev. **Contact:** Col. Allen J. Diefendorf, 25985 Holly Vista, San Bernardino, CA 92404-3514.

#### 446th Bomb Group Ass'n

Veterans of the 446th Bomb Group will hold a fiftieth-anniversary reunion October 6-10, 1993, at the Marriott Hotel in Denver, Colo. **Contact:** Francis E. Bigos, 2135 S. Adams St., Denver, CO 80210-4901. Phone: (303) 756-1972.

#### 453d Bomb Group Ass'n

The 453d Bomb Group (World War II) will hold a reunion with the 453d Operations Group, Air Combat Command, May 31-June 3, 1993, at Fairchild AFB, Wash. **Contact:** Dan Reading, P. O. Box 792, La Habra, CA 90633. Phone: (310) 691-2994.

#### 453d Bomb Squadron Ass'n

Veterans of the 453d Bomb Squadron, 323d Bomb Group, 9th Air Force (World War II), will hold a reunion September 9-13, 1993, in San Antonio, Tex. **Contact:** C. V. Sochocki, 1314 N. Brookfield St., South Bend, IN 46628-3074. Phone: (219) 233-6044.

#### 459th Bomb Group Ass'n

The 459th Bomb Group will hold a reunion September 9-12, 1993, at the Hyatt Regency Hotel in Dearborn, Mich. **Contact:** Frank S. Day, 7290 Miller Dr., Warren, MI 48092-4727. Phone: (313) 795-1900.

#### 465th Tactical Fighter Squadron

Members of the 465th Tactical Fighter Squadron and the 507th Tactical Fighter Group (1971 through 1993) will hold a reunion June 25-27, 1993, at Tinker AFB, Okla. **Contacts:** Col. Ronald K. Williams, 149 Seitz Dr., Salina, KS 67401. Phone: (800) 536-2191. Col. Marty Valentine Case, 1306 Shady Creek, Euless, TX 76039. Phone: (817) 267-0465.

#### 466th Bomb Group

Veterans of the 466th Bomb Group will hold a fiftieth-anniversary reunion June 23-27, 1993, at the Sheraton Hotel in Colorado Springs, Colo. **Contact:** Lou Loevsky, 16 Hamilton Dr., E., North Caldwell, NJ 07006-4626. Phone: (201) 226-4624.

#### 487th Bomb Group Ass'n

The 487th Bomb Group will hold a reunion August 17-23, 1993, at the Hilton Hotel in Buffalo, N. Y. **Contact:** Roy M. Levy, 10162 Robin Ave., Fountain Valley, CA 92708. Phone: (714) 962-6293.

#### 500th Bomb Squadron Ass'n

Veterans of the the 500th Bomb Squadron, 345th Bomb Group, who served between 1942 and 1945 will hold a reunion September 5-8, 1993, in Atlanta, Ga. **Contact:** Lt. Col. Herman F. Reheis, USAF (Ret.), Rte. 1, Turtle Cove, Monticello, GA 31064. Phone: (706) 468-8717.

#### 555th/563d/566th/573d SAW Battalions

Veterans of the 555th, 563d, 566th, and 573d Signal Aircraft Warning Battalion Squadrons (World War II) will hold a reunion September 30-October 2, 1993, in St. Louis, Mo. **Contact:** James D. Lynn, 3855 Utah, St. Louis, MO 63116. Phone: (314) 771-2928.

#### 757th/910th Veterans Ass'n

Veterans of the 757th Tactical Airlift Squadron and the 910th Tactical Airlift Group will hold a reunion July 16-18, 1993, at Youngstown Municipal Airport, Ohio. **Contact:** Ed Rivera, 79 Wilson Ave., Niles, OH 44446. Phone: (216) 652-4648.

#### Class 59-E

Seeking contact with members of Class 59-E (Bainbridge AB, Ga.) who are interested in holding a reunion in conjunction with the Southern Airways School September 5-6, 1994. **Contact:** Maj. Jon C. Heritage, USAF (Ret.), 218 Quinlan, Suite 354, Kerrville, TX 78028. Phone: (210) 896-6634.

#### 67th Troop Carrier Squadron

Seeking contact with members of the 67th Troop Carrier Squadron who are interested in holding a reunion in August or September 1993 in Dayton, Ohio. **Contact:** F. Gerald Randa, 436 Kinney Cir., Wooster, OH 44691. Phone: (216) 345-6615.

## Bulletin Board

If you need information on an individual, unit, or aircraft, or if you want to collect, donate, or trade USAF-related items, write to "Bulletin Board," AIR FORCE Magazine, 1501 Lee Highway, Arlington, VA 22209-1198. Letters should be brief and typewritten; we reserve the right to condense them as necessary. We cannot acknowledge receipt of letters. Unsigned letters, items or services for sale or otherwise intended to bring in money, and photographs will not be used or returned.—THE EDITORS

Seeking contact with USAF missileers, past and present, for the new Association of Air Force Missileers, an organization for all who wear the missile badge. **Contact:** Col. Charles G. Simpson, USAF (Ret.), P. O. Box 5693, Breckenridge, CO 80424.

Seeking information on my father, Sgt. Luis A. Ortiz. His last known address was SG Box 119, Hebo, Ore. 97122. **Contact:** Gary Luis Pittman, 13 Nunnery Rd., Canterbury, Kent CT1 3LS.

Author seeks information on the role of intelligence in aviation targeting and mission planning by all air forces during World War II. For a unit history, also seeking contact with former C-47 aircrews and ground crews who served with the 21st Troop Carrier Squadron ("Kyushu Gypsies") during the Korean War. Also seeking contact with former aircrews and ground crews who

## HELP NEEDED

The family of **John Elroy McCaw**, known during World War II as Major J.E. "Elroy" McCaw, requests help from anyone who knew of Mr. McCaw's military activities. He was the executive assistant to Maj. Gen. H.M. McClelland, the Air Communications officer in the War Department. Elroy was involved in a number of activities, including the establishment of a weather station in Siberia and joint operations with the OSS and agents Michael Burke and John Shaheen. He also was involved in secret radar projects (probably GCA development) with Sir Robert Watson-Watt. Files from Gen. McClelland's office list several officers and civilians who were associated with him at the time, including Mr. Larson, Lt. Thomas Creamer, Lt. Edward Ragan, Capt. J.B. Dow, Lt. E.B. Bridgeman, Mr. John H. Teeter, Col. Macrum, Mr. James B. Massey, Capt. Detzer, Col. Maxwell, Col. Reynolds, Col. Roberts, Cmdr. Bernard Baruch Jr., Lt. Col. George Haller, Lt. Col. George Metcalfe, Maj. M.B. Lampl, Col. Tom Rives, Col. William Canterbury, Col. D.C. Doubleday, and Dr. Dale R. Corson.

If you can provide any lead regarding Major McCaw's activities during World War II, or if you know the whereabouts of any of the above named persons, please call collect to Bruce McCaw, 206-827-7272, or write him at Box 1717, Bellevue, WA 98009.

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## Bulletin Board

served with "The Carpetbaggers" of 8th Air Force in World War II. **Contact:** Steve Pease, P. O. Box 16854, Colorado Springs, CO 80935.

A memorial service for a crew of the 777th Squadron, 464th Bomb Group, 15th Air Force, Italy, KIA May 25, 1944, scheduled for May 25, 1993, near Cannes, France, has been changed to September 1993. **Contact:** Col. Betty Karle, 17 Jerry Lee Dr., Mena, AR 71953.

Seeking contact with members of 55th Fighter Squadron, 20th Fighter Group, 67th Fighter Wing, 8th Air Force. **Maj. John C. Wilkins** was a member reported MIA November 7, 1943. **Contact:** Steve Wilkins, 10104 N. E. 62d St., Kirkland, WA 98033.

Seeking contact with personnel who served at **Daly Waters AB**, Northern Territory, Australia, during World War II. Also seeking information on military units based at Daly Waters AB during World War II. **Contact:** Lt. Col. F. M. Stefanek, USAF (Ret.), 27120 S. E. Hwy. 212, Boring, OR 97009.

Seeking information on the meaning of "Burma Roadster." Could it be the name of an airplane? **Contact:** J. R. "Bill" Bailey, 1541 Eastwood Dr., Slidell, LA 70458.

To provide details for a book, seeking contact with **KC-135** crews and fighter crews who saved lives or were saved in Vietnam. **Contact:** Maj. Vernon B. Byrd, Jr., USAF (Ret.), 2153 Notre Dame Blvd., Chico, CA 95928.

To obtain a picture of the group, seeking contact with members of the **April 1943 OCS class**, Miami Beach, Fla., who were quartered at the Greystone Hotel on 20th St. **Contact:** G. B. Terpening, 3423 Spring Creek Dr., Santa Rosa, CA 95405.

An A-20 gunner, 9th Air Force, seeks information on a source for **VHS videos of A-20 Havocs or Bostons** in action, any theater of operations. No checkout films. **Contact:** J. F. Gregory, 301 Janis Dr., Yorktown, VA 23692.

Collector seeking contact with anyone at **Cannon AFB, N. M.**, who can help increase his collection of F-111 scarves, patches, stickers, squadron ball caps, photos, and unit histories. Also seeking flight scarves from the 528th and 529th Bomb Squadrons and a videotape showing FB 111/F-111G flight operations. **Contact:** Curtis J. Lenz, 32 June St., Nashua, NH 03060-5345.

A student in Barcelona, Spain, seeks contact with a **USAF servicewoman** to obtain information on her role in the Air Force. **Contact:** Peter S. Argila, Via Augusta, 35 Bjos., 08911 Badalona, Barcelona, Spain.

Seeking examples of air-to-ground codes/ciphers from World War II to Vietnam (Syko to Whiz Wheel). **Contact:** Fred Wrixon, 214 N. 7th St., Martins Ferry, OH 43935.

Seeking a copy of the book **Fighter's Up** by Macrae Smith, published in 1945, and copies of **Aerospace Historian** magazines, any year, especially March 1972. **Contact:** Josephine Rachele, 1404 Herzel Blvd., West Babylon, NY 11704.

Seeking contact with **SSgt. John E. Schultz**. I first saw him in Guam in May 1948, when he was with the 514th Weather Reconnaissance Squadron. I last saw him at Yokota AB, Japan, in November 1951. **Contact:** Russell H. Conant, 89 Forest St., Middleboro, MA 02346-2019.

Seeking contact with **Charley Herter**, from the Boston area, or his family and friends. We first



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met in the fall of 1943 when he was a medic on detached duty to our unit, Battery C, 160th FA Bn., 45th Infantry Division. **Contact:** John Ross, 7018 E. 58th Pl., Tulsa, OK 74145-8203.

Seeking information on **Robert Davies**, who served with USAF near London in 1961. He returned to the US in late 1961 and is believed to be residing in Detroit. **Contact:** Shirley Maddock, 26 Cornflower Rd., Jaywick Sands, Clacton-on-Sea, Essex CO15 2RZ, England.

Seeking information on my grandfather, **Donald Tyrrell**. He was an officer in the Air Force stationed at Wolverly, England, from 1942 to 1944. He may have lived in 20 Mile Springs, Vt. **Contact:** Jayne-Marie Tyrrell-Owen, 31 Queen Elizabeth Rd., Comberton Estate, Kidderminster, Worcestershire DY10 3BD, England.

Seeking any home movies taken at **bombardier training schools**, 1942-45. They are needed for a composite VCR tape for the Childress Museum, honoring young men who trained there during World War II. Especially interested in training footage and flight line airplane shots. **Contact:** Maj. Walter Lockhoof, USAF (Ret.), 210 3d St. N. W., Childress, TX 79201.

Seeking contact with **Sean Marc Gershon**. He was in England in 1989 (RAF Upper Heyford). **Contact:** Lisa Armstrong, 2900 W. Greenridge Pl., Tucson, AZ 85741.

Seeking contact with anyone who knew **SSgt. Jim O'Neil**, a waist gunner on a B-17 with the 410th Bomb Squadron, 94th Bomb Group, at Rougham AB, England, from October 1943 to April 1944. **Contact:** Kevin O'Neil, 1083 Arroyo, Clovis, CA 93611-6241.

Collector seeks **instrument panel**, flight instrument, and any military surplus cockpit item. **Contact:** Lt. Col. Henry Delaney, USAF (Ret.), 68 Ave. of the Oaks, Beaumont, TX 77707.

Bombardier seeks **USAAF Bombardier class ring**, from the period 1943-45. It has a bomb on one side and wings on the other. I lost mine and want to replace it. **Contact:** Henry W. Seidl, Jr., 17345 Haynes St., Van Nuys, CA 91406.

Seeking contact with ground and flight crew members who served with the **371st Bomb Squadron**, 307th Bomb Group, at Kadena AB, Japan, from October 1952 to August 1953. **Contacts:** Whitney J. Savoy, 4888 Bridge Street Hwy., Saint Martinsville, LA 70582, John W. Roach, 46 Read Rd., Williston, VT 05495.

Seeking contact with **Robert Hudson**, a quartermaster signalman in the Navy stationed in Argentia, Newfoundland, from 1952 to 1953. He came from a farming family in Illinois and could still be in the Cowden area. **Contact:** Robert Rhodes, 1253 Barrington St., Halifax, Nova Scotia B3J 1Y2, Canada.

Seeking information on **Robert W. Barr** (Los Angeles), **Lucian Harris** (Houston), **Harry L. Fetter** (Denver), and **George Q. Favreau** (Cambridge), pilots who moved from Stirling Island to Middleburg Island as part of 339th Fighter Squadron. **Contact:** Charles Parker, 4915 Morton Rd., New Bern, NC 28562.

Seeking contact with **Ron "Mack Truck" Nielsen**, based at Long Beach AFB, Calif., from 1951 to 1952. **Contact:** Ken Stremming, 12 Springlake Ave., Hinsdale, IL 60521-4748.

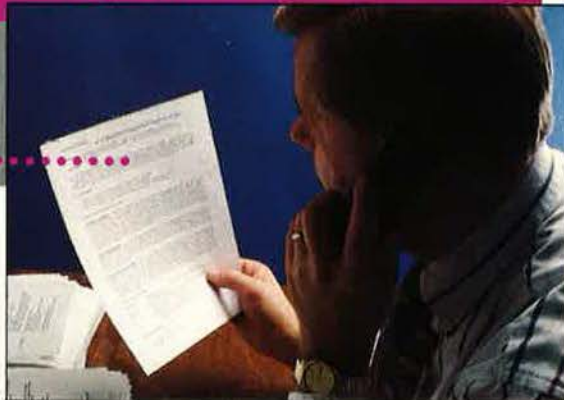
Seeking contact with the following B-24 crew members of the 404th Bombardier Squadron, 11th Air Force, stationed on Shemya in the Aleutians during World War II: **2d Lt. Richard T. Potter**, **Ft. Officer Edward S. Cayon**, and **Sgt. George P. Gleason**. **Contact:** William Schwerdtman, 12125 100th Ave., Seminole, FL 34642. ■

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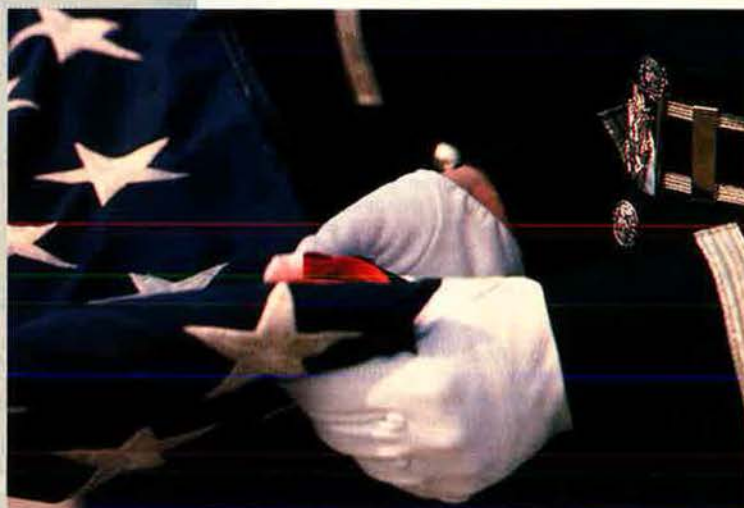


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20-24	\$400,000	\$300,000	\$200,000	\$50,000	\$5,000
25-29	350,000	262,500	175,000	50,000	5,000
30-34	250,000	187,500	125,000	40,000	5,000
35-39	180,000	135,000	90,000	30,000	5,000
40-44	100,000	75,000	50,000	20,000	5,000
45-49	60,000	45,000	30,000	10,000	5,000
50-54	40,000	30,000	20,000	7,500	5,000
55-59	28,000	21,000	14,000	5,000	5,000
60-64	18,000	13,500	9,000	3,000	5,000
65-69	8,000	6,000	4,000	2,000	5,000
70-74	5,000	3,750	2,500	1,000	5,000
75-79	4,000	3,000	2,000	1,000	5,000
80-84	3,000	2,250	1,500	1,000	5,000



We all know that life is filled with difficult decisions, tradeoffs, and compromises. But providing for your family with life insurance that you can afford doesn't have to be one of them. AFA's Decreasing Term Life Insurance plan will help you secure your financial future at a fixed, firm, and affordable price.

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That's why thousands of AFA members — people just like you — are turning to their Association for a proven way to provide for their families. Join them today and you'll receive...

- Choice of Coverage Levels — You can request a range of benefits under the Standard, High Option, and High Option Plus plans — up to \$200,000, \$300,000, or \$400,000, depending on your needs.
- Low-Cost Dependent Coverage.
- Disability Premium Waiver — If, prior to your turning age 60, you become totally disabled and the disability lasts for at least nine months while your coverage is in force, you may apply for the disability waiver of premium benefit. Upon approval, your coverage will remain in effect without further premium payment on your part, for as long as you continue to be totally disabled and are otherwise eligible for coverage...up to age 80!
- Professional Administration — AFA's insurance programs are administered by the Association's experienced professional insurance staff.
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**Eligibility.** All members of the Air Force Association under age 65 are eligible to apply for this insurance. Once you're insured, you may retain this coverage until you reach age 85.

**Effective Date of Coverage.** All certificates are dated and take effect on the last day of the month in which the application for coverage is approved. AFA insurance coverage runs currently with AFA membership, and is written in conformity with the insurance regulations of the state of Minnesota.

**Termination of Coverage.** Other than your attaining age 85, your coverage can only be terminated if a) you are no longer an Air Force Association member in good standing, b) you do not pay your premium, or c) the AFA master policy is discontinued.

**Exceptions & Limitations.** Benefits for suicide or death as a result of intentionally self-inflicted injuries (while sane or insane) will not be effective until coverage has been in force for 12 months.



# AFA's Decreasing Term Life Insurance: Application

To be completed by member:

Your name: \_\_\_\_\_  
 Last/First/Middle  
 Address: \_\_\_\_\_  
 Number and Street/City/State/Zip  
 Daytime Phone: \_\_\_\_\_ Social Security #: \_\_\_\_\_ Date of birth: \_\_\_\_\_ Height: \_\_\_\_\_ Weight: \_\_\_\_\_  
 Area code/Number Month/Day/Year  
 Primary beneficiary: \_\_\_\_\_  
 Name/Relationship  
 Secondary beneficiary: \_\_\_\_\_  
 Name/Relationship

In the past twelve months, I  have  have not used any tobacco products.

This insurance can only be issued to AFA members. Please check the appropriate box below:

I enclose \$25 for annual AFA membership dues (includes \$18 for subscription to Air Force Magazine).  I am currently an AFA member.

Please issue coverage as follows:  Member Only  Member and dependents

(Please select your preferred payment frequency and indicate the correct premium amount.)

Plan of Insurance	Standard		High Option		High Option Plus	
	Member Only	w/Dependents	Member Only	w/Dependents	Member Only	w/Dependents
<b>Monthly Government allotment.</b> I enclose 2 months premium to cover the necessary period for my allotment (payable to Air Force Association) to be established.	<input type="checkbox"/> \$10.00	<input type="checkbox"/> \$12.50	<input type="checkbox"/> \$15.00	<input type="checkbox"/> \$17.50	<input type="checkbox"/> \$20.00	<input type="checkbox"/> \$22.50
<b>Quarterly.</b> I enclose amount checked.	<input type="checkbox"/> \$30.00	<input type="checkbox"/> \$37.50	<input type="checkbox"/> \$45.00	<input type="checkbox"/> \$52.50	<input type="checkbox"/> \$60.00	<input type="checkbox"/> \$67.50
<b>Semi-Annually.</b> I enclose amount checked.	<input type="checkbox"/> \$60.00	<input type="checkbox"/> \$75.00	<input type="checkbox"/> \$90.00	<input type="checkbox"/> \$105.00	<input type="checkbox"/> \$120.00	<input type="checkbox"/> \$135.00
<b>Annually.</b> I enclose amount checked.	<input type="checkbox"/> \$120.00	<input type="checkbox"/> \$150.00	<input type="checkbox"/> \$180.00	<input type="checkbox"/> \$210.00	<input type="checkbox"/> \$240.00	<input type="checkbox"/> \$270.00

I am currently insured under the  Standard  High Option Plan. My certification number is \_\_\_\_\_.

Please increase my coverage to the  High Option  High Option Plus Plan.

Monthly Government allotment. I enclose 2 months premium to cover the necessary period for my allotment (payable to Air Force Association) to be established.

AFA Visa or AFA MasterCard No. \_\_\_\_\_ Expiration date \_\_\_\_\_  Monthly  Quarterly  Semi-annually  Annually

Names of Dependents to be insured, relationship, DOB, height, weight

## The following questions should be answered for you and any dependents for whom you are requesting coverage:

- 1) Have you been hospitalized during the preceding 90 days?  Yes  No
- 2) In the past three years, have you received treatment or been told you had:
  - a. cancer, leukemia, Hodgkins Disease, or other associated malignancies?  Yes  No
  - b. heart disease, stroke, or other cardiovascular disease?  Yes  No
- 3) Within the past two years, have you had persistent cough, pneumonia, chest discomfort, muscle weakness, unexplained weight loss of ten pounds or more, swollen glands, patches in mouth, visual disturbance, recurring diarrhea, fever, or infection?  Yes  No
- 4) Has any application made by you for life or health insurance been declined, postponed or issued other than as applied for?  Yes  No
- 5) Are you receiving, entitled to receive or would be entitled to receive upon timely application any benefits due to sickness or injury (other than medical expense benefits) under any private policy or plan or government program, whether insured or non-insured?  Yes  No

If you answered "Yes" to any of the above questions, please give the names of the persons to whom your answer applies and provide details, dates, diagnosis, treatment and the names and addresses of the health care provider(s) and hospital(s). Use additional sheets of paper if necessary.

Information in this application, a copy of which shall be attached to and made a part of my certificate when issued, is given to obtain the plan requested and is true and complete to the best of my knowledge and belief. I agree that no insurance will be effective until a certificate has been issued and the initial premium paid. I understand that the coverage will not become effective until approved by MetLife.

I understand that if on the Effective Date I am not eligible for such insurance by reasons of (i) age or (ii) membership status, insurance will not become effective on my life. "Hospitalized" means inpatient confinement for: hospital care, hospice care, or care in an intermediate or long-term care facility. It also includes outpatient hospital care for chemotherapy, radiation therapy, or dialysis treatment.

### Authorization to furnish medical information

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Member's Signature \_\_\_\_\_ Date \_\_\_\_\_ 19\_\_

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**Information Disclosure:** In most cases, the information we have about you will be sent to third parties only if you authorize us to do so. In some cases where disclosure is required by law or necessary to conduct our business, we may send the information to third parties without your consent.

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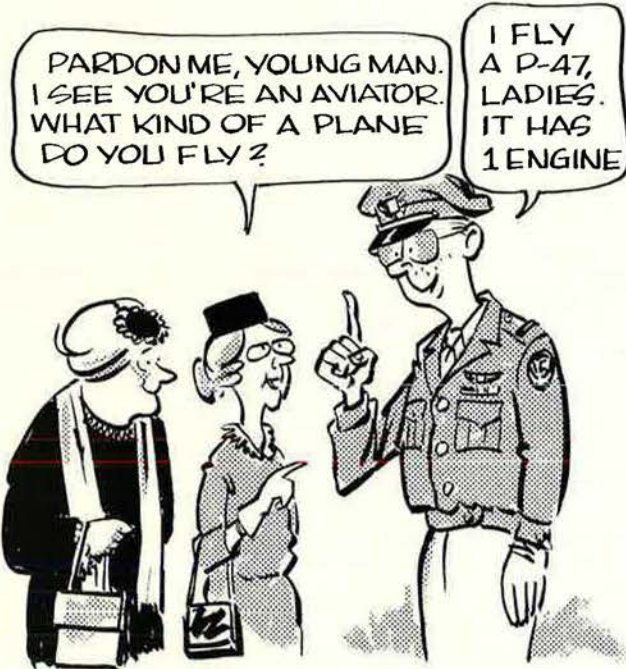


Bob Stevens'

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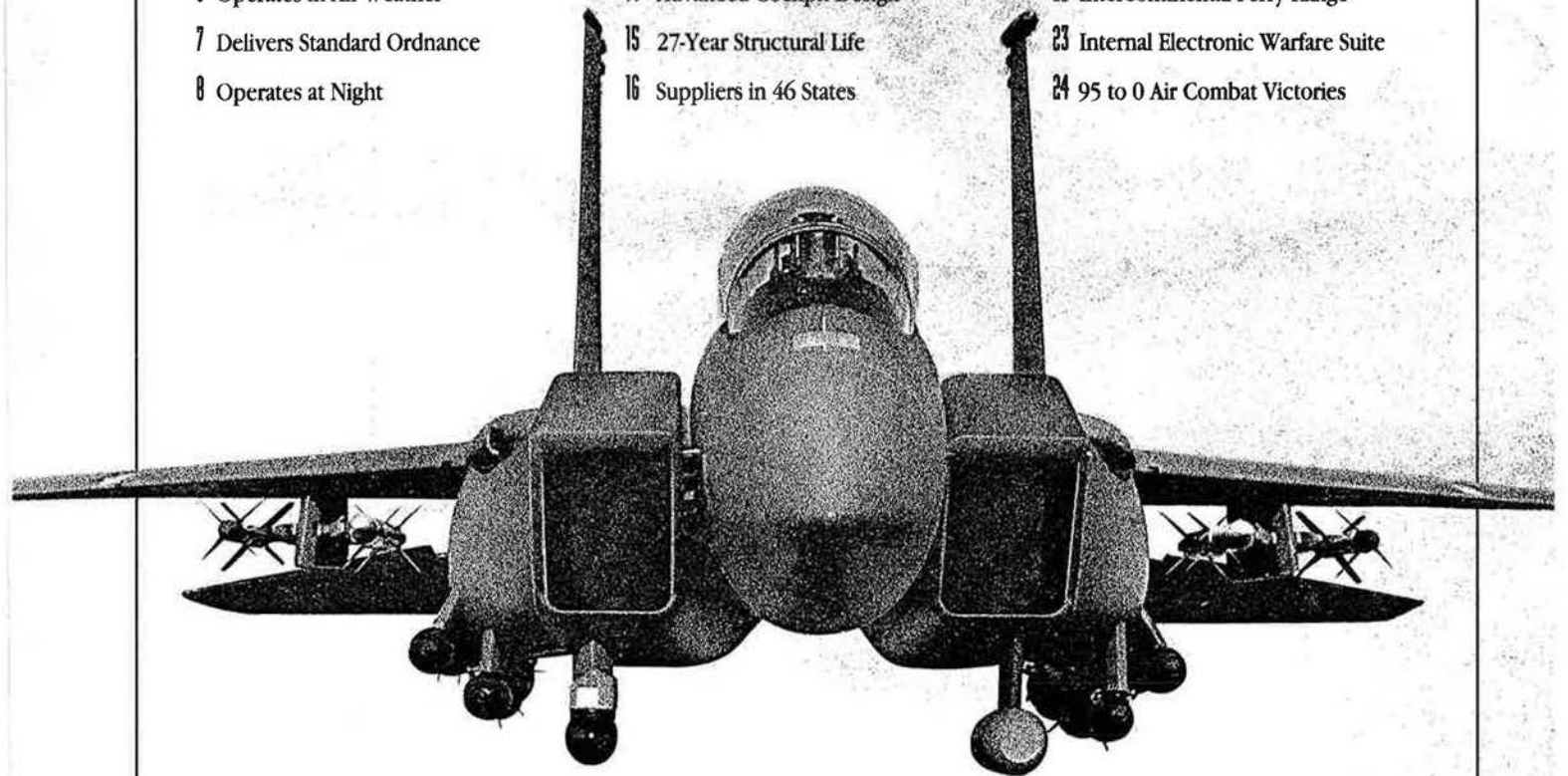
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