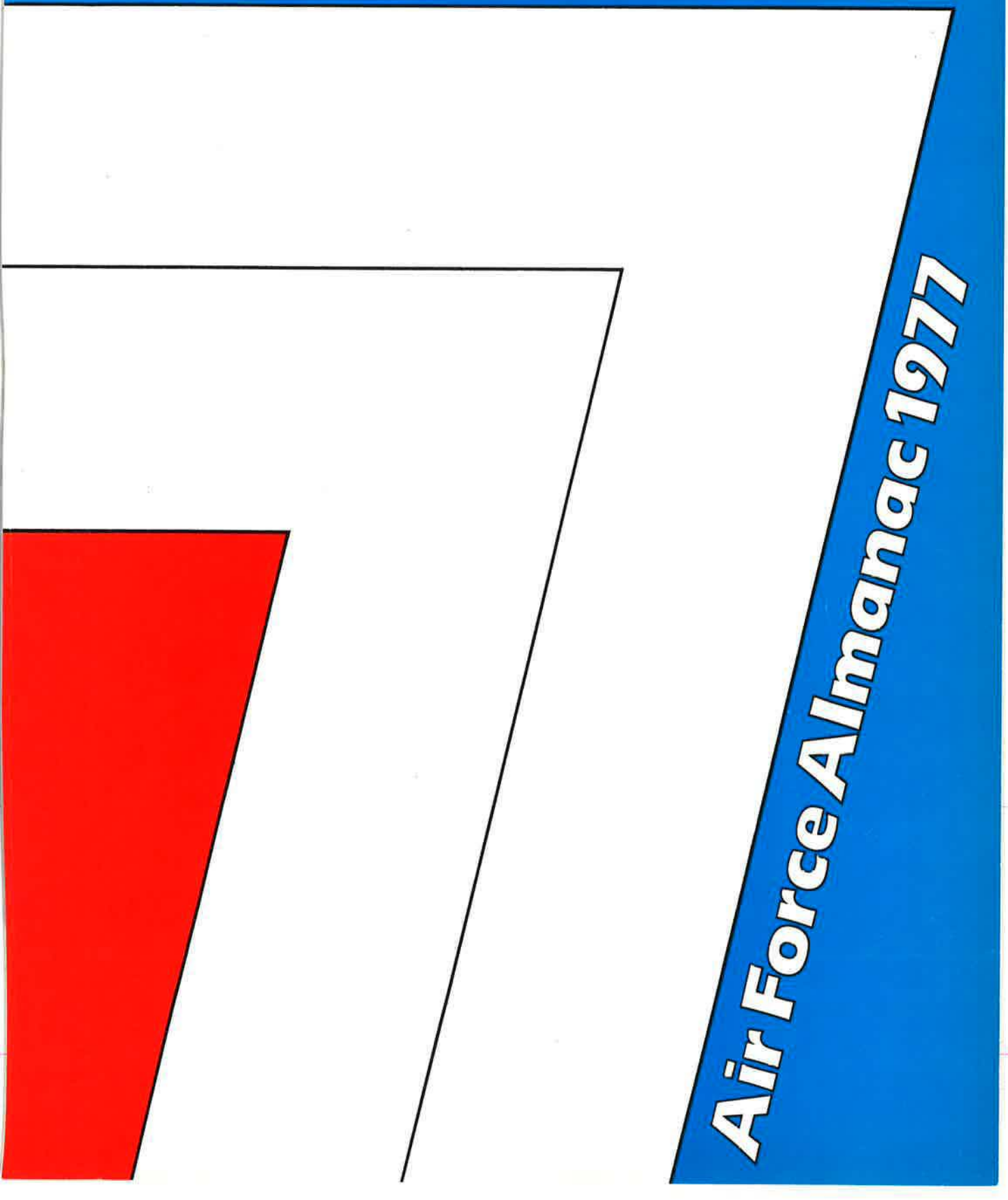
MAY 1977/$2

AIR FORCE MAGAZINE

PUBLISHED BY THE AIR FORCE ASSOCIATION



Air Force Almanac 1977

FLEETSATCOM in TRW anechoic chamber at Space Park.

Designed to meet demanding military requirements, **FLEETSATCOM** provides:

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AIR FORCE MAGAZINE
PUBLISHED BY THE AIR FORCE ASSOCIATION

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ANNUAL AIR FORCE ALMANAC ISSUE

DEPARTMENTS

AIR FORCE Magazine (including SPACE DIGEST) is published monthly by the Air Force Association, Suite 400, 1750 Pennsylvania Ave., N.W., Washington, D.C. 20006. **Phone:** (202) 637-3300. Second-class postage paid at Washington, D.C. **Membership rate:** $10 per year (includes $9 for one-year subscription); $24 for three-year membership (includes $21 for subscription). **Subscription rate:** $10 per year; $5 additional for foreign postage. Single copy $1. Special issues (Soviet Aerospace Almanac, USAF Almanac, Anniversary issue, and "Military Balance" issue) $2 each. **Change of address** requires four weeks' notice. Please include mailing label. Publisher assumes no responsibility for unsolicited material. Trademark registered by Air Force Association.

Passive countermeasures.

With IBM on board, the nation's electronic support measures work to a common purpose.

For ships and aircraft, IBM s providing everything needed o pinpoint and identify emitter signals in today's dense electro-nagnetic environments. That neans hardware, software and, nost important, systems inte-gration.

Take the Navy's Mark 105 Target Acquisition Console, for example. This programmable shipboard passive fire control system automatically detects, sorts, identifies and locates micro-wave emitters. It has multiple digital channels for two-way communication with weapons direction systems, tactical data systems, and missiles, and can simultaneously process a number of emitters. And its display con-sole is specially designed for operator ease of use and rapid decision making.

Fast reaction is also crucial in today's fighter aircraft. An-other IBM system, the Advanced Wild Weasel Receiver Set, is designated for the Air Force F-4 fighter. This system is capable of accurate identification and rapid response against radiating sites.

IBM is also part of the Navy's newest countermeasures develop-ment program involving design-to-price concepts as well as being on board the Navy's newest carrier-based patrol aircraft, the S-3A, with the AN/ALR-47 System.

Passive countermeasures: just one area where IBM exer-cises its special ability to make complex systems work to a com-mon purpose. From the B-52 through the space shuttle, IBM has designed integrated systems for command and control, navigation, ASW helicopters, shipboard and submarine sonar, ground tracking and launch control.

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Federal Systems Division,
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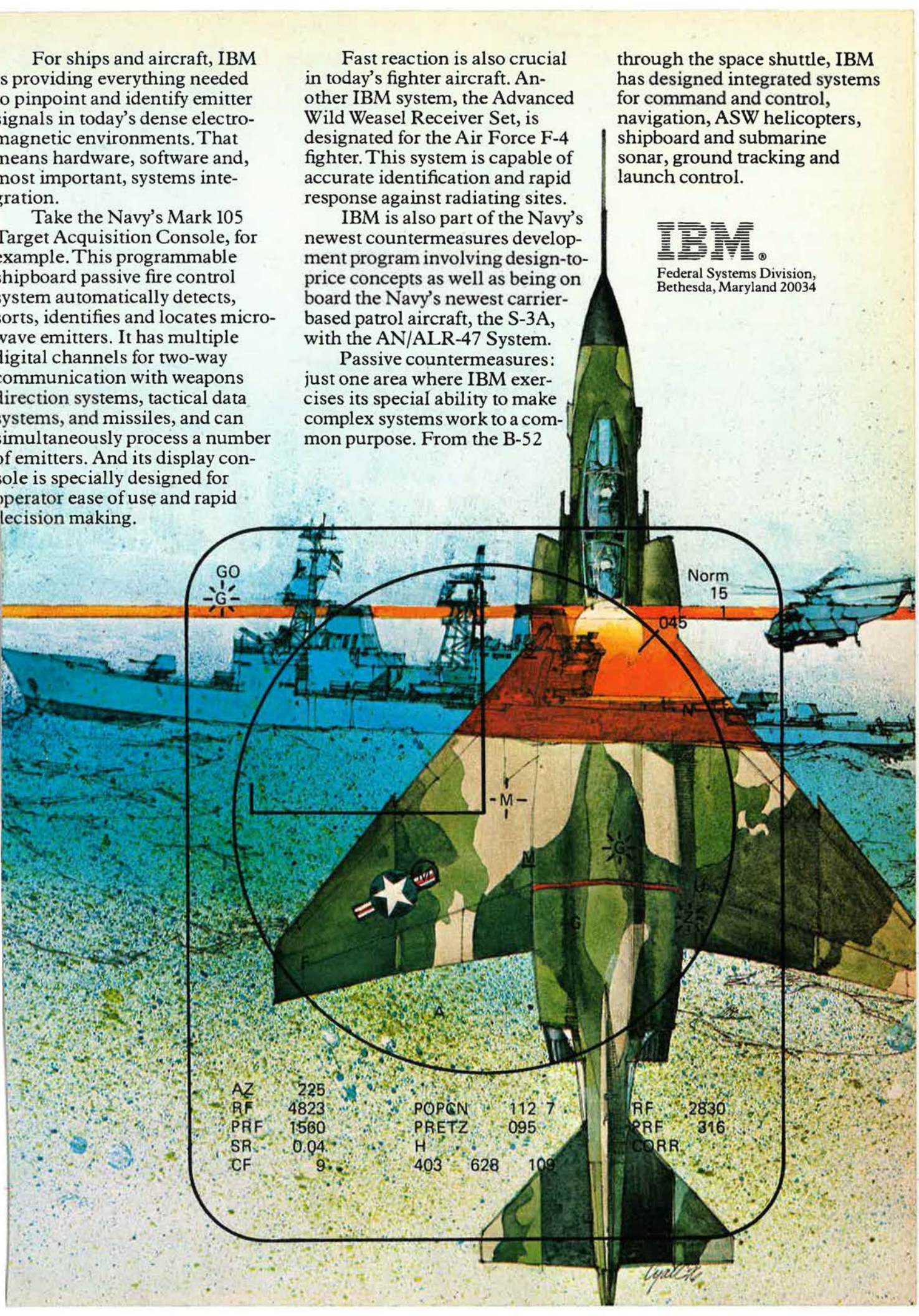

There are good reasons the Advanced Sparrow AIM-7F is carried aboard many of the world's most advanced aircraft, including the F-4, F-14, F-15, and the planned-for F-18.

During extensive U.S. Air Force and Navy testing, this latest generation Sparrow met all mission requirements:

□ Successfully intercepted BOMARC drones flying at the highest possible altitudes.

□ Successfully intercepted targets close to the deck in look-down, shoot-down attacks.

□ Successfully completed tests in the countermeasures environment which it is expected to encounter.

□ Successfully intercepted targets flying in formation from both tail-chase and forward attacking positions.

□ Successfully met all its design performance and reliability requirements.

Added to this proven performance is the fact that Advanced Sparrow, now in its third year of production at Raytheon, incorporates a wide range of improved capabilities. All solid-state construction means it can take the stress and shock of hundreds of takeoffs and landings, the ir activity of countless hours in the air, and still be ready for blazingly fast snap starts. Maxi mum launch range is almost twice that of previous models and maneuverability has been increased to handle toda highly advanced combat aircraft.

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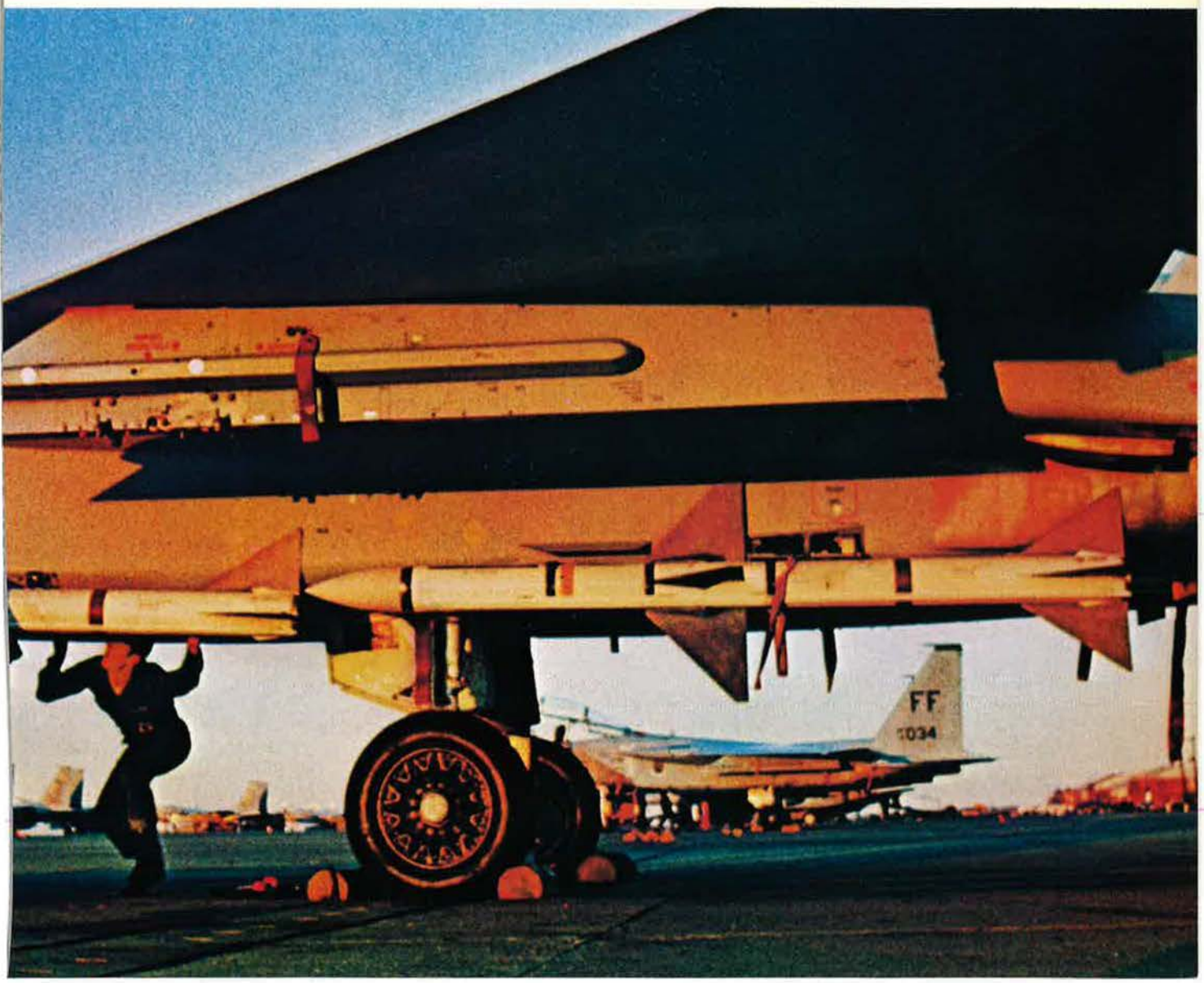

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AN EDITORIAL

A Measure of SALT

By John F. Loosbrock, EDITOR

A KEY function of AIR FORCE Magazine is to provide our readers with factual information in our particular area of interest and concern. This annual Air Force Almanac issue is one of our major projects, designed primarily as a year-round reference to fulfill the informational task. Our mail and other reactions indicate it performs a useful and necessary service.

But facts alone are not enough. We have an obligation as well to make the pertinent and provocative observation, as did the little boy in the Hans Christian Andersen fairy tale who brought sanity and reality to an essentially absurd situation by crying, "But the Emperor has no clothes."

It is with this latter function in mind that we call attention to John Lehman's article on the issues involved in the SALT negotiations and debates. (It begins on page 28.) Dr. Lehman, in addition to providing a lucid, factual background, dares to pose two seminal questions, so simple and so obvious that they have been largely ignored, not only by political commentators but by the politicians themselves.

The first question provides the yardstick by which US negotiatory proposals may be judged, namely, "What are we ultimately seeking from SALT?"

The second question provides an equally useful measure against which US senators can set any treaty which SALT negotiations might produce, namely, "Does this treaty increase the security of the United States?"

The linkage, to use the current buzz-word, is obvious. We must seek increased security for the United States, and any SALT treaty that does not provide it should be rejected by the Senate.

It has been said that arms races possess "a certain mad momentum" of their own. We submit that arms control negotiations possess their own kind of momentum, too.

As Dr. Lehman points out, "The process becomes the goal, the treaty (any treaty) is the grail, its contents not really a major focus of the machinery." The resistible force meets the immovable object. All the Soviets then have to do is stand firm, secure in the knowledge that the United States will accommodate.

If the White House and the Congress will keep one simple truth in mind—that increased US security is the goal and a SALT agreement only the means—then the madness will be separated from the momentum and SALT can become a monument to success, not a gravestone of failure. ■

A NOTICE TO OUR READERS

We have experienced difficulty of late with on-time delivery of AIR FORCE, notably the February and March issues. April we have no handle on at this writing. Less than satisfactory handling by the Postal Service, along with complications arising from a move by our printer to a new plant, as well as paper supply problems are at the bottom of these delays. We look for improvement and are working hard at it. Meanwhile, please bear with us.

—J. F. Loosbrock

Airmail

Award to AEF

I just read in *Air Force Times* about the Aerospace Education Foundation receiving a community service award from the American Society for Training and Development. Congratulations!

The Foundation has done an outstanding job over the years in providing increased occupational education opportunities to American youth. Your efforts in packaging Air Force instructional materials into low-cost courses for use by public school systems is just another example of the outstanding work that exemplifies the can-do attitude of the Air Force Association.

Again, congratulations on a job well done!

James P. Goode
Acting Assistant Secretary, Manpower & Reserve Affairs
Department of the Air Force
Washington, D. C.

A More Equitable System

There have been many arguments for and against the new officer evaluation system. One hidden factor in the system that seems to have been overlooked is motivation, or rather, the lack of it.

I am addressing, specifically, how the new OER groups all officers of the same rank together for evaluation. New captains compete against senior captains, and so on. No matter how hard he tries, the newly promoted officer inevitably ends up in the bottom fifty percent of the ratings.

Some explanations offered for this practice are a lack of experience in the grade, less responsibility, not immediately being considered by a promotion board, and many others, all of which are logically sound. The problem is not in the justifications, it is in the design of the system.

Under the old system, inflated and hard to interpret as it was, the newly promoted officer volunteered for many additional duties, however unpopular or time-consuming, to ensure that he would receive a "9-4" rating. Now, it seems, the newly ranked officer is practically assured of receiving a three and, therefore, has no reason to compete for any taxing additional duties or perform beyond his normal AFSC responsibilities. One new captain's comment I overheard was, "Why should I continue to work so hard when I'm going to end up with a three anyway?"

One solution that comes to mind for the motivation problem contained in the new OERs is to restructure the rating groups. The most common statement included in the reviewer's downgrade of a rating is presently, "This rating more closely aligns the officer with his peers."

A more equitable arrangement would be to subdivide the current groups into possibly two-year increments. Roughly, this would be second lieutenants, first lieutenants, captains to two years, captains over four, over six, and right on up the entire rank structure. In this manner, a newly promoted officer would not be competing against senior officers of the same rank.

There are many possibilities, any of which would allow an officer to be rated more closely to his peer group. The present inequity is obvious. After all, why should an officer have to compete with his immediate supervisor who could be of the same rank? This is currently being done.

If motivation in the officer ranks continues to decline because of the OER system, so will morale. When a person performs "above and beyond," but is not recognized for it in his rating, he feels a loss of purpose. If the practice of placing newly promoted officers in the bottom fifty percent of the ratings continues, motivation will decline, and shortly thereafter, morale will follow. And, surely, the Air Force will suffer in the end.

Capt. David W. Miller
Randolph AFB, Tex.

Flew Right Past Us

Couldn't help but notice a real blooper on page 46 of your February issue. The top picture has a caption indicating a USAFE weapons loading crew is securing a missile to an F-5 pylon.

What is really happening is an ECM configuration crew is installing an ECM pod on the right inboard station. The WR tail number in the background indicated that the F-4s were from RAF Bentwaters or Woodbridge, UK. Since the ECM troops are in their shirt-sleeves, the picture was either taken in the summer in the UK or while the 81st Tactical Fighter Wing was at a WTD location.

As a former OIC of the Weapons Loading Section at the 81st TWF I couldn't pass this one up. Weapons Load Crews hang bombs or missiles, not ECM pods. If you would like to get some real pictures of real load crews, next time you are near Bentwaters please stop by.

Lt. Guy R. Vanderman
APO New York

• *This one really got away from us. Our thanks to Lieutenant Vanderman and all the other alert readers who caught it.*—THE EDITORS

Duplication or Depth?

Is it any wonder that the Congress and the American public sometimes question the ever-increasing budget of the military?

On page 34 of your March issue we have a full-page ad by Fairchild Industries proclaiming the virtues of our new A-10 tank killer. I've seen the movies verifying its capabilities and have had the opportunity to inspect it personally at our recent Arizona Aerospace Days in Tucson at Davis-Monthan AFB.

On page 21 of the same issue, I read where the United States Army last December contracted with Hughes Helicopter Co. to undertake a full-scale development of a new antitank helicopter with a potential $3.6 billion program.

It kind of reminds one of World War II when everybody had to do his own thing, doesn't it?

Frank L. Smith
Tucson, Ariz.

Comparing Ranks

Your chart of comparative military ranks on page 110 of the March 1977 Soviet Aerospace Almanac shows, under United States, the rank of Admiral of the Fleet—which is Soviet, not us. Official naval and

The airlifter that's better than new.

When Hercules first flew, it was a great advance in airlift. But Hercs rolling off Lockheed production lines today are far advanced over the first models.

Payload is up 26%. Engine power, up 20%. Range stretches out 52% farther. Cruise speed is 11% faster. And structural life has risen 100%.

And while Hercules keeps getting better and better, it's also looking better and better as fuel costs reach for the sky. Herc's turboprop engines use far less fuel than fanjet engines. 50% less in some cases.

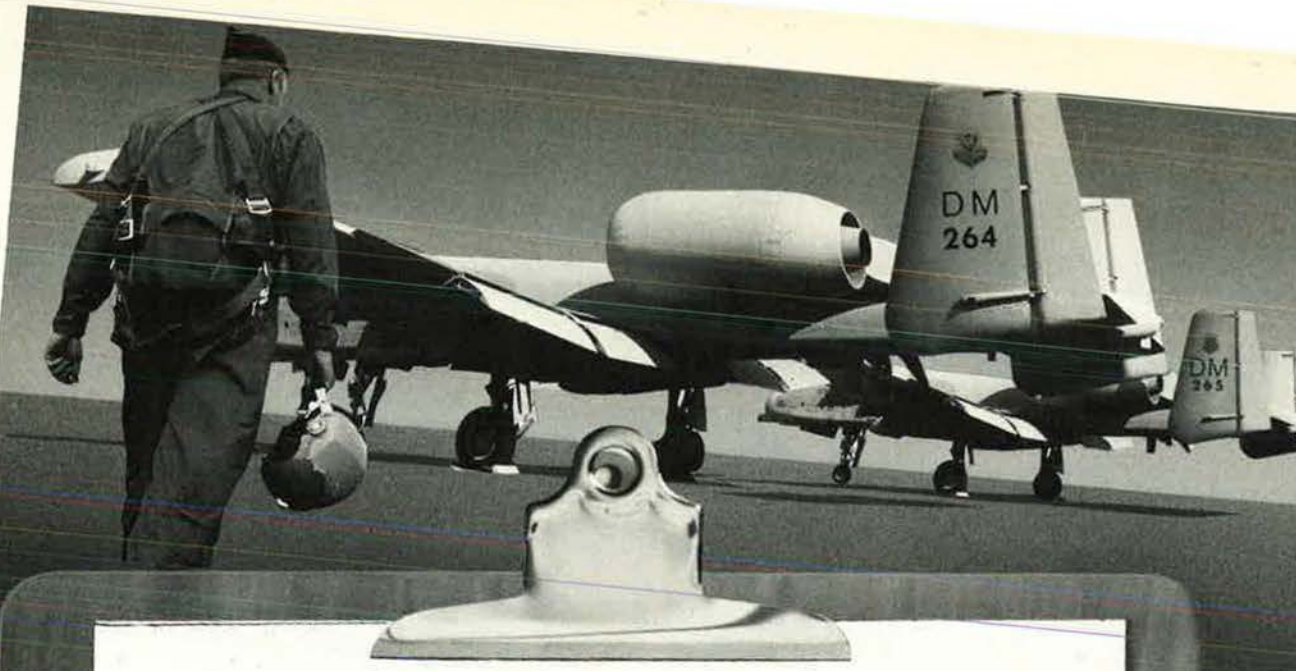
Hercules was born with a classic airlift shape, so simple and functional that it has become almost timeless. And within that simple shape, Lockheed has improved Hercules from nose to tail. All basic systems have been improved. New ones have been added.

The result: An airlifter that's far better than when it first flew. An airlifter that will be serving the Armed Services in the 21st century. An airlifter that's also been chosen by 42 other nations. An airlifter so versatile that it also serves as a search and rescue plane, ski plane, forest fire fighter, and in many other roles. An airlifter so rugged it can handle dirt, gravel, sandy and snowy runways.

Today Hercules is the world's biggest airlift bargain. And it keeps getting better and better.

Lockheed Hercules

Lockheed-Georgia Company



A-10 PILOT REPORTS:

"To fight a close-in war... killing a tank in bad weather and bad terrain... THERE'S NOTHING ELSE THAT CAN DO THE JOB. IT'S THAT SIMPLE."

With the A-10 now in the USAF Tactical Air Command, fighter pilots have a tactical aircraft to defeat armor and protect the lives of friendly ground forces. The A-10 is the only modern attack aircraft developed for the CAS mission.

FAIRCHILD
INDUSTRIES

Department of Defense charts list the rank as Fleet Admiral. Also, you leave out the rank of Commodore, which is equal to Rear Admiral (lower half).

William B. Larson
Ft. Walton Beach, Fla.

• *The Navy Department tells us that the rank of Commodore, abolished in 1899, was reestablished in 1941 for use only in time of war or national emergency. The grade is comparable to Brigadier General. Except for a two and a half year period since WW II, Navy is still authorized use of the grade but has not made any appointments.*—The EDITORS

Memorial for an Ace

The Thomas B. McGuire, Jr., Chapter 360, AFA, is working to establish a memorial to Major McGuire, the second ranking American fighter ace of all time and in whose honor McGuire AFB, N. J., is named. The focal point of this proposed memorial would be a Lockheed P-38 Lightning restored to the markings of the aircraft flown by Major McGuire in the Pacific theater during World War II.

Chapter 360 would like to enlist the aid of readers in an attempt to locate a P-38 for use in this memorial. The aircraft does not have to be capable of being brought back to flightworthy condition. We sincerely want an airplane suitable for restoration for static display.

If any readers have knowledge of a P-38 aircraft which might be made available to Chapter 360 for use in the memorial to Major McGuire, please contact me.

William J. Demas, Pres.
Thomas B. McGuire, Jr.,
Chapter 360, AFA
Box 16003
McGuire AFB, N. J. 08641

Return Visit to China

Last summer I had the pleasure of touring the People's Republic of China as part of a US-China veteran group of seven, together with their families. Two Kunming-based GIs had been photographed with Chairman Mao during the Chungking negotiations in 1945, and this photograph is currently on display, and has been since 1958, in the Chuning Memory House. It was this photograph that opened the door for our tour and also showed the desire of the Chinese authorities for a renewal of friendly American contacts. The tour took in six cities in eighteen days and was marked by warm and enthusiastic welcomes everywhere.

My tour of duty in China was with the China-based superforts (B-29s) at A-7, where I was radarman in Captain Skelly's crew in the 792d Squadron, 468th Group, 50th Wing, Twentieth Air Force. I mentioned to Mr. Yueh, head of the China International Travel Service, who honored us by making the tour with us personally, that many aircrews who had to abandon ship over enemy-occupied territory in China were rescued by the guerrilla forces of the Eighth and Fourth Route Armies and taken back to their bases through Mao's Yenan headquarters, where an American mission (Dixie Mission) was stationed to facilitate rescues and other joint action against the Japanese forces who were occupying large areas of China.

Mr. Yueh thereupon suggested that a group of rescued airmen who would like to come to China for a return trip would be most welcome. If anyone reading this letter is one of the rescued airmen referred to above, I would appreciate hearing from you on the possibility of joining such a return tour, perhaps contacting some of the same people involved in this great adventure.

If you know of any of these rescued airmen, ask him to get in touch with me.

Gilbert Wasserman
183 Jules Dr.
Staten Island, N. Y. 10314

Skyvan Search

I would like to ask the assistance of AFA members in resolving a problem I have with a Short Skyvan.

This Skyvan was operated in Laos, South Vietnam, and Cambodia by an operator known as Continental Air Services, between February 1969 and November 1972. It was first registered as XW-PEX, then as N3201, and finally as XW-PGL. It was in this final registration that it flew in the Indochina area during the period mentioned.

I, as a member of a number of aviation societies, have specialized in the Short Skyvan and have compiled comprehensive histories on each one. To this has been added color slides or black and white photographs of each registration whenever possible. However, the Skyvan mentioned has totally

THE SANCTITY OF SOVIET SIGNATURES

President Roosevelt trusted the Russians when Stalin signed the Yalta Agreement in February of 1945. In March, the press of the Allied world, particularly the Americans, lauded Roosevelt and Churchill for getting Stalin's commitment toward "securing the road to peace." Only days later, Roosevelt and Churchill spoke bitterly of Stalin's blatant and obviously preplanned violation of his signed commitment by brutally crushing all opposition to communism in Poland. Only a month later President Roosevelt's heart failed him.

Of the principal military negotiators at the Yalta Conference, I am the only American survivor. Gen. H. H. Arnold had a heart attack in early 1945, and I replaced him as the spokesman for American airpower at Yalta.

I saw Stalin, Vyshinsky, and Gromyko seated solemnly at the conference table with Churchill, Eden, and Alexander Cadogan, and, on our side, Roosevelt, Stettinius, and our Ambassador to the USSR, Averell Harriman. There the Russians formally agreed, among other political matters, to free elections in Poland. It became apparent very shortly that the Russians intended to violate that commitment even before they signed it.

From reading Marx and Engels and more recent Communist doctrine, perhaps our President, his Secretary of State, and our senior foreign policy authorities should have known in 1945 [that] the Communist leaders will sign anything which they believe will benefit their State with no intention of ever honoring their signatures. That doctrine, promulgated by Marx and Engels over a century ago and practiced repeatedly, has never been renounced by any official Communist manifesto.

It should be axiomatic that absolutely no credence should be given to any formally signed Russian commitment to a strategic arms limitation until after we have installed and operated the establishment that would guarantee our ability to verify in detail the adherence of the Russians to such a commitment.

Gen. Laurence S. Kuter, USAF (Ret.)
Naples, Fla.

Airmail

eluded me. I actually saw the plane at Saigon, but was not able to photograph it, and the opportunity never arose again.

If any reader has a color slide or a black and white photo and will send me a copy I will repay all processing and postage costs incurred.

Charles A. Cooke
31 Malmo Place
Massey
Auckland 8, New Zealand

History of the FAU

Having read your magazine for some time now, it has helped my understanding of the USAF enormously and it certainly ranks as one of the best magazines available in its sphere of activity.

The motive of this letter is a call for help. I am at present working on a history of the FAU (Fuerza Aérea Uruguaya) and would like to contact any officers that may have worked with FAU officers here or in the USA during the forties and fifties. Also, I'd be grateful for any data anybody might be able to supply on previous service histories of aircraft known to have gone to the FAU.

Any help readers may be able to give me will be greatly appreciated, as a paucity of records and other similar problems are making this a most difficult task.

Ariel Fabius
Guayaquí 3385/701
Montevideo, Uruguay

18th Weather Squadron History

I have privately printed (fifty copies —hard cover) a history of the 18th Weather Squadron from a manuscript housed at the Albert Simpson Historical Research Center, Maxwell AFB, Ala. There is a particular reference to AAF 146, Seething, England, 448th Bomb Group.

If any of those distinguished gentlemen who were at the weather station during May 1944 are still alive, I would be happy to send you a copy. I restrict the time to May 1944 because the book contains a photograph of the officers and men at that time. Please get in touch with me.

Samuel Zarcoff
1241 South Hayworth
Los Angeles, Calif. 90035

Montana Air Base

The Lewistown, Mont., Air Base was built for training B-17 crews during World War II. I am now writing an article about the base and would like to hear from anyone who served here at that time.

There must be many stories, statistics, and pictures that would be very interesting and certainly appreciated.

Jack Milburn
Giltedge Stage
Lewistown, Mont. 59457

Attention 407th AROs

Would like to hear from anyone who served as an airborne radio operator with the 407th Air Refueling Sqdn., Malmstrom AFB, Mont. Lt. Col. W. S. Shackleford, Jr., was the CO.

Gene Konopateki
Box 388
Tustin, Calif. 92680

Anything on the 4th Repair Sqdn.?

Assistance is needed from any veterans of the Fifth Air Force unit known as the 4th Repair Squadron, 4th Air Depot Group, during World War II years of 1941–45 in the Pacific. Where can I obtain information or an illustrated book on this unit that might have been published after World War II?

M. L. Merryman
305 E. Pear, Apt. 1
Centralia, Wash. 98531

Were You Listening?

A government history project is interested in contacting persons who performed active-duty assignments prior to 1945 involving "listening-in" stations, intercept of communications, codes, and ciphers, or US cryptology. Please write

Government History Project
P. O. Box 3413
Crofton, Md. 21114

Members of 66th Tac Recon Units

I would like to correspond with persons who were assigned to units of the 66th Tactical Reconnaissance Wing during the years 1956–58. During this period, squadrons of the 66th flew RF-84F, RB-57, and RB-66 type aircraft.

I am interested in learning more about the accomplishments of the wing and its units for a magazine article I am writing. Would appreciate hearing from anyone who could help in this project.

Charles B. Mayer
4136 Salem Ave. S.
Minneapolis, Minn. 55416

Shot Down Near Warsaw

Request assistance in locating TSgt. Marcus L. Shook and SSgt. James D. Christy of the 568th Bomb Squadron, 390th Bomb Group (H). Both were crew members of B-17 S/N 43-38175, which was downed near Warsaw, Poland, on September 18, 1944.

Any information would be appreciated.

George Shiller
P. O. Box 502
Alhambra, Calif. 91801

MiG Alley

I am trying to contact former members of units serving in Korea, such as the 4th and 51st Fighter-Interceptor Wings; 8th and 18th Fighter-Bomber Wings; and 67th Tac Recon Group. I am doing research for a forthcoming book titled *MiG Alley—200 Miles.* The book will center on aircraft and aircrews that had MiG kills or other historic missions. Would also like some first-hand accounts from pilots with MiG kills.

Anyone having photos or information on same is asked to contact me.

Larry Davis
Squadron/Signal Publications
4409 12th St., S. W.
Canton, Ohio 44710

We suggest that readers keep their letters to a maximum of 500 words. The Editors reserve the right to excerpt or condense as required in the interests of space or good taste. Names will be withheld on request, but unsigned letters are not acceptable.

UNIT REUNIONS

Daedalians

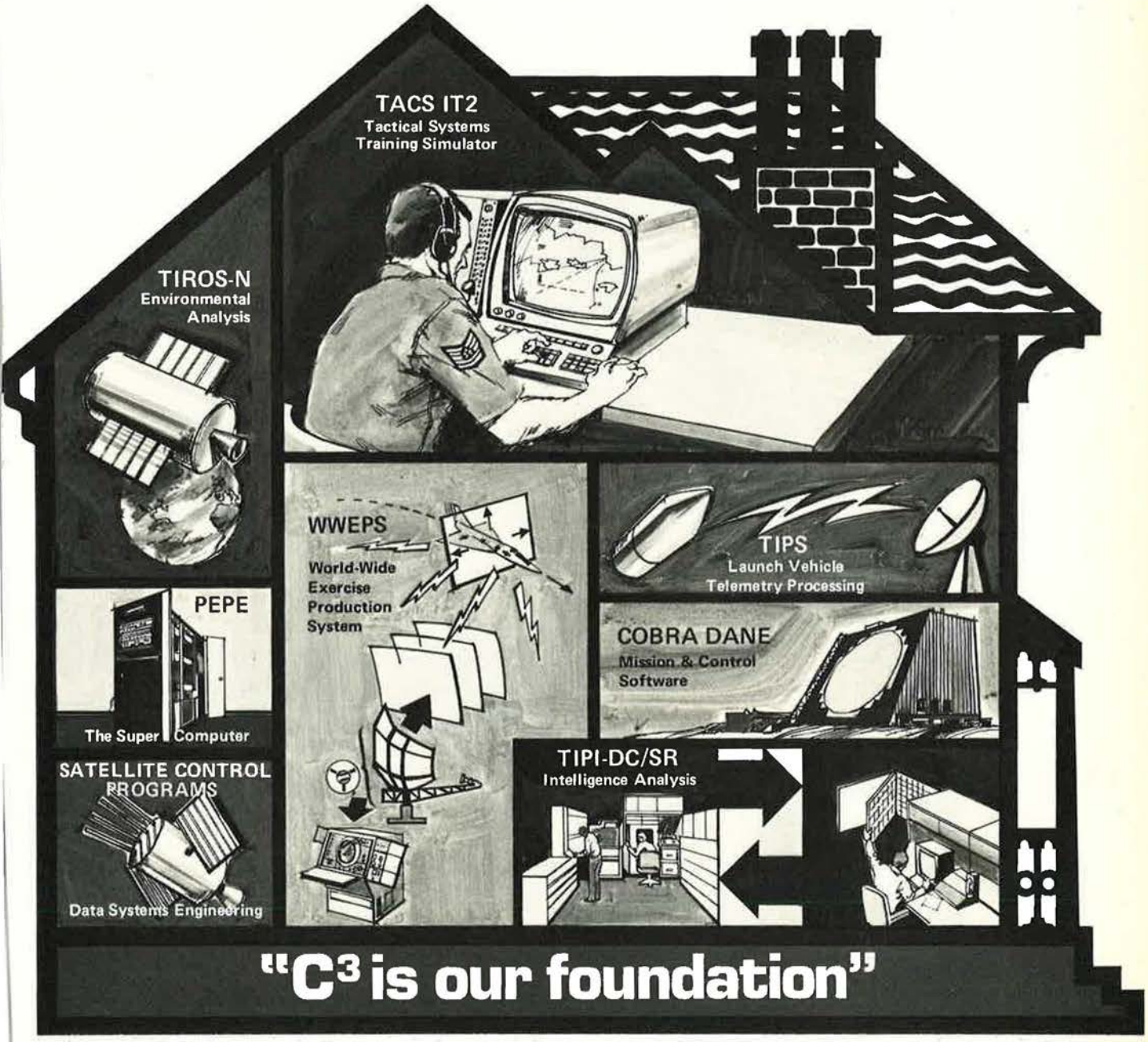
The Order of Daedalians is holding its annual convention May 19–21, in Denver, Colo., at the Denver Marriott Hotel. Contact

Col. Robert E. Morris
USAF (Ret.)
Daedalus Flyer Editor
Bldg. 1660
Kelly AFB, Tex. 78241
Phone: (512) 924-9485 or -9486

4th Fighter Squadron

We are having a reunion in Milwaukee, Wis., on August 6. Unfortunately, we haven't had many reunions since WW II, so our address list is in sad shape. Need all the help we can get in reach

A systems house for today and tomorrow



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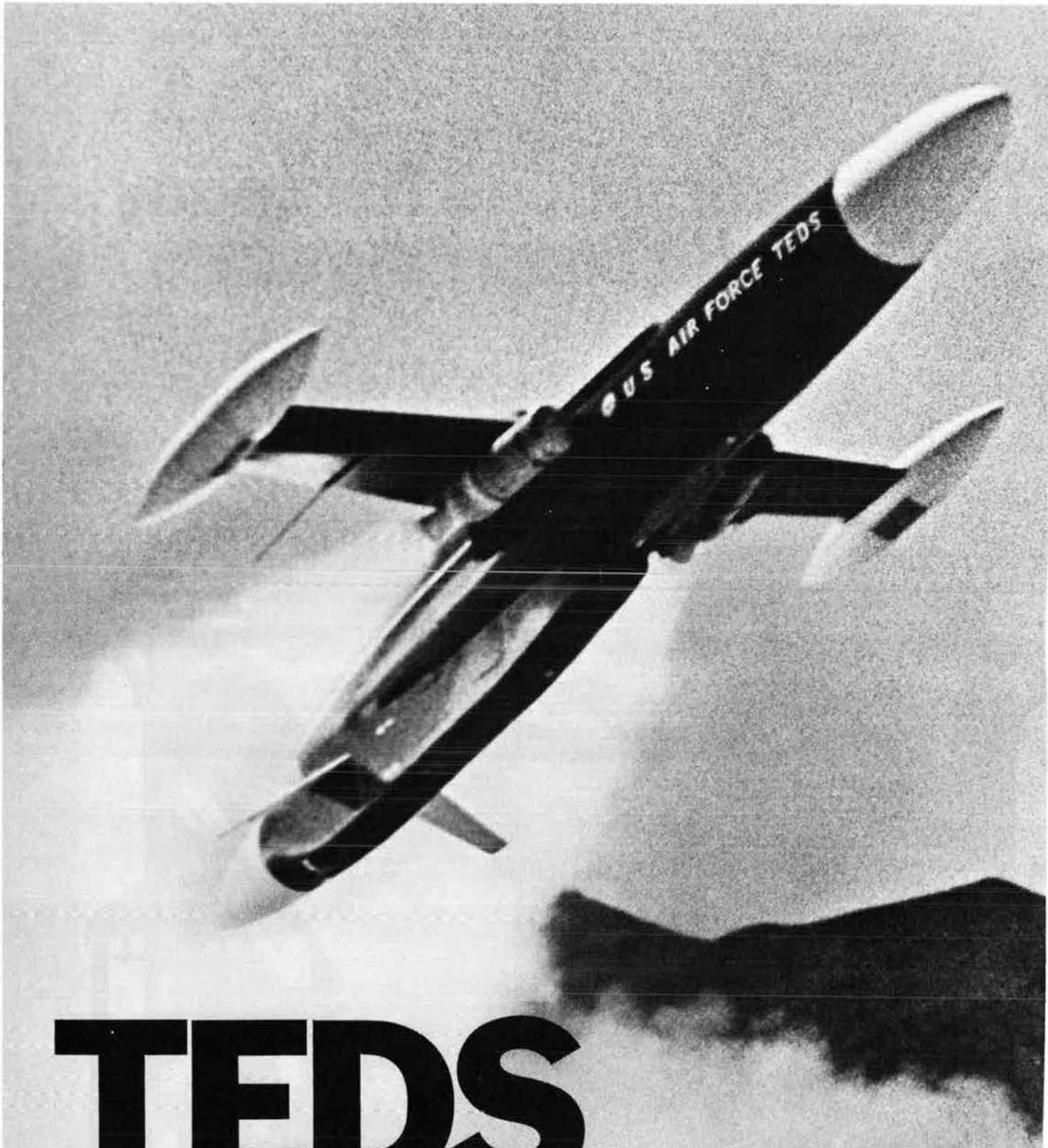

TEDS

Tactical Expendable Drone System. Northrop TEDS has successfully completed all validation flights for U.S. Air Force. Provides electronic countermeasures support for strike aircraft. 500 knot speed. 400 nautical mile range.

Based on combat-proven technology. TEDS is low-cost, high-performance modification of Northrop MQM-74C/Chukar II production target drone. More than 76,000 remotely-piloted vehicles have been built by Northrop for U.S. and 20 other nations. All delivered on time, on cost, performance as promised.

Aircraft, Electronics, Communications, Construction, Services. Northrop Corporation, Ventura Division, 1515 Rancho Conejo Blvd., Newbury Park, California 91320, U.S.A.

NORTHROP

Airmail

ing former members of the 4th. Contact
Toni Kalenic
3606 N. 48th St.
Milwaukee, Wis. 53222
Phone: (414) 461-5285

11th Bomb Group (H)
The 11th Bombardment Group (H) Association, 7th AF, Pacific, will hold their 17th annual reunion July 20–24, at the New Hampshire Highway Hotel, Concord, N. H., at the intersection of I-93 and NH-4. Contact
William M. Cleveland
1106 Maplewood Ave.
Portsmouth, N. H. 03801

49th Fighter Squadron
A reunion of the 49th Fighter Squadron, 14th Fighter Group, WW II P-38 outfit, will be held August 5–7, in Amana, Iowa. Please contact
Sheril D. Huff
3200 Chetwood Dr.
Del City, Okla. 73115

81st Tac Fighter Wing
A reunion for all past and present members of the 81st TFW, Bentwaters, England, is being planned for July '77 in Las Vegas, Nev. Contact
Lt. Col. Al Lambert
4353 DeForest St.
Las Vegas, Nev. 89103
Phone: (702) 643-4900

85th FS/79th FG
All former members of the 85th Fighter Sqdn./79th Fighter Group (WW II North Africa, Sicily, Italy, Corsica, France, Austria) are invited to the August 4-7 reunion at Stouffer's Hotel in Dayton, Ohio. For inquiries and reservations, contact
Edwin Newbould
1123 East 173d Place
South Holland, Ill. 60473

98th Bomb Group
Members of the B-29 98th Bomb Group/Wing, 1947–53, Spokane and Yokota, interested in a reunion and/or forming a memorial association, send a stamped, self-addressed envelope to
James V. King
Box 206
North Highlands, Calif. 95660

100th Bomb Group/Wing
Veterans of the 100th Bomb Group/Wing, WW II, and Pease AFB, N. H., era, will hold a reunion at Pease AFB August 5–7. Contact
Lt. Col. Hunt Walton, USAF (Ret.)
Pepperrell Rd.
Kittery, Maine 03905

C-141ers
The 4th annual reunion of personnel associated with the C-141 development program during the period 1961–66 will be held in Encino, Calif., June 22. Contact
Col. Charles Craig
10126 Reseda, Villa 115
Northridge E, Calif. 91324
Phone: (213) 885-9305

303d Bomb Group
The 2d reunion of the 303d Bomb Group Association will be held in Colorado Springs, Colo., at the Four Seasons Motor Inn, August 25–28. Please help locate any former "Hell's Angels" who did not attend the 1st reunion.
303d Bomb Group Assn.
Box 8531
Pembroke Pines Branch
Hollywood, Fla. 33024

316th Fighter Squadron
The next reunion of the 316th Fighter Squadron "Hell's Belles" will be held July 2–3, in Athens, Ohio. All former members are invited. Contact
George Cohen
37 Briarwood Dr.
Athens, Ohio 45701

362d Fighter Group
WW II veterans of the 362d Fighter Group (377th, 378th, 379th Fighter Sqdns. and Group Headquarters) will hold a reunion in New Orleans, La., July 18–23. Contact
Bill Marles
2838 Blue Brick Dr.
Nashville, Tenn. 37214
Phone: (615) 883-1208

432d Bomb Sqdn. (M)
The 8th reunion of the 432d Bomb Sqdn. (M), WW II, will be held at the Edgewater Beach Inn, Seattle, Wash., August 9–11. Details from
Chuck Miller
615 Carved Terrace
Colorado Springs, Colo. 80919

452d Bomb Group (H)
The 452d Bomb Group (H) and attached units, 8th AF, will meet in Dayton, Ohio, August 11–14. Still hope to find many of our misplaced buddies who served with us in England. Write
Rom Blaylock
2103 Center Ave.
New Bern, N. C. 28560

465th Bomb Group
All WW II members of the 465th Bomb Group (H) are invited to a reunion planned for Las Vegas in August.
Jim Bagley
P. O. Box 110
Winter Haven, Fla. 33880

485th Bomb Group
The 13th annual reunion of the 485th Bomb Group, 15th AF, will be held August 5–7 in Minneapolis, Minn. Details and newsletter from
Carl P. Gigowski
344 Eola St., S. E.
Grand Rapids, Mich. 49507

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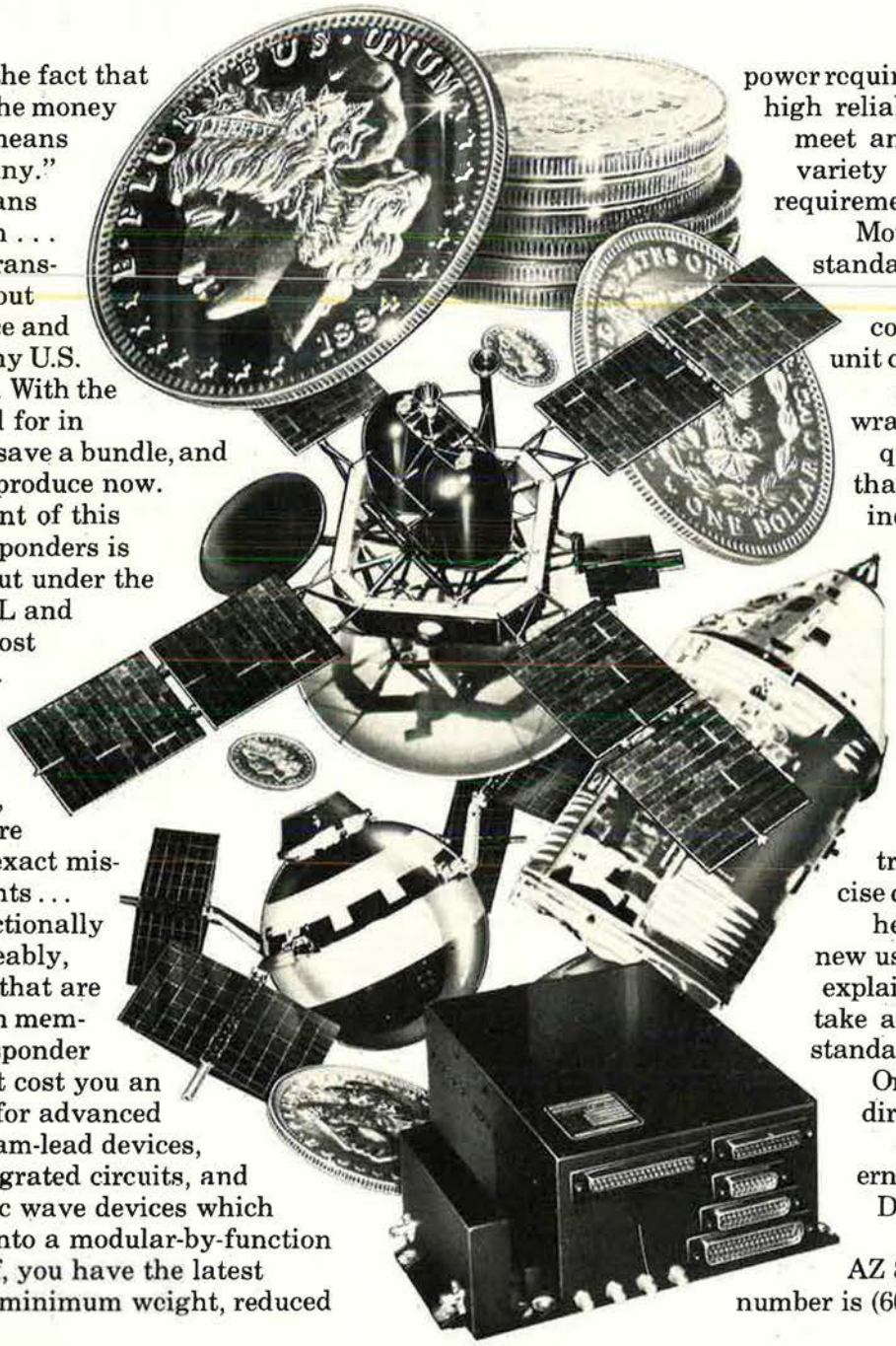
Standardization!



In addition to the fact that it's on a lot of the money you'll save, it means "One out of many." Today that means standardization . . . one standard transponder family out of the experience and funding on many U.S. space missions. With the R&D costs paid for in advance you'll save a bundle, and we're ready to produce now. The development of this family of transponders is being carried out under the guidance of JPL and NASA's Low-Cost Systems Office. In a matter of months, Motorola can assemble basic, proven hardware to match your exact mission requirements . . . simply . . . functionally . . . interchangeably, using modules that are common to each member of the transponder family. It won't cost you an arm and a leg for advanced design with beam-lead devices, large scale integrated circuits, and surface-acoustic wave devices which are organized into a modular-by-function design. In brief, you have the latest technology for minimum weight, reduced power requirements, and the high reliability it takes to meet an almost endless variety of critical space requirements.

Motorola's modular standard transponders with an integral command detector unit can talk to STDN or DSN and are wrapped in a space-qualified package that's only 8 x 6 x 4 inches. (And . . . the TDRSS version is currently under development.)

If during your next mission, you're planning on mountains of telemetered data, accurate tracking, and precise commands, let us help. Write for our new user's guide which explains how you can take advantage of this standardized flexibility. Or send your order directly to Dick Orr at Motorola Government Electronics Division, P.O. Box 2606, Scottsdale, AZ 85252. His phone number is (602) 949-4111.

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Aerospace World News, Views & Comments

By William P. Schlitz, ASSISTANT MANAGING EDITOR

The 552d Airborne Warning and Control Wing, Tinker AFB, Okla., is to manage all E-3A aircraft, the first production version of which was delivered in March.

Washington, D. C., April 11

★ Currently in training at Langley AFB, Va., are pilots and technicians ultimately destined to man USAF's first overseas F-15 Eagle wing. By autumn, three full squadrons of F-15s and their aircrews and maintenance personnel will be in place with USAFE's 36th Tactical Fighter Wing, Bitburg AB, Germany.

Object of the program—dubbed "Ready Eagle"—is to deliver the F-15-equipped, combat-ready wing with "minimum disruption and within minimum time." (Under normal manning procedures, aircrews and maintenance people would have been brought to fully operational status at Bitburg.)

Following initial F-15 flight training at Luke AFB, Ariz., sixty pilots bound for Bitburg joined the 1st Tactical Fighter Wing—USAF's first operational F-15 wing—at Langley for additional training. They and a cadre of twenty-four seasoned F-15 pilots from the 1st TFW and Luke's 58th Tactical Fighter Training Wing will provide the 36th TFW's aircrews.

In conjunction with this activity is the qualification of maintenance personnel at Langely, being undertaken jointly by TAC experts and the 1st TFW's experienced hands.

★ The first production E-3A Airborne Warning and Control System (AWACS) aircraft was received by its operational unit—the 552d Airborne Warning and Control Wing, Tinker AFB, Okla.—in March.

All E-3As are to be assigned to the TAC unit, but with a number deployed to separate operating locations in the US and abroad. Included among the users will be USAFE, Alaskan Air Command, PACAF, and ADCOM.

Support manager for the AWACS aircraft will be AFLC's Oklahoma City Air Logistics Center, also at Tinker.

The radar, whose antenna is carried atop the E-3A, has a range of more than 250 miles and is able to "look down" and separate targets from ground clutter. AWACS will support both tactical and strategic defense forces.

Last autumn, the aircraft performed in the largest and most complex peacetime tactical air operation ever conducted in the US. TAC amassed more than 400 aircraft from twenty-one bases in nine states to test the Boeing-built E-3A's command control and communications and surveillance capabilities in a realistic air battle environment.

This year, USAF is scheduled to receive an additional six production E-3As of the total of sixteen currently authorized.

★ Five NATO nations have formed a consortium to develop "Sea Gnat," seen as an advanced shipboard decoy system that would help protect vessels against air- and sea-launched missiles.

Involved in the program are Denmark, West Germany, Norway, the United Kingdom, and the US. Their representatives will form a steering committee for executive direction of Sea Gnat, the development of which will be conducted by a program office within USN's Naval Electronic Systems Command, Washington, D. C.

The decoy requirement grew out of NATO-sponsored studies, which determined that such an interoperable system would also provide "economies in development costs as well as potential savings in procurement and logistical support," DoD said. "Decoys appear to offer a high effectiveness in defense against antiship missiles relative to their cost and are considered one of the more promising electronic warfare defenses for NATO naval forces," spokesmen said.

★ The first EF-111A, designed specifically for a tactical electronic warfare role, made its maiden flight in mid-March at Grumman Aerospace Corp.'s test facility at Calverton, Long Island.

The Tactical Jamming System aircraft, the first of two planned prototypes, flew for an hour and forty minutes, reached an altitude of 30,000 feet (9,144 m), and hit a

Aerospace World

maximum speed of Mach 0.85.

Characteristics of the EF-111A (*see photo*) are a sixteen-foot-long (4.88 m) cone-shaped radome on the underside of the fuselage housing antennas for high-powered jamming transmitters and a tail fin topped with a pod containing receiving antennas and associated equipment.

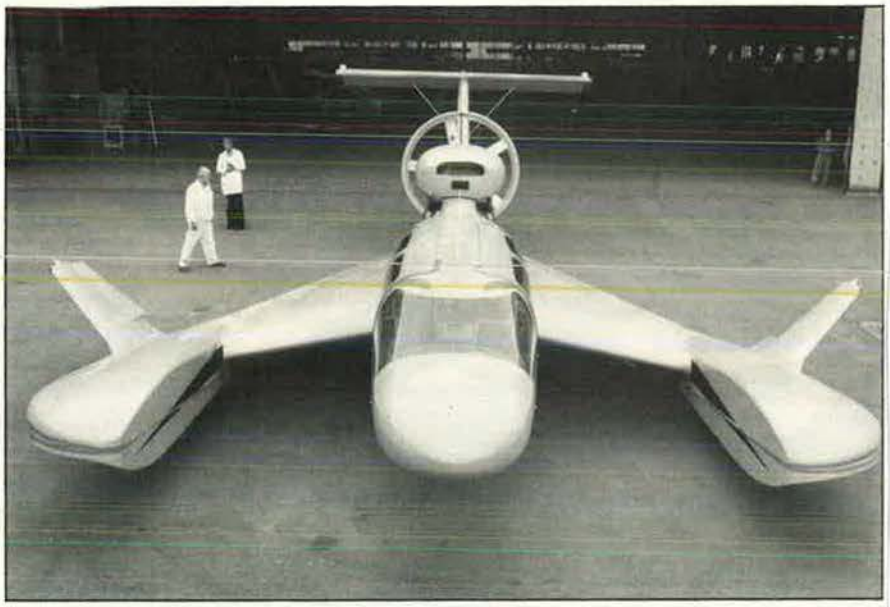
In all, three tons of sophisticated electronics gear has been incorporated into the EF-111A, much of it refined from the Navy's EA-6B ECM aircraft.

The EF-111A, of which USAF is considering a buy of forty once the test-flight program is complete, is billed as uniquely suited for tactical jamming. Being able to operate at Mach 2.1 up to 50,000 feet (15,250 m) and Mach 1.4 on the deck gives the aircraft great mission versatility, its designers say.

The aircraft will be able to jam enemy monitoring radar at a stand-off position miles from enemy territory or penetrate enemy airspace while escorting tactical aircraft on close-support missions.

★ Navy helicopter pilots may soon be able to conduct entire tactical

First flight of the EF-111A. See adjacent item.



Rollout of this unique airfoil boat—the X 114—took place this past spring in Germany. Testing of the X 114, built by VFW-Fokker's Rhein-Flugzeugbau, is under way. The six-seat craft is a follow-on to the two-seat X 113, from which much advanced airfoil technology has been derived.

Intelligence Briefing...A Roundup

The following has been excerpted from the March 9 issue of *Foreign Report*, published by the London *Economist:*

• "Western aerial reconnaissance suggests that the Russians are currently delivering arms to the Middle East at a rate comparable to that of 1973. The arms include T-62 tanks, MiG-21 and MiG-23 jet fighters, Tupolev-22 bombers armed with long-range missiles, antiaircraft missile batteries and heavy artillery as well as large quantities of light weapons and ammunition. The arms are being shipped to Syria, Egypt, Libya, Iraq, Somalia, and South Yemen. . . . The Russians believe that the leadership struggle in the Arab world . . . is approaching a new pitch of intensity."

• "Cuba's Fidel Castro has just spent ten days talking to Colonel Qaddafi in Tripoli. They are said to have agreed on many things—although Russia is likely to be the main beneficiary of their accords. The basic deal is said to be: Cuban tank crews and advisers to help Libya to absorb the massive new deliveries of Soviet equipment, in return for Libyan finance. One side attraction for both Castro and Qaddafi is that their direct collusion may partly relieve them of the appearance of exclusive dependence on the Soviet bloc. . . ."

• "The strategic port of Djibouti, near the entrance to the Red Sea, is one of the immediate targets for the Russians and their African friends. A referendum to decide the future of the French enclave (officially known as the territory of the Afars and Issas) will be held on 24 April. Some 90,000 people will be allowed to vote, and the majority is expected to opt for 'total independence.' However, the Issas and the detribalized Somalis of the port of Djibouti will interpret this as leading to some form of association with Somalia, whereas the Afars will think in terms of a closer connection with Ethiopia. The choice before Djibouti is between becoming the prime port of Ethiopia (which makes geographical sense) and becoming one of several Somali ports (and a subsidiary Soviet base) which would doom it to gradual economic stagnation."

• "[The Indian] government is pressing ahead with its nuclear programme. It has just bought an Iris-80 computer from France to replace the Soviet-made Besam computer which was used in developing the technology required to explode India's first nuclear device underground . . . their reason for buying French is that Soviet computers are hopelessly outdated (which also explains Soviet efforts to steal computer technology from the West). The Indians also complain that there are long delays in service and repairs."

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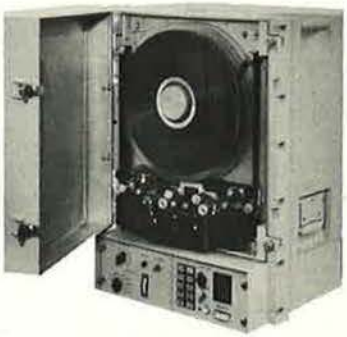

M-14 Series – Militarized portable. 14 or 28 tracks. 2 MHz at 120 ips, with optional capabilities for 2 MHz at 60 ips, digital high density to 30 KBPI and full computer control. Includes BITE and tape lock servo.

SCIENCE/SCOPE

Adding new dimensions to the versatility of the US Air Force's Maverick missile are the imaging-infrared (IIR) and laser versions. Built by Hughes, the two guidance systems fulfill different missions. The IIR seeker operates as well in darkness as in daylight and lets a pilot attack a target even though he cannot see it. The laser Maverick is better suited for close-in air-support missions where the forward observer can determine what hard targets to "illuminate." The IIR Maverick is ideal for strike and interdiction missions where the pilot acquires the target and can more effectively strike with a homing missile.

Successful launches of both types have been carried out in tests conducted by the US Air Force at Eglin AFB, Florida. The laser Maverick was launched from an F-4 aircraft against tank targets "illuminated" by a laser designator. The seeker in the missile's nose locked onto the reflected laser energy, and the Maverick scored direct hits. The IIR Maverick also scored direct hits.

Improving the effectiveness and accuracy of forward observers are two new laser designating devices for the US Army. Called the Laser Target Designator (LTD) and the Ground Laser Locator Designator (GLLD), both systems -- being developed by Hughes -- will pinpoint targets accurately while allowing the observer to remain hidden from the enemy. The LTD resembles a stock, short-barreled rifle and can be operated by one man. With a high-power telescope, an observer "fires" a pulsed-laser beam to "illuminate" the target. This spot is a point for an aircraft's laser tracker to lock onto or its laser-guided munitions to home in on. The pulse is uniquely coded so its reflections cannot be confused with other lasers or any deceptive signals the enemy might use.

GLLD, easily transportable by two men, allows the observer to locate and designate any mobile or stationary target. Using GLLD's laser rangefinder, the observer determines the target's azimuth, range, and elevation. This information is then relayed by voice or automatic data link to remote, conventional artillery for effective shelling or to aircraft equipped with laser homing projectiles.

Electronically displayed tactical data for antisubmarine warfare is now available to aircraft crews through subsystems delivered by Hughes to the US Navy. The subsystem, part of the aircraft-carrier Tactical Support Center system, uses digital TV to present data to crews before, during, and after flight. The displays are high-resolution TV monitors, and two types of data are shown: text, as though a typewritten page, and map-like pictures, with notes alongside symbols.

Reduced energy consumption and extended equipment life will result from a new facility-management system being developed by Hughes for installation at the Air Force's Arnold Engineering Development Center. The system will monitor and control most of the heating, ventilating, and air-conditioning equipment in the Center's 42 buildings. The system can be programmed to shut down nonessential operations automatically during periods of peak-power requirements.

Data is transferred between remote terminals and a computer-controlled central station via time-division multiplexing. Other functions, such as closed-circuit TV, can be added. It is estimated the system will result in savings of $200,000 annually in energy and labor costs and will pay for itself in four years.

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missions from carrier or shore-based launch to an attack on an enemy submarine—without ever leaving the ground.

The training system—two of which are to be built by Cubic Corp.'s Defense Systems Division—will harness a visual display screen to a digital computer, into which can be programmed various types of subhunting missions.

The system will be able to handle the training of six crew members simultaneously, as well as replay an entire simulated mission for additional and more detailed instruction.

★ In step with the US's systematic exploration of our solar system, two spacecraft—Voyager-1 and -2—are being readied for launch late this summer.

The Voyagers' travels will take them to Jupiter and Saturn (and past the several moons of both planets). If successful, one of the craft will then be targeted for a first encounter with Uranus, some 1.7 billion miles (2.7 billion km) from earth and, possibly, Neptune, 2.7 billion miles (4.3 billion km) distant. (In a recent discovery, scientists have ascertained that Uranus, like Saturn, has rings of ice and stone circling it. Some astronomers theorize that all the planets had rings when they were formed some 4.6 billion years ago but those of the planets closer to the sun have evaporated.)

Unusual rounded delta shape is an advanced aircraft concept currently the subject of a series of wind-tunnel tests at AFSC's Arnold Engineering Development Center, located at Arnold AFS, Tenn.

The first Voyager will close on Jupiter in March 1979 and will take man's first closeup photos of its four largest moons. Passing Saturn in November 1980, the craft will come within 4,000 miles (6,430 km) of Titan, the planet's largest moon and the only planetary satellite known to have an atmosphere. Closeup observations of Saturn's rings and moon will also be firsts for man.

★ NASA has moved to bring into being a fantastic concept that has intrigued scientists for at least fifty years: using the sun's photon out-

USAF's YC-141B stretched StarLifter takes off from Dobbins AFB, Ga., on its maiden flight. The airfreighter has a projected productivity increase of up to forty-five percent—on a fleet basis the equivalent of adding ninety to 120 aircraft to the airlift fleet, officials said.

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put to propel a vehicle in space in much the way sailboats maneuver on earth.

"A mirror-like aluminized plastic surface" of incredible thinness would form the vehicle's "sail" to catch the momentum of the photon stream, allowing the craft to "tack" toward or away from the sun. However, the major difference with earthling sails would be size—the solar sail could measure 2,400 feet on each side.

If the project proves feasible, NASA would employ the Space Shuttle in perhaps 1981 or 1982 to carry the "Solar Sailcraft" into space and deploy it. (One problem would be stowage of the huge furled object in the Shuttle's cargo hold.)

NASA considers the Solar Sailcraft idea attractive because of the economies of a fuelless craft.

Contracts to develop elements of the Solar Sailcraft were awarded to E. I. Dupont Co., Wilmington, Del. (sail material candidate); MacNeal-Schwendler, Los Angeles (heliogyro design); International Latex Corp., Dover, Del., and Sheldahl Corp., Northfield, Minn. (sail material candidates); Able Engineering, Goleta, Calif., and Astroresearch Corp., Carpinteria, Calif. (boom designs).

The Solar Sailcraft has a potential competitor, however: a craft that would convert sunlight into electricity to power rockets.

★ NASA has initiated studies toward the eventual construction of very large structures in space. In fact, officials are looking to the first major demonstration of such a capability by as early as 1983–84.

NASA has asked industry for proposals that would detail techniques for "packaging, transporting, fabricating, erecting, and operating large structures in space."

"Building such structures can lead to vastly improved methods of communications and improved monitoring of earth resources, radio astronomy, public service, and solar electrical power systems," the space agency said.

French Air Force Sgt. Jean-Pierre Scheidt, with Senior Airman Helen Hoy, spent a month at Ramstein AB, Germany, under the American-French air controller exchange program.

The plan is to orbit building materials via the Space Shuttle. One project under consideration is the construction of a 100-kilowatt solar power facility that could be used to "supplement onboard Shuttle power for various experiments," the space agency said.

The assembly of the large orbital structures is regarded as a first step toward more complex fabrication as part of a space construction base in 1985 or beyond, NASA officials said.

★ In a matter related to orbital habitats, NASA is probing the feasibility of using the Space Shuttle's external fuel tank as an orbiting vehicle. The idea would be to carry the tank—some interior space of which would be equipped as a habitat—into orbit instead of jettisoning it. Later flights could create a cluster of airlock module, multiple docking adapter, and solar electric conversion wing. The tank's fuel area could then be reconditioned for work and living space, among other options.

★ Figures released by the Aerospace Industries Association reveal that the civilian use of helicopters in the US and Canada is at an all-time high.

For the year 1976, the number of helicopters rose by 18.4 percent over the previous year—to 6,181 used by 2,330 operators, compared to 1975's 5,222 helicopters flown by 1,891 operators.

Business use of helicopters—mining, construction, logging, oil exploration, etc.—increased markedly to a new high, with 1,392 corporate helicopters in service (an impressive rise of nearly thirty percent over 1975).

Other statistics:

- A 16.9 percent increase in the number of commerical operators;
- A 31.9 percent increase in civil government agency helicopters.

★ USAF/Rockwell International and the B-1 industry team have been named as recipients of the Robert J. Collier Trophy for 1976.

The trophy, sponsored by the National Aeronautic Association and one of aviation's most coveted awards, is presented annually for "the greatest achievement in aeronautics or astronautics in America" during the previous year.

The B-1's overseers were cited "for the highly successful design, development, management, and flight test of the B-1 strategic aircraft system."

The trophy will be presented to representatives of the Air Force and Rockwell, the B-1's prime contractor, at ceremonies on May 24 in the nation's capital. Accepting for USAF and Rockwell will be Air Force Chief of Staff Gen. David C. Jones and company President and Chief Executive Officer Robert Anderson.

★ Winners of the 1976 Harmon International Aviation Trophies, for outstanding piloting "worthy of international recognition and contributing to the art and science of flight," were announced in March:

- **The Aviator's Trophy:** To USMC **Lt. Col. Herbert M. Fix,** for outstanding piloting during emergency helicopter evacuation in Cambodia and South Vietnam in 1975, during which his squadron flew to safety more than 5,000 American and Vietnamese civilians as well as Marines, under combat conditions "involving anti-aircraft, machine gun, and small-arms fire, and in part at night with few navigational aids."
- **The Astronaut's Trophy:** Jointly to USAF **Maj. Gen. Thomas P. Stafford** and USSR **Col. Alexei Leonov** for their outstanding command piloting in the Apollo/Soyuz Test Project in 1975, during which two spacecraft of dissimilar design, launched from

Sperry Update 1

A timely report of Sperry Flight Systems activities in the airline, defense, space and general aviation markets.

Sperry report series back in print.

Years ago we published a series of advertisements of this type designed to keep you abreast of our program involvement, product applications and new innovations. Many of you have told us you liked the series and found it informative, so this is the first in a new series of updates. We hope you stay with us throughout the year.

New three-inch CRT available from Sperry.

If you have an application for a small cathode ray tube display, check with Sperry, where a three-inch display (above) has been developed for military fighter use as an azimuth indicator.

Sperry cathode ray tube technology has added a new dimension to cockpit planning, featuring displays that can be seen in bright sunlight.

Our solid background in CRT displays helped us win contracts to build the vertical situation displays for the McDonnell F-15 and the Rockwell International B-1. And we're building CRT's for Teledyne systems' tactical navigation system aboard Navy SH-3H helicopters.

We have also provided CRT displays for the Boeing YC-14 and a variety of other test programs.

Hughes picks Sperry disc for F-18 radar system.

Hughes Aircraft Company has ordered Sperry's magnetic memory disc for storage of data in its new multi-purpose digital radar for the Navy F-18 fighter.

The initial letter contract calls for delivery of 21 disc memory systems and includes follow-on options for more than 100 units.

Sperry originally developed the disc for its TERN-100 Navigation System. The Hughes order launches the disc as a separate product for Sperry, with potential use in a variety of airborne computer and processor applications requiring quickly retrievable low cost mass memory.

Air data computer selected for F-18

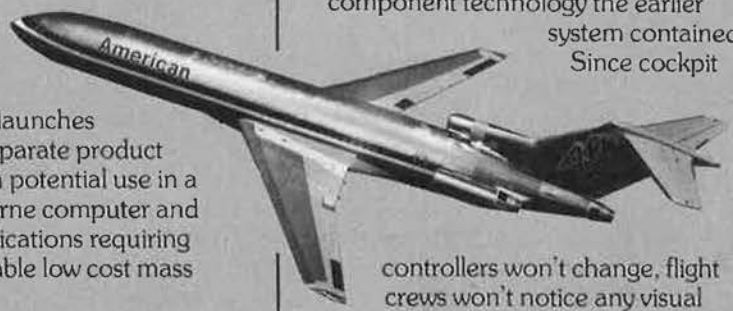
Already in production on digital air data computers for the F-15 and F-16, Sperry was awarded a contract for full-scale development of an advanced digital air data computer for the F-18.

The McDonnell Douglas F-18 contract runs through mid-1979 and calls for the design, development, test and manufacture of 22 pre-production computers.

The new digital air data computer is an advanced technology version of systems built for the F-15 and F-16... lighter, smaller and requiring less power. The F-18 unit will have a projected reliability of 2.5 times greater than previous models.

727 autopilot update scheduled for fall.

Sperry's SP-50 autopilot, standard in the popular Boeing 727 jetliner, will be getting some state-of-the-art changes and will be introduced this fall. Designated SP-150, the "new" autopilot is functionally identical to the SP-50, but will offer even greater reliability, will weigh less, and require less electrical power. Integrated circuitry replaces the 20-year-old component technology the earlier system contained. Since cockpit



controllers won't change, flight crews won't notice any visual differences, however, they will note operational improvements in the 727 system. Airline operations and maintenance personnel will find the transition painless, because SP-150 and SP-50 units are interchangeable. It's possible to use components from each system in one 727. The switch also improves the built-in test capability of the system.

Boeing has delivered 1244 of its 727's and announced orders for 156 more as this report was prepared.

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We're fully experienced in delivering producible systems on time, within budget.

We've come through time and time again on programs like Atlas, Gemini, Thor, Transtage, Lunar Ascent Engine, Lance and Minuteman III.

Plus the complete propulsion system for the Apollo program including the F-1 for launch, J-2 for 2nd and 3rd stages. The Lunar module ascent engine for takeoff from the moon. And the command module reaction control propulsion system for reentry.

We also know how to lend a hand to help keep major projects on schedule.

Rocketdyne is ready to take on the next big job — the Post Boost Propulsion System for the Air Force MX Program. We have the experience, the technology and the resources to do the job right. Right now.

Rocketdyne Division, Rockwell International, 6633 Canoga Avenue, Canoga Park, CA 91304.

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pads 6,500 miles (10,461 km) apart, rendezvoused successfully in orbit and returned safely.

• **The Aeronaut's Trophy:** To Great Britain's **Donald Cameron,** for his 1975 flight of eighteen hours fifty-six minutes from the UK to Yeovil, France, in a hot air balloon of his own design (the largest in existence) during which he set a world endurance record.

Resplendent in desert camouflage, this Anglo-French-built, two-seat Jaguar International fighter is destined for the Oman Air Force under a multimillion-dollar contract negotiated by the Middle East nation in 1974.

Index to Advertisers

SSgt. Michael Church, 347th Field Training Detachment, Moody AFB, Ga., clues son Chris on F-4 fine points during a recent tour of the base by a local student group.

• **The Aviatrix's Trophy:** To **Mrs. Marion Rice Hart** of Washington, D. C., for her consistently outstanding piloting of small planes on a global scale in 1975, flying to the Andaman Islands in the Bay of Bengal and to Iceland, Europe, and the Middle East. (She soloed the Atlantic when she was seventy-five, is a geologist and the first woman to receive a degree in chemical engineering from MIT, and is the author of a book on celestial navigation, in its fifth edition.)

★ **NEWS NOTES—Dr. James C. Fletcher,** NASA Administrator who, since his appointment in April 1971,

Aerospace World

has guided the space agency from triumph to triumph, has **resigned** his post effective May 1 to return to private life.

In mid-March, NASA launched into synchronous orbit **Palapa-2,** a second satellite in the telecommunications system that will help link together **Indonesia's** 3,400-mile archipelago.

A Navy **Tomahawk** cruise missile in a recent test successfully transitioned from boost to cruise flight, a major step toward the optimum goal of launch from a submerged submarine. Tomahawk is also being developed as a **land-based cruise missile.**

USAF's **Honor Guard,** Bolling AFB, D. C., is seeking **NCO volunteers** E-5 through E-7. Honor Guard NCOs participate in ceremonies at the White House, Pentagon, Arlington National Cemetery, and on arrival and departure of foreign dignitaries. For qualifications, see AFR 39-11. Call (202) 767-4793 or AUTOVON 297-4793.

AFA member and USAF **Maj. Gregory H. Canavan** has been presented the **Fannie and John Hertz Foundation Award** in the field of applied physical sciences for "contributing significantly to the well being and defense" of the US. A 1965 graduate of the Air Force Academy who earned a Ph.D. in 1969, Major Canavan is assigned to the **Defense Advanced Research Projects Agency,** Arlington, Va.

USN has named its **F-18 Strike Fighter,** currently under development, the **"Hornet."**

To check out safety systems, a **live, unarmed Short-Range Attack Missile** was flown aboard a B-1 in March. **First launch and flight** of a live SRAM from a B-1 is scheduled for June.

Maj. Gen. Kenneth R. Chapman, USAF (Ret.), has been named **NASA Assistant Administrator** for the Office of DoD and Interagency Affairs, succeeding **Lt. Gen. William V. Snaveley,** USAF (Ret.), who has accepted a position abroad. General Chapman previously served with the Nuclear Regulatory Commission.

USAF's **TSgt. Herman J. Kokojan** (whose work has appeared both on the cover and inside AIR FORCE Magazine) has been named **1976 Military Photographer of the Year**—the second consecutive such honor. Sergeant Kokojan is currently serving with *Airman* Magazine, Bolling AFB, D. C.

Died: Brig. Gen. William J. Flood, USAF (Ret.), a pioneer aviator and balloonist who, as commander of Wheeler Field, was wounded during the attack on Pearl Harbor, in Washington, D. C., in March after a long illness. He was eighty-one.

Died: Lt. Gen. John W. O'Neill, USAF (Ret.), former **Vice Commander of AFSC,** whose Air Force career spanned thirty-two years, in March of a heart attack. A longtime member of AFA, he was fifty-eight. ■

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AIR FORCE

MAY 1977

The author, until recently the Deputy Director of the US Arms Control and Disarmament Agency, describes technical and procedural issues that have stalemated SALT negotiations, and warns against a growing but little-recognized bureaucratic weakness that could imperil the foundation for US success at . . .

SALT: Asking the Right Question

BY JOHN F. LEHMAN, JR.

STRATEGIC policy, like most political matters, is simply applied common sense. Its high priests and practitioners do their best to hide this fact in jargon and esoterica. But common sense must begin with some assumptions and, for some strange reason, in strategic policy people seem to want to cover up or avoid admitting their assumptions, preferring instead to declare certain broad generalities to which the wise and just may be expected to repair. Thus, such policy commentators as Paul Warnke or Gene La Rocque invariably will begin with some version of, "Of course I favor a strong and adequate national defense. . . ." This premise is, in fact, a diversionary substitute for the relevant premise they never wish to admit, which is some version of "the real cause of the arms race is US military provocation." Similarly, George Keegan or Danny Graham may often begin their commentary with some version of, "Of course I am in favor of a sound arms reduction agreement. . . ." The really relevant premise is usually some version of, "But the Russians are really only using SALT to lull us while they achieve strategic superiority," but that idea never seems to appear in explicit form.

Let me begin this discussion of SALT by bringing out of the closet some of my own assumptions, without taking space here to defend them. First, I believe that strategic arms limitation negotiations with the Russians should be pursued and can contribute to US national security.

Second, I believe the SALT I accords on balance were worth signing. We may not have had to pay as high a price as we did, and we certainly could have negotiated better language than the loophole-riven interim agreement on offensive weapons. But people tend to forget that, when the accords were signed in 1972, it had been six years since the deployment of the last US strategic system and that, because of the minimum deterrence assumptions of the McNamara Doctrine (again closet assumptions), there were no strategic programs on the US drawing board except for MIRV. The Soviets, however, then were building about 110 new SLBMs and about ninety ICBMs per year with new generations beyond those well along in development. And it should be remembered that the offensive arms agreement was only an interim accord. As modified and vastly improved by the Jackson Amendment, the SALT I agreements put the Soviets on notice that the US would not settle for second best.

A third assumption is that a sound SALT II agreement, based on equal aggregate numbers and fully verifiable, would be in the interests of US security and should be signed. This does not mean that all negotiable agreements currently being discussed at SALT would be in our interest. Indeed, some options currently under discussion could be worse than no agreement at all. Not only could an unsound agreement be against US interests in the short term, but, ironically, it could also make it impossible to obtain a sound and enduring agreement at some later stage.

A fourth assumption is that numbers do count. Strategic equality is important, especially in terms of equal war-fighting capability. Again this is simply common sense, perhaps best stated by former British disarmament chief, Lord Chalfont—"strategic superiority is . . . a simple and incontrovertible proposition namely that the nuclear balance ceases to exist at the moment when one side believes that it has acquired the capacity to deliver an effective nuclear attack upon the other and survive the ensuing retaliation." It is an incontrovertible fact that the US strategic budget peaked back in the 1950s, and, from 1961 until FY '76, American strategic spending actually declined at an average annual rate in constant dollars of eight percent. At the same time, Soviet ex

penditures on strategic weaponry were increasing at from three to four percent every year beginning in 1964 up to the present.

A fifth assumption is one vigorously argued by Henry Kissinger. He rightly reminds us that "it does no good to preach strategic superiority while practicing regional retreat." There is a danger that we focus too much attention on the admittedly alarming danger of a strategic imbalance while diverting attention from the far more immediately dangerous growth of regional imbalances in Europe, the Middle East, and elsewhere. It is there that military disparities can have immediate and enormous political consequences. It is this assumption that should make one particularly sensitive to the impact of certain SALT outcomes upon our allies and upon the balance of forces in Europe.

Carter's Position

On February 8, 1977, President Carter held his first substantive press conference as President. There he amazed both admirers and critics with a very sensible proposal for pursuing a SALT II agreement based on the Vladivostok accords on equal aggregates, while deferring cruise missiles and Backfire bombers to another forum. This position gratified some people (Senator Jackson) and astonished the rest (Carter's SALT advisors). To understand those reactions, it is necessary to look at the recent past.

Where Have We Been?

When President Ford and General Secretary Brezhnev agreed at Vladivostok on the outlines of a SALT II agreement based on 2,400 strategic systems for each side, with a sublimit of 1,320 MIRVed systems, most observers believed a treaty would be forthcoming within a year. By the beginning of the following year, however, it had become apparent that achieving such a treaty would not be at all easy. The obstacles were principally three. First, despite the seemingly uncontroversial principles accepted by both sides that all limits must be verifiable by national technical means, the Soviets refused to agree to a method for counting launchers capable of launching MIRVed systems. Second, despite the fact that there had been no mention of cruise missiles in the Vladivostok agreement, the Soviets added the demand that all cruise missiles over a 600-km (373 mile) range limit must be counted in the 2,400 aggregate. Third, while the Vladivostok agreement specifically mentioned counting all heavy bombers, there was no explicit definition agreed upon as to what was a heavy bomber. The US insisted that the Soviet Backfire bomber, with a 6,000-mile range and a 20,000-pound payload, be counted as a heavy bomber. In the two and one-half years since Vladivostok, those three issues have not been resolved.

Congressional and public understanding of the nature of this impasse unfortunately has been confused by the curious attitudes and pronouncements of the Ford Administration. Senior officials at the State Department and President Ford himself in speeches and interviews seemed to place the blame for the impasse on "disagreements within the Administration," never once suggesting that some fault may lie with the Soviets. This view was, in fact, grossly misleading. Between September 1975 and September 1976, the US government, with all agencies concurring, put forward to the Soviets five different proposed solutions to the impasse. The Soviets did not budge. As President Ford's arms control director, Fred Ikle, has testified, "had the Soviets shown only some of this flexibility, an agreement might long since been reached. . . ." In fairness to the Soviets, it is possible to argue that with so many new US positions they had difficulty judging when the bottom line had been reached. They must have indeed been perplexed, as were many people in the US government, to find that on several occasions "senior officials traveling with the Secretary of State" gave background news interviews that denigrated the seriousness of the new US proposals, implying that further concessions would be forthcoming.

Beginning in February of 1976, the Soviets were offered a deal based on deferring the cruise missile and Backfire issues and signing a SALT II treaty on the basis of

"Under no circumstances should the B-1 be considered a SALT bargaining chip or a SALT issue. . . ."

"If there is one single issue that is most critical . . . it is verification."

what had been discussed at Vladivostok. In view of the verification complexities still unresolved, this approach made eminent good sense then and still does. It is certainly not fair to carp, as "former Ford officials" have recently been quoted, that this approach has already been tried and failed. It has never been given to the Soviets as a firm bottom-line proposal. It is, therefore, quite encouraging that President Carter has taken such a sensible approach in his first public discussion of the issue.

Achieving the Carter Proposal

The most serious obstacle to achieving a sensible SALT outcome has been the takeover of virtually all key second-tier appointments in State, Defense, and the National Security Council by people euphemistically described by the *Wall Street Journal* as being "of the new politics." This clique of personalities drawn from an extremely narrow end of the Democratic party spectrum has well-established views on the current SALT negotiations and, as a Washington lawyer might say, they are on "all fours" with the views of Mr. Warnke rather than those of the President. They may be expected to bend every bureaucratic effort, through the use of the old option game and other time-worn procedures for sandbagging a President, to bring him around to a more compatible position.

The President himself has not helped his case by publicly indicating to the Russians a willingness to curtail the B-1 and drop the mobile MX, dependent on Soviet attitudes in arms control. This was a naïve linkage at best, and certainly a counterproductive move.

The Issues

The levels of Vladivostok—2,400 strategic launchers on each side—clearly are very high. One can easily make the case that both sides would be better off, and US security better served, with numbers at half that level or lower. But at lower levels the issue of throw-weight is much more important. Obviously, if we were to reduce, for instance, to 1,000 ICBMs on each side, if the US missiles were Minuteman with a throw-weight in the 2,000–3,000-pound category, and the Soviet systems were SS-19s and SS-18s with from three to six times that throw-weight, a highly unstable imbalance would result. Also, the lower the agreed levels, the higher the reliability of verification procedures must be, because a much higher payoff can be gained by evasion. A hidden stockpile, for instance, of 500 SS-16s would mark a fifty percent change in the number of strategic vehicles with a treaty limit of 1,000 on each side, but only twenty-one percent of the current Vladivostok limits of 2,400.

The sublimit of 1,320 MIRVed vehicles per side agreed to at Vladivostok also has been criticized as being very high. It is, in fact, s high as to be irrelevant for both sides. The reason is that with up to ten warheads per missile, either side would wind up with more MIRVs than might be needed while the number of weapons with large, single warheads needed to cope with hard or mobile targets could fall below the required level.

The B-1 was not raised as an issue in the negotiations until the past year. Early in 1976, the Russians, with marvelous chutzpah, raised the ante and demanded that each B-1 be counted as three strategic vehicles. This presumably was a repetition of their repeated tactic of raising outrageous issues (as they did with "forward-based systems" [FBS]) and dropping them only after establishing their entitlement to a concession in return. Under no circumstances should the B-1 be considered a SALT bargaining chip or a SALT issue, as President Carter has unfortunately suggested. There are many things wrong with the way the B-1 was developed. But at the present time it is clearly more cost-effective than such alternatives as the improved B-52X, the standoff cruise missile carrier, or the FB-111H. It should not be included in SALT because it is perhaps the most stabilizing of all our strategic vehicles. It provides the multiple-aim-point benefits of dispersal to thousands of civilian fields, fast escape and ability to outrun nuclear blast shockwaves, and far more reliable command and control than either ICBMs or SLBMs.

THE CARTER COMPREHENSIVE PROPOSAL

The comprehensive proposal presented to the Soviets during Secretary of State Cyrus Vance's recent trip to Moscow meets most of the criteria for an equitable agreement outlined in this article and, in the author's view, would receive strong but not unanimous Senate support if embodied in a treaty. The terms would lower the aggregate level to 2,000 strategic systems; require the Soviets to dismantle 150 heavy SS-9 and SS-18 ICBMs; lower the MIRV limit to 1,200 launchers; and limit ICBM and SLBM tests to six of each per year for each side. It also includes a number of significant US concessions: all cruise missiles with a range beyond 2,500 km would be banned; cruise missiles on non-heavy bombers (*e.g.*, F-111, A-6) would be limited to 600 km; mobile ICBMs (*e.g.*, MX) would be banned; and conventionally armed cruise missiles would be subject to the same limitations as nuclear armed (but camera-armed would not, a major evasion loophole); and Backfire would not be counted in any way.

It is high irony that the most strident criticism of the Carter proposal so far—that it is not fair enough to the Soviets—has come from some of former Secretary of State Henry Kissinger's SALT advisors and from President Ford himself.

—JOHN F. LEHMAN, JR.

John F. Lehman, Jr., received BA and MA degrees in law and diplomacy from Cambridge University and holds a doctorate in International Relations from the University of Pennsylvania. He was a senior assistant to Henry Kissinger on the National Security Council staff, a member of the US delegation to the Mutual and Balanced Force Reduction Talks in Vienna, and, from April 1975 to January 1977, Deputy Director of the US Arms Control and Disarmament Agency. A Naval Reservist, Dr. Lehman has flown most of the strategic and theater attack aircraft in the US inventory. He now is President of the Abington Corp., Washington, D. C.

Moreover, it is the system most able to provide a reliable and enduring strategic reserve for a credible flexible response posture.

The MX has not been raised as an issue in SALT, nor does it belong in SALT II. Unless we move promptly to an agreement reducing overall numbers to a level well below current Soviet deployments, ICBMs in fixed-silo aim points become an increasingly destabilizing element with every passing year. Unless we adopt the highly destabilizing "launch under confirmed attack" posture advocated by some, the Minuteman silos will not survive a Soviet first-strike in sufficient numbers to provide adequate retaliatory capability. If we are to keep a land-based leg of the Triad, ICBMs must come out of their holes and be deployed in some kind of multiple aim-point mode. And, unless an agreement is reached involving verifiable reductions substantially below what the Soviets now have deployed, the MX will also be needed to help redress the destabilizing throw-weight imbalance in order to maintain parity with Soviet counterforce capability.

Verification

If there is one single issue that is most critical to achieving a good SALT II agreement, and for that matter any arms control agreement, it is verification. Verification procedures must ensure that the United States will detect any possible violations of the SALT II agreement in time to take whatever action is necessary to prevent the Soviets from gaining an advantage by such violation. By providing the American people with reliable evidence that the terms of the agreement are in fact being observed—that they do not have to take the Soviets solely on good faith—domestic and international confidence is enhanced, creating the kind of atmosphere conducive to further progress. This kind of verification must begin with the assumption that violations of an agreement may occur—and that concerted efforts to conceal such violations are possible. Such verification depends to a considerable extent on technical and human intelligence collection, but the task is considerably easier than political military intelligence assessment. Verification need only prove a negative, that certain activities are *not* taking place.

Achieving this kind of verification without ambiguity is difficult enough, as we have found in policing SALT I agreements with regard to ICBMs and SLBMs. A higher order of magnitude of difficulty is encountered in trying to achieve reliable measures to verify MIRV levels and mobile ICBM levels, but they are attainable. One must frankly admit, however, that at the present writing no one has come forward with an approach to verifying cruise missiles that meets the tests outlined above.

Without on-site inspection we do not have a way of verifying the critical components of cruise missiles, *i.e.*, guidance, payload, and range. The Soviet cruise missiles, the SSN-3 and SSN-12, now deployed on their submarines and surface ships are more than big enough, with adequate power, payload, and volume for a long-range fuel load, to pose a strategic threat to fifty percent of the US population and industrial base. Because of the way the Soviets now train and the way they deploy their cruise missile carriers, we can reliably surmise that they do not currently intend to use them in strategic attack modes, nor would this add significantly to the SLBM threat against the US if they did. But the important point is that we do not *know*. If they replace the semiactive homing guidance with their current inertial guidance technology, and if they put on, say, a 500-pound nuclear warhead instead of a larger conventional warhead, and use the rest of the volume for fuel, the Soviets would have a very long-range strategic countervalue weapon, and there is no reliable way to assure that we would know what they had been doing. This is most significant if we accept anything approaching the Soviet position on range limitations—of 600 km for cruise missiles. At that low range, the uncertainty in performance is at least a factor of two. At longer ranges, for instance 2,500 to 5,500 km, so much of the volume must be taken up with fuel that the margin of uncertainty is much less, perhaps ten to twenty percent.

Nor do restrictions on testing show much promise for verifying cruise-missile limitations. In the US cruise missile test program, we have been recovering the missile intact by parachute. There is simply no way to monitor such testing by national technical means unless the country conducting the tests actively cooperates. The only practical approach to including cruise missiles in a SALT agreement now appears to be range limits no lower than 2,500 km applying to all cruise missiles regardless of payload, whether nuclear armed, conventionally armed, or camera armed—with exemptions only for such high-altitude, long-range reconnaissance vehicles as Compass Cope.

Gray-Area Systems

President Carter's proposal to defer dealing with the cruise missile and Backfire issues to subsequent negotiations and signing SALT II based on the Vladivostok accords is the only possible approach to achieve an acceptable SALT II agreement before SALT I expires in October of this year. The reason is the emergence of so-called "gray-area systems" as a major strategic issue. This term has come to describe nuclear attack systems that are designed for primary use in theater areas rather than intercontinental. They have been around for a long time, and we have lived with them. But the recent substantial growth and modernization program in these gray-area systems embarked upon by the Soviets, plus the emergence of the US

cruise missile program, make it impossible to ignore these systems when assessing the strategic balance. The Soviets have long deployed gray-area systems in Europe, *i.e.*, systems that cannot normally reach the United States but whose mission is strategic attack against our European allies. Several thousand medium bombers, about 600 SS-4 and SS-5 medium-range ballistic missiles, and Golf-class submarines with 700-mile-range SLBMs have formed the bulk of this strategic threat to Europe. But lately this threat has been greatly augmented by the introduction of the SS-20 mobile IRBMs and the Backfire bomber, as well as substantial numbers of new and advanced theater attack aircraft.

SALT II

In addition to the growth in threat that this poses to US forces and US allies in Europe, these new systems have a further complication for SALT in that both the SS-20 and the Backfire can hit the United States from Soviet bases. Backfire has a one-way range of about 6,000 miles unrefueled, which is more than adequate, and the SS-20 can be given sufficient range to hit the United States by simply loading less than its full payload of three reentry vehicles. The SS-20, being mobile, poses a most difficult problem for verification as well, in that its launcher is compatible with the SS-16 ICBM. Indeed, as is well known, the SS-20 is merely the lower two stages of the SS-16. It would be extremely difficult to detect the stockpiling by the Soviets of large numbers of either full SS-16 missiles or third stages to be added to the SS-20. It is interesting to note in this respect that we have only recently discovered that we grossly underestimated the production and total numbers stockpiled of Soviet intermediate missiles that are now being used as surplus space launchers, and further that their SSN-8 submarine-launched missile, which we have always estimated to be of about a 4,000-mile range, was recently flown 5,600 miles.

The FBS Issue

The Soviets have had the cheek in SALT I and then again in SALT II negotiations to suggest that it is they, not the US, who should be compensated for theater systems. They maintained the position that the so-called "forward-based systems" (FBS) are a strategic threat to the Soviet Union and should be counted in SALT. These FBS are the US F-4s and F-111s deployed in Europe in a tactical nuclear attack role and the A-6s and A-7s deployed on the two carriers in the Mediterranean. This Soviet claim is a complete red herring, as they and we both know that, of those aircraft, only the F-111 can even reach the Soviet border flying an operational profile. It was perplexing that some senior officials of the Ford Administration actually came to view the Soviets' dropping of this preposterous demand as a concession for which the US must compensate them in the negotiations.

There are, of course, gray-area systems on the allied side and, in my view, these must be taken into consideration in SALT III, along with Soviet gray-area systems. There are four British and four French Polaris submarines and there are eighteen French intermediate-range ballistic missiles; thirty-two Mirage IV-A medium attack bombers; sixty US FB-111As, and two wings of F-111Es and Fs based in England. The Soviets have at least a four-to-one advantage in these gray-area systems.

By far the most interesting gray-area system is the US cruise missile. Apart from its clearly strategic role when used as a penetrator on strategic bombers, the US cruise missile is a theater system with far-reaching implications. The current US programs will have a maximum range of about 2,000 miles, only about two-thirds that of the SS-20, and a payload of about 250 pounds, about one-tenth that of the SS-20. By providing a cheaper and less vulnerable basis for NATO's theater nuclear strike forces, it could considerably enhance the stability of our nuclear posture in Europe and, perhaps more importantly, could release a great many dual-capable aircraft to enhance the current conventional deterrent capability in the near term.

Morcover, the terrain-matching guidance system shows promise of delivering the kinds of accuracies that would enable conventional high-explosive warheads to take over targeting requirements now reserved to tactical nuclear weapons. The same weapon, in an entirely different mode with a different guidance system, will greatly enhance the Navy's sea-control mission by providing a very-long-range antiship capability. It would be foolish in the extreme to foreclose any of these promising stabilizing weapon system options in the present SALT context. In subsequent negotiations to obtain overall reductions, however, some cruise missile limitations, along with other limitations on other gray-area systems, should certainly be pursued.

A Good Agreement or None

The heaviest burden in SALT lies with the senior political levels in Congress and the White House. They must keep paramount the simple question: What is it we seek to achieve through SALT? The answer can only be the increased security of the US. The enormous US SALT bureaucracy by its size and makeup cannot keep sight of this guiding question, let alone the answer. The process becomes the goal, a treaty (any treaty) is the grail, its contents not really a major focus of the machinery. If substance, *i.e.*, Soviet obstinance on the cruise missile, prevents an agreement, that issue becomes the enemy, the obstacle to be removed. If the Soviets can't be budged, then the obstruction in the US position can—and must—or there will be no agreement and that, to careerists with years vested in the effort, is unthinkable.

But such an outcome is very thinkable if the single question of what we ultimately seek from SALT is kept paramount. If a treaty cannot be achieved except by limitations asymmetric to the US, or terms not empirically verifiable, then US security will not be enhanced by signing and ratifying it. The bureaucracy, by its nature, can never reach such a conclusion. The President then must make the decision. If, as in the present Administration at this writing, the subcabinet policymakers of all agencies are of such complete uniformity in outlook that the President is overwhelmed by one voice then it lies with the Senate to ask the simple question: Does this treaty increase the security of the United States? ■

Fifteen years ago, President Kennedy, angered by Soviet double-dealing in connection with nuclear weapons testing, vowed that this country would never again be caught up in an uninspected test moratorium. But there are indications now that this history lesson may go unheeded.

The US Can't Turn Back the Nuclear Clock

BY EDGAR ULSAMER
SENIOR EDITOR

NUCLEAR technology, by nature, is schizoid; it can be made to serve destructively in weapons, or constructively in the generation of power and for other peaceful purposes. Mastering the nuclear process for peaceful purposes unlocks the door to nuclear weapons technology in a limited, latent way. Once the genie is out of the bottle, it can turn into a Dr. Jekyll or a Mr. Hyde, or transform itself from one into the other.

Owning a civilian nuclear power plant, according to the US Arms Control and Disarmament Agency (ACDA), "can start a country down the path toward the ability to make nuclear weapons whether or not that country wants weapons on the day it signs the contract for a power reactor." Nuclear weapons and the nuclear fuel cycle share common technology, production facilities, and materials. The knowledge of how to build a primitive nuclear weapon is available not only to most legitimate governments but at the subgovernmental level that conceivably may include anarchists and terrorists.

The central challenge of the atomic age is to curb proliferation of nuclear weapons and to safeguard weapons-grade nuclear materials while at the same time making available the benefits of nuclear power to an energy-starved world. The United States, as far back as 1946, proposed policies and mechanisms to eliminate or limit nuclear weapons proliferation *without* retarding the development of peaceful nuclear energy. The Baruch Plan, presented to the United Nations in that year, called for eliminating all nuclear weapons and creating an International Atomic Development Authority to tightly control, license, and inspect *all* nuclear activities *everywhere*, as well as to apply sanctions against trans-

gressors. Since the US was the only nuclear power in the world at the time, this offer was notably unselfish. But the Baruch Plan was liquidated posthaste by the Soviet Union's resounding "Nyet!" US nuclear policy since then has remained high-minded, erratic, and, as probably foreordained, limited in its effectiveness. Its principal flaw, probably, is the notion—seen at times by others as naïve, presumptuous, or both—that this country should be accepted by the non-Communist world as its major nuclear shield and as the principal provider of plutonium or enriched uranium that is the trigger of nuclear weapons and the fuel of most commercial reactors in operation today.

In the first case, the credibility of the US nuclear umbrella is being weakened as this nation's strategic superiority changes to rough equivalence with the USSR and as the national leadership intensifies hints about withdrawing US troops from the territory of allies whose confidence in Washington's willingness to risk nuclear holocaust at home for the sake of their defense was shaky at best.

The second tenet of US nuclear policy, that proliferation can be curbed by tight American control—exercised in carrot-and-stick fashion—over nuclear hardware and the supply of fissile material, is being invalidated by technical, economic, and political change.

US leverage in nonproliferation negotiations of either bilateral or international scope depends on this country's ability and firm commitment to serve as a reliable supplier of nuclear fuel. But the United States closed its order books for new contracts to enrich nuclear fuel in 1974. As ERDA's Deputy Assistant Administrator for National Security, Maj. Gen. Edward B. Giller, USAF (Ret.), points out: "We had to. The capacity of the three government enrichment plants had been reached. Not only were we unable to take on new contracts to meet the projected fuel needs of countries building new nuclear power stations, we had no clear commitment to expand our enrichment capacity so we might reopen the order books for future contracts."

Another factor adds uncertainty about assured nuclear fuel supplies from the US: The broad and vociferous antinuclear campaign being waged in this country by environmentalists and others who are opposed to nuclear technology. Its bark often is being mistaken abroad for a bite.

Finally, the extreme checks and balances imposed on US governmental export authority involving fissile materials lower America's credibility as a reliable supplier. In part, this is the result of the creation of the Nuclear Regulatory Commission which, as an independent regulatory body, is separate from and not responsible to the Executive Branch. Yet it is the Commission that has the final say on nuclear export licenses. The wisdom of empowering an independent agency to overrule the President on matters involving national security and foreign policy seems questionable.

Another condition slows down and often stalls governmental decisions involving international nuclear issues: the bureaucratic proliferation of agencies and committees, each of which must approve nuclear export requests. This means as many as twenty agencies of the Executive Branch and a similar number of congressional committees.

The spread of nuclear technology in any form; single or collective attempts to control safety measures, materials, and know-how; and accords to reduce the development and testing of nuclear weapons all affect US national security in decisive ways. The issues are complex, controversial, and, at times, clouded by uncertainty. The following discussion provides one assessment of these grave issues, without claiming that there are no other valid perspectives.

Current Reactor Technologies

While nuclear technologies in weapon and power-generation applications are advancing rapidly, certain fundamental factors can be presumed to remain constant for the time being. The current crop of nuclear reactors, both the light water reactor (LWR), used in the United States and sold abroad by the US, and the Canadian Natural Uranium Heavy Water Reactor use uranium as fuel. The nuclear fission, or splitting of the atom, that occurs in the reactor is a self-sustaining chain reaction, meaning that atoms of a given element, either uranium or plutonium, are being bombarded with subatomic particles, mainly neutrons, in such a manner that enough new neutrons are being released to split other atoms, in wave after wave, and thus sustain the process until it either is stopped or the fuel supply is exhausted.

Natural uranium is impure, consisting essentially of the U-238 isotope that does not sustain chain reaction (nonfissile), but containing 0.7 percent of the U-235 isotope that does (fissile). Isotopes are atoms of the same element with the same nuclear charge (same number of protons), but of different atomic weight (a different number of neutrons). The fissile isotope provides most of the thermal energy and sustains the chain reaction in the core of the reactor. U-235 is the only fissile isotope that exists in nature; two other fissile isotopes, U-233 and plutonium-239, are man-made by-products of nuclear reaction processes. They are of special importance to advanced, superefficient reactors under development in Western Europe and under study in the US.

The U-238 isotope in a reactor plays what nuclear physicists call a "fertile" role—that is, it does not contribute directly to the fission process; some of these isotopes will, however, capture random neutrons and thus be converted or "bred" into fissile plutonium. This phenomenon is more of a bane than a blessing because plutonium is the stuff that many nuclear weapons are made of.

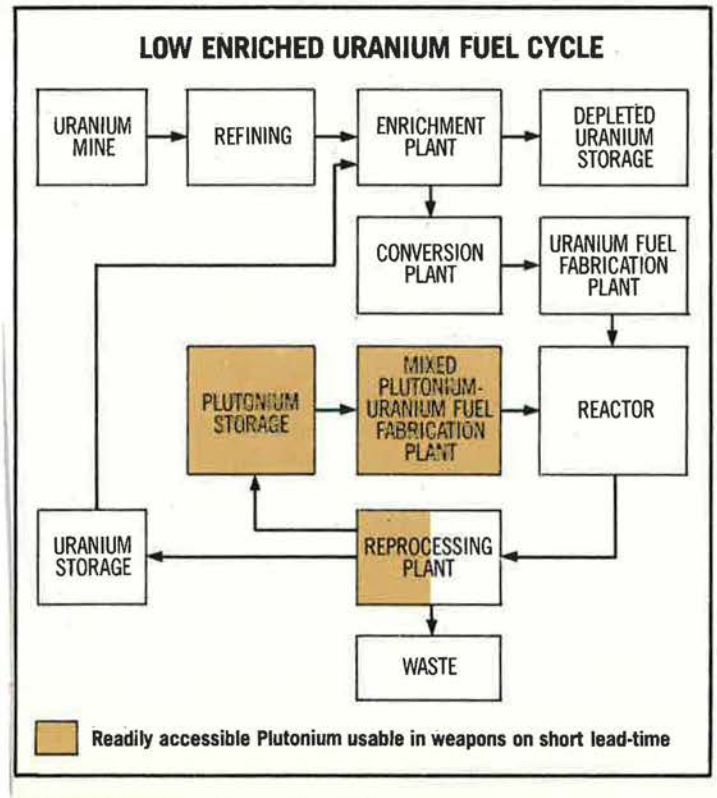
Natural uranium is not usable in light water reactors. In order to sustain chain reaction, systems of this type require cores that contain about three percent of the U-235 isotope. The natural element, therefore, has to be "enriched" to increase the percentage of fissile isotopes. In the past, the only means for enriching uranium was a technically demanding and costly technique known as gaseous diffusion, essentially a repetitive filtering in-

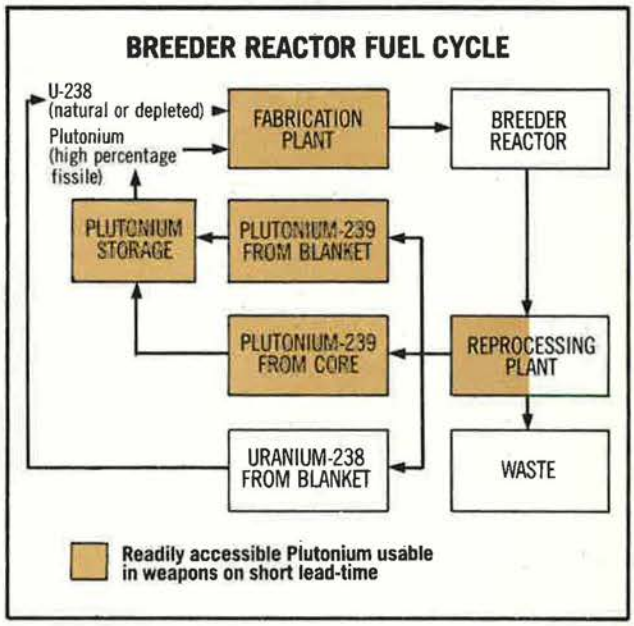
volving a thousand or more pressure chambers and consuming enormous amounts of electricity. The US, the only country in the free world that operates large gaseous diffusion plants, shares with the rest of the world their products but not the underlying technology. The reason for secretiveness is that the same process carried forward further can be used to provide the fissile material for nuclear weapons.

Nuclear weapons that use uranium require U-235 concentrations of at least twenty percent and reach full efficiency at the ninety percent level. But advancing technology has reduced the importance of gaseous diffusion in controlling proliferation of nuclear weapons by third countries. The reasons are varied and complex. For one, at least three enrichment processes that promise to be less complex and costly than diffusion are either available now or soon will be. These different approaches involve enrichment through the use of gas centrifuges, lasers, or aerodynamic nozzles. Such nozzles were developed by South Africa and West Germany. The latter's recent agreement with Brazil to export nuclear power plants, a nuclear fuel-reprocessing facility, and a small enrichment plant drew strong criticism in the media, here and elsewhere. US diplomatic efforts to bring about cancellation of the arrangement appear to have failed and helped cause a serious rift with Brazil.

Another technology that "bypasses" the need for gaseous diffusion is the heavy water reactor developed by the Canadian government. These systems "burn" natural uranium. They are able to do so because their "moderator" is *heavy water,* so-called because it involves a hydrogen isotope—deuterium—with twice the atomic weight of ordinary hydrogen. If reactors are fueled with uranium containing only a small percentage of U-235, the neutron flux in the active core of the system has to be slowed down—or "moderated"—in order to sustain chain reaction. Ordinary (or light) water is sufficient if the fuel is enriched to the level of the US light water reactors. But the CANDU or Canadian deuterium/uranium reactors do away with the need for expensive enriched fuel by using instead an expensive heavy water moderator to retard the neutron flux. This Canadian technology has been exported to a number of nations. The CANDU is interesting not only because it bypasses the need for enriched, tightly controlled uranium; it also is better suited for producing weapons-grade plutonium than are light water reactors. India's explosion, in May 1974, of a ten- to fifteen-kiloton nuclear device with weapons characteristics was made possible by her CANDU research reactor obtained from Canada.

The opportunity for proliferation increases automatically as the number of power reactors and the total time they have been operating increase. Light as well as heavy water reactors transmute into fissile plutonium—but don't consume—some of their "fertile" U-238 fuel, which becomes part of the highly radioactive waste. This spent fuel, after cooling, can be separated chemically and the plutonium extracted. A typical modern civilian reactor produces about 1,000 megawatts of electrical power. ACDA estimates that in a year, a light water reactor will produce enough plutonium for between ten and seventy nuclear weapons; a heavy water reactor enough for from ten to fifty weapons. A detailed study by the Committee for Economic Development (CED) entitled "Nuclear Energy and National Security," predicts that by the year 2000 "the total plutonium produced as a by-product of global nuclear power will be the equivalent of one million atomic bombs." The report adds ominously: "The worst hazards will come, not from US enrichment of uranium or separation of plutonium for its own power plants, but from up to a hundred countries that may be doing the same thing."





—Flow chart data from U. S. Arms Control and Disarmament Agency Annual Report, dated July 1976.

Uranium—A Limited Resource

According to the Energy Research and Development Administration (soon to be superseded by a new Energy Department), commercial light water reactors use about one-fourth to one-third of their nuclear fuel cores a year. ERDA estimates that the world supply of natural uranium that is "reasonably assured" and can be extracted at reasonable cost (no more than $30 per pound) amounts to about 2.4 million tons. By the year 2000, ERDA believes "cumulative non-Communist foreign requirements" will exceed 2.2 million tons. The government admits readily that these figures are highly tenuous, that the supplies may turn out to be far more plentiful than can be estimated without additional geological sampling, and that more uranium could be mined at costs higher than deemed economical at present. The US has proven uranium reserves of 700,000 tons, with an additional three million tons considered possible. Nevertheless, some forecasts envision shortfalls on a worldwide as well as national basis by the end of this century. Shortages of enriched uranium fuel exist already, but their cause is economic and political.

It is clear that the world's uranium is not infinite. Concern is mounting, especially in countries where developing nuclear energy is considered more urgent than in the US, over whether or not the supply will last until fusion reactors drawing their fuel from seawater come into being. This concern is largely responsible for intensified activity and significant advance in two areas of nuclear technology that affect the potential of nuclear-weapon proliferation in a major way.

Commercial reactors, at present, waste fuel and breed fewer fissile isotopes than they consume. The technical reason is the requirement to slow down the neutron flux. ERDA estimates that, theoretically, reprocessing or "recycling" the unused uranium and extracting newly created plutonium from depleted fuel stocks could improve fuel efficiency by thirty-five percent. In practice, that value may turn out to be lower and confined to plutonium extraction. The US, and presumably the Soviet Union, carry out plutonium separation on a substantial scale, mainly for weapons and medical research purposes. Several Western countries also have demonstrated the capacity for fuel recycling and are on the verge of doing so on a routine commercial basis. For the time being, recycling is a costly process but it provides, in conjunction with heavy water natural uranium reactors, a degree of "nuclear independence." As ACDA points out, such a "heavy water/plutonium reuse fuel cycle would not produce particularly inexpensive electric power, but would be a potential danger because it could supply the material for a large number of nuclear weapons."

The US operates no recycling facilities for fuels used in civilian reactors because of weapons proliferation concerns. Some experts feel this self-restraint may have tangential effects on the US nuclear weapons arsenal. Under certain conditions, temporary shortages of nuclear materials could slow down the deployment of new MIRVed systems, such as MX and Trident, these experts believe. West Germany and France are marketing reprocessing facilities abroad, a fact that shows the futility of unilaterally suppressing this technology in the US.

New Generation Breeder Reactors

Compared to the relatively modest gain in fuel efficiency made possible by recycling, the fast breeder reactor technology promises revolutionary advance, fifty to sixty times above the level of light water reactors. Although the US pioneered this technology, the Soviet Union, France, England, and West Germany now lead in this field.

The breeder's main distinguishing feature is, as the name implies, its ability to create more fissile material than it consumes. It does so because of its fast-neutron reactor, meaning the neutrons are not slowed down by a moderator between the time they are expelled from split atoms and the time of the next chain reaction. The start-up fuel of fast breeder reactors is a mixture of plutonium and uranium-238. The plutonium initiates the chain reactions. In addition to generating thermal energy, the fast neutron breeder reactor breeds plutonium from the natural or depleted uranium in its core as well as from the "breeding blanket" that encases it.

Periodically, the breeder's fuel rods must be renewed. Every time that happens, more plutonium is recovered than was put into the system the previous time. The newly created plutonium can be used in other reactors. In practical terms, breeder technology appears capable of meeting the world's energy needs for centuries to come because it increases the amount of energy from a specific amount of uranium almost a hundredfold and permits the use of low-grade ore.

In the eyes of environmentalists and other causists, the pluses of the breeder are outweighed by its dependence on a "plutonium economy." Without proper safeguards, the breeder's plutonium production and attendant need for large-scale plutonium recycling facilities would indeed increase the danger of nuclear weapons proliferation.

There is concern, possibly inflated, over massive contamination because of the clearly toxic character of plutonium. Hard evidence from experience in weapons manufacturing and subsequent findings about the efficiency of protective safeguards by the Nuclear Regulatory Commission and other agencies have not allayed some of this concern. (The health hazard of plutonium appears to be considerably below that of burning coal.) Even though several industrialized nations are moving toward conversion to power generation by breeder reactors, the White House this year decided to slow down US efforts by cutting R&D funding by about one-fourth from the proposed level. Reasons given were that potential benefits "must be weighed against the safety questions associated with the [breeder reactor] and the dangers of nuclear proliferation from plutonium processing."

It is perhaps ironic that two prominent members of the Carter Administration had participated in comprehensive, high-powered studies that reached different

NUMBER OF POTENTIAL NUCLEAR WEAPONS PER YEAR FROM A 1,000-MEGAWATT CIVILIAN POWER REACTOR

Reactor Type	Potential Weapons*	Remarks
LWR—Light Water Reactor	10–70	This is the type of reactor produced currently in the United States. Weapons from plutonium output if spent fuel is reprocessed. If plutonium recycle is used, up to 50 weapons available from annual input.
Natural Uranium Heavy Water Reactor	10–50	Weapons from plutonium output if plutonium is reprocessed. But plutonium recycle appears less economically attractive.
LMFBR—Liquid Metal Fast Breeder Reactor	20–100	Weapons from plutonium output after reprocessing. Depending on design, initial loading involves enough plutonium for up to 500 weapons. LMFBR plutonium is generally of high fissile content, but must be separated from fuel.

* Based on a range of assumptions about the quality of nuclear material in weapons and the design and operating characteristics of nuclear reactors.

conclusions. In 1975, Defense Secretary Harold Brown, then President of the California Institute of Technology, signed a statement along with some thirty other prominent scientists (including eleven Nobel Prize winners in physics, chemistry, or physiology and medicine) that is part of ERDA's fact sheet on breeder reactors. It asserts in part: "Contrary to the scare publicity given to some mistakes that have occurred, no appreciable amount of radioactive material has escaped from any commercial US power reactor. We have confidence that technical ingenuity and care in operation can continue to improve the safety in all phases of the nuclear power program, including the difficult areas of transportation and nuclear waste disposal."

Equally noteworthy were the conclusions of CED's September 1976 report, among whose signatories was the then President and Chairman of the Board of the Bendix Corp. and now Secretary of the Treasury, W. Michael Blumenthal. In part that study found that "if plutonium extraction becomes common in the rest of the world, most of the benefits that might have been hoped for from a deliberate suppression of plutonium extraction in this country will simply not materialize." The CED study also warned that "nuclear isolationism is simply not an available option for the United States. The question is not whether the benefits are worth the risks. The United States cannot eliminate the risk by foregoing the benefits. Worse, this country can lose what leadership it has in world nuclear development" in so doing without gain in either national or internal security. Merely denying a domestic source of "critical nuclear materials to an organization capable of the rest of the task would not increase the difficulty [of building nuclear weapons] very much," the study concluded.

But a just-released Ford Foundation study of plutonium recycling and breeder reactors by twenty-one prominent scientists—including Secretary Brown—recommended delaying application of these technologies until the twenty-first century. The two-year study, which found favor in the White House, urged this go-slow policy in the interest of curbing the spread of nuclear weapons, in spite of West European and Japanese development of breeder reactors. The study urged an increase in US uranium enrichment capacity as an alternative to the plutonium-related technologies.

By the year 2000, the cumulative, worldwide nuclear power market could reach "several hundred billion dollars," according to ERDA estimates. The impact on the US economy of not competing for this market would be major.

The Real Threshold: Critical Mass

While the step from commercial nuclear power to nuclear weapons takes time and often can be detected in advance, this need not be so, as the Indian experience of 1974 demonstrated. The concentration of fissile material required for an explosive chain reaction is the so-called critical mass. It varies within definable bounds, although it is possible that new sophisticated techniques and materials could reduce presently accepted standards. In general terms, however, critical mass in crude nuclear weapons requires at least five kilograms (about eleven pounds) of relatively pure plutonium-239, or about twenty-five kilograms (about fifty-five pounds) of uranium-235.

The common technique for initiating the process is "squeezing" the fissile material through "implosion," caused by chemical explosives. The efficiency of this technique, the purity of the fissile material (usually called special nuclear material or SNM), and other basic design features determine the need for quantities of SNM above the critical mass minimum to assure a given yield measured in kilotons. (Almost all strategic nuclear weapons of the US and USSR are fusion weapons that use fissile materials as the "trigger" rather than for the main source of their yield. This is not true in the case of many theater weapons.)

The critical mass values provide a reasonably accurate yardstick for calculating the approximate number of weapons that could be built from the by-products of nuclear power generation by countries suspected of planning to do so surreptitiously. (There are other sensors, of a classified nature, that can provide broad information about another country's fissile material production. These findings are thought to be very rough and not always reliable unless corroborated by other intelligence.)

The ability to determine if a third country is about to

"go nuclear" in a weapon sense is probably adequate if a major military capability is sought; it must be considered inadequate if the country's objective is limited to a small number of low-yield weapons, meant perhaps for intimidating a "nonnuclear" neighbor. According to ACDA, the "warning time" will shrink from months to "days and weeks" with the advent of plutonium recycling and breeder reactors, and it would be "reduced to zero" in the case of countries using peaceful nuclear explosions (PNEs) for excavation and similar purposes.

Treaties and Controls

Applying safeguards against nuclear proliferation on an international scale is the job of the International Atomic Energy Agency (IAEA) headquartered in Vienna, Austria, which was created in 1957 and which now has 106 members. IAEA's basic mission is to detect any diversion of significant quantities of commercial nuclear material through materials accounting, remote monitoring, and inspection procedures. In the case of flagrant, persistent violations, the international agency reports the incident to the United Nations Security Council and General Assembly. The IAEA's Board of Directors is empowered to suspend the violator's membership rights and privileges and to recall all IAEA-sponsored material and technical assistance. The UN can invoke further sanctions on an *ad hoc* basis.

Closely linked to IAEA's safeguards is the Nonproliferation Treaty (NPT) of 1970. Cosponsored by the United States, the Soviet Union, and the United Kingdom, NPT now has ninety-eight full members and twelve signatories. Among the nonmember and nonsignatory states are two nations—France and the People's Republic of China—that have major nuclear weapon capability, and several that could but do not now have such systems. Under this treaty, nuclear-weapon states agree not to transfer nuclear explosives or control over them to nations that don't have them. States without nuclear weapons agree not to acquire weapons, and to place all of their civilian nuclear activities under the safeguard agreements and verification procedures of the IAEA. All treaty members agree also to extend these safeguards to their nuclear exports to any nonnuclear weapon state. The treaty promotes cooperation in the development of peaceful nuclear technologies and commits its members to negotiations "in good faith" toward nuclear arms control and disarmament. Refinement and modernization of NPT provisions take place frequently as the result of review conferences.

While there have been no known violations of the treaty, major deficiencies do exist. The most decisive weakness is that a sizable number of countries, some with nuclear weapons capabilities, and others with nuclear ambitions, have not signed the accord. Other potential deficiencies include the right of members to withdraw on ninety days' notice, and problems concerning peaceful nuclear explosions.

The US spent some $200 million over a period of years to explore the feasibility of using nuclear devices for large-scale excavation work, but failed to realize any appreciable benefits compared to conventional excavation methods. The US offered to share its findings with other nations. But interest in PNEs persists abroad in spite of—or perhaps because of—the direct bridge they provide to nuclear weapons capability. As ACDA points out, if PNEs "should win widespread acceptance, then nonproliferation efforts will face serious challenges." In the last analysis, however, no treaty of any kind is likely to deter a nation from seeking nuclear arms if it views its survival as dependent on them. Only interlocking mutual security arrangements, confidence in their reliability and durability, and fear of political and economic sanctions promptly invoked in case of transgression can provide credible, permanent incentives for nonproliferation by "have-not" nations.

But not even such utopian conditions will be effective against another form of nuclear-weapons proliferation—the theft of fissile materials, or even weapons, by terrorists or dissidents with enough nuclear know-how to use them. Steadily tightening security precautions have reduced the probability of such an occurrence to near zero in politically stable countries and lowered it considerably in the case of others. Of course, such acts cannot be categorically ruled out. But the notion that the world should forego the benefits of nuclear power generation to forestall the remote risk of nuclear terrorism is probably not wise and certainly not practical.

Treaties on Nuclear Weapons

While all international arrangements on nuclear material and technology potentially affect US national security, that condition obtains directly in the case of accords governing the testing, development, and deployment of nuclear weapons. The US entered into several multinational or bilateral treaties of this type and is considering others. Whether this nation's security gained or lost as a result is open to question.

The first major commitment was the Limited Test Ban Treaty of 1963, now adhered to by more than 100 countries. The accord outlaws nuclear weapons tests in the atmosphere, space, and under water, and prohibits underground nuclear explosions that produce radioactive debris outside the territory of the nation conducting the test.

It was preceded by two important occurrences. In 1961 and 1962, the Soviet Union conducted a series of tests culminating in the explosion of a fifty-eight-megaton device in the upper atmosphere, by far the most powerful detonation of the nuclear age. This test provided the Soviet Union with invaluable information about important nuclear effects on command control and communications and weapons survivability that the US lacked. The United States had begun a unilateral, self-imposed moratorium of all nuclear testing on November 7, 1958, in order to coax the Soviet Union into doing likewise. A year later, the USSR indeed announced that it would abstain from further tests as long as the Western powers observed the moratorium. But Moscow resumed massive testing in August 1961, ostensibly in response to a French weapons test four

months earlier. Upon completion of that prolonged test program, the Soviet Union proposed a new moratorium, which was rejected by President Kennedy in strong terms: ". . . We know enough now about broken negotiations, secret preparations, and the advantages gained from a long test series never to offer again an uninspected moratorium. . . ."

What was not known at the time was the fact that the moratorium could have had disastrous effects on US national security. The original Polaris SLBM system, introduced during the moratorium, was equipped with failure-prone warheads. In subsequent underground tests of key components, the failure rate was found to be excessive, clearly attributable to the gap in knowledge caused by the moratorium.

The Outer Space Treaty of October 10, 1967, signed by seventy-three countries, including the US and the USSR, is probably the least controversial nuclear accord. It prohibits military installations or weapons on celestial bodies and placing in orbit any objects carrying "nuclear weapons of mass destruction." The Soviet Fractional Orbital Bombardment System (FOBS) could be seen as violating this accord but there is no evidence that nuclear payloads were ever deployed during FOBS's infrequent flight-tests. The Seabed Arms Control Treaty of 1971 is another "preventive" accord that bans placing weapons of mass destruction on or below the ocean floors.

The most recent nuclear accords are twin agreements between the US and the Soviet Union: the Threshold Test Ban Treaty (TTBT), and the PNE Treaty. The first establishes a maximum yield "threshold" of 150 kilotons on underground weapon tests; the parallel treaty on peaceful nuclear explosions places an identical limit on individual detonations and an aggregate limit of 1,500 kilotons on group explosions serving nonmilitary purposes. Both sides intensified testing of higher yield devices before the Threshold Treaty became effective a year ago. This compression of the test sequence—involving more than twenty underground detonations—had a negative effect on the new MK 12A, higher yield warhead of Minuteman III because test data were not fully "digested" between shots. As a result, difficulties were encountered in obtaining the required warhead yield.

The twin accords had other blemishes. Yield of devices to be tested for the first time cannot be predicted with high accuracy. Neither can it be measured precisely by the seismic devices of the other side. Because of the first uncertainty, the US is holding its test firings to yield levels below the 150-KT limit. There is strong circumstantial evidence that the USSR is going in the other direction and has exceeded the limit, probably on the assumption that the US can't prove modest breaches of the threshold.

The Problems of Comprehensive Test Bans

Influential arms control proponents in the US view the Threshold pact as inadequate and advocate its replacement by a Comprehensive Test Ban Treaty (CTB). On March 17, President Carter told the United Nations that this country will "explore the possibility of a total cessation of nuclear testings. While our ultimate goal is for all nuclear powers to end testing, we do not regard this as a prerequisite for suspension of tests by the two principal nuclear powers." This goal is difficult to attain, however, and, unless firmly linked to new arms accords, could open pitfalls for the US. No means exist to detect small nuclear detonations of a few kilotons' yield. The earth's natural noise masks low-power detonations. It can be argued that the value of such detonations to nuclear weapons *designers* is marginal; but they can be crucial for the study of nuclear effects and for assuring the survivability of weapon systems in a nuclear environment.

A critical situation could arise also if CTB does not outlaw peaceful nuclear explosions. The USSR apparently is determined to continue this technique while the US has written it off as impractical. Yet PNEs could provide the USSR with exclusive information important to her weapons designers, even though US observers and their instruments were at the site.

A rigorously applied CTB presumably would affect equally the ability of both the US and the USSR to improve the nuclear efficiency of their strategic weapons. But this seemingly fair picture is tilted as long as the USSR retains its current vast throw-weight advantage. Yield-to-weight, the principal measure of merit for nuclear weapons efficiency and, in the case of fusion weapons, the associated ability to make the fission trigger as small as possible, are crucial if throw-weight is limited. Without testing, future warheads will have to be designed with a wide margin of error. This exacts penalties in weight, cost, and efficient use of the special nuclear material. The fission trigger, even though it may provide only about twenty percent of a reentry vehicle's yield (but all its nuclear fallout), weighs more, costs far more than the fusion portion of the weapon, and may be in short supply in the future. (The latter condition, many experts believe, could be prevented through modernization. Older weapons, especially those deployed in Europe, contain inordinately large quantities of SNM that could be used far more sparingly—and therefore would go farther—in technologically advanced weapons. But this, too, depends on testing.)

Another crucial question connected with CTB involves the reliability of stockpiles of SNM. Without testing samples of nuclear weapons built in the past, there can be no assurance that older systems are still in working order.

Some nuclear weapons experts view CTB as mortgaging the future because it may preclude the development of new weapons vital to US security a decade or more from now. This perception may be extreme. It would seem reasonable, however, in light of past experiences that evoked President Kennedy's warning, that as a *sine qua non* the US enter into no accords that are not verifiable, or that subject this nation to asymmetrical restrictions. ■

The Wayward Press (Lone Eagle Div.)

Lindbergh's Journalistic Flight or Lindbergh: Did He Serve Aviation or Newspapers?

Fifty years ago, US newspapers used 25,000 tons of paper, plus ink, to exploit the accomplishment of Lucky Lindy and the *Spirit of St. Louis*. The press claimed it did as good a job of reporting as he did as a pilot. Charles A. Lindbergh remained skeptical.

BY CLAUDE WITZE, SENIOR EDITOR

IN 1927, American newspapers bought 25,000 tons of newsprint beyond their anticipated normal consumption for the year. The paper was used to print headlines and stories about Charles A. Lindbergh, his solo flight to Paris in the *Spirit of St. Louis,* and his triumphal coast-to-coast reception afterward by a jubilant nation.

It was the newspaper story of the century. So far, the aeronautical story of the century is man's landing on the moon in 1969, which had relatively little impact on newspaper output, though it was a far more spectacular achievement, costly to the citizenry itself, infinitely complex, and still of undetermined scientific significance.

The newspapers of fifty years ago had no competition from television. Radio, in that day, was a cumbersome thing, disrupted by static and restricted, for the most part, to the broadcast of sparse news bulletins. There were exceptions, such as the feeble effort to broadcast major prizefights from ringside. But a substantial part of the audience heard these through earphones, with the signal interpreted by a crystal, a cat's whisker, and some wire wound around an oatmeal box.

There were plenty of newspapers. Media was a noun that meant the plural of medium. Reporters were not handicapped by notions of advocacy journalism and the idea that what they wrote had to have social impact. They were after the news, spurred by bosses who were after circulation. The craft was competitive in its own house; there was a multiplicity of newspapers. Most of them had multiple editions each day and, in journalism's Heaven, each edition had a new sensational headline. A few oldtimers can remember when we published an EXTRA, which was hawked on the streets by eager newsboys, before the days of vending machines. Lindbergh spawned many an EXTRA. The last one I helped put out rolled off the press late on Sunday, December 7, 1941. If there has been one since, I have not seen it.

A Newspaper Natural

Lindbergh—headline writers called him "Lucky Lindy," "The Flying Fool," and "The Lone Eagle"—was a newspaper natural. There was a fast-growing interest in aviation. And the most renowned hero of his era soon dominated the front pages. This was well illustrated by the New York *Times.* There was an aviation fever rising in America, and almost every day page one had a story about some modern explorer and his flying machine. On Sunday, April 10, 1927, the *Times* proclaimed:

Two Famous Navy Fliers Preparing
For Dashes Across Atlantic Next Month:
Both to Report by Wireless to the TIMES

The flyers were Cmdr. Richard E. Byrd and Lt. Cmdr. Noel Davis, who wanted to win a $25,000 prize offered by Raymond Orteig of Paris for the first transatlantic flight between New York and Paris. In that same Sunday paper, back on page 24, there was a small item from St. Louis. The name of Charles A. Lindbergh appeared in the *Times* for the first time less than six weeks before he became the most acclaimed international hero of all time.

The *Times* was one of the few newspapers that found room for that story on April 10. Meyer Berger, in his 1951 book, *Story of the New York Times,* practically accuses that day's editors of managing the news. Berger says that the *Times* first heard about Lindbergh from E. Lansing Ray, publisher of the St. Louis *Globe Democrat.* Ray was a fellow-member of the Board of Directors of the Associated Press with Adolph S. Ochs, publisher of the *Times* from 1896 to 1935. Writes Berger:

"Ray had enthusiastically assured Ochs and other newspaper executives at the annual [AP] board luncheon that Lindbergh was an extraordinary flier. He said that Harry Knight, President of the Aero Club of St. Louis, would handle any contracts for Lindbergh ocean-flight stories. No one bothered to follow up the

The man and his airplane in a photo taken at Curtiss Field, before he moved to Roosevelt Field for takeoff. The press was eagerly standing by, with cash in hand.

lead because all eyes were on Byrd and Chamberlin." ("Chamberlin" was Clarence Chamberlin, a part-time test pilot for the Wright Aeronautical Corp., who, on June 4–5, 1927, with Charles Levine aboard, flew the Bellanca-built airplane, the *Columbia,* nonstop from New York to the village of Eisleben, 110 miles southwest of Berlin.)

Lindbergh's account of his own flight, published in 1927 as a small book titled *We,* said he "found that there were a number of public-spirited men in St. Louis sufficiently interested in aviation to finance such a project" as his flight to Paris. He did not include the fact that Mr. Ray, of the *Globe-Democrat,* was one who advanced $1,000 and was assured the story rights for the St. Louis area.

The Berger account makes it clear that Harry Knight was the key contact. He made the deal with Mr. Ray, who, in turn, helped seek outlets in other cities. New York was an important one. Seven days before the Lindbergh takeoff, according to Berger, Arthur Hays Sulzberger, who was the son-in-law of Mr. Ochs and already in training to take command of the newspaper, had a brief phone conversation with Harry Knight and then dictated a memo:

"The New York *Times* agrees to pay $1,000 to bind the contract, with a further payment of $4,000, making a total of $5,000, in the event of a successful flight to Paris, this payment to cover world rights to the story.

"Should the flight not be successful, it is agreed that we are to have an option on the story for the payment of an additional $1,000 to the $1,000 already paid.

"Should the flight actually not start, Mr. Knight agrees to return to us the $1,000 binder money."

Fifty years later, the New York *Times* was casting editorial aspersions on newspapers or television networks that stooped to paying cash to news sources.

World Rights to the Story

With the Sulzberger memo on his desk, Frederick T. Birchall, the editor, sent a cable to Edwin James, the newspaper's chief correspondent in Paris:

"Have just purchased world news rights to Lindbergh flight, which probably starts tonight. Lindbergh instructed silence except to *Times* correspondent bearing your credentials. Prepare to isolate him if he's successful. In event of failure and rescue he communicates with us by whatever means possible."

Weather held up Lindbergh's departure for a week. It is not clear whether he agreed to all the Birchall restrictions, but the Berger book says the flyer came to the *Times* studio on May 17 to be photographed. The idea that he could be isolated and talk only to the *Times* is contrary today to most newspaper practice and ethical standards. The people's right to know, presumably, is not limited by the ability to pay cash.

The *Times* episode cannot be finished without noting that Mr. Birchall's program was knocked askew. Ed James made a valiant effort, deploying his staff in and around Le Bourget airport hours in advance of what then was the possibility that Lindbergh would make it. He managed to file a story and the *Times* of Sunday, May 22, proclaimed:

Lindbergh Does It! To Paris in 33½ Hours;
Flies 1,000 Miles Through Snow and Sleet;
Cheering French Carry Him Off the Field

Wrote James in his lead:

"Lindbergh did it. Twenty minutes after 10 o'clock tonight, suddenly and softly there slipped out of the darkness a gray-white airplane as 25,000 pairs of eyes strained toward it. At 10:24 the *Spirit of St. Louis* landed and lines of soldiers, ranks of policemen and stout steel fences went down before a mad rush as irresistible as the tides of the ocean."

How a veteran reporter could be so wrong in his crowd estimate never was made clear. Four days later, James wrote a better story about the experience and this time said there were "150,000 people gone suddenly insane with joy." The *Times* reporter and his aides never got near Lindbergh at Le Bourget. Said one of them: "I wish the editor who sent that message had been here to isolate him. That's what I wish." Commented James: "Next time Lindbergh does it, if France will mobilize her army to keep Le Bourget clear, we shall try to isolate Lindbergh."

Lindbergh did write of his exploits for the *Times* and

papers subscribing to the service, and the Sulzberger ceiling of $5,000 was abandoned. Publisher Ochs ruled that the revenue should go to the young pilot and he got it. It amounted to more than $60,000.

As Lindbergh visited a few cities in Europe—Brussels, London—and then came back for wild welcomes in Washington, New York, St. Louis, and on to the West Coast, the press continued to exploit his achievement. As late in the year as September 20, there was a huge welcoming rally at the Los Angeles Coliseum, preceded by a parade. The headlines and news stories poured out each day. Some of them were funny.

'I Won't Be Made a Tin God'

The Women's Christian Temperance Union issued a circular calling on all young men to follow the Lindbergh example and refuse to use cigarettes. The flyer was irritated. On August 9, the St. Louis *Globe-Democrat* carried a dispatch from Cincinnati reporting that Lindbergh had smoked a cigarette during a banquet given in his honor by the local Chamber of Commerce. The newspaper quoted him:

"I won't be made a tin god by the W.C.T.U. or anybody else. I don't make a habit of smoking, but I will smoke a cigarette any time I desire. I won't be held up to the youth of the nation as an example any longer. If the W.C.T.U. don't quit issuing these circulars, I will take a drink, I'll be dad-burned if I don't."

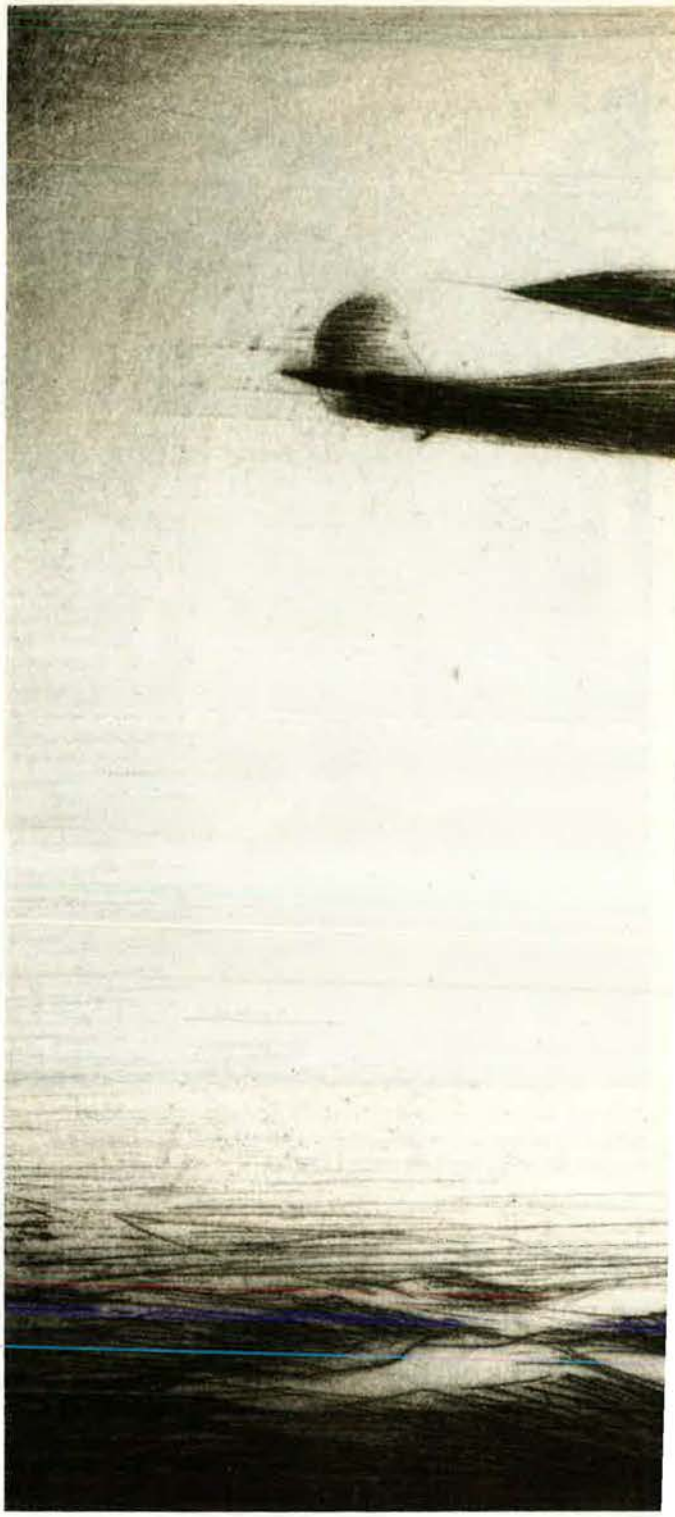
The newspaper continued:

"Lindy said he was tired of being held up as a model young man and wished people would let him alone and give him a chance to rest. He was tired, he declared, of being looked at from morning till night and of being followed." At the Cincinnati hotel, he was let out of a side door to avoid the lobby crowd.

The W.C.T.U. had some impact, because the Missouri Historical Society later received a donation for the Lindbergh memorial from a young girl who said she had given up smoking and intoxicating beverages until she became eighteen years old. She said she was doing this with a pledge to Lindbergh.

Another admirer sent him a monkey, which may be the only gift not on display today in the special Lindbergh museum in St. Louis. Each of the presents brought more publicity. There is a gold thermos bottle from the Commerce, War, and Navy Departments. There are many gold and silver models of the *Spirit of St. Louis,* one of them encrusted with diamonds. There are keys to what must be most of the major cities in North and South America.

The museum has Lindbergh's flying suit, his canteen, aeronautical charts, and compass on display. In adjoining cases are his honorary membership cards in the Chauffeurs Association of Bogotá and the High Noon Club of Chicago. There is a lifetime pass good for rides on the Canadian National Railways and more medals, from all over the world, than any private citizen has ever had. There is a gold trowel presented by the Bricklayer's Local #9, AFL, of Sacramento, a Masonic gavel, a gold sword from the City of Hamburg, and six bottles of Holland gin presented by Schiedam, the Netherlands. A complete inventory would fill a book.



There were two things behind all this. Lindbergh himself was an immensely attractive young man. He was handsome in the Young Viking sense, modest, and exuded a charisma that instantly won the hearts of the American people and everyone overseas. He was extremely competent. Of all the flyers who took off over the ocean in that period, he was the only one who landed at his chosen destination. There was some luck in that navigation, but also a great deal of skill. He had perfected it as an air-mail pilot.

This is Ireland, *an etching made by artist Levon West for the New York* Times, *one of the newspapers most interested in Lindbergh's flight. It depicts the* Spirit of St. Louis *about to make its landfall. Under the name Ivan Dmitri, Levon West was also a noted photographer.*

The second factor, which had firm foundations in what Lindbergh had to offer, was the role of the press, which exploited him. The St. Louis *Globe-Democrat* and the New York *Times* led a vanguard of ink-stained entrepreneurs who found a way to sell an extra 25,000 tons of newsprint by filling it with what we can only call the Lindbergh Saga. There were millions of words of good newspaper copy, written by competent reporters. There also were more millions of words that could not find their way into print today, fifty years later. Newspapers in 1977 are more sophisticated, more parsimonious. They would question the social significance of what Lindbergh was doing. Television holds a tight grip on banality; newspapers are aware of this and are trying to be less trite.

It is interesting that when Lindbergh was asked to speak, as an awkward but charming airplane pilot in 1927, he frequently spoke about his flight to Paris as a trailblazer. Commercial flights, carrying passengers, would someday go over the Atlantic.

On Saturday, June 11, 1927, the capital city of Washington belonged to Lindbergh. He came in from France on the cruiser *Memphis,* which had been sent by President Calvin Coolidge to bring him home. The city went wild. Skipping details, we will go to a special meeting of the National Press Club at the Washington Auditorium. There must be something significant about the fact that Richard V. Oulahan, Washington bureau chief of the New York *Times,* gave the opening address. He was an active member of the Press Club, but never its president.

Mr. Oulahan was frank in addressing Lindbergh. He spoke of "your journalistic flight of the past three weeks," which amounted to a declaration that the pilot had done more for newspapering than he had done for aviation. The spokesman for the National Press Club used flowery language. He spoke of "an accomplishment so daring, so superb in achievement, by the picture presented of that onrushing chariot of dauntless youth, flashing across uncharted heavens straight through the storm's barrage." The world, he said, was carried off its feet. There was no mention of the fact that the New York *Times,* Mr. Oulahan's paper, also was carried away and trying frantically to sell its copy to other newspapers. Instead, he said the press was inspired and had done as good a job of newspapering as Lindbergh had done as a pilot. Mr. Oulahan went on:

"It [the press] performed as fine a mission in chronicling the subsequent conduct of our young Ambassador of Good Will. His words and bearing dissipated vapors of misunderstanding. He personified, to a Europe amazed at the revelation, the real spirit of America.

"The press should be proud then, if in telling the story of this later phase in the career of the American boy, it brought to the peoples of the world a new realization that clean living, clean thinking, fair play and sportsmanship, modesty of speech and manner, faith in a mother's prayers, have a front page news value intriguing imagination and inviting emulation, and are still potent as fundamentals of success."

It is doubtful that the National Press Club has heard anything like it since 1927. Lindbergh, who must have been aghast and embarrassed, responded with appreciation for the warm reception. Then he proceeded to give the press a "news analysis," a résumé of what they had missed that was significant. He said that Europeans had nothing like America's then still-feeble air-mail service. He pointed out that there were passenger airlines in Europe, not only air-mail service, as in America.

"All Europe is covered with a network of lines carrying passengers between all the big cities," he told the newspapermen. "Now it is up to us to create and develop passenger lines that compare with our mail routes." He went on to oppose government subsidies, but to endorse the construction of more US airports.

The Commercial Aviation Gap

Lindbergh pursued the same subject in some of the articles he wrote for the *Times,* the *Globe-Democrat,* and their affiliated newspapers. He insisted that there was a commercial aviation gap between Europe and the US. What was critical? He wrote:

"As I see it, aviation has reached the stage where prospect of development of flying depends on money. What is really needed are capitalists who are willing to risk large sums on the future of aviation."

There must have been others with the same idea. The *Wall Street Journal* of May 25, 1927, broke its silence on the Lindbergh story for the first time. It reported that Wright Aeronautical Corp. stock had gone from 28⅝ to 39 dollars a share, adding about $2,500,000 to the company's paper value. The *Spirit of St. Louis* had been powered by a Wright Whirlwind engine.

Some newspapers agreed with Lindbergh on the rosy outlook for aviation, others did not. The St. Louis *Post-Dispatch* editorialized that "there can be no doubt whatever that transatlantic flight is destined to become, in no great time, a commonplace event of every day. Planes will cross the seas with as little concern, and perhaps as little danger, as surface ships do now."

At the Milwaukee *Journal,* the editorial writer was more skeptical. His essay was headed "With the Flying Fool," and it argued that the Lindbergh flight's value was not worth the risk. The New York *World* printed a letter to the editor from a lady named Gertrude Minton Pinchot. She said she had talked with experts in aeronautics and now knew for a fact that no attempted flight across the ocean had much chance of success. And if one pilot did make it, because he is gallant and reckless, that would prove nothing.

There were, of course, a few newspaper reporters who took aviation, and particularly Lindbergh, seri-

An Aviation Reporting First

No report on press coverage of the Lindbergh flight in 1927 would be complete without mention of the *Survey,* a weekly published by students at the Brooklyn Technical High School in Brooklyn, N. Y.

Friday, May 20, 1927, was the day of the annual Brooklyn Tech outing and picnic. About 2,500 boys and their parents and teachers embarked on the *Alexander Hamilton,* a palatial and famous steamer operated by the Hudson River Day Line. They rode up river to Indian Point Park for a festive day, and returned.

Radio was still in its infancy, but the student body included several radio buffs, who had built their own receivers. One of them rigged a copper wire antenna on the upper deck. Below, in a cabin, the staff of the *Survey,* equipped with a mimeograph machine, published two abbreviated editions of the school newspaper during the trip. This item was printed:

"Special dispatch: Through the medium of Jack Hartley and his radio we hear that Lindbergh, The Flyin' Fool, started his Paris flight at 7:25 this morning. Here's luck!"

As always, there was a typographical error. The correct starting time was 7:52, not 7:25.

The editor of the *Survey,* and the author of the item, was seventeen-year-old Claude Witze.

—THE EDITORS

ously enough to give their readers accurate technical information about the man, his aircraft, and how he approached his problems. This was evident in some of the material from San Diego, where the *Spirit of St. Louis* had been made to order by Ryan Airlines.

It was apparent again in the stories about Lindbergh's takeoff from Roosevelt Field, on Long Island. Both C. B. Allen of the New York *World* and Lauren D. ("Deac") Lyman of the New York *Times* were there and provided expert coverage of the flight preparations and the takeoff. The two men were lifelong friends and for many years continued to be Lindbergh's closest confidants in the newspaper world. Allen and Lyman both are mentioned in the heavy 1971 *Wartime Journals of Charles A. Lindbergh* and are identified there as close friends of the pilot.

At the takeoff, when the *Spirit of St. Louis* with its overload of fuel literally staggered into the air, it was Allen and Lyman who led the pack of newsmen monitoring the runway. They were, for the most part, legmen for their news desks in New York City, dashing to the telephone with frequent bulletins. But these two were the only reporters there who went on to distinguished careers in journalism and aviation.

Lyman won the Pulitzer Prize for his exclusive story in the *Times* that disclosed Lindbergh's decision in 1936 to flee America and live in England. After that, the reporter joined United Aircraft Corp., now United Technologies, where he became a vice president. C. B. Allen, who was a competent pilot in his own right, served as a member of the US Air Safety Board, a forerunner of the Civil Aeronautics Board, and still later continued his newspaper work. He covered aviation, after the *World* folded in 1931, for the New York *World-Telegram* and then for the *Herald Tribune.* He was present at Lakehurst, N. J., when the dirigible *Hindenburg* crashed in 1937. Allen served in the Air Transport Command in World War II. He left the newspaper business in 1953 and became an assistant to the president of the Martin Co. until his retirement in 1968.

Lyman and Allen were singled out in 1965 for distinction by the US Air Force. Each was given a citation "for adding to the world's knowledge of flight." The awards were conferred by USAF Secretary Eugene M. Zuckert, who said of them:

"Beginning around 1925, these two close friends covered the news of a great period in aviation history with such accuracy, thoroughness, and clarity that they earned the lasting respect and friendship of military and civilian aviators throughout the country."

The anniversary of the flight to Paris is not a fitting time to follow Lindbergh and the press into the troublesome years that were to come. There is, however, a story involving William Randolph Hearst that must go in the record. Like other newspaper giants, Hearst was aware of the enthusiasm for aviation in the mid-1920s and saw many opportunities to capitalize on it in his business, which was mass newspaper circulation. One of his editors, Philip Payne of the New York *Daily Mirror,* was lost at sea in one of the flights backed by Hearst. But he missed the ground floor deal on the Lindbergh venture.

When Lindbergh returned from Paris, Hearst offered him $500,000 cash and part of the profits for the right to make a screen story of his life. Lindbergh turned him down flat. Later in the year, the Hearst newspapers started a campaign of vilification against the government of Mexico that became so heated it resulted in a congressional investigation, and President Coolidge dispatched Lindbergh to Mexico City to see if he could patch things up as a good-will ambassador. The official ambassador was Dwight Morrow, and it was on this trip that Lindbergh met Morrow's daughter, Anne, who became Mrs. Lindbergh.

About five years later, when the son of Anne and Charles Lindbergh was kidnapped, Hearst dispatched his star reporter to Hopewell, N. J., to work on the story. W. A. Swanberg tells what happened in his 1961 biography, *Citizen Hearst.* Here is the paragraph:

"[Brisbane] picked up the telephone and called Hopewell 7, the Lindbergh number. 'This is Arthur Brisbane,' he said over the wire, 'I'd like to come over and talk to you.' There was a pause. Then he said, 'I don't think you heard me. This is *Arthur Brisbane* speaking.' A look of amazement came over his face. 'Are you sure,' he demanded, 'that you understand that this is Arthur Brisbane?' There was another pause, after which he slammed down the receiver angrily. . . ."

Press Relations Ebb

There was immediate provocation, but the roots of Lindbergh's almost fanatic demand for privacy and anonymity, which led many newspapermen to dislike him, were deep in the bog of ink and newsprint spread across the nation in 1927. Henry H. Adams, in his *Years of Deadly Peril,* says of Lindbergh: "The sensational press had made a recluse of him." Lindbergh had met more than one Arthur Brisbane.

The 1927 news stories give no hint of this. When Lindbergh returned to St. Louis, which he claimed as his legal residence, he met the press at the home of Harry Knight. A local reporter found him a sharp match: ". . . he had a good time with reporters. He was like a boy with a new game. He thoroughly enjoyed it and was seemingly inspired. Twice when Harry Knight reminded his guest he was tired and the interview should be terminated, Lindbergh waved him aside. 'Let them go on five minutes more. I only answer one question in five. . . .' "

The account went on to say the flyer had a sense of humor, "a sort of quiet and wondering amusement that twitched at the corners of his boyish mouth, and occasionally spread his lips in the inimitable Lindbergh smile."

The truth seems to be that things went downhill, in Lindbergh's relations with the press, from this point on. The newspapermen wore out their welcome. It was reported by the Associated Press that a New York press clipping bureau took 300,000 stories from New York newspapers alone in twelve days. It was an all-time record, set by the newspaper story of the century. There are about twenty-two years left to generate another aviation story of the century, if it is possible to overcome the lead set by the Apollo program. It is a safe bet that the Lindbergh exploitation by the press never will be matched. ■

There is little likelihood that the USSR will diminish its military efforts. Therefore, meeting manpower requirements, modernizing equipment, managing efficiently, and maintaining credible combat capability are . . .

USAF's Major Challenges

BY THE HON. JOHN C. STETSON, SECRETARY OF THE AIR FORCE

A change in the Presidency historically ushers in a period of optimism, renewed vitality, and greater dedication. Despite the problems that currently face our nation both at home and abroad, our experiences in 1977 have continued that tradition.

The reasons for this optimism and renewed faith can be traced in part to the basic confidence the American people have in the capability of their armed forces. In the short time I have been Secretary, I have talked with a great number of our military and civilian leaders and looked into most areas of major concern. My preliminary assessment is that the Air Force is in excellent condition—and the confidence of the American people is well founded.

I am proud to be a part of the Air Force team—to share this task with the men and women, military and civilian, serving throughout the nation and around the world. We undoubtedly face tough challenges and rigorous tests in the weeks and months ahead, yet I believe the Air Force team is equal to the task.

The Air Force has a rich heritage fashioned by people who accepted great responsibilities, met difficult challenges, and worked within the constraints of limited resources to get the job done. Thomas C. Reed, my predecessor, was one of those individuals. Harold Brown, a former Secretary of the Air Force and now Secretary of Defense, is another. The list is much longer, and to all of them we owe a deep sense of gratitude for their strong leadership.

But the efforts of the past do not guarantee that all will be well for the future. Long-term challenges still require hard work.

For example, the Air Force has faced persistent reductions in the purchasing power of its budget for a decade. The resulting management actions to cope with this situation reduced the size of our manpower and equipment resources. From my initial briefings, I noted that personnel levels, the number of aircraft, and the number of major installations have all been reduced by over one-third and flying hours have been reduced by more than half.

"We must seek out . . . original ideas, and enlightened management practices . . . to enhance Air Force readiness."

Although readiness and fighting capability have been preserved to a great extent by concentrating these reductions in headquarters and support areas, it is clear that the continuation of this trend could result in damage to Air Force combat capabilities.

Consequently, reduction must give way to stability and even to moderate growth if mission requirements are to continue to be met. However, I cannot envision a budget that will provide unlimited resources or relieve us of the necessity for economy and sound management. It seems to me that in the days ahead we face four major challenges: meeting manpower requirements, continuing the essential modernization of equipment, efficiently managing resources, and maintaining undiminished a credible combat capability.

I believe one of the most important elements in any endeavor is having good people. To get and keep them requires adequate compensation. Nevertheless, rising personnel costs in the services are real and visible and continue to be cause for great concern.

Vigilance and hard work toward reducing manpower costs must continue, especially because the easier solutions and the quick fixes have already been implemented. We plan to continue such initiatives as curbing permanent change of station moves and cutting training expenses. I believe efficiency and economy must be everyone's concern.

At all times, however, we must be fair and equitable with Air Force people. The military profession requires exceptional skills and dedication to perform demanding jobs, often under the most adverse circumstances. Family separations, periodic transfers, overseas service, long hours, and loss of certain personal freedoms have long been characteristic of military life.

We need to chart a stable, visible, and predictable course in total military compensation. Air Force people deserve a fair and equitable return for their hard work, and I plan to do everything I can to support this objective. The benefits question is a controversial one—and a subject close to the hearts of everyone in uniform. There are definite realities to be faced: rising personnel costs must be brought under control. However, there are a number of positive aspects. For example, the recent changes to GI Bill educational benefits struck a favorable balance between the needs of the people and the requirement for economy. For those on active duty before the end of CY 1976, there have been significant increases in benefits. For those who have joined since the first of the year, the new Veterans Educational Assistance Program will provide two-for-one cost sharing assistance for those seeking further education.

I am sure that the legitimate needs of military people will be weighed very carefully in any future changes to compensation programs. For example, I strongly believe that changes in the retirement program should keep faith with the people now on active duty. And I believe that similarly balanced perspectives will govern the overall compensation issue. If the Air Force is to continue attracting and retaining quality people, all of us must work hard to ensure that the compensation question is resolved equitably.

But adequate compensation alone

will not ensure that we get sufficient numbers of quality people. Meeting our recruiting goals in the years ahead will be a critical challenge. Each individual must help in finding and encouraging qualified young people to join the Air Force.

Another issue directly impacting on Air Force combat capabilities is equipment modernization. In reviewing recent trends, I note that last year aircraft procurement rose to more than 200 for the first time since 1970. In FY '78, the budget requests 335 new aircraft.

As in any venture in which machines play such a central role—be it business or defense—continuous, moderately paced modernization is important. It avoids the double jeopardy of reduced capacity if aging equipment is phased out, and creeping obsolescence if it is retained. Secondly, we must keep pace with the efforts of the competition to produce a better product. In the case of national defense, that product is deterrence, and the competition is the Soviet Union. I don't believe we need to match them man-for-man, gun-for-gun, but rather we need to preserve the very delicate balance of power that now exists. Modernization has begun, and I think we need to keep it going.

I have begun to familiarize myself in great detail with a number of programs that have the goal of preserving this critical balance. The B-1 is a major factor in maintaining that balance, as is the modernization of our ICBM force, and the Airborne Warning and Control System (AWACS).

The conventional force balance—centered around the F-15, F-16, and A-10 systems—will be an area of special concern and heightened interest during the next several years.

It is my desire to give a good deal of attention to research and development (R&D) programs in the months ahead, recognizing that therein lie the military capabilities of ten, twenty, or even more years in the future.

Along with our efforts in these varied areas, the common thread and indispensable element will be the management of our resources. Air Force leadership is undergoing a significant evolution. With a few very notable exceptions, management responsibilities now rest on the shoulders of post-World War II Air Force leaders.

We are now in the midst of a transition in the civilian leadership of the Air Force. There will be a new team at the civilian reins, a team that even now I am assembling. All are capable, committed, and dedicated people. Yet, to be successful, management must have the cooperation and support of all people in every echelon. Our efforts to cut costs and reduce waste will only be successful if individuals throughout the force recognize and pursue those same objectives.

We must seek out additional avenues, original ideas, and enlightened management practices to further streamline our efforts and ultimately enhance Air Force readiness and combat capability.

From what I have seen in the short time I have been on the job, I believe Air Force people are performing excellently. Furthermore, I believe they have the capacity for change, innovation, and progress.

We face a very challenging management task. I see in the future an era of limited resources, and one in which there is little expectation that the Soviet Union will diminish its efforts. We must, by necessity, seek measures to operate more economically and efficiently. However, I believe we can—at the same time—preserve the best interests of our people and conduct the modernization necessary to ensure that the Air Force has the equipment required to remain first in the world.

I am proud to be Air Force Secretary and to serve with such a dedicated, capable group of men and women. I will need your support, assistance, and fresh ideas. Together we can solve the tough problems that lie ahead. ■

Secretary Stetson believes that the B-1 is a major factor in maintaining "the very delicate balance of power that now exists" between the US and USSR.

Secretary of the Air Force John C. Stetson holds a bachelor's degree in aeronautical engineering from MIT. During World War II, he served as a Navy communications officer. From 1951 to 1965, Mr. Stetson was a member and then a partner in the management consulting firm of Booz, Allen, and Hamilton, responsible for a number of assignments with aircraft companies and major oil companies operating in the Middle East. He then became president of the Houston Post Co., and, in 1970, president of A. B. Dick Co., a manufacturer and international distributor of business machines, a position he held until his appointment as USAF's twelfth Secretary.

The Chief of Staff outlines achievements of the past year that have created greater efficiency while protecting the well-being of Air Force people. He warns that economic issues must not be allowed to undermine a major tenet of Air Force philosophy . . .

The Air Force Is a Way of Life

BY GEN. DAVID C. JONES, CHIEF OF STAFF, UNITED STATES AIR FORCE

THE editors of AIR FORCE Magazine traditionally have given the Chief of Staff this welcome opportunity to present an annual "State of the Service" message in the Almanac Issue. My previous reports and those of my predecessors generally have covered the spectrum of major Air Force programs, policies, and issues. This year, however, I plan to focus on the aspect of our Air Force that I consider to be the most important: people.

Quality

Following nearly a decade of reductions in personnel strength, our Air Force is about one-third smaller than the 1964 pre-Southeast Asia peacetime level—in fact, we are at the lowest manpower level since 1950. Therefore, it is essential that the force—active and Reserve, civilian and military—consist of the highest quality, best motivated, most productive people we can obtain. We have placed strong and continuing emphasis on quality, and our emphasis has paid off.

During the past year, we achieved our recruiting objectives while maintaining our high eligibility standards. Ninety-five percent of our enlistees were high school graduates or the equivalent. Less than one percent were below average on the Armed Services Vocational Aptitude Battery. The young men and women we recruited joined an enlisted force that, throughout its ranks, is exceptionally competent and wholly professional.

There is strong evidence that our emphasis on quality has led to higher morale and better discipline. Our Basic Military Training and Technical Training attrition rates have decreased. Our involuntary separation rate is down about fifteen percent from 1975, and the separation of people identified as marginal performers has decreased thirty-six percent. Our court-martial rate is the lowest in Air Force history.

We continue to attract and train outstanding young men and women officer candidates, and the present officer force has never been better prepared or better educated. For example, more than thirty-five percent of our officers hold master's degrees or higher.

Our civilian work force continues to be characterized by dedication and outstanding performance. From top management positions through vital technical and clerical jobs, our civilians provide expertise and continuity to a balanced Air Force team.

Our confidence in the people of the Air Reserve Forces is reflected in their crucial and increasing role in the total Air Force. Air National Guard units form a bulwark of Aerospace Defense Command interceptor alert requirements, and National Guard and Air Force Reserve KC-135s support Strategic Air Command peacetime and war-plan air refueling requirements.

Under wartime conditions, more than fifty percent of our tactical airlift effort and about half of our strategic airlift crews would come from the Air Reserve Forces. Twenty percent of our in-flight refueling, more than fifty percent of our tactical reconnaissance, and about forty percent of our fighter support would be drawn from Air Guard and Reserve Forces.

We have made great strides in equal opportunity and human relations. There are now more than 36,000 women in the Air Force, serving in ninety-six percent of all job areas—including such nontraditional occupations as aircraft maintenance and vehicle repair. Women are doing very well in their first year at the Air Force Academy and in a test program that admitted twenty women officers to pilot training this past September. Recently, six women officers entered navigator training.

Strong management emphasis on our Human Relations Education program has paid significant dividends. There is still much to be done in the human relations area, but our progress has been most encouraging.

All in all, from a people standpoint, 1976 was the best year ever for the Air Force. Quality is the hallmark of the people in today's Air Force. By almost any criterion, our people have never been better. The key result is force readiness, directly and substantially enhanced by the excellence of our people.

Despite our many people-oriented successes, there has been growing concern over another aspect of the people equation: personnel costs. It has been widely pointed out that personnel costs have increased and now consume something like fifty-six percent of the defense budget. It is true that personnel costs are going up, but increased cost is not a phenomenon unique to personnel.

To put Air Force personnel costs in context, they are lower proportionally than the US and Defense Department averages by a significant margin. As a fraction of Air Force outlays, personnel costs have declined from fifty-six percent in 1974 to a projected fifty percent in 1978. By comparison, about sixty percent of the US Gross National Product is for compensation of people.

Against this backdrop, our responsibility in the Air Force remains clear: We must maintain readiness and keep costs down. Maintaining readiness includes getting and keeping

top-quality, dedicated people who are committed to the Air Force way of life. Keeping costs down means hiring only those people we need. It also means managing all our resources even more efficiently and effectively. It does *not* mean erosion of benefits.

Taking Care of Our Own

There has been an increasing concern among our members over a range of issues categorized as the erosion of benefits. The size of the personnel budget makes it inevitable that its elements be considered and justified in the context of other budget priorities. Therefore, pay, allowances, commissary subsidies, medical care, housing, the retirement system, and other personnel expenditures have been closely scrutinized.

Although the actual changes have not been great, there has been extensive piecemeal studying and constant questioning of benefits. This has led to a perception of benefits erosion and fostered uncertainties about the future stability of benefits.

Furthermore, many of our people seem to have no clear sense that someone is looking out for their interests. There is a danger that this concern will cause our people and their families to lose their sense of identity with the Air Force—to look upon themselves as employees in an adversary relationship with their employer, rather than as members of the Air Force family.

Meanwhile, since the beginning of this decade, we have seen aspects of a fundamental shift in the nature of the military system. The basis for the shift has been well articulated by Dr. Charles Moskos of Northwestern University.

In evaluating the rationale of the 1970 "Report of the President's Commission on an All-Volunteer Armed Force," Dr. Moskos suggested that "instead of a military system anchored in the normative values of a calling—captured in words like 'duty, honor, country,' " the President's Commission "explicitly argued that primary reliance to recruit an armed force be based on monetary incentives determined by marketplace standards."

"Maintaining readiness includes getting and keeping top-quality, dedicated people who are committed to the Air Force way of life."

Gen. David C. Jones, a combat pilot during the Korean War, has held command positions in SAC, TAC, and ARRS. He served as DCS/Operations and Vice Commander of Seventh Air Force in Vietnam, and has had unusually wide experience in Europe as IG, DCS/Plans and Operations, Chief of Staff, Vice Commander, and Commander in Chief of US Air Forces in Europe. General Jones became USAF's ninth Chief of Staff on July 1, 1974.

The military way of life and a military career traditionally have been regarded by our society as a calling. The calling was buttressed by the value embodied in "duty, honor, country" and a life style where the institution, with the support of society, took care of its own.

Yet, we are seeing a fundamental shift in the motivational bases of the military system away from a calling toward an occupation—"just another job"—where the first priority readily could become self interest rather than the organization and the job to be done.

In my view, emphasis on marketplace incentives keyed to the All-Volunteer Force, uncertainties associated with perceived erosion of institutional benefits, and the accompanying pressure on traditional values have driven the armed services along the road from calling to occupation. It is clear to me that it is not in the best interests of the armed services, and therefore of our society, to continue along that road.

A continuation of these trends could promote a work environment conducive to unionization. I am opposed to unionization of the military, and I am concerned that a shift from calling to occupation would make the armed services more fertile ground for unionization.

My opposition is not in any way based on opposition to unions as such. I vigorously applaud the many past and continuing positive contri-

butions of the labor movement to strengthening our nation. I believe that most of the rank and file of labor unions in America as well as the vast majority of the American people hold the conviction that unionization of the military is undesirable.

The Air Force has traditionally taken care of its own, and that philosophy is at the heart of our institutional identity. The attention given to costs and economies has obscured our efforts to care for the legitimate needs of our people and has contributed to the understandable unease among Air Force members and their families.

I firmly believe we can and will continue to take care of our own. But it will require that we become more visible and outspoken in our advocacy of the reasonable claims of our people to a quality of life consistent with the demands made on them.

It will also require that we accept the challenge of doing more *with* less. That has been reasonable and necessary in the past and will continue to be so. But it is not reasonable or necessary to do more *for* less.

We cannot expect to attract and retain the kinds and numbers of people we need if they see their well-being eroded while compensation and benefits in the private sector improve. Our responsibility, our challenge is to offset the potential for benefit erosion by reducing costs elsewhere through more efficient management and more effective methods of doing our job.

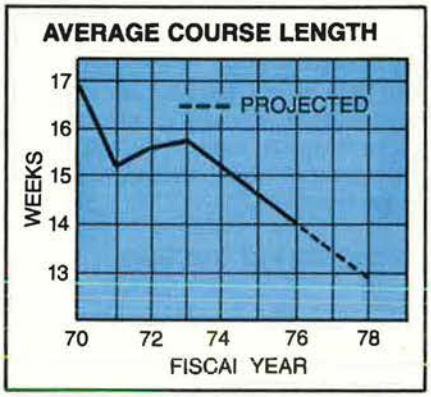
In the meantime, we should have a moratorium on any changes in compensation and benefits. The reviews and studies to date have been conducted in fragmented fashion and, in my view, represent ineffective and ill-conceived chipping away at bits and pieces of a complex and complicated problem. With the President's Blue Ribbon Panel on Military Compensation, we have a highly promising opportunity to address the issues in depth and come to grips with the serious problems that are causing uneasiness and concern among our people.

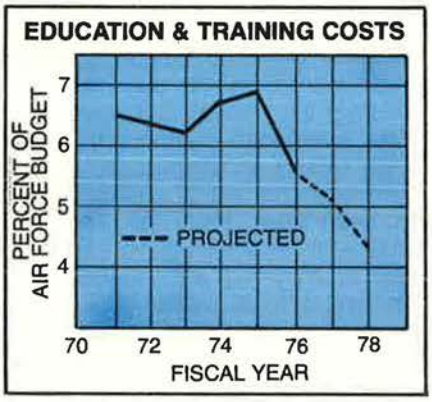
More Efficient—More Ready

During the past several years, the Air Force has taken numerous initiatives to hold the line on costs and enhance combat capability, the cutting edge of readiness. For example:

- Since 1968, our management headquarters have been reduced by one-half while Air Force strength has fallen by one-third.
- Air Force military and civilian strength reductions in FY '76 and '77 will total 62,000 authorizations—three-fourths of the total for the entire Department of Defense.
- We have retired more than 400 support aircraft, thereby freeing nearly 6,500 people for other jobs and saving $100 million per year.
- We are increasing capability by modernizing our active and Reserve forces and fully equipping our twenty-six active tactical fighter wings—adding more than 250 combat aircraft, notwithstanding declining manpower levels.
- We surpassed our goal of zero growth in energy consumption from 1975 to 1976 with a reduction of 7.8 percent. The support aircraft reductions alone save 1,500,000 barrels of fuel per year.
- During the past ten years, we have decreased the number of major installations from 214 to 137, and we are looking at additional candidates for reduction or closure.
- A continuing aggressive flight simulator program can allow us by 1985 to avoid 535,000 flying hours otherwise necessary to maintain readiness.
- The share of the Air Force budget devoted to training has been cut by ten percent during the last year.

These initiatives are contributing to readiness through efficiency and are reducing personnel costs by making our force less labor-intensive. We are implementing other initiatives to get more productive use of our people's time and make them more ready for combat and combat support.



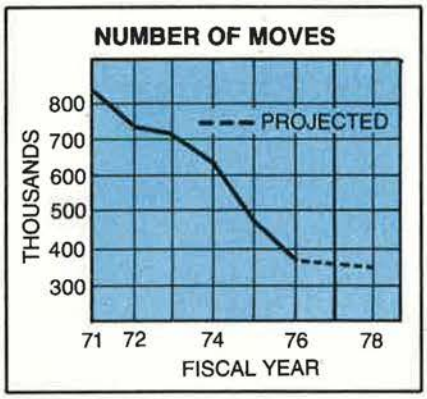


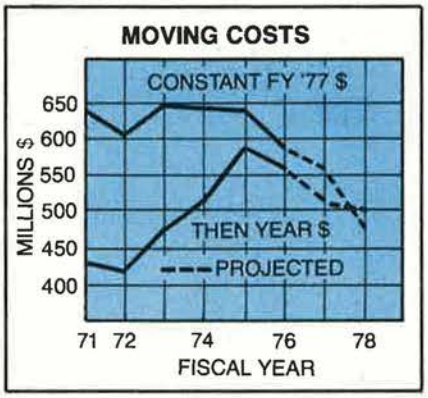
Training for first-term airmen is being geared more precisely to that required by the jobs they will hold during their first enlistment—less theory and more application.

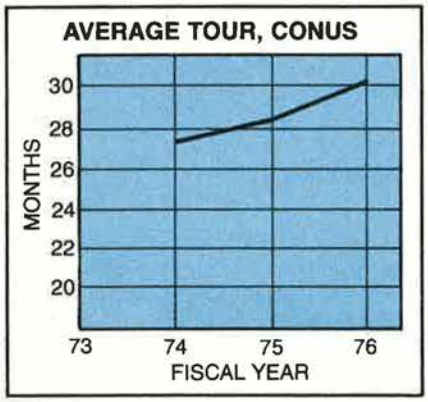
We are using some new applications of techniques that have been with us for several years—simulation, programmed learning, self-paced instruction, and realistic hands-on training.

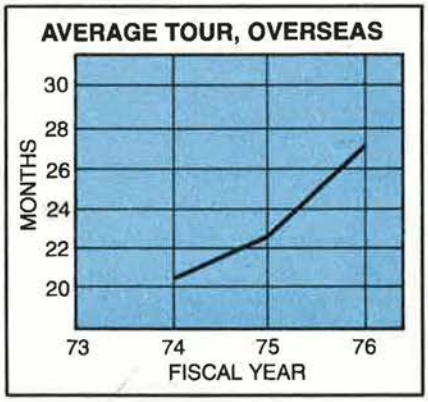
Another readiness enhancing training initiative is a program called Accelerated Copilot Enrichment. It helps compensate for a declining level of aircrew experience in the B-52 and KC-135 by giving our copilots needed flying time and decision-making experience in the much less costly T-38 and T-37. Thus, we have been able to avoid the expensive increases in B-52 and KC-135 flying hours that would otherwise be required.

These and related efforts are im-









proving training quality while helping to reduce course length and decrease training expenditures as a percent of the Air Force budget. Most important, they are contributing to significant improvements in Total Force readiness.

We are also reducing change-of-station movement costs and are increasing stability for our people. A test program at some of our northern bases offers guaranteed five-year stabilized tours. We are also increasing opportunities to extend in overseas areas, and are improving support facilities overseas to reduce the requirement for short tours. We have eliminated many "automatic" moves and maximum tour lengths in the United States, thereby precluding many seemingly unnecessary moves and improving stability for our members and their families.

These changes are paying big dividends in terms of stability and costs, even though the average cost-per-move has more than doubled since 1971.

A Way of Life

We are proud of our record and will match Air Force leadership and management with anyone—military or civilian. All in all, we have done a great deal to seek and achieve efficiencies. We will continue to search for and find ways to do more *with* less so we will not have to do more *for* less.

My overriding concern, however, is that we not let a focus on economic issues become a preoccupation that distorts our traditional perspective. Our recruiting posters proclaim "The Air Force—A Great Way of Life." That simple slogan states a very important tenet of our philosophy. The Air Force is much more than just another occupational choice in the job market. It *is* a way of life.

Our people have demonstrated an admirable selflessness and self-discipline, and their character has been reflected in the character of the organization. As a result, the Air Force is one of the most highly respected institutions in America.

Our nation is fortunate to have had generation upon generation of idealistic men and women with an abiding faith in their country and a willingness to serve it. Air Force success with the All-Volunteer Force is a measure of our institutional compatibility with that idealism.

Our commitment to individual worth and dignity, plus the challenge of high standards, have effectively complemented the more tangible benefits our recruiters offer. The combined appeal of those factors has enabled us to meet our active-duty recruiting goals despite a competitive array of alternatives.

As the pool of eligible youths shrinks and the state of the economy improves, the recruiting job is growing tougher. Because of the inherent hardships and rigors of military life, we can never hope to attract the people we need solely through monetary incentives. Adequate financial compensation is a necessary element, but is far from sufficient. Our appeal is directed to a higher sense of values manifest in the devotion and professionalism of Air Force people.

One of our most urgent priorities is to carry the message to the American public that the Air Force represents one of the best investments in history. Air Force people are capable, and they are willing. They represent the finest this nation has to offer. What they have done, what they are doing, deserves recognition and respect.

They are what makes this a great Air Force, the best ever. It must be made even better—not necessarily bigger, but stronger, more capable, more ready. This is our objective, and Air Force people are working hard to achieve it. ■

A MAJOR COMMAND

Aerospace Defense Command

Interceptor crews scramble during ADCOM's William Tell '76 interceptor weapons competition at Tyndall AFB, Fla.

Aerospace Defense Command's future holds promise of improved capabilities for fulfilling a multifaceted mission, ranging from ballistic missile warning and operations in space to domestic air surveillance and bomber defense.

Under the command of Gen. Daniel James, Jr., ADCOM has some 24,000 military people and nearly 5,000 civilians stationed around the world.

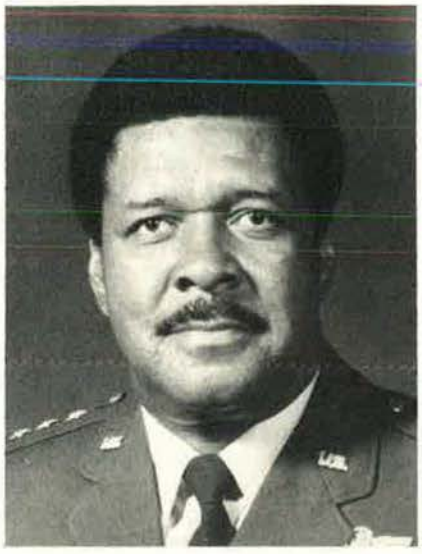
Its mission for several years has included assessment and warning of ballistic missile attack, space surveillance, ensuring the sovereignty of airspace over the continental US, and providing defense against bomber attack.

More recently, ADCOM was charged with retaining an option to deploy air defense forces to overseas theaters.

ADCOM wants to expand its space mission. Based on years of experience in tracking and launching satellites, it hopes to become the operational command for military use of the Space Shuttle. As the Shuttle operator, ADCOM would be responsible for launch and recovery facilities at Vandenberg AFB, Calif., training Shuttle military personnel, and flight planning for all launches of military payloads.

Other new systems and actions that will bolster ADCOM capabilities for ballistic missile attack warning and space surveillance include:

- The new Cobra Dane phased-array radar at Shemya, Alaska, which will supply early warning of missile attack and track orbiting satellites.
- Ground breaking last fall at Otis AFB, Mass., and selection of Beale AFB, Calif., as the sites for phased-array radars of the Pave Paws submarine-launched ballistic missile warning system.



Gen. Daniel James, Jr., Commander in Chief, ADCOM.

CMSgt. James J. Forman, Senior Enlisted Advisor, ADCOM.

• Improved deep-space satellite coverage achieved by moving a Baker-Nunn camera from Sand Island in the Pacific to Korea.

• Continued testing at an experimental Ground-Based Electro-Optical Deep Space Surveillance site, forerunner of a proposed five-station network for nighttime surveillance of deep space.

On the air defense side of the ADCOM mission, the command has sixteen fighter-interceptor squadrons for continental US air defense, of which six are active Air Force F-106 squadrons. The Air National Guard provides six F-106 units and four F-101 units. One of the latter will begin converting to F-4s in July. Augmented by Tactical Air Command F-4s, these units maintain alert aircraft at twenty-six sites around the periphery of the forty-eight contiguous states.

ADCOM has another squadron of F-4s at Keflavik as part of the Atlantic Command's US Forces Iceland. Alaskan Air Command F-4s also support the ADCOM air defense mission.

Performing the command's airborne radar surveillance mission are ten Air Force Reserve EC-121s. Manned by active and Reserve crews, seven fly from Florida and three patrol off Iceland.

Programs also are under way or planned to give ADCOM advanced air defense equipment needed for surveillance, warning, command and control, and destruction of hostile aircraft. Among them:

• Plans to deploy an interceptor version of one of the newest fighters to replace the aging F-106s in ADCOM's active Air Force squadrons.

• Continued development of the Joint Surveillance System, under which ADCOM and the Federal Aviation Administration share data from a network of radars around the nation's perimeter for peacetime surveillance.

• Scheduled replacement of the six costly and outdated SAGE control centers in the US with four regional operations control centers.

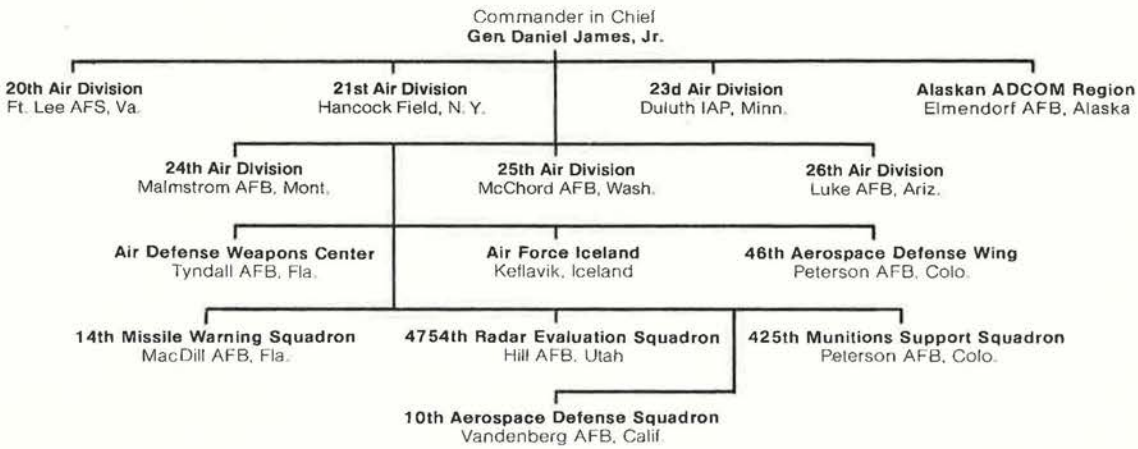
• Use of the E-3A airborne warning and control aircraft (AWACS), prepositioned at the regional operations control centers, for wartime surveillance, command and control.

• Developing an enhanced Distant Early Warning (DEW) Line that would correct deficiencies in low-altitude coverage of northern bomber approaches by replacing existing DEW radars with unattended automatic sensors. ■

An ADCOM Baker-Nunn camera used to photograph satellites beyond radar range.

AEROSPACE DEFENSE COMMAND

Headquarters, Peterson AFB, Colo.



A MAJOR COMMAND

Air Force Communications Service

AFCS air traffic controllers operate the world's largest military air traffic control system. More than 12,000,000 operations were handled in 1976.

Today, there is increased emphasis on the communications and air traffic control facilities and services that support our frontline tactical and strategic forces. Meeting these needs is the prime mission of the Air Force Communications Service (AFCS).

From its headquarters at Richards-Gebaur AFB, Mo., AFCS operates and maintains some 500 units at nearly 400 locations. AFCS has more than 50,000 active-duty people: 2,772 officers, 41,532 airmen, and 7,409 civilians, including 848 foreign nationals.

Established as a major command on July 1, 1961, AFCS provides these services to the Air Force and other government and civilian agencies:

- On-base communications;
- Long-haul communications;
- Air Traffic Control and navigational aids;
- Emergency communications mission support;
- Communications-electronics-meteorological engineering and installation.

Supporting the active force are some 15,000 Air National Guard and Air Force Reserve personnel assigned to 154 Guard and thirty-five Reserve units. They contribute more than 80,000 man-days each year, working with their active-duty counterparts.

Most AFCS unit commanders wear a second hat as the communications-electronics officer for the customer they serve. They are responsible for defining communications needs of the command and ensuring that those needs are met.

In many cases, the command's requirements are satisfied by AFCS Engineering and Installation (E&I) personnel. The backbone of the AFCS E&I function is its electronics engineering and electronics installation squadrons, which completed more than 6,900 installation, removal, and relocation jobs in 1976.

On July 1, the Strategic Air Command and AFCS consolidated their collocated communications units under AFCS and established the Strategic Communications Area at Offutt AFB, Neb. During the year, the command withdrew its people from Thailand and Goose AB, Labrador, and reduced its forces in Taiwan.

In 1976, AFCS air traffic controllers handled more than 12,000,000 operations and were credited with saving forty-four imperiled aircraft worth $90.5 million, with 234 people aboard. They operate the world's largest military air traffic control system, with 740 control facilities and navigation aids at 140 locations throughout the world. The control systems are evaluated by the command's three facility checking squadrons in the United States, Europe, and the Pacific.

Other major projects completed during the past year included the installation of optical character readers that have greatly reduced station handling time in telecommunications centers; installation of the CONUS Meteorological Data System (COMEDS), which serves all DoD components; engineering and installation of the new National Military Command Center; publication of the first USAF traffic control and landing systems plan; and the lease of the White Alice Communications System

Maj. Gen. Rupert H. Burris, Commander, AFCS.

CMSgt. Earl E. Dorris, Senior Enlisted Advisor, AFCS.

This satellite communications complex at Clark AB, Philippines, provides long-range communications for the Joint Chiefs of Staff.

in Alaska to RCA Alaska Communications.

During the year, AFCS acquired or relocated four Defense Satellite Communications System (DSCS) terminals—at Clark AB, Philippines, and Sunnyvale AFS, Calif. In the next five years, the command is scheduled to acquire thirteen new terminals and to replace some of the equipment at the eleven existing terminals.

Backing up AFCS regular communications systems are the command's highly mobile Combat Communications groups and squadrons that support combat operations where there are no fixed Air Force facilities.

Other projects that AFCS is working on include the upgrading of automatic telecommunications centers supporting Air Force Logistics Command's six centers, replacing the outdated equipment on the European weather facsimile network, and automating the record communications at USAF aeronautical stations.

The command plans to have minicomputers in some of its telecommunications centers. About one-tenth the size of current systems and at one-fifth the cost, these computers can act independently or collectively as a modular system.

In the air traffic control field, AFCS is looking at the GPN-XX radar program to fill the gap between the mobile TPN-19 and fixed base systems. The command has a major role in developing the NAVSTAR global positioning system that is scheduled for full implementation in the mid-1980s.

Air Force Communications Service will play a major role in national security as it continues to "Provide the Reins of Command." ■

AIR FORCE COMMUNICATIONS SERVICE

Headquarters, Richards-Gebaur AFB, Mo.

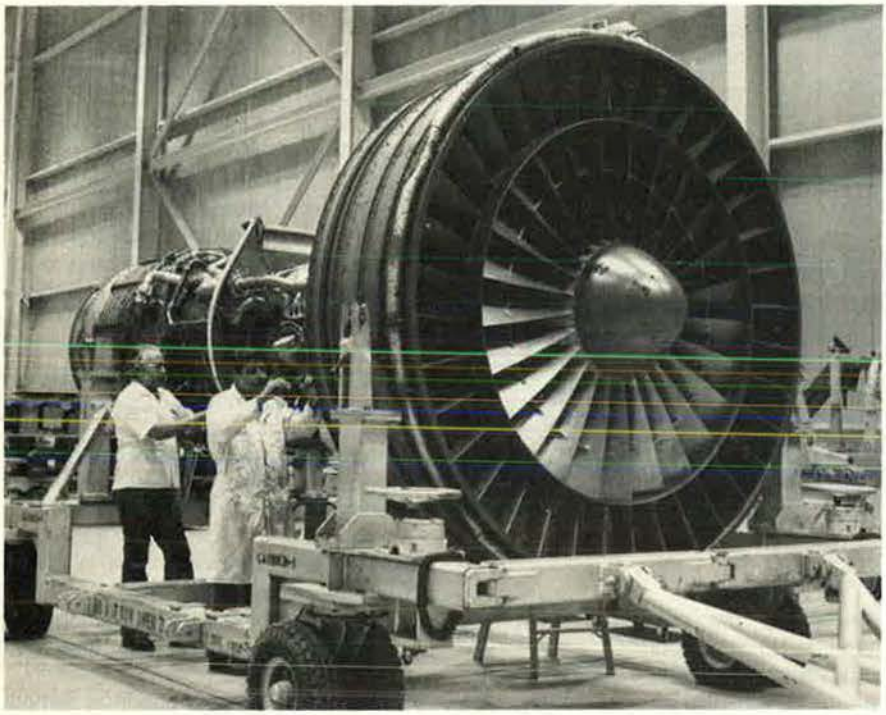
Commander
Maj. Gen. Rupert H. Burris

Pacific Communications Area Hickam AFB, Hawaii	**Tactical Communications Area** Langley AFB, Va.	**European Communications Area** Ramstein AB, Germany
Northern Communications Area Griffiss AFB, N. Y.	**Strategic Communications Area** Offutt AFB, Neb.	**Southern Communications Area** Oklahoma City AFS, Okla.
1840th Air Base Wing Richards-Gebaur AFB, Mo.	1931st Communications Group Elmendorf AFB, Alaska	3d Combat Communications Group Tinker AFB, Okla.
1866th Facility Checking Squadron Richards-Gebaur AFB, Mo.	Communications Computer Programming Center Tinker AFB, Okla.	1842d Electronics Engineering Group Richards-Gebaur AFB, Mo.
2199th Computer Service Squadron Richards-Gebaur AFB, Mo.	2000th Management Engineering Squadron Richards-Gebaur AFB, Mo.	1814th Communications Squadron Ft. Myer, Va.
1872d School Squadron Richards-Gebaur AFB, Mo.	1815th Test Squadron Richards-Gebaur AFB, Mo.	1801st Support Squadron Richards-Gebaur AFB, Mo.

A MAJOR COMMAND

Air Force Logistics Command

The major thrust of Air Force Logistics Command activity during the past year centered on two areas.



Technicians at the San Antonio Air Logistics Center, Kelly AFB, Tex., overhaul a TF39 engine used by the C-5 Galaxy. AFLC people at this, and the command's other Air Logistics Centers, overhauled 4,342 jet engines in FY '76.

In May 1976, Gen. F. Michael Rogers, AFLC Commander, announced the establishment of the Air Force Acquisition Logistics Division (AFALD). Activated on July 1, 1976, its mission is to assure the availability of technically superior equipment at an affordable life-cycle cost.

International logistics is the second area on which AFLC focused major emphasis during the year. The command moved to improve support of more than sixty countries associated with the Security Assistance Program by establishing an Assistant for International Logistics as an integral part of the Commander's staff.

In its job of providing logistics support for the US Air Force and the air forces of allied nations, the command's work force of some 83,000 civilians and 9,000 military personnel keeps aircraft, missiles, and equipment in top condition. The task can be categorized into four major activities: procurement, supply, transportation, and maintenance.

Policy guidance flows from Headquarters AFLC to five industrial-type, production-oriented subordinate organizations that carry out the operational work: Warner Robins Air Logistics Center, Robins AFB, Ga.; San Antonio ALC, Kelly AFB, Tex.; Oklahoma City ALC, Tinker AFB, Okla.; Ogden ALC, Hill AFB, Utah; and Sacramento ALC, McClellan AFB, Calif.

Each ALC is responsible for the logistics support of specific weapon systems and equipment. Thus, the newest Air Force fighter—the F-16—is supported by the Ogden ALC; the F-15 Eagle air-superiority fighter by Warner Robins ALC; the giant C-5 Galaxy transport by the San Antonio ALC; the E-3A AWACS aircraft by Oklahoma City ALC; and the A-10 close-support aircraft by the Sacramento ALC.

Two additional AFLC organizations have major functions in the logistics mission.

The Aerospace Guidance and Metrology Center (AGMC) at Newark AFS, Ohio, repairs and calibrates inertial guidance and navigation systems for aircraft and missiles and manages the Air Force's worldwide measurement and calibration program.

AFLC also has responsibility for storing surplus aircraft and for returning them to flying status, if needed. Charged with carrying out this task is the Military Aircraft Storage and Disposition Center (MASDC) at Davis-Monthan AFB, Ariz. MASDC also disassembles aircraft no longer needed and distributes the parts throughout the Department of Defense.

The predominantly civilian work

Gen. F. Michael Rogers, Commander, AFLC.

CMSgt. Robert E. Rogers, Senior Enlisted Advisor, AFLC.

force of AFLC is unique in the Air Force. Their diversified professions and skills range from scientists, engineers, physicians, mathematicians, computer specialists, and technicians, to clerk-typists, morticians, firemen, jet engine repair specialists, and contract specialists. AFLC's civilians represent more than 800 professions and skills.

An examination of the command's statistics for FY '76 reveals impressively large figures:

- AFLC managed a budget of more than $5.7 billion (about eighteen percent of the Air Force's total), plus stock and industrial funds of almost $6.5 billion.
- The command obligated $3.8 billion to buy supplies and services used to support the Air Force, other government activities, and those foreign governments covered by the Security Assistance Program.
- It processed more than 708,000 requisitions under the Foreign Military Sales program.
- It received and processed 4,337,397 requisitions for supplies, equipment, material, and services.
- It overhauled 4,342 jet engines, some 500 reciprocating engines, and 2,011 gas turbine engines.
- Its ALCs and contractors handled nearly 1,350 aircraft under the programmed depot maintenance schedule. More than 1,450 modifications were performed.

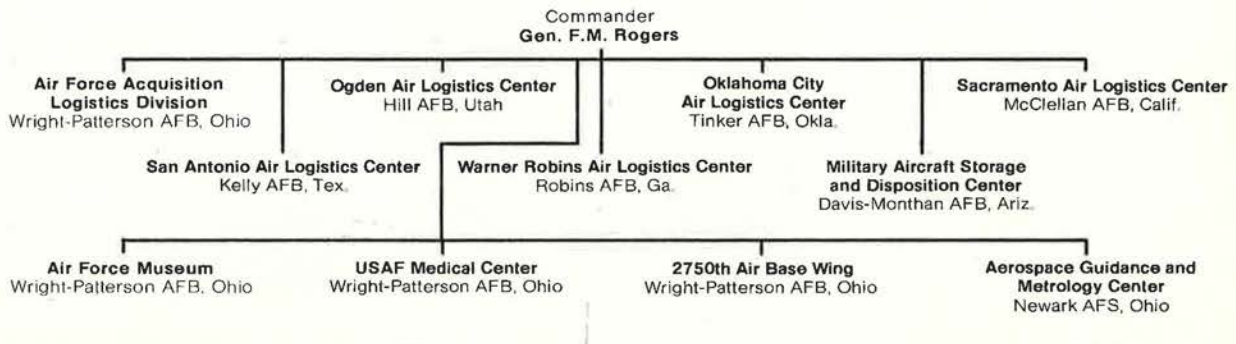
AFLC operates a logistics support system—direct from wholesaler to consumer—which helps maintain a high combat readiness posture throughout the world. ■

Aircraft electricians at the Ogden Air Logistics Center, Hill AFB, Utah, work on an F-4 Phantom electrical system. AFLC employs some 83,000 civilians.

A distillation unit at Aerospace Guidance and Metrology Center, Newark AFS, Ohio, reclaims fluids used in aircraft and missile inertial navigation systems.

AIR FORCE LOGISTICS COMMAND

Headquarters, Wright-Patterson AFB, Ohio



A MAJOR COMMAND

Air Force Systems Command

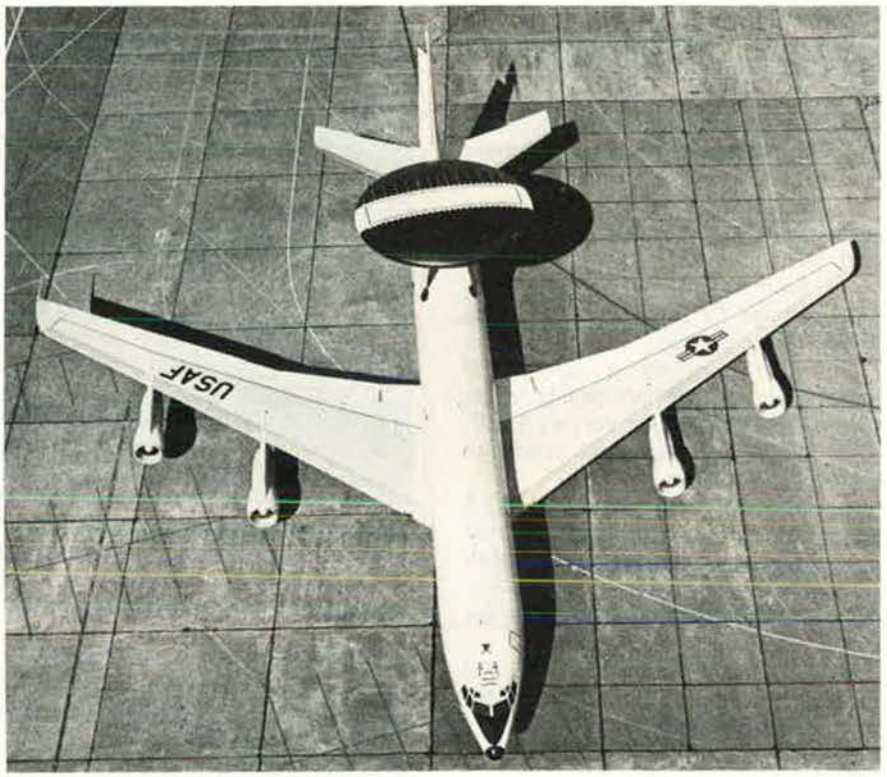
Air Force Systems Command (AFSC), headquartered at Andrews AFB, Md., is responsible for research, development, test, evaluation, and procurement and production of Air Force missiles, aircraft, and related hardware.

AFSC's budget in FY '77 was $8.7 billion, or more than a quarter of the total Air Force budget. In calendar year 1976, the command administered 19,466 contracts for the Air Force and other military services and government agencies, with a face value of $51.7 billion. AFSC installations worldwide are valued at more than $2 billion.

In FY '77, approximately 54,700 military and civilian personnel worked for AFSC—10,000 officers, 16,700 airmen, and 28,000 civilians.

Management initiatives undertaken by AFSC in 1976 included a comprehensive Five-Year Manufacturing Plan that was developed and distributed throughout the command; 100 approved value engineering change proposals, both in-house and by contractors, that saved the Air Force more than $19 million; the computerized Acquisition Management Information System for handling the details of thousands of AFSC contracts that achieved savings estimated at $302,000 per year with 340 documents processed daily; and twenty-four studies by AFSC management engineering teams at a cost of $91,875 that saved $5.9 million—for a net cost avoidance of $5.8 million.

Technological advances in 1976 included providing the economic and qualitative advantages of hot isostatic pressing—a process that may largely eliminate the need for machining aircraft parts; a major advance in engine airframe interaction and control; a reduced-smoke propellant system for high-performance, air-to-air and air-to-surface missiles; development of a technique to correct for ionosphere-induced signal time delays in the NAVSTAR Global Positioning System; development of a more efficient means of digital communication by bandwidth compression and improved digital-to-analog and analog-to-digital conversion; and ongoing development for superplastic forming of titanium sheet, a new manufacturing process that permits easier and less-costly production of complex parts.



The first production model of the E-3A Airborne Warning and Control System (AWACS), a major AFSC program, entered flight testing in 1976.

AFSC is involved in more than 200 weapon systems programs, each in a different development stage. They range in complexity from the simple to the sophisticated, and include such areas as avionics, space satellites, strategic and tactical aircraft, and intercontinental ballistic missiles.

Among AFSC's most significant program achievements in 1976:

- More than 325 flight-test hours were flown in the three B-1 advanced strategic DT&E aircraft, with DoD

Gen. William J. Evans, Commander, AFSC.

CMSgt. Francis W. Roper, Senior Enlisted Advisor, AFSC.

deciding to proceed with production.

- First full-scale development model of the F-16 Air Combat Fighter was rolled out and flown.
- The first production A-10 close air support aircraft was officially turned over to TAC in March 1976.
- More than 140 F-15 Eagles have now been turned over to TAC. The first aircraft for the initial operational squadron were delivered in January 1976.
- The YC-15 Advanced Medium Short Takeoff and Landing (AMST) Transport aircraft completed the first phase of its flight-test program. The YC-14, a competitive prototype, was rolled out last June and began its flight-test program in August.
- The 3,000th F-5/T-38 aircraft in the F-5 family (one of the most successful Foreign Military Sales programs, with sales in twenty-one foreign countries) was delivered.
- An eighteen-month contract was let for the validation phase of the Interim Upper Stage (IUS), DoD's part in NASA's Space Shuttle.
- The first production model E-3A Airborne Warning and Control System (AWACS) entered flight testing.
- The in-flight refueling system of the E-4 Advanced Airborne Command Post was finished and installed on all completed aircraft.
- Several test flights of the Air-Launched Cruise Missile were completed, using the terrain correlation update technique, which allows the missile to fly preprogrammed courses accurately.
- One of the world's largest radars, Cobra Dane (used to monitor Soviet ballistic missile development flights), was undergoing final testing at Shemya AFB in the Aleutians in preparation for being turned over to the Aerospace Defense Command in early 1977.
- Full-scale development and pilot production of the planar-wing GBU-15 modular glide weapon began.
- Conceptual work in the advanced ICBM Technology (MX) program was approved by DoD, as were plans for the validation phase of this new intercontinental ballistic missile system. The latter will test the technical feasibility of multiple-aimpoint options and subsystems.

The B-1 advanced strategic aircraft in one of its low-altitude test flights.

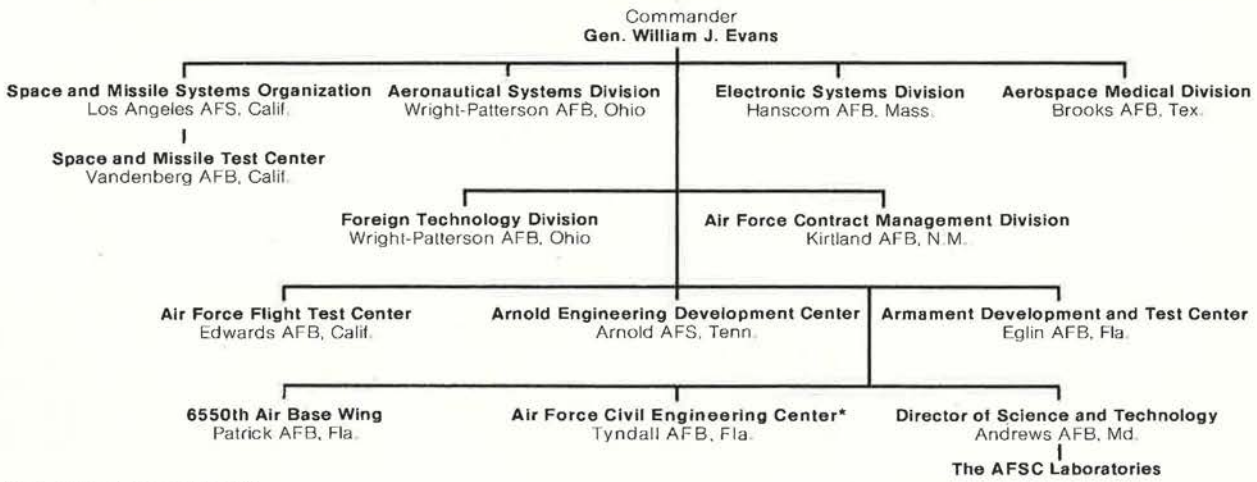
Flight testing of aircraft, including the B-1, F-16, and A-10, should continue throughout 1977. An E-3A Airborne Warning and Control System was turned over to TAC in March 1977, and launch and operation of six Phase I vehicles in the NAVSTAR Global Positioning System are slated for this year.

Foreign military sales during 1976 (432 cases valued at $8.3 billion) were made in support of US foreign policy and national interests. This program also helps maintain the country's economic production base, generates jobs in the aerospace industry, and helps offset development and import costs.

Every AFSC program is designed to strengthen the means of acquiring the most effective aerospace weapon systems, thus assuring the continuing readiness of the Air Force. ■

AIR FORCE SYSTEMS COMMAND

Headquarters, Andrews AFB, Md.



*See also article on AFESA.

A MAJOR COMMAND

Air Training Command

ATC, one of the world's largest training systems, is reducing training time and increasing quality by emphasizing practical application in one field.

Air Training Command (ATC), headquartered at Randolph AFB, Tex., continued to fulfill its mission of recruiting and providing initial military, technical, and flying training while improving efficiency and increasing its support of other commands.

Including tenants and students, about 120,000 people—21,500 civilian and 98,500 military—perform the ATC mission at its fourteen bases, sixty-six field-training detachments, and nearly 1,000 recruiting offices. At the close of 1976, the command's $3 billion inventory included more than 1,600 aircraft (692 T-37s, 822 T-38s, 96 T-41s, and 19 T-43s). With an operating budget of $1.4 billion, ATC remained one of the world's largest training systems.

Basic military training was provided to about 75,000 young men and women, and approximately 700 officers were commissioned through the Officer Training School. Some 154,000 students graduated from ATC's 2,400 resident and nonresident technical training courses, and 128,000 were trained in more than 900 courses by field-training detachments located worldwide.

Major programs are under way to reduce training time and improve graduate quality by reducing basic instruction in theory and stressing practical applications in one career field area.

Training in ATC gained new recognition in 1976, when the Ninety-fourth Congress granted ATC's Community College of the Air Force (CCAF) authority to award Associate in Applied Sciences degrees, to be earned by Air Force enlisted personnel through a combination of Air Force training and off-duty education in civilian schools. Active enrollment in CCAF was about 48,000 at the end of 1976, and is expected to increase dramatically as Air Force people realize the value of the degree.

Undergraduate Pilot Training (UPT) production decreased from about 2,300 in 1975 to some 1,300 in 1976. In addition, approximately 400 allied foreign students completed specialized UPT courses. Undergraduate Navigator Training (UNT) decreased from 1,313 in 1975 to 854 in 1976. In a test program, twenty women have entered pilot training and six have entered UNT. No changes to the current UPT/UNT programs have been made for this particular test.

Navigator training became an interservice operation in 1976 with ATC providing instruction and facilities for US Navy, Coast Guard, and Marine Corps trainees.

At Reese AFB, Tex., the first UPT Instrument Flight Simulator (UPT-IFS) is being installed. Eventually, each pilot training base will have the UPT-IFS complexes, allowing the command to shift significant blocks of in-flight instruction to the highly sophisticated simulators.

In partnership with the Strategic Air Command (SAC), ATC has implemented the Accelerated Copilot Enrichment (ACE) program to provide increased flying experience in T-37s and T-38s for SAC junior pilots, whose operational aircraft flying time has been reduced by fuel shortages and budgetary restrictions.

ATC is manager for the Air Force Security Assistance Training Program (SATP) conducted in the United States. During 1976, more than 6,000 foreign military trainees from fifty-five countries received flying, technical, military, and professional training, about eighty percent provided by ATC. More than ninety-eight percent of the training costs were paid by the countries involved.

In the San Antonio area, where four major Air Force bases and the Army's Ft. Sam Houston are located, ATC has developed and is implementing major consolidations of services that cross command and

Gen. John W. Roberts, Commander, ATC.

CMSgt. Brian Bullen, Senior Enlisted Advisor, ATC.

service lines. The San Antonio Procurement Center, an ATC unit, will provide procurement services for Kelly, Brooks, Lackland, and Randolph AFBs. Another ATC unit, the San Antonio Real Property Maintenance Agency, will service the four Air Force bases and Ft. Sam Houston.

ATC's first major participation in a tactical exercise occurred in March 1977, when more than 160 ATC personnel from fourteen bases deployed to Ft. Hood, Tex., in support of Gallant Crew 77, a US Readiness Command exercise.

In late 1976, ATC Headquarters' Administrative Word Processing Center, the largest in the Air Force, became operational. Using state-of-the-art equipment, the center is providing increased administrative support for the headquarters while reducing operating costs. ■

RECRUITING THE BEST QUALIFIED MEN AND WOMEN

In 1976, Air Force Recruiting Service, located at Randolph AFB, Tex., recruited the best qualified men and women in the history of the all-volunteer force. Commanded by Maj. Gen. Melvin G. Bowling, Air Force recruiters, despite a tougher recruiting environment, signed up some 72,000 men and women without prior service, about 350 candidates for Officers Training School, approximately 600 prior-service personnel, 604 registered nurses, more than 400 fully qualified physicians, six veterinarians, some 170 dentists, and about thirty-five biomedical science corps personnel.

Overall quality is up, with ninety-five percent of the new recruits having a high school diploma or the equivalent, marking the best recruits in almost a decade. That quality is reflected in lower basic and technical training attrition rates and a more dedicated and professional force.

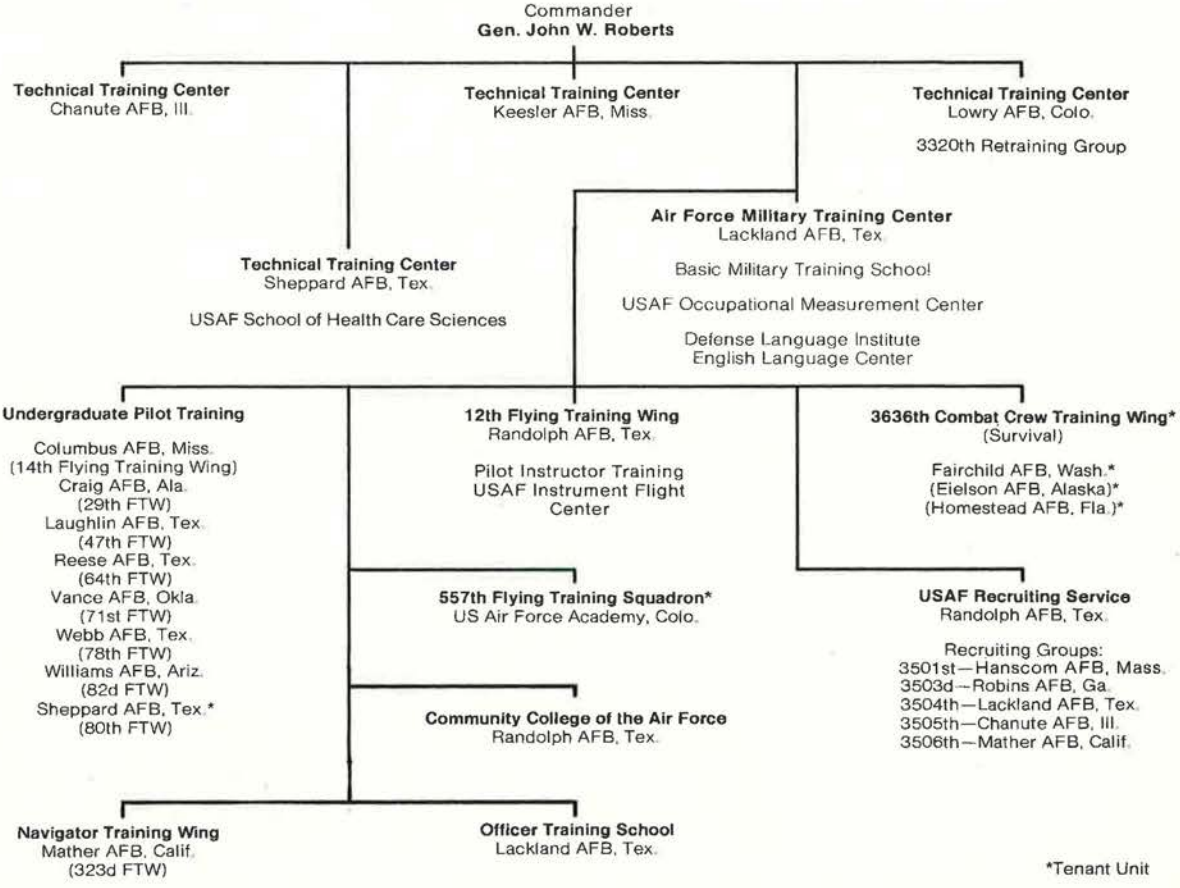
However, it is becoming increasingly difficult to obtain outstanding young people, and ATC has launched the Air Force Recruiter Assistance Program (AFRAP). Under AFRAP, everyone in the Air Force is urged to refer high-quality potential enlistees to Air Force recruiters. Many AFRAP activities are under way at bases around the world to help show Air Force life as it really is to eligible young people.

A major part of AFRAP is the "Hasty Rap" program, which sends young first-term airmen back to their hometowns to help recruiters tell other youths about life in the Air Force.

Some 3,500 military and civilian people work for Air Force Recruiting Service in the United States, Puerto Rico, and Europe.

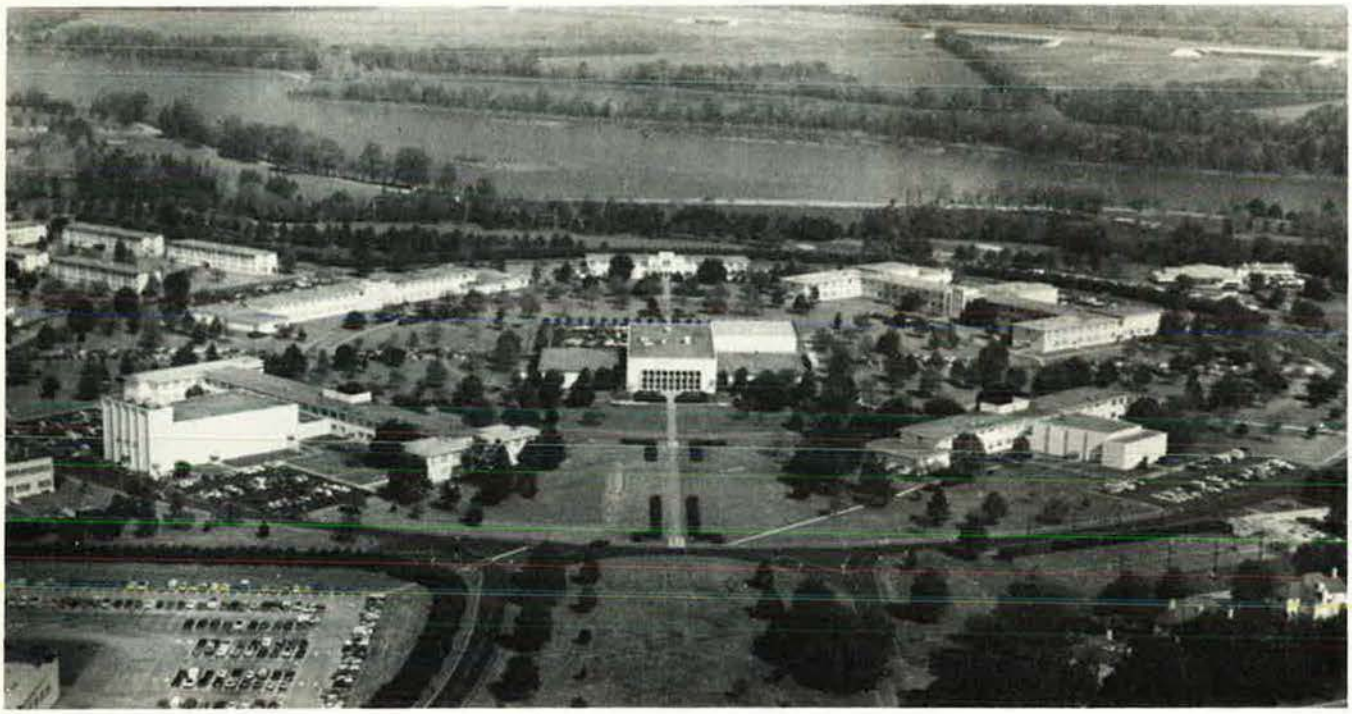
AIR TRAINING COMMAND

Headquarters, Randolph AFB, Tex.



A MAJOR COMMAND

Air University



At the center of the Air University's Chennault Circle is the Fairchild Library, with the Squadron Officer School at lower left and the Air Command and Staff College and Air War College at the right.

With today's more complex environment, sophisticated systems, resource limitations, and continuing technological breakthroughs, competent professional leadership is the key to Air Force efficient and effective mission accomplishment.

Air University (AU) provides professional military education (PME), graduate engineering and management programs, and continuing career education for the officers, NCOs, and civilians who will be the leaders of tomorrow's Air Force.

Each year, nearly half of the Air Force population—active-duty, civilian, and Ready Reserve—as well as selected personnel from the sister services, other government agencies, and many foreign forces study in one or more of AU's professional education programs.

AU's headquarters and most of its major activities are located at Maxwell AFB, Montgomery, Ala. Three of AU's PME schools—Air War College for senior officers, Air Command and Staff College for mid-career officers, and Squadron Officer School for junior officers—are located on Chennault Circle at Maxwell. The fourth PME school, the USAF Senior Noncommissioned Officer Academy, is located at nearby Gunter AFS.

AU's specialized schools meet specific USAF educational requirements. The Leadership and Management Development Center serves as the focal point for leadership and management education in the Air Force. It provides resident courses in leadership, and traveling teams offering both leadership seminars and consultant services designed to solve people problems throughout the Air Force. Absorbing the functions of Air University's now disestablished Institute for Professional Development, the Leadership and Management Development Center offers continuing education programs for personnel managers, comptrollers, judge advo-

Lt. Gen. Raymond B. Furlong, Commander, Air University.

CMSgt. Johnny M. Portis, Senior Enlisted Advisor, AU.

cates, chaplains, and a seminar for USAF commanders.

Academic Instructor and Foreign Officer School (AIFOS) serves in two capacities. It conducts the USAF Teachers' College for instructors, and prepares foreign officers for attendance at USAF schools.

The Extension Course Institute (ECI) administers approximately 380 correspondence courses in professional military and specialized education, and career-development fields of instruction. With some 300,000 students participating annually, the Institute has handled more than 7,000,000 enrollments.

USAF requirements in scientific, technological, managerial, and other designated professional areas are met through the Air Force Institute of Technology, located on AU's northern campus at Wright-Patterson AFB, Ohio.

Air Force Reserve Officers Training Corps (AFROTC), headquartered at Maxwell AFB, is the major source of new USAF officers. It operates detachments at colleges throughout the US and in Puerto Rico. AU's Junior AFROTC program is conducted at approximately 275 high schools throughout the nation, in Europe, and on Guam.

Air War College students use a computer in a theater warfare exercise that simulates a conventional war.

Air University now provides support for the Civil Air Patrol, a civilian, volunteer, nonprofit corporation with some 64,000 members in more than 2,000 communities throughout the United States.

Supporting the academic complex is the Air University Library, with vast resources that include bibliographic, documentary, and circulating facilities. Collocated with the library is the Albert F. Simpson Historical Research Center.

A new program, the Logistics Management Center, has been established to coordinate a comprehensive research program involving the talents of government, business, and the academic community in improving Air Force logistics support.

PME and continuing education, resident, seminar, and correspondence curricula are being revised to include increased emphasis on mission-oriented subjects. Course formats are being altered to be even more responsive to Air Force needs.

The overriding consideration throughout AU is total commitment to quality education, using the latest educational developments, in keeping with its motto, *Proficimus More Irretenti*—"We Progress Unhindered by Tradition." ■

AIR UNIVERSITY

Headquarters, Maxwell AFB, Ala.

Commander
Lt. Gen. Raymond B. Furlong

- **3843d Computer Services Squadron**, Maxwell AFB, Ala.
- **3840th Support Squadron**, Maxwell AFB, Ala.
- **Air War College**, Maxwell AFB, Ala.
- **Air Command and Staff College**, Maxwell AFB, Ala.
- **Squadron Officer School**, Maxwell AFB, Ala.
- **Hq. CAP-USAF**, Maxwell AFB, Ala.
- **Academic Instructor and Allied Officer School**, Maxwell AFB, Ala.
- **USAF Senior NCO Academy**, Gunter AFS, Ala.
- **AF Institute of Technology**, Wright-Patterson AFB, Ohio
- **Air Force Reserve Officers Training Corps**, Maxwell AFB, Ala.
- **Extension Course Institute**, Gunter AFS, Ala.
- **Air University Library**, Maxwell AFB, Ala.
- **3825th Academic Services Group**, Maxwell AFB, Ala.
- **USAF Regional Hospital**, Maxwell AFB, Ala.
- **Logistics Management Center**, Gunter AFB, Ala.
- **3800th Air Base Wing**, Maxwell AFB, Ala.
- **Leadership and Management Development Center**, Maxwell AFB, Ala.

A MAJOR COMMAND

Alaskan Air Command

A radome of the Alaskan Air Command's 794th Aircraft Control and Warning Squadron at Cape Newenham AFS overlooks the Bering Sea from a desolate hilltop.

The Alaskan Air Command (AAC), created on December 21, 1945, is one of the oldest of USAF's major commands. Now commanded by Lt. Gen. M. L. Boswell, AAC provides early warning of aerospace attack on the US and Canada, guards the sovereignty of US airspace, and supports US ground forces in Alaska.

The AAC Commander is also the Commander, North American Air Defense Command/Aerospace Defense Command (NORAD/ADCOM) Alaskan Region, and is responsible to the Commander in Chief, NORAD, for aerospace defense of that Region. As the senior military officer in Alaska, he is the coordinating authority for all joint military administrative and logistical matters and the military point of contact for the state.

AAC operates three air bases, thirteen aircraft control and warning (AC&W) squadrons, and two forward operating bases. The air bases are Elmendorf AFB, bordering Anchorage; Eielson AFB, near Fairbanks; and Shemya AFB, near the tip of the Aleutian chain. The AC&W squadrons are along the Western coast with some strategically placed in the interior. Galena and King Salmon Airports are forward operating bases for fighter aircraft. In addition, AAC provides administrative and logistic support for the 13th Missile Warning Squadron at Clear AFS and for the 16th Surveillance Squadron at Shemya AFB, both manned by ADCOM personnel. ADCOM also maintains six Distant Early Warning radar sites along the Arctic Ocean.

More than one-fifth of AAC's nearly 11,000 military and civilian people are stationed at remote sites. This year, support activities at several of the command's AC&W sites are programmed to be civilianized, thus reducing remote "blue suit" manning by a thousand.

The 21st Composite Wing, based at Elmendorf AFB, is the main aerial arm of AAC. The wing has two flying and six support squadrons and an airbase group. The flying units are the 43d Tactical Fighter Squadron equipped with F-4E Phantoms, and the 5041st Tactical Operations Squadron, which flies largely T-33 Shooting Stars. Major tenants at Elmendorf include the 616th Military Airlift Group and its 17th Tactical Airlift Squadron, equipped with C-130Es, and the 71st Aerospace Rescue and Recovery Squadron, equipped with HC-130s and HH-3 helicopters.

The 5010th Combat Support Group at Eielson AFB is the only other flying unit in AAC. The group's 25th Tactical Air Support Squadron flies the O-2A, and also has T-33s that provide training targets for AAC's air defense mission. Eielson's largest tenant unit is SAC's 6th Strategic Wing, equipped with KC-135 Stratotankers.

A Joint Task Force (JTF), normally headed by the AAC Commander, may be established by the Joint Chiefs of Staff for contingency/emergency operations other than aerospace defense. Such a JTF was formed for "Jack Frost 77," a US Readiness Command exercise that involved 25,000 active-duty, National Guard, and Reserve people from the Air Force, Army, Navy, Marine Corps, and Coast Guard. This was but one of the many exercises in which AAC participates.

Lt. Gen. Marion L. Boswell, Commander, Alaskan Air Command.

CMSgt. Richard P. E. Cook, Senior Enlisted Advisor, AAC.

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John J. Bischoff
Vice President

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If you want more information about tail warning systems, contact John J. Bischoff, Vice President. Telephone (516) 595-5959.

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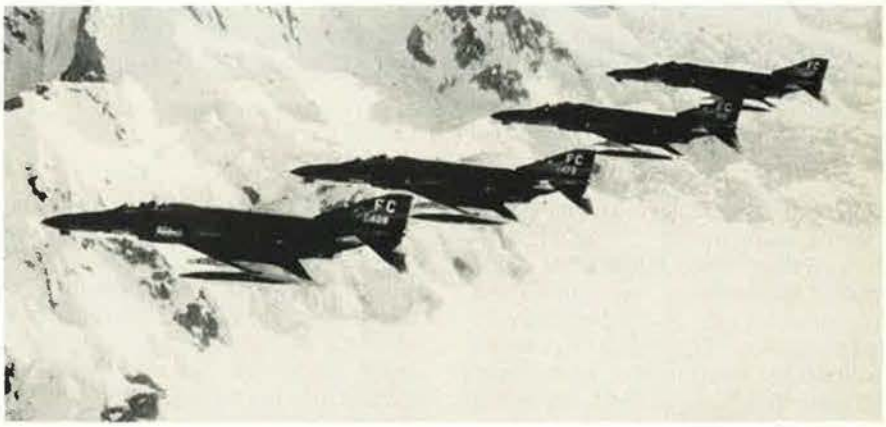
AAC also operates a Rescue Coordination Center (RCC) that uses facilities of all US services in the state, the Civil Air Patrol, the Federal Aviation Administration, and civilian volunteers. During 1976, the RCC provided emergency assistance to 224 military people and civilians and was credited with saving seventy-eight lives.

AAC's mission makes the command one of the more unusual in the Air Force. Whether its people are maintaining constant vigilance, demonstrating readiness by participating in exercises, or assisting in rescue operations and disaster relief, AAC men and women stand ready to provide "Top Cover for America." ■



Heavy-duty snow removal equipment (top) is essential for clearing runways during Alaska's long winters. Above, F-4Es of the 43d Tactical Fighter Squadron in formation above Alaska's rugged terrain.

ALASKAN AIR COMMAND

Headquarters, Elmendorf AFB, Alaska

Commander
Lt. Gen. M. L. Boswell

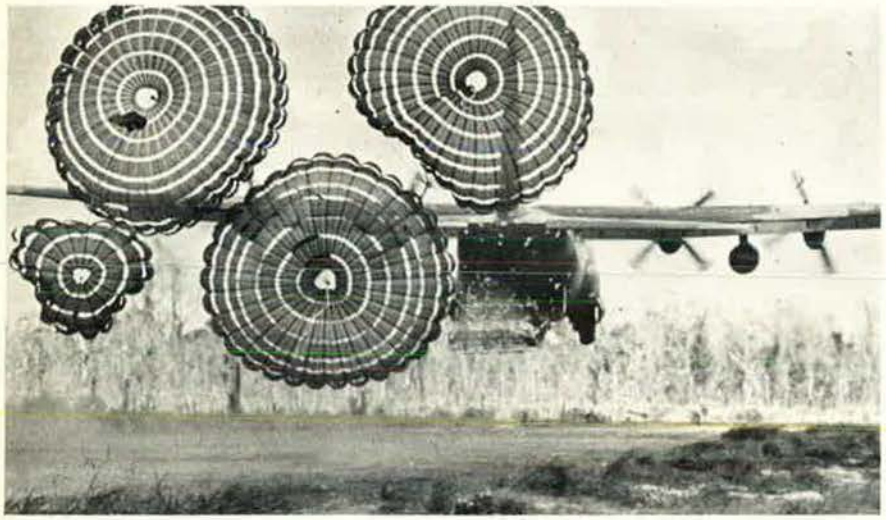
- 2 Air Base Squadrons and 13 ACW Squadrons located throughout Alaska
- **USAF Hospital Elmendorf** Elmendorf AFB, Alaska
- **21st Composite Wing** Elmendorf AFB, Alaska
  - **21st Air Base Group** Elmendorf AFB, Alaska
  - **43d Tactical Fighter Squadron** Elmendorf AFB, Alaska
  - **5041st Tactical Operations Squadron** Elmendorf AFB, Alaska
- **5010th Combat Support Group** Eielson AFB, Alaska
  - **25th Tactical Air Support Squadron** Eielson AFB, Alaska
- **5073d Air Base Group** Shemya AFB, Alaska

A MAJOR COMMAND

Military Airlift Command

The Military Airlift Command became the third specified command in the Air Force on February 1, 1977.

Specified command status provides the means to make airlift operations more responsive to joint operational requirements during wartime. It simplifies and streamlines command relationships, with the Commander in Chief of MAC directly responsible to the National Command Authorities through the Joint Chiefs of Staff, to other specified and unified commands. The Air Force retains service responsibility for day-to-day administrative and logistical support. The new status applies only to airlift matters and does not include the MAC technical services.



Parachutes pull heavy combat cargo from a MAC C-130 Hercules during a Low-Altitude Parachute Extraction System (LAPES) mission.

Although MAC's three technical services are vitally important to airlift as well as other Air Force tasks, strategic and tactical airlift form the primary mission. To perform this mission, MAC has vast active-duty and Reserve airlift resources but nevertheless leans heavily on commercial airlift, especially on the huge reservoir of Civil Reserve Air Fleet (CRAF) aircraft during critical periods when airlift demands surge. This military and civilian airlift alliance is observing its twenty-fifth anniversary.

CRAF, with more than 100 widebody and 200 other jet transport aircraft, has the potential of doubling MAC's strategic airlift capacity.

Several important airlift programs have been proposed to increase the US strategic airlift capability. A prototype stretched C-141 StarLifter has been developed and is to undergo flight tests this year. Acceptance of this program could increase strategic airlift capacity by a third. Engineering design also is under way to strengthen the wings of the C-5 Galaxy, the world's largest aircraft, to nearly quadruple this indispensable transport's lifespan. A proposal also has been made to modify some of the CRAF aircraft to make them more compatible with the military airlift mission.

The routine channel missions of MAC, however, continue every day, interspersed with massive buildups of requirements for exercises and humanitarian efforts. In 1976, earthquakes in Guatemala and Turkey, typhoons at Guam and the Philippines, and earlier this year the disastrous snowstorms in the Buffalo and Niagara Falls area drew emergency airlift response from C-5s,

Army helicopters and ground vehicles are loaded aboard a C-5 Galaxy during a joint training exercise.

Gen. William G. Moore, Jr., Commander in Chief, Military Airlift Command.

CMSgt. Otto H. Lensch III, Senior Enlisted Advisor, MAC.

C-141s, and C-130 Hercules aircraft laden with relief equipment and supplies.

In addition, MAC's Aerospace Rescue and Recovery Service rescued 734 Filipinos from the floods brought on by Typhoon Olga. A flash flood in the Big Thompson Canyon in Colorado claimed the lives of more than 100. Another eighty-one persons were saved by ARRS's helicopter crews. In all, ARRS rescued 1,352 people around the world during 1976, raising its thirty-year total to 17,493.

Simultaneously with its other responsibilities, MAC transports participated in more than twenty-five exercises, carrying military units to places all over the free world. Several of the exercises supported our European allies. On one such exercise, Reforger '76, MAC deployed 12,859 troops and about 250 tons of cargo in 153 C-141 missions from the US to Germany.

MAC also opened a new series of airlift missions in support of Army Air Line of Communications (ALOC), a test program for the airlift of repair parts. Under the ALOC concept, supplies are to be moved rapidly by air, enabling the Army to reduce inven-

OPERATIONAL AIRCRAFT ASSIGNED TO MAC

TYPE	NUMBER
T/UH-1F/P	39
UH-1N	51
HH-1	11
C/HH-3	46
C/HH-53	33
C-5	77
C-9	23
T-39	103
C-12	1
C-130	272
HC-130	32
WC-130	14
C-135	11
C-137	5
C-140	6
C-141	271
TOTAL	995

Pararescuers rush a patient to a UH-1 Aerospace Rescue and Recovery Service helicopter for airlift to a medical facility during a Military Assistance to Safety and Traffic (MAST) mission.

tories and devote fewer resources to the management of supply depots. The test will continue through FY '77.

MAC, additionally responsible for the evacuation of American servicemen and their families to medical facilities, airlifted 60,000 patients and 12,000 medical and nonmedical attendants worldwide. This function was accomplished by the air and medical crews of the C-9 Nightingale and specially configured C-141 and C-130 aircraft.

Many changes occurred in MAC during the year, each one designed to improve effectiveness with a critical eye on costs. For example, Air Weather Service, another MAC technical service, instituted the Automated Weather Distribution System at its first station. The system computerizes much of the distribution, combines some jobs, and results in reduced costs. Other AWS units provide up-to-the-minute weather forecasts and severe weather warnings.

By the end of 1976, MAC manpower authorizations totaled more than 90,000 officers, enlisted personnel, and civilians. ■

MILITARY AIRLIFT COMMAND

Headquarters, Scott AFB, Ill.

Commander in Chief
Gen. William G. Moore, Jr.

- **21st Air Force**, McGuire AFB, N. J.
- **22d Air Force**, Travis AFB, Calif.
- **Air Weather Service (AWS)**, Scott AFB, Ill.
- **Aerospace Rescue & Recovery Service (ARRS)**, Scott AFB, Ill.
- **Aerospace Audio-Visual Service (AAVS)**, Norton AFB, Calif.
- **375th Aeromedical Airlift Wing**, Scott AFB, Ill.

TWENTY-FIRST AIR FORCE (MAC)

Headquarters, McGuire AFB, N. J.

Commander
Maj. Gen. Alden G. Glauch

- **317th Tactical Airlift Wing**, Pope AFB, N. C.
- **435th Tactical Airlift Wing**, Rhein-Main AB, Germany
- **436th Military Airlift Wing**, Dover AFB, Del.
- **437th Military Airlift Wing**, Charleston AFB, S. C.
- **438th Military Airlift Wing**, McGuire AFB, N. J.
- **1605th Air Base Wing**, Lajes Field, Azores
- **76th Airlift Division**, Andrews AFB, Md.
- **89th Military Airlift Wing**, Andrews AFB, Md.
- **1st Air Base Wing**, Andrews AFB, Md.
- **1100th Air Base Wing**, Bolling AFB, D.C.

TWENTY-SECOND AIR FORCE (MAC)

Headquarters, Travis AFB, Calif.

Commander
Maj. Gen. Thomas A. Aldrich

- **60th Military Airlift Wing**, Travis AFB, Calif.
- **61st Military Airlift Support Wing**, Hickam AFB, Hawaii
- **62d Military Airlift Wing**, McChord AFB, Wash.
- **63d Military Airlift Wing**, Norton AFB, Calif.
- **314th Tactical Airlift Wing**, Little Rock AFB, Ark.
- **374th Tactical Airlift Wing**, Clark AB, P. I.
- **443d Military Airlift Wing**, Altus AFB, Okla.
- **463d Tactical Airlift Wing**, Dyess AFB, Tex.

General Electric engines used in Boeing AMST for new concept in powered lift.

The Boeing YC-14 Advanced Medium STOL Transport (AMST) continues to perform successfully in its flight test program that began last August.

Engines for the YC-14 are two General Electric F103 high bypass turbofans in the 50,000 pound thrust class. The F103 is an advanced technology military version of the highly reliable GE CF6-50 that powers commercial wide-body transports.

An innovative upper surface blowing system provides power lift for the YC-14 by deflecting engine exhaust along the curve of the wing and downward. This enables the aircraft to fly in and out of short, semi-prepared fields with relatively large loads. Air Force goals call for the aircraft to carry 27,000 pounds of cargo out of a 2000-foot field — about one third the distance needed by standard jet aircraft of comparable size.

The YC-14 is part of the Air Force AMST prototype development program, directed by Air Force Systems Command Aeronautical Systems Division at Wright Patterson Air Force Base, Ohio.

The F103 for the YC-14 . . . yet another case of GE technology at work to help make major advances in military aviation possible.

205-161A

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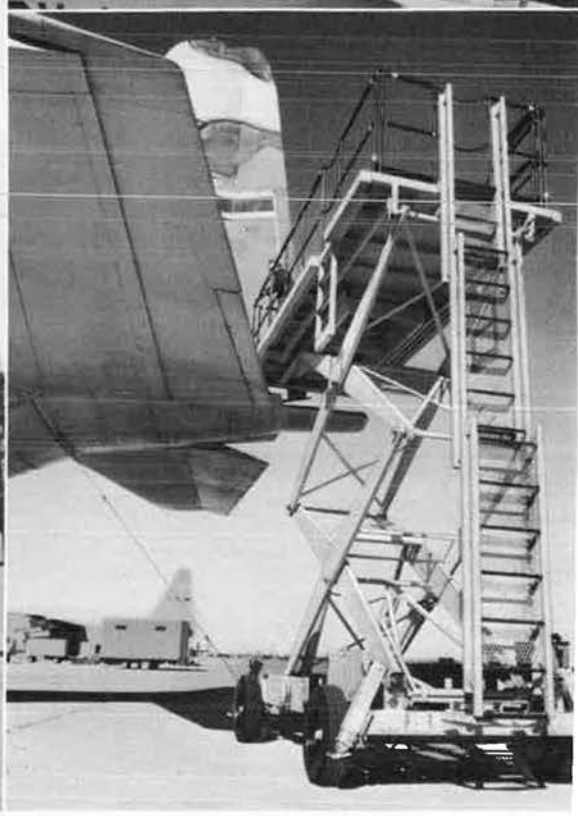

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Controlled right from the work platform, Manlift units reposition and move from place to place quickly, saving countless manhours. Sensor pads around its platform stop the unit when it touches the aircraft to prevent damage. Studies prove they save at least 30% in manhours over stationary stands, ladders, and scaffolds.

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A MAJOR COMMAND

Pacific Air Forces

Pacific Air Forces (PACAF), with headquarters at Hickam AFB, Hawaii, begins its twentieth year of maintaining an effective forward defense in the Pacific area. Reorganized from the Far East Air Force (FEAF) in 1957, PACAF, the air component of the unified Pacific Command (PACOM), has carved a niche in the history of aerospace operations in an area covering more than half the earth's surface where some two billion people live under more than thirty-five different flags.

Gen. Louis L. Wilson, Jr., the Commander in Chief, Pacific Air Forces (CINCPACAF), has dual responsibilities—to the Commander in Chief, Pacific Command (CINCPAC), and to the US Air Force Chief of Staff. He is responsible to the CINCPAC for accomplishing assigned operational missions and serves as the principal adviser to the CINCPAC in employment of USAF airpower within the PACOM. In concert with other service component commanders, the CINCPACAF supports the CINCPAC mission of maintaining the security of the PACOM and defending the United States against attack through the Pacific.

The CINCPACAF also commands Air Force operational and support forces, units, bases, and facilities in Japan, Korea, Taiwan, the Philippines, Australia, Hawaii, and Wake Island. More than 33,000 military and civilian personnel are assigned to the command. Other PACAF responsibilities include military assistance to air forces of friendly nations and support for other USAF commands operating in the area.

In July 1976, the ten-year Air Force operational presence on mainland Southeast Asia ended when, by agreement with the Royal Thai government, the last American combat forces left Thailand. Facilities at U-Tapao Royal Thai Navy Airfield reverted to the Thai government upon the withdrawal.

The Southwest Pacific was a beehive of activity during the past year as three operational exercises—TRIAD, Summer Rain, and Kangaroo II—were held in Australia and New Zealand. The ANZUS (Australian, New Zealand, United States) forces joined to test the operational capabilities of their respective military forces.

World attention was focused on Northeast Asia, when, on August 18, two US Army officers were beaten to death by North Korean soldiers in the Joint Security Area (JSA) at Panmunjom. The incident flared during a routine tree-trimming detail and culminated with the United States displaying a heavy show of force and subsequently removing the tree during Operation Paul Bunyan.

To support this operation, USAF demonstrated rapid mobility. Within nine hours after notification, an F-4 squadron from Okinawa was operational at Kunsan AB, Korea, and, twenty-six hours after the deployment order, a squadron of F-111s from Mountain Home AFB, Idaho, was standing alert at Korea's Taegu Air Base. Tactical airpower, combined with strategic and logistic flights in support of the US position in Korea,

PACAF has F-4 Phantom fighters based in Hawaii, Okinawa, Korea, and the Philippines, ready to deploy anywhere within the command area in hours.

Gen. Louis L. Wilson, Jr., CINC, Pacific Air Forces.

CMSgt. Charles L. Reynolds, Senior Enlisted Advisor, PACAF.

A PACAF Security Policeman guards one of MAC's C-5s in transit through the Pacific Command area, which covers more than half the surface of the globe.

effectively displayed US intent and determination. As a result, change in boundaries in the Joint Security Area were agreed upon, reducing the risk of future confrontation between North Korean and United Nations forces.

Through ever-increasing mobility and flexibility, PACAF forces provide combat-ready tactical units anywhere within the PACOM area of responsibility. This high degree of mobility and flexibility is an important part of the command's role in maintaining an effective deterrent.

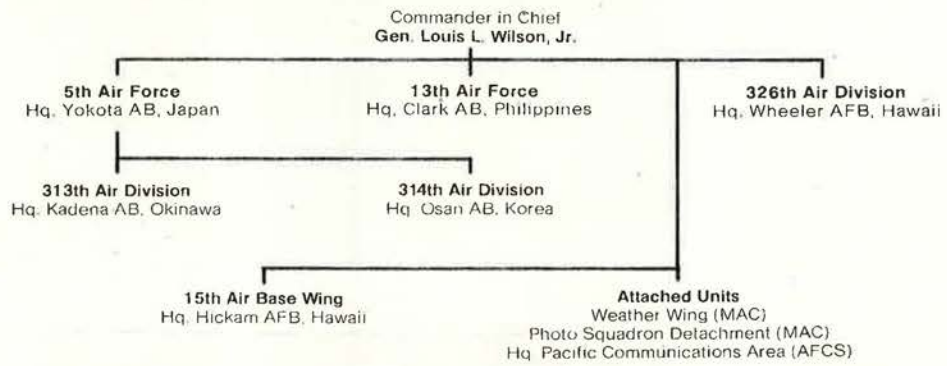
Deployed around the periphery of Communist Asia, PACAF units are capable of conducting reconnaissance, airlift, and offensive and defensive operations to counter aggression if deterrence should fail. ■

THE MAJOR OPERATIONAL UNITS OF PACIFIC AIR FORCES (PACAF)

UNIT	LOCATION	AIRCRAFT
15th Air Base Wing	Hickam AFB, Hawaii	EC-135, T-33, O-2
326th Air Division	Wheeler AFB, Hawaii	F-4
154th Tactical Fighter Group (ANG)	Hickam AFB, Hawaii	F-4
FIFTH AIR FORCE HQ., YOKOTA AB, JAPAN		
8th Tactical Fighter Wing	Kunsan AB, Korea	F-4
18th Tactical Fighter Wing	Kadena AB, Okinawa	F-4, RF-4, C-130, T-39
51st Composite Wing (Tactical)	Osan AB, Korea	F-4, OV-10, T-33
313th Air Division	Kadena AB, Okinawa	
314th Air Division	Osan AB, Korea	
475th Air Base Wing	Yokota AB, Japan	T-39, UH-1
THIRTEENTH AIR FORCE HQ., CLARK AB, PHILIPPINES		
3d Tactical Fighter Wing	Clark AB, Philippines	F-4, T-38, T-39, T-33

PACIFIC AIR FORCES

Headquarters, Hickam AFB, Hawaii



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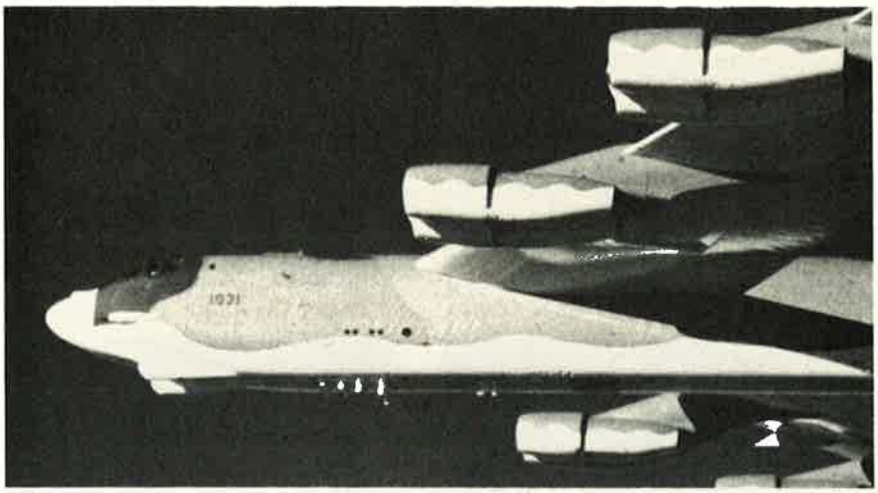

Communications EW. A concept that's easy to understand, but not quite so easy to realize in cost effective hardware. Effective exploitation of communications requires exhaustive analysis of worldwide command and control structures, and a hardware package that combines ease of control with real time results.

For the Army, GTE Sylvania developed the most cost effective, most sophisticated solid state tactical communications jamming equipment possible with today's technology.

For the Air Force, GTE Sylvania is now developing the latest cost effective, sophisticated solid state air defense communications jamming system. Measured against the technology known today, it will be the best.

For the Navy, GTE Sylvania has developed key high power components for application in sea and airborne communications EW.

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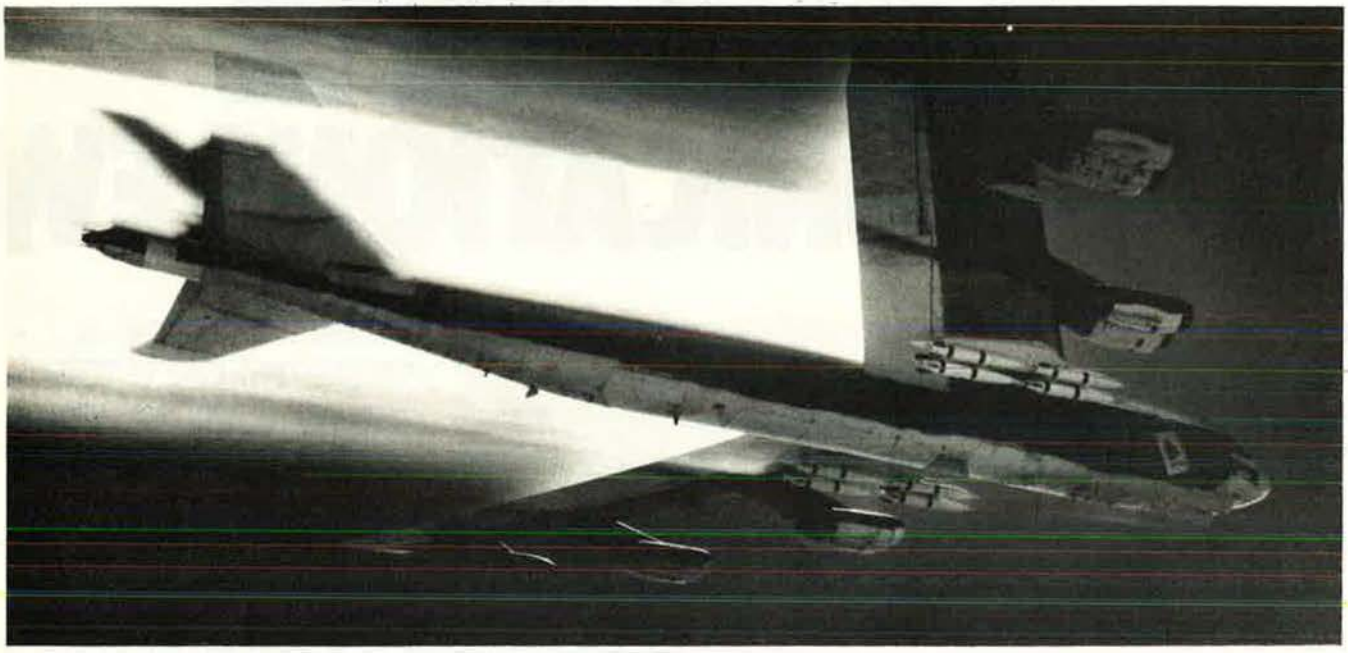
Call EW Marketing: (415) 966-2163.

GTE SYLVANIA

A MAJOR COMMAND

Strategic Air Command



This Stratofortress, one of some 400 that are the mainstay of SAC's manned bomber force, was photographed in unusual atmospheric conditions that produced this dramatic picture. The B-52 is carrying Short-Range Attack Missiles (SRAMs).

For more than thirty years, the Strategic Air Command has been the United States's primary deterrent force. By providing ready, flexible, and credible strategic offensive forces capable of responding anywhere in the world, SAC has had a significant role in deterring war, particularly nuclear war.

The command maintains a mix of manned bombers, tankers, and land-launched intercontinental ballistic missiles (ICBMs). SAC's weapons, combined with the US Navy's ballistic missile submarine fleet, form the strategic triad of offensive forces.

To carry out its mission, SAC has approximately 130,000 men and women serving at bases throughout the contiguous United States and Alaska, and at various overseas locations.

The command's nuclear punch is provided by its bombers and ICBM force:

- Approximately 400 B-52 Stratofortresses are the mainstay of the SAC manned bomber force. The giant eight-engine B-52 can deliver a wide range of weapons, including a large payload of conventional bombs, gravity-fall nuclear weapons, and air-to-ground missiles. The more advanced "G" and "H" models are equipped with an electro-optical viewing system, which enables the crew to perform its mission in a completely closed thermal-curtain cockpit environment. The "G" and "H" models also can carry twenty high-speed, inertially guided Short-Range Attack Missiles (SRAMs).
- Some seventy FB-111 swingwing bombers provide a low-level supersonic delivery capability. The FB-111 can carry six SRAMs.
- Approximately 600 KC-135 Stratotankers, including eighty currently assigned to Air Reserve Force units, give the strategic bombers an unlimited range. As the Air Force's single operational manager of the tanker force, SAC also provides refueling for other major air commands and unified and specified commands. The KC-135 can offload approximately 1,000 gallons of fuel a minute.
- One thousand Minuteman ICBMs include 450 Minuteman IIs and 550 Minuteman IIIs on strategic alert

Gen. Russell E. Dougherty, CINC, Strategic Air Command.

CMSgt. James M. McCoy, Senior Enlisted Advisor, SAC.

around the clock under constant control of SAC missile crews. The Minuteman IIIs have multiple independently targetable reentry vehicles, or MIRVs. Under a force modernization program, the command has provided the Minuteman III with the Command Data Buffer system that enables rapid missile retargeting.

• Fifty-four Titan II ICBMs are the heavyweights of SAC's missile force. The Titan II is a two-stage, storable-liquid-fuel missile that carries the largest US warhead.

In addition to its nuclear role, SAC has several important collateral missions that reflect the flexibility of the command and its weapon systems.

In 1976, for example, SAC's B-52s began flying sea surveillance missions in cooperation with the Navy. The bomber's long range, responsiveness, and large payload make it an ideal platform for surveillance, aerial mine-laying, and sea-lane interdiction.

Strategic Air Command has main-

STRATEGIC AIR COMMAND

Headquarters, Offutt AFB, Neb.

Commander in Chief
Gen. Russell E. Dougherty

8th Air Force
Hq. Barksdale AFB, La.

19th Air Division
40th Air Division
42d Air Division
45th Air Division

1st Strategic Aerospace Division
Hq. Vandenberg AFB, Calif.

3d Air Division
Hq. Andersen AFB, Guam

43d Strategic Wing
Andersen AFB, Guam
(B-52/KC-135)

376th Strategic Wing*
Kadena AB, Okinawa
(KC-135)

15th Air Force
Hq. March AFB, Calif.

4th Air Division
12th Air Division
14th Air Division
47th Air Division
57th Air Division

1st Combat Evaluation Group
Barksdale AFB, La.

544th Aerospace Reconnaissance Technical Wing
Offutt AFB, Neb.

306th Strategic Wing*
Ramstein AB, Germany

3902d Air Base Wing
Offutt AFB, Neb.

*Tenant Unit

EIGHTH AIR FORCE

Headquarters, Barksdale AFB, La.

Commander
Lt. Gen. James E. Hill

19th Air Division
Carswell AFB, Tex.

11th Air Refueling Squadron*
Altus AFB, Okla.
(KC-135)

2d Bomb Wing
Barksdale AFB, La.
(B-52/KC-135)

7th Bomb Wing
Carswell AFB, Tex.
(B-52/KC-135)

381st Strategic Missile Wing
McConnell AFB, Kan.
(Titan II)

384th Air Refueling Wing
McConnell AFB, Kan.
(KC-135)

45th Air Division
Pease AFB, N. H.

416th Bomb Wing
Griffiss AFB, N. Y.
(B-52/KC-135)

380th Bomb Wing
Plattsburgh AFB, N.Y.
(FB-111/KC-135)

509th Bomb Wing
Pease AFB, N.H.
(FB-111/KC-135)

42d Bomb Wing
Loring AFB, Me.
(B-52/KC-135)

40th Air Division
Wurtsmith AFB, Mich.

379th Bomb Wing
Wurtsmith AFB, Mich.
(B-52/KC-135)

410th Bomb Wing
K.I. Sawyer AFB, Mich.
(B-52/KC-135)

449th Bomb Wing
Kincheloe AFB, Mich.
(B-52/KC-135)

305th Air Refueling Wing
Grissom AFB, Ind.
(KC-135)

351st Strategic Missile Wing
Whiteman AFB, Mo.
(Minuteman)

42d Air Division
Blytheville AFB, Ark.

19th Bomb Wing*
Robins AFB, Ga.
(B-52/KC-135)

68th Bomb Wing*
Seymour Johnson AFB, N.C.
(B-52/KC-135)

97th Bomb Wing
Blytheville AFB, Ark.
(B-52/KC-135)

301st Air Refueling Wing
Rickenbacker AFB, Ohio
(KC-135)

308th Strategic Missile Wing*
Little Rock AFB, Ark.
(Titan II)

* Tenant Unit

tained an airborne command post on continual alert high in the stratosphere over the heartland of the United States since February 3, 1961. The EC-135 aircraft serve as backup to SAC's underground command post. If the underground facilities were lost, the airborne command post would assume direction of SAC's bomber and missile forces and execute the command's emergency war orders at the direction of the National Command Authorities.

Other extensively modified 135-series aircraft are used for reconnaissance. RC-135s are capable of long missions using a wide variety of reconnaissance equipment. But a large percentage of SAC's global reconnaissance is performed by high-altitude SR-71 and U-2 aircraft.

The outlook for SAC includes continued modernization of the bomber and missile forces. The B-1 strategic bomber, undergoing extensive flight testing at Edwards AFB, Calif., will provide the capability of penetrating enemy defenses at lower-level, high-subsonic speeds. The B-1 will carry a heavy weapon payload, and will have an intercontinental range. It is fully compatible with the KC-135 tanker.

SAC has become the single operational manager of the E-4A aircraft for the Air Force. (The E-4A, a military version of the Boeing 747, is the Advanced Airborne Command Post.) The main operating location for the E-4s will be Offutt AFB, Neb.

Over the past thirty-one years, the command has undergone numerous changes in weapon systems, but the basic mission of the Strategic Air Command has not changed drastically. SAC has maintained a credible force capable of deterring enemy aggression and threats, and has upheld its motto: "Peace Is Our Profession." ■

An RC-135 aircraft of the 55th Strategic Reconnaissance Wing, Offutt AFB, Neb., is refueled by one of SAC's 600 KC-135 Stratotankers.

FIFTEENTH AIR FORCE (SAC)

Headquarters, March AFB, Calif.

Commander
Lt. Gen. Bryan M. Shotts

4th Air Division
F. E. Warren AFB, Wyo.

28th Bomb Wing
Ellsworth AFB, S. D.
(B-52/KC-135)

44th Strategic Missile Wing
Ellsworth AFB, S. D.
(Minuteman)

90th Strategic Missile Wing
F. E. Warren AFB, Wyo.
(Minuteman)

55th Strategic Reconnaissance Wing
Offutt AFB, Neb.
(RC/EC-135)

12th Air Division
Dyess AFB, Tex.

390th Strategic Missile Wing*
Davis-Monthan AFB, Ariz.
(Titan II)

22d Bomb Wing
March AFB, Calif.
(B-52/KC-135)

96th Bomb Wing
Dyess AFB, Tex.
(B-52/KC-135)

14th Air Division
Beale AFB, Calif.

9th Strategic Reconnaissance Wing
(SR-71/U-2)

93d Bomb Wing
Castle AFB, Calif.
(B-52/KC-135)

100th Air Refueling Wing
Beale AFB, Calif.
(KC-135)

320th Bomb Wing*
Mather AFB, Calif.
(B-52/KC-135)

916th Air Refueling Squadron*
Travis AFB, Calif.
(KC-135)

47th Air Division
Fairchild AFB, Wash.

92d Bomb Wing
Fairchild AFB, Wash.
(B-52/KC-135)

341st Strategic Missile Wing
Malmstrom AFB, Mont.
(Minuteman)

6th Strategic Wing*
Eielson AFB, Alaska
(RC-135)

57th Air Division
Minot AFB, N. D.

5th Bomb Wing
Minot AFB, N. D.
(B-52/KC-135)

91st Strategic Missile Wing
Minot AFB, N. D.
(Minuteman)

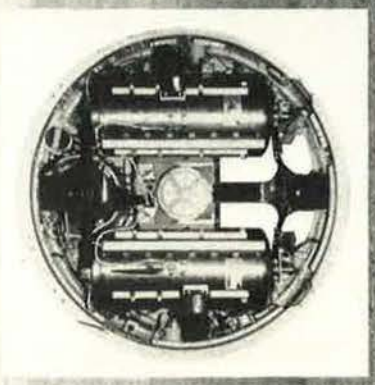
319th Bomb Wing
Grand Forks AFB, N. D.
(B-52/KC-135)

321st Strategic Missile Wing
Grand Forks AFB, N. D.
(Minuteman)

*Tenant Unit

MINUTEMAN III

When reliability & total cost come first...



The Bell post-boost propulsion system offers no compromise. The effectiveness of the Minuteman III strategic deterrent depends upon extremely high reliability of propulsion systems to properly position its payloads. Periodic maintenance, or recycling to maintain operational dependability, can seriously affect the actual hardware "cost of ownership" as well as its on-line availability. The first cost of the Bell PBPS is its primary cost. Once it is installed in the silo it will remain ready to perform . . . today, tomorrow or years from now. Since its first successful flight in 1968, its reliability has carried it through more than 70 flight tests, over 50 static firings, and 1,000 cumulative years of standby operation. SAMSO reports that PBPS engines have fired over 300,000 times and have never missed a firing . . .

The Minuteman Program has given the nation a dependable strategic deterrent for 15 years. An Advanced ICBM Technology Program (MX) is probing beyond today's technology to assure that future requirements can be met. If the United States ever needs an ICBM to replace Minuteman, today's MX Program — in which Bell's research and development is an important part — is designed to make sure that missile is available.

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BUFFALO, NEW YORK 14240

A MAJOR COMMAND

Tactical Air Command

At Luke AFB, Ariz., TAC trains pilots and maintenance people for its F-15 wings, as well as for Eagle squadrons being assigned to US Air Forces in Europe.

Crews for the first operational A-10 wing, Myrtle Beach AFB, S. C., are training at Davis-Monthan AFB, Ariz.

Tactical Air Command underscored its diverse responsibilities in several ways during 1976. It deployed twenty F-111s in record time to Taegu Air Base during increased tensions in Korea, trained pilots and maintenance people to combat-ready status for NATO's first F-15 wing, and increased the combat capability of its force by more realistic training programs.

Adding three new flying wings while expanding and modernizing its aircraft inventory has increased TAC's resources to more than 92,000 people and approximately 1,800 aircraft on twenty-three bases. At the end of March, TAC's authorized aircraft strength was:

664 F-4s	68 O-2s
66 F-5s	42 OV-10s
130 F-15s	1 E-3
41 F-105s	5 EC-135s
267 F-111s	27 C/AC/DC-130s
210 A-7s	82 T-38s
29 A-10s	15 CH-3s
122 RF-4s	4 CH-53s
	19 UN-1s

In its thirty-first year, the command continues to fulfill its mission of organizing, equipping, and training fighter and reconnaissance forces and maintaining a combat-ready reserve capable of rapid worldwide deployment.

TAC is also the USAF air component of two unified commands—the US Atlantic Command, Norfolk, Va., and US Readiness Command, MacDill AFB, Fla.—and the gaining command for 50,000 Air National Guard and Air Force Reserve personnel in ninety-nine units across the nation.

On August 20, 1976, nineteen hours after notification to deploy to Korea, twenty F-111s of the 366th Tactical Fighter Wing, Mountain Home AFB, Idaho, landed at Taegu Air Base, demonstrating US resolve and TAC responsiveness to overseas contingencies. Such deployments, in both contingencies and training, are a way of life for TAC aircrews and support people.

At Luke AFB, Ariz., and Langley

Gen. Robert J. Dixon, Commander, TAC.

CMSgt. Norman O. Gallion, Coordinator NCO Advisors to the Commander, TAC

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- It has the largest surveillance volume — three times that of the nearest competitor.
- It can detect targets at a range 30% greater than its nearest competitor.
- It carries the only weapon system able to launch missiles at more than one target at a time — it can attack six while continuing to monitor 24, simultaneously.
- Its Phoenix missiles have scored an unprecedented 85% success rate against a variety of targets from distances of 2 to 110 miles.
- It costs no more to do the job than any competitor.

F-14/Phoenix . . . The only new concept in air superiority . . . the only one designed originally as an air-defense interceptor . . . and the only one ready now!

GRUMMAN AEROSPACE CORPORATION

TAC's maintenance and support people keep the command's 1,800 aircraft combat-ready. This F-4 is based at Seymour Johnson AFB, N. C.

In March, TAC's 552d Airborne Warning and Control Wing, Tinker AFB, Okla., received the first E-3A Airborne Warning and Control System (AWACS) aircraft.

AFB, Va., TAC is training pilots and maintenance crews for the first NATO F-15 wing, USAFE's 36th Tactical Fighter Wing, Bitburg AB, Germany. The first combat-ready squadron arrived at Bitburg in April and the wing will be fully equipped by October.

The goal of TAC is readiness, honed to a fine edge through realistic training. Squadron-size units regularly deploy to Nellis AFB, Nev., for "Red Flag" combat training (*see January '77 AIR FORCE*). During the first year, ten "Red Flags" were conducted, with crews from fourteen tactical air units of TAC, ANG, and AFRES participating. At times, USAFE and PACAF crews flew with these units, and nearly every major air command and the other military services participated.

At Eglin AFB, Fla., in December 1976, the USAF Tactical Air Warfare Center began "Blue Flag," a program to train battle staffs in making real-time battlefield management decisions.

The logistics element of TAC's readiness training, "Black Flag," is being incorporated into the daily activities of TAC wings. Two programs —Production Oriented Maintenance Organization (POMO) and Production Oriented Scheduling Techniques (POST)—are designed to organize and train as the unit would operate in wartime. POMO, "crew chief maintenance," organizes maintenance people into units corresponding to those in which they would deploy and fight. POST incorporates a two- to three-day surge into each week's flying schedule, with reduced flying on other days. The objective is to routinely practice wartime sortie surge generation. Other maintenance, routine duties, and appointments are scheduled around the heavy flying period.

TAC is modernizing its force, which will be equipped in the 1980s with F-15, A-10, F-4G, and F-16 aircraft, complemented by the equivalent of ten ANG and AFRES F-4, A-7, and A-10 wings.

In 1976, the 1st TFW at Langley reached its full authorization of F-15s, and the 49th TFW at Holloman AFB, N. M., became the second TAC operational unit to be equipped with F-15s. The tank-killing A-10 entered TAC's inventory in March 1976 with the 355th TFW at Davis-Monthan AFB, Ariz. The 354th TFW at Myrtle Beach AFB, S. C., was selected as the initial operational unit, and will receive its first A-10s this summer. The F-16 is scheduled to enter the TAC inventory early in 1979.

In July 1976, the 432d Tactical Drone Group was activated at Davis-Monthan AFB and TAC became the single Air Force manager for the operational control of drones and remotely piloted vehicles, thus expanding and enhancing TAC's combat capability.

A vast improvement in the ability to command and control tactical aircraft was achieved in March 1977 with the delivery of the first E-3A Airborne Warning and Control System (AWACS) aircraft to TAC's 552d Airborne Warning and Control Wing at Tinker AFB, Okla. In the autumn of 1976, the E-3A proved its operational capability in a series of tests and exercises. Among them were the US Readiness Command's Brave Shield XV, a comprehensive test involving more than 400 aircraft flying from twenty-one bases in nine states; and a strategic defensive test during ADCOM's Vigilant Overview operation.

TAC's most important element will continue to be its people, whose dedication has enabled the command to achieve its enduring goal—Readiness. ■

TACTICAL AIR COMMAND

Headquarters, Langley AFB, Va.

Commander
Gen. Robert J. Dixon

9th Air Force
Hq. Shaw AFB, S. C.

Albrook AFS, C. Z.
US Air Force
Southern Air Division
Inter-American Air Force Academy
Howard AFB, C. Z.
24th Composite Wing
(O-2, UH-1)

Eglin AFB, Fla. (AFSC)
USAF Tactical Air
Warfare Center
(F/RF-4)

Seymour Johnson AFB, N. C.
8th Tactical Deployment
Control Squadron
(EC-135)

12th Air Force
Hq. Bergstrom AFB, Tex.

Tinker AFB, Okla. (AFLC)
552d Airborne Warning and Control Wing
(E-3A)

Keesler AFB, Miss. (ATC)
7th Airborne Command & Control Squadron
(C-130)

Langley AFB, Va.
2d Aircraft
Delivery Group

Nellis AFB, Nev.
USAF Tactical Fighter Weapons Center
57th Tactical Training Wing
(F-4E, F-5E, F-111A/E, F-15, A-10)
USAF Air Demonstration Squadron
820th Civil Engineering Squadron

NINTH AIR FORCE (TAC)

Headquarters, Shaw AFB, S. C.

Commander
Lt. Gen. James V. Hartinger

MacDill AFB, Fla.
56th Tactical Fighter Wing
(F-4E)

Shaw AFB, S.C.
363d Tactical Recon Wing
(RF-4C)
507th Tactical Air Control Wing
(O-2A, CH-3E, OV-10)

Seymour Johnson AFB, N. C.
4th Tactical Fighter Wing
(F-4E)

Davis-Monthan AFB, Ariz.
355th Tactical Fighter Wing
(A-10, A-7D)

Patrick AFB, Fla. (AFSC)
549th Tactical Air Support
Training Group*
(O-2, OV-10)

Homestead AFB, Fla.
31st Tactical Fighter Wing
(F-4E)

Myrtle Beach AFB, S. C.
354th Tactical Fighter Wing
(A-7D)

England AFB, La.
23d Tactical
Fighter Wing
(A-7D)

Moody AFB, Ga.
347th Tactical Fighter Wing
(F-4E)

Eglin AFB, Fla. (AFSC)
33d Tactical Fighter Wing
(F-4E)

Eglin AAF No. 9, Fla.
(Hurlburt Field)
1st Special Operations Wing
(CH-3, UH-1, C-130, AC-130)
USAF Special Operations School
USAF Air Ground Operations School
823d Civil Engineering Sqdn.

Langley AFB, Va.
1st Tactical Fighter Wing
(F-15, EC-135)
9th Tactical
Intelligence Sqdn.

*Reports to 507th TACWg, Shaw AFB, S.C.

TWELFTH AIR FORCE (TAC)

Headquarters, Bergstrom AFB, Tex.

Commander
Lt. Gen. James D. Hughes

George AFB, Calif.
35th Tactical Fighter Wing
(F-4C/D/E/F, F-105G)

Bergstrom AFB, Tex.
67th Tactical Recon Wing
(RF-4C)
602d Tactical Air Control Wing
(O-2, OV-10, CH-53)

Cannon AFB, N. M.
27th Tactical Fighter Wing
(F-111D)

Nellis AFB, Nev.
474th Tactical Fighter Wing
(F-111A, F-4D)

Holloman AFB, N. M.
49th Tactical Fighter Wing
(F-4D)
479th Tactical Training Wing
(T-38)

Luke AFB, Ariz.
58th Tactical Training Wing
(F-15, F-4)

Hill AFB, Utah (AFLC)
388th Tactical Fighter Wing
(F-4D)

Williams AFB, Ariz. (ATC)
425th Tactical Fighter
Training Sqdn.*
(F-5B/E)

Mountain Home AFB, Idaho
366th Tactical
Fighter Wing
(F-111F/A)

Davis-Monthan AFB, Ariz.
432d Tactical Drone Gp.
(RC/DC-130, CH-3)

*Reports to 58th TTW, Luke AFB, Ariz.

A MAJOR COMMAND

United States Air Forces in Europe

F-4Cs, F-4Ds, F-4Es, and F-111s from nine of USAFE's tactical fighter wings during a weapons loading competition.

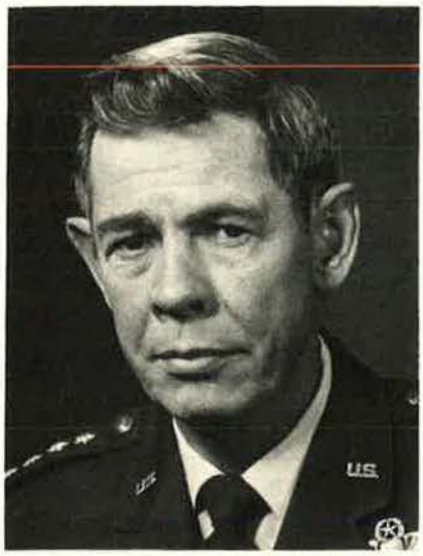
United States Air Forces in Europe (USAFE) continues its emphasis on combat readiness. Approximately 72,000 USAF military men and women and more than 600 tactical aircraft stand ready at twenty-two major installations, from the United Kingdom to Turkey, as a major element of NATO's deterrent posture.

Significant improvements in command and control, aircraft modernization, and interoperability with allied air forces will mark 1977 as a year of progress in Europe. The first F-15 Eagle wing in USAFE is being deployed to Bitburg AB, Germany, and the command's second wing of F-111s is being based at RAF Lakenheath. Three F-4 Phantom squadrons that have been at Bitburg are relocating to Hahn, Ramstein, and Spangdahlem Air Bases in the Federal Republic of Germany.

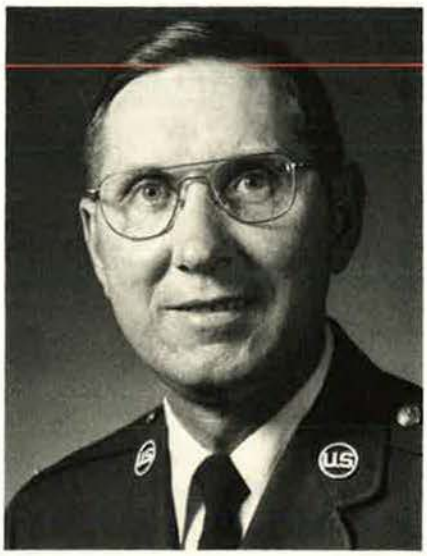
USAFE's primary tactical air control unit, the 601st Tactical Control Wing at Sembach AB, Germany, has added tactical air control units in northern Germany. The 600th Tactical Control Group has been established at Hessisch-Oldendorf Air Station, about thirty miles southwest of Hannover, the 606th Tactical Control Squadron will be located near Bremerhaven, and the new USAFE-manned NATO Support Cell at the German Kaserne at Kalkar, some seventy miles northwest of Cologne, has been activated.

A major improvement in aerial combat training has been added to theater forces with the basing of F-5E "aggressor" aircraft at RAF Alconbury. They provide realistic dissimilar air combat training for European-based crews. USAFE men and women also participate with allied air forces in exercises from Norway to Pakistan. Training programs emphasize all-weather capabilities in support of both land and sea forces.

USAFE's theater-based airpower is only part of the USAF assets available to deter, and if necessary to fight, the significantly improved air forces of the Warsaw Pact nations. Extensive training programs that continue throughout the year include TAC, ANG, and AFRES units deployed from the States. A prime objective is to make tactical air forces



Gen. Richard H. Ellis, Commander in Chief, USAFE.



CMSgt. Jackson L. Davidson, Senior Enlisted Advisor, USAFE.

THE MAJOR OPERATIONAL UNITS OF USAFE

UNIT	LOCATION	AIRCRAFT/MISSION
	England	
10th Tac Recon Wing	RAF Alconbury	RF-4C, F-5E
48th Tac Fighter Wing	RAF Lakenheath	F-111F
20th Tac Fighter Wing	RAF Upper Heyford	F-111E
81st Tac Fighter Wing	RAF Bentwaters/Woodbridge	F-4D, MAC Rescue HC-130, HH-53
513th Tac Airlift Wing	RAF Mildenhall	MAC Rotational C-130, SAC Rotational KC-135
	Spain	
401st Tac Fighter Wing	Torrejon AB	F-4C
406th Tac Fighter Tng. Wing	Zaragoza AB	Tactical Range Support, Weapons Training School, SAC Rotational KC-135
	Italy	
40th Tac Air Control Gp.	Aviano AB	Rotational USAFE Aircraft, Command and Control
	Turkey	
Hq. TUSLOG	Ankara AS	Command and Communications
Det. 10, TUSLOG	Incirlik CDI	Rotational USAFE Aircraft
	Greece	
7206th Air Base Gp.	Hellenikon AB	Support and Communications
	The Netherlands	
32d Tac Fighter Sqdn.	Camp New Amsterdam	F-4E
	Germany	
26th Tac Recon Wing	Zweibrücken AB	RF-4C
36th Tac Fighter Wing	Bitburg AB	F-15
50th Tac Fighter Wing	Hahn AB	F-4E, F-4D
52d Tac Fighter Wing	Spangdahlem AB	F-4C, F-4D
86th Tac Fighter Wing	Ramstein AB	F-4E, MAC Cargo
435th Tac Airlift Wing (MAC)	Rhein-Main AB	C-9, C-130
601st Tac Control Wing	Sembach AB	OV-10, CH-53, Communications, Command and Control
Det. 5, 601st Tac Control Wing	Lindsey AS	Communications, Command and Control
7350th Air Base Gp.	Tempelhof Central Airport, Berlin	Support and Communications
600th Tac Control Gp.	Hessisch-Oldendorf AS	Communications, Command and Control

of the allies interoperable. Squadron-sized tactical units are deploying directly from their Stateside bases to the air bases of NATO allies, with maximum integration into the operations of German, Dutch, and Canadian units. Rapid reinforcement is vital to NATO's defense of Europe, and USAFE, TAC, MAC, SAC, and the Reserve Forces are trained for that mission.

In peace or in time of unilateral military activity, USAFE is a component of the US European Command. However, in a NATO-Warsaw Pact confrontation, most USAFE tactical forces would be under NATO command and control. USAFE's Commander in Chief, Gen. R. H. Ellis, also commands NATO's Allied Air Forces Central Europe (AAFCE), which include Belgian, Canadian, German, Dutch, UK, and US air units.

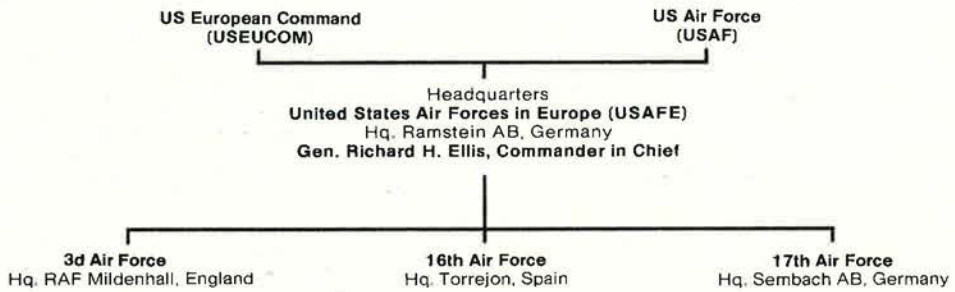
AAFCE headquarters is collocated with USAFE headquarters at Ramstein AB and reports directly to NATO's Allied Forces Central Europe at Brunssum, the Netherlands.

USAFE's continuing force modernization, realistic training, and improved command and control ensure the best support US forces have contributed to the North Atlantic Treaty Organization. ■

A 601st Tactical Control Wing radar sited in northern Germany.

UNITED STATES AIR FORCES IN EUROPE

Headquarters, Ramstein AB, Germany



A MAJOR COMMAND

USAF Security Service

United States Air Force Security Service (USAFSS) provides signals intelligence (SIGINT), communications security (COMSEC), and electronic warfare (EW) analysis services for all Air Force commands. USAFSS also serves as the Air Force element of the National Security Agency/ Central Security Service.

To accomplish this technically sophisticated mission, the command employs its 14,800 military and 2,200 civilian members in more than one hundred locations throughout the US and twelve allied countries. Brig. Gen. Kenneth D. Burns, USAFSS Commander since August 1975, directs the operations of the globally dispersed units from USAF Security Service headquarters at Kelly AFB, Tex.

The command has three subordinate units at Kelly AFB, which provide specialized support to commands throughout the Air Force.

- The Air Force Electronic Warfare Center (AFEWC) provides electronic warfare planning, evaluation, and analysis support to the armed forces. AFEWC evaluates EW effectiveness in combat and exercises, monitors the capabilities and use of EW equipment, and recommends improvements.
- The Air Force Communications Security Center (AFCOMSECCEN) manages the Air Force COMSEC program. Its responsibilities include technical guidance and planning, COMSEC education, threat analysis, engineering assistance and surveillance, and monitoring support to commanders.
- Air Force Cryptologic Depot (AFCD) functions as the agent for acquiring, storing, maintaining, distributing, and accounting for cryptologic devices and materials required for all Air Force secure communications.

The USAF School of Applied Cryptologic Sciences (USAFSACS) at Goodfellow AFB, Tex., provides specialized training for Air Force officers and airmen and selected Army, Navy, and Marine Corps enlisted personnel. It was the first military training organization to receive civilian academic accreditation.

Many USAFSS operational units are based at strategic sites in the Pacific and European areas. Mobile emergency reaction units (ERU) are maintained in constant readiness to deploy anywhere in the world. The ERUs provide Air Force tactical commands with real time support during emergencies.

Radio communications analysts process intelligence for top commands.

USAFSS also has increased its ability to provide quick-reaction support to tactical air commanders from direct support units (DSU). DSU and ERU elements periodically deploy for field-training exercises in the US and Europe where they test and refine their capabilities to meet tactical needs.

Operating from mobile tactical support vans deployed under protective camouflage screens, a DSU/ ERU provides direct intelligence support on an almost real-time basis. The men and women technicians gather, analyze, and provide advice on techniques and material to keep Air Force communications links secure. These specialists also provide commanders on-the-spot analyses of their electronic jamming and countermeasures techniques.

The command has a dynamic Total Force program of recruiting Reservists with prior military duty in USAFSS. Their skills are blended into the command's mission, both to maintain their own proficiency and to add to the command's productivity.

In February 1976, USAFSS opened its Leadership School for enlisted personnel. Collocated at Goodfellow with the command's NCO Academy, it provides professional military education (PME) to first-line supervisors. In February of this year, the staff and facilities were enlarged so both PME courses can be offered concurrently.

Within the headquarters, senior enlisted managers have been assuming greater roles in matters affecting the enlisted force. The Inspector General has added enlisted men to the inspection team and the Deputy Chief of Staff for Operations has placed senior NCOs in technical advisory positions.

"We've always believed that the enlisted people in this command are the very best," said General Burns, "and we've always given them challenging jobs. We're going to challenge them even more as we strive to maintain 'Freedom Through Vigilance.' " ■

Brig. Gen. Kenneth D. Burns, Commander, USAFSS.

CMSgt. Thomas J. Echols, Senior Enlisted Advisor, USAFSS.

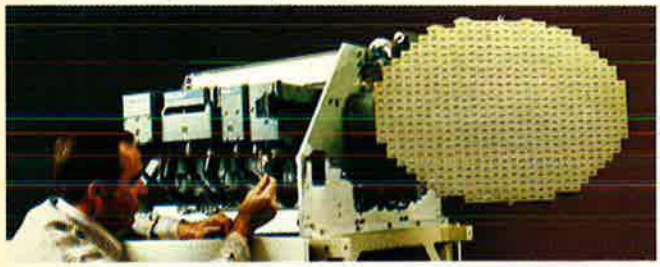
Affordable high performance avionics for the '80 s and beyond.

Westinghouse and the F-16 multi-role fighter.

The F-16 is a new breed of aircraft; fast, highly maneuverable, and able to perform both air-to-air and air-to-ground missions efficiently and effectively. Westinghouse systems are on board the F-16, helping to optimize the aircraft's multi-role mission and its survivability. And Westinghouse expertise in design-to-cost and integrated logistics support, backed up by Reliability Improvement Warranty contractual commitments, is helping to make the F-16 more affordable.

Multi-mode radar for multi-role fighter.

Westinghouse designed the F-16's radar in harmony with the aircraft's full avionics system to provide simple, one-man operation. This allows the pilot to maintain a head-up, hands-on posture at all times, while focusing maximum attention on flying the aircraft or deploying weaponry. The radar is a digital, pulse doppler, fire control sensor which is half the size, weight and cost of comparable fighter radars. Yet the F-16 radar provides multiple all-weather air-to-air search and tracking and air-to-ground mapping modes as well as excellent "dogfight" and weapon delivery capabilities. The pilot selects the appropriate operating mode and mode parameters by rapid activation of switches on the F-16 throttle grip or flight controller, or by making switch settings on the cockpit radar control panel. Or, in tactical situations, the aircraft's fire control computer will automatically select the appropriate radar mode to match the fire control mode selected by the pilot.



Seven air-to-ground modes.

In air-to-ground operation, the *real beam mapping mode* provides the pilot with an all-weather, velocity-stabilized radar map of the ground area ahead of his aircraft.

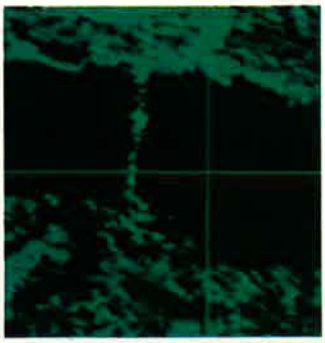
An *expanded real beam map mode* may be selected for a 4:1 expansion of the displayed video map centered around the tracking cursors. For further resolution of the map image, the pilot may select a *doppler beam sharpening mode* which improves the azimuth resolution of the expanded real beam mode.

For quasi-silent mapping operations, the pilot may select a *scan freeze mode* in which the ground map is "frozen" on the radar, and the radar transmitter is turned off to avoid detection.

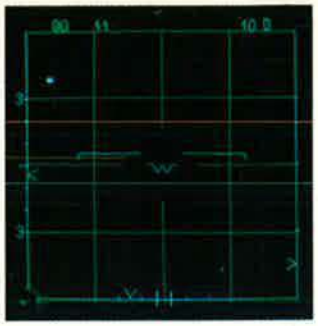
The *air-to-ground ranging mode* gives the aircraft's fire control system real-time measurement to a designated ground point.

A *beacon mode* provides the pilot with an accurate navigation fix or the capability for offset weapon delivery relative to a ground beacon.

Two *sea surface search modes* are also available for detection of small ships, stationary or moving, in a variety of sea states.



Three air-to-air modes.

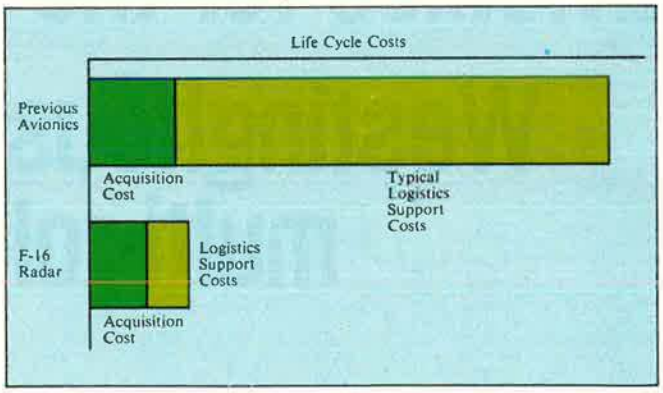


An *air-to-air downlook mode* provides a pulse doppler search and track capability to distinguish low-flying aircraft from ground clutter. Automatically selected in the presence of clutter, downlook provides a consistently clean scope for easy recognition of real targets. An *air-to-air uplook mode* increases the radar's detection range in clutter-free environments at medium to high altitudes.

For close-in air combat, the pilot can initiate an *automatic search and track mode.* This "dogfight" mode enhances the aircraft's survivability by overriding all sensors and weapons selections to automatically configure the F-16 for air combat with its internal gun and/or heat-seeking Sidewinder (AIM-9) missiles. Additional growth provisions for radar guided missiles have been provided, although the USAF does not now plan to incorporate this capability.

In addition to its many present operating modes, the F-16 radar has the flexibility to increase its capability for all-weather strike and reconnaissance through the addition of such modes as high-resolution synthetic aperture mapping, ground target tracking, and terrain follow/avoidance. You'll hear more about this growth potential in the future.

Something new in logistics support: reliability improvement warranty.



Reduction of total life cycle cost has been a primary goal of the F-16 program since its inception. To help make this goal a reality, Westinghouse developed the F-16 radar under the design-to-cost approach in which logistics engineers closely monitor every phase of system design and development for its impact on total life cycle costs. Since system reliability is the major driver of maintenance costs and, consequently, life cycle costs, Westinghouse has been working to design reliability into the F-16 radar. System architecture has been simplified, parts count reduced, system requirements balanced, and new digital techniques exploited. In production, computer-aided manufacturing and testing techniques will be used wherever possible. Finally, the preproduction radar systems are being subjected to grueling reliability growth testing in real-world environments and will be subjected to

many hours of actual flight testing as well.

The results? During F-4 flight testing of the prototype radar, the soundness of our design decisions was undeniably demonstrated. In 142 hours of flight operation, the F-16 radar experienced only two failures, for an effective 71-hour MTBF. Both failures were repaired within minutes by replacing LRU's, and radar availability remained 100%. A second F-16 radar operating concurrently with the flight system, but in a room-ambient test bench environment, accumulated 500 hours without *any* failures. Test results such as these clearly demonstrate the benefits of the design-to-cost approach.

Our confidence in the operational performance and support of the F-16 radar is very high. That's evidenced by Westinghouse's commitment to Reliability Improvement Warranty wherein we have agreed—for a fixed contract price—to repair all failures of radar systems in 442 operational USAF and NATO aircraft for a period of *4 years or 300,000 flight hours*, whichever comes first. This unprecedented commitment to system reliability speaks for itself about the validity of lower life cycle cost for the F-16 radar.

Survivability in hostile environments.

A Westinghouse-developed ECM system—the AN/ALQ-131 pod—has been designated as compatible by the USAF for the F-16 fighter. Following a successful series of flight and environmental tests, the new AN/ALQ-131 ECM system is now in production for the USAF.

The AN/ALQ-131 is a modular, versatile ECM system designed to meet both present and future electronic warfare threats in a number of scenarios. A digital processor control system which can be readily reprogrammed by means of a preassembled mission tape—on the flight line or in the shop—provides the AN/ALQ-131 with a rapid, accurate means of optimizing system response on a mission-by-mission basis.

In conjunction with the F-16's multi-role mission, the pod configuration and modular construction of the AN/ALQ-131 provide a high degree of adaptability for a variety of mission requirements. The AN/ALQ-131 may be mounted on any of three available hardpoints (one under each wing and one on the centerline) for minimum interference with the F-16's ordnance.

And with the experience gained from 42 consecutive months of on-time production and delivery of AN/ALQ-119 ECM pods, Westinghouse has the know-how to produce this tomorrow pod today.

Lightweight, new power system.

Electrical power to operate the controls and systems on the F-16 is provided by a Westinghouse spray-oil-cooled generating system which supplies a minimum of 40 kVA of AC power. The three-phase generator is similar to other Westinghouse generators found on the Lockheed S-3A, Fairchild A-10, Boeing E-3A and E-4B, Rockwell B-1 and XFV12A, and the SAAB JA37. This type of unit is able to generate approximately twice the kVA per pound with five times the reliability of generators which are cooled by conventional methods. In fact, the F-16 has completed more than 1000 hours of flight testing without a generating system failure.

The generator is part of an Integrated Drive Generator (IDG) package and is cooled by oil sprayed directly on its heat-generating components rather than by air or oil circulated through cooling passages. Spray cooling allows for greater heat transfer capability and permits higher current densities. This significantly reduces generator weight and size for a given power rating over air-cooled units.

The generator is integrated with a constant speed drive with the two components sharing a common bearing and common oil supply. This mating and sharing arrangement eliminates excess material and seals, reduces system weight and maintenance requirements, and increases reliability.

What it all means.

The underlying goal in the development of the F-16 has been the evolution of an aircraft which could successfully fulfill a multi-role mission by combining high performance, superior air-to-ground and air-to-air capabilities, and affordable acquisition and logistics costs with a technological step forward in avionics. The F-16 satisfies these requirements, and the Westinghouse systems on board the F-16 are playing a big part in making this new generation of aircraft possible. It's the age of affordable high-performance avionics.

If you'd like more information on Westinghouse's F-16 avionics, write Westinghouse Electric Corporation, Defense and Electronic Systems Center, MS-129A, P.O. Box 746, Baltimore, Maryland 21203. Please specify your preference for our F-16 Radar Brochure or information on ECM, power systems, or ILS.

Westinghouse

A SEPARATE OPERATING AGENCY

Air Force Accounting and Finance Center

The Air Force Accounting and Finance Center located at Denver, Colo., performs three major functions for the Air Force. It pays all USAF members, accounts for all appropriated funds, and provides the technical guidance and systems for the accounting and finance network.

AFAFC pays more than 1,153,000 men and women each month—575,000 active-duty members, 160,000 Reservists and Air National Guardsmen, and 418,000 Air Force retirees.

The Center accounts for all money that Congress appropriates to the Air Force. For FY '77 that amounts to more than $32 billion. Using myriad financial reports from the field, AFAFC compiles and provides eighty-six key reports to fund managers at all levels, including the Air Staff, Department of Defense, Office of Management and Budget, and the Congress.

AFAFC supplies technical guidance for the operation of the Air Force's worldwide accounting and finance network, and tests the systems that make up this network.

Carrying out this wide-ranging mission is the responsibility of Maj. Gen. Lucius Theus, who is both Director of Accounting and Finance for the Comptroller of the Air Force and Commander of the Air Force Accounting and Finance Center. The Center is assigned thirty-seven officers, 220 airmen, and 1,930 civilians.

In 1976, AFAFC made many improvements that resulted in better and faster pay services. Last year, AFAFC completed coast-to-coast conversion to the Electronic Funds Transfer System (EFTS) for active-duty Air Force personnel. Through EFTS, AFAFC automatically deposits the pay of all blue-suiters who have their pay sent to financial institutions. The Center sends pay information on all these members and a single check for their collective pay through the Federal Reserve System, to the members' banks, credit unions, and savings-and-loan associations. The Air Force is one of the largest users of EFTS and was the first within DoD.

The Center began to implement the EFTS for retired Air Force members in 1976, and will complete the conversion by mid-1977.

Another new system under development is the Retiree/Annuitant Pay System (RAPS), which will provide retired Air Force people with the same speedy pay service that active-duty members receive under the Joint Uniform Military Pay System (JUMPS). Due for completion in 1978, RAPS will put all Air Force retirees' pay data on immediate access storage in the AFAFC computers, making possible instantaneous answers to pay inquiries.

In 1976, the Air Force was named executive agency for establishing an all-service billing and collecting function for foreign military sales, to be called the Security Assistance Accounting Center (SAAC). SAAC has been located at AFAFC, with full implementation scheduled for this year.

Personalized service to all Air Force members has been, and will continue to be, of the greatest importance. ■

Maj. Gen. Lucius Theus, Commander, AFAFC.

CMSgt. Melvin D. Bauer, Senior Enlisted Advisor, AFAFC.

A SEPARATE OPERATING AGENCY

Air Force Audit Agency

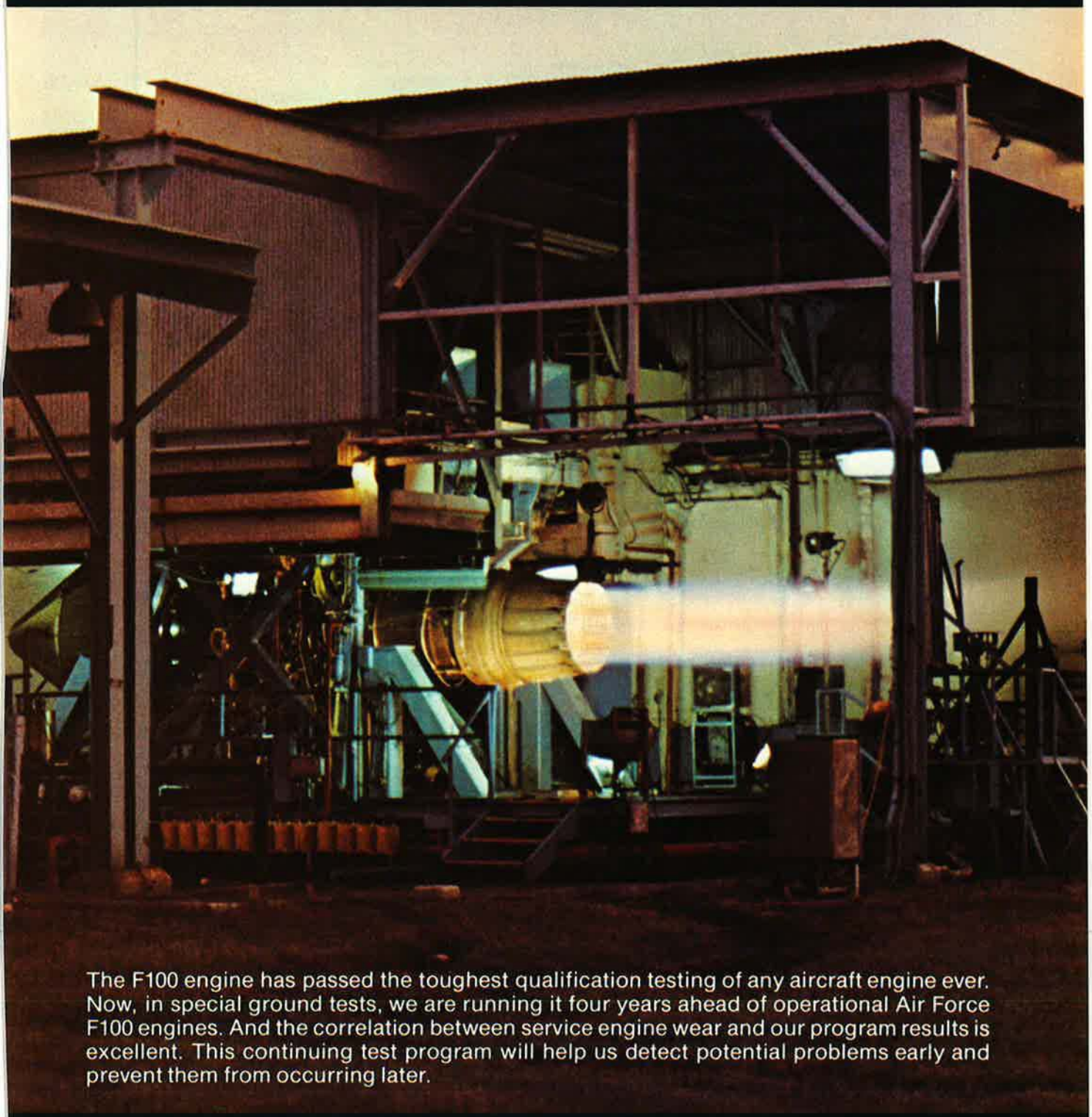
The Air Force Audit Agency (AFAA) at Norton AFB, Calif., is the internal audit organization of the Air Force. AFAA's operations are worldwide, with eighty-seven offices on Air Force installations in thirty-five states and ten foreign countries. Most of the Agency's 1,105 authorized military and civilian people have bachelor's degrees and about a third hold master's degrees in appropriate fields, or are CPAs.

Internal auditing of USAF policies, procedures, and controls improves Air Force capabilities by helping management use its resources more efficiently. AFAA audits identify problems at all levels that warrant management attention, search out causes for error, and recommend solutions.

Public law requires the comptroller of each military department to establish and maintain an internal audit function. The Comptroller of the Air Force delegated authority to perform this function to the AFAA. Brig. Gen. Joseph B. Dodds is the USAF Auditor General and Commander of AFAA. He reports directly to the USAF Comptroller, but also has authority to communicate with the Assistant Secretary of the Air Force for Financial Management.

AFAA is structured to provide maximum response to Air Force requirements. The Norton headquarters—consisting of Plans, Operations, and Resources Management Directorates—coordinates the worldwide operation. By permanently deploying auditors at "resident audit offices" on thirty-seven installations, AFAA

The F100 engine. Its accelerated mission testing makes it 1981 in 1977.



The F100 engine has passed the toughest qualification testing of any aircraft engine ever. Now, in special ground tests, we are running it four years ahead of operational Air Force F100 engines. And the correlation between service engine wear and our program results is excellent. This continuing test program will help us detect potential problems early and prevent them from occurring later.

PRATT & WHITNEY AIRCRAFT GROUP

Government Products Division

West Palm Beach, Florida 33402 U.S.A.

UNITED TECHNOLOGIES

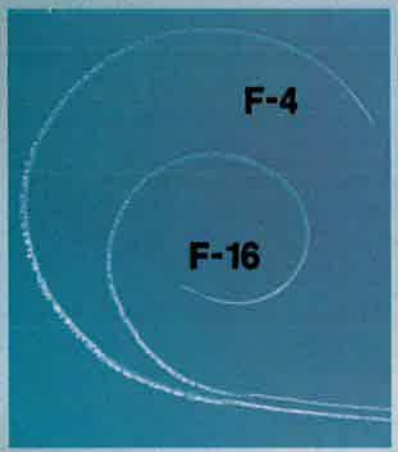
F-16

The Multi-role Fighter

When combat requirements change, so does the **Multi-role** *F-16. It's the flexible fighter specifically designed for both air-to-air and air-to-ground roles.*

In the traditional air combat arena, the F-16 is superior to existing threat aircraft. Compared to the operational F-4, the F-16 goes twice as far, turns in half the radius and accelerates twice as fast — yet weighs half as much. Its provision for radar missile delivery can give it added air-to-air authority.

The F-16's all-weather radar acquires both aerial or surface targets. Its ground-mapping feature plus the F-16's head-up display and integrated fire control computer offer the latest in air-to-ground delivery of more than 15,000 pounds in bombs and missiles. What's more, the F-16's life cycle costs are less than any tactical fighter in the inventory.
Low cost. **Multi-role.**
The F-16.



GENERAL DYNAMICS
Pierre Laclede Center, St. Louis, Missouri 63105

resident auditors and their people maintain close contact with all levels of Air Force management. This arrangement permits timely response to local problems as well as to conditions that may prevail throughout the Air Force.

Responsiveness is achieved by audits to meet the particular needs at each management level. The centrally directed audit (CDA) is made concurrently at selected locations to evaluate more significant Air Force programs and activities. The results of CDAs are reported to the management level that is best able to act on the recommendations—typically Hq. USAF.

The problem detection audits (PDA) are brief surveys to determine if a problem identified at one base exists at others. If it does, it is promptly reported, or is used as the basis for a CDA. Resident auditors have authority to conduct audits on their own initiative. Local commanders may request resident auditors to perform consultative audits when there are possible management problems. These audits generally are reported only to the requesting commanders.

The audit force is managed by the Auditor General through Western and Eastern geographic regions and two functional directorates. The Western Region at Norton manages the audit mission in the Western CONUS, Alaska, and the Pacific. The Eastern Region at Langley AFB, Va., is responsible for bases in the Eastern CONUS, Canal Zone, Greenland, and Europe.

The two functional directorates—Acquisition and Logistics Systems at Wright-Patterson AFB, Ohio, and Service-Wide Systems at Andrews AFB, Md., provide specialized service. The Directorate of Acquisition and Logistics Systems services Air Force Systems Command (AFSC) and Air Force Logistics Command (AFLC). It controls and supervises audit offices at AFSC's buying divisions and AFLC's Air Logistics Centers. This centralized management permits coordinated auditing of all phases of a weapon system's life cycle from conception to operational and logistic support.

The Service-Wide Systems Directorate performs audits of support activities and programs. The Directorate has audit offices at Air Force Accounting and Finance Center, Air Force Military Personnel Center, and Air Force Data Systems Design Center.

AFAA auditors issued seventy-six summary reports of Air Force audits in FY '76 and more than 5,300 local reports, including more than 600 audits requested by commanders. Air Force managers were thus able to realize $241.3 million in savings or cost-avoidance. Compared to AFAA's cost of operation, the improved use of resources represents better than an eleven-to-one return on investment.

AFAA's emphasis in FY '77 will include energy management and conservation, computer systems security and privacy, and Air Force budget formulation and appropriation management. ■

Brig. Gen. Joseph B. Dodds, Commander, AFAA.

CMSgt. Robert S. Wise, Senior Enlisted Advisor, AFAA.

A SEPARATE OPERATING AGENCY

Air Force Data Automation Agency

The Air Force Data Automation Agency (AFDAA), established as a separate operating agency on February 29, 1972, provides centralized management and organizational structure for automatic data processing (ADP) activities with Air Force-wide application. It provides ADP systems support, from conception through termination, to the Air Force and several other federal agencies.

Brig. Gen. Frederick L. Maloy is both AFDAA Commander and Air Force Director of Data Automation. The Agency provides Air Force-wide specialized ADP expertise and consultant services that address ADP requirements, facilities design, and safety.

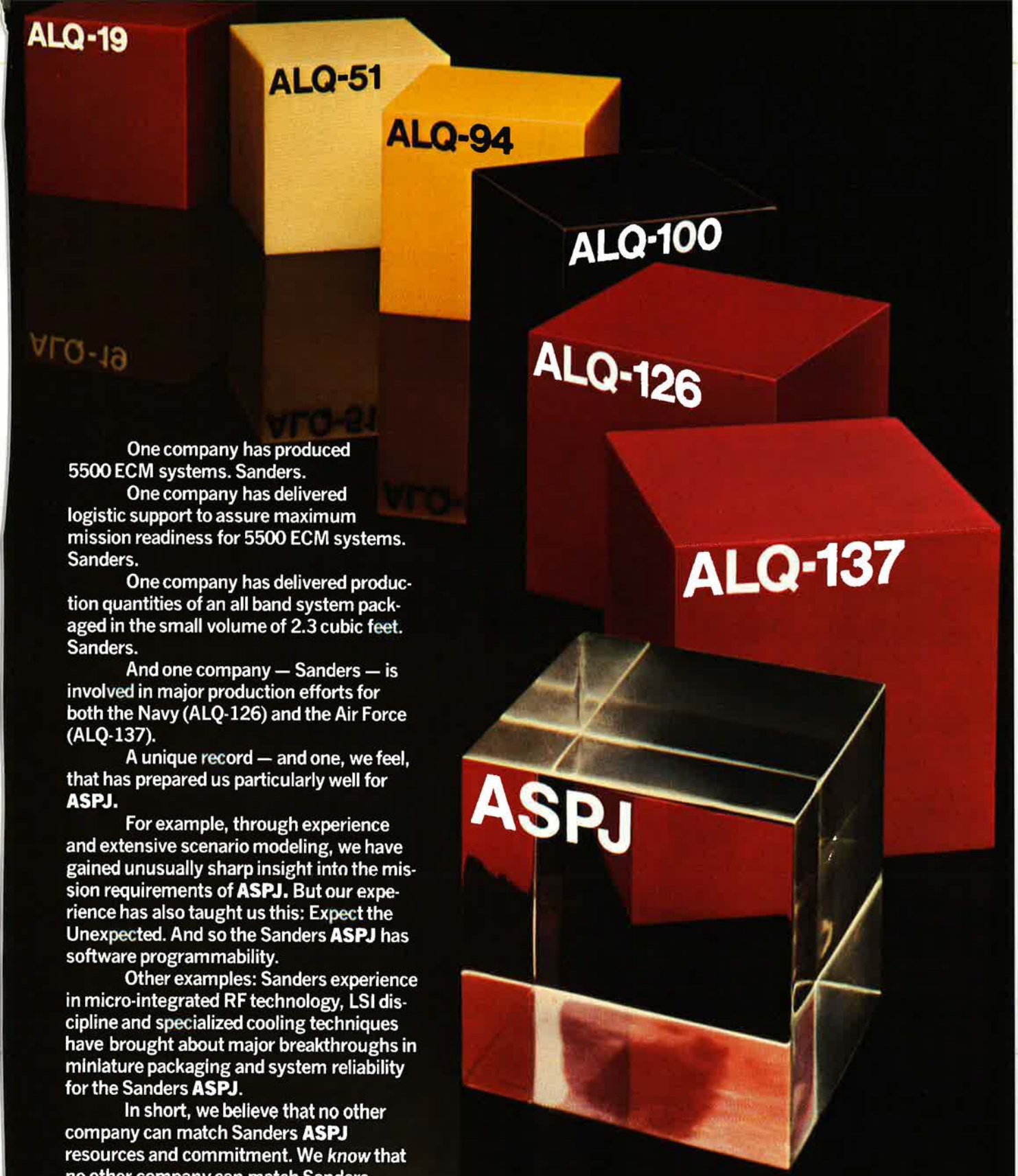
The Agency consists of headquarters elements, the Data Systems Evaluation Office (DSEO), and the Program Management Office (PMO), located at Gunter AFS, Ala., and four subordinate units: the Air Force Data Services Center (AFDSC), the Air Force Data Systems Design Center (AFDSDC), the Federal Computer Performance Evaluation and Simulation Center (FEDSIM), and the Air Force Computer Acquisition Office (AFCAO). AFDAA has approximately 1,200 military people and 920 civilians assigned.

The DSEO provides independent assistance to the Air Force to ensure the production of ADP systems that meet user needs on schedule at the projected cost.

The PMO directs a Capital Replacement Program for base-level U-1050-II and B3500 computers at approximately 125 sites.

The AFDSC is located in the Pentagon and provides automatic data processing, computing, and management science services to Hq. USAF, Office of the Secretary of Defense, and other agencies. It is responsible for planning, designing, developing, and implementing computer-based

When you have produced 5,500 ECM systems, you are uniquely qualified to produce ASPJ ...ECM for next-generation fighters.



One company has produced 5500 ECM systems. Sanders.

One company has delivered logistic support to assure maximum mission readiness for 5500 ECM systems. Sanders.

One company has delivered production quantities of an all band system packaged in the small volume of 2.3 cubic feet. Sanders.

And one company — Sanders — is involved in major production efforts for both the Navy (ALQ-126) and the Air Force (ALQ-137).

A unique record — and one, we feel, that has prepared us particularly well for **ASPJ.**

For example, through experience and extensive scenario modeling, we have gained unusually sharp insight into the mission requirements of **ASPJ.** But our experience has also taught us this: Expect the Unexpected. And so the Sanders **ASPJ** has software programmability.

Other examples: Sanders experience in micro-integrated RF technology, LSI discipline and specialized cooling techniques have brought about major breakthroughs in miniature packaging and system reliability for the Sanders **ASPJ**.

In short, we believe that no other company can match Sanders **ASPJ** resources and commitment. We *know* that no other company can match Sanders experience.

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What's our mild-mannered civilian turbofan engine doing in a tough bird like this?

Just proving a point, just proving a point.

The bird is the new CASA C-101 trainer/light attack aircraft.

The engine, Garrett's TFE 731 turbofan.

And the point is this:

Our TFE 731 has what it takes to perform as efficiently and reliably in the combat environment as it does in the world of the business jet.

The C-101, being developed by CASA (Construcciones Aeronauticas S.A.) for the Spanish Air Force, is a basic and advanced trainer, with an air-to-air and air-to-ground weapons delivery capability. Armed recon, ECM and photo recon missions are also planned because of the CASA's maneuverability and long endurance at low level.

Its Garrett engine will be essentially the same fuel-saving, low-pollution turbofan now used by four leading business jet builders—Dassault, Israel Aircraft Industries, Learjet and Lockheed. The TFE 731 is also the conversion engine for AiResearch Aviation's 731 JetStar.

The CASA 101. As the forerunner of a new breed of economical, virtually smokeless combat aircraft, it makes sense to power it with the turbofan that powers the economical clean-flying business jets.

GARRETT

The Garrett Corporation One of The Signal Companies

GARRETT'S TFE 731 TURBOFAN

The only one in its class

Northrop Corp. and Messerschmitt-Boelkow-Blohm (MBB) are partners in the development of the C-101.

management information systems for these agencies. AFDSC operates a regionalized ADP service center at San Antonio, Tex.—the San Antonio Data Services Center (SADSC)—which has two large computer systems with three independent remote terminal networks. SADSC provides support to six major commands and separate operating agencies on a fee basis.

The AFDSDC at Gunter AFS is responsible for designing, developing, and maintaining USAF standard ADP systems; establishing the use of common computer techniques; and recommending areas for additional applications. AFDSDC develops and recommends standards for programming languages, establishes documentation standards, participates in the development of related standards for equipment, and acts as the ADP Systems Manager for many Air Force-wide systems.

The FEDSIM, located in Washington, D. C., was established in February 1972 by the General Services Administration (GSA) to provide computer performance and evaluation services to all agencies of the federal government. Because of USAF's recognized expertise in this area, it was designated to operate the FEDSIM for GSA. FEDSIM provides advanced techniques of computer performance and evaluation, and simulation services on a fully reimbursable basis.

The AFCAO at Hanscom AFB, Mass., acquires ADP computer systems or ADP computer elements for the Air Force. This includes developing specifications and soliciting documents necessary for the selection and acquisition of ADP computer elements. ■

Brig. Gen. Frederick L. Maloy, Commander, AFDAA.

CMSgt. Philip C. Salley, Senior Enlisted Advisor, AFDAA.

A SEPARATE OPERATING AGENCY

Air Force Commissary Service

The Air Force Commissary Service (AFCOMS), Kelly AFB, San Antonio, Tex., was activated in April 1976, and assumed worldwide operational control of USAF commissaries the following October. When Congress rejected proposals in 1975 and 1976 to phase out commissary appropriations, AFCOMS was created with the understanding that the military services were to streamline operations, reduce costs, and improve service.

AFCOMS has four elements: a Board of Directors (BoD), Headquarters, four regions, and the commissary stores. The BoD, responsible to the Air Force Chief of Staff, provides direction to the AFCOMS Commander for commissary operations and approves basic policies, plans, and programs.

Staffed by commissary specialists, the headquarters develops plans and programs for the management and control of Air Force commissaries. Its four regions—Western (including Far East and Alaska), Central, Eastern, and European—manage commissaries within their respective geographical areas.

AFCOMS primarily supports the troop issue and subsistence program. It also seeks to reduce commissary operating costs, provide authorized patrons with food and household items at the lowest practical cost, and maintain a reliable, efficient management system. As required by law, it must generate sufficient earnings to pay for certain reimbursable operating and construction costs.

Maj. Gen. Daniel L. Burkett, Commander, AFCOMS.

Under the leadership of the AFCOMS Commander, Maj. Gen. Daniel L. Burkett, 9,571 civilians and 692 military people operate 170 commissaries and 127 troop issue/subsistence functions in the CONUS and overseas. Total sales in FY '76 exceeded $1.3 billion.

During the year, management improvements and overhead consolidation have been emphasized. Where feasible, the management and control function of two or more stores has been consolidated in one administrative office under AFCOMS's "complexing" concept. The first complexing program consolidated twenty-two stores into nine complexes and saved 123 manpower spaces. Further consolidation will produce more savings as AFCOMS pursues long-range plans for at least forty-three complexes.

Other projected economies include more frequent vendor deliveries to reduce inventories, and automated systems for reports, inven-

tory control, and accounts payable. Coordination is maintained with the Air Force Auditor and the Office of Special Investigations to reduce inventory losses. AFCOMS also coordinates with local and national vendors on special offers, discounts, and sales promotions.

The Service's engineering staff is used exclusively for designing commissary facilities. Projects are under way at twelve bases, and this year the Directors approved an additional $20 million for new construction and renovations. New or renovated stores will have wider aisles, better lighting, heating, and refrigeration, more shelf space, and better traffic flow.

Data automation, electronic cash registers with scanners, and electronic scales are several other initiatives under study. Another long-range program involves further development of commissary people in administrative, technical, professional, and management skills.

Congress has asked for "substantial savings" and a more cost-effective and efficient operation. AFCOMS is making things happen for the good of the commissary patrons and is satisfying the congressional mandate. ■

A SEPARATE OPERATING AGENCY

AF Engineering and Services Agency

The Air Force Engineering and Services Agency (AFESA) was established April 8, 1977, as a separate operating agency. Commanded by Maj. Gen. Robert C. Thompson, who also serves as Director of Engineering and Services at Hq. USAF, it is expected to be fully operational by July 1 of this year.

Headquartered at Kelly AFB, Tex., AFESA components will include portions of the Air Force Civil Engineering Center at Tyndall AFB, Fla.; the Air Force Regional Civil Engineer Offices at Atlanta, Ga., Dallas, Tex., and San Francisco, Calif.; and portions of the Air Force Services Office at Philadelphia. The Air Force Commissary Service (*see preceding article*) will also come under AFESA, as will the Mortuary Offices at Bolling AFB, D. C., and Wright-Patterson AFB, Ohio. Eventually, components of the Civil Engineering Maintenance, Inspection, Repair, and Training (CEMIRT) function will be transferred from the Aerospace Defense Command to AFESA.

While General Thompson will maintain his office in the Pentagon, Maj. Gen. Daniel L. Burkett, Deputy Commander of AFESA (who will also retain his position as head of Air Force Commissary Service) will remain at Kelly AFB. Realignment of AFCOMS as a component of AFESA will not alter its present function, but it will cease to be a separate operating agency.

By centralizing the direction and control of these technical and related services, USAF will have a more streamlined operation. No overall personnel reductions are contemplated.

At press time, a mission statement and total military and civilian authorizations were not available. ■

Maj. Gen. Robert C. Thompson, Commander, AFESA.

A SEPARATE OPERATING AGENCY

Air Force Intelligence Service

The National Security Act of 1947, as amended, authorizes the Air Force to collect, evaluate, correlate, and disseminate department intelligence. Department of Defense directives require the Air Force to provide an organization capable of furnishing adequate, timely, and reliable intelligence for DoD use.

The Air Force Intelligence Service (AFIS) was established June 27, 1972, as a separate operating agency to provide specialized services to Air Force Headquarters and USAF commanders.

While charged with supporting USAF planning and combat operations, AFIS remains flexible and adaptable to the changing intelligence requirements of the Air Force. The Assistant Chief of Staff for Intelligence (ACS/I), Hq. USAF, Maj. Gen. Eugene F. Tighe, Jr., also serves as Commander of AFIS.

AFIS has these organizational elements:

- The Directorate of Operational Intelligence provides the Air Force with all source intelligence affecting Air Force missions and resources, including force deployment and employment, indications and warning, intelligence analysis of current operations, and special intelligence research. It also provides targeting, weaponeering, and cartographic expertise. This directorate is the working contact with the Defense Mapping Agency.
- The Directorate of Security and Communications Management oversees the worldwide Air Force Special Security Office and Special Activities Office systems by ensuring compliance with special intelligence security, intelligence telecommunications, and communications security policies.
- The Directorate of Intelligence Data Management plans, coordinates, and exercises management control of worldwide Air Force intelligence data-handling capabilities.
- The Directorate of Attaché Affairs operates the Air Force attaché program, supports the Defense Attaché System (DAS), and monitors all matters concerning Air Force participation in DAS.
- The Directorate of Personnel

coordinates military and civilian personnel acquisition and assignments, oversees career development, and is liaison on personnel matters between worldwide intelligence activities and the Air Force Military Personnel Center.

- The Directorate of Intelligence Reserve Forces operates the Air Force Intelligence Service Reserve Program. Responsibilities include recruitment, administration, training, and utilization of intelligence mobilization augmentees who provide an immediate support capability under the Total Force Policy for contingency and mobilization requirements.
- The Directorate of Soviet Affairs conducts basic research in the disciplines of Communist military doctrine and strategy, and produces expository materials for use in assessing their impact on USAF plans and operations.
- The 7602d Air Intelligence Group (AINTELG), located at Ft. Belvoir, Va., is responsible for management and collection of worldwide human source intelligence, as well as evasion and escape and prisoner-of-war intelligence. A typical project is sifting and reviewing data from POW "lessons learned" to better prepare the Air Force in the event the US is faced again with a potential POW problem.

The Air Force Intelligence Service participates in a number of joint-service and Air Force training exercises each year to improve the readiness of active-duty and Reserve Forces intelligence personnel. ■

Maj. Gen. Eugene F. Tighe, Jr., Commander, AFIS.

CMSgt. Wayne E. Ford, Senior Enlisted Advisor, AFIS.

A SEPARATE OPERATING AGENCY

Air Force Office of Special Investigations

The Air Force Office of Special Investigations (AFOSI), located at the Forrestal Building in Washington, D. C., is a centrally directed organization controlling some 1,875 special agent and support people assigned to thirty-one districts and 126 detachments and operating locations throughout the world. When any USAF commander needs assistance in dealing with fraud, counterintelligence, or criminal activities, he requests help from AFOSI's professional investigators. The commander then takes the action he deems necessary.

To perform its mission, AFOSI divides its investigative tasks among the three major directorates of Fraud, Counterintelligence, and Criminal investigations.

The Fraud Directorate is responsible for the direction and staff supervision of investigations of fraudulent activities, major administrative irregularities, and violations of public trust involving Air Force procurement, disposal, pay and allowance matters, and nonappropriated fund activities. This directorate also supervises AFOSI investigative surveys to determine the existence, location, and extent of such malfeasance or irregularities.

The Fraud Directorate recruits and trains special agents in an intensive three-phase program designed to aid in the detection of fraud or major administrative irregularities, especially at major procurement areas, and directs a fraud intelligence collections program geared to keep Air Force commanders apprised of patterns or trends in fraudulent activities. This directorate also coordinates investigative support to the Army and Air Force Exchange Service, AFOSI having been designated the Executive Agency for such support, and coor-

Col. Forest A. Singhoff, Commander, AFOSI.

CMSgt. Billy Johnson, Senior Enlisted Advisor, AFOSI.

dinates AFOSI support to more than 180 Defense Supply Agency field offices throughout the world under a 1974 agreement.

The Directorate of Counterintelligence counters the threat to Air Force security posed by foreign intelligence services through its offensive and defensive measures to detect, neutralize, and destroy the effectiveness of such activities. This includes investigating espionage and other counterintelligence matters for Air Force commanders. A significant and expanding AFOSI responsibility is the collection and analysis of information concerning terrorist threats to the Air Force and its timely dissemination to affected commanders. The directorate supervises various other counterterrorism services for Air Force commanders in areas of heightened terrorist activity. It also provides protective services to senior Air Force and certain other US officials.

The Criminal Directorate provides direction for the investigation of criminal offenses against persons, their property, or the USAF. Included are offenses ranging from housebreaking to homicide. Generally, jurisdiction is limited to crimes committed on Air Force installations by persons subject to the UCMJ.

To aid in criminal fact finding, AFOSI directs the USAF polygraph/Identi-kit programs, maintains the USAF terminal to the FBI National Crime Information Center, provides a highly trained forensic science cadre, and performs continuing patterns and trends analysis.

Since many investigative matters extend beyond Air Force personnel or the boundaries of Air Force bases, AFOSI maintains liaison with law enforcement and investigative organizations at the international, federal, state, and local levels. Such cooperation ensures the preservation of jurisdictional responsibilities and assures the Air Force commander the most factually exhaustive investigative result.

To maintain the integrity of a truly professional force of investigators, AFOSI selects and trains its own special agents from among the most highly qualified and capable Air Force officers, NCOs, and civilians.

Selectees attend a twelve-week investigator's course at the Air Force Special Investigations School in Washington, D. C. The course includes approximately 420 hours of administrative, investigative, and military law work. Upon graduation, students are awarded badges and official credentials as AFOSI special agents.

After gaining experience as working investigators, most special agents return to the school for advanced or specialized training to further enhance the investigative professionalism of AFOSI. ■

A SEPARATE OPERATING AGENCY

Air Force Inspection and Safety Center

The Air Force Inspection and Safety Center (AFISC) at Norton AFB, Calif., monitors the Air Force inspection system and safety programs, helping assure that the Air Force's fighting capability is sustained and managed effectively. Maj. Gen. Ranald T. Adams, Jr., serves as both the Center's Commander and as the Deputy Inspector General for Inspection and Safety, Hq. USAF.

On January 31, 1977, AFISC's work force totaled 535 (383 military and 152 civilians), including foreign exchange officers, safety engineers from major aerospace companies, air staff training officers, Reserve supplement officers, and mobilization augmentors.

AFISC has five directorates—Inspection, Aerospace Safety, Medical Inspection, Nuclear Surety, and Programs. The last supports the others in such areas as analysis, scheduling, operational budgeting, data automation, personnel, and administration.

In June 1976, the Assistant for Inquiries and Complaints moved from the Pentagon to Norton AFB. This office monitors the IG complaint program and answers complaints referred to The Inspector General of the Air Force.

The Center's Directorate of Inspection evaluates the effectiveness of Air Force management, mission capability, and readiness. The directorate conducts three types of inspections: the Functional Management Inspection (FMI) to evaluate well-defined activities and programs; the System Acquisition Management Inspection (SAMI) to review all aspects of the acquisition process, identifying and reporting problems early in developmental stages of new weapon systems; and the Command Inspection System Inspection (CISI) to evaluate MAJCOM/SOA Inspector General performance. The Inspector General occasionally directs special-interest items to be examined by both AFISC and major command inspection teams.

The Center conducts an Inspection School for all newly assigned USAF, major command, and separate operating agency inspectors.

The Directorate of Aerospace

Maj. Gen. Ranald T. Adams, Jr., Commander, AFISC.

CMSgt. Edward H. Johnston, Senior Enlisted Advisor, AFISC.

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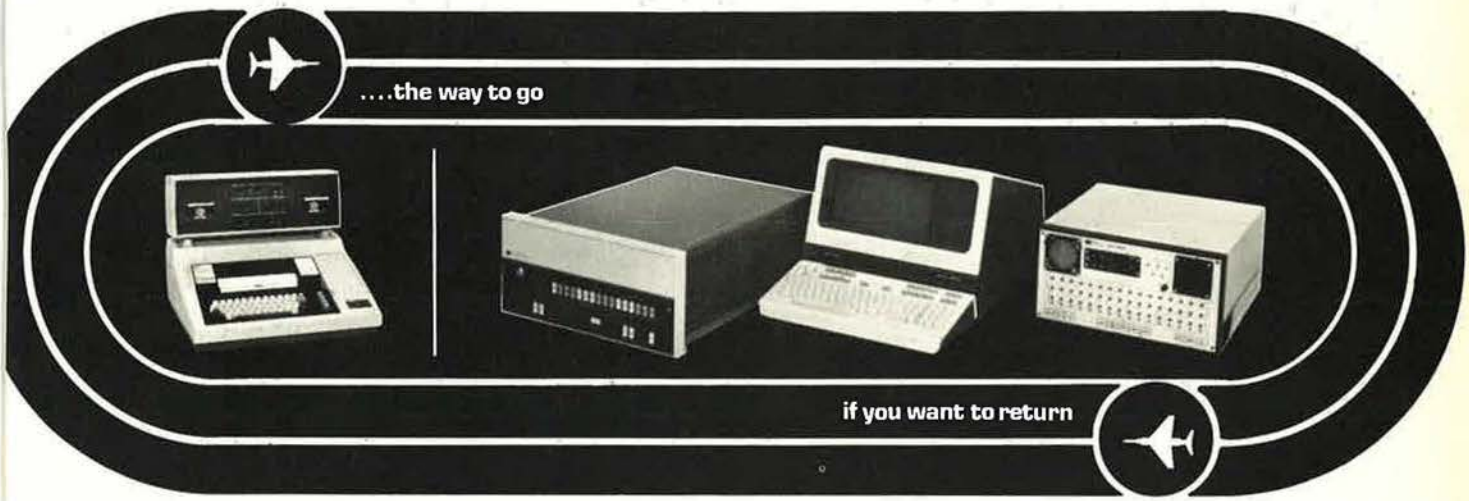

The Radar Warning Trainer is designed to meet the EW training requirements of today's pilots and radar warning system (RWS) operators. It operates in an integrated mode with flight trainers and in a stand alone mode. Using modern software and microprocessing techniques, accurate real time simulation of the RWS is provided. RWS anomalies and six degrees of aircraft freedom are modeled, providing the trainee with audio and visual cues to identify various threat conditions.

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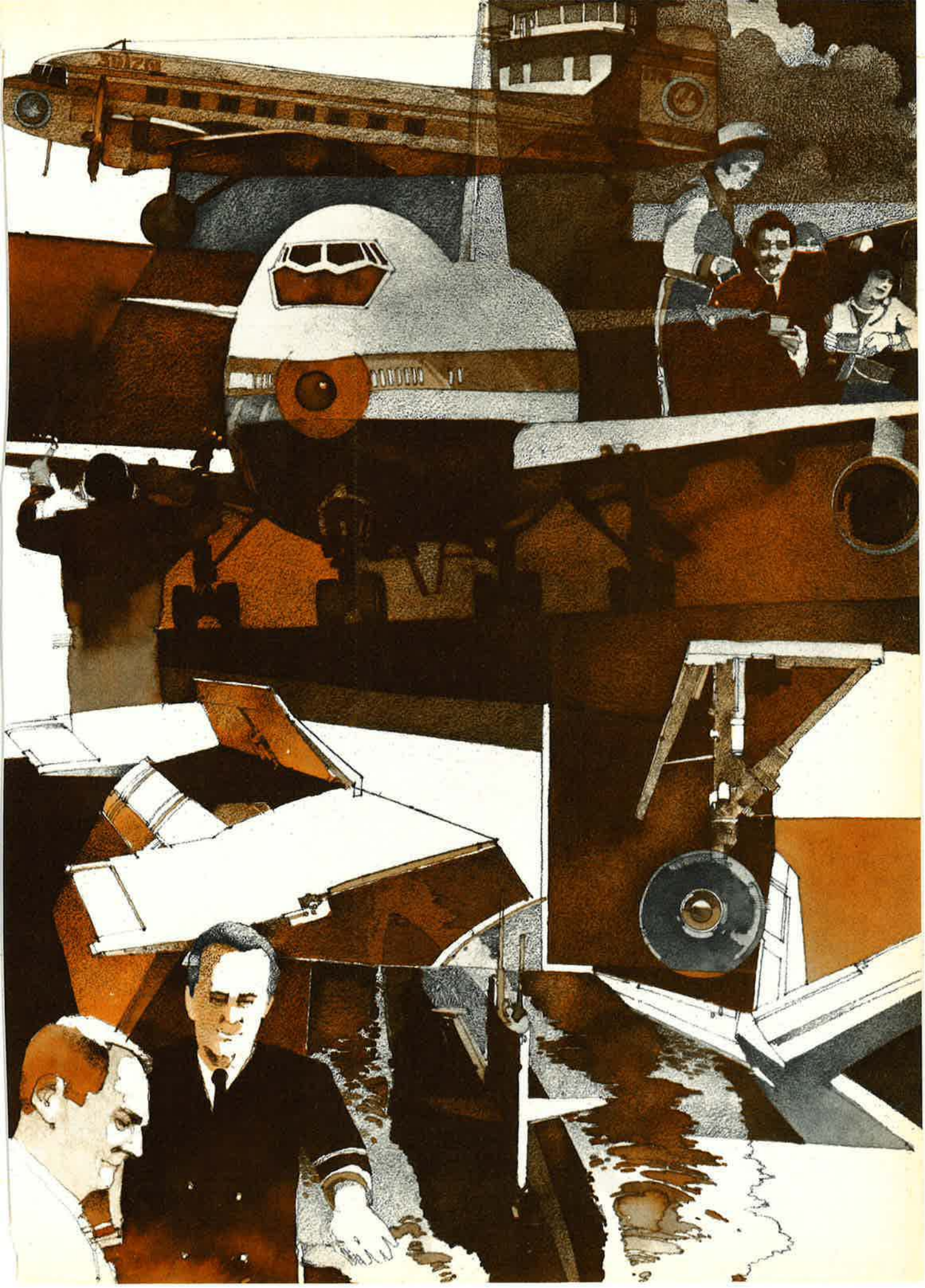


Safety administers Air Force-wide programs of accident prevention in flight, ground, missile, space, and explosive safety. Last year, there were eighty-seven major aircraft accidents—the lowest in Air Force history. USAF ground fatalities also dropped to an all-time low. The directorate publishes *Driver, Aerospace Safety,* and *Maintenance* magazines.

Safety action teams study such specific weapon systems and safety problems as those relating to the F-16 and B-1, along with human factors, to identify high accident potentials and to influence management actions. Two new action teams were recently formed to study aircraft engines and the C-141 stretch modification.

The Directorate's Reports and Analysis Division develops programs based on flying hours, sorties, and landings to forecast aircraft accident trends. Forecasts for 1976 were eighty-five percent accurate by aircraft type, while accident forecasts were ninety-eight percent accurate. These forecasts are used for accident prevention.

The new Hazardous Air Traffic Reporting (HATR) program will consolidate reporting hazardous conditions involving air traffic services. This automated data base will identify flying and traffic control deficiencies and improve aircrew services.

The Directorate of Medical Inspection performs Health Services Management Inspections (HSMIs) of all active-duty and Air Force Reserve medical units. The inspectors look at the health-care system to determine the best methods of providing quality care for the maximum number of people. The directorate also conducts functional management inspections (FMIs) dealing with specific medical activities and programs. Two recent subjects of FMIs were Air Reserve Forces Medical Unit Annual Training, and Use and Control of Non-Physician Health Care Providers.

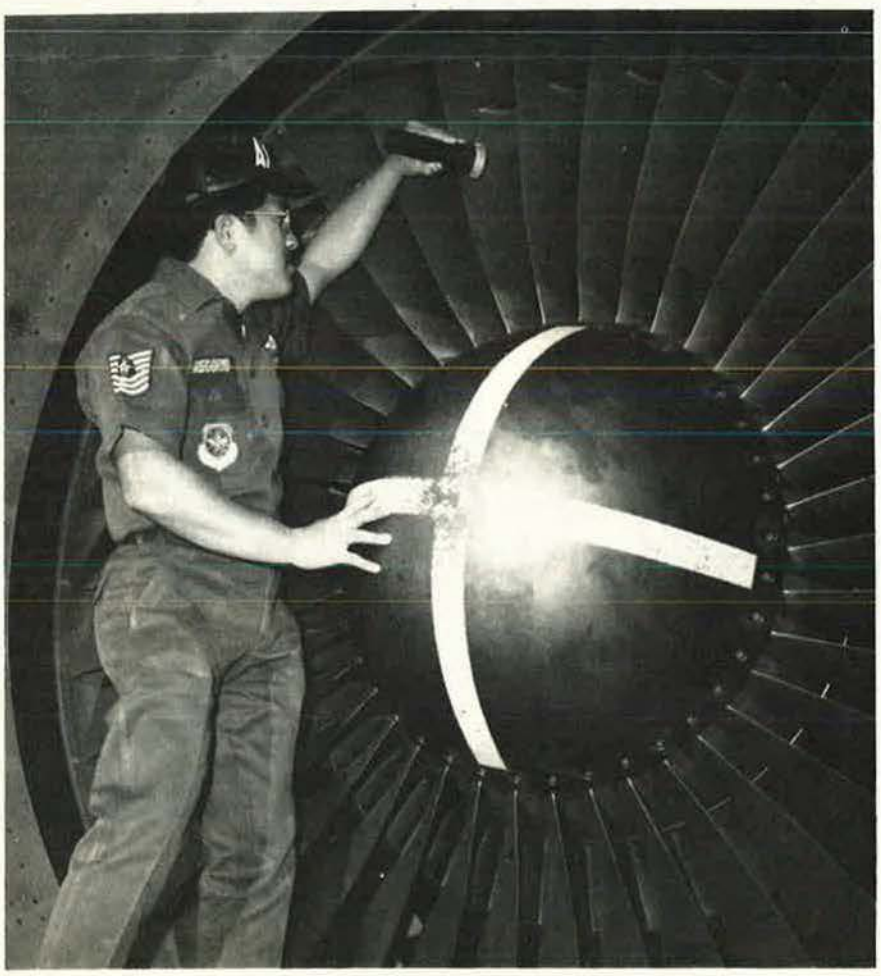
The Directorate of Nuclear Surety at Kirtland AFB has safety and inspection responsibilities similar to those of the Directorates of Inspection and Aerospace Safety. However, they are confined to nuclear matters.

In addition to directing the accident, incident, deficiency (AID) reporting system and giving technical advice for investigating and preventing nuclear accidents, the directorate provides the secretariat and chairman of the Nuclear Weapon System Safety Group (NWSSG). The NWSSG evaluates each nuclear weapon system to ensure that it satisfies the DoD Nuclear Safety Standards, and originates the weapon system safety rules for Secretary of Defense approval.

AFISC's operations affect nearly every facet of Air Force life, from how the Air Force flies and fights to the way its people are treated and cared for. AFISC people are reminded daily of their mission by a large sign over the headquarters entrance: "Strength Through Vigilance." ■

A SEPARATE OPERATING AGENCY

Air Force Test and Evaluation Center



MSgt. Richard A. Gregorio of AFTEC AMST test team checks out engine of prototype YC-14.

Established in January 1974 as a separate operating agency, the Air Force Test and Evaluation Center (AFTEC) is a major participant in the weapon systems acquisition process. AFTEC is responsible for the operational test and evaluation (OT&E) of all Air Force major weapon systems undergoing research and development and entry into the operational inventory. In keeping with DoD and congressional desires for independent, objective service operational test agencies, the Center is a separate entity from other Air Force test organizations. It is under the Air Force Chief of Staff and reports test results directly to him.

"Our job is to test emerging systems and evaluate them against a set of operationally oriented standards," according to Maj. Gen. Howard W. Leaf, AFTEC Commander since October 1976. "We conduct testing as early as practical to provide the decision-makers an appraisal of how well new weapon systems can perform and be maintained in an actual operational environment."

The nucleus of the AFTEC organi-

zation is at Kirtland AFB, N. M., where a staff of operational, technical, analytical, and test specialists design and evaluate the tests. AFTEC has 194 military people and fifty-four civilians assigned.

AFTEC testing is conducted at a variety of test sites by teams comprised of a test director from AFTEC and a cadre of operations, logistics, maintenance, and training experts from the using and supporting commands. More than 600 people from these commands are currently assigned to AFTEC test teams.

AFTEC's initial operational test and evaluation (IOT&E) conducted on prototype and preproduction systems provides Air Force and DoD decision-makers important information during early stages of an acquisition program. The Center's testing after production decision, normally performed on operationally configured hardware, leads to an evaluation of the capabilities of production items.

In the past year, the Center tested eleven new systems. Among AFTEC's significant accomplishments were:

- Completion of follow-on testing of the production F-15;
- Initial operational testing of three B-1 and two F-16 prototypes;
- Completion of a test program on the A-10 production aircraft;
- An extensive final phase of initial operational test and evaluation of the E-3A airborne warning and control system (AWACS);
- Early operational testing of the advanced medium short takeoff and landing transport candidates (YC-14 and YC-15);
- First phase of F-4G Wild Weasel operational assessment;
- An operational effectiveness evaluation of the AIM-7 Sparrow missile;
- Operational evaluation of the Cobra Dane phased-array radar;
- Participation in several OSD-sponsored joint service operational tests.

The next twelve months will be just as active for AFTEC, with additional OT&E scheduled for the B-1, F-16, AIM-9L Sidewinder missile, E-3A, and F-4G Wild Weasel. The E-4B advanced airborne command post, C-141 stretch (YC-141B), and the EF-111A tactical jamming system are also scheduled for operational testing by AFTEC.

"Emphasis on earlier OT&E will increase," said General Leaf. "It represents prudent acquisition management in today's environment. The essence of sound operational testing is realism and we will continue to be as innovative as possible in developing test scenarios that simulate actual operational situations." ■

Maj. Gen. Howard W. Leaf, Commander, AFTEC.

CMSgt. Martin J. Kuettel, Senior Enlisted Advisor, AFTEC.

A SEPARATE OPERATING AGENCY

AF Management Engineering Agency

The Air Force Management Engineering Agency (AFMEA) was activated November 1, 1975, at Randolph AFB, Tex. Maj. Gen. Jack I. Posner, Air Force Director of Manpower and Organization, also serves as the AFMEA Commander. Authorized 311 people, the Agency employs a staff of sixty-nine at Randolph and 242 assigned to eleven Functional Management Engineering Teams (FMETs) located throughout the CONUS.

Last year, the House Armed Services Committee stated:

> The Air Force remains the best managed service in terms of manpower. . . . The Committee heard a great deal of testimony concerning the Management Engineering process used by the Air Force in its evaluation of manpower requirements. . . . These Management Engineering concepts have apparently been a major contributing factor to this success. The other Services, which use these processes to a lesser degree, are encouraged to take similar steps.

Innovative management played a key role in this recognition. One forward-looking manpower management decision was to reorient the Air Force Management Engineering Program. AFMEA has been the keystone of that reorientation. Each of the Agency's FMETs serves a single function, such as medical, a group of related functions, or those involved in engineering and services activities. This focus on a single function or grouping fosters a quantum improvement in the expertise of the Agency's industrial engineers and manpower managers. It also greatly improves their "corporate memory," enhances the quality of manpower standards and guides, elicits greater confidence and support from the functional manager served, and reduces the time needed to develop and update standards.

With the support and cooperation of Air Force manpower managers, and using work measurement data supplied by its own FMETs as well as major command base-level management engineering teams, AFMEA is directly responsible for the development of manpower standards and guides for about sixty percent of Air Force manpower resources. The Agency oversees development of manpower standards and guides within the major commands covering the remaining forty percent of Air

Force manpower. Work measurement techniques—time studies, work sampling, computer simulation, and auditing—are the tools used in developing standards.

AFMEA executes the overall manpower management policies established by Hq. USAF. It schedules all Air Force management engineering studies and approves all manpower standards. It works closely with the Air Force Military Personnel Center and the Air Force Office of Civilian Personnel Operations to coordinate manpower and personnel management actions.

AFMEA also administers the Air Force Productivity Program within guidelines established by Hq. USAF. In this role, the Agency oversees labor productivity measurement systems, inputs to the federal government productivity measurement system, seeks out labor productivity enhancement methods, and manages the Fast-Payback Capital Investment Program (FASCAP). FASCAP is a program designed to provide small amounts of capital to improve productivity by purchasing commercially available equipment. Investment costs must be amortized within two years.

Since becoming operational, AFMEA has initiated 149 work center manpower standard studies that are in various stages of development. It has approved 277 Air Force major command manpower standards. Of these, 166 have been implemented with an annual saving of $2.7 million. An added annual saving of more than $9 million should accrue when the remainder are adopted. By January 1977, the Agency had approved FY '77 FASCAP projects totaling $700,000 to produce a two-year saving of $1.7 million.

AFMEA will continue to make unique, innovative contributions to assure that "the Air Force remains the best managed service in terms of manpower." ■

Maj. Gen. Jack I. Posner, Commander, AFMEA.

CMSgt. William C. Toups, Senior Enlisted Advisor, AFMEA.

A SEPARATE OPERATING AGENCY

Air Force Military Personnel Center

One of the most visible of the Air Force's separate operating agencies is the Air Force Military Personnel Center (AFMPC). The Center's mission is people—and the programs and policies that affect them. From recruiting to retirement or separation, Center personnel help Air Force members shape their careers. They even help in leisure activities by providing central direction for the Air Force-wide complex of open messes, libraries, sports activities, and crafts centers.

The more than 1,900 military and civilian workers at AFMPC are responsible for assignments, promotions, retention, and professional military education for all Air Force members below the grade of colonel—some 500,000 people.

With a force this large and the increasing emphasis on reducing personnel costs, reduction of PCS costs and turbulence is a continuing concern at the Center. Three new programs have been added during the past year, all dealing with reduction of the more costly moves between overseas and CONUS bases.

A captain reviews his records on a microfiche viewer at AFMPC. Master records of some half-million people are on file at the Center.

Overseas selection procedures have been revised to give additional incentive to elect accompanied tours. People can serve a short tour and then elect to serve an accompanied tour at the same location. And the one-year limit on overseas tour extension requests has been eliminated. These changes are paying dividends. There has been a fifty-four percent

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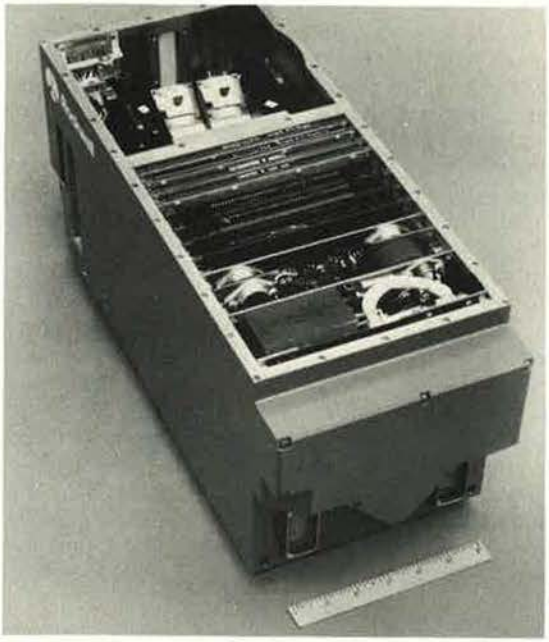
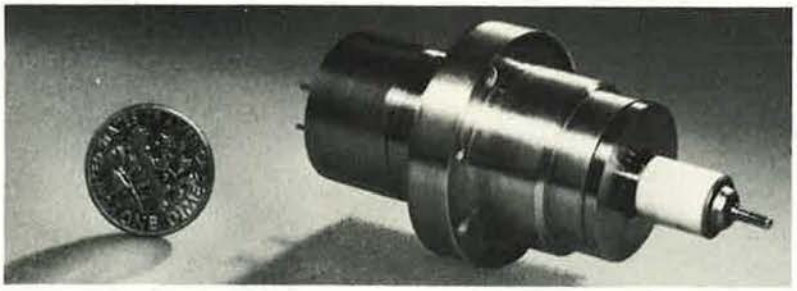


MICRON's new generation 3/4 ATR strapdown package.



A Micro Electrostatically Suspended Gyro System utilizes a solid one-centimeter beryllium rotor spinning in a vacuum at 150,000 RPM.

Ready to reduce navigator life cycle costs. Now.
MICRON — AN/ASN-122 — brings the first proven *strapdown* inertial system to aircraft navigation. MICRON is designed to minimize acquisition costs, maximize reliability. Result: low life cycle costs.

MICRON strapdown technology (an AFAL development) is much less complex mechanically than the gimballed systems now being used. And with simplicity come cost and reliability benefits.

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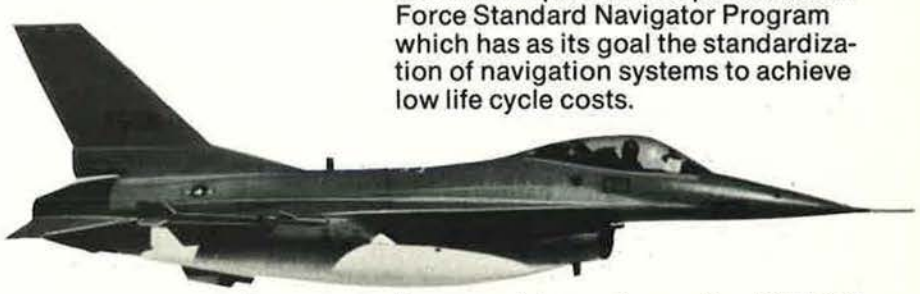
The MESG is a unique, highly advanced inertial sensor developed specifically to be accurate in a strapdown environment. It provides two axes of reference with only one moving part.

MICRON technology is ready now for the Air Force Standard Navigator Program, as well as other potential medium accuracy applications. These include RPV's, helicopters, missiles and transport aircraft, plus other important tactical fighter applications.

In addition, MICRON is capable of achieving high accuracy for strategic applications — such as the B-52 and special purpose missions — with software changes only.

Rockwell is proud to be part of the Air Force Standard Navigator Program which has as its goal the standardization of navigation systems to achieve low life cycle costs.



For more information, write: MICRON Program Manager, Autonetics Group, Rockwell International, 3370 Miraloma Avenue, Anaheim, CA 92803.

Rockwell International

A computer operator loads magnetic discs which form part of the "memory" for AFMPC's Burroughs 6700 computers.

reduction in PCS moves between FY '71 and FY '76. During the same time, however, the average cost of a move has increased by 250 percent, making the overall cost higher.

Improved management of the officer force continues to be a prime objective of the Center. Two programs related to that objective are the Rated and the Support Distribution Training Management Systems (RDTM and SDTM), which examine experience within each specialty to project accession requirements, assist managers to appropriately distribute available officers, and enable centralized control and scheduling of flying training requirements. Under RDTM, AFMPC (in coordination with the MAJCOMS) assumes direct assignment and training management responsibility for most rated officers. By using the modeling and analytical aspects of RDTM and SDTM, managers can better satisfy Air Force requirements, improve operational readiness, and remain sensitive to individual career patterns.

AFMPC long ago turned to computers to handle time-consuming data retrieval, leaving Center personnel more time to devote to people. The heart of the system is the Advanced Personnel Data System (APDS), composed of a central computer at AFMPC and remote terminals at all consolidated base personnel offices (CBPOs). In October 1976, AFMPC acquired a second Burroughs 6700 series computer. Its increased capacity has made possible many new and better force management programs.

For instance, APDS-PROMIS allows recruiters to call up video displays of all Air Force job opportunities for which an applicant is qualified, allowing recruiters to make firm contracts for enlistment and follow-on schooling. Air Force civilians were included on a limited basis in APDS last year, and the new system is undergoing considerable expansion this year.

Analytical studies to describe and quantify the personnel requirements of upcoming aircraft conversions will enable personnel managers to predict the specific personnel needs for the out years, to preclude a drop in readiness during the conversion.

A new AFMPC responsibility is the Air Force Survey Program. Enhanced sampling techniques have allowed rapid assessment of attitudes and opinions that can be incorporated into many personnel policy changes.

Tests are also under way to evaluate the benefits to CBPOs of adapting word-processing equipment, thereby freeing personnel technicians from routine manual tasks so they may devote more time to dealing with Air Force people on a personal basis.

The Center's goal in these new programs, and all its actions, is to provide faster, better, and more efficient management of the Air Force's most important resource—people. ■

Maj. Gen. Walter D. Druen, Jr., Commander, AFMPC.

CMSgt. T. J. Severson, Senior Enlisted Advisor, AFMPC.

A SEPARATE OPERATING AGENCY

Air Reserve Personnel Center

The Air Reserve Personnel Center, at Lowry AFB, Colo., has 850 military and civilian people working on myriad personnel actions designed to ensure that the Reserve Forces are ready to meet their increased role under the Total Force Policy.

During the past year, ARPC expanded its programs and systems, including a word-processing center and microfilming, a career management program, a promotion system for enlisted people, and a centralized personnel system.

The Center operates one of the largest word-processing centers in the Air Force. Automatic typewriters and a centralized dictation telephone system allow ARPC people a cost-effective means of preparing professional and personalized correspondence.

In reducing microfilming costs and streamlining master personnel records, the Center undertook a major project to retain only essential items. Converting all military personnel records to microfilm is progressing rapidly, with officers' records having been completed last month. The enlisted records should be finished by September.

ARPC's Officer Management Divi-

sion developed a computer system that allows the Center to coordinate line-officer assignments more quickly, thereby reducing application processing time. It also enhances Reserve strength accounting, since assignment actions are projected in the Advanced Personnel Data System (APDS) thirty days before the effective date of the assignment.

For the Reserve enlisted force, ARPC instituted a career management program for the top three grades. A promotion system for airmen in the nonpay programs and the Ready Reinforcement Personnel Section (RRPS) was approved this year and will go into effect in the near future.

During the year, the Center also adopted several initiatives for quicker and more personalized service to Reservists. A Training Management Division was organized to provide mobilization augmentees a single point of contact for all personnel matters, including social and affirmative actions and human-relations training.

ARPC has organized briefing teams that visit active-duty and Reserve bases around the country to explain the Center's services and its mission.

Managers of the Reserve Chaplain, Surgeon, and Judge Advocate programs provided proficiency training standards to installations as well as to individuals. The Surgeon's office also became the single point of contact for the Air Force Health Professions Scholarship Program (HPSP).

The Center recognizes that to fulfill its primary mission—maintaining preparedness for mobilization—there must be personalized two-way communication between it and members of the Reserve Forces, brought about through people-oriented programs. ■

Col. Thomas C. Richards, Commander, ARPC.

CMSgt. John Spencer, Senior Enlisted Advisor, ARPC.

A SEPARATE OPERATING AGENCY

Air Force Reserve

While the primary mission of the Air Force Reserve is to train for mobilization, under today's Total Force Policy Reservists also provide valuable support to the active force during peacetime. For example, Reserve Associate unit crews fly regularly scheduled Military Airlift Command (MAC) strategic airlift and aeromedical airlift missions, thus reducing MAC's personnel and overhead costs.

These Reserve units provide approximately forty percent of the authorized aircrews and twenty-five percent of the maintenance force for MAC's C-141 StarLifter and C-5 Galaxy transports, and for the C-9 Nightingale flying hospital aircraft. Twelve Reserve squadrons equipped with more than 110 C-130 Hercules transports also augment MAC's tactical airlift capability.

Other MAC-gained Reserve resources include C-123 Provider and C-7 Caribou transport units; four aerospace rescue and recovery units that fly HC-130, HH-1H, and HH-3E aircraft; and a weather reconnaissance group equipped with WC-130s, which provides seventy-two percent of the nation's hurricane surveillance in direct support of the Department of Commerce.

AFRES C-123s conduct all USAF's aerial spray missions requested by local, state, and federal agencies. Specially equipped Reserve C-130s help the Forestry Service with a new airborne firefighting system.

MAC gains more than 270 aircraft from AFRES-equipped units. The Reserve tactical airlift units represent one-third of the Air Force's tactical airlift capability.

In October 1976, the Air Force Reserve also was assigned a refueling mission, flying KC-135 Stratotankers for the Strategic Air Command (SAC).

Another important augmentation mission is TACRATE. Its purpose is to test and evaluate the capability of Air Force Reserve personnel to augment active Tactical Air Command (TAC) fighter units. A two-year test is under way at Moody AFB, Ga., involving Reserve aircrews and maintenance and munitions personnel.

TAC's strike force can be augmented by more than 185 Reserve aircraft and crews. These Reserve units are equipped with F-105 Thunderchiefs, A-37 Dragonflys, AC-130 gunships, and a special operations squadron that flies CH-3Es to support special missions on land or sea.

AFRES C-130 drops cargo of retardant during a mission to help Forest Service combat forest fires.

The Air Force Reserve also flies EC-121T airborne early warning and control aircraft that would be gained by Aerospace Defense Command. The AFRES unit equipped with this aircraft trains both active-duty and Reserve crews. All EC-121s in the Air Force inventory are now assigned to AFRES.

More than 130 AFRES nonflying units also support gaining commands. For example, some twenty Reserve aeromedical evacuation units train medical crews for patient evacuation. At the base level, more than 100 Reserve medical service units or elements train with the base hospital or medical unit they would augment in an emergency.

Specialized civil engineering capability is provided by thirty-five AFRES civil engineering flights. AFRES also has a Red Horse civil engineering squadron that can deploy anywhere the active force requires heavy repair and construction augmentation.

More than 1,000 trained Reservists assigned to thirty-five communications flights would be gained by the Air Force Communication Service during mobilization to augment the active force in providing worldwide communications.

Reserve mobile maintenance squadrons supported by companion mobile supply squadrons train for deployment in Air Force Logistic Command's bare-base operations to provide forward maintenance and crash-damage assistance.

Nearly 6,000 Reservists assigned to aerial port squadrons are prepared to assist in handling MAC cargo, passengers, and mail.

From its Robins AFB, Ga., headquarters, AFRES administers fifty-three units flying nearly 500 combat-ready aircraft. Manned by 48,000 trained citizen-airmen in some 1,200 different skills, the Air Force Reserve remains ready. ■

Maj. Gen. William Lyon, Commander, AFRES.

CMSgt. Olin B. Colwell, Senior Enlisted Advisor, AFRES.

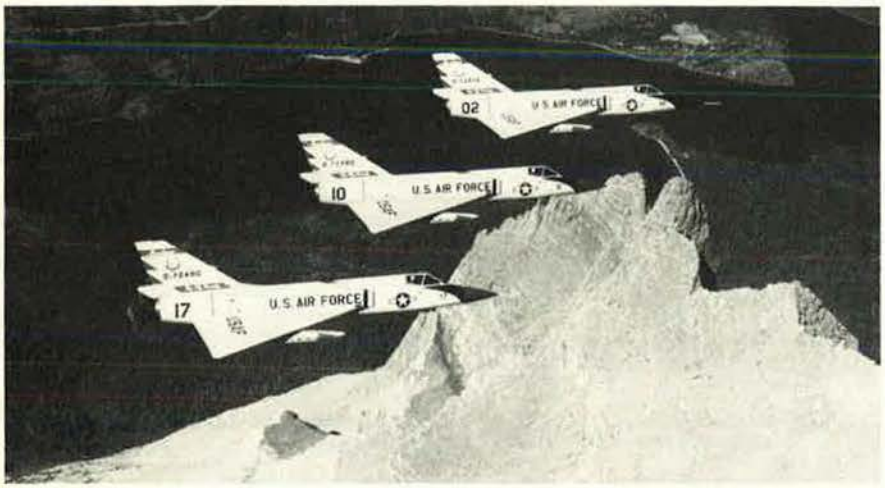
AIR FORCE RESERVE FLYING WINGS AND ASSIGNED UNITS

AIR FORCE	WING HQ.	GROUP	SQUADRON	TYPE AIRCRAFT	LOCATION	GAINING COMMAND
Fourteenth Air Force (Hq., Dobbins AFB, Ga.)	94th TAW	932d AAG (Assoc)	73d AAS (Assoc)	C-9	Scott AFB, Ill.	MAC
			700th TAS	C-7A	Dobbins AFB, Ga.	MAC
		908th TAG	357th TAS	C-7A	Maxwell AFB, Ala.	MAC
	302d TAW		355th TAS	C-123K	Rickenbacker AFB, Ohio	MAC
			356th TAS	C-123K	Rickenbacker AFB, Ohio	MAC
		911th TAG	758th TAS	C-123K	Greater Pittsburgh AP, Pa.	MAC
	315th MAW (Assoc)		300th MAS (Assoc)	C-141	Charleston AFB, S. C.	MAC
			701st MAS (Assoc)	C-141	Charleston AFB, S. C.	MAC
			707th MAS (Assoc)	C-141	Charleston AFB, S. C.	MAC
	439th TAW		337th TAS	C-130B	Westover AFB, Mass.	MAC
			731st TAS	C-123K	Westover AFB, Mass.	MAC
		914th TAG	328th TAS	C-130A	Niagara Falls IAP, N. Y.	MAC
	459th TAW		756th TAS	C-130E	Andrews AFB, Md.	MAC
		913th TAG	327th TAS	C-130E	Willow Grove NAS, Pa.	MAC
		927th TAG	63d TAS	C-130A	Selfridge ANG Base, Mich.	MAC
	512th MAW (Assoc)		326th MAS (Assoc)	C-5A	Dover AFB, Del.	MAC
			709th MAS (Assoc)	C-5A	Dover AFB, Del.	MAC
	514th MAW (Assoc)		335th MAS (Assoc)	C-141	McGuire AFB, N. J.	MAC
			702d MAS (Assoc)	C-141	McGuire AFB, N. J.	MAC
			732d MAS (Assoc)	C-141	McGuire AFB, N. J.	MAC
Tenth Air Force (Hq., Bergstrom AFB, Tex.)			302d SOS	CH-3E	Luke AFB, Ariz.	TAC
		915th AEW&CG	79th AEW&CS	EC-121T	Homestead AFB, Fla.	ADCOM
		919th SOG	711th SOS	AC-130A	Eglin AFB, Fla. (Aux. 3)	TAC
	301st TFW		457th TFS	F-105D/F	Carswell AFB, Tex.	TAC
		507th TFG	465th TFS	F-105D/F	Tinker AFB, Okla.	TAC
		508th TFG	466th TFS	F-105B	Hill AFB, Utah	TAC
	434th TFW		45th TFS	A-37B	Grissom AFB, Ind.	TAC
			46th TFS	A-37B	Grissom AFB, Ind.	TAC
		910th TFG	757th TFS	A-37B	Youngstown Municipal AP, Ohio	TAC
		917th TFG	47th TFS	A-37B	Barksdale AFB, La.	TAC
	452d ARW		336th ARS (Heavy)	KC-135	March AFB, Calif.	SAC
		940th ARG (Heavy)	314th ARS (Heavy)	KC-135	Mather AFB, Calif.	SAC
Fourth Air Force (Hq., McClellan AFB, Calif.)	349th MAW (Assoc)		301st MAS (Assoc)	C-5A	Travis AFB, Calif.	MAC
			312th MAS (Assoc)	C-5A	Travis AFB, Calif.	MAC
			708th MAS (Assoc)	C-141	Travis AFB, Calif.	MAC
			710th MAS (Assoc)	C-141	Travis AFB, Calif.	MAC
	403d RWRW		305th ARRS	HH-3E, HC-130H	Selfridge ANG Base, Mich.	MAC
			301st ARRS	HH-1H, HH-3E	Homestead AFB, Fla.	MAC
			303d ARRS	HC-130H	March AFB, Calif.	MAC
			304th ARRS	HH-1H	Portland IAP, Ore.	MAC
		920th WRG	815th WRS	WC-130H	Keesler AFB, Miss.	MAC
	433d TAW		68th TAS	C-130B	Kelly AFB, Tex.	MAC
		924th TAG	704th TAS	C-130B	Bergstrom AFB, Tex.	MAC
	440th TAW		95th TAS	C-130A	Gen. Billy Mitchell Fld., Wis.	MAC
		928th TAG	64th TAS	C-130A	Chicago-O'Hare IAP, Ill.	MAC
		934th TAG	96th TAS	C-130A	Minneapolis-St. Paul IAP, Minn.	MAC
	442d TAW		303d TAS	C-130E	Richards-Gebaur AFB, Mo.	MAC
		926th TAG	706th TAS	C-130B	NAS, New Orleans, La.	MAC
	445th MAW (Assoc)		728th MAS (Assoc)	C-141	Norton AFB, Calif.	MAC
			729th MAS (Assoc)	C-141	Norton AFB, Calif.	MAC
			730th MAS (Assoc)	C-141	Norton AFB, Calif.	MAC
	446th MAW (Assoc)		97th MAS (Assoc)	C-141	McChord AFB, Wash.	MAC
			313th MAS (Assoc)	C-141	McChord AFB, Wash.	MAC

AAG/S (Assoc)	Aeromedical Airlift Group/Squadron (Assoc)	RWRW	Rescue & Weather Reconnaissance Wing
AEW&CG/S	Airborne Early Warning & Control Group/Squadron	SOG/S	Special Operations Group/Squadron
ARRS	Aerospace Rescue & Recovery Squadron	TAW/G/S	Tactical Airlift Wing/Group/Squadron
ARW/G/S	Air Refueling Wing/Group/Squadron	TFW/G/S	Tactical Fighter Wing/Group/Squadron
MAW/S (Assoc)	Military Airlift Wing/Squadron (Assoc)	WRG/S	Weather Reconnaissance Group/Squadron

VITAL ADJUNCT TO THE ACTIVE AIR FORCE

Air National Guard



The ANG operates 1,567 mission aircraft of eighteen types. Here, a formation of Montana ANG F-106 interceptors.

This nation's National Guard is rooted in the American concept that able-bodied citizens have a responsibility to be ready at all times to bear arms for the common defense. That tradition was begun in the early seventeenth century with the development of militia units in the colonies.

The Air National Guard (ANG), formed in 1946, now shares with the Army National Guard its 340-year history of readiness to defend our country.

While its potential as a federal force has been strengthened, the National Guard of each state remains constitutionally a state-administered military force with command authority vested in the state governors.

The primary federal mission of the ANG is to provide a combat-ready force immediately available for mobilization to support the active Air Force. While in nonmobilized status, it also supports USAF missions in Europe, the Middle East, the Caribbean, and Greenland. The gaining commands to which Air National Guard units are assigned are ADCOM, MAC, SAC, TAC, ATC, AFCS, and PACAF.

When not federalized, National Guard units serve the states in which they are located. A citizen airman must be ready to respond to his governor's call for assistance in state emergencies, including disaster relief, search and rescue missions, and preserving peace and order.

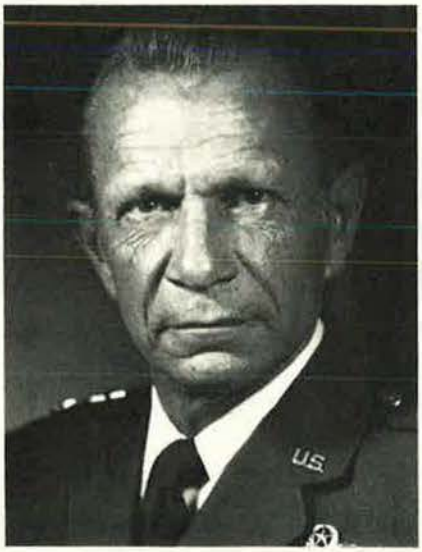
At the end of January 1977, there were 91,567 members of the ANG assigned to twenty-four wings, ninety-one flying units, and 233 specialized combat support ground units.

The Air National Guard operates 1,567 mission aircraft of eighteen types. Combat support units include three Tactical Air Control Groups, eight Combat Communications Groups, nineteen Electronic Installation Squadrons, thirty-nine Weather Flights, ninety-two Civil Engineering Flights, and two Civil Engineering (Heavy Repair) Units. The services provided by these support units play an integral role in the peacetime and wartime mission of the ANG and the Air Force.

There has been increased ANG participation in such programs as the short-term tactical fighter deployments to Europe, fighter exercises in simulated hostile environments, and JCS exercises. Modernization continues as the Air Guard receives such newer aircraft and equipment as the A-7, C-130E, KC-135, and the TPS-43E radar for the Tactical Air Control System. Last year, the ANG was assigned responsibility for a unique DoD asset when it received the Joint Mobile Relay Center (JMRC), a sophisticated mobile communications system. The ANG's ability to adapt to new roles and missions enables it to provide a significant portion of the Air Force's total combat capability.

During 1976, the ANG achieved the lowest major aircraft accident flying rate in its history—3.2 per 100,000 flying hours—and was winner of the Maj. Gen. Benjamin D. Foulois award for the most effective aircraft accident-prevention program in the Air Force. Air National Guard Air Defense units again proved their aerial marksmanship by capturing first place in the F-101 and F-106 categories at William Tell '76.

On February 1, 1977, Maj. Gen. John T. Guice, on becoming Director of the Air National Guard, emphasized the major challenges facing the Guard in the coming years. While meeting the challenges of recruiting and retention, force modernization, and resource conservation, the Air National Guard will continue to stand ready to defend both state and nation. ■



Maj. Gen. John T. Guice, Director, ANG.

CMSgt. Theodore H. Jackson, Senior Enlisted Advisor, ANG.

THE AIR NATIONAL GUARD BY MAJOR COMMAND ASSIGNMENT

(As of April 1, 1977)

AEROSPACE DEFENSE COMMAND

F-101 Voodoo

107th Fighter Interceptor Gp.	Niagara Falls, N. Y.
119th Fighter Interceptor Gp.	Fargo, N. D.
142d Fighter Interceptor Gp.	Portland, Ore.
147th Fighter Interceptor Gp.	Ellington AFB, Tex.*

F-106 Delta Dart

102d Fighter Interceptor Wg.	Otis AFB, Mass.*
144th Fighter Interceptor Wg.	Fresno, Calif.
120th Fighter Interceptor Gp.	Great Falls, Mont.
125th Fighter Interceptor Gp.	Jacksonville, Fla.
177th Fighter Interceptor Gp.	Atlantic City, N. J.
191st Fighter Interceptor Gp.	Selfridge ANGB, Mich.

EB-57

158th Defense System Evaluation Gp.	Burlington, Vt.
190th Defense System Evaluation Gp.	Forbes Field, Kan.

STRATEGIC AIR COMMAND

KC-135 Stratotanker

101st Air Refueling Wg.	Bangor, Me.
126th Air Refueling Wg.	Chicago, Ill.
141st Air Refueling Wg.	Fairchild AFB, Wash.
134th Air Refueling Gp.	Knoxville, Tenn.
157th Air Refueling Gp.	Pease AFB, N. H.
160th Air Refueling Gp.	Rickenbacker AFB, Ohio
189th Air Refueling Gp.	Little Rock AFB, Ark.
170th Air Refueling Gp.	McGuire AFB, N. J.

KC-97L

136th Air Refueling Wg.	Dallas NAS, Tex.
171st Air Refueling Wg.	Pittsburgh, Pa.
128th Air Refueling Gp.	Gen. Mitchell Field, Wis.
151st Air Refueling Gp.	Salt Lake City, Utah
161st Air Refueling Gp.	Phoenix, Ariz.

MILITARY AIRLIFT COMMAND

C-130 Hercules

118th Tactical Airlift Wg.	Nashville, Tenn.
133d Tactical Airlift Wg.	Minneapolis/St. Paul, Minn.
137th Tactical Airlift Wg.	Will Rogers World Airport, Okla.
146th Tactical Airlift Wg.	Van Nuys, Calif.
109th Tactical Airlift Gp.	Schenectady, N. Y.
130th Tactical Airlift Gp.	Charleston, W. Va.
139th Tactical Airlift Gp.	St. Joseph, Mo.
143d Tactical Airlift Gp.	Providence, R. I.
145th Tactical Airlift Gp.	Charlotte, N. C.
153d Tactical Airlift Gp.	Cheyenne, Wyo.
164th Tactical Airlift Gp.	Memphis, Tenn.
165th Tactical Airlift Gp.	Savannah, Ga.
166th Tactical Airlift Gp.	Wilmington, Del.
167th Tactical Airlift Gp.	Martinsburg, W. Va.
172d Tactical Airlift Gp.	Jackson, Miss.
176th Tactical Airlift Gp.	Anchorage, Alaska
179th Tactical Airlift Gp.	Mansfield, Ohio

C-7A Caribou

135th Tactical Airlift Gp.	Baltimore, Md.

HC-130 Hercules/HH-3 Jolly Green Giant

106th Aerospace Rescue & Recovery Gp.	Suffolk Co. Airport, N. Y.
129th Aerospace Rescue & Recovery Gp.	Hayward, Calif.

PACIFIC AIR FORCES

F-4 Phantom

154th Tactical Fighter Gp.	Hickam AFB, Hawaii

* No longer a major active Air Force base

TACTICAL AIR COMMAND

A-7D Corsair II

121st Tactical Fighter Wg.	Rickenbacker AFB, Ohio
132d Tactical Fighter Wg.	Des Moines, Iowa
140th Tactical Fighter Wg.	Buckley ANGB, Colo.
112th Tactical Fighter Gp.	Pittsburgh, Pa.
150th Tactical Fighter Gp.	Kirtland AFB, N. M.
156th Tactical Fighter Gp.	San Juan, Puerto Rico
169th Tactical Fighter Gp.	McEntire ANGB, S. C.
185th Tactical Fighter Gp.	Sioux City, Iowa

F-100D Super Sabre

116th Tactical Fighter Wg.	Dobbins AFB, Ga.
122d Tactical Fighter Wg.	Fort Wayne, Ind.
127th Tactical Fighter Wg.	Selfridge ANGB, Mich.
131st Tactical Fighter Wg.	St. Louis, Mo.
103d Tactical Fighter Gp.	Windsor Locks, Conn.
104th Tactical Fighter Gp.	Westfield, Mass.
114th Tactical Fighter Gp.	Sioux Falls, S. D.
138th Tactical Fighter Gp.	Tulsa, Okla.
149th Tactical Fighter Gp.	Kelly AFB, Tex.
159th Tactical Fighter Gp.	New Orleans NAS, La.
178th Tactical Fighter Gp.	Springfield, Ohio
180th Tactical Fighter Gp.	Toledo, Ohio
181st Tactical Fighter Gp.	Terre Haute, Ind.
188th Tactical Fighter Gp.	Fort Smith, Ark.

A-7D Corsair II

162d Tactical Fighter Training Gp.	Tucson, Ariz.

F-105B Thunderchief

108th Tactical Fighter Wg.	McGuire AFB, N. J.

F-105D Thunderchief

113th Tactical Fighter Wg.	Andrews AFB, Md.
192d Tactical Fighter Gp.	Byrd Field, Sandston, Va.

F-105F Thunderchief

184th Tactical Fighter Training Gp.	McConnell AFB, Kan.

A-37B Dragonfly

174th Tactical Fighter Gp.	Syracuse, N. Y.
175th Tactical Fighter Gp.	Baltimore, Md.

F-4C Phantom

183d Tactical Fighter Gp.	Springfield, Ill.

RF-4C Phantom

117th Tactical Reconnaissance Wg.	Birmingham, Ala.
123d Tactical Reconnaissance Wg.	Louisville, Ky.
124th Tactical Reconnaissance Gp.	Boise, Idaho
148th Tactical Reconnaissance Gp.	Duluth, Minn.
152d Tactical Reconnaissance Gp.	Reno, Nev.
155th Tactical Reconnaissance Gp.	Lincoln, Neb.
187th Tactical Reconnaissance Gp.	Montgomery, Ala.

RF-101C Voodoo

186th Tactical Reconnaissance Gp.	Meridian, Miss.

O-2A Super Skymaster

128th Tactical Air Support Wg.	Truax Field, Wis.
105th Tactical Air Support Wg.	White Plains, N. Y.
110th Tactical Air Support Gp.	Battle Creek, Mich.
111th Tactical Air Support Gp.	Willow Grove NAS, Pa.
163d Tactical Air Support Gp.	Ontario, Calif.
182d Tactical Air Support Gp.	Peoria, Ill.

EC-121S/C-121C Warning Star

193d Tactical Early Warning Gp.	Harrisburg, Pa.

A SEPARATE OPERATING AGENCY

Air Force Academy

Under the leadership of Lt. Gen. James R. Allen, Superintendent, the Air Force Academy provides instruction and experience to cadets so they are graduated with the knowledge and character essential to leadership and with the motivation to become career officers.

In existence since April 1, 1954, the Academy graduated its first class in 1959. This year, for the first time in the Academy's twenty-three-year history, women cadets are enrolled. There were 157 women among the 1,593 cadets admitted last June.

Women cadets undergo virtually the same training as men cadets. They are eligible for all of the Academy's aviation and airmanship programs except the T-41 Flight Indoctrination Program. If the Air Force test program for limited-duty women pilots is successful, the Class of '80 women may be taking T-41 flight training by the time they are seniors.

Air training officers (ATOs), Air Force women officers in the grades of first and second lieutenant, are assisting in the training of women cadets. ATOs will remain at the Academy until women cadets attain upperclass status.

Authorized Cadet Wing strength is 4,417 at the beginning of academic classes each August. On January 31, 1977, 4,229 cadets were enrolled.

There are 1,136 officers, 1,439 enlisted people, and 2,400 civilian employees assigned to Academy and tenant units.

Since 1959, the Academy has graduated 10,286 cadets, including nineteen Rhodes Scholars. More than 850 cadets in the Class of 1977 will be graduated June 1 this year.

Brig. Gen. William T. Woodyard, Dean of the Faculty, administers academic instruction organized under four divisions—basic sciences, engineering sciences, humanities, and social sciences.

The predominantly military faculty numbers 549. Each officer holds a master's degree, and approximately thirty percent have doctorates in the subject area they teach.

Although the faculty is made up primarily of Air Force officers, there are three visiting civilian professors, two State Department foreign service officers, and about a dozen officers from the other services currently serving on the faculty.

Each cadet must complete at least 138 semester hours of course work in one of twenty-three academic majors to graduate with a bachelor of science degree and a regular commission as a second lieutenant. About half the cadets participate in a special enrichment program that includes additional courses. Cadets also take fourteen hours of physical education and twenty-seven hours of military training.

The top fifteen percent of each graduating class may be offered graduate education under Air Force Institute of Technology sponsorship some time between three and eight years after graduation. Acceptance into the program depends upon performance as an officer and on Air Force requirements for the specialty.

The leadership, military training, and flight programs are directed by Brig. Gen. Stanley C. Beck, Commandant of Cadets. Along with formal classes in professional military subjects, cadets gain leadership experience as officers and NCOs in the Cadet Wing.

The Wing is divided into four groups of ten squadrons each. Seniors (cadets first class) hold officer rank in command and staff positions, while juniors and sophomores (cadets second and third class) perform NCO duties.

Prospective cadets arrive at the Academy each summer and enter basic cadet training (BCT), a six-week course of intensive military training and physical conditioning. Succeeding summers are spent in a combination of leave, participating in field-training programs, and in leadership positions at the Academy to train members of the lower classes and the new group of incoming cadets.

Two of the summer programs open to cadets away from the Academy are "Operation Third Lieutenant" and "Operation Non-Com." Under "Third Lieutenant," juniors and seniors perform junior officer duties with operational Air Force units. Under "Non-Com," sophomores work with NCOs at bases in the US to gain an understanding of the duties and responsibilities of the enlisted force.

In the airmanship program, the Academy has fifty-two T-41 and two U-4 aircraft, three hot-air balloons, sixteen sailplanes, seven aero club aircraft, and twenty-four T-37 jet trainers based at nearby Peterson AFB. Most pilot-qualified seniors are taught to fly the T-41 by instructor pilots of the 557th Flying Training Squadron (ATC), supplemented by Academy pilots.

Lt. Gen James R. Allen, Superintendent, USAFA.

CMSgt. Elmer W. Wienecke, Senior Enlisted Advisor, USAFA.

The airmanship program offers cadets leadership experiences and the opportunity to earn private licenses in several areas. Cadets serve as instructors in the basic freefall parachuting course, in the parasailing orientation given to all freshmen cadets, and in the basic soaring program. FAA licenses may be earned in powered aircraft, gliders, and hot-air balloons. The cadet parachute team swept the 1976 National Collegiate Parachute Championship held at Deland, Fla., in December.

Practical application of professional flight-crew duties is gained in Air Training Command T-43 jet navigation aircraft flying out of Peterson AFB. Cadets also receive flights in T-37 jet trainers to gain an appreciation of aviation skills, aircrew responsibilities, and jet aircraft capabilities.

Col. John J. Clune heads the Department of Athletics, which oversees the physical education, intramural, and intercollegiate athletic programs. Cadets who do not participate in one of nineteen intercollegiate sports must compete in a different intramural sport each fall, winter, and spring. All cadets are required to take physical education courses and physical fitness tests throughout their four years at the Academy.

The Academy's athletic program has produced twenty-one National Collegiate Athletic Association Scholar/Athletes, more than any other school in the nation.

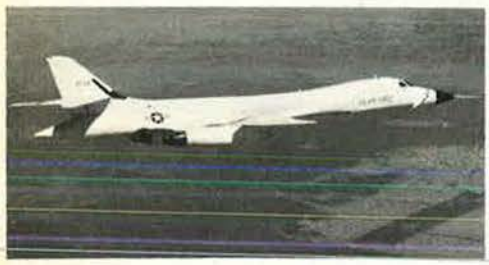
Located on the Academy grounds is the Air Force Academy Preparatory School, where enlisted people from the regular and Reserve forces undergo a year of intensive study in math, English, and military training to prepare for an Academy appointment. Air Force women entered the Prep School for the first time in January 1976.

To be eligible for admission to the Academy, young men and women must be unmarried US citizens of good moral character, in good physical condition, and at least seventeen years old but not yet twenty-two on July 1 of the year they are admitted. They must show adequate academic preparation, demonstrated leadership potential, and a desire to pursue military careers. Nominations to the Academy are made through congressional or other authorized channels. ■

GALLERY OF

BY S. H. H. YOUNG, ASSOCIATE COMPILER, JANE'S ALL THE WORLD'S AIRCRAFT

Bombers



B-1

B-52 with SRAMs and Electro-optical Viewing System (EVS)

FB-111A

B-1

Approval was given on December 2, 1976, by the Department of Defense, for limited production of the B-1 bomber, which has been under development for the USAF since 1970. To date, Rockwell has built and flown three development models. A fourth, pre-production, prototype was provided for in the FY '76 budget, and this aircraft is due to fly in early 1979. Congressional approval to start the production program was based on the impressive test results achieved by the first three aircraft. USAF's stated requirement is for 240 production B-1s to replace B-52s now in service. Manufacture of the first three of these was authorized under the FY '77 Defense budget; the original FY '78 request for eight has been cut to five by the new Administration.

The B-1 is a variable-geometry aircraft with a blended wing-body configuration, intended to maintain the effectiveness of the SAC manned bomber force into the next century. Its nuclear hardening, high alert rate, and fast takeoff give it excellent launch survivability. It is intended, normally, to cruise to its target at subsonic speed, then attack at high subsonic speed and low altitude. Alternatively, it is capable of supersonic over-the-target dash at high altitude. Its radar signature is approximately 10% that of the B-52; it carries twice the latter's payload, and can use shorter runways. A unique structural mode control system (SMCS), utilizing small canard foreplanes and the bottom rudder section, minimizes the effect of turbulence on crew and airframe during high-speed, low-level terrain following. Variable-geometry inlets, which allow speeds of up to Mach 2.1, have been eliminated as a cost-reduction measure on production aircraft, although they can be fitted later if required. The first test flight was made on December 23, 1974; Mach 2.0 was exceeded for the first time in April 1976. Operational test flights have demonstrated the B-1's ability to fulfill its designed role, in terms of base escape, high-altitude cruise with aerial refueling, low-altitude high-speed terrain following penetration, simulated weapons release, and recovery. Defensive avionics under development for the aircraft include radio frequency surveillance and warning equipment, electronic countermeasures, and other countermeasures such as chaff.

Contractor: Rockwell International Corporation, North American Aircraft Operations, B-1 Division.

Power Plant: four General Electric YF101-GE-100 afterburning turbofan engines; each approximately 30,000 lb thrust.

Accommodation: four: two pilots and two systems operators, in pairs.

Dimensions: span spread 136 ft 8½ in, fully swept 78 ft 2½ in, length overall 150 ft 2½ in, height 33 ft 7¼ in.

Weight: gross 395,000 lb.

Performance: max speed at 50,000 ft Mach 2.1.

Armament: three internal weapon bays, accommodating 24 AGM-69B SRAMs on three rotary dispensers, or 75,000 lb of free-fall bombs. Provision for 8 more SRAMs or 40,000 lb of free-fall weapons externally.

B-52 Stratofortress

Progressive refinement of the B-52 Stratofortress eight-jet long-range bomber, including installation of new equipment and more powerful engines in successive versions, has enabled the type to continue as the major piloted component of the current SAC inventory. About 400 of the 744 production B-52s built between 1954 and 1962 remain, of which the "G" and "H" models are most numerous and most effective. Versions still operational are **B-52D,** total of 170 built with J57-P-29W turbojet engines, with delivery from December 1956. **B-52F,** with uprated J57-P-43W engines, first flown in May 1958; 89 built; those remaining in inventory now used for training purposes. **B-52G,** introduced important changes including a redesigned wing containing integral fuel tankage, fixed underwing tanks, a new tail fin of reduced height and broader chord, a remotely controlled tail turret which allowed the gunner to be repositioned with the rest of the crew, and the ability to carry two AGM-28 Hound Dog air-to-surface missiles on missions of a round-trip range of more than 10,000 miles. Deliveries of the B-52G began in February 1959, and 193 were built. **B-52H,** the final version, switched to TF33 turbofan engines and had improved defensive armament, including a Vulcan multibarrel tail gun and underwing pods of penetration rockets; 102 were built, with deliveries starting in May 1961. Under a major USAF program initiated in 1971, the B-52Gs and "H"s are being modified to carry 20 AGM-69A Short Range Attack Missiles, six under each wing and eight in the bomb-bay. In addition, nearly all of the B-52Gs and "H"s have been equipped with an AN/ASQ-151 Electro-optical Viewing System (EVS), using forward-looking infrared (FLIR) and low-light-level TV sensors to improve low-level flight capability. (Data for B-52G.)

Contractor: The Boeing Aerospace Company.

Power Plant: eight Pratt & Whitney J57-P-43W turbojet engines; each 13,750 lb thrust.

Accommodation: two pilots, side-by-side, plus navigator, radar-navigator, ECM operator, and tail gunner.

Dimensions: span 185 ft 0 in, length 157 ft 7 in, height 40 ft 8 in.

Weight: gross 480,000 lb.

Performance (approx): max speed at 20,000 ft 660 mph, service ceiling 55,000 ft, range 10,000 miles.

Armament: four 0.50 caliber guns in tail turret; bombs and Quail diversionary missiles internally. Alternative provision for 20 SRAM missiles.

FB-111A

Developed originally to provide SAC with a replacement for some of its B-52C/F versions of the Stratofortress and the B-58A Hustler, the **FB-111A** is a two-seat medium-range, high-altitude strategic bomber version of the basic swing-wing F-111, also capable of supersonic speed at sea level. The first of 76 production aircraft flew in July 1968, and the initial delivery was made in October 1969 to the 340th Bomb Group. Operational units equipped with the FB-111A are the 380th and 509th Bomb Wings.

Contractor: General Dynamics Corporation.

Power Plant: two Pratt & Whitney TF30-P-7 turbofan engines; each 20,350 lb thrust with afterburning.

Accommodation: two, side-by-side.

Dimensions: span spread 70 ft 0 in, fully

USAF WEAPONS

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swept 33 ft 11 in, length 73 ft 6 in, height 17 ft 1.4 in.
Weight (approx): gross 100,000 lb.
Performance: max speed at 36,000 ft Mach 2.5, service ceiling more than 60,000 ft, range 4,100 miles with external fuel.
Armament: up to four AGM-69A SRAM air-to-surface missiles on external pylons, plus two in the weapons bay, or six nuclear bombs, or combinations of these weapons; provision for up to 31,500 lb of conventional bombs.

Fighters

F-4 Phantom II

Continued updating has enabled this mid-1950s all-weather fighter to remain an effective element in USAF's tactical inventory. Well over 600 F-4s equip TAC units; about 450 are based with USAFE in Europe; PACAF units in Hawaii, Korea, Okinawa, and the Philippines are similarly equipped. Latest equipment produced for USAF Phantoms includes the Pave Spike day tracking/laser ordnance designator pod, for use with "smart" weapons, and the advanced ALQ-131 ECM system capable of covering the complete range of threat radars. First Phantom version supplied to USAF was the **F-4C**, a two-seat tactical fighter developed from the basic F-4B naval version, with provision for a large external weapon load. Modifications included dual controls, an inertial navigation system, improved weapon aiming system, and boom flight refueling, instead of drogue. The 583 aircraft completed between May 1963 and May 1966 were deployed by USAF for close-support, attack, and air-superiority duties, and with ANG from January 1972. Two squadrons are operational in a "Wild Weasel" defense suppression role, carrying ECM warning sensors, jamming pods, chaff dispensers, and antiradiation missiles. The **F-4D** was developed from the F-4C with major systems changes, including new weapon ranging and release computers to increase accuracy in air-to-air and air-to-surface weapon delivery. First F-4D flew in December 1965, with deliveries beginning in March 1966. Total of 843 built, primarily for USAF, but 32 were supplied to Iran and 18 were transferred from USAF to the Republic of Korea. The **F-4E** is a multirole fighter capable of performing air-superiority, close-support, and interdiction missions. A 20 mm Vulcan multi-barrel gun is fitted, together with an improved fire-control system, as a result of operational experience with earlier aircraft, some of which had been equipped with pod-mounted guns. An additional fuselage fuel tank extends the F-4E's radius of action. Leading-edge slats, to improve maneuverability, are being retrofitted to all the USAF's F-4Es. In addition, from early 1973, some models were fitted with Northrop's target-identification system electro-optical (TISEO) as an aid to positive long-range visual identification of airborne or ground targets. Several hundred F-4Es have been built for USAF. Current improvements include the Pave Tack system, which provides a day/night all-weather capability to acquire, track, and designate ground targets for laser, infrared, and electro-optically guided weapons, and a digital intercept computer that includes launch computations for all USAF AIM-9 and AIM-7 missiles. The **F-4G** (Advanced "Wild Weasel") is a modified F-4E with sophisticated electronic warfare equipment that enables it to detect, identify, and locate enemy radars, and to direct against them weapons for their destruction or suppression. Changing EW threats are covered by use of reprogrammable software. Primary armament will include Shrike (AGM-45), Standard ARM (AGM-78), and HARM (AGM-88), with optional availability of the CBU Rockeye area weapon for suppression purposes, and the Maverick missile. The first operational kit installation was begun in the spring of 1976, followed by a second in the autumn. A further 15 installations are scheduled for the current year, 60 next year, and 39 in 1979, providing a total of 116 aircraft. (Data for F-4E.)
Contractor: McDonnell Aircraft Company, Division of McDonnell Douglas Corporation.
Power Plant: two General Electric J79-GE-17 turbojets; each 17,900 lb thrust with afterburning.
Accommodation: pilot and weapon systems operator in tandem.
Dimensions: span 38 ft 5 in, length 62 ft 10 in, height 16 ft 3 in.
Weights: empty 30,425 lb, gross 58,000 lb.
Performance: max speed at 40,000 ft Mach 2.27, range with typical tactical load 1,300 miles.
Armament: one 20 mm M-61A1 multibarrel gun; provision for up to four AIM-7E Sparrow and four AIM-9 Sidewinder air-to-air missiles or up to 16,000 lb external stores.

F-4E Phantom II

F-5E Tiger II

F-5E/F Tiger II

This advanced version of the F-5 export aircraft was developed primarily to provide America's allies with an uncomplicated air-superiority tactical fighter, capable of relatively inexpensive maintenance and operation. The single-seat **F-5E**, first flown in August 1972, is basically a VFR day/night fighter with limited all-weather capability. Design emphasis is on maneuverability rather than high speed, notably through the use of maneuvering flaps. More than 900 F-5Es and two-seat **F-5Fs** have been ordered by a dozen countries. TAC, assisted by ATC, is training pilots and technicians of user air forces. For this purpose, 20 F-5Es were supplied to USAF, beginning in April 1973 with the 425th TF Squadron, before deliveries to foreign governments began late that year. Deliveries of the F-5F began in the summer of 1976. TAC also operates two "aggressor squadrons" of camouflaged F-5Es, simulating late-model MiG threat aircraft, in "Red Flag" exercises at Nellis AFB, Nev. Similar training is provided by F-5Es of the 527th Tactical Fighter Training Aggressor Squadron, USAFE, at RAF Alconbury, England. PACAF's aggressor squadron, in the Philippines, operates T-38s. (Data for F-5E.)
Contractor: Northrop Corporation, Aircraft Division.
Power Plant: two General Electric J85-GE-21 turbojet engines; each 5,000 lb thrust with afterburning.
Accommodation: pilot only.
Dimensions: span 26 ft 8 in, length 48 ft 2 in, height 13 ft 4 in.
Weights: empty 9,583 lb, gross 24,675 lb.
Performance (at 13,220 lb): max level speed at 36,000 ft Mach 1.57, service ceiling 52,000 ft, range with max fuel, with reserve fuel for 20 min max endurance at S/L (with external tanks retained) 1,595 miles.
Armament: two AIM-9 Sidewinder missiles on wingtip launchers; two M-39A2 20 mm can-

F-15 Eagle

F-16 armed with AIM-9 Sidewinders

F-100D Super Sabre

F-101B Voodoo

non in nose, with 280 rounds per gun; up to 7,000 lb of mixed ordnance on four underwing attachments and one under-fuselage station. Optional armament and equipment includes AGM-65 Maverick, laser-guided bombs, centerline multiple ejector rack, and (F-5F only) a laser designator.

F-15 Eagle

First flown in July 1972, the **F-15** is a single-seat fixed-wing all-weather fighter designed for an air-superiority role, but with an inherent air-to-surface attack capability. Specialized equipment includes a lightweight Hughes radar system for long-range detection and tracking of small high-speed objects operating at all heights down to treetop level, and for ensuring effective weapons delivery, with a head-up display for close-in dogfights. The IFF system embodies a Hazeltine interrogator to inform the pilot if an aircraft seen visually or on radar is friendly; an inertial navigation system is fitted. Equipment specially developed for the F-15 includes a pair of low-drag fuel pallets, known as Fast Packs. As well as obviating the need for tanker support for global missions, these packs extend the F-15's capabilities, enabling it to carry a heavier bomb load to distant targets, and providing space for cameras and other sensors for reconnaissance missions, a laser designator, or "Wild Weasel" equipment for missile site suppression, as well as fuel.

To date, 296 F-15s have been ordered for operational use by USAF. An additional 108 were approved in the FY '77 budget, and 78 are requested for FY '78. Planned total procurement is 729 aircraft. Forty-seven Eagles delivered to Luke AFB, Ariz., from November 1974, for training, include two-seat **TF-15s.** The first aircraft for a combat squadron was delivered to Langley AFB, Va., in January 1976, and a wing is being deployed to Europe this year. Eight world time-to-height records were set by the specially-prepared F-15 *Streak Eagle* in early 1975, of which six remain unbeaten, including climb to 20,000 m (65,616 ft) in 2 min 2.94 sec. (Data for F-15).

Contractor: McDonnell Aircraft Company, Division of McDonnell Douglas Corporation.
Power Plant: two Pratt & Whitney F100-PW-100 turbofan engines; each 25,000 lb thrust.
Accommodation: pilot only.
Dimensions: span 42 ft 9¾ in, length 63 ft 9 in, height 18 ft 5½ in.
Weight: gross 56,000 lb.
Performance: max speed Mach 2.5, combat ceiling 65,000 ft, ferry range, without Fast Packs, more than 2,878 miles.
Armament: one internally mounted M-61A1 20 mm multibarrel cannon; four AIM-9L Sidewinder and four AIM-7F Sparrow air-to-air missiles carried externally. Provision for carrying up to 15,000 lb of ordnance on three weapon stations.

F-16

A contract awarded to General Dynamics in April 1975 covered construction of six single-seat **F-16A** and two two-seat **F-16B** full-scale development (FSD) aircraft, the first of which flew in December 1976. These aircraft differ in a number of significant ways from the two YF-16s that were built and tested, together with two Northrop YF-17s, under USAF's Lightweight Fighter Prototype program, begun in April 1972. The prototypes were designed to exploit and flight test emerging advanced technologies such as: decreased structural weight through the use of composites, decreased drag resulting from reduced static stability margins, fly-by-wire flight controls with side stick force controller, high *g* tolerance/high visibility cockpit with a 30 degree reclined seat and single-piece bubble canopy, blended wing-body aerodynamics with forebody strakes and automatically variable wing leading-edges to enhance the exceptional maneuverability provided by the light weight/low wing loading design and the high thrust provided by the single F100-PW-100 engine. The interchangeability of this engine with that of the F-15 contributed to the lower acquisition and operating costs of the F-16 in the Air Force's evaluation of the two prototype fighter designs. These lower costs, together with the performance advantages demonstrated in test flights, led to the decision to develop and procure the F-16 for USAF. Compared with the prototypes, the production models have a 10 in longer fuselage, increased wing area, an added self-contained jet-fuel engine starter, and increased external stores-carrying capability on nine stations. An advanced all-digital stores management system feeds information concerning weapons selection and delivery mode to the fire control computer. Other equipment includes a High Resolution Ground Map (HRGM), an advanced radar warning receiver, a Marconi-Elliott head-up display, and internal chaff or flare dispensers; ECM can be carried. USAF plans to procure at least 650 F-16s, of which 105 are requested in the FY '78 budget. In addition, four NATO nations in Europe (Belgium, Denmark, the Netherlands, and Norway) have signed a memorandum of understanding with the US to purchase 348 F-16s under co-production arrangements. (Data for F-16A.)

Contractor: General Dynamics Corporation.
Power Plant: one Pratt & Whitney F100-PW-100 (3) turbofan engine; about 25,000 lb thrust with afterburning.
Accommodation: pilot only.
Dimensions: span 32 ft 10 in, length 49 ft 6 in, height 16 ft 6 in.
Weights (approx): empty 15,000 lb, design gross 33,000 lb.
Performance: max speed Mach 2 class, ferry range more than 2,200 miles.
Armament: one M-61A1 20 mm multibarrel cannon with 500 rounds, mounted in fuselage; infrared missile mounted on each wingtip; underwing attachments for other stores including air-to-surface weapons.

F-100 Super Sabre

Around 400 Super Sabres remain operational with the ANG. The original prototype, flown in May 1953, was the first operational fighter capable of supersonic speed in level flight. The **F-100A,** with a J57-P-7 or -39 engine, was the basic single-seat interceptor version. Two hundred and three were delivered, of which some were later converted to camera-carrying RF-100As. The **F-100C** introduced a strengthened wing with four attachments for up to 6,000 lb of bombs, other weapons, or drop tanks, and could be flight refueled. Four hundred and seventy-six were built, being superseded in production by the **F-100D,** with bomb-load increased to 7,500 lb, a Minneapolis Honeywell supersonic autopilot, tail-warning radar, and other refinements; 1,274 were built. Final version was the **F-100F,** a two-seat variant for use as a fighter-bomber, air-superiority fighter, or trainer, of which 339 were built in 1957–59, with full operational equipment apart from having two instead of the standard four guns. (Data for F-100D.)

Contractor: North American Aviation, Inc.
Power Plant: one Pratt & Whitney J57-P-21A turbojet engine; 17,000 lb thrust with afterburning.
Accommodation: pilot only.
Dimensions: span 38 ft 9 in, length 47 ft 0 in, height 15 ft 0 in.
Weights: empty 21,000 lb, gross 34,832 lb.
Performance: max speed at 36,000 ft Mach 1.3, range, with two external tanks, 1,500 miles.
Armament: four 20 mm M-39E guns in fuselage; underwing pylons for six 1,000 lb bombs, two Sidewinder or Bullpup missiles, rockets, etc.

F-101B Voodoo

The F-101B is a two-seat long-range all-weather interceptor that was first flown in March 1957. The ANG has three squadrons of F-101Bs, and the aircraft will continue to serve with the Canadian Armed Forces under NORAD control. *(For reconnaissance versions see page 121.)*

Contractor: McDonnell Aircraft Corporation.
Power Plant: two Pratt & Whitney J57-P-55 turbojet engines; each 14,990 lb thrust with afterburning.
Accommodation: pilot and radar operator in tandem.
Dimensions: span 39 ft 8 in, length 67 ft 4¾ in, height 18 ft 0 in.
Weight: gross 46,500 lb.
Performance: max speed at 40,000 ft Mach 1.85, service ceiling 51,000 ft, max range 1,550 miles.
Armament: two AIM-4D Falcon air-to-air missiles carried externally, and two AIR-2A Genie nuclear-warhead unguided rockets carried internally.

F-105 Thunderchief

Still in service with the ANG and AF Reserve are several squadrons of **F-105D** single-seat all-weather fighter-bombers, equipped with NASARR monopulse radar system, for use in both high- and low-level missions, and Doppler for night or bad weather operations. First F-105D flew in June 1959. More than 600 were built, of which about 30 were modified to carry the T-Stick II system to improve all-weather bombing. Also in the ANG and Reserve are a few **F-105Bs** and the **F-105F** two-seat dual-purpose trainer/tactical fighter version of the F-105D with lengthened fuselage and higher tail fin, of which 143 were built. Two squadrons of the active Air Force fly the **F-105G** all-weather "Wild Weasel" version of the two-seat F-105, intended for the suppression of surface-to-air missile sites, with electronic countermeasures pods mounted on the underfuselage. Typical armament load comprises four Shrike missiles or two Standard ARMs. (Data for F-105D.)

Contractor: Fairchild Republic Division of Fairchild Industries.

Power Plant: one Pratt & Whitney J75-P-19W turbojet engine; 26,500 lb thrust with afterburning and water injection.

Accommodation: pilot only.

Dimensions: span 34 ft 11¼ in, length 67 ft 0¼ in, height 19 ft 8 in.

Weights: empty 27,500 lb, gross 52,546 lb.

Performance: max speed at 38,000 ft Mach 2.1, service ceiling 52,000 ft, max range more than 1,842 miles.

Armament: one General Electric 20 mm Vulcan multibarrel gun and more than 14,000 lb of stores under fuselage and wings.

F-106 Delta Dart

The F-106 all-weather fighter was developed in the mid-1950s from the F-102 to accommodate the larger J75 engine. Constant updating has enabled Aerospace Defense Command to deploy the aircraft throughout the '60s and '70s, and 231 have continued to serve with active USAF squadrons. By the end of FY '77, about 40% of these will have been transferred to the ANG. The two production versions are: **F-106A**, single-seat interceptor with J75 engine, first flown in January 1957; 277 were built, with deliveries from July 1959. **F-106B,** a tandem two-seat dual-purpose combat trainer, of which 63 were built. The F-106's MA-1 electronic guidance and fire-control system has been updated periodically. Other modifications have included installation of supersonic drop tanks, in-flight refueling, and the approval of a 20 mm cannon, which gives greater effectiveness against low altitude/ECM/maneuvering targets. These improved the F-106's capability in such a way as to permit its operation in global roles as well as for continental US defense in conjunction with USAF E-3A AWACS aircraft. (Data for F-106A.)

Contractor: Convair Division of General Dynamics.

Power Plant: one Pratt & Whitney J75-P-17 turbojet engine; 24,500 lb thrust with afterburning.

Accommodation: pilot only.

Dimensions: span 38 ft 3½ in, length 70 ft 8¾ in, height 20 ft 3⅓ in.

Weights (approx): empty 23,650 lb, gross 35,500 lb.

Performance (approx): max speed at 40,000 ft Mach 2.3, service ceiling 57,000 ft, range 1,200 miles.

Armament: one AIR-2A Genie unguided nuclear-warhead rocket and four AIM-4F/G Falcon air-to-air missiles carried internally; 20 mm cannon is being installed on all operational F-106s.

F-111

Production of this pioneer variable-geometry tactical fighter was completed in 1976, and four versions are deployed with four USAF tactical fighter wings: **F-111A,** the initial aircraft of this type delivered for service with the 4480th TF Wing, a training unit, in July 1967 were development models. First operational wing was the 474th TFW, with deliveries beginning in October 1967. A total of 141 production F-111As was built, and this version served with distinction in SEA in 1972–73. The "A" was superseded in production by the **F-111E,** a version with modified air intakes which improve engine performance above Mach 2.2. Ninety-four were built, and most of these serve with the 20th TFW, based in the UK in support of NATO, with the remainder in the 474th TFW. The **F-111D** has more advanced avionics, offering improvements in navigation and air-to-air weapon delivery. Ninety-six were built and equip the 27th TFW. The **F-111F,** of which 106 were built for the 366th TFW, has uprated turbofans. It will be modified to carry in its weapons bay the Pave Tack system, which provides a day/night all-weather capability to acquire, track, and designate ground targets for laser, infrared, and electro-optically guided weapons. The F-111F-equipped 48th TFW is now based in the UK. The F-111's EW capabilities are being updated, with the new ALQ-131 ECM system. In addition, the **EF-111A,** an ECM conversion of the F-111A, is under development by Grumman as a potential replacement for USAF's EB-66s. Two prototypes are flying, with a further 40 conversions envisaged to equip two USAF squadrons in the late 1970s. Basic equipment comprises ALQ-99A jammers. The EF-111A will also be capable of locating enemy radars and directing F-4G "Wild Weasel" fighters to attack them. SAC has a strategic bomber version of the F-111, designated **FB-111A** (*see page 116*). The Royal Australian Air Force acquired 24 **F-111Cs** for strike duties.

Contractor: General Dynamics Corporation.

Power Plant: F-111A/E: two Pratt & Whitney TF30-P-3 turbofan engines; each 18,500 lb thrust with afterburning. F-111D: two TF30-P-9 turbofan engines; each 19,600 lb thrust with afterburning. F-111F: two TF30-P-100 turbofan engines; 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 11.4 in, length 73 ft 6 in, height 17 ft 1.4 in.

Weights (F-111A): empty 46,172 lb, gross 91,500 lb.

Performance (F-111A): max speed at S/L Mach 1.2, max speed at altitude Mach 2.2, service ceiling more than 51,000 ft, range with max internal fuel more than 3,165 miles.

Armament: one 20 mm M-61A1 multibarrel cannon or two 750 lb bombs in internal weapon bay; four swiveling and four fixed wing pylons carrying total external load of up to 25,000 lb of bombs, rockets, missiles, or fuel tanks.

F-105D Thunderchief

F-106 Delta Darts

F-111

Attack and Observation Aircraft

A-7D Corsair II

The outstanding target kill capability of this single-seat tactical fighter was demonstrated by the 354th TFW in Southeast Asia. Accuracy is achieved with the aid of a continuous-solution navigation and weapon-delivery system, including all-weather radar bomb delivery. The first of the initial two production aircraft, each powered by a TF30-P-8 engine, flew in April 1968, followed five months later by the first flight of the TF41-engined model. Deliveries to USAF began in December of the same year. The 354th TFW was the first operational unit equipped with A-7Ds. Deliveries have also been made since 1973 to ANG units in New Mexico, Colorado, Ohio, Pennsylvania, Arizona, Iowa, Puerto Rico, and South Carolina, representing the first new aircraft received by these units in more than 20 years. Flight testing of a port wing manufactured by Vought, and consisting almost entirely of composite materials, began last year with similar tests planned for eight more wings installed on A-7Ds operated by ANG units. Several hundred A-7A, B, and E Corsair IIs are used by the USN, which made the first combat sorties from the USS *Ranger* in the Gulf of Tonkin on December 3, 1967.

Contractor: Vought Corporation, subsidiary of The LTV Corporation.

Power Plant: one Allison TF41-A-1 non-afterburning turbofan engine; 14,250 lb thrust.

Accommodation: pilot only.

Dimensions: span 38 ft 9 in, length 46 ft 1½ in, height 16 ft 0¾ in.

A-7D Corsair II

A-10

A-37B Dragonfly

AC-130A gunship

O-2A

OV-10A Bronco

SR-71 "Blackbird"

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 M-61A1 20 mm multibarrel gun; up to 15,000 lb of air-to-air or air-to-surface missiles, bombs, rockets, or gun pods on 6 underwing and two fuselage attachments.

A-10

Designed specifically for the close air support (CAS) mission, the A-10 was selected by USAF after competitive fly-off with the Northrop A-9A and a comparative evaluation with the A-7D. The large payload, long loiter, and wide combat radius ensure flexibility. The A-10 can carry up to 16,000 lb of mixed ordnance with partial fuel, or approximately 12,000 lb with full internal fuel. The 30 mm GAU-8/A gun can fire 2,100 or 4,200 rds/min, and provides a cost-effective weapon with which to defeat the whole array of ground targets encountered in the CAS role, including tanks. The A-10 achieves its survivability through a combination of high maneuverability and design features that make it a "hard" aircraft. Equipment includes a head-up display, laser seeker, target penetration aids, and associated equipment for Maverick missiles. Two prototypes, six pre-production, and 195 production A-10s have been funded to date, with a further 144 requested in the FY '78 budget. The first flight of a production A-10A was made in October 1975, and the training squadron began operations at Davis-Monthan AFB, Ariz., in March 1976. The first operational squadron will be activated in July of this year at Myrtle Beach AFB, S. C. Procurement of a total of 733 A-10s is envisaged.
Contractor: Fairchild Republic Company, Division of Fairchild Industries.
Power Plant: two General Electric TF34-GE-100 turbofan engines; each approx 9,065 lb thrust.
Accommodation: pilot only.
Dimensions: span 57 ft 6 in, length 53 ft 4 in, height 14 ft 8 in.
Weight: max gross weight 47,400 lb.
Performance: combat speed at S/L, tropic day, clean 423 mph, range with 9,500 lb of weapons and 2.0 hr loiter, 20 min reserve, 288 miles.
Armament: one 30 mm GAU-8/A gun; eight underwing hard points and three under fuselage for up to 16,000 lb of ordnance, including various types of free-fall or guided bombs, gun pods, or 6 AGM-65 Maverick missiles, and chaff or other jammer pods. The centerline pylon and the two flanking fuselage pylons cannot be occupied simultaneously.

A-37B Dragonfly

Currently in service with the 434th TFW of the Air Force Reserve, and with the 174th and 175th TFG of the ANG, the A-37 was evolved from the T-37 trainer for use in armed counter-insurgency (COIN) missions from short unimproved airstrips. The first 39 production models (A-37As), with derated engines, were converted T-37Bs. A total of 511 A-37Bs followed, of which many served in Southeast Asia. Others have been delivered to foreign air forces, mainly in Latin America.
Contractor: Cessna Aircraft Company.
Power Plant: two General Electric J85-GE-17A turbojet engines; each 2,850 lb thrust.
Accommodation: two, side-by-side.
Dimensions: span over tip-tanks 35 ft 10½ in, length excluding fuel probe 28 ft 3¼ in, height 8 ft 10½ in.
Weights: empty 6,211 lb, gross 14,000 lb.
Performance: max level speed at 16,000 ft 507 mph, service ceiling 41,765 ft, range with max payload, including 4,100 lb ordnance, 460 miles.
Armament: one GAU-2B/A 7.62 mm Minigun installed in forward fuselage; four pylons under each wing able to carry various combinations of rockets and bombs.

AC-130A/H

Most of the AC-130 gunships still in USAF's inventory were transferred to the Air Force Reserve last year. Each of the original batch of AC-130As was fitted with four 20 mm Vulcan cannon, four 7.62 mm Miniguns, searchlight, and sensors, including forward-looking infrared target acquisition equipment and low-light-level TV and laser target designators. AC-130As are now equipped with two 40 mm cannon, two 20 mm cannon, and two 7.62 mm guns. In the AC-130H, one of the 40 mm cannon is replaced by a 105 mm howitzer.
Contractor: Greenville (Texas) Division of E-Systems, Inc. Other data basically as for C-130 *(page 123)*.

O-2A

This military version of the "push-and-pull" Cessna 337 Skymaster was selected by USAF in 1966 to replace the Cessna O-1 in the forward air controller role in Vietnam. A total of 346 was ordered. Specialized equipment and electronics permit control of air strikes, visual reconnaissance, target identification and marking, ground-air coordination, and damage assessment. The O-2B, equipped for psywar missions, is no longer in operation.
Contractor: Cessna Aircraft Company.
Power Plant: two Continental IO-360-C/D piston engines; each 210 hp.
Accommodation: pilot and observer side-by-side; two passengers optional.
Dimensions: span 38 ft 2 in, length 29 ft 9 in, height 9 ft 2 in.
Weights: empty 2,848 lb, gross 5,400 lb.
Performance: max speed at S/L 199 mph, service ceiling 19,300 ft, range 1,060 miles.
Armament: four underwing pylons can carry light ordnance, including a 7.62 mm Minigun pack.

OV-10A Bronco

This two-seat counterinsurgency combat aircraft was first flown in August 1967; 157 were acquired by USAF for use in the forward air control role and for limited quick-response ground support pending the arrival of tactical fighters. Production of the OV-10A for the US services ended in April 1969, and 15 aircraft that had been specially modified for the night forward air control and strike designation role reverted to the original OV-10A configuration in 1974. Versions of the OV-10 are in service with the USN, US Marine Corps, and foreign air forces.
Contractor: Rockwell International Corporation, North American Aircraft Operations.
Power Plant: two Garrett AiResearch T76-G-416/417 turboprop engines; each 715 hp.
Accommodation: two in tandem.
Dimensions: span 40 ft 0 in, length 41 ft 7 in, height 15 ft 2 in.
Weights: empty 6,969 lb, overload gross weight 14,466 lb.
Performance: max speed at S/L, without weapons, 281 mph; service ceiling 28,800 ft; combat radius with max weapon load, no loiter, 228 miles.
Armament: four fixed forward-firing M-60C 7.62 mm machine-guns; four external weapon attachment points under short sponsons, for up to 2,400 lb of rockets, bombs, etc; fifth point, capacity 1,200 lb, under center fuselage. Provision for carrying one Sidewinder missile on each wing and, by use of a wing pylon kit, various stores, including rocket and flare pods, and free-fall ordnance. Max weapon load 3,600 lb.

Reconnaissance and Special-Duty Aircraft

SR-71A/C

Known unofficially as the "Blackbird," this strategic reconnaissance aircraft confirmed itself as the fastest, highest-flying production aircraft in history when it established a series of world records in July 1976, flown by three USAF crews. Flying from Beale AFB, Calif. the SR-71A set an absolute speed record of 2,193.167 mph over a 15/25 km straight course a speed of 2,092.294 mph around a 1,000 k

closed circuit; and a sustained altitude of 85,069 ft in horizontal flight. Developed initially as a successor to the U-2, the prototype flew for the first time in December 1964; delivery of production aircraft began in January 1966, for operation by the 9th Strategic Reconnaissance Wing at Beale. At least 30 SR-71As are thought to have been built, each carrying complex equipment ranging from simple battlefield surveillance systems to multiple-sensor, high-performance systems capable of specialized surveillance of up to 60,000 sq miles of territory in one hour. Mission details are highly classified, but SR-71As and Teledyne Ryan AQM-34L RPVs are known to have been the only USAF reconnaissance aircraft permitted to overfly North Vietnam after the cessation of bombing in January 1973. Other sorties were made in the Middle East during and after the Yom Kippur war in late 1973. In September 1974, an SR-71A flew from New York to London, England, in 1 hr 54 min 56.4 sec, at an average speed of 1,806.987 mph. The **SR-71C** is a tandem two-seat training version.

Contractor: Lockheed Aircraft Corporation.

Power Plant: two Pratt & Whitney JT11D-20B (J58) turbojet engines; each 34,000 lb thrust with afterburning.

Accommodation: crew of two in tandem.

Dimensions: span 55 ft 7 in, length 107 ft 5 in, height 18 ft 6 in.

Weights (estimated): empty 60,000 lb, gross 170,000 lb.

Performance (estimated): max speed at 78,750 ft more than Mach 3, operational ceiling above 80,000 ft, range Mach 3.0 (1,980 mph) at 78,750 ft 2,982 miles.

Armament: none.

U-2A/D

Although initial production of this type dates back to the late 1950s, several U-2s remain in service for special high-altitude reconnaissance and weather flights, with some of the weather reconnaissance aircraft redesignated **WU-2.** Essentially a powered glider with sailplane-like high aspect ratio wing and lightweight structure, the design resulted from original requirements for an aircraft capable of carrying out strategic reconnaissance for long periods at very high altitudes over Communist territory. Fifty-five are believed to have been built, including 2 prototypes, 48 single-seat **U-2A/B** versions, and 5 two-seat **U-2Ds.** The J57-P-37A turbojet of the U-2A was replaced by a more powerful J75-P-13, adapted to run on low-volatility fuel, in the U-2B. Versions such as the U-2D, U-2R, U-2CT tandem-cockpit trainer, U-2EPX (electronics patrol experimental), and HASP U-2 (high-altitude sampling program) are conversions of basic models. All have similar dimensions except for the U-2R, which is 63 ft long, with a span of 103 ft and height of 16 ft.

Contractor: Lockheed Aircraft Corporation.

Power Plant: one Pratt & Whitney J75-P-13 turbojet engine; 17,000 lb thrust, in all current models.

Dimensions: span 80 ft 0 in, length 49 ft 7 in, height 13 ft 0 in.

Weights: gross, with slipper tanks, 17,270 lb; max permissible more than 21,000 lb.

Performance: max speed at 40,000 ft 528 mph, operational ceiling about 80,000 ft, range about 4,000 miles.

RF-101

Three of the four squadrons that were equipped with RF-101 Voodoos were deactivated during the last fiscal year, heralding the end of the lengthy service career of USAF's first supersonic daylight tactical reconnaissance aircraft. Original RF-101As and "C"s, with nose-mounted cameras, were supplemented in 1967–68 by RF-101Gs and "H"s, converted from F-101A/C fighters, for service with the ANG. Data similar to F-101B.

RF-4C

Developed to replace the RF-101 in USAF service, the RF-4C is a multisensor reconnaissance version of the F-4C Phantom II. The first production model flew in May 1964, and 505 were built before manufacture ended in December 1973. They are operated by TAC, PACAF, and USAFE tactical reconnaissance units, and were taken into ANG service in February 1972. Radar and photographic systems are housed in a modified nose, increasing the overall length of the aircraft by 33 in. The three basic reconnaissance systems, operated from the rear seat, comprise side-looking radar, an infrared sensor, and forward- and side-looking cameras. Data similar to F-4.

EC-121

Derived from the C-121 Super Constellation transport, a few versions of this early-warning, fighter-control, and reconnaissance aircraft continue in service, easily distinguished by the massive radomes above and below the fuselage. The **EC-121D** is a development of the EC-121C, with added wingtip fuel tanks, first delivered in May 1954. Under subsequent modification programs, some "D"s became **EC-121Hs,** with additional electronics to feed data into NORAD's SAGE defense system; others became **EC-121Ts,** which are currently operated by the 79th AEW and C Squadron of the Air Force Reserve. (Data for EC-121D.)

Contractor: Lockheed Aircraft Corporation.

Power Plant: four Wright R-3350-91 piston engines; each 3,250 hp.

Dimensions: span 126 ft 2 in, length 116 ft 2 in, height 27 ft 0 in.

Weights: empty 80,611 lb, gross 143,600 lb.

Performance: max speed at 20,000 ft 321 mph, service ceiling 20,600 ft, range 4,600 miles.

Armament: none.

EC-135, etc.

Several aircraft in the KC-135 Stratotanker series were modified for specialized roles, during production or at a later date. The **EC-135C** (originally designated KC-135B) is basically similar to the KC-135A but with 18,000 lb st TF33 turbofans. It is equipped as a Flying Command Post in support of SAC's airborne alert role, and is fitted with extensive communications equipment. EC-135Cs can be refueled by SAC tankers. Fourteen were built and have been adapted to provide control of Minuteman ICBMs. At least one SAC EC-135C is airborne at all times, accommodating a flight crew of 5, a general officer, and a staff of 18. Versions of the C-135 Stratolifter series used for reconnaissance include 12 turbofan **RC-135Vs,** equipped also for electronic reconnaissance with SAC; 2 **RC-135Bs,** and 2 **RC-135Vs;** and 10 **WC-135Bs,** converted C-135Bs, are used by MAC for long-range weather reconnaissance missions. In addition, 8 **EC-135Ns** were equipped as airborne radio and telemetry stations for the Apollo program. Data basically as C-135 *(page 123).*

E-3A AWACS

Of the 34 E-3A AWACS (Airborne Warning and Control System) aircraft required by TAC, twelve have been authorized to date, with three more requested under the FY '78 budget. Purchase of others is under discussion by NATO nations in Europe. AWACS was conceived essentially as a mobile, flexible, survivable, and jamming-resistant surveillance and command control and communications (C^3) 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 carries an extensive complement of mission avionics, including computer, radar, IFF, communications, display and navigation systems. Two test-bed aircraft were built to allow a competitive fly-off between two competing brassboard radar systems developed by two different contractors. The winning aircraft was converted into the System Integration Demonstration (SID) vehicle, to conduct the tests which were the basis of the production decision. It has since undergone rework for delivery as the sixth production E-3A. Three additional RDT&E aircraft, one of which is the losing brassboard machine, will be used primarily for routine operational suitability and technical order verification testing. On October 31, 1975, the first E-3A with production electronics began engineering test and evaluation as a preliminary to formal qualification testing carried out during 1976. The unique capability of AWACS is provided by its Westinghouse Electronic Corporation look-down radar, which makes possible all-altitude surveillance over land or water, thus correcting a serious deficiency in existing surveillance systems. AWACS can support a variety of tactical and/or air defense missions with no change in configuration. Deliveries to TAC were planned to extend from the spring of this year to November 1981.

U-2D

RF-4C

EC-121

EC-135

E-3A AWACS

E-4 Advanced Airborne Command Post (AABNCP)

EB-57

C-5 Galaxy

C-7A Caribou

C-9A Nightingale

C-12A

Contractor: The Boeing Aerospace Company.
Power Plant (production aircraft): four Pratt & Whitney TF33-P100/100A turbofan engines; each 21,000 lb thrust.
Accommodation: operational crew of 17.
Dimensions: span 130 ft 10 in, height 41 ft 4 in.
Performance: max speed 530 mph, ceiling above 29,000 ft, endurance 5 hr on station 1,150 miles from base.

E-4A/B (AABNCP)

SAC is now sole operational manager of the Advanced Airborne Command Post (AABNCP) force, which is equipped with Boeing 747s modified to serve as the National Emergency Airborne Command Post (NEACP) and Hq. Strategic Air Command airborne command post. Three **E-4As** provide an interim NEACP capability, utilizing existing EC-135 command control and communications (C^3) equipment. A fourth aircraft, delivered in August 1975, serves as a test-bed for advanced C^3 equipment and is designated **E-4B.** It began flying in the spring of 1976 with a new 1,200kVA electrical system designed to support advanced electronics to be added later. This will include a wide variety of radio communications equipment, such as a new LF/VLF system employing a trailing-wire antenna that is towed behind the aircraft in flight. Original plans, now held in abeyance pending further study, envisaged procurement of two additional E-4Bs, and retrofit of the E-4As to E-4B configuration.
Contractor: The Boeing Aerospace Company.
Power Plant: four General Electric F103-GE-100 turbofan engines; each 52,500 lb thrust. (Aircraft No. 1 and 2 were retrofitted with these engines in 1976.)
Dimensions: span 195 ft 8 in, length 231 ft 4 in, height 63 ft 5 in.
Weight (E-4A): gross 778,000 lb.
Performance: unrefueled endurance 12 hours.

EB-57

Two Air National Guard defense system evaluation groups and ADCOM's 17th Defense System Evaluation Squadron at Malmstrom AFB, Mont., have the two-seat version of the EB-57. Equipped with the latest devices for jamming and penetrating air defenses, their task is to simulate an enemy bomber force, and attempt to find gaps in air-defense systems by day or night, at variable altitudes and from any point of the compass.
Contractor: The Martin Company.
Power Plant: two Wright J65-W-5F turbojet engines; each 7,200 lb thrust.
Dimensions: span 64 ft 0 in, length 65 ft 5 in, height 15 ft 6 in.
Performance: max speed more than 500 mph, ceiling above 45,000 ft, range more than 1,800 miles.

WC-130B/E/H

Nineteen modified C-130 Hercules transports, designated WC-130B, E, and H, are equipped for weather reconnaissance duties, including penetration of tropical storms to obtain data for forecasting of storm movements. They are assigned to the 41st Rescue and Weather Reconnaissance Wing of MAC's Aerospace Rescue and Recovery Service and the 815th WRS of the Air Force Reserve. Data similar to C-130.

Transports and Tankers

C-5 Galaxy

Largest aircraft in service anywhere in the world, the C-5 flew for the first time in June 1968. A total of 81 was delivered to MAC between December 1969 and May 1973, each capable of airlifting loads of up to 214,000 lb, such as two M-60 tanks or three CH-47 Chinook helicopters, over transoceanic ranges. The 70 aircraft in first-line service are capable of in-flight refueling. Initial funds have been made available, and a contract has been awarded for engineering design and test of a modification to the wing of the C-5 which would extend the aircraft's operational life, and increase the payload capability to 235,000 lb.
Contractor: Lockheed-Georgia Company.
Power Plant: four General Electric TF39-GE-1 turbofan engines; each 41,000 lb thrust.
Accommodation: crew of five, rest area for 15 (relief crew, etc.); 73 troops and 36 standard 463L pallets or assorted vehicles, or additional 270 troops.
Dimensions: span 222 ft 9 in, length 247 ft 10 in, height 65 ft 1 in.
Weights: empty 323,000 lb, gross (for 2.25 *g*) 764,500 lb.
Performance: max speed at 25,000 ft 571 mph, service ceiling (at 615,000 lb) 34,000 ft, range with max fuel 5,350 miles.

C-7A Caribou

Built in Canada, the prototype of this twin-engine STOL utility transport flew in July 1958. The US Army was the principal customer and in January 1967 still had 134 C-7As in service, all of which were transferred to USAF. Their ability to operate from short, unprepared runways in all weather conditions led to the widespread use of the C-7As in Southeast Asia. All have since been transferred to the AFRES and ANG.
Contractor: de Havilland Aircraft of Canada Ltd.
Power Plant: two Pratt & Whitney R-2000-7M2 piston engines; each 1,450 hp.
Accommodation: crew of two or three; 31 troops, 25 paratroops, or 14 litters and 9 other persons.
Dimensions: span 95 ft 7½ in, length 72 ft 7 in, height 31 ft 9 in.
Weights: empty 18,335 lb, gross 28,500 lb.
Performance: max speed at 6,000 ft 216 mph, service ceiling 27,100 ft, range 200 to 1,175 miles.

C-9A Nightingale

Utilized by USAF aeromedical evacuation operations, the C-9A is essentially an off-the-shelf DC-9 Series 30 commercial transport, modified to include a special-care compartment with separate atmospheric and ventilation controls. The first of 21 was delivered in August 1968 to MAC's 375th Aeromedical Airlift Wing; orders were completed by February 1973. The Nightingale is also currently performing overseas theater aeromedical evacuation missions in Europe and the Pacific.
Contractor: Douglas Aircraft Company, Division of McDonnell Douglas Corporation.
Power Plant: two Pratt & Whitney JT8D-9 turbofan engines; each 14,500 lb thrust.
Accommodation: crew of two; 30 to 40 litter patients, more than 40 ambulatory patients, or a combination of both, plus five medical staff.
Dimensions: span 93 ft 5 in, length 119 ft 3½ 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-12A

The C-12A is a military version of the Beechcraft Super King Air 200, of which 34 are being produced for USAF under contracts extending to October of this year. Its role is to support attaché and military assistance advisory missions throughout the world. MAC uses two C-12As to train aircrews and to supplement support airlift.
Contractor: Beech Aircraft Corporation.
Power Plant: two Pratt & Whitney Aircraft of Canada PT6A-38 turboprop engines; each 750 shp.
Accommodation: crew of two; up to 8 passengers or 4,764 lb of cargo.
Dimensions: span 54 ft 6 in, length 43 ft 10 in, height 15 ft 5 in.
Weight: gross 12,500 lb.
Performance: max speed at 14,000 ft 301 mph, service ceiling 30,900 ft, range at max cruising speed 1,024 miles.

KC-97L

Five air refueling groups and wings of the Air National Guard (ANG) continue to fly KC-97Ls. These aircraft were built between 1953

and 1956 as KC-97G tankers. When replaced with KC-135As, they were modified to KC-97L standard by addition of J47-GE-25A jet pods before being handed over to the ANG for operation as tankers for TAC fighters.

Contractor: The Boeing Airplane Company.

Power Plant: four Pratt & Whitney R-4360-59 piston engines; each 3,500 hp. Two General Electric J47-GE-25A auxiliary turbojets; each 5,200 lb thrust.

Dimensions: span 141 ft 3 in, length 110 ft 4 in, height 38 ft 3 in.

Weights (KC-97G): empty 82,500 lb, gross 175,000 lb.

Performance (KC-97G): max speed at 25,000 ft 375 mph, service ceiling 35,000 ft, range at 297 mph 4,300 miles.

C-123 Provider

One modified version of the basic C-123B, which entered service in 1955 as a troop and supply transport, is still in the USAF inventory. The **C-123K,** which first flew in 1966, features two underwing pylon-mounted auxiliary turbojets, improved landing gear, and a new stall warning system. This version was widely used during the Vietnam War for transport and special duties. The Air Force Reserve has three C-123K squadrons and one UC-123K aerial spray squadron. (Data for C-123K.)

Contractor: The Fairchild Engine and Airplane Corporation.

Power Plant: two Pratt & Whitney R-2800-99W piston engines; each 2,500 hp; and two General Electric J85-GE-17 turbojet engines; each 2,850 lb thrust.

Accommodation: crew of three; 58 troops, 50 litters, or 21,000 lb of cargo.

Dimensions: span 110 ft 0 in, length 76 ft 4 in, height 34 ft 6 in.

Weights: empty 35,366 lb, gross 60,000 lb.

Performance: max speed at 10,000 ft 228 mph, service ceiling above 25,000 ft, range with 15,000 lb payload 1,035 miles.

C-130 Hercules

The specification on which the Hercules is based was issued by TAC in 1951. The initial production model was the **C-130A,** first flown in April 1955, powered by 3,750 ehp Allison T56-A-11 or -9 turboprops; 219 were ordered, with deliveries beginning in December 1956. Two special variants, **DC-130As** (originally GC-130As), were built as drone launchers/directors for ARDC (now AFSC), 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** was a developed version with improved range and higher weights, powered by 4,050 ehp Allison T56-A-7 turboprops; the first of 134 entered USAF service in April 1959. Six C-130Bs were modified in 1961 for air-snatch recovery of classified USAF satellites, to replace C-119s of the 6593d Test Squadron at Hickam AFB. Twelve **C-130Ds** were modified C-130As for use in the Arctic, with wheel-ski landing gear, increased fuel capacity, and provision for JATO. The **C-130E** is an extended-range development of the C-130B, with larger underwing fuel tanks; 389 were ordered for MAC and TAC with deliveries beginning in April 1962. Basically similar to the "E," the **C-130H** has uprated T56-A-15 turboprop engines, a redesigned outer wing, and other minor improvements; delivery began in April 1975. C-130s are currently active in USAF regular, Reserve, and ANG airlift squadrons. Variants include **HC-130H** for the Aerospace Rescue and Recovery Service, and the **AC-130A/H** and **WC-130B/E/H** described separately. (Data for C-130H.)

Contractor: Lockheed-Georgia Company.

Power Plant: four Allison T56-A-15 turboprop engines; each 4,508 ehp.

Accommodation: crew of five; up to 92 troops or 6 standard freight pallets, etc.

Dimensions: span 132 ft 7 in, length 97 ft 9 in, height 38 ft 3 in.

Weights: empty 75,331 lb, gross 175,000 lb.

Performance: max speed 386 mph, service ceiling at 130,000 lb 33,000 ft, range with max payload 2,487 miles.

HC-130

Sixty-six extended-range C-130s, designated **HC-130H,** were ordered in 1963 for the Aerospace Rescue and Recovery Service, with uprated T56-A-15 engines and specialized search and rescue equipment for the recovery of aircrews and retrieval of space hardware. This includes advanced direction-finding equipment, and surface-to-air (STAR) and air-to-air (ATAR) recovery systems. Initial flight was made in December 1964. Crew complement is eight to ten. Twenty HC-130Hs have been modified into **HC-130Ps** for the combat rescue mission, and are capable of refueling helicopters in flight. Four were modified into **JHC-130Hs,** with added equipment for aerial recovery of reentering space capsules. Under a USAF contract dated December 1974, another HC-130H was modified by LAS to **DC-130H** standard, with four pylons each capable of carrying a 10,000 lb new-generation RPV. Fifteen **HC-130Ns,** a newer search and rescue version of the HC-130P with advanced direction-finding equipment, were ordered in 1969; these aircraft are capable of refueling helicopters in flight but are not equipped with the surface-to-air recovery system. Other data similar to C-130, except length is 98 ft 9 in with STAR recovery system folded.

VC-131H

Of the 110 variants of the C-131 acquired by USAF in the 1950s, only four VC-131H transports now remain in active service with MAC. They were modified from C-131Ds, in 1965, for use by the 89th MAW, Special Missions, at Andrews AFB.

Contractor: Convair Division of General Dynamics Corporation.

Power Plant: two Allison T56-A-9 turboprop engines; each 3,750 shp.

Accommodation: crew of four and 44 passengers.

Dimensions: span 105 ft 4 in, length 81 ft 6 in, height 29 ft 2 in.

Weight: gross 54,600 lb.

Performance: cruising speed 342 mph, max range 1,605 miles.

KC-135 Stratotanker

As single manager of all USAF KC-135 tankers, SAC supports its own force and those of other commands with aerial refueling for all tactical and cargo aircraft. With high-speed, high-altitude capabilities, the **KC-135A** can also be used as a long-range passenger and/or cargo transport. It was developed from the Boeing Model 367-80 (prototype for the 707 series). A total of 732 was built, of which the first flew in August 1956; about 600 remain operational. Variants include the **KC-135Q,** adapted to refuel Lockheed SR-71s; and **KC-135R** and **KC-135T** for special reconnaissance. (Data for KC-135A.)

Contractor: The Boeing Company.

Power Plant: four Pratt & Whitney J57-P-59W turbojet engines; each 13,750 lb thrust.

Accommodation: crew of four or five; up to 80 passengers.

Dimensions: span 130 ft 10 in, length 136 ft 3 in, height 38 ft 4 in.

Weights: empty 98,466 lb, gross 297,000 lb.

Performance: max speed at 30,000 ft 585 mph, service ceiling 50,000 ft, range with 120,000 lb of transfer fuel 1,150 miles, ferry mission 9,200 miles.

C-135 Stratolifter

Only 16 basic C-135 transports remain operational with MAC. Ordered originally to serve as interim jet passenger/cargo transports, pending delivery of C-141s, the original Stratolifter was a KC-135A with the tanker's refueling equipment deleted, and minor internal changes. Three converted KC-135As, known as C-135A "Falsies," were followed by 15 production **C-135As** with J57-P-59W turbojet engines, and 30 **C-135Bs** with Pratt & Whitney TF33-P-5 turbofans. Eleven "B"s were subsequently converted to **VC-135Bs** with revised interior for VIP transportation; others became **WC-135B** and **RC-135E/M.** Data similar to KC-135, except:

Dimensions: length 134 ft 6 in.

Weights (C-135B): operating weight empty 102,300 lb, gross 275,500 lb.

Accommodation: 126 troops; 44 litters and 54 sitting casualties; or 87,100 lb of cargo.

Performance (C-135B): max speed 600 mph, range with 54,000 lb payload 4,625 miles.

VC-137

Best known of the modified Boeing 707 transports acquired by USAF for VIP duties is "Air Force One," a **VC-137C** operated by MAC's 89th Military Airlift Wing from Andrews AFB, Md.,

KC-97L

C-123K Provider

C-130E Hercules

VC-131H

KC-135 Stratotanker

VC-137

C-140 JetStar

C-141 StarLifter

YC-14 AMST prototype

YC-15 AMST prototype

T-33A

T-37B

for use by the President. It is basically a 707-320B with a special VIP interior for a crew of seven or eight and 49 passengers. A second VC-137C also serves with the 89th Wing, together with three smaller 707-120s, originally designated VC-137As but later modified to **VC-137B** standard by the installation of turbofan engines.

Contractor: The Boeing Company.
Power Plant: four Pratt & Whitney JT3D-3 turbofan engines; each 18,000 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 about 7,000 miles.

C-140 JetStar

Five **C-140As** are used by Air Force Communications Service (AFCS) for inspecting worldwide military navigation aids. Eleven transport versions, **VC-140Bs,** are in service with the 89th Military Airlift Wing, Special Missions, of MAC, operating from Andrews AFB, Md. Deliveries began in late 1961.

Contractor: Lockheed-Georgia Company.
Power Plant: four Pratt & Whitney J60-P-5A turbojet engines; each 3,000 lb thrust.
Accommodation: C-140A crew of five; VC-140B crew of three and 8 or 13 passengers.
Dimensions: span 54 ft 5 in, length 60 ft 5 in, height 20 ft 5 in.
Weight: gross 40,920 lb.
Performance: max cruising speed at 20,000 ft 550 mph, ceiling above 45,000 ft, range with reserves 2,280 miles.

C-141 StarLifter

Initiated as the flying element of Logistics Support System 463L, with an all-weather landing system standard, the **C-141** began squadron operations with MAC in April 1965. It was soon making virtually daily flights to Southeast Asia, and played a key role in the civilian evacuation program in both South Vietnam and Cambodia. Lockheed built 284, of which some were modified to carry Minuteman ICBMs, with local structural strengthening to accommodate this 86,207 lb load. In service, loads have often been space-limited; so, to utilize more fully the potential of its C-141s, USAF is evaluating a prototype, designated **YC-141B,** of which the fuselage has been lengthened by 23 ft 4 in. The prototype conversion offers a number of other options, including in-flight refueling capability. On the basis of the test program, USAF will decide whether or not to seek funds to modify its entire active fleet of 271 C-141s.

Contractor: Lockheed-Georgia Company.
Power Plant: four Pratt & Whitney TF33-P-7 turbofan engines; each 21,000 lb thrust.
Accommodation: crew of four: 154 troops; 122 paratroops; or 64,000 lb of freight.
Dimensions: span 159 ft 11 in, length 145 ft 0 in, height 39 ft 3 in.
Weights: empty 136,000 lb, gross 323,100 lb.
Performance: max speed at 25,000 ft 571 mph, service ceiling 41,600 ft, range with max fuel 4,750 miles.

AMST (YC-14 and YC-15)

Boeing and McDonnell Douglas each received a contract in November 1972 to develop their proposals for an advanced medium STOL transport (AMST). Funding covered the manufacture of two prototypes from each company, meeting the same broad requirement but utilizing radically different principles of propulsive lift technology. Basically, both designs use a supercritical unswept high-wing T-tail airframe, with rear-loading ramp, and fuselage-side fairings to house the main-wheel bogies when retracted. The wide-bodied cargo compartment is configured to accommodate essential Army firepower and key support equipment, much of which is too large to put aboard the C-130. The AMST is intended to transport a 65,000 lb payload in conventional operation, or 27,000 lb into and out of 2,000 ft unprepared dirt runways (S/L 103°F) at a 400 nautical mile radius. Ferry range of the production version will be in excess of 3,500 nautical miles. Prototype testing is scheduled for completion this summer. The successful contractor may then be authorized to develop a production AMST, giving USAF an option for modernization of its tactical airlift force.

Boeing YC-14

Boeing's AMST prototypes made their first flights in August and October 1976 respectively. The YC-14 uses upper surface blowing and inboard Coanda flaps to achieve the propulsive lift necessary for STOL performance. This requires a highly unconventional power plant installation. Two General Electric CF6-50D engines, each approx 51,000 lb thrust, are mounted close to the fuselage, above and forward of the wing. Benefits resulting from this layout include the presentation of low infrared signature to ground-based detectors; and uncluttered underwing surface, simplifying the carriage of external stores, including RPVs; and a reduced noise footprint. Maximum gross weight is estimated at 170,000 lb for STOL operation or 237,000 lb for conventional operation (2.5*g* load factor).
Dimensions: span 129 ft 0 in, length 131 ft 8 in, height 48 ft 4 in.

McDonnell Douglas YC-15

The first year of flight testing proved highly successful for the YC-15, which has a more conventional configuration than does the YC-14. It has triple inboard spoilers/airbrakes, and externally blown flaps to achieve propulsive lift. The prototypes were each powered originally by four 16,000 lb thrust Pratt & Whitney JT8D-17 turbofans, with which they made their first flights in August and December 1975 respectively. At the conclusion of scheduled testing, they were returned to the McDonnell Douglas facilities at Long Beach, Calif., where the first prototype was fitted with a wing of increased span (132 ft 7 in) and had one of its JT8D engines replaced by a General Electric/SNECMA CFM56 turbofan. It has resumed flight testing in this form, as has the second prototype, on which one of the original engines has been replaced by a refanned JT8D-209. (Data for prototypes in original form.)
Dimensions: span 110 ft 4 in, length 124 ft 3 in, height 43 ft 4 in.
Weight (estimated): gross 216,680 lb.
Performance: max level speed 535 mph.

Trainers

T-33A

Although the T-38 is USAF's standard jet advanced trainer, the T-33A version of the Shooting Star jet fighter is still widely used for combat support missions, and for proficiency and radar target evaluation training. A lengthened fuselage accommodates a second cockpit in tandem, with the canopy extended to cover both; the armament of the fighter was replaced by an all-weather "navigational nose." Production ended in August 1959, when deliveries to USAF totaled more than 4,000. At least 300 remain in service.

Contractor: Lockheed Aircraft Corporation.
Power Plant: one Allison J33-A-35 turbojet engine; 4,600 lb thrust.
Accommodation: crew of two, in tandem.
Dimensions: span 38 ft 10½ in, length 37 ft 9 in, height 11 ft 4 in.
Weights: empty 8,084 lb, gross 11,965 lb.
Performance: max speed at 25,000 ft 543 mph, service ceiling 47,500 ft.
Armament: two 0.50 caliber machine guns on some early aircraft only.

T-37B

The original T-37A version of this two-seat primary trainer was the first USAF jet trainer designed as such from the start. From November 1959, deliveries switched to the T-37B, and all "A" models were subsequently converted to "B" standard. USAF uses its T-37Bs for Un-

dergraduate Pilot Training (UPT)/Undergraduate Navigator Training (UNT), and 692 are currently in service with Air Training Command. Well over a thousand T-37s have been built, and versions are used by many foreign countries for their pilot training programs, as well as for military surveillance and low-level attack duties. (Data for T-37B.)

Contractor: Cessna Aircraft Company.
Power Plant: two Continental J69-T-25 turbojet engines; each 1,025 lb thrust.
Accommodation: two, side-by-side.
Dimensions: span 33 ft 9.3 in, length 29 ft 3 in, height 9 ft 2.3 in.
Weights: empty, 3,870 lb, gross 6,600 lb.
Performance: max speed at 25,000 ft 426 mph, service ceiling 35,100 ft, range at 360 mph, standard tankage 870 miles.

T-38 Talon

This lightweight twin-jet advanced trainer, which was in continuous production from 1956 to 1972, has maintained constantly the best safety record of any USAF supersonic aircraft. Like the F-5 tactical fighter, the Talon was derived from Northrop's private-venture N-156 design and is almost identical in structure to the F-5. The first T-38 flew in April 1959, and production models entered operational service in March 1961. More than 1,100 of the total 1,187 T-38s built were delivered to USAF; 822 are currently in service with ATC.

Contractor: Northrop Corporation.
Power Plant: two General Electric J85-GE-5 turbojet engines; 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), ceiling above 55,000 ft, range, with reserves, 1,093 miles.

T-39 Sabreliner

Built as a private venture to meet USAF requirements for a combat-readiness trainer and utility aircraft, the prototype Sabreliner made its first flight in September 1958, powered by two General Electric J85 turbojets. Subsequent production models utilized by USAF are T-39B basic utility trainers with J60 turbojet engines, of which 143 were delivered for service throughout the Air Force. Of the remaining T-39s, 103 are assigned to MAC as single manager for airlift support, and are based at Norton AFB, Calif., Scott AFB, Ill., and Andrews AFB, Md.

Contractor: Sabreliner Division of Rockwell International Corporation.
Power Plant: two Pratt & Whitney J60-P-3 turbojet engines; each 3,000 lb thrust.
Accommodation: crew of two; 4 to 7 passengers.
Dimensions: span 44 ft 5 in, length 43 ft 9 in, height 16 ft 0 in.
Weights: empty 9,300 lb, gross 17,760 lb.
Performance: max speed at 36,000 ft 595 mph, service ceiling 39,000 ft, range 1,950 miles.

T-41A Mescalero

USAF pilot candidates undergo a flight screening program with about 14 hours in a standard Cessna Model 172 light aircraft, bought by USAF as a trainer under the designation T-41A. An initial order for 170 aircraft in 1964 was supplemented by a further 34 in July 1967. Ninety-six remain in the ATC inventory. A more powerful version, the T-41C, was ordered by USAF in October 1967, and 52 of these are used for cadet flight training at the USAF Academy. (Data for the T-41A.)

Contractor: Cessna Aircraft Company.
Power Plant: one Continental O-300-C piston engine; 145 hp.
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

The first of these navigation trainers, selected by USAF to replace the piston-engine T-29, made its initial flight on April 10, 1973. Basically a military version of the commercial Boeing Model 737-200, the T-43A is equipped with the same on-board avionics as the most advanced USAF operational aircraft, including celestial, radar, and inertial navigation systems, LORAN, and other radio systems. Deliveries of the 19 aircraft ordered for ATC were completed in July 1974.

Contractor: The Boeing Aerospace Company.
Power Plant: two Pratt & Whitney JT8D-9 turbofan engines; each 14,500 lb thrust.
Accommodation: crew of two; 12 students, 4 advanced students, and 3 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.

T-38 Talon


T-39 Sabreliner


T-41A Mescalero

T-43A

Helicopters

UH-1F and HH-1H

The **UH-1F** was developed from the basic Bell Model 204 to participate in a design competition for a missile site support helicopter. USAF ordered 146, of which the first flew in February 1964. Deliveries began, to the 4486th Test Squadron, in September of the same year, and were completed in 1967. A few UH-1Fs were modified to **UH-1Ps** for classified psychological warfare missions in Vietnam. **TH-1F** is a version of the UH-1F used for instrument and hoist training. In November 1970 USAF ordered 30 larger 12/15-seat **HH-1Hs,** based on the Model 205, for local base rescue duties. (Data for UH-1F.)

Contractor: Bell Helicopter Textron.
Power Plant: one General Electric T58-GE-3 turboshaft engine; 1,272 shp (derated to 1,100 shp).
Accommodation: one pilot and 10 passengers; or two crew and 2,000 lb of cargo.
Dimensions: rotor diameter 48 ft 0 in, length of fuselage 39 ft 7½ in, height 14 ft 8 in.
Weight: gross 9,000 lb.
Performance: max speed 138 mph, service ceiling at mission gross weight 13,450 ft, max range, no allowances, at mission gross weight 347 miles.

UH-1N

Developed originally to meet a Canadian government requirement, the UH-1N is a twin-engine version of the UH-1 utility helicopter capable of sustained cruising flight on one engine. Initial orders on behalf of the US services, placed simultaneously with Canadian orders in 1969, included 79 for USAF. Deliveries began in the following year, and UH-1Ns replaced all USAF HH-43F Huskies.

Contractor: Bell Helicopter Textron.
Power Plant: Pratt & Whitney (Canada) T400-CP-400 Turbo "Twin-Pac," consisting of two PT6 turboshaft engines coupled to a combining gearbox with a single output shaft; flat-rated to 1,250 shp.
Accommodation: pilot and 14 passengers or cargo; or external load of 3,383 lb.
Dimensions: rotor diameter (with tracking tips) 48 ft 2¼ in, length of fuselage 42 ft 4¾ in, height 14 ft 4¾ in.
Weight: gross 10,500 lb.
Performance: max speed at S/L 126 mph, service ceiling 15,000 ft, max range, no reserves, 248 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

Important design changes incorporated in this twin-engine amphibious transport helicopter, based on the US Navy's SH-3A, 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 both

HH-1H


UH-1N

CH-3E

HH-3E Jolly Green Giant

HH-53B

HH-53C

LGM-25C Titan II

LGM-30G Minuteman III

new production aircraft and 41 re-engined CH-3Cs. A total of 83 new and uprated aircraft was produced, of which 50 were adapted subsequently as HH-3Es (*see below*).

Contractor: Sikorsky Aircraft, Division of United Technologies Corporation.

Power Plant: two General Electric T58-GE-5 turboshaft engines; each 1,500 shp.

Accommodation: crew of two or three; 25 or 30 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% reserve, 465 miles.

Armament: General Electric 7.62 mm machine gun.

HH-3E Jolly Green Giant

Variant of the CH-3E for USAF's Aerospace Rescue and Recovery Service, developed 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. Some HH-3Es are modifications of CH-3Cs. An unarmed version (HH-3F Pelican) is used by the US Coast Guard. Other data basically similar to CH-3E above.

HH-53B

Ordered in September 1966 for USAF's Aerospace Rescue and Recovery Service to supplement the HH-3E, this twin-turbine heavy-lift helicopter carries the same general equipment as the Jolly Green Giant, including the in-flight refueling probe and all-weather avionics and armament, but is faster and larger. The first of eight HH-53Bs flew in March 1967, and, following delivery, which began in June the same year, the type was used extensively for rescue operations in Southeast Asia, including the freeing of the SS *Mayaguez* and her crew in May 1975.

Contractor: Sikorsky Aircraft, Division of United Technologies Corporation.

Power Plant: two General Electric T64-GE-3 turboshaft engines; each 3,080 shp.

Accommodation: crew of three; basic accommodation for 38 combat-equipped troops or 24 litters and 4 attendants.

Dimensions: rotor diameter 72 ft 3 in, length of fuselage (without refueling probe) 67 ft 2 in, height 24 ft 11 in.

Weights: empty 23,125 lb, gross 42,000 lb.

Performance: max speed at S/L 186 mph, service ceiling 18,400 ft, max range, with 10% reserve, 540 miles.

HH-53C and CH-53C

The **HH-53C** is an improved version of the HH-53B, powered by 3,925 shp T64-CE-7 turboshaft engines. It was first delivered to USAF in August 1968. With a maximum speed of 196 mph, the **HH-53C** is faster than the "B" model; it can transport 60 passengers or 18,500 lb of freight and has an external cargo hook of 20,000 lb capacity. Other data basically as for HH-53B above. A total of 72 HH-53B/Cs were built. Four generally similar **CH-53Cs** are used to provide battlefield mobility for the Air Force mobile Tactical Air Control System.

Strategic Missiles

LGM-25C Titan II

In service since 1963, this two-stage ICBM is deployed in six squadrons, each with nine missiles, based at Davis-Monthan AFB, Ariz.; McConnell AFB, Kan.; and Little Rock AFB, Ark. Titan II is fitted with a thermonuclear warhead having the largest yield of any carried by a US missile and has a launch reaction time of one minute from its fully hardened underground silo. During flight, the second stage shuts down once a speed of 17,000 mph is attained; vernier nozzles then adjust the velocity and correct the trajectory for the proper ballistic delivery of the ablative-type reentry vehicle, which finally separates from the burnt-out second stage. Advanced penetration aids are carried to hinder detection and destruction by enemy ABMs.

Contractor: Martin Marietta Corporation.

Power Plant: first stage: Aerojet-General LR87 storable liquid-propellant engine; 430,000 lb thrust; second stage: Aerojet-General LR91 storable liquid-propellant engine; 100,000 lb thrust.

Guidance: AC Electronics inertial guidance system.

Warhead: thermonuclear, in General Electric Mk 6 ablative reentry vehicle.

Dimensions: length 103 ft 0 in, max body diameter 10 ft 0 in.

Weight: launch weight 330,000 lb.

Performance: max speed 17,000 mph (approx), max range 6,300 miles.

LGM-30F/G Minuteman

Of similar range, though smaller and lighter in weight than the liquid-propellant Titan, this three-stage solid-propellant second-generation missile was designed to supersede earlier ICBMs and has a smaller payload. The current operational versions are:

LGM-30F Minuteman II: similar in configuration to the original Minuteman I, Minuteman II has increased range and targeting coverage; also increased accuracy and payload capacity. Operational since 1965, it is currently based at Malmstrom AFB, Mont., Ellsworth AFB, S. D., and Whiteman AFB, Mo.

LGM-30G Minuteman III: with MIRV capability, this version increases the possibility of penetrating enemy defense systems. First highly successful test launch was made in 1968, and Minuteman III is now operational at Minot AFB, N. D., F. E. Warren AFB, Wyo., Grand Forks AFB, N. D., and Malmstrom AFB, Mont.

With the Minuteman force now made up of the planned 450 Minuteman IIs and 550 Minuteman IIIs, production will end in September, and current funding is primarily for the purchase of components, guidance systems, and spares. Recent R&D has been aimed at development of the Mk 12A reentry vehicle, which increases the yield of the Minuteman III warhead, and refinements to improve accuracy.

Assembly and Integration: The Boeing Aerospace Company.

Power Plant: first stage: Thiokol M-55E 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 Aerojet-General SR73-AJ-1 solid-propellant motor; 34,400 lb thrust.

Guidance: Autonetics Division of Rockwell International inertial guidance system.

Warhead: LGM-30F single thermonuclear warhead in Avco reentry vehicle; LGM-30G multiple thermonuclear warheads, each in a General Electric Mk 12 reentry vehicle.

Dimensions: length 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.

AGM-69 SRAM

Delivery of the 1,500 AGM-69A SRAMs (Short Range Attack Missiles) ordered to equip B-52G/H and FB-111 strategic bombers was completed in 1975. Current funding (reduced by the new Administration) is for development and possible production restart of the **AGM-69B** for the B-1 bomber, with changes to meet new nuclear safety and hardness criteria, and a warhead common with that of the ALCM and Navy Tomahawk. The supersonic air-to-surface SRAM, which has a nuclear warhead, was designed fundamentally to attack and neutralize enemy terminal defenses, such as SAM missile sites. An inertial guidance system makes the missile impossible to jam. Each SAC B-52G/H can carry 20 AGM-69A SRAMs, twelve in three-round underwing clusters and eight on a rotary dispenser in the aft bomb-bay,

together with up to four Mk 28 thermonuclear weapons. An FB-111A can carry four AGM-69As on swiveling underwing pylons and two internally. When carried externally, a tailcone, 22.2 in long, is added to the missile to reduce drag.

Contractor: The 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 dog-leg courses. CEP stated to be well within lethal radius of warhead.

Warhead: nuclear, of similar yield to that of single Minuteman III warhead.

Dimensions: length 14 ft 0 in, body diameter 1 ft 5½ 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-86 ALCM

The Air-Launched Cruise Missile (ALCM) is a small unmanned winged air vehicle capable of sustained subsonic flight following launch from a carrier aircraft. It has a turbofan engine and a nuclear warhead, and is programmed for precision attack on surface targets. Guidance is by a combination of inertial and terrain comparison techniques. Small radar signature and low-level flight capability enhance its effectiveness. A B-52 could carry 12 ALCMs externally and 8 internally on a SRAM rotary dispenser, with the missiles' wings and tail folded, and engine air intake retracted. A B-1 could carry 24, all internally. When carried externally, ALCM will be able to have an underbelly auxiliary fuel tank fitted to increase its range. Powered flights of prototypes began at White Sands Missile Range on March 5, 1976, when the missile impacted 80 miles downrange after a 10 min 40 sec flight at Mach 0.65. Development continues, with the current emphasis on increased range.

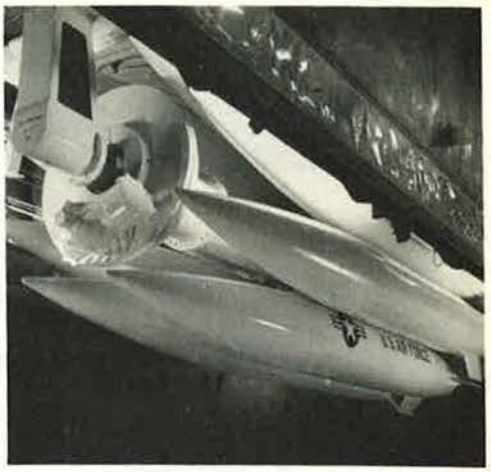
Contractor: Boeing Aerospace Company.

Power Plant: Williams Research Corporation F107-WR-100 turbofan engine; 600 lb thrust class.

Dimensions: length 14 ft, body diameter 2 ft 1 in, wing span 9 ft 6 in.

Weights: with belly tank 2,400 lb, without tank 1,900 lb.

Performance: classified.



AGM-69 SRAM

AGM-86 ALCM

Airborne Tactical and Defense Missiles

AIR-2A Genie

On July 19, 1957, a Genie, launched from an F-89J Scorpion, became the first nuclear-tipped air-to-air rocket ever tested in a live firing. Production ended in 1962, but thousands were delivered and continue in first-line service with F-106 squadrons of USAF, as well as with F-101Bs of the Canadian Armed Forces. Unguided in flight, Genie is normally fired automatically by the Hughes fire-control system fitted in the launching aircraft. As one of many safety precautions, the missile remains inert in a nuclear sense until it is armed in the air, a few moments before firing. A training version, without nuclear warhead, is also in service.

Contractor: McDonnell Douglas Astronautics Company.

Power Plant: Thiokol SR49-TC-1 solid-propellant rocket motor; 36,000 lb thrust.

Guidance: no guidance system.

Warhead: nuclear, with reported yield of 1.5 kilotons.

Dimensions: length 9 ft 7 in, body diameter 1 ft 5.35 in, fin span 3 ft 3½ in.

Weight: launch weight 820 lb.

Performance: max speed Mach 3, max range 6 miles.

AIM-4A/C/D Falcon

Falcon was the first air-to-air guided weapon to come into USAF service. Versions include:

AIM-4A: improved version of the original radar-homing production model; about 12,000 built between 1956 and 1959.

AIM-4C: similar airframe to AIM-4A but with infrared guidance system. About 9,500 were delivered simultaneously with the "A"s.

AIM-4D: "cross-bred" version, combining the improved infrared homing head of the AIM-4G Super Falcon with the basic airframe of the AIM-4C. Used to arm F-4 fighters of Tactical Air Command. Thousands of older Falcons were converted to AIM-4D standard.

Contractor: Hughes Aircraft Company.

Power Plant: Thiokol M58-E4 solid-propellant rocket motor; 6,000 lb thrust.

Guidance: AIM-4A: Hughes semiactive radar homing system; AIM-4C/D: infrared homing system.

Warhead: high-explosive.

Dimensions: length AIM-4A 6 ft 6 in, AIM-4C/D 6 ft 7½ in, body diameter 6.4 in, wing span 1 ft 8 in.

Weights: launch weight AIM-4A 110 lb; AIM-4C 122 lb; AIM-4D 134 lb.

Performance (AIM-4D): max speed Mach 4, range 6 miles.

AIM-4F/G Super Falcon

Arming the F-106 Delta Dart, the Super Falcon is a developed version of the AIM-4A/C Falcon, having reduced susceptibility to enemy countermeasures and higher performance. A mixed armament of four AIM-4F/Gs is carried internally. The two versions were introduced simultaneously in 1960, superseding the interim AIM-4E.

Contractor: Hughes Aircraft Company.

Power Plant: Thiokol M46 two-stage solid-propellant motor; first-stage rating of 6,000 lb thrust.

Guidance: AIM-4F: Hughes semiactive radar homing guidance; AIM-4G: infrared homing system.

Warhead: high-explosive, weighing 40 lb.

Dimensions: length AIM-4F 7 ft 2 in; AIM-4G 6 ft 9 in, body diameter 6.6 in, wing span 2 ft 0 in.

Weights: launch weight AIM-4F 150 lb; AIM-4G 145 lb.

Performance: max speed Mach 2.5, max range 7 miles.

AIR-2A Genie

AIM-7E/F Sparrow

Some 34,000 of the AIM-7C, D, and E versions of Sparrow were produced, and this radar-homing air-to-air missile is one of the most important guided weapons in service with NATO air forces and their allies. Basic current operational model, the all-weather all-altitude **AIM-7E,** is standard armament of the F-4 Phantom II and is suited also for use against shipping targets from aircraft or ships. The **AIM-7E-2** is similar but has better maneuverability to improve its "dogfight" capability. In production for both USAF and USN is the advanced solid-state **AIM-7F,** with larger motor, Doppler guidance, and good capability over both dogfight and medium ranges. USAF procurement of the "F" is expected to total 5,415, to supersede the AIM-7E and to arm the F-15, with a further increment of 1,300 requested in the FY '78 budget. General Dynamics is to be brought in as a second source contractor. Development of a monopulse seeker for the AIM-7F was started in 1975, aimed at reducing cost and improving performance in the ECM and lookdown/clutter areas; initial operational capability is planned for 1981. (Data for AIM-7F.)

Contractor: Raytheon Company.

Power Plant: Hercules MK 58 Mod O solid-propellant rocket motor.

Guidance: Raytheon semiactive Doppler radar homing system.

Warhead: high-explosive.

Dimensions: length 12 ft 0 in, body diameter 8 in, wing span 3 ft 4 in.

Weight: launch weight 500 lb.

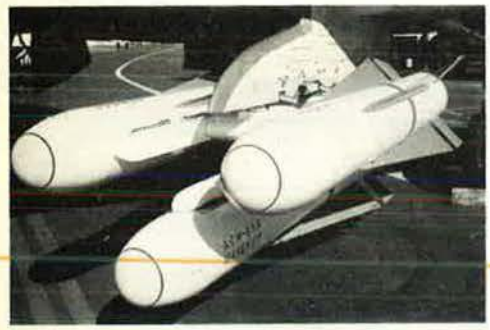
Performance (estimated): max speed more than Mach 3.5, range AIM-7E 14 miles; AIM-7F 28 miles.

AIM-4D Falcons

AIM-7F Sparrow

AIM-9J Sidewinder

AGM-45A Shrike



AGM-65 Maverick

AGM-78 Standard ARM

Electro-Optical Guided Bomb (EOGB)

Modular Glide Weapon System (GBU-15)

AIM-9 Sidewinder

The AIM-9 Sidewinder is a close-range air-to-air missile using infrared guidance. More than 80,000 of the basic **AIM-9Bs** were produced by Philco and General Electric for USAF, USN, and many foreign armed services, including NATO air forces. Later versions of Sidewinder under development for USAF or in service are:

AIM-9E: with improved guidance and control. Produced by Philco by modification of AIM-9Bs.

AIM-9G: advanced model with airframe changes, new motor and guidance, improved target acquisition and lock-on, produced by Raytheon.

AIM-9H: version with improved close-range capability, produced for USN; one-time procurement of 800 by USAF in FY '76. Solid-state guidance, off-boresight acquisition/launch capability. Lead bias function moves missile impact point forward to more vulnerable area on target aircraft.

AIM-9J: advanced version of AIM-9E with both increased range and improved maneuvering capability for dogfighting. Being produced for 1977–78 delivery to USAF by Ford Aerospace, to equip the F-15 and other Sidewinder-compatible aircraft, by modification of remaining 590 AIM-9Bs in USAF inventory and 1,410 acquired from USN.

AIM-9J+ (J-3): all-aspect version with solid-state electronics and same fuze as AIM-9L. Delivery in 1978–80 by conversion of AIM-9Es and Js.

AIM-9L: third-generation Sidewinder for USAF and USN. New Mk 36 Mod 6 solid-propellant 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, rate bias, and active optical fuze for increased lethality and low susceptibility to countermeasures. Planned USAF procurement is 4,810 between FY '76 and FY '80. (Data for AIM-9B.)

Contractor: Naval Weapons Center.
Power Plant: Naval Propellant Plant solid-propellant rocket motor.
Guidance: infrared homing guidance.
Warhead: high-explosive, weighing 25 lb.
Dimensions: length 9 ft 3½ in, body diameter 5 in, fin span 1 ft 10 in.
Weight: launch weight 159 lb.
Performance: max speed Mach 2.5, max range 2 miles.

AGM-45A Shrike

By the end of the current FY, USAF will have procured 12,863 of these supersonic missiles, which are designed to home automatically on enemy radar installations. The AGM-45A entered operational service in Vietnam during 1965 and subsequently played an important role in the US air offensive. It became a standard penetration aid on US tactical aircraft, and its effectiveness has been increased progressively by many improvements. Twelve versions are known to have been produced for USAF and USN, differing primarily in the frequency coverage of the front end detachable seeker sections. Late models are planned to equip the "Wild Weasel" F-4Gs.

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: classified.

AGM-65 Maverick

The basic **AGM-65A** version of this tactical air-to-surface missile differs from earlier US TV-guided weapons in having a self-homing capability. This enables the pilot of the launch aircraft to seek other targets or leave the target area once Maverick 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. The AGM-65A is carried by the A-7D, A-10, F-4D, and F-4E, normally in three-round underwing clusters, and is intended for use against pinpoint targets such as tanks and columns of vehicles. It is also carried by Teledyne Ryan BGM-34 RPVs. By the end of FY '76 a total of 17,000 AGM-65A Mavericks had been delivered, and manufacture of 2,000 more is under way. Also in series production is the **AGM-65B** with a modified "scene-magnification" TV seeker. Engineering development of the "B" was completed by January 1975 and 4,000 were ordered in August, with deliveries to begin in December 1975.

To overcome limitations of the TV Maverick, which can be used only in daylight clear-weather conditions, two new versions have been developed:

AGM-65C: laser-guided version intended for close air support by day or night against targets marked by airborne or ground designator. Initial 100 requested in FY '77, and 100 more in FY '78.

AGM-65D: with imaging infrared seeker (IIR). $29.2 million requested for continued development in FY '78.

Later development will include adaptation of Maverick to carry the 250 lb Mk 19 warhead for use against larger hardened targets such as command bunkers. (Data for AGM-65A.)

Contractor: Hughes Aircraft Company.
Power Plant: Thiokol TX-481 solid-propellant rocket motor.
Guidance: self-homing electro-optical guidance system.
Warhead: high-explosive, shaped charge.
Dimensions: length 8 ft 1 in, body diameter 1 ft 0 in, wing span 2 ft 4 in.
Weight: launch weight 462 lb.
Performance: classified.

AGM-78 Standard ARM

Designed to provide a significant increase in capability over earlier weapons in countering the threat of radar-controlled antiaircraft guided missiles and guns, the AGM-78 Standard ARM (Anti-Radiation Missile) has been in production since 1968, with several advanced models developed subsequently, some highly classified. The initial **AGM-78A** version used the passive homing target-seeking head of the Shrike missile; current models have improved seeker heads and avionics for better target selection, increased effectiveness against target countermeasures, and still greater attack range. Standard ARM is deployed on USAF's F-105 and also by USN. Equipment carried by the launch aircraft includes a Target Identification and Acquisition System (TIAS), which is able to determine and pass to the missile specific target parameters. Late production version is **AGM-78D.**

Contractor: General Dynamics Corporation, Pomona Division.
Power Plant: Aerojet-General Mk 27 Mod 4 dual-thrust solid-propellant rocket motor.
Guidance: passive homing guidance system, using seeker head that homes on enemy radar emissions.
Warhead: high-explosive.
Dimensions: length 15 ft 0 in, body diameter 1 ft 1½ in, wing span 3 ft 6 in.
Weight: launch weight, basic version 1,356 lb.
Performance: max speed Mach 2, max range 15.5 miles.

Electro-Optical Guided Bomb (EOGB)

USAF's GBU-8, HOBO, is an unpowered 2,000 lb TV-guided air-to-surface weapon, produced in the form of a kit that converts a standard Mk 84 bomb into a highly accurate guided weapon with moderate/long-range capability. The weapon's guidance is automatic once it has been locked on to a target, enabling the pilot to leave the target area after the weapon has been launched. EOGB consists of a forward guidance assembly, the warhead, an interconnect section, and an aft control section, including an autopilot. It was used in Southeast Asia.

Contractor: Rockwell International Corporation.
Guidance: TV, automatic tracking.
Warhead: Mk 84 bomb (2,000 lb, unitary).
Dimensions: length 12 ft 5 in, body diameter 1 ft 6 in, wing span 3 ft 8 in.
Weight: 2,240 lb.

Modular Glide Weapon System (GBU-15)

The GBU-15 is an unpowered munition in the 2,000 lb class that can be equipped with alternative aerodynamic components, warheads, and guidance units. Initial versions will be TV-guided, with data-link options that permit the weapon to be controlled from the cockpit of

the launch aircraft. The weapon can be assembled in a cruciform configuration for low-altitude attack, or in a planar (flip-out wing) configuration for high-altitude standoff attack. Provisions are made for the addition of advanced seekers to provide night and adverse weather capabilities. (Data for Mk 84 version, unless indicated otherwise.)

Contractor: Rockwell International Corporation.
Guidance: TV self-homing or data link (DME, laser, and IIR options).
Warhead: Mk 84 bomb (2,000 lb, unitary) or CBU-75 (cluster).
Dimensions: length 12 ft 5 in, body diameter 1 ft 6 in, wing span 3 ft 8 in.
Weight: 2,240 lb.

Launch Vehicles

Agena

A payload section (nose cone) able to accommodate a variety of earth-orbiting and space probes weighing up to several hundred pounds gives this space vehicle an inherent versatility. Agena is normally utilized as the upper stage of such launchers as Atlas and Titan III. With its attached payload, it has functioned for longer than six months on some USAF missions. An Agena spacecraft was the first to accomplish a rendezvous and docking by spacecraft in orbit and to provide propulsion power in space for another spacecraft. Current version is **Agena D;** tested successfully in June 1962, this is able to accept a variety of payloads, unlike the earlier "A" and "B," which had integrated payloads. Agena is used in most USAF reconnaissance satellite launchings, except for Big Bird missions.

Prime Contractor: Lockheed Missiles and Space Company, Inc.
Power Plant: Bell Aerosystems YLR81-BA-11 liquid-propellant rocket engine; 16,000 lb thrust.
Dimensions (Agena D): length (typical) 23 ft 3 in, diameter 5 ft 0 in.
Weights (typical Agena D): launch weight 15,037 lb; weight in orbit, less payload, 1,277 lb.

Atlas Launchers

By January of this year, Atlas had recorded a total of 427 space and ballistic launches, and 38 Atlas E and F missiles remained available for future launches. Current launch vehicles are as follows:

Atlas-Agena: Used by the USAF for military satellite and scientific launchings, this is a general-purpose space launch vehicle (SLV), consisting of the Atlas SLV standardized launcher with an Agena upper stage. Atlas-Agena vehicles have successfully launched Ranger lunar probes, Mariner Mars and Venus probes, Vela nuclear detection satellites, and OAO, OGO, and ATS satellites.

Atlas SLV-3A: An upgraded version of the earlier SLV-3, with lengthened propellant tanks, the SLV-3A was evolved primarily for use with the Agena upper stage, but it could serve as a direct-ascent vehicle or in conjunction with other upper stages. Of the fourteen SLV-3As produced under initial contracts, seven were for use by the USAF in classified missions, with the remainder for NASA.

Atlas SLV-3D: Although intended for use primarily with the Centaur D-1A upper stage, the SLV-3D is standardized like the SLV-3A and can be used on other missions. In 1972, Pioneer 10 was launched on its flight path to Jupiter with the highest velocity ever imparted to a spacecraft, the launch vehicle being an Atlas/Centaur with an additional TE-M-364-4 solid-propellant rocket motor.

Prime Contractor: General Dynamics Corporation, Convair Division.
Power Plant: uprated Rocketdyne MA-5 propulsion system, comprising central sustainer motor and two boosters; total S/L thrust approx 431,040 lb (60,000 lb from the central sustainer motor, 370,000 lb total from the boosters, 1,040 lb from two verniers).
Dimensions: length SLV-3A 78 ft 11 in; SLV-3A/Agena 118 ft; SLV-3D/Centaur 131 ft, max body diameter 10 ft 0 in.
Launch Weight (SLV-3A): 314,000 lb.
Performance (SLV-3A-Agena): capable of putting payload of 8,500 lb into a 115-mile circular orbit, or of launching 2,730 lb into synchronous transfer orbit.

Centaur

First US high-energy upper stage and first to utilize liquid hydrogen as a propellant. The latest version, Centaur D-1, retains the same propulsion and structural features as its predecessor, Centaur D, but has several redesigned or repackaged astrionics components. Used in conjunction with the Atlas SLV-3D or the Titan IIIE, it provides widely ranging applications and capabilities: the nose section of the former is modified to a constant 10 ft diameter to accommodate the Centaur D-1A which, in turn, generates most of the electronic command and control systems for the launch vehicle; the Centaur D-1T also provides guidance for its Titan booster. A 10 ft diameter fairing protects payloads for Centaur D-1A; a 14 ft shroud encloses both the payload and the Centaur D-1T on Titan/Centaur. Atlas-Centaur D-1A launch missions have been assigned into 1981. Primary mission of Titan IIIE/Centaur was the placing of two Viking spacecraft on Mars last year. Centaur's multiburn and extended coast capability were tested after the 1976 launch of a Helios solar probe, and will be used operationally during the 1977 Mariner Jupiter Saturn missions.

Prime Contractor: General Dynamics Corporation, Convair Division.
Power Plant: two Pratt & Whitney RL10A-3 liquid hydrogen engines; each 15,000 lb thrust.
Guidance: inertial guidance system.
Dimensions: Centaur: length 30 ft 0 in, diameter 10 ft 0 in.
Launch Weight (approx): 37,000 lb.
Performance: Atlas-Centaur: 11,200 lb into 115-mile circular orbit, or 4,100 lb into synchronous transfer orbit, or 1,300 lb to nearest planet; Titan/Centaur: 34,000 lb into 115-mile circular orbit, or 7,300 lb into synchronous equatorial orbit, or 8,200 lb to nearest planet.

Scout

Designed to make possible space, orbital, and reentry research by NASA and the Department of Defense at comparatively low cost, using "off-the-shelf" major components where available. Scout is a four/five-stage launch vehicle, first ordered in 1959, which can be launched at any angle from vertical to 20° from vertical. A subsequent version with an improved fourth stage 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. A fifth-stage velocity package is being developed, which will increase the Scout's hypersonic reentry performance, make possible highly elliptical deep-space orbits, and extend the vehicle's probe capabilities to the sun. Using the latest Algol III first-stage motor, Scouts can put 425 lb payloads (320 lb with the earlier motor) into a 310-mile easterly orbit, and have been used to launch many unmanned spacecraft, including classified military satellites.

Prime Contractor: Vought Corporation.
Power Plant: first stage: Aerojet-General Algol IIB solid-propellant motor; 115,000 lb thrust or Algol III; 140,000 lb thrust; second stage: Thiokol Castor II solid-propellant motor; 60,000 lb thrust; third stage: Hercules Antares II solid-propellant motor; 21,000 lb thrust; fourth stage: UTC FW-4S solid-propellant motor; 6,000 lb thrust; fifth stage under development.
Guidance: simplified Honeywell gyro guidance system.
Dimensions: height overall 75 ft 2½ in, max body diameter 3 ft 9 in.
Launch Weight: 47,185 lb.

Titan III

As the standard US heavy-duty space "workhorse" booster, Titan III can be modified to launch a wide variety of payloads, both

Atlas SLV-3A/Agena

Centaur

Scout

Titan IIIB

Titan IIIC

Titan IIIE-Centaur

manned and unmanned, ranging from 35,000 lb in earth orbit to 7,000 lb for planetary missions. The basic core section consists of two booster stages evolved from the Titan II ICBM and an upper stage, known as Transtage, capable of functioning both in the boost phase of flight and as a restartable space propulsion vehicle. Principal configurations are:

Titan IIIB: basically the first two stages of the core section, able to accommodate various upper stages. First launched in July 1966 and used subsequently with Agena upper stages to launch classified USAF payloads.

Titan IIIC: consisting of the core section with two five-segment strap-on motors functioning as a booster before ignition of the main engines. First launched in June 1965; payloads include USAF early warning satellites.

Titan IIID: basically similar to IIIC but using only the first two stages of the core section and able to accept a variety of upper stages. Current vehicles use radio guidance instead of the Titan IIIC inertial guidance. Future vehicles will also use the Space Shuttle Interim Upper Stage (IUS) redundant avionics for improved reliability. Production contract for original IIID placed by USAF in 1967; first used in June 1971 to orbit the first Lockheed Big Bird photo-reconnaissance spacecraft.

Titan IIID/IUS. Basically a Titan IIID adapted to accommodate a Space Shuttle Interim Upper Stage. This configuration is under consideration as a further reliability improvement to replace Titan IIIC.

Titan IIIE-Centaur: basically a Titan IIID that has been modified to accommodate a Centaur high-energy upper stage. Primary mission was to place two Viking spacecraft on Mars this year.

Titan IIIs have achieved well over 80 successful launchings since 1966, and additional contracts have extended production of various models through 1979.

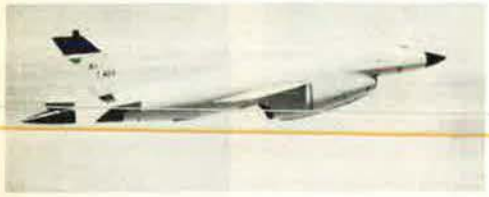
Prime Contractor: Martin Marietta Corporation.

Power Plant: first and second stages: Aerojet liquid-propellant engines; first stage 526,000 lb thrust; second stage 102,000 lb thrust; Transtage Aerojet twin-chamber liquid-propellant engine; 16,000 lb thrust; Titan IIIC/Ds also have two UTC five-segment solid-propellant booster rocket motors; each more than 1,200,000 lb thrust.

Dimensions: first and second stages of core: height 96 ft 3½ in, diameter 10 ft 0 in; Transtage: height 15 ft 0 in, diameter 10 ft 0 in.

Launch Weights: Titan IIIB: 345,000 lb; Titan IIIC; 1,390,000 lb.

Performance (Titan IIIC, approx): speed at burnout: solid-propellant boosters 4,100 mph, first stage 10,200 mph, second stage 17,100 mph, Transtage 17,500 mph.



Ryan AQM-34V

Ryan BGM-34B armed with Mavericks

Remotely Piloted Vehicles (RPVs)

Ryan AQM-34

Of the large "family" of surveillance/reconnaissance RPVs encompassed within this basic USAF designation and the Ryan Model number 147, a total of twenty-four versions has been revealed, all evolved from the BQM-34A Firebee I target drone. Many hundreds of AQM-34s have been delivered for operational use, while versions have also been utilized widely for testing the effectiveness of new equipment in a combat environment without risk to personnel. The original AQM-34 was no more than a modified Firebee I with a new guidance system and increased fuel capacity. Typical current versions are: **AQM-34K,** latest of a family of low-altitude night reconnaissance RPVs produced under USAF's Compass Bin program, controllable from an airborne or ground station, and fitted with a pre-programmed navigation system utilizing a Doppler navigator and digital programmer. **AQM-34L,** a low-altitude reconnaissance version, with nose-mounted camera or other sensor. Used for many missions over North Vietnam, this vehicle and the Lockheed SR-71 manned strategic reconnaissance aircraft were the only US reconnaissance types permitted to overfly that country after the cessation of bombing in January 1973. **AQM-34M,** very similar to the AQM-34L, is an improved vehicle that has almost replaced the "L" in operational use. Seventy-eight delivered, with radar altimeter standard; some with Loran and some with underwing auxiliary fuel tanks. **AQM-34P,** high-altitude surveillance version with extended span. One damaged airframe displayed in Peking in 1965. **AQM-34Q/R,** high-altitude surveillance drones, with span extended to 32 ft. These two models form part of USAF's Combat Dawn program, for electronic intelligence missions, with midair recovery by helicopter. Twenty "R"s ordered in 1971 were said to fly above 60,000 ft at 485 mph. **AQM-34V,** first flown in May 1976, with first deliveries to 11th Tactical Drone Squadron at Davis-Monthan AFB, Ariz., later the same year. Forty-seven being produced as updated AQM-34H/Js; 16 being built as new. Improved flight controls; guidance compatible with Sperry Univac Multiple Drone Control (MDC) system installed in DC-130H, which can control up to eight RPVs simultaneously. Active jamming equipment includes E-Systems (Melpar Division) modular noise jammers, and either Lundy ALE-2 or M.B. Associates ALE-38 underwing chaff dispenser pods. Can be air or ground launched. Prime recovery by Mid-Air Retrieval System (MARS) fitted to CH-3 or HH-53 helicopter; but ground landing bag system under development for retrofit when qualified.

Contractor: Teledyne Ryan Aeronautical, Division of Teledyne Inc.

Power Plant: AQM-34K, L, M 1,920 lb thrust Teledyne CAE J69-T-41A turbojet; AQM-34P, Q, R 2,700 lb thrust Teledyne CAE J100-CA-100; AQM-34V 1,700 lb thrust J69-T-29.

Dimensions: span AQM-34L 13 ft; AQM-34K, M, V 14 ft 6 in; AQM-34P, Q, R 32 ft, length AQM-34V 26 ft; AQM-34K 29 ft; AQM-34L, M, P, Q, R 30 ft, body diameter AQM-34K, L, M, V 3 ft 1¼ in; AQM-34P, Q, R 3 ft 3½ in.

Weights: gross AQM-34K 3,367 lb; AQM-34L 3,065 lb; AQM-34M 3,113 lb; AQM-34P 3,792 lb; AQM-34Q 3,870 lb; AQM-34R 6,200 lb; AQM-34V 4,500 lb.

Performance (AQM-34L): range at low altitude variable from 177 miles at 645 mph to 748 miles at 485 mph.

Ryan BGM-34

Plans to evolve combat drones for a variety of missions that at present require manned aircraft are reflected in this RPV which, though sharing the Firebee I parentage of the AQM-34, is intended to fulfill a more aggressive role. There are two current versions: **BGM-34B:** Eight ordered. At least one BGM-34B was fitted with an extended, modified nose housing target acquisition and designation equipment of the kind contained in the Aeronutronic Ford Pave Knife pods carried by F-4D Phantoms for use with laser-guided "smart bombs"; this enabled the RPV to be used in a pathfinder role. One other BGM-34B has been fitted with a Hughes high-resolution FLIR (forward-looking infrared) nose sensor instead of the TV installation. BGM-34Bs have made successful single and multiple passes against a variety of targets, launching a number of live and inert weapons, including SPASMs (self-propelled air-to-surface missiles) and Maverick TV-guided missiles. **BGM-34C** is an interim multimission RPV, for air or ground launch, with modular nose sections for reconnaissance, electronic warfare, or strike missions. Capable of carrying twice the weapon payload of the "B" version, including four Maverick missiles. Five ordered in 1974, with three modular reconnaissance noses, two strike noses, and one electronic warfare nose. Prototypes are being converted from YAQM-34U RPVs, and were scheduled to complete 32 DT & E and IOT & E flights during 1976 and the first half of 1977. A DC-130H has been modified to control up to eight drones simultaneously.

Contractor: Teledyne Ryan Aeronautical, Division of Teledyne Inc.

Power Plant: Teledyne CAE J69-T-41A turbojet; 1,920 lb thrust.

Dimensions: span 14 ft 6 in, length 26 ft 0 in, body diameter 3 ft 1.2 in.

Weights: gross, BGM-34B 3,230 lb, BGM-34C 5,000 lb.

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AN AIR FORCE ALMANAC

THE UNITED STATES AIR FORCE IN FACTS AND FIGURES

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 Information in its role as liaison with Air Staff agencies in bringing up to date the comparable data from last year's "Almanac." Also, we welcome suggestions from readers about the kinds of information they would like to see in future editions of this Almanac Issue. A word of caution: Personnel figures that appear in this section in different forms will not always agree because of differing cutoff dates, rounding off, or categories of personnel (such as those serving outside the Air Force) that are excluded in some cases. These figures do illustrate trends, however, and may be helpful in placing force fluctuations in perspective.

—THE EDITORS

USAF—HOW IT GOT ITS NAME

FROM	TO	DESIGNATION
Aug. 1, 1907	July 18, 1914	Aeronautical Div., US Signal Corps
July 18, 1914	Apr. 6, 1917	Aviation Section, US Signal Corps
Apr. 6, 1917	May 21, 1918	Aeronautical Div., US Signal Corps*
May 21, 1918	June 4, 1920	Div. of Military Aeronautics, US Army
June 4, 1920	July 2, 1926	Army Air Service
July 2, 1926	June 20, 1941	Army Air Corps
June 20, 1941	Sept. 18, 1947	Army Air Forces
Sept. 18, 1947		United States Air Force

* During World War I, the air arm of the American Expeditionary Force (AEF) was designated "Air Service," but this designation did not apply to the entire Aeronautical Division of the Signal Corps.

UNITED STATES AIR FORCE PERSONNEL STRENGTH—1907 THROUGH 1978

YEAR	STRENGTH	YEAR	STRENGTH	YEAR	STRENGTH	YEAR	STRENGTH
1907	3	1925	9,670	1943	2,197,114	1961	820,490
1908	13	1926	9,674	1944	2,372,292	1962	883,330
1909	27	1927	10,078	1945	2,282,259	1963	868,644
1910	11	1928	10,549	1946	455,515	1964	855,802
1911	23	1929	12,131	1947	305,827	1965	823,633
1912	51	1930	13,531	1948	387,730	1966	886,350
1913	114	1931	14,780	1949	419,347	1967	897,426
1914	122	1932	15,028	1950	411,277	1968	904,759
1915	208	1933	15,099	1951	788,381	1969	862,062
1916	311	1934	15,861	1952	973,474	1970	791,078
1917	1,218	1935	16,247	1953	977,593	1971	755,107
1918	195,023	1936	17,233	1954	947,918	1972	725,635
1919	25,603	1937	19,147	1955	959,946	1973	690,999
1920	9,050	1938	21,089	1956	909,958	1974	643,795
1921	11,649	1939	23,455	1957	919,835	1975	612,551
1922	9,642	1940	51,165	1958	871,156	1976	585,207
1923	9,441	1941	152,125	1959	840,028	1977	571,000*
1924	10,547	1942	764,415	1960	814,213	1978	572,000*

* Projected

USAF AND AIR RESERVE FORCES PERSONNEL BY CATEGORIES

CATEGORY	FY '68	FY '74	FY '75	FY '76	FY '77	FY '78
AIR FORCE MILITARY						
Officers	140,000	110,000	105,000	100,000	96,000	95,000
Airmen	762,000	529,000	503,000	481,000	471,000	473,000
Cadets	4,000	4,000	4,000	4,000	4,000	4,000
TOTAL, AIR FORCE MILITARY	**906,000**	**643,000**	**612,000**	**585,000**	**571,000**	**572,000**
Career Reenlistments	56,600	46,500	50,200	48,700	44,400	51,800
Rate	88%	90%	90%	82%	89%	90%
First-Term Reenlistments	10,700	19,500	17,300	18,000	19,000	19,000
Rate	18%	31%	40%	37%	35%	36%
CIVILIAN PERSONNEL						
Direct Hire	316,000	274,000	264,000	248,000	242,000	241,000
Indirect Hire Foreign Nationals	26,000	16,000	14,000	14,000	15,000	15,000
TOTAL, CIVILIAN PERSONNEL	**342,000** [1]	**290,000**	**278,000**	**262,000**	**257,000**	**256,000**
TOTAL, AIR FORCE MILITARY AND CIVILIAN PERSONNEL	**1,248,000**	**933,000**	**890,000**	**847,000**	**828,000**	**828,000**
AIR RESERVE FORCES						
Air National Guard, Paid	75,000	94,000	95,000	91,000	92,000	93,000
Air Force Reserve, Paid	46,000	48,000	55,000	49,000	55,000	53,000
Air Force Reserve, Nonpaid	145,000	135,000	89,000	82,000	69,000	67,000
TOTAL, READY RESERVE	**266,000**	**277,000**	**239,000**	**222,000**	**216,000**	**213,000**
Standby	101,000	46,000	42,000	44,000	46,000	46,000
TOTAL, AIR RESERVE FORCES [2]	**367,000**	**323,000**	**281,000**	**266,000**	**262,000**	**259,000**

[1] Excludes Air National Guard Technicians who were State Employees until FY '69 when they were changed to Federal Employees by Public Law.
[2] Excludes Retired Air Force Reserve.
NOTE: Personnel data for FY '77–78 are programmed.

UNITED STATES AIR FORCE—PERSONNEL STRENGTH BY COMMANDS AND AGENCIES

COMMAND	OFFICERS	AIRMEN	TOTAL MILITARY	CIVILIANS	TOTAL PERSONNEL
Aerospace Defense Command (ADCOM)	3,560	21,035	24,595	4,679	29,274
Air Force Communications Service (AFCS)	2,896	41,787	44,683	6,761	51,444
Air Force Logistics Command (AFLC)	2,626	6,786	9,412	82,307	91,719
Air Force Systems Command (AFSC)	9,881	17,657	27,538	27,274	54,812
Air Training Command (ATC)	10,307	66,774	77,081	15,136	92,217
Air University (AU)	4,694	2,445	7,139	2,130	9,269
Alaskan Air Command (AAC)	788	7,442	8,230	1,515	9,745
Military Airlift Command (MAC)	12,720	62,032	74,752	15,665	90,417
Pacific Air Forces (PACAF)	3,057	20,802	23,859	6,902	30,761
Strategic Air Command (SAC)	19,724	91,315	111,039	16,186	127,225
Tactical Air Command (TAC)	11,293	72,898	84,191	10,587	94,778
United States Air Forces in Europe (USAFE)	6,049	41,122	47,171	2,947	50,118
USAF Security Service (USAFSS)	1,028	13,637	14,665	1,611	16,276
TOTALS	**88,623**	**465,732**	**554,355**	**193,700**	**748,055**

SEPARATE OPERATING AGENCIES	OFFICERS	AIRMEN	TOTAL MILITARY	CIVILIANS	TOTAL PERSONNEL
Air Force Accounting & Finance Center (AFAFC)	38	222	260	1,788	2,048
Air Force Audit Agency (AFAA)	421	88	509	523	1,032
Air Force Commissary Service (AFCMS)	22	668	690	7,725	8,415
Air Force Data Automation Agency (AFDAA)	390	871	1,261	905	2,166
Air Force Inspection & Safety Center (AFISC)	296	80	376	149	525
Air Force Intelligence Service (AFIS)	181	221	402	141	543
AF Management Engineering Agency (AFMEA)	74	132	206	49	255
Air Force Military Personnel Center (AFMPC)	483	895	1,378	653	2,031
AF Office of Special Investigations (AFOSI)	543	1,223	1,766	316	2,082
Air Force Test & Evaluation Center (AFTEC)	161	31	192	52	244
Hq. Air Force Reserve (AFRES)	144	259	403	10,203	10,606
Air Reserve Personnel Center (ARPC)	59	114	173	667	840
United States Air Force Academy (USAFA)	1,036	1,342	2,378	1,847	4,225
TOTALS	**3,848**	**6,146**	**9,994**	**25,018**	**35,012**

NOTE: Military and civilian strength figures are current as of December 31, 1976.
Military figures are assigned strength. Civilian figures are total direct chargeable employees.

USAF TOTAL ACTIVE-DUTY STRENGTH BY GRADE

(As of December 31, 1976)

AIRMEN

GRADE	NUMBER
CHIEF MASTER SERGEANT	4,783
SENIOR MASTER SERGEANT	9,594
MASTER SERGEANT	33,722
TECHNICAL SERGEANT	56,446
STAFF SERGEANT	94,777
SERGEANT/SENIOR AIRMAN	119,761
AIRMAN FIRST CLASS	93,762
AIRMAN	29,945
AIRMAN BASIC	33,842
TOTAL	**476,632**

OFFICERS

GRADE	NUMBER
GENERAL	13
LIEUTENANT GENERAL	42
MAJOR GENERAL	127
BRIGADIER GENERAL	192
COLONEL	5,333
LIEUTENANT COLONEL	12,890
MAJOR	19,245
CAPTAIN	40,212
FIRST LIEUTENANT	13,079
SECOND LIEUTENANT	7,747
WARRANT OFFICER	13
TOTAL	**98,893**
CADETS	4,339
AIRMEN	476,632
TOTAL STRENGTH	**579,864**

USAF MILITARY PERSONNEL BY GRADE, RACE, AND SEX

(As of December 31, 1976)

OFFICERS

GRADE	FORCE	BLACK (%)	OTHER (%)	WOMEN (%)
GENERAL	374	5 (1.3)	1 (0.3)	2 (0.5)
COLONEL	5,333	79 (1.5)	30 (0.5)	51 (1.0)
LIEUTENANT COLONEL	12,890	183 (1.4)	99 (0.8)	288 (2.2)
MAJOR	19,245	426 (2.2)	223 (1.2)	651 (3.4)
CAPTAIN	40,212	971 (2.4)	327 (0.8)	1,865 (4.6)
FIRST LIEUTENANT	13,079	706 (5.4)	131 (1.0)	1,428 (11.0)
SECOND LIEUTENANT	7,747	531 (6.9)	108 (1.4)	843 (11.0)
WARRANT OFFICER	13	0 (0.0)	0 (0.0)	0 (0.0)
TOTALS	**98,893**	**2,901 (2.9)**	**919 (0.9)**	**5,128 (5.2)**

AIRMEN

GRADE	FORCE	BLACK (%)	OTHER (%)	WOMEN (%)
CHIEF MASTER SERGEANT	4,783	336 (7.0)	29 (0.6)	12 (0.3)
SENIOR MASTER SERGEANT	9,594	864 (9.0)	58 (0.5)	30 (0.3)
MASTER SERGEANT	33,722	3,778 (11.2)	280 (0.8)	80 (0.2)
TECHNICAL SERGEANT	56,446	7,995 (14.2)	510 (0.9)	192 (0.3)
STAFF SERGEANT	94,777	14,044 (14.8)	1,103 (1.2)	1,589 (1.7)
SERGEANT/SENIOR AIRMAN	119,761	21,938 (18.3)	2,208 (1.8)	10,264 (8.6)
AIRMAN FIRST CLASS	93,762	13,562 (14.5)	1,707 (1.8)	11,152 (11.9)
AIRMAN	29,945	3,475 (11.6)	972 (3.2)	3,760 (12.6)
AIRMAN BASIC	33,842	3,984 (11.8)	1,131 (3.3)	4,811 (14.2)
TOTALS	**476,632**	**69,976 (14.7)**	**7,998 (1.7)**	**31,890 (6.7)**
TOTALS, INCLUDING OFFICERS	**575,525**	**72,877 (12.7)**	**8,917 (1.5)**	**37,018 (6.4)**

AVERAGE AGES OF MILITARY PERSONNEL

(As of December 31, 1976)

Officers	Average 34.0 years of age
Noncommissioned Officers (Top 6 Grades)	Average 30.0 years of age
Airmen	Average 27.0 years of age

AIR FORCE FULL-TIME CIVILIAN EMPLOYMENT BY GRADE

(As of December 31, 1976)

GS		WP		WS		WL		WG	
GR	POP	GR	POP	GR	POP	GR	POP	GR	POP
1	172	4	1	1	69	1	2	1	325
2	1,783	8	2	2	42	2	38	2	2,169
3	11,546	9	6	3	142	3	16	3	1,215
4	18,134	10	5	4	233	4	126	4	2,786
5	19,934	11	7	5	444	5	86	5	4,911
6	7,205	12	14	6	569	6	79	6	5,629
7	10,417	13	2	7	1,024	7	52	7	6,437
8	2,833	14	8	8	882	8	246	8	8,229
9	16,807	15	3	9	1,619	9	457	9	8,687
10	1,008	16	6	10	1,607	10	1,097	10	23,546
11	14,808	17	5	11	833	11	107	11	5,949
12	12,481	18	2	12	430	12	4	12	2,518
13	8,060	20	1	13	333	13	4	13	472
14	2,902	21	2	14	260			14	129
15	953	23	1	15	122			15	3
16	97	24	1	16	52				
17	20			17	12				
18	8			18	5				
				19	2				
TOTALS	**129,168**		**66**		**8,680**		**2,314**		**73,005**

GR = Grade
GS = General Schedule
POP = Population
WP = Printing and Lithographic Pay Schedules
WS = Supervisory (Foreman) Pay Schedules
WL = Leader Pay Schedules
WG = Nonsupervisory Pay Schedules

FEDERAL CIVILIAN PAY SCALE

General Schedule
(Effective February 20, 1977)

GRADE	1	2	3	4	5	6	7	8	9	10
GS- 1	$5,810	$6,004	$6,198	$6,392	$6,586	$6,780	$6,974	$7,168	$7,362	$7,556
GS- 2	6,572	6,791	7,010	7,229	7,448	7,667	7,886	8,105	8,324	8,543
GS- 3	7,408	7,655	7,902	8,149	8,396	8,643	8,890	9,137	9,384	9,631
GS- 4	8,316	8,593	8,870	9,147	9,424	9,701	9,978	10,255	10,532	10,809
GS- 5	9,303	9,613	9,923	10,233	10,543	10,853	11,163	11,473	11,783	12,093
GS- 6	10,370	10,716	11,062	11,408	11,754	12,100	12,446	12,792	13,138	13,484
GS- 7	11,523	11,907	12,291	12,675	13,059	13,443	13,827	14,211	14,595	14,979
GS- 8	12,763	13,188	13,613	14,038	14,463	14,888	15,313	15,738	16,163	16,588
GS- 9	14,097	14,567	15,037	15,507	15,977	16,447	16,917	17,387	17,857	18,327
GS-10	15,524	16,041	16,558	17,075	17,592	18,109	18,626	19,143	19,660	20,177
GS-11	17,056	17,625	18,194	18,763	19,332	19,901	20,470	21,039	21,608	22,177
GS-12	20,442	21,123	21,804	22,485	23,166	23,847	24,528	25,209	25,890	26,571
GS-13	24,308	25,118	25,928	26,738	27,548	28,358	29,168	29,978	30,788	31,593
GS-14	28,725	29,683	30,641	31,599	32,557	33,515	34,473	35,431	36,389	37,347
GS-15	33,789	34,915	36,041	37,167	38,293	39,419	40,545	41,671	42,797	43,923
GS-16	39,629	40,950	42,271	43,592	44,913	46,234	47,555*	48,876*	50,197*	
GS-17	46,423	47,970*	49,517*	51,064*	52,611*					
GS-18	54,410*									

* The rate of basic pay for employees at these rates is limited by Section 5308 of Title 5 of the United States Code to the rate for Level V of the Executive Schedule (currently, $47,500).

MONTHLY MILITARY BASIC PAY RATES

(Effective October 1, 1976)

YEARS OF SERVICE

PAY GRADE	UNDER 2	2	3	4	6	8	10	12	14	16	18	20	22	26
COMMISSIONED OFFICERS														
O-10	$2,943	$3,047	$3,047	$3,047	$3,047	$3,164	$3,164	$3,406	$3,406	$3,650	$3,650	$3,894	$3,894	$4,137*
O-9	2,609	2,677	2,734	2,734	2,734	2,804	2,804	2,920	2,920	3,164	3,164	3,406	3,406	3,650
O-8	2,363	2,433	2,491	2,491	2,491	2,677	2,677	2,804	2,804	2,920	3,047	3,164	3,291	3,291
O-7	1,963	2,097	2,097	2,097	2,190	2,190	2,318	2,318	2,433	2,677	2,861	2,861	2,861	2,861
O-6	1,455	1,599	1,703	1,703	1,703	1,703	1,703	1,703	1,761	2,040	2,144	2,190	2,318	2,514
O-5	1,164	1,367	1,461	1,461	1,461	1,461	1,506	1,586	1,692	1,819	1,923	1,981	2,051	2,051
O-4	981	1,194	1,274	1,274	1,297	1,355	1,447	1,529	1,599	1,668	1,715	1,715	1,715	1,715
O-3	912	1,019	1,089	1,205	1,263	1,308	1,379	1,447	1,483	1,483	1,483	1,483	1,483	1,483
O-2	795	868	1,043	1,078	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100
O-1	690	718	868	868	868	868	868	868	868	868	868	868	868	868
COMMISSIONED OFFICERS WITH MORE THAN 4 YEARS ACTIVE SERVICE AS ENLISTED MEMBERS														
O-3	—	—	—	1,205	1,263	1,308	1,379	1,447	1,506	1,506	1,506	1,506	1,506	1,506
O-2	—	—	—	1,078	1,100	1,135	1,194	1,240	1,274	1,274	1,274	1,274	1,274	1,274
O-1	—	—	—	868	927	961	996	1,031	1,078	1,078	1,078	1,078	1,078	1,078
WARRANT OFFICERS														
W-4	928	996	996	1,019	1,065	1,112	1,159	1,240	1,297	1,343	1,379	1,424	1,472	1,586
W-3	844	916	916	927	938	1,007	1,065	1,100	1,135	1,169	1,205	1,252	1,297	1,343
W-2	739	799	799	823	868	916	950	985	1,019	1,055	1,089	1,124	1,169	1,169
W-1	616	706	706	765	799	834	868	904	938	973	1,007	1,043	1,043	1,043
ENLISTED MEMBERS														
E-9	—	—	—	—	—	—	1,055	1,079	1,104	1,129	1,154	1,176	1,239	1,359
E-8	—	—	—	—	—	885	910	934	959	984	1,006	1,031	1,092	1,214
E-7	618	667	692	716	741	764	788	813	849	873	898	910	971	1,092
E-6	534	582	606	631	655	679	704	741	764	788	800	800	800	800
E-5	468	510	534	558	594	618	643	667	679	679	679	679	679	679
E-4	450	475	503	543	564	564	564	564	564	564	564	564	564	564
E-3	433	457	475	494	494	494	494	494	494	494	494	494	494	494
E-2	417	417	417	417	417	417	417	417	417	417	417	417	417	417
E-1	374	374	374	374	374	374	374	374	374	374	374	374	374	374

NOTE: Amounts less than $1 have been omitted.

Basic pay while serving as Chairman of the Joint Chiefs of Staff or as Chief of Staff of the Air Force is $4,565.10, regardless of cumulative years of service.

Basic pay for the highest enlisted rank, while serving as Chief Master Sergeant of the Air Force, is $1,652.10, regardless of cumulative years of service.

* Basic pay is limited to $3,958.20 by Level V of the Executive Schedule.

BASIC ALLOWANCE FOR QUARTERS (BAQ)

Pay Grade	Without Dependents	With Dependents
C/S and O-10	$297.00	$371.40
O-9	297.00	371.40
O-8	297.00	371.40
O-7	297.00	371.40
O-6	268.80	327.90
O-5	249.30	300.30
O-4	222.90	269.10
O-3	196.80	242.70
O-2	171.30	216.90
O-1	133.80	174.30
W-4	215.10	259.50
W-3	192.60	237.30
W-2	168.30	213.60
W-1	152.10	197.10
M/S and E-9	162.60	228.60
E-8	150.30	212.40
E-7	128.40	198.30
E-6	117.00	183.00
E-5	112.50	168.30
E-4	99.30	147.90
E-3	88.50	128.40
E-2	78.30	128.40
E-1	73.80	128.40

AVIATION CAREER INCENTIVE PAY SCHEDULE

PHASE I

Monthly Rate	Years of Aviation Service As an Officer *(including flight training)*
$100	2 or less
$125	over 2
$150	over 3
$165	over 4
$245	over 6

PHASE II

Monthly Rate	Years of Service as an Officer
$225	over 18
$205	over 20
$185	over 22
$165	over 24 but not over 25
0	over 25

NOTE: An officer in pay grade O-7 may not be paid at a rate greater than $160 a month. And an officer in pay grade O-8 or above may not be paid at a rate greater than $165 a month.

BASIC ALLOWANCE FOR SUBSISTENCE (BAS)

Officers (Monthly)	Enlisted (Daily)		
	Separate Rations	Rations in Kind Not Available	Emergency Rations
$55.61	$2.65	$2.99	$3.97

COMPARISON OF DoD BUDGETS FOR FY 1976–78

By Military Programs and Components

(Billions of dollars)

Military Program	Total Obligational Authority FY '76	FY '77	FY '78
Strategic Forces	$ 7.3	$ 9.8	$ 10.6
General-Purpose Forces	33.0	38.2	42.0
Intelligence and Communications	6.7	7.5	8.2
Airlift and Sealift	1.4	1.5	1.7
Guard and Reserve Forces	5.4	6.0	7.1
Research and Development	8.7	10.1	10.8
Central Supply and Maintenance	9.8	11.1	12.0
Training, Medical, other	21.6	22.7	24.4
Administration and Associated Activities	2.1	2.1	2.2
Support of Other Nations	1.6	1.3	1.3
Totals	**$97.5**	**$110.2**	**$120.4**
Components			
Department of the Army	$24.0	$ 26.9	$ 29.6
Department of the Navy	31.5	36.4	40.1
Department of the Air Force	28.4	32.3	34.7
Defense Agencies/OSD	3.5	3.8	4.2
Defense-wide	8.7	9.6	10.6
Civil Defense	.1	.1	.1
Military Assistance Program	1.4	1.1	1.0
Totals	**$97.5**	**$110.2**	**$120.4**

NOTE: In the FY '78 column, amounts for pay raises and other proposed legislation are distributed. Columns may not add to totals shown, due to rounding.

EDUCATIONAL LEVELS—AIR FORCE LINE OFFICERS

Level	End June 1976	
	No.	%
Below high school	1	nil
High school, less than baccalaureate	2,929	3.4
Baccalaureate, no master's degree	55,558	64.9
Master's degree, no doctorate	25,717	30.0
Professional degree	339	0.4
Doctorate	1,107	1.3
TOTALS	**85,651**	**100.0**

Note: Small numbers coded "N/A" or "Unknown" not included.

EDUCATIONAL LEVELS—AIR FORCE ENLISTED FORCE

Level	End June 1976	
	No.	%
Below High School (No GED)	7,425	1.6
GED passed (old system) no diploma or civilian equivalency certificate	17,612	3.7
High school diploma or equivalency certificate based on GED (new system)	9,054	
High school completion (diploma or certificate)	372,455	
Total recognized high school diploma or certificate	381,509	79.4
Some postsecondary education, below bachelor	64,098	13.3
Baccalaureate or higher	9,689	2.0
TOTALS	**480,333**	**100.0**

INSTALLATIONS OF THE UNITED STATES AIR FORCE

Major Installations	FY '64	FY '68	FY '75	FY '76	FY '77
US and Possessions	160	138	113	111	110
Foreign	56	60	35	29	27
TOTALS	**216**	**198**	**148**	**140**	**137**
Other Installations					
US and Possessions	3,650	2,723	2,323	2,372	2,371
Foreign	1,168	1,060	720	658	653
TOTALS	**4,818**	**3,783**	**3,043**	**3,030**	**3,024**
"Other Installations" includes: [1]					
Auxiliary	2,849	1,892	—	—	—
Ballistic Missile	1,083	1,158	1,157	1,157	1,157
Industrial	55	43	—	—	—
Radar	331	183	—	—	—
Air National Guard	103	106	125	127	127
Tenant, Non-Air Force	348	357	—	—	—
War Only	49	44	—	—	—
Electronics Station or Site	—	—	599	579	579
General Support Annex	—	—	1,140	1,146	1,140
Auxiliary Air Field	—	—	22	21	21

[1] "Other Installations" was redefined in 1972.

AIR FORCE BUDGET AND FINANCE—FISCAL YEARS 1964–78

(Figures in millions of dollars)

	FY '64	FY '68	FY '74	FY '76	FY '77	FY '78
Gross National Product	$616,200	$829,900	$1,360,900	$1,609,500	$1,827,600	$2,105,000
Federal Budget, Outlays	118,600	178,800	269,600	366,500	411,200	459,373
DoD Budget, Outlays	50,786	78,027	78,445	88,537	98,300	109,742
DoD Percent of: GNP	8.2%	9.4%	5.8%	5.5%	5.4%	5.2%
Federal Budget	42.8%	43.6%	29.1%	24.2%	23.9%	23.9%
Air Force Budget Outlays						
Current Dollars	20,456	25,734	23,928	26,446	28,285	30,600
Constant FY '78 Prices	48,100	52,047	32,910	30,323	30,161	30,600
AF Percent of: GNP	3.3%	3.1%	1.8%	1.6%	1.5%	1.4%
Federal Budget	17.2%	14.4%	8.9%	7.2%	6.9%	6.7%
DoD Budget	40.3%	33.0%	30.5%	29.9%	28.8%	27.9%
Total Obligational Authority						
DoD—Current Dollars	50,647	75,627	85,075	97,511	110,190	120,373
Constant FY '78 Prices	124,658	154,735	113,039	110,848	116,862	120,373
AF—Current Dollars	19,958	24,974	24,748	28,268	32,257	34,079
Constant FY '78 Prices	48,048	51,283	33,151	32,334	34,308	34,079
(With Anticipated Pay Supplementals)						(34,729)
Aircraft Procurement (3010)	3,620	5,306	2,827	3,974	6,148	7,542
Missile Procurement (3020)	2,220	1,408	1,416	1,710	1,864	1,875
Other Procurement (3080)	876	2,358	1,641	2,040	2,297	2,472
Procurement Subtotal	6,716	9,072	5,884	7,724	10,309	11,889
Military Construction—AF (3300)	497	481	314	523	834	439
Military Construction—AFRES (3730)	3	4	11	18	11	11
Military Construction—ANG (3830)	17	10	19	59	37	43
Military Construction Subtotal	517	495	344	600	882	493
RDT&E (3600)	3,627	3,412	3,062	3,606	3,806	4,223
TOTAL, INVESTMENT	**10,860**	**12,929**	**9,290**	**11,930**	**14,997**	**16,605**
Military Personnel—AF (3500)	4,423	5,678	7,479	7,373	7,364	7,240
Reserve Personnel—AF (3700)	57	63	126	150	169	171
National Guard—AF (3850)	60	84	182	210	228	232
Military Personnel Subtotal	4,540	5,825	7,787	7,733	7,760	7,643
Operation & Maintenance—AF (3400)	4,339	5,904	6,882	7,553	8,289	8,586
Operation & Maintenance—AFRES (3740)	—	—	239	327	359	378
Operation & Maintenance—ANG (3840)	220	266	551	710	793	832
Stock Fund (4921)	—	—	—	15	59	35
Operation & Maintenance Subtotal	4,559	6,170	7,672	8,605	9,500	9,831
TOTAL, OPERATING	**9,099**	**11,995**	**15,459**	**16,338**	**17,260**	**17,474**
Programs, TOA (Current $)						
I Strategic Forces	6,527	5,186	4,327	4,638	5,749	5,799
II General-Purpose Forces	3,030	7,273	5,606	7,001	8,129	9,471
III Intelligence and Communications	2,979	3,622	3,336	3,500	3,867	4,219
IV Airlift and Sealift Forces	1,010	1,736	756	1,347	1,493	1,586
V Reserve and Guard Forces	502	621	1,220	1,600	1,733	2,056
VI Research and Development	2,063	1,556	2,401	3,216	3,848	3,767
VII Central Supply and Maintenance	1,767	2,375	2,761	3,059	3,608	3,461
VIII Training, Medical, and Other General Activities	1,726	2,079	3,438	3,305	3,281	3,179
IX Administration and Associated Activities	342	352	553	563	525	517
X Support of Other Nations	11	173	351	39	24	24

NOTE: Columns may not add due to rounding.
FY '78 column reflects amended budget.

USAF AIRCRAFT PROCUREMENT—FY '64–78

CATEGORY	FY '64	FY '68	FY '73	FY '74	FY '75	FY '76	FY '77	FY '78
Fixed-Wing Aircraft								
Total Budgeted	778	1,152	161	165	195	181	219	335
Accepted/Scheduled Acceptances	726	935	255	117	94	269	182	378
Helicopters								
Total Budgeted	43	38	6	0	0	0	4	0
Accepted/Scheduled Acceptances	37	36	29	1	5	0	0	0

NOTE: Columns may not add due to rounding.
columns are actual. FY '77–78 data are programmed.

THE NUMBER OF SQUADRONS IN USAF

MAJOR FORCE SQUADRONS	FY '68	FY '74	FY '76	FY '77	FY '78
Bomber	40	28	26	24	24
ECM/Reconnaissance	3	1	1	1	1
IRBM/ICBM	26	26	26	26	26
Tanker	41	38	35	32	30
Interceptor	34	7	6	6	6
Bomarc	6	—	—	—	—
Command, Control and Surveillance	13	8	6	6	6
Tactical Bomber	1	—	—	—	—
Mace/Matador	2	—	—	—	—
Fighter	92	74	74	77	78
Reconnaissance	21	13	9	9	9
Tactical Air Control System	9	11	9	11	11
Special Operations Force	22	5	5	5	5
Tactical Airborne Command Control System	—	—	2	4	4
Tactical Airlift	31	17	15	15	15
Strategic Airlift	32	17	17	17	17
Aeromed Evacuation	6	3	3	3	3
Special Mission	2	2	2	2	2
Mapping	2	1	—	—	—
Weather	6	3	2	2	2
Air Rescue and Recovery	14	12	5	5	5
Intelligence	15	9	7	6	6
Other	9	2	2	2	2
TOTAL, USAF	**427**	**277**	**252**	**253**	**252**
Air National Guard	78	91	91	91	91
Air Force Reserve (incl. Associate Squadrons)	37	53	53	53	53
TOTAL, MAJOR FORCE SQUADRONS	**542**	**421**	**396**	**397**	**396**

NOTE: Data in FY '68–76 columns are actual; FY '77 and FY '78 data are programmed.

Number of Aircraft Per Active-Duty USAF Squadron

Aircraft Type	Number
A-7	24
B-52	14
C-5	17
C-9	11
C-130	15
AC-130	10
KC-135	15
C-141	18
F-4	24
RF-4	18
F-5	18
F-15	24
F-106	18
F-111	24
FB-111	15

Projected UE Assignments for New Weapon Systems

A-10	24
B-1	15
E-3A	10
F-16	24

NOTE: In addition, four USAF aircraft types are counted as total Unit Equipment, not by squadrons. These include the HC-130 (24 total), the WC-130 (13 total), and the T-39 (104 total), all of the Military Airlift Command; and the T-38 trainer (948 total, plus those assigned to the Thunderbirds demonstration team).

THE NUMBER OF ACTIVE AIRCRAFT AND FLYING HOURS

TYPE OF AIRCRAFT	FY '64	FY '68	FY '74	FY '76	FY '77	FY '78
Bomber, Strategic	1,364	714	500	494	491	489
Bomber, Other	145	65	—	—	—	—
Tanker	998	667	657	622	556	525
Fighter/Interceptor/Attack	3,538	3,985	2,387	2,496	2,588	2,667
Reconnaissance/Electronic Warfare	595	1,009	610	412	423	422
Cargo/Transport	2,327	2,358	1,253	889	863	853
Search and Rescue (Fixed Wing)	100	91	56	41	37	38
Helicopter (includes Rescue)	401	465	317	254	253	255
Special Research	3	5	—	—	—	—
Trainer	2,873	2,584	1,996	1,800	1,772	1,786
Utility/Observation	345	663	154	198	216	213
TOTAL, USAF	**12,689**	**12,606**	**7,930**	**7,206**	**7,199**	**7,248**
Air National Guard total	1,806	1,438	1,798	1,617	1,567	1,532
Air Force Reserve total	719	426	428	464	480	473
Free World Military Forces total	—	692	1,976	—	—	—
Aircraft earmarked (MAP, USN, and Other Non-USAF)	166	165	—	—	—	—
TOTAL ACTIVE AIRCRAFT: USAF, AFRES, ANG	**15,380**	**15,327**	**12,132**	**9,287**	**9,246**	**9,253**
FLYING HOURS (000)						
USAF	6,028	7,068	3,272	2,606	2,713	2,676
ANG	432	465	405	406	405	406
AFRES	202	164	128	137	140	144
TOTAL FLYING HOURS	**6,662**	**7,697**	**3,805**	**3,149**	**3,258**	**3,226**

UNITED STATES AIR FORCE MEDAL OF HONOR WINNERS—1918–1977

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	Deceased, 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.	Superior, 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 as 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	Los Angeles, Calif. (Ret. Lt. Gen.)
Erwin, SSgt. Henry E.	Adamsville, Ala.	Apr. 12, 1945, Koriyama, Japan	Birmingham, 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	Santa Barbara, Calif. (Ret. Maj. Gen.)
Howard, Lt. Col. James H.	Canton, China	Jan. 11, 1944, Oschersleben, Germany	Washington, D.C. (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	Barber, Ark. (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. Col.)
Morgan, 2d Lt. John C.	Vernon, Tex.	July 28, 1943, Kiel, Germany	Greenwich, Conn. (Ret. Col.)
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.	Pittsburgh, Pa. (Ret. Lt. Col.)
Smith, SSgt. Maynard H.	Caro, Mich.	May 1, 1943, St. Nazaire, France	Long Island City, N.Y.
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	Poland, N.Y.
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.	Hyannis, Mass. (Ret. Lt. Col.)
KOREA			
Davis, Maj. George A., Jr.	Dublin, Tex.	Feb. 10, 1952, Sinuiju-Yalu River, No. Korea	KIA, Feb. 10, 1952
Loring, Maj. Charles J., Jr.	Portland, Me.	Nov. 22, 1952, Sniper Ridge, No. Korea	KIA, Nov. 22, 1952
Sebille, Maj. Louis J.	Harbor Beach, Mich.	Aug. 5, 1950, Hamch'ang, So. Korea	KIA, Aug. 5, 1950
Walmsley, Capt. John S., Jr.	Baltimore, Md.	Sept. 14, 1951, Yangdok, No. Korea	KIA, Sept. 14, 1951
VIETNAM			
Bennett, Capt. Steven L.	Palestine, Tex.	June 29, 1972, Quang Tri, So. Vietnam	KIA, June 29, 1972
Day, Col. George E.	Sioux City, Iowa	Conspicuous gallantry while POW	Active duty, Col., Eglin AFB, Fla.
Dethlefsen, Maj. Merlyn H.	Greenville, Iowa	Mar. 10, 1967, Thai Nguyen, No. Vietnam	Active duty, Col., Dyess AFB, Tex.
Fisher, Maj. Bernard F.	San Bernadino, Calif.	Mar. 10, 1966, A Shau Valley, So. Vietnam	Kuna, Idaho (Ret. Col.)
Fleming, 1st Lt. James P.	Sedalia, Mo.	Nov. 26, 1968, Duc Co, So. Vietnam	Active duty, Maj., RAF Woodbridge, UK
Jackson, Lt. Col. Joe M.	Newnan, Ga.	May 12, 1968, Kham Duc, So. Vietnam	Chicopee, Mass. (Ret. Col.)
Jones, Lt. Col. William A. III	Norfolk, Va.	Sept. 1, 1968, Dong Hoi, No. Vietnam	Killed. Nov. 15, 1969, Woodbridge, Va.
Levitow, A1C John L.	Hartford, Conn.	Feb. 24, 1969, Long Binh, So. Vietnam	Glastonbury, Conn.
Sijan, Capt. Lance P.	Milwaukee, Wis.	Conspicuous gallantry while POW	Died while POW, Jan. 1968
Thorsness, Lt. Col. Leo K.	Walnut Grove, Minn.	Apr. 19, 1967, No. Vietnam	Sioux Falls, S. D. (Ret. Lt. Col.)
Wilbanks, Capt. Hilliard A.	Cornelia, Ga.	Feb. 24, 1967, Dalat, So. Vietnam	KIA, Feb. 24, 1967
Young, Capt. Gerald O.	Anacortes, Wash.	Nov. 9, 1967, Da Nang area, So. Vietnam	Active duty, Lt. Col., Bogota, Colombia

Air Force 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	July 18, 1973	Nov. 23, 1975
Thomas C. Reed	Jan. 2, 1976	Apr. 6, 1977
John C. Stetson	Apr. 6, 1977	

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	

AEROSPACE DEFENSE COMMAND

Lt. Gen. George E. Stratemeyer	Mar. 21, 1946	Nov. 30, 1948
Maj. Gen. Gordon P. Saville	Dec. 1, 1948	Dec. 31, 1950
Lt. Gen. Ennis C. Whitehead	Jan. 1, 1951	Aug. 25, 1951
Gen. Benjamin W. Chidlaw	Aug. 25, 1951	May 31, 1955
Maj. Gen. Frederic H. Smith (acting)	May 31, 1955	July 19, 1955
Gen. Earle E. Partridge	July 20, 1955	Sept. 17, 1956
Lt. Gen. Joseph H. Atkinson	Sept. 17, 1956	Aug. 15, 1961
Lt. Gen. Robert M. Lee	Aug. 15, 1961	July 31, 1963
Lt. Gen. Herbert B. Thatcher	Aug. 1, 1963	July 31, 1967
Lt. Gen. Arthur C. Agan	Aug. 1, 1967	Feb. 28, 1970
Lt. Gen. Thomas K. McGehee	Mar. 1, 1970	July 1, 1973
Gen. Seth J. McKee	July 1, 1973	Oct. 1, 1973
Gen. Lucius D. Clay, Jr.	Oct. 1, 1973	Aug. 31, 1975
Gen. Daniel James, Jr.	Sept. 1, 1975	

Formerly Air Defense Command.
Redesignated Aerospace Defense Command Jan. 1, 1968.

AIR FORCE COMMUNICATIONS SERVICE

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	

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	

Formerly Air Materiel Command.
Redesignated as Air Force Logistics Command Apr. 1, 1961.

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	

Formerly Air Research and Development Command (ARDC).
Redesignated as Air Force Systems Command Apr. 1, 1961.

AIR TRAINING COMMAND

Lt. Gen. John K. Cannon	Apr. 15, 1946	Oct. 15, 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. 31, 1975
Gen. John W. Roberts	Sept. 1, 1975	

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	

ALASKAN AIR COMMAND

Brig. Gen. Edmund C. Lynch	Dec. 21, 1945	Oct. 1, 1946
Brig. Gen. Joseph H. Atkinson	Oct. 1, 1946	Feb. 26, 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. 14, 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. 24, 1956
Maj. Gen. James H. Davies	Oct. 24, 1956	June 27, 1957
Maj. Gen. Frank A. Armstrong, Jr.	June 27, 1957	Aug. 19, 1957
Brig. Gen. Kenneth H. Gibson	Aug. 19, 1957	Aug. 14, 1958
Maj. Gen. C. F. Necrason	Aug. 14, 1958	July 26, 1961
Maj. Gen. Wendell W. Bowman	July 26, 1961	Aug. 15, 1963
Maj. Gen. James C. Jensen	Aug. 15, 1963	Nov. 14, 1966
Maj. Gen. Thomas E. Moore	Nov. 14, 1966	July 31, 1969
Maj. Gen. Joseph A. Cunningham	July 31, 1969	Aug. 1, 1972
Maj. Gen. Donavon F. Smith	Aug. 1, 1972	June 6, 1973
Maj. Gen. Charles W. Carson, Jr.	June 18, 1973	Mar. 3, 1974
Maj. Gen. Jack K. Gamble	Mar. 18, 1974	June 30, 1975
Lt. Gen. James E. Hill	July 1, 1975	Oct. 31, 1976
Lt. Gen. Marion L. Boswell	Nov. 1, 1976	

MILITARY AIRLIFT COMMAND

Lt. Gen. Laurence S. Kuter	June 1, 1948	Oct. 28, 1951
Lt. Gen. Joseph Smith	Nov. 15, 1951	June 30, 1958
Lt. Gen. William H. Tunner	July 1, 1958	May 31, 1960
Gen. Joe W. Kelly, Jr.	June 1, 1960	July 18, 1964
Gen. Howell M. Estes, Jr.	July 19, 1964	July 31, 1969
Gen. Jack J. Catton	Aug. 1, 1969	Sept. 12, 1972
Gen. Paul K. Carlton	Sept. 20, 1972	Mar. 31, 1977
Gen. William G. Moore, Jr.	Apr. 1, 1977	

Formerly Military Air Transport Service (MATS).
Redesignated as Military Airlift Command Jan. 1, 1966.

PACIFIC AIR FORCES

Gen. George C. Kenney	June 15, 1944	Dec. 29, 1945
Lt. Gen. Ennis C. Whitehead	Dec. 30, 1945	Apr. 25, 1949
Lt. Gen. George E. Stratemeyer	Apr. 26, 1949	May 20, 1951
Lt. Gen. Earle E. Partridge (acting)	May 21, 1951	June 9, 1951
Gen. O. P. Weyland	June 10, 1951	Mar. 25, 1954
Gen. Earle E. Partridge	Mar. 26, 1954	May 31, 1955
Gen. Laurence S. Kuter	June 1, 1955	July 31, 1959
Gen. Emmett O'Donnell, Jr.	Aug. 1, 1959	July 31, 1963
Gen. Jacob E. Smart	Aug. 1, 1963	July 31, 1964
Gen. Hunter Harris, Jr.	Aug. 1, 1964	Jan. 31, 1967
Gen. John D. Ryan	Feb. 1, 1967	July 31, 1968
Gen. Joseph J. Nazzaro	Aug. 1, 1968	July 31, 1971
Gen. Lucius D. Clay, Jr.	Aug. 1, 1971	Sept. 30, 1973
Gen. John W. Vogt	Oct. 1, 1973	June 30, 1974
Gen. Louis L. Wilson, Jr.	July 1, 1974	

Formerly Far East Air Forces (FEAF).
Redesignated as Pacific Air Forces July 1, 1957.

STRATEGIC AIR COMMAND

Gen. George C. Kenney	Mar. 21, 1946	Oct. 15, 1948
Gen. Curtis E. LeMay	Oct. 16, 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 31, 1968
Gen. Bruce K. Holloway	Aug. 1, 1968	Apr. 30, 1972
Gen. John C. Meyer	May 1, 1972	July 31, 1974
Gen. Russell E. Dougherty	Aug. 1, 1974	

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 W. Momyer	Aug. 1, 1968	Sept. 30, 1973
Gen. Robert J. Dixon	Oct. 1, 1973	

US AIR FORCES IN EUROPE

Lt. Gen. John K. Cannon	Aug. 16, 1945	Mar. 2, 1946
Maj. Gen. Idwal H. Edwards	Mar. 2, 1946	Aug. 14, 1947
Brig. Gen. John F. McBlain	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	

USAF SECURITY SERVICE

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
Brig. Gen. Kenneth D. Burns	Aug. 1, 1975	

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 1, 1962	June 30, 1965
Lt. Gen. Thomas S. Moorman	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	

AIR FORCE MAGAZINE'S GUIDE TO ACES

In compiling this list of aces who flew with USAF and its predecessor organizations (the Air Service and the Army Air Forces), AIR FORCE Magazine has used official USAF sources except for World War I. During that war, many Americans scored victories serving with foreign countries. As a result, these men do not appear on official lists as "American" aces. We have included in our list of World War I aces both those who flew with the American Air Service and with the British or French. The lists for World War II, Korea, and Vietnam include only AAF/USAF airmen.

The Albert F. Simpson Historical Research Center, Maxwell AFB, Ala., has completed a detailed accounting of the Air Service victory credits in World War I and USAF victory credits in Korea and Southeast Asia. The Center is still preparing the list of Army Air Forces victory credits for World War II. This has taken much time as a result of the great number of victories and the many different procedures used to record them. The final documented list of all World War II combat scores will not be available for several years. All World War II awards are still tentative, and all are open to further change or challenge.

Although some World War I totals (notably Frank Luke's) include balloons, all entries for subsequent conflicts are for air-to-air victories.

—The Editors

LEADING AMERICAN ACES OF WORLD WAR I

(Ten or more victories)

Rickenbacker, Capt. Edward V. (AEF)	26	Luke, 2d Lt. Frank, Jr. (AEF)	18	Bennett, 1st Lt. Louis B. (RFC)	12
Lambert, Capt. William C. (RFC)	22	Lufbery, Maj. Raoul G. (FFC/LE)	17	Kindley, Capt. Field E. (AEF)	12
Gillette, Capt. Frederick W. (RFC)	20	Kullberg, Lt. Harold A. (RFC)	16	Putnam, 1st Lt. David E. (LE/AEF)	12
Malone, Capt. John J. (RN)	20	Rose, Capt. Oren J. (RFC)	16	Springs, Capt. Elliott W. (AEF)	12
Wilkinson, Maj. Alan M. (RFC)	19	Warman, Lt. C. T. (RFC)	15	Iaccaci, Lt. Thayer A. (RFC)	11
Hale, Capt. Frank L. (RFC)	18	Libby, Capt. Frederick (RFC)	14	Landis, Capt. Reed G. (AEF)	11
Iaccaci, Capt. Paul T. (RFC)	18	Vaughn, 1st Lt. George A. (AEF)	13	Swaab, Capt. Jacques M. (AEF)	10
		Baylies, Lt. Frank L. (FFC/LE)	12		

AEF—American Expeditionary Force
FFC—French Flying Corps
LE—Lafayette Escadrille
RFC—Royal Flying Corps (British)
RN—Royal Navy (British)

LEADING ARMY AIR FORCE ACES OF WORLD WAR II

(Fourteen and a half or more victories)

Bong, Maj. Richard I.	40	Duncan, Col. Glenn E.	19.50	Dunham, Col. William D.	16
McGuire, Maj. Thomas B.	38	Carson, Maj. Leonard K.	18.50	Harris, Lt. Col. Bill	16
Gabreski, Col. Francis S.	28*	Eagleston, Lt. Col. Glenn T.	18.50*	Welch, Maj. George S.	16
Johnson, Lt. Col. Robert S.	27	Hill, Maj. David L. (AVG/USAF)	18.25†	Beerbower, Capt. Donald M.	15.50
MacDonald, Col. Charles H.	27	Older, Lt. Col. Charles H. (AVG/USAF)	18.25†	Brown, Capt. Samuel J.	15.50
Preddy, Maj. George E.	26.83	Beckham, Col. Walter C.	18	Peterson, Maj. Richard A.	15.50
Meyer, Col. John C.	24*	Green, Col. Herschel H.	18	Whisner, Maj. William T., Jr.	15.50*
Schilling, Col. David C.	22.50	Zemke, Col. Hubert	17.75	Blakeslee, Col. Donald J. M. (ES/USAF)	15†
Johnson, Lt. Col. Gerald R.	22	England, Lt. Col. John B.	17.50	Bradley, Col. Jack T.	15
Kearby, Col. Neel E.	22	Beeson, Maj. Duane W.	17.33	Cragg, Maj. Edward	15
Robbins, Col. Jay T.	22	Thornell, Maj. John F., Jr.	17.25	Foy, Maj. Robert W.	15
Christensen, Capt. Fred J.	21.50	Reed, Maj. Wm. N. (AVG/USAF)	17†	Herbst, Col. John C.	15
Wetmore, Capt. Ray S.	21.25	Varnell, Capt. James S., Jr.	17	Hofer, 1st Lt. Ralph K.	15
Mahurin, Lt. Col. Walker M.	20.75*	Johnson, Col. Gerald W.	16.50	Homer, Maj. Cyril F.	15
Voll, Maj. John J.	20.50	Godfrey, Capt. John T.	16.33	Landers, Lt. Col. John D.	14.50
Lynch, Lt. Col. Thomas J.	20	Anderson, Lt. Col. Clarence E., Jr.	16.25	Powers, Capt. Joe H., Jr.	14.50
Westbrook, Lt. Col. Robert B.	20				
Gentile, Capt. Donald S.	19.83				

* Aces who added to these scores by victories in the Korean War.
AVG—American Volunteer Group
ES—Eagle Squadron
†—The Simpson Center has no way of verifying kills made while flying with AVG or ES.

USAF ACES OF THE KOREAN WAR

McConnell, Capt. Joseph, Jr.	16	Low, 1st Lt. James F.	9	Love, Capt. Robert J.	6
Jabara, Lt. Col. James	15*	Hagerstrom, Maj. James P.	8.50*	Whisner, Maj. William T., Jr.	5.50*
Fernandez, Capt. Manuel J.	14.5	Risner, Capt. Robinson	8	Baldwin, Col. Robert P.	5
Davis, Lt. Col. George A., Jr.	14*	Ruddell, Lt. Col. George I.	8*	Becker, Capt. Richard S.	5
Baker, Col. Royal N.	13*	Buttlemann, 1st Lt. Henry	7	Bettinger, Maj. Stephen L.	5
Blesse, Maj. Frederick C.	10	Jolley, Capt. Clifford D.	7	Creighton, Maj. Richard D.	5*
Fischer, 1st Lt. Harold E.	10	Lilley, Capt. Leonard W.	7	Curtin, Capt. Clyde A.	5
Garrison, Lt. Col. Vermont	10*	Adams, Maj. Donald E.	6.50*	Gibson, Capt. Ralph D.	5
Johnson, Col. James K.	10*	Gabreski, Col. Francis S.	6.50*	Kincheloe, Capt. Iven C., Jr.	5
Moore, Capt. Lonnie R.	10	Jones, Lt. Col. George L.	6.50	Latshaw, Capt. Robert T., Jr.	5
Parr, Capt. Ralph S., Jr.	10	Marshall, Maj. Winton W.	6.50	Moore, Capt. Robert H.	5
Foster, Capt. Cecil G.	9	Kasler, 1st Lt. James H.	6	Overton, Capt. Dolphin D., III	5
				Thyng, Col. Harrison R.	5*
				Westcott, Maj. William H.	5

* These are in addition to World War II victories.

AAF/USAF ACES OF WORLD WAR II AND LATER WARS

	WW II	KOREA	TOTAL
Gabreski, Col. Francis S.	28	6.5	34.5
Meyer, Col. John C.	24	2	26
Mahurin, Col. Walker M.	20.75	3.5	24.25
Davis, Maj. George A., Jr.	7	14	21
Whisner, Maj. William T., Jr.	15.5	5.5	21
Eagleston, Col. Glenn T.	18.5	2	20.5
Garrison, Lt. Col. Vermont	7.33	10	17.33
Baker, Col. Royal N.	3.5	13	16.5
Jabara, Maj. James	1.5	15	16.5
Olds, Col. Robin	12	4*	16
Mitchell, Col. John W.	11	4	15
Brueland, Maj. Lowell K.	12.5	2	14.5
Hagerstrom, Maj. James P.	6	8.5	14.5
Hovde, Lt. Col. William J.	10.5	1	11.5

	WW II	KOREA	TOTAL
Johnson, Col. James K.	1	10	11
Adams, Maj. Donald E.	4	6.5	10.5
Ruddell, Lt. Col. George I.	2.5	8	10.5
Thyng, Col. Harrison R.	5	5	10
Colman, Capt. Philip E.	5	4	9
Heller, Lt. Col. Edwin L.	5.5	3.5	9
Chandler, Maj. Van E.	5	3	8
Hockery, Maj. John J.	7	1	8
Creighton, Maj. Richard D.	2	5	7
Emmert, Lt. Col. Benjamin H., Jr.	6	1	7
Bettinger, Maj. Stephen L.	1	5	6
Visscher, Maj. Herman W.	5	1	6
Liles, Capt. Brooks J.	1	4	5
Mattson, Capt. Conrad E.	1	4	5
Shaeffer, Maj. William F.	2	3	5

* Colonel Olds's 4 additional victories came in Vietnam.

AMERICAN ACES OF THE VIETNAM WAR

DeBellevue, Capt. Charles D. (USAF)	6
Cunningham, Lt. Randy (USN)	5
Driscoll, Lt. William (USN)	5
Feinstein, Capt. Jeffrey S. (USAF)	5
Ritchie, Capt. Richard S. (USAF)	5

LEADING AIR SERVICE/ AAF/USAF ACES OF ALL WARS

Bong, Maj. Richard I.	40	WW II	
McGuire, Maj. Thomas B.	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.	26	WW I	
Mahurin, Lt. 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, Col. 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	
Whisner, Maj. William T., Jr.	21	WW II, Korea	
Eagleston, Col. Glenn T.	20.50	WW II, Korea	
Voll, Maj. John J.	20.50	WW II	
Lynch, Lt Col. Thomas J.	20	WW II	
Westbrook, Lt. Col. Robert B.	20	WW II	
Gentile, Capt. Donald S.	19.83	WW II	

SOME FAMOUS FIRSTS IN THE ANNALS OF AVIATION

First American to shoot down five enemy aircraft during World War I — Capt. Frederick Libby (serving with RFC)

First American ace of World War I — Capt. Alan M. Wilkinson (RFC)

First American ace to serve with the AEF — Capt. Raoul G. Lufbery (FFC/LE)

First American AEF ace of World War I — Capt. Douglas Campbell (FFC/LE)

First American ace of World War II — Pilot Officer William R. Dunn (RAF)

First American USAAF ace of World War II — Lt. Boyd D. "Buzz" Wagner

First American ace of the Korean War and USAF's first jet ace — Capt. James Jabara (May 20, 1951)

First American to score an aerial victory in Korea — 1st Lt. William G. Hudson (F-82 pilot; downed a Yak-11, June 27, 1950)

First jet-to-jet kill of the Korean War — 1st Lt. Russell J. Brown, (F-80 pilot; downed a MiG-15, November 8, 1950)

First American ace of two wars — Maj. A. J. "Ajax" Baumler (8 victories in the Spanish Civil War and 5 in World War II)

First USAF ace with victories in World War II and the Vietnam War — Brig. Gen. Robin Olds (12 victories in WW II and 4 in Vietnam)

Source: Fighter Aces, by Col. Raymond F. Toliver and Trevor J. Constable, Macmillan Co., N. Y., 1965

AIR FORCE MAGAZINE'S

GUIDE TO USAF BASES AT HOME AND ABROAD

(Includes civilian airports and airfields of other military services that provide basing for USAF units and activities.)

Altus AFB, Okla. 73521; 3 mi. NE of Altus. Phone: (405) 482-8100. AUTOVON: 866-1110. MAC base. 443d Military Airlift Training Wing; transition training for C-141 and C-5 crews. Formerly SAC base; SAC's 11th ARS continues tanker operations as tenant. AFCS's 4th Combat Communications Group has tenant status. Base activated Jan. 1943; inactivated May 1945; reactivated Jan. 1953. Area: 2,487 acres. Altitude: 1,376 ft. M—4,039; C—732; TP $51.6M; O—269; N—431; H (25).

Andrews AFB, Md. 20331; 11 mi. SE of Washington, D. C. Phone: (301) 981-9111. AUTOVON: 858-1110. MAC base; Hq. Air Force Systems Command; high-priority airlift for D. C. area; also proficiency flying for Hq. USAF, AFRES, ANG, Navy, Marines. Other units: 1st Composite Wing; 89th Military Airlift Special Missions Wing; 459th Tactical Airlift Wing (AFRES); 113th Tactical Fighter Wing (ANG); weather squadron. Base activated June 1943; named for Lt. Gen. Frank M. Andrews, military air pioneer, killed in an aircraft accident, May 3, 1943. Area: 4,279 acres. Altitude: 279 ft. M—5,800; C—4,-135; TP—$139M; O—392; N—1,351; T/G—82; H (250).

Arnold AFS, Tenn. 37389; approximately 7 mi. SE of Manchester. Phone: (615) 455-2611. AUTOVON: 882-1520. AFSC installation; site of the Arnold Engineering Development Center, the free world's largest complex of wind tunnels, jet and rocket engine test cells, space simulation chambers, and hyperballistic ranges, which support the acquisition of new aerospace systems by conducting research, development, and evaluation testing for the Air Force, other military services, and government agencies. Base activated Jan. 1, 1950; named for Gen. H. H. "Hap" Arnold, wartime Chief of the AAF. Area: 40,118 acres. Altitude: 950 to 1,150 ft. M—100; C—3,380; TP—$54.2M; O—24; N—16; D.

Barksdale AFB, La. 71110; in Bossier City. Phone: (318) 456-2252. AUTOVON: 781-1110. SAC base. Hq. 8th Air Force; 2d Bomb Wing. Base is also site of 917th Tactical Fighter Group (AFRES). Base activated Feb. 2, 1933; named for Lt. Eugene H. Barksdale, WW I airman killed in Aug. 1926 aircraft accident. Area: 22,000 acres (20,000 acres reserved for recreational area). Altitude: 167 ft. M—6,724; C—1,687; TP—$87.3M; O—360; N—702; T/G—33; H (65).

At the end of each entry in this Guide to Bases are data on base population and facilities, designated by the following symbols: M and C—assigned military and civilian personnel, including, where applicable, contractor, BX, and nonappropriated fund employees; TP—total military and civilian annual payroll; O, N, T/G—on-base Officer, NCO, and Transient/Guest housing units; H ( ), D—hospital, dispensary medical facilities with number of hospital beds in parentheses. In some instances, information was not available.

Beale AFB, Calif. 95903; 13 mi. E of Marysville. Phone: (916) 634-3000. AUTOVON: 368-1110. SAC base. 14th Air Division; 9th Strategic Reconnaissance Wing; 100th Air Refueling Wing. Beale is the only USAF base having SR-71 and U-2 strategic recce aircraft. Originally US Army's Camp Beale; became AF installation in Nov. 1948; became AFB in Dec. 1951; named for Brig. Gen. E. F. Beale, Indian agent in Calif. prior to Civil War. Area: 22,944 acres. Altitude: 113 ft. M—5,065; C—591; TP—$53.7M; O—247; N—1,490; T/G—69; H (35).

Bellows AFS, Hawaii (APO San Francisco 96553); approximately 12 mi. NE of Honolulu. Phone: (808) 259-9469. PACAF base. It is a closed airfield presently used by the Marine Corps as a tactical maneuver area, by the Army National Guard as an armory, and by the Air Force as a radio-transmitter site and recreation center. Activated in 1930 as Bellows Field in honor of 2d Lt. Franklin D. Bellows, killed in France during WW I. Became Bellows AFS on March 28, 1948. Area: 1,492 acres. Altitude: 15 ft.

Bergstrom AFB, Tex. 78743; 8 mi. SE of downtown Austin. Phone: (512) 385-4100. AUTOVON: 685-1110. TAC base. Hq. 12th Air Force; 67th Tactical Reconnaissance Wing; 602d Tactical Air Control Wing; 924th Tactical Airlift Group (AFRES). TAC NCO Academy; Hq. 10th AF (AFRES). Base activated Sept. 22, 1942; named for Capt. John A. E. Berg-

strom, first Austin serviceman killed in WW II. Area: 3,147 acres. Altitude: 541 ft. M—5,154; C—826; TP—$71.2M; O—92; N—612; H (30).

Blytheville AFB, Ark. 72315; 4 mi. NW of Blytheville. Phone: (501) 763-3931. AUTOVON: 637-1110. SAC base. 42d Air Division; 97th Bomb Wing. Base activated June 1942; inactivated Feb. 1947; reactivated Aug. 1955. Area: 3,093 acres. Altitude: 254 ft. M—2,804; C—831; TP—$38.1M; O—248; N—682; H (25).

Bolling AFB, D. C. 20332; 3 mi. S of the US Capitol. Phone: (202) 767-4522. AUTOVON: 297-1110. MAC base. Support base for AF activities in the D. C. area; houses various Hq. USAF agencies. Activated Oct. 1917; named for Col. Raynal C. Bolling, Ass't Chief of Air Service, killed during WW I. Area: 602 acres. Altitude: 16 ft. M—1,750; C—664; TP—$35.3M; O—191; N—800; T/G—15; D.

Brooks AFB, Tex. 78235; 7 mi. SE of San Antonio. Phone: (512) 536-1110. AUTOVON: 240-1110. AFSC base. Home of Aerospace Medical Division, USAF School of Aerospace Medicine; USAF Occupational and Environmental Lab, and USAF Human Resources Lab; tenant units include Armed Forces Central Medical Registry, a security squadron, and a communications squadron. Base activated Dec. 8, 1917; named for Cadet Sidney J. Brooks, Jr., killed Nov. 13, 1917, on his final solo flight before commissioning. Area: 1,330 acres. Altitude: 600 ft. M—1,300; C—900; TP—$35.3M; O—70; N—100; T/G—8; D.

Buckley ANGB, Colo. 80011; 8 mi. E of Denver. Phone: (303) 366-5363. AUTOVON: 877-9110. ANG base. 140th Tactical Fighter Wing; also host to Navy Reserve, Marine Reserve, ARNG, and USAF SAMSO units. Base activated April 1, 1942, and used as a gunnery training facility. ANG assumed control from US Navy and operated it since 1959. Named for Lt. John H. Buckley, National Guardsman, killed at Argonne, France, Sept. 27, 1918. Area: 3,251 acres; Altitude: 5,663 ft. M—526; C—340; TP—$2.4M; D.

Cannon AFB, N. M. 88101; 7 mi. west of Clovis. Phone: (505) 784-3311. AUTOVON: 681-1110. TAC base. 27th Tactical Fighter Wing. Activated Aug. 1942; named for Gen. John K. Cannon, WW II Commander of all Allied Air Forces in Mediterranean. Area: 3,780 acres. Altitude: 4,295 ft. M—4,079; C—708; TP—$48.8M; O—138; N—874; T/G 92; H (30).

Carswell AFB, Tex. 76127; 7 mi. WNW of downtown Fort Worth. Phone: (817) 738-3511. AUTOVON: 739-1110. SAC base. 19th Air Division; 7th Bomb Wing; 301st Tactical Fighter Wing (AFRES). 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 winner. Area: 2,750 acres. Altitude: 650 ft. M—5,075; C—1,235; TP—$72.4M; O—128; N—680; T/G—0; H (120).

Castle AFB, Calif. 95342; 8 mi. NW of Merced. Phone: (209) 726-2011. AUTOVON: 347-1110. SAC base. 93d Bomb Wing. Conducts training of SAC B-52 and KC-135 crews. Also houses ADCOM fighter-interceptor squadron. Activated Sept. 1941; named for Brig. Gen. Frederick W. Castle, WW II B-17 pilot and Medal of Honor winner. Area: 2,700 acres. Altitude: 188 ft. M—5,538; C—530; TP—$61.9M; O—239; N—696; H (20).

Chanute AFB, Ill. 61866; 1 mi. S of Rantoul; 14 mi. N of Champaign. Phone: (217) 495-1110. AUTOVON: 862-1110. ATC base. Provides technical training in missile and aircraft maintenance and weather school. Base has museum, Chanute Technical Training Display Center. Base activated May 21, 1917; named for Octave Chanute, aeronautical engineer and glider pioneer. Area: 2,100 acres. Altitude: 737 ft. M—10,316; C—1,487; TP—$107.3M; O—310; N—1,348; T/G—8; H (65).

Charleston AFB, S. C. 29404; in North Charleston. Phone: (803) 554-0230. AUTOVON: 583-0111. MAC base. 437th Military Airlift Wing and Associate 315th MAW (AFRES). Base activated June 1942; inactivated Feb. 1946; reactivated Aug. 1953. Area: 3,900 acres. Altitude: 45 ft. M—4,708; C—1,406; TP—$75.1M; O—347; N—608; D.

Columbus AFB, Miss. 39701; 10 mi. NNW of Columbus. Phone: (601) 434-7322. AUTOVON: 742-1110. ATC base. 14th Flying Training Wing, undergraduate pilot training. Base activated in 1941 for pilot training. Area: 4,606 acres. Altitude: 214 ft. M—2,387; C—529; TP—$33.1M; O—282; N—538; H (15).

Craig AFB, Ala. 36701; 5 mi. SE of Selma. Phone: (205) 874-7431. AUTOVON: 485-1110. ATC base is candidate for closure. 29th Flying Training Wing, undergraduate pilot training. Base activated Aug. 1940; named for Bruce K. Craig, flight engineer for B-24 manufacturer, killed in 1941 crash. Area: 2,064 acres. Altitude: 176 ft. M—1,782; C—501; TP—$31.3M; O—251; N—375; T/G—10; H (10).

Davis-Monthan AFB, Ariz. 85707; 4 mi. SE of Tucson. Phone: (602) 748-3900. AUTOVON: 361-1110. TAC base. 355th Tactical Fighter Wing; 390th Strategic Missile Wing (Titan II) (SAC); 432d Tactical Drone Group (TAC); A-7D/A-10 combat crew training. Also site of AFLC's Military Aircraft Storage and Disposition Center. Base activated in 1927; named for two Tucson aviator accident victims—1st Lt. Samuel H. Davis, killed Dec. 28, 1921; and 2d Lt. Oscar Monthan, killed Mar. 27, 1924. Area: 18,000 acres. Altitude: 2,705 ft. M—6,583; C—1,989; TP—$110M; O—215; N—1,040; H (80).

Dobbins AFB, Ga. 30060; 2 mi. S of Marietta; 10 mi. NW of Atlanta. Phone: (404) 424-8811. AUTOVON: 925-1110. Hq. 14th Air Force (AFRES); 94th Tactical Airlift Wing (AFRES); 116th Tactical Fighter Wing (ANG). Base activated in 1943; named for Capt. Charles Dobbins, WW II pilot, killed in action. Area: 2,095 acres. Altitude: 1,068 ft. M—8; C—1,222; TP—$17.1M; O—3; N—6; D.

Dover AFB, Del. 19901; 4 mi. SE of Dover. Phone: (302) 678-7011. AUTOVON: 455-1110. MAC base. 436th Military Airlift Wing; air transport units; Associate 512th MAW (AFRES). Dover is largest air freight terminal on East Coast. Base activated Dec. 1941; inactivated 1946; reactivated Feb. 1951. Area: 3,600 acres. Altitude: 28 ft. M—5,303; C—1,480; TP—$74.3M; O—286; N—1,254; T/G—104; H (35).

Duluth International Airport, Minn. 55814; 5 mi. NW of Duluth. Phone: (218) 727-8211. AUTOVON: 825-0011. ADCOM base. 23d NORAD Region and 23d ADCOM Air Division; SAGE Control Center (NORAD); 4787th Air Base Group; 148th Tactical Recon Gp., Minn. (ANG). Activated Mar. 1951. Area: 1,139 acres. Altitude: 1,429 ft. M—1,169; C—448; TP—$19.7M; O—70; N—275; T/G—23; D.

Dyess AFB, Tex. 79607; 2 mi. WSW of Abilene. Phone: (915) 696-0212. AUTOVON: 461-1110. SAC base. 96th Bomb Wing (SAC); 463d Tactical Airlift Wing (MAC). Base activated Apr. 1942; inactivated Dec. 1945; reactivated Sept. 1955; named for Lt. Col. William E. Dyess, WW II fighter pilot killed in accident Dec. 1943. Area: 5,186 acres. Altitude: 1,774 ft. M—5,164; C—467; TP—$72.8M; O—433; N—566; H (150).

Edwards AFB, Calif. 93523; 20 mi. E of Rosamond. Phone: (805) 277-1110. AUTOVON: 350-1110. AFSC base. AF Flight Test Center. USAF Test Pilot School trains pilots and flight-test engineers. NASA Dryden Flight Research Center is concerned with the Space Shuttle, lifting bodies, supersonic and transonic flight research. Other tenant units include US Army Aviation Engineering Flight Activity and USAF Rocket Propulsion Laboratory. Base activated Sept. 1933; named for Capt. Glen W. Edwards, killed June 5, 1948, in crash of a YB-49 "Flying Wing" experimental bomber. Area: 301,000 acres. Altitude: 2,302 ft. M—3,739; C—4,811; TP—$67.2M; O—520; N—1,591; T/G—155; H (25).

Eglin AFB, Fla. 32542; 2 mi. NE of Valparaiso; 7 mi. SE of Fort Walton Beach. Phone: (904) 881-6668. AUTOVON: 872-1110. AFSC base. Air Force Armament Development and Test Center; AF Armament Laboratory; 3246th Test Wing; 39th Aerospace Rescue and Recovery Wing; 33d Tactical Fighter Wing; Tac Air Warfare Center; 919th Special Operations Group (AFRES); new Air Force Armament Museum. Base activated in 1935; named for Lt. Col. Frederick I. Eglin, WW I flyer killed in aircraft accident, Jan. 1, 1937. Area: 464,980 acres. Altitude: 85 ft. M—11,405; C—4,097; TP—$185.3M; O—342; N—2,016; T/G—140; H (200).

Eielson AFB, Alaska (APO Seattle 98737); 26 mi. SE of Fairbanks. Phone: (907) 372-2181. AUTOVON: (317) 377-1292. AAC base. SAC tanker operations; air defense and search and rescue for AAC; communications for AFCS; 6th Strategic Wing. Activated Oct. 1944; named for Carl B. Eielson, Arctic aviation pioneer. Area: about 35,000 acres. Altitude: 534 ft. M—2,655; C—719; TP—$39.7M; O—148; N—1,015; T/G—20; D.

Ellsworth AFB, S. D. 57706; 11 mi. ENE of Rapid City. Phone: (605) 342-2400. AUTOVON: 747-1110. SAC base. 28th Bomb Wing; 44th Strategic Missile Wing; SAC post-attack command and control system squadron. Activated July 1954; named for Brig. Gen. Richard E. Ellsworth, killed Mar. 18, 1953, in crash of RB-36. Area: 5,675 acres. Altitude: 3,600 ft. M—5,913; C—741; TP—$36M; O—567; N—941; T/G—26; H (30).

Elmendorf AFB, Alaska (APO Seattle 98742); 1 mi. NW of Anchorage. Phone: (907) 752-1110. AUTOVON: (317) 752-1110. AAC base. Hq. Alaskan Air Command and 21st Composite Wing; 43d Tactical Fighter Sq.; 5041st Tactical Operations Sq.; 616th Military Airlift Group (MAC); aerospace rescue and recovery squadron (MAC); 1931st Communications Group (AFCS); security squadron (USAFSS). Base activated July 1940; named for Capt. Hugh M. Elmendorf, killed in air accident Jan. 13, 1933. Area: 13,400 acres. Altitude: 118 ft. M—6,146; C—2,230; TP—$78.2M; O—356; N—1,968; T/G—260; H (140).

England AFB, La. 71301; 5 mi. W of Alexandria. Phone: (318) 448-2100. AUTOVON: 683-1110. TAC base. 23d Tactical Fighter Wing. Base activated Oct. 1942; named for Lt. Col. John B. England, WW II ace, killed Nov. 17, 1954, in a crash. Area: 2,282 acres. Altitude: 89 ft. M—2,915; C—529; TP—$33.5M; O—109; N—491; T/G—5; H (70).

Fairchild AFB, Wash. 99011; 12 mi. WSW of Spokane. Phone: (509) 247-2219. AUTOVON: 352-1110. SAC base. 47th Air Division; 92d Bomb Wing (SAC); 3636th Combat Crew Training Wing (ATC); 141st Air Refueling Wing (ANG); 48th Air Rescue and Recovery Sq. (MAC); and 2039th Communications Sq. (AFCS). Base activated Jan. 1942; named for Gen. Muir S. Fairchild, USAF Vice Chief of Staff at his death in 1950. Area: 5,450 acres. Altitude: 2,462 ft. M—4,469; C—954; TP—$53.3M; O—601; N—977; T/G—18; H (50).

Francis E. Warren AFB, Wyo. 82001, adjacent to Cheyenne. Phone: (307) 775-2510. AUTOVON: 481-1110. SAC base. 4th Air Division; 90th Strategic Missile Wing. Base activated July 4, 1867; under Army jurisdiction until 1947 when reassigned to USAF. Home of first Atlas-D ICBM missile wing (1960-65); named for Francis Emory Warren, Wyoming senator and early governor. Base has 7,600 acres, plus 200 Minuteman III missile sites distributed over some 15,000 sq. mi. Altitude: 6,000 ft. M—4,000; C—600; TP—$42.5M; O—190; N—166; T/G—13; H (40).

General Mitchell Airport, Wis. 53207; 5.8 mi. S of Milwaukee. Phone: (414) 481-6400. AUTOVON: 796-9110. 440th Tactical Airlift Wing (AFRES); 128th Air Refueling Group (ANG). Base activated Jan. 1958. Named for Brig. Gen. William "Billy" Mitchell. Area: 99 acres. Altitude: 724 ft. M—4; C—520; TP—$10.2M.

George AFB, Calif. 92392; 6 mi. NW of Victorville. Phone: (714) 269-1110, AUTOVON: 353-1110. TAC base. 35th Tactical Fighter Wing. Provides F-4 and F-105 transitional and upgrade training for aircrewmen. Home of USAF's only two operational F-105G "Wild Weasel" squadrons. ADCOM F-106 unit maintains operating location at George. Base activated in 1941; named for Brig. Gen. Harold H. George, WW I fighter ace killed in Australia in aircraft accident Apr. 29, 1942. Area: 5,347 acres. Altitude: 2,875 ft. M—4,789; C—471; TP—$51.22M; O—318; N—1,322; T/G—40; H (25).

Goodfellow AFB, Tex. 76901; 2 mi. SE of San Angelo. Phone: (915) 653-3231. AUTOVON: 885-3450. USAF Security Service base. 6940th Security Wing; USAF School of Applied Cryptologic Sciences. Base activated Jan. 1941; named for 2d Lt. John J. Goodfellow, Jr., WW I fighter pilot killed in combat Sept. 17, 1918. Area: 1,127 acres. Altitude: 1,877 ft. M—2,071; C—405; TP—$26M; O—16; N—50; T/G—6; D.

Grand Forks AFB, N. D. 58205; 16 mi. W of Grand Forks. Phone: (701) 594-6011. AUTOVON: 362-1110. SAC base. 319th Bomb Wing; 321st Strategic Missile Wing (Minuteman III). Base activated in 1956. Area: 5,400 acres. Alti-

tude: 911 ft. M—5,470; C—820; TP—$68.6M; O—542; N—1,584; T/G—86; H (20).

Greater Pittsburgh International Airport, Pa. 15231; 16 mi. NW of Pittsburgh. Phone: (412) 264-5000. AUTOVON: 277-1110. 911th Tac Airlift Gp. (AFRES); 171st Air Refueling Wing (ANG); 112th Tactical Fighter Group (ANG). Base activated Jan. 1945. Area: 346 acres. Altitude: 1,203 ft. M—2; C—350; TP—$6.4M.

Griffiss AFB, N. Y. 13441; 1 mi. SE of Rome. Phone: (315) 330-1110. AUTOVON: 587-1110. SAC base. 416th Bomb Wing. Major tenant is Rome Air Development Center (RADC), part of AFSC. Base also houses hq. of AFCS's Northern Communications Area and ADCOM fighter-interceptor squadron. Base activated Feb. 1, 1942; named for Lt. Col. Townsend E. Griffiss, killed in aircraft accident Feb. 15, 1942. Area: 3,468 acres. Altitude: 515 ft. M—4,235; C—3,168; TP—$92.5M; O—183; N—582; T/G—144; H (70).

Grissom AFB, Ind. 46971; 9 mi. S of Peru. Phone: (317) 689-2211. AUTOVON: 928-1110. SAC base. 305th Air Refueling Wing; 434th Tactical Fighter Wing (AFRES). Activated Jan. 1943 for Navy flight training; reactivated June 1954 as Bunker Hill AFB; renamed May 1968 for Lt. Col. Virgil I. "Gus" Grissom, killed Jan. 27, 1967, with other Astronauts Edward White and Roger Chaffee, in Apollo capsule fire. Area: 2,810 acres. Altitude: 800 ft. M—2,800; C—485; TP—$41M; O—370; N—758; T/G—16; D.

Gunter AFS, Ala. 36114; 4 mi. NE of Montgomery. Phone: (205) 279-1110. AUTOVON: 921-1110. AU base. Hq. Air Force Data Automation Agency and site of AF Data Systems Design Center. USAF Extension Course Institute; USAF Senior NCO Academy. Base activated Aug. 27, 1940; named for William A. Gunter, former mayor of Montgomery, who died in 1940. Area: about 2 sq. mi. Altitude: 166 ft. M—5,623; C—2,666; TP—*(see Maxwell AFB);* O—150; N—174; D.

Hancock Field, N. Y. 13225; 10 mi. NNE of Syracuse. Phone: (315) 458-5500. AUTOVON: 587-9110. ADCOM base. 21st NORAD Region and 21st Air Division (ADCOM); also houses 174th Tactical Fighter Group (ANG); SAGE region control center. Base activated Sept. 1942. Area: 1,125 acres. Altitude: 421 ft. M—1,075; C—400; TP—$15.7M; O—91; N—237; T/G—2; D.

Hanscom AFB, Mass. 01731; 17 mi. NW of Boston. Phone: (617) 861-4441. AUTOVON: 478-4441. AFSC base. Hq. Electronic Systems Div. (AFSC); also site of AF Geophysics Lab, formerly AF Cambridge Research Laboratories (AFSC) providing basic and applied research in electronics and geophysics. Joint federal-state use of the base began in 1946; named for Laurence G. Hanscom, pre-WW II advocate of private flying, killed in 1941 in a lightplane accident. Until recently was called Laurence G. Hanscom AFB. Area: 1,086 acres. Altitude: 133 ft. M—1,898; C—6,665; TP—$85.2M; O—339; N—357; T/G—19; D.

Hickam AFB, Hawaii (APO San Francisco 96553); 6 mi. W of Honolulu. Phone: (808) 422-0531. AUTOVON: 430-0111. PACAF base. Hq. Pacific Air Forces; 15th Air Base Wing, support organization for Air Force units in Hawaii and throughout the Pacific; ANG fighter group; Hq., Pacific Communications Area (AFCS); 1st Weather Wing; 61st Military Airlift Support Wing. Base activated Sept. 1937; named for Lt. Col. Horace M. Hickam, air pioneer killed in crash Nov. 5, 1934. Area: 2,544 acres. Altitude: sea level. M—5,120; C—2,232; TP—$85.9M; O—567; N—2,919; D. (These figures include relevant data for Bellows AFS and Wheeler AFB.)

Hill AFB, Utah 84406; 7 mi. S of Ogden. Phone: (801) 777-7221; AUTOVON: 458-1110. AFLC base. Hq., Ogden Air Logistics Center; furnishes logistic support for Minuteman and Titan ICBMs; manager for F-4, F-101, and F-16 aircraft; also home of 388th Tactical Fighter Wing and drone test activity; 508th Tactical Fighter Group (AFRES). Base activated Nov. 1940; named for Maj. Ployer P. Hill, killed Oct. 30, 1935, test-flying the first B-17. Area: 7,000 acres. Altitude: 4,788 ft. M—4,000; C—14,500; TP—$264M; O—263; N—882; T/G—8; H (35).

Holloman AFB, N. M. 88330; 6 mi. SW of Alamogordo. Phone: (505) 479-6511; AUTOVON: 867-1110. TAC base. 49th Tactical Fighter Wing and 479th Tactical Training Wing. AFSC also conducts test and evaluation of airborne missiles, drones, recon systems, and missile reentry vehicles, and operates Central Inertial Guidance Test Facility, AFSC track facility, and Radar Target Scatter site (RATSCAT). Activated 1942; named for Col. George V. Holloman, guided-missile pioneer, killed in crash Mar. 19, 1946. Area: 97,877 acres. Altitude: 4,000 ft. M—5,795; C—1,432; TP—$86M; O—319; N—1,386; T/G—20; H (25).

Homestead AFB, Fla. 33030; 5 mi. NNE of Homestead. Phone: (305) 257-8011. AUTOVON: 791-0111. TAC base. 31st Tactical Fighter Wing; site of ATC sea-survival school; AFRES early warning and control group and aerospace rescue and recovery squadron. Base activated Apr. 1955. Area: 3,607 acres. Altitude: 7 ft. M—8,799; C—1,472; TP—$71.6M; O—321; N—1,294; T/G—318; H (85).

Hurlburt Field, Fla. 32544 (Eglin AFB Auxiliary Field #9); part of Eglin AFB (AFSC) reservation but TAC-operated base; 8 mi. W of Ft. Walton Beach. Phone: (904) 881-6668. AUTOVON: 872-1110. Home of 1st Special Operations Wing, focal point of all USAF special operations; reports directly to 9th Air Force; base houses USAF Special Operations School and USAF Air-Ground Operations School; C-130E (Combat Talon), AC-130H gunship, and UH-1N/CH-3E armed helicopter squadron; special operations Combat Control Team (TAC) and Combat Weather Team (MAC); air defense squadron (ADCOM); TAC Red Horse squadron. Base activated in 1943 named for 1st Lt. Donald W. Hurlburt, WW II bomber pilot killed Oct. 2, 1943, in crash on Eglin reservation. Altitude: 35 ft. M—3,330; C—622; TP—$41.2M; O—100; N—280; T/G—300; H (200) at Eglin-main.

Indian Springs AF Auxiliary Field, Nev. 89018; 45 mi. NW of Las Vegas. Phone: (702) 879-6204. AUTOVON: 682-6204. TAC base. Provides bombing and gunnery range support for tactical operations from Nellis AFB; manages construction of realistic target complexes; supports the Energy Research and Development Administration (ERDA)—formerly Atomic Energy Commission. Base activated in 1942, named for nearby town. Area: 3,014,422 acres (includes ranges). Altitude: 3,124 ft. M—156; C—27; TP—*(see Nellis AFB)*; O—12; N—67; D.

Keesler AFB, Miss. 39534; located in Biloxi. Phone: (601) 377-1110. AUTOVON: 868-1110. ATC base. Keesler Technical Training Center (communications, electronics, personnel, and administrative courses); Keesler USAF Medical Center; also provides technical training for foreign students. Hosts MAC and AFRES weather recon units, TAC airborne command and control squadron, plus AFCS installation group. Base activated June 12, 1941; named for 2d Lt. Samuel R. Keesler, Jr., WW I aerial observer, killed in action Oct. 9, 1918. Area: 1,576 acres. Altitude: 26 ft. M—12,788; C—3,047; TP—$161.1M; O—531; N—1,431; T/G—90; H (350).

Kelly AFB, Tex. 78241; 5 mi. SW of San Antonio. Phone: (512) 925-1110. AUTOVON: 945-1110. AFLC base. Hq. San Antonio Air Logistics Center; Hq. USAF Security Service; AF Communications Security Center; AF Special Communications Center; USAF Environmental Health Laboratory; 433d Tactical Airlift Wing (AFRES); tactical fighter group (ANG). Base activated May 7, 1917; named for 2d Lt. George E. M. Kelly, first Army pilot to lose his life in a military aircraft, killed May 10, 1911. Area: 3,924 acres. Altitude: 689 ft. M—4,348; C—18,046; TP—$334.5M; O—46; N—387; D.

Kincheloe AFB, Mich. 49788; 20 mi. S of Sault Ste. Marie. Phone: (906) 495-5611. AUTOVON: 741-1110. SAC base is candidate for closure. 449th Bomb Wing. Base first activated 1941 as Kinross AFB; later renamed for Capt. Iven C. Kincheloe, Jr., jet ace of Korean War and later X-2 test pilot, killed July 26, 1958, in F-104 crash. Area: 3,700 acres. Altitude: 799 ft. M—3,046; C—455; TP—$39.5M; O—379; N—1,004; T/G—9; H (20).

Kingsley Field, Ore. 97601; 5 mi. SE of Klamath Falls. Phone: (503) 882-4411. AUTOVON: 620-1470. ADCOM base. Supports fighter-interceptor detachment

and operates Keno AFS, Ore. Formerly a naval air station, base was activated by USAF in April 1956; named for 2d Lt. David R. Kingsley, WW II B-17 bombardier and Medal of Honor winner, who was KIA on June 23, 1944. Area: 1,640 acres. Altitude: 4,081 ft. M—358; C—213; TP—$7M; O—54: N—231; D.

Kirtland AFB, N. M. 87117; south of Albuquerque. Phone: (505) 264-0011. AUTOVON: 964-0011. AFSC base. Hq., AF Contract Management Division and AF Weapons Laboratory, AFSC. Furnishes contract management, nuclear and laser research, development and testing, operational test and evaluation services, advanced helicopter training, and HC-130 search and rescue training. Base houses AF Test and Evaluation Center; ARRS 1550th ATTW (MAC), New Mexico ANG; AFSC NCO Academy; AF Directorate of Nuclear Safety; Interservice Nuclear Weapons School; Defense Nuclear Agency Field Command; Naval Weapons Evaluation Facility; ERDA's Albuquerque Operations Office; and Sandia Laboratories. Base activated Jan. 1941; named for Col. Roy S. Kirtland, air pioneer and Commandant of Langley Field in the 1930s, died in 1941. Area: 47,466 acres. Altitude: 5,352 ft. M—5,300; C—4,200; TP—$201M; O—731; N—1,403; T/G—58; H (65).

K. I. Sawyer AFB, Mich. 49843; 16 mi. S of Marquette. Phone: (906) 346-6511. AUTOVON: 472-1110. SAC base. 410th Bomb Wing; ADCOM fighter-interceptor squadron. Base activated 1956; named for Kenneth I. Sawyer, who proposed site for a county airport, died in 1944. Area: 4,800 acres. Altitude: 1,220 ft. M—4,000; C—1,000; TP—$51M; O—423; N—1,270; H (25).

Lackland AFB, Tex. 78236; 8 mi. WSW of San Antonio. Phone: (512) 671-1110. AUTOVON: 473-1110. ATC base. Provides basic military training for airmen, precommissioning training for officers; technical training of basic, advanced security police/law enforcement personnel; patrol dog/handler courses; training of instructors, recruiters, and career-motivation counselors, social actions/drug abuse counselors; USAF marksmanship training; USAF Occupational Measurement Center; USAF Defense Language Institute English Language Center; Wilford Hall USAF Medical Center. Known as "The Gateway to the Air Force" for its role in providing basic training and indoctrination since activation in 1941; named for Brig. Gen. Frank D. Lackland, early Commandent of Kelly Field flying school, died in 1943. Area: 6,828 acres, including 4,017 acres at Lackland Training Annex. Altitude: 787 ft. M—21,261; C—2,247; TP—$233.2M; O—204; N—585; TG—340; H (1,000).

Langley AFB, Va. 23665; 3 mi. N of Hampton. Phone: (804) 764-9990. AUTOVON: 432-1110. TAC base. Host unit 4500th Air Base Wing; Hq. Tactical Air Command; 1st Tactical Fighter Wing (TAC); 5th Weather Wing (MAC); 2d Aircraft Delivery Group (TAC); 9th Tactical Intelligence Squadron (TAC); 6th Command and Control Squadron (TAC). Base activated Dec. 30, 1916, is the oldest continuously active Air Force base in the US; named for aviation pioneer and scientist Samuel Pierpont Langley, who died in 1906. Area: 3,500 acres. Altitude: 10 ft. M—8,538; C—1,771; TP—$98.9M; O—384; N—1,291; T/G—227; H (75).

Laughlin AFB, Tex. 78840; 6 mi. E of Del Rio. Phone: (512) 298-3511. AUTOVON: 732-1110. ATC base, 47th Flying Training Wing, undergraduate pilot training. Base activated Oct. 1942; named for 1st Lt. Jack T. Laughlin, killed in action Jan. 29, 1942. Area: 3,908 acres. Altitude: 1,080 ft. M—2,406; C—585; TP—$32.3M; O—255; N—348; T/G—2; H (10).

Laurence G. Hanscom AFB, Mass. *(see Hanscom AFB).*

Little Rock AFB, Ark. 72076; 12 mi. NE of Little Rock. Phone: (501) 988-3131. AUTOVON: 731-1110. MAC base. 314th Tactical Airlift Wing; 308th Strategic Missile Wing; combat crew training; SAC Titan ICBM support base; SAC satellite base; 189th Air Refueling Group (ANG). Base activated in 1955. Area: 6,000 acres. Altitude: 310 ft. M—6,825; C—666; TP—$70.8M; O—373; N—1,162; H (30).

Loring AFB, Me. 04751; 4 mi. W of Limestone. Phone: (207) 999-1110. AUTOVON: 920-1110. SAC base. 42d Bomb Wing. Base activated Feb. 25, 1953; named for Maj. Charles J. Loring, Jr., F-80 pilot killed Nov. 22, 1952, in North Korea; posthumously awarded the Medal of Honor. Area: 9,000 acres. Altitude: 746 ft. M—3,800; C—1,000; TP—$39.6M; O—473; N—1,511; T/G—12; H (25).

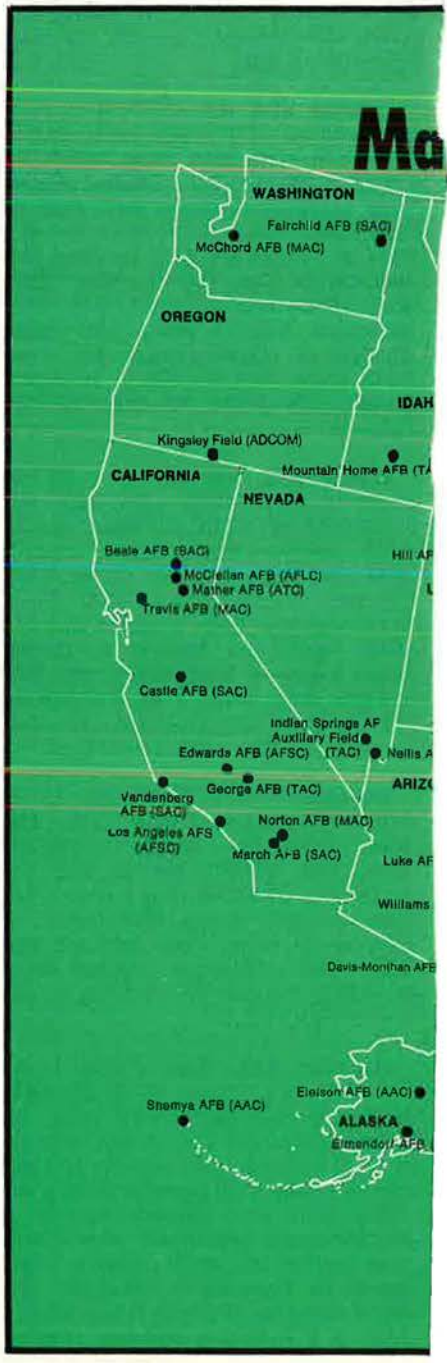
Los Angeles AFS, Calif. 90045; 12 mi. SW of Los Angeles. Phone: (213) 643-1000. AUTOVON: 833-1110. AFSC support base. Hq. AFSC's Space and Missile Systems Organization (SAMSO); manages the development, production, test, and delivery of most of DoD's space and ballistic systems; 28 tenant units. Base activated Dec. 14, 1960. M—1,659; C—1,131; TP—$49.7M; D.

Lowry AFB, Colo. 80230; 1 mi. SE of Denver. Phone: (303) 388-5411. AUTOVON: 926-1110. ATC base. Technical training center; Air Force Accounting and Finance Center. Base activated Feb. 26, 1938; named for 1st Lt. Francis B. Lowry, killed in action Sept. 26, 1918. Area: 1,863 acres. Altitude: 5,400 ft. M—10,034; C—4,498; TP—$142.5M; O—95; N—772; T/G—40; D.

Luke AFB, Ariz. 85309; 20 mi. WNW of Phoenix. Phone: (602) 935-7411. AUTOVON: 853-1110. TAC base. 58th Tactical Fighter Training Wing; houses NORAD region control center; Hq. 26th Air Division (ADCOM); 302d Special Operations Sqdn. (AFRES). Luke is the largest fighter training base in the free world. Programs include training USAF aircrews in F-4 and F-15; West German students in F-104G; and foreign training in F-5 (at nearby Williams AFB). Base activated in 1941; named for 2d Lt. Frank Luke, Jr., balloon-busting ace in WW I, recipient of the Medal of Honor, KIA on Sept. 29, 1918. Area: 4,197 acres plus 2,700,000-acre range. Altitude: 1,101 ft. M—6,612; C—1,246; TP—$87.2M; O—149; N—726; T/G—51; H (80).

MacDill AFB, Fla. 33608; adjacent SSW of Tampa. Phone: (813) 830-1110. AUTOVON: 968-1110. TAC base. Hq. US Readiness Command; 56th Tactical Fighter Wing conducts replacement training in F-4E Phantoms. Base activated April 15, 1941; named for Col. Leslie MacDill, killed in airplane accident Nov. 8, 1938. Area: 6,000 acres. Altitude: 6 ft. M—6,206; C—1,610; TP—$78.831M; O—103; N—702; T/G—269; H (70).

Malmstrom AFB, Mont. 59402; 4 mi. E of Great Falls. Phone: (406) 731-9990. AUTOVON: 632-1110. SAC base. 341st



Strategic Missile Wing; also Hq. 24th Air Division (ADCOM); SAGE region control center (NORAD). Base activated Dec. 15, 1942; named for Col. Einar A. Malmstrom, WW II fighter commander, killed in T-33 accident Aug. 21, 1954. Site of SAC's first Minuteman wing, 1961. Area: 3,573 acres, plus about 23,000 sq. mi. in missile complex. Altitude: 3,525 ft. M—5,725; C—714; TP—$38.1M; O—481; N—922; T/G—40; H (25).

March AFB, Calif. 92508; 9 mi. SE of Riverside. Phone: (714) 655-1110. AUTOVON: 947-1110. SAC base. Hq. 15th AF; 22d Bomb Wing; 452d Air Refueling Wing (AFRES); 303d ARRS (AFRES). Base activated March 1, 1918; named for 2d Lt. Peyton C. March, Jr., who died in Texas of crash injuries Feb. 18, 1918. Area: 8,840 acres. Altitude: 1,530 ft. M—6,400; C—1,495; TP—$72M; O—103; N—609; T/G—4; H (120).

Mather AFB, Calif. 95655; 12 mi. ENE of Sacramento. Phone: (916) 364-1110. AUTOVON: 828-1110. ATC base. 323d Flying Training Wing; USAF's only training installation for navigators, navigator-bombardiers, and electronic-warfare officers; also houses SAC's 320th Bomb Wing. Base activated 1918; named for 2d Lt. Carl S. Mather, killed in US Jan. 30, 1918, in midair collision. Area: 5,800 acres. Altitude: 96 ft. M—5,243; C—1,177; TP—$91.5M; O—451; N—820; T/G—40; H (80).

Maxwell AFB, Ala. 36112; 1 mi. WNW of Montgomery. Phone: (205) 293-1110. AUTOVON: 875-1110. AU base. Hq. Air University, professional education center for USAF; site of Air War College, Air Command and Staff College, Squadron Officer School, Leadership and Management Development Center, Academic Instructor and Foreign Officer School, Hq. Air Force ROTC; Hq. Civil Air Patrol-USAF; 908th Tac Airlift Group (AFRES). (Senior NCO Academy and ECI are at Gunter AFS.) Base activated 1918; named for 2d Lt. William C. Maxwell, killed in air accident Aug. 12, 1920, Luzon, Philippines. Area: 3,161 acres. Altitude: 169 ft. M—5,623; C—2,666; TP—$136.8M; O—485; N—439; T/G—35; H (200). (Includes Gunter AFS.)

McChord AFB, Wash. 98438; 1 mi. S of Tacoma. Phone: (206) 984-1910. AUTOVON: 976-1110. MAC base. 62d Military Airlift Wing; Hq. 25th Air Division (ADCOM); fighter-interceptor squadron (ADCOM); SAGE region control center, (NORAD); AFRES military airlift wing; tac airlift squadron (MAC). Base activated June 7, 1940; named for Col. William C. McChord, 1937 crash victim. Area: 4,500 acres. Altitude: 550 ft. M—5,699; C—1,461; TP—$100.6M; O—293; N—600; D.

McClellan AFB, Calif. 95652; 9 mi. NE of Sacramento. Phone: (916) 643-2111. AUTOVON: 633-1110. AFLC base. Hq. Sacramento Air Logistics Center; management, maintenance, and supply support of such USAF weapon systems as F-111, FB-111, A-10A, F-100, F-104, F-105, and various surveillance and warning systems, radar sites, missile tracking stations, airborne and ground power generators, and electric motors and distribution equipment. Houses 2049th Communications Gp.; USAF Environmental Health Laboratory; 41st Rescue and Weather Reconnaissance Wing; 1155th Technical Operations Sq.; 2951st Combat Logistics Support Sq.; Hq. 4th Air Force (AFRES). Base activated July 1936; named for Maj. Hezekiah McClellan, pioneer in Arctic aeronautical experiments, killed in crash May 25, 1936. Area: 2,583 acres. Altitude: 76 ft. M—3,008; C—14,104; TP—$290M; O—512; N—647; T/G—18; D.

McConnell, AFB, Kan. 67221; 5 mi. SE of Wichita. Phone: (316) 685-1151. AUTOVON: 962-1110. SAC base. 381st Strategic Missile Wing; 384th Air Refueling Wing; ANG F-105 squadron. Base activated June 5, 1951; named for Capt. Fred J. McConnell, WW II bomber 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 bomber pilot, killed July 10, 1943, during attack on the Pacific island of Bougainville. Area: 2,472 acres. Altitude: 1,371 ft. M—3,918; C—582; TP—$46M; O—155; N—434; H (15).

McEntire ANGB, S. C. 29044; 12 mi. E of Columbia. Phone: (803) 776-5121. AUTOVON: 630-3450. ANG base. Hq. South Carolina ANG; 169th Tactical Fighter Group (ANG); 240th Mobile Communications Flight (ANG): 240th ATC Flight (ANG); 51st Aviation Company, S. C. Army National Guard. Base constructed in 1941 and used as a flying training field until 1944; used as a Marine Corps fighter training base until ANG occupancy in Oct. 1946. Named for Brig. Gen. B. B. McEntire, Base Commander, killed in an F-104 crash in 1960. Area: 2,300 acres. Altitude: 352 ft. M—17; C—25; TP—$5M; D.

McGuire AFB, N. J. 08641; 18 mi. SE of Trenton. Phone: (609) 724-2100. AUTOVON: 440-0111. MAC base. Hq. 21st AF; 438th Military Airlift Wing and associate 514th MAW (AFRES); 108th Tactical Fighter Wing (ANG); Hq. N. J. ANG; 170th Air Refueling Group (ANG). Base adjoins Army's Ft. Dix; activated as AFB in 1949; named for Maj. Thomas B. McGuire, Jr., second leading US ace of WW II, holder of Medal of Honor, killed in action Jan. 7, 1945, in the Philippines. Area: 5,000 acres. Altitude: 133 ft. M—5,486; C—1,687; TP—$85.5M; O—491; N—1,264; T/G—30; D.

Minneapolis-St. Paul International Airport, Minn. 55450. Immediately adjacent to Minneapolis and St. Paul. Phone: (612) 725-5011. AUTOVON: 825-5110. 934th Tactical Airlift Group (AFRES); 133d Tactical Airlift Wing (ANG). Base activated Dec. 1960. Area: 300 acres. Altitude: 840 ft. M—4; C—340; TP—$6.6M.

Minot AFB, N. D. 58701; 13 mi. N of Minot. Phone: (701) 727-4761. AUTOVON: 344-1110. SAC base. 57th Air Division; 91st Strategic Missile Wing; 5th Bomb Wing; also houses fighter-interceptor unit (ADCOM). Base activated Aug. 1959. Area: 5,151 acres plus additional 19,058 for missile sites. Altitude: 1,668 ft. M—6,375; C—823; T—$73.2M; O—647; N—1,823; T/G—40; D.

Moody AFB, Ga. 31601; 10 mi. NNE of Valdosta. Phone: (912) 333-4211. AUTOVON: 460-1110. TAC base. 347th Tactical Fighter Wing. Base activated June 1941; named for Maj. George P. Moody, killed May 5, 1941, while testing Beech AT-10. Area: 5,000 acres. Altitude: 233 ft. M—2,691; C—528; TP—$31M; O—136; N—170; T/G—9; H (20).

Mountain Home AFB, Idaho 83648; 56 mi. SE of Boise. Phone: (208) 828-2111. AUTOVON: 857-1110. TAC base. 366th Tactical Fighter Wing (F-111s). Base activated April 1942. Area: 6,639 acres. Altitude: 3,000 ft. M—4,217; C—783; TP—$48M; O—246; N—1,289; T/G—15; H (40).

Myrtle Beach AFB, S. C. 29577; 1 mi. SW of Myrtle Beach. Phone: (803) 238-7211. AUTOVON: 748-1110. TAC base. 354th Tactical Fighter Wing. Home of the first operational A-7D wing; now scheduled to convert to A-10 and to become USAF's first operational A-10 wing. Base activated Mar. 1941. Area: 3,800 acres. Altitude: 25 ft. M—3,042; C—649; TP—$37.1M; O—218; N—582; H (15).

Nellis AFB, Nev. 89191; 8 mi. NE of Las Vegas. Phone: (702) 643-1800. AUTOVON: 682-1800. TAC base. 57th Tactical Training Wing, host unit; USAF Tactical Fighter Weapons Center; 474th Tactical Fighter Wing; USAF Thunderbirds Aerial Demonstration Squadron; 4440th TFTG (Red Flag); TFWC Range Group; conducts initial and advanced tactical fighter training and realistic combat training for all services; provides test and evaluation of air tactics and new equipment. Base activated July 1941; named for 1st Lt. William H. Nellis, WW II fighter pilot killed Dec. 27, 1944, in Europe. Area: 3,025,695 acres (includes Indian Springs AFAF). Altitude: 1,868 ft. M—8,133; C—1,086; T/G—39; H (35).

GUIDE TO AIR FORCE STATIONS

In addition to the major facilities listed in this "Guide to Bases," USAF has a number of Air Force Stations (AFS) throughout the United States and overseas. These stations, for the most part, perform an air defense mission and house radar, SAGE, or AC&W units. Here is AIR FORCE Magazine's listing of those stations, with state and ZIP code.

Albrook AFS, APO New York 09825
Almaden AFS, California 95042
Baudette AFS, Minnesota 56623
Blaine AFS, Washington 98230
Bucks Harbor AFS, Maine 04618
Calumet AFS, Michigan 49913
Cambria AFS, California 93428
Campion AFS, APO Seattle 98703
Cape Canaveral AFS, Florida 32925
Cape Charles AFS, Virginia 23310
Cape Lisburne AFS, APO Seattle 98716
Cape Newenham AFS, APO Seattle 98745
Cape Romanzof AFS, APO Seattle 98706
Caswell AFS, Maine 04750
Charleston AFS, Maine 04426
Cold Bay AFS, APO Seattle 98711
Cudjoe Key AFS, Florida 33042
Dauphin Island AFS, Alabama 36528
Empire AFS, Michigan 49630
Finland AFS, Minnesota 55603
Finley AFS, North Dakota 58230
Fort Lee AFS, Virginia 23801
Fort Fisher AFS, North Carolina 28449
Fort Yukon AFS, APO Seattle 98710
Fortuna AFS, North Dakota 59275
Gentile AFS, Ohio 45401
Gibbsboro AFS, New Jersey 08026
Havre AFS, Montana 59501
Indian Mountain AFS, APO Seattle 98748
Jacksonville AFS, Florida 32212
Kaala AFS, APO San Francisco 96786
Kalispell AFS, Montana 59922
Keno AFS, Oregon 97601
Klamath AFS, California 95548
Kotzebue AFS, APO Seattle 98709
Lake Charles AFS, Louisiana 70601
Lockport AFS, New York 14094
Makah AFS, Washington 98357
Martinsburg AFS, West Virginia 25401
Mica Peak AFS, Washington 99023
Mill Valley AFS, California 94941
Minot AFS, North Dakota 58759
Montauk AFS, New York 11954
Mt. Hebo AFS, Oregon 97122
Mt. Laguna AFS, California 92048
Newark AFS, Ohio 43055
No. Bend AFS, Oregon 97459
No. Charleston AFS, South Carolina 29405
No. Truro AFS, Massachusetts 02652
Oklahoma City AFS, Oklahoma 73145
Opheim AFS, Montana 59250
Pillar Point AFS, California 94019
Point Arena AFS, California 95468
Port Austin AFS, Michigan 48467
Punamano AFS, FPO Hawaii 96515
Richmond AFS, Florida 33156
Roanoke Rapids AFS, North Carolina 27870
San Antonio AFS, Texas 78209
San Pedro Hill AFS, California 90000
Sault Sainte Marie AFS, Michigan 49783
Savannah AFS, Georgia 31402
Sparrevohn AFS, APO Seattle 98746
St. Albans AFS, Vermont 05478
St. Louis AFS, Missouri 63118
Sunnyvale AFS, California 94088
Tatalina AFS, APO Seattle 98747
Tin City AFS, APO Seattle 98715
Tonopah AFS, Nevada 89049
Watertown AFS, New York 13601

New Orleans NAS (Alvin Callendar Field), La. 70146; 15 mi. SE of New Orleans. Phone: (504) 393-3011. AUTOVON: 363-3011. 926th Tactical Airlift Group (AFRES); 159th Tactical Fighter Group (ANG). Named for Lt. Alvin Callendar, WW I pilot, shot down over France. Area: 3,243 acres. Altitude: 3 ft. M—7; C—402; TP—$9M.

Niagara Falls International Airport, N. Y. 14304; 6 mi. E of Niagara Falls. Phone: (716) 297-4100. AUTOVON: 489-3110. 914th Tactical Airlift Group (AFRES); 107th Fighter Interceptor Group (ANG). Base activated Jan. 1952. Area: 979 acres. Altitude: 590 ft. M—4; C—261; TP—$8.2M; O—114; N—174.

Norton AFB, Calif. 92409; 59 mi. E of Los Angeles, within corporate limits of city of San Bernardino. Phone: (714) 382-1110. AUTOVON: 876-1110. MAC base. 63d Military Airlift Wing; Hq. Air Force Inspection and Safety Center; Hq. Air Force Audit Agency; Hq. Aerospace Audio-Visual Service (MAC); also 445th Military Airlift Wing (Assoc.); C-141 AFRES associate unit. Base activated Mar. 2, 1942; named for Capt. Leland F. Norton, WW II bomber pilot, killed in an aircraft accident in France, May 1944. Area: 2,396 acres. Altitude: 1,156 ft. M—5,982; C—3,213; TP—$124.3M; O—56; N—208; T/G—60; D.

Offutt AFB, Neb. 68113; 8 mi. S of Omaha. Phone: (402) 291-2100. AUTOVON: 271-1110. SAC base. Hq. Strategic Air Command; 55th Strategic Reconnaissance Wing; 544th Aerospace Reconnaissance Technical Wing; AF Global Weather Center; 3d Weather Wing; 3902d Air Base Wing. Base activated 1888 as the Army's Ft. Crook; landing field named in 1924 for 1st Lt. Jarvis J. Offutt, WW I pilot who died Aug. 13, 1918, from wounds; entire installation renamed Offutt AFB in 1946. Area: 1,907 acres. Altitude: 1,049 ft. M—12,200; C—3,131; TP—$186M; O—730; N—1,651; T/G—65; H (65).

O'Hare International Airport, Ill. 60666; 22 mi. NW of Chicago Loop. Phone: (312) 694-3031. AUTOVON: 930-1110. 928th Tactical Airlift Group (AFRES); 126th Air Refueling Wing (ANG); Defense Contract Administration Services Region. Base activated in April 1946. Named for Lt. Cmdr. Edward H. "Butch" O'Hare, Medal of Honor winner killed in combat over the Pacific in Nov. 1943. Area: 391 acres. Altitude: 643 ft. M—2,256; C—1,255; TP—$36.3M.

Patrick AFB, Fla. 32925; 2 mi. S of Cocoa Beach. Phone: (305) 494-1110. AUTOVON: 854-1110. AFSC base. Operated by the 6550th Air Base Wing in support of DoD, NASA, and other agency missile and space programs. Major tenants are Defense Race Relations Institute; AF Technical Applications Center. Deputy for Eastern Test Range; 549th Tactical Air Support Group; and 2d Combat Communications Group (AFCS). Activated in 1940, base is air-head for Cape Canaveral AFS. 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: 2,332 acres. Altitude: 9 ft. M—3,366; C—3,581; TP—$61M; O—248; N—1,431; T/G—10; H (30).

Pease AFB, N. H. 03801; 3 mi. W of Portsmouth. Phone: (603) 436-0100. AUTOVON: 852-1110. SAC base. 45th Air Division; 509th Bomb Wing; also houses air refueling group (ANG). Base activated 1956; named for Capt. Harl Pease, Jr., WW II B-17 pilot and Medal of Honor winner, killed Aug. 7, 1942, during attack on Rabaul, New Britain Island. Area: 4,373 acres. Altitude: 101 ft. M—3,600; C—536; TP—$83.8M; O—122; N—990; H (70).

Peterson AFB, Colo. 80914; 7 mi. E of Colorado Springs. Phone: (303) 591-7321. AUTOVON: 692-0111. Home of 46th Aerospace Defense Wing, which supports North American Air Defense Command, Aerospace Defense Command, and the NORAD Combat Operations Center in the Cheyenne Mountain complex. Base activated in 1941; named for 1st Lt. Edward J. Peterson, who was killed Aug. 8, 1942, in aircraft crash at the field. Area: 980 acres. Altitude: 6,200 ft. M—4,731; C—1,991; TP—$88.7M; O—148; N—342; T/G—40.

Plattsburgh AFB, N. Y. 12903; 2 mi. SW of Plattsburgh. Phone: (518) 563-4500. AUTOVON: 689-1110. SAC base. 380th Bomb Wing; medium bomber and tanker operations; FB-111 combat crew training. Established as military installation in 1814; activated as an Air Force base in 1955. Area: 3,100 acres. Altitude: 235 ft. M—4,114; C—759; TP—$56.1M; O—382; N—1,255; H (20).

Pope AFB, N. C. 28308; 12 mi. NNW of Fayetteville. Phone: (919) 394-0001. AUTOVON: 486-1110. MAC base. 317th Tactical Airlift Wing; 1st Aeromedical Evacuation Group; USAF Airlift Center. Base adjoins Army's Ft. Bragg and provides tactical airlift support for airborne forces and other personnel, equipment, and supplies. Activated Sept. 1919; named for 1st Lt. Harley H. Pope, WW I flyer, killed Jan. 7, 1919, in a local crash. Area: 2,000 acres. Altitude: 218 ft. M—3,871; C—353; TP—$46.3M; O—89; N—370; D.

Randolph AFB, Tex. 78148; 20 mi. ENE of San Antonio. Phone: (512) 652-1110. AUTOVON: 487-1110. ATC base. Hq. Air Training Command; 12th Flying Training Wing; Instrument Flight Center; T-37 and T-38 pilot instructor training; site of Air Force Military Personnel Center; Hq. USAF Recruiting Service; and Community College of the Air Force. Base activated Oct. 1931; named for Capt. William M. Randolph, killed Feb. 17, 1928, in a crash. Area: 2,618 acres. Altitude: 761 ft. M—5,375; C—2,643; TP—$115.8M; O—361; N—658; T/G—13; D.

Reese AFB, Tex. 79401; 6 mi. W of Lubbock. Phone: (806) 885-4511. AUTOVON: 838-1110. ATC base. 64th Flying Training Wing, undergraduate pilot training. Base activated in 1942; named for 1st Lt. Augustus F. Reese, Jr., fighter pilot killed in Sardinia May 14, 1943. Area: 3,597 acres. Altitude: 3,338 ft. M—2,199; C—634; TP—$36.1M; O—167; N—252; T/G—12; H (10).

Richards-Gebaur AFB, Mo. 64030; 17 mi. S of Kansas City. Phone: (816) 348-2000. AUTOVON: 465-1110. AFCS base. 1840th Air Base Wing; Hq. Air Force Communications Service; 442d Tactical Airlift Wing (AFRES); AFCS NCO Academy. Base activated Mar. 1944, named for 1st Lt. John F. Richards and Lt. Col. Arthur W. Gebaur, Jr. Richards was killed Sept. 26, 1918 in France, while on an artillery-spotting mission; Gebaur, Aug. 29, 1952, over North Korea. Area: 2,418 acres. Altitude: 1,090 ft. M—2,516; C—2,215; TP—$62.4M; O—241; N—374; H (5).

Rickenbacker AFB, Ohio 43217; 13 mi. SSE of Columbus. Phone: (614) 492-8211. AUTOVON: 950-1110. SAC base. 301st Air Refueling Wing; 121st Tactical Fighter Wing (ANG); 302d Tactical Airlift Wing (AFRES); 160th Air Refueling Group (ANG). Base activated June 1942. Formerly Lockbourne AFB, renamed on May 18, 1974, in honor of Capt. Edward V. Rickenbacker, America's leading WW I ace, Medal of Honor winner, and aviation pioneer who died July 23, 1973. Area: 4,100 acres. Altitude: 744 ft. M—2,399; C—1,306; TP—$44.4M; O—165; N—700; T/G—15; D.

Robins AFB, Ga. 31098; at Warner Robins, 18 mi. SSE of Macon. Phone: (912) 926-1110. AUTOVON: 468-1001. AFLC base. Hq. Warner Robins Air Logistics Center; Hq. AFRES; 19th Bomb Wing; 5th Combat Communications Group (AFCS); 3503d Recruiting Group. Base activated March 1942; named for Brig. Gen. Augustine Warner Robins, an early Chief of the Materiel Division of the Air Corps, died June 16, 1940. Area: 7,625 acres. Altitude: 294 ft. M—4,063; C—14,988; TP—$297.3M; O—352; N—1,044; T/G—40; H (45).

Scott AFB, Ill. 62225; 6 mi. ENE of Belleville. Phone: (618) 256-1110. AUTOVON: 638-1110. MAC base. Hq. Military Airlift Command; hq. of two of MAC's services—Aerospace Rescue and Recovery Service and Air Weather Service; 375th Aeromedical Airlift Wing; AFRES associate aeromedical airlift group. Base activated June 14, 1917; named for Cpl. Frank S. Scott, first enlisted man to die in an air accident, killed Sept. 28, 1912. Area: 2,310 acres. Altitude: 453 ft. M—4,955; C—2,611; TP—$100.6M; O—327; N—372; T/G—35; H (220).

Selfridge ANGB, Mich. 48045; 3 mi. NE of Mount Clemens. Phone: (313) 465-1241. AUTOVON: 273-1110. ANG base. 127th Tactical Fighter Wing (ANG); 191st Fighter Interceptor Group (ANG); 403d Rescue and Weather Recce Wing (AFRES); 927th Tactical Airlift Group (AFRES); also hosts Navy Reserve, Marine Air Reserve, Army Reserve, Army

units, and US Coast Guard Air Station for Detroit. Base activated July 1917, and transferred to Michigan ANG, July 1971; named for 1st Lt. Thomas E. Selfridge, first Army officer to fly in an airplane and first fatality of powered flight; killed Sept. 17, 1908, at Ft. Myer, Va., when plane piloted by Orville Wright crashed. Area: 3,660 acres. Altitude: 583 ft. M—900; C—1,800; TP—$46M; T/G—12; D.

Seymour Johnson AFB, N. C. 27531; adjacent to Goldsboro. Phone: (919) 736-0000. AUTOVON: 488-1110. TAC base. 4th Tactical Fighter Wing; 68th Bomb Wing (SAC); 8th Tactical Deployment and Control Squadron (TAC). Base first activated June 12, 1941; named for Navy Lt. Seymour A. Johnson, killed in plane crash, 1941. Area: 4,093 acres. Altitude: 109 ft. M—5,689; C—1,100; TP—$66.9M; O—314; N—1,386; H (30).

Shaw AFB, S. C. 29152; 7 mi. WNW of Sumter. Phone: (803) 668-8110. AUTOVON: 965-1110. TAC base. Hq. 9th AF (TAC); RF-4C recon operations and training; 363d Tac Recon Wing; 507th Tac Air Control Group. Base activated Aug. 30, 1941; named for 2d Lt. Ervin D. Shaw, one of first Americans to see air action in WW I; killed in action July 9, 1918. Area: 3,082 acres and supports another 10,339 acres. Altitude: 252 ft. M—5,791; C—651; TP—$88.26M; O—389; N—1,316; T/G—16; H (90).

Shemya AFB, Alaska (APO Seattle 98736); located at western tip of the Aleutian chain, midway between Anchorage, Alaska, and Tokyo, Japan. Phone: (907) 572-3000. AUTOVON: (317) 572-3000. AAC base. Activated in 1943, Shemya was used as a bomber base in WW II. The International Date Line has been "bent" around Shemya so that local date is the same as elsewhere in the US. Area: about 4½ mi. long by 2½ mi. wide. Altitude: 270 ft. M—800; C—300; TP—*(see Elmendorf AFB);* T/G—70; D.

Sheppard AFB, Tex. 76311; 4 mi. N of Wichita Falls. Phone: (817) 851-2511. AUTOVON: 736-1001. ATC base. Sheppard Technical Training Center; 80th Flying Training Wing; furnishes undergraduate pilot training for the German Air Force and for foreign students under Security Assistance Training (SAT). Base activated June 14, 1941; named for Morris E. Sheppard, US Senator from Texas, died in 1941. Area: 5,082 acres. Altitude: 1,015 ft. M—11,013; C—1,996; TP—$132.1M; O—332; N—780; T/G—55; H (210).

Tinker AFB, Okla. 73145; 8 mi. SE of Oklahoma City. Phone: (405) 732-7321. AUTOVON: 735-1110. AFLC base. Hq. Oklahoma City Air Logistics Center; furnishes logistic support for bombers, jet engines, instruments, and electronics; Hq., AFCS's Southern Communications Area; 3d Combat Communications Group (AFCS); 552d Airborne Warning and Control Wing (TAC); 507th Tactical Fighter Group (AFRES). Base activated May 1941; named for Maj. Gen. Clarence L. Tinker. On June 7, 1942, at the end of the Battle of Midway, General Tinker's LB-30 (an early-model B-24) apparently went down at sea after attacking enemy ships retreating toward Wake Island. Area: 4,359 acres. Altitude: 1,291 ft. M—3,800; C—17,200; TP—$315M; O—110; N—422; H (30).

Travis AFB, Calif. 94535; at Fairfield, 50 mi. NE of San Francisco. Phone: (707) 438-4011. AUTOVON: 837-1110. MAC base. Hq. 22d AF; 60th Military Airlift Wing; 349th Military Airlift Wing (AFRES); also houses SAC tanker operations; David Grant Medical Center. Base activated May 25, 1943; named for Brig. Gen. Robert F. Travis, killed Aug. 5, 1950, in a B-29 accident. Area: 6,000 acres. Altitude: 62 ft. M—9,500; C—2,691; TP—$210.2M; O—459; N—954; T/G—40; H (325).

Tyndall AFB, Fla. 32401; 7 mi. SE of Panama City. Phone: (904) 283-1113. AUTOVON: 970-1110. ADCOM base. Air Defense Weapons Center; 678th Air Defense Group; conducts combat crew training for F-106 pilots; AF Civil Engineering Center. Base activated Dec. 7, 1941; named for 1st Lt. Frank B. Tyndall, WW I fighter pilot, killed in crash July 15, 1930. Area: 28,000 acres. Altitude: 18 ft. M—4,500; C—1,300; TP—$65M; O—178; N—795; H (80).

Vance AFB, Okla. 73701; 3 mi. SSW of Enid. Phone: (405) 237-2121. AUTOVON: 962-7110. ATC base. 71st Flying Training Wing, undergraduate pilot training. Base activated Nov. 1941; named for Lt. Col. Leon R. Vance, Jr., Medal of Honor winner, killed July 26, 1944, when air-evac plane returning him to the United States went down in the Atlantic near Iceland. Area: 1,603 acres. Altitude: 1,307 ft. M—1,128; C—1,105; TP—$20.2M; O—154; N—76; T/G—1; D.

Vandenberg AFB, Calif. 93437; 8 mi. NNW of Lompoc. Phone: (805) 866-1611. AUTOVON: 276-1110. SAC base. Site of 1st Strategic Aerospace Division (SAC); Space and Missile Testing Center (AFSC); 6595th Aerospace Test Wing. Conducts missile crew training and provides facilities and support for operational ICBM tests; research and development testing of Air Force space and ballistic missile programs; and unmanned polar-orbiting space operations of USAF, NASA contractors, foreign allies, *et al.* Originally Army's Camp Cooke; activated Oct. 1941, base was taken over by USAF June 7, 1957; renamed for Gen. Hoyt S. Vandenberg, USAF's second Chief of Staff, died Apr. 2, 1954. Officers and airmen trained in computer-controlled simulators move on to alert duty with operational ICBM wings. It is the only AFB from which are launched operational ballistic missiles in the SAC deterrent force and polar-orbiting satellites in US space program. About 1,355 launches have taken place from Vandenberg since Dec. 1958. Area: 98,400 acres. Altitude: 400 ft. M—4,567; C—5,611; TP—$113.7M; O—458; N—1,693; T/G—20; H (50).

Volk Field ANGB, Wis. 54618; 85 mi. N of Madison. Phone: (608) 427-3341. AUTOVON: 884-3480. ANG Permanent Field Training Site (PFTS), collocated with ARNG Camp Williams, both operated by the Wisconsin National Guard. Field was built by WPA and used by Army Air Forces as a training base during WW II. ANG leased the property from the state and assumed control in 1954. Named for Lt. Jerome A. Volk, first Guardsman from Wisconsin killed in action in the Korean War. Area: 2,400 acres, plus a 5,000-acre air-to-ground range. Altitude: 915 ft. M—4; C—40; TP—$1.1M; T/G—1,600.

Warren AFB, Wyo. *(see Francis E. Warren AFB).*

Webb AFB, Tex. 79720; 4 mi. SW of Big Spring. Phone: (915) 267-2511. AUTOVON: 866-0111. ATC base is candidate for closure. 78th Flying Training Wing, undergraduate pilot training (foreign students and Air Force fixed-wing conversion programs only). Base activated Sept. 25, 1942; named for 1st Lt. James L. Webb, WW II fighter pilot, killed in a crash in Japan, June 16, 1949. Area: 2,311 acres. Altitude: 2,561 ft. M—2,011; C—549; TP—$35.8M; O—189; N—276; T/G—24; H (5).

Westover AFB, Mass. 01022; 5 mi. NE of Chicopee Falls. Phone: (413) 557-1110. AUTOVON: 589-1110. 439th Tac Airlift Wing (AFRES). Base activated Oct. 1939; named for Maj. Gen. Oscar Westover, Chief of the Air Corps, killed in 1938 in aircraft accident. Area: 2,500 acres. Altitude: 244 ft. M—130; C—1,000; TP—$12.2M; O—174; N—432; D.

Wheeler AFB, Hawaii (APO San Francisco 96515); located near center of the island of Oahu. Phone: (808) 422-0531. PACAF base. Furnishes administrative and logistic support to the Hawaiian Air Defense Division (326th Air Division); Joint Coordination Center, Far East; tactical air support squadron. Also supports US Army flying activities from adjacent Schofield Barracks. Base activated Feb. 1922; named for Maj. Sheldon H. Wheeler, killed July 13, 1921, during aerial exhibition. Area: 1,423 acres. Altitude: 845 ft. M—550; C—250; TP—*(see Hickam AFB)*; D.

Whiteman AFB, Mo. 65301; 1.5 mi. S of Knob Noster. Phone: (816) 563-5511. AUTOVON: 975-1110. SAC base. 351st Strategic Missile Wing. Base activated 1942; named for 2d Lt. George A. Whiteman, shot down while taking off in a fighter plane from Wheeler Field, Hawaii, on Dec. 7, 1941, the first AAF casualty of WW II. Area: 3,384 acres plus area encompassed by missile complex of about 16,000 sq. mi. Altitude: 869 ft. M—3,237; C—599; TP—$40.2M; O—317; N—675; T/G—5; H (25).

Williams AFB, Ariz. 85224; 16 mi. SE of Mesa; 10 mi. E of Chandler. Phone: (602) 988-2611. AUTOVON: 474-1011. ATC base. 82d Flying Training Wing, largest undergraduate pilot training base; also provides F-5 combat crew training

for foreign students. Home of AFSC Human Resources Laboratory/Flying Training Division doing extensive research on flight simulators. Base activated July 1941; named for 1st Lt. Charles D. Williams, killed in crash July 6, 1927, during aerial demonstration. Area: 3,867 acres. Altitude: 1,385 ft. M—2,781; C—707; TP—$42.7M; O—310; N—498; T/G—40; H (20).

Willow Grove Air Reserve Facility, Pa. 19090; 20 mi. N on Rt. 611 from central Philadelphia. Phone: (215) 441-1062. AUTOVON: 991-1062. 913th Tactical Airlift Group (AFRES); 111th Tactical Air Support Group (ANG). Base activated Aug. 1958. Area: 162 acres. Altitude: 361 ft. M—8; C—387; TP—$8.7M.

Wright-Patterson AFB, Ohio 45433; Fairborn, 10 mi. ENE of Dayton. Phone: (513) 257-1110. AUTOVON: 782-1110. AFLC base. Hq. Air Force Logistics Command; Hq. Aeronautical Systems Division (AFSC); Foreign Technology Division (AFSC); AF Institute of Technology; USAF Medical Center, Wright-Patterson; Air Force Museum; Air Force Acquisition Logistics Division; plus more than 70 other DoD activities and government agencies. Originally separate, Wright Field and Patterson Field were merged and redesignated Wright-Patterson AFB on Jan. 13, 1948; named for aviation pioneers Orville and Wilbur Wright and for 1st Lt. Frank S. Patterson, killed June 19, 1918, in the crash of a DH-4. The Wright brothers did much of their early flying on Huffman Prairie, now Areas A and C of present base. Area: 8,147 acres. Altitude: 824 ft. M—7,700; C—16,600; TP—$444M; O—1,120; N—867; T/G—41; H (320).

Wurtsmith AFB, Mich. 48753; 3 mi. NW of Oscoda. Phone: (517) 739-2011. AUTOVON: 623-1110. SAC base. 40th Air Division; 379th Bomb Wing. Base activated in 1926; assigned to SAC Apr. 1, 1960; named for Maj. Gen. Paul B. Wurtsmith, killed Sept. 13, 1946, in crash. Area: 5,200 acres. Altitude: 634 ft. M—3,100; C—600; TP—$39M; O—321; N—1,034; H (20).

Youngstown Municipal Airport, Vienna, Ohio 44473; 14 mi. N of Youngstown. Phone: (216) 856-1645. AUTOVON: 856-1620. 910th Tactical Fighter Group. Base activated 1952. Area: 231 acres. Altitude: 1,196 ft. M—1; C—332; TP—$6.0M; T/G—5. ■

USAF'S MAJOR BASES OVERSEAS

Albrook AFS, Canal Zone
APO New York 09825
Hq. USAF Southern Air Division

Andersen AFB, Guam
APO San Francisco 96334
Hq. 3d Air Division, SAC

Ankara AS, Turkey
APO New York 09254
TUSLOG detachment, USAFE

Aviano AB, Italy
APO New York 09293
Tactical group, USAFE

Bitburg AB, West Germany
APO New York 09132
Tactical fighter base, USAFE

Camp New Amsterdam, The Netherlands
APO New York 09292
Fighter-interceptor base, USAFE

Clark AB, Philippines
APO San Francisco 96274
Hq. 13th Air Force, PACAF

Frankfurt, West Germany
APO New York 09101
Support base, USAFSS

Hahn AB, West Germany
APO New York 09109
Tactical fighter base, USAFE

Hellenikon AB, Greece
APO New York 09223
Support base, USAFE

Howard AFB, Canal Zone
APO New York 09817
Support base, USAF Southern Air Division

Incirlik AB, Turkey
APO New York 09289
Tactical fighter base, USAFE

Izmir, Turkey
APO New York 09224
Support base, USAFE

Kadena AB, Okinawa
APO San Francisco 96239
Air division base, PACAF
Strategic operations, SAC

Keflavik Airport, Iceland
FPO (US Navy), New York 09571
Fighter-interceptor base, ADCOM

Kunsan AB, South Korea
APO San Francisco 96264
Tactical fighter base, PACAF

Lajes Field, Azores
APO New York 09406
Airlift base, MAC

Lindsey AS, West Germany
APO New York 09633
Support base, USAFE

Moron AB, Spain
APO New York 09282
Support base, USAFE

Osan AB, South Korea
APO San Francisco 96570
Air division base, PACAF
Tactical fighter base, PACAF

RAF Alconbury, United Kingdom
APO New York 09238
Tactical reconnaissance base, USAFE

RAF Bentwaters, United Kingdom
APO New York 09755
Tactical fighter base, USAFE

RAF Lakenheath, United Kingdom
APO New York 09179
Tactical fighter base, USAFE

RAF Mildenhall, United Kingdom
APO New York 09127
Hq. 3d Air Force, USAFE
Tactical airlift base, USAFE

RAF Sculthorpe, United Kingdom
APO New York 09048
Support base, USAFE

RAF Upper Heyford, United Kingdom
APO New York 09194
Tactical fighter base, USAFE

RAF Wethersfield, United Kingdom
APO New York 09120
Support base, USAFE

RAF Woodbridge, United Kingdom
APO New York 09405
Tactical fighter base, USAFE

Ramstein AB, West Germany
APO New York 09012
Hq. USAFE
Tactical fighter base, USAFE
Hq. European Command Area, AFCS

Rhein-Main AB, West Germany
APO New York 09057
Tactical airlift base, MAC

Sembach AB, West Germany
APO New York 09130
Hq. 17th Air Force, USAFE
Support base, USAFE

Sondrestrom AB, Greenland
APO New York 09121
Support base, ADCOM

Spangdahlem AB, West Germany
APO New York 09123
Tactical fighter base, USAFE

Taegu AB, South Korea
APO San Francisco 96213
Combat support base, PACAF

Tempelhof Airport, Berlin, Germany
APO New York 09611
Support base, USAFE

Thule AB, Greenland
APO New York 09023
Aerospace defense base, ADCOM

Torrejon AB, Spain
APO New York 09283
Hq. 16th Air Force, USAFE
Tactical fighter base, USAFE

Wiesbaden AB, West Germany
APO New York 09332
Support base, USAFE
Weather base, MAC

Yokota AB, Japan
APO San Francisco 96328
Hq. 5th Air Force, PACAF

Zaragoza AB, Spain
APO New York 09286
Tactical fighter training base, USAFE

Zweibrücken AB, West Germany
APO New York 09860
Tactical fighter/reconnaissance base, USAFE

A GUIDE TO USAF'S R&D FACILITIES

The United States Air Force is the product of a technological breakthrough —powered flight. From its inception, USAF has been the nation's principal user as well as provider of aerospace technology. The Air Force's dependence on technology increases steadily and with it the importance of USAF's role as a catalyst of scientific and technological advance. The Air Force Systems Command (AFSC) and its many diverse components formulate and manage USAF's scientific and technological activities and programs. Presented here is a guide to all key installations of the AFSC divisions, centers, and laboratories.

Principal R&D Facilities

From AFSC headquarters at Andrews AFB, Md., Gen. William J. Evans, AFSC Commander, directs the operations of the command's divisions, development and test centers, ranges, and laboratories. AFSC manages and controls approximately 200 installations, valued at more than $2 billion. Following is a descriptive listing of these organizations and facilities:

Special AFSC Divisions

Foreign Technology Division (FTD), Wright-Patterson AFB, Ohio—To prevent possible technological surprise by a potential enemy, the FTD acquires, evaluates, analyzes, and disseminates foreign aerospace technology, in concert with other divisions and centers. Information collected from a wide variety of sources undergoes screening and is processed in unique electronic data-handling and laboratory processing equipment. Then, it is analyzed by scientific and technical specialists who prepare reports, studies, and technical findings and assessments of potential hostile, technological, or operational environs with which USAF weapon systems must cope.

Air Force Contract Management Division (AFCMD), Kirtland AFB, N. M.—Responsible for DoD contract management activities in those plants assigned to the Air Force under the DoD National Plant Cognizance Program. The AFCMD manages the administration of contracts executed by the Air Force, Army, Navy, Defense Supply Agency, NASA, and other government purchasing agencies when required.

Aerospace Medical Division (AMD), Brooks AFB, Tex.—Conducts biomedical and biotechnical research, development, and test programs necessary to explore the capabilities and limitations of man in aerospace operations and enhance his ability to function as an integral part of the Air Force systems and operations. The Division provides clinical medical services and specialized advanced training and education in aerospace medical and paramedical specialties. AMD units include:

- **Wilford Hall USAF Medical Center,** Lackland AFB, Tex.—AMD's primary clinical facility has 1,100 beds and is the largest single-structure hospital in the Department of Defense. Postgraduate training in the form of internships, residencies, and fellowships is provided for medical, dental, administrative, and allied medical specialists.

- **6570th Aerospace Medical Research Laboratory,** Wright-Patterson AFB, Ohio —Specializes in theoretical and experimental medical research and development in the areas of biodynamics, human engineering, combined aerospace stress effects, and toxic hazards.

- **USAF School of Aerospace Medicine,** Brooks AFB, Tex.—Is concerned with research directed at the selection, care, and retention of pilots and other specialized Air Force personnel. The School specializes in research into the effects of electromagnetic and ionizing radiation, atmosphere composition, and control and development of medical equipment needed specifically for aerospace operations.

USAF Occupational and Environmental Health Laboratory (OEHL), Brooks AFB, Tex.—Responsible for services in the bioenvironmental engineering, analytical, ecology/toxicology, and specialized areas.

Product Organizations

Space and Missile Systems Organization (SAMSO), Los Angeles AFS, Calif.—Manages DoD space and ballistic missile systems. Its responsibility for space systems development encompasses engineering, test, program management, installation, on-orbit tracking command and control, and evaluation. SAMSO manages development of space boosters and related aerospace ground equipment for the launch and tracking of a wide variety of DoD and NASA payloads.

- **The Air Force Satellite Control Facility (AFSCF),** headquartered at Sunnyvale AFS, Calif., operates a worldwide tracking and control network, collects and processes data from satellites.

- **The Space and Missile Test Center (SAMTEC),** headquartered at Vandenberg AFB, Calif., provides field-test management for all DoD-directed ballistic and space programs. SAMTEC manages satellite launches from Vandenberg and Patrick AFB, Fla., as well as a variety of ICBM ballistic tests. The Test Center also operates the Western Test Range. Beginning in the early 1980s, Space Shuttle flights with astronaut crews will be launched and recovered from SAMTEC.

Deputy for Eastern Test Range (Det. 1, SAMTEC), Patrick AFB, Fla.—The Deputy for Eastern Test Range is an operational component and missile testing laboratory of the Air Force Systems Command. Executive responsibility for the ETR is assigned to the Space and Missile Test Center, Vandenberg AFB, Calif. The Eastern Test Range extends southeastward from Cape Canaveral across the Atlantic Ocean to ninety degrees east longitude in the Indian Ocean. Support capability is provided by a number of ground tracking stations, sites, and a fleet of instrumented ships and aircraft to provide mobile support in remote areas. Each station and tracking system is configured to complement the integrated range network.

Aeronautical Systems Division (ASD), Wright-Patterson AFB, Ohio—Is responsible for the development and acquisition of aeronautical systems, as well as for tactical warfare and reconnaissance systems, subsystems, and related equipment.

Typical of the wide range of systems presently under ASD management are the B-1 advanced strategic bomber; the F-15 air-superiority fighter; the International Fighter, or F-5E; the F-16 Air Combat Fighter; the A-10 Close Air Support Aircraft; and the Maverick, a television-guided, air-to-surface weapon.

Not only does ASD acquire new and advanced systems for the future, but it modernizes aircraft and nonballistic missiles of the force-in-being. In recent years, ASD has been deeply involved in

a tactical warfare modernization program. Old aircraft have been modified and new ones developed for this purpose. Noteworthy are the AC-47 and AC-130 gunships and the A-7D attack aircraft.

Electronic Systems Division (ESD), Hanscom AFB, Mass.—Responsible for developing, acquiring, and delivering electronic systems and equipment for the command control and communications (C^3) functions of aerospace forces.

These systems take many forms, such as undersea communications cables around the Indochina peninsula, line-of-sight and tropospheric scatter communications throughout the Mediterranean, the underground North American Air Defense Command (NORAD) combat operations center, long-range radars to warn of missile and aircraft attack, the air-defense control net for the North American continent, equipment for improved weather forecasting, the free world's satellite detection and tracking network, and a new airborne radar-and-communications post, which can give the Air Force an instant air-defense and tactical-control system anywhere in the world at jet speed.

ESD is heavily involved in the application of computers to command and control problems and is the Air Force's center for evaluating contract proposals by computer manufacturers.

Development Centers and Labs

Director of Science & Technology, Andrews AFB, Md.—Located at Systems Command headquarters, the Director of Science & Technology (DL) manages the command's research and development laboratories' programs and developments. Laboratories either under the Director of Science & Technology supervision, or for which DL has responsibility over technical direction of selected developments, and their respective functional areas, are:

• **Air Force Weapons Laboratory (AFWL),** Kirtland AFB, N. M.—Conducts research and development programs in weapon effects and safety, fuzing, civil engineering, laser technology, and nuclear survivability/vulnerability.

• **Rome Air Development Center (RADC),** Griffiss AFB, N. Y.—RADC is under the operational control of the Electronic Systems Division (ESD). Conducts research in electromagnetic energy conversion, signal detection and processing, computation and display, command control, and test and evaluation. RADC furnishes research and development and engineering support of intelligence devices, ground communications hardware, ground environment equipment for surveillance, aircraft approach and landing, ground-based navigation aids, and electronic warfare.

• **Air Force Rocket Propulsion Laboratory (AFRPL),** Edwards AFB, Calif.—AFRPL is responsible for conducting exploratory and advanced development programs in the areas of liquid rockets, solid rockets, hybrid rockets, advanced rocket propellants, and the development of ground support equipment. AFRPL carries out numerous system support programs for other units and divisions of AFSC, other branches of the armed services, and NASA.

• **Air Force Armament Laboratory (AFATL),** Eglin AFB, Fla.—AFATL is under the operational control of Armament Development and Test Center (ADTC). AFATL is the principal Air Force Laboratory performing research and development of free-fall and guided nonnuclear munitions and airborne targets and scorers. AFATL conducts exploratory and advanced development of aircraft armaments and performs engineering support to ADTC development activities that provide munitions products to operational forces. The wide span of interest includes chemical and fuel-air explosives, energy sources and conversions, electronic and mechanical devices, aerodynamics, terradynamics, etc., as well as bombs, dispensers, fuzes, flares, guns, and ammunition.

• **Air Force Human Resources Laboratory (AFHRL),** Brooks AFB, Tex.—AFHRL has operating locations at Lackland AFB, Tex.; Williams AFB, Ariz.; Lowry AFB, Colo.; Wright-Patterson AFB, Ohio; Maxwell AFB, Ala.; and the Air Force Academy. AFHRL is the principal Air Force organization planning and executing development programs in the fields of manpower, personnel, training, and education. AFHRL provides technical and management assistance to Hq. USAF, USAF major commands, other US military services, other US governmental agencies, and to military services of allied countries.

• **Air Force Geophysics Laboratory (AFGL),** Hanscom AFB, Mass.—AFGL is the center for basic and exploratory development involving the earth, atmosphere, and space environment.

• **The Frank J. Seiler Research Laboratory (FJSRL),** USAF Academy, Colo.—This in-house laboratory is engaged in basic research concerned with the physical and engineering sciences. The research usually centers around chemistry, applied mathematics, and gas dynamics. FJSRL sponsors related research conducted by the faculty and cadets of the USAF Academy.

• **Air Force Office of Scientific Research (AFOSR),** Bolling AFB, D. C.—The primary agency for all Air Force basic research in physics, aeromechanics and energetics, the chemical sciences, electronic and solid state sciences, life sciences, and mathematical and information sciences. The administration of the Frank J. Seiler Research Laboratory and European Office of Aerospace Research and Development also belongs to AFOSR.

• **European Office of Aerospace Research (EOAR),** London, England—This unit is the link between the Air Force and the scientific communities in Europe, Africa, and the Near East.

Wright Aeronautical Laboratories

The Air Force Wright Aeronautical Laboratories (AFWAL) mission is to plan and execute USAF exploratory development, advanced development, and selected research and engineering development programs for flight vehicles, aeropropulsion, avionics, and materials, and the USAF manufacturing methods program. It also provides support within its areas of technical competence for the planning, development, and operation of aerospace systems, and to Air Force, Department of Defense, and other government agencies.

The Air Force Wright Aeronautical Laboratories is an establishment directly subordinate to the Air Force Systems Command and is directly responsible to AFSC Director of Science and Technology for mission accomplishment.

Laboratories comprising the AFWAL include:

• **Air Force Aero Propulsion Laboratory (AFAPL)** works in the areas of air breathing, electric and advanced propulsion, fuels and lubricants, and flight vehicle power.

• **Air Force Materials Laboratory (AFML)** handles research in material sciences, metals and ceramics, nonmetallic materials, manufacturing technology, and materials application.

• **Air Force Flight Dynamics Laboratory (AFFDL)** is concerned with flight vehicle dynamics, performance, control, launching, alighting, and structures; crew station environmental control and escape; and aerodynamic decelerators.

• **Air Force Avionics Laboratory (AFAL)** conducts research and technology programs for electronic components, optics and photo materials, navigation and guidance, vehicle defense, electronic warfare, and communications.

Test and Evaluation Centers

Air Force Flight Test Center (AFFTC), Edwards AFB, Calif.—Responsible for test and evaluation of manned aircraft and aerospace vehicles. Conducts aircraft development testing and provides facilities for contractor tests and the functional tests and military demonstrations intended to determine the capability and suitability of a complete system in meeting established USAF requirements and design objectives. The B-1, F-15, F-5E, A-10, F-16, and E-3A Airborne Warning and Control System (AWACS) are currently being tested at AFFTC. The USAF Test Pilot School trains experimental test pilots to supervise and conduct flight tests of research, experimental, or production-type aerospace vehicles. Additionally, the school trains Aerospace Research Pilots for flight test, engineering design, and/or management in ad-

vanced aircraft and manned space research programs. The USAF Parachute Test Group, El Centro, Calif., develops recovery and retardation systems for DoD.

Armament Development and Test Center (ADTC), Eglin AFB, Fla.—The Center manages the Air Force's nonnuclear munitions program. ADTC's primary mission is the development, testing, and initial purchase of all nonnuclear munitions. The Center also is responsible for the development and test of all nonnuclear munitions for the Air Force as well as the initial purchase of these munitions for the Air Force's inventory. Among the items developed and tested by ADTC are bombs, mines, dispensers, and fuzes. In addition, the Center conducts research and development testing of aeronautical systems, such as aircraft and their associated missiles and airborne electronic warfare equipment.

Arnold Engineering Development Center (AEDC), Arnold AFS, Tenn.—This Center is the largest complex of wind tunnels, high-altitude jet and rocket engine test cells, space environmental chambers, and hyperballistic ranges in the free world. The Center's mission is to ensure that aerospace hardware—aircraft, missiles, spacecraft, jet and rocket propulsion systems, and other components—will "work right the first time they fly." Tests are conducted for federal agencies, the Army, Navy, Air Force, and private companies. These customers reimburse AEDC for conducting their tests. Currently valued at $1 billion, AEDC began its first tests in the 1950s. ARO, Inc., is the operating contractor.

Among the Center's forty test units are some of the largest and most adaptable of their respective types currently available for testing. They subject aerospace systems to objective testing across a broad range of realistic and repeatable conditions—often with engines operating. Full-size hardware or scale models can be tested at Arnold under conditions precisely matching altitudes of up to 1,000 miles and velocities up to twenty-three times the speed of sound.

Air Force Civil Engineering Center (AFCEC), Tyndall AFB, Fla.—AFCEC has a two-fold mission aimed at upgrading the technology and capabilities of Air Force civil engineering. It functions as the lead center for civil engineering and environmental quality research and development; exploratory advanced and engineering development; and test and evaluation of civil engineering systems, techniques, and equipment. The Center also provides specialized technical and planning assistance to all commands.

GUIDE TO NASA'S RESEARCH CENTERS

The National Aeronautics and Space Administration (NASA) continues to operate a number of research, development, test, and evaluation (RDT&E) facilities that frequently participate in or coordinate their work with USAF R&D programs.

Following is a descriptive listing of key NASA installations:

Ames Research Center, Moffett Field, Calif.—Ames conducts laboratory and flight research such as atmospheric reentry, fundamental physics, materials, chemistry, life sciences, guidance and control, aircraft supersonic flight, aircraft operational problems, and V/STOL. It manages such spaceflight programs as Pioneer. Named for Dr. Joseph S. Ames (1864–1943), Chairman of the National Advisory Committee for Aeronautics (NACA) from 1927 to 1939.

Hugh L. Dryden Flight Research Center, Edwards AFB, Calif.—Dryden Flight Research Center is concerned with manned flight within and outside the atmosphere, including low-speed, supersonic, hypersonic, and reentry flight, and aircraft operations. Examples of its studies are lifting bodies (wingless vehicles whose bodies provide lift in the atmosphere) and integration between man and technological systems and vehicles. Named for Dr. Hugh L. Dryden (1898–1965), Director of NACA from 1949–58 and then Deputy Administrator of the new NASA.

Goddard Space Flight Center, Greenbelt, Md.—Goddard Space Flight Center is responsible for a broad variety of unmanned earth-orbiting satellites and sound-rocket projects. Among its projects are Orbiting Observatories, Explorers, Nimbus, Applications Technology satellites, and Earth Resources Technology satellites. Goddard is also the nerve center for the worldwide tracking and communications network for both manned and unmanned satellites. Named for Dr. Robert H. Goddard (1882-1945), "father" of rocketry and the space age.

Jet Propulsion Laboratory, Pasadena, Calif.—Jet Propulsion Laboratory is operated for NASA by the California Institute of Technology. The laboratory's primary role is investigation of the planets. It also designs and operates the Deep Space Network, which tracks, communicates with, and commands spacecraft on lunar, interplanetary, and planetary missions.

John F. Kennedy Space Center, Fla.—The Center makes preflight tests and prepares and launches manned and unmanned space vehicles for NASA. Launches from the Pacific Coast are conducted by the KSC Western Test Range Operations Division at Lompoc, Calif. Named for the late US President under whose leadership plans were made to land men on the moon.

Langley Research Center, Hampton, Va.—Oldest of the NASA centers, Langley has the task of providing technology for manned and unmanned exploration of space and for improvement and extension of performance, utility, and safety of aircraft. Langley devotes more than half its efforts to aeronautics. The Center is charged with overall project management for Viking. Named for Samuel P. Langley (1834–1906), astronomer and aerodynamicist who pioneered in the theory and construction of heavier-than-air craft.

George C. Marshall Space Flight Center, Huntsville, Ala.—Marshall serves as one of NASA's primary Centers for the design and development of space transportation systems, orbital systems, scientific payloads, and other means for space exploration. The Center has major responsibilities for Space Shuttle activities, the Spacelab program, such scientific projects as the High Energy Astronomy Observatory, and programs in support of the Energy Research and Development Administration. Named for the late General of the Army George C. Marshall, recipient of the Nobel Peace Prize, who died in 1959.

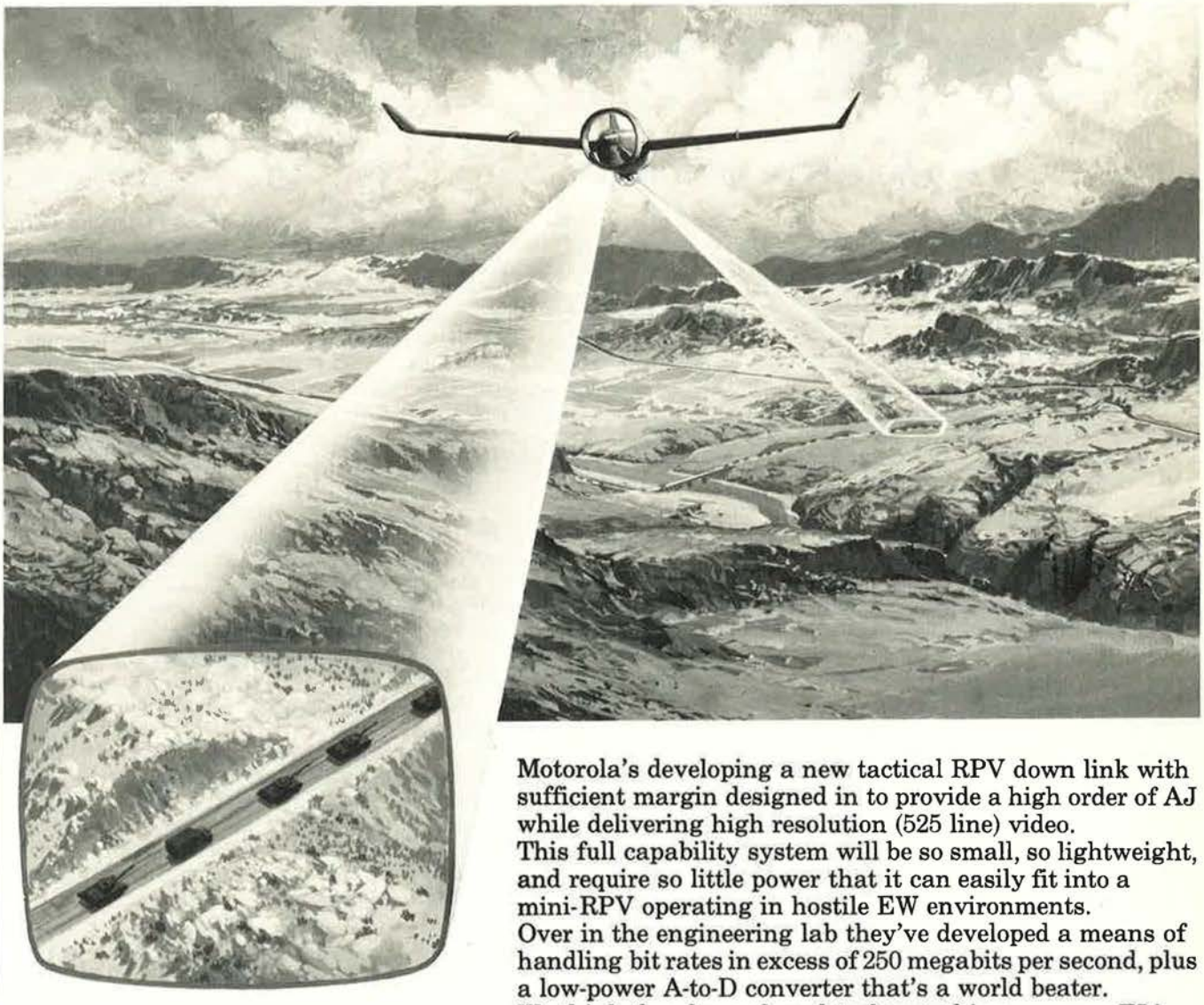
Wallops Flight Center, Wallops Island, Va.—Wallops Station is one of the oldest and busiest ranges in the world. Some 300 experiments are sent aloft each year on vehicles that vary in size from small meteorological rockets to the four-stage Scout with orbital capability. A sizable effort is devoted to aeronautical research and development.

Lewis Research Center, Cleveland, Ohio—Aircraft and rocket propulsion and electric power generation in space are among the major programs of Lewis. These take the Center into such studies as metallurgy, fuels and lubricants, magnetohydrodynamics, and ion propulsion. Lewis has technical management of the Agena and Centaur rocket stages. Named for Dr. George W. Lewis (1882–1948), NACA Director of Aeronautical Research from 1924–47.

Lyndon B. Johnson Space Center, Houston, Tex.—The Center designs, tests, and develops manned spacecraft and selects and trains astronauts. It directs the Space Shuttle program. Mission Control for manned spaceflight is located at the Center. Named for the late President Johnson, during whose Administration the US manned space program gained its greatest impetus.

National Space Technology Laboratories, Bay St. Louis, Miss.—This laboratory complex conducts remote sensing as well as environmental and related research. Other responsibilities include developmental testing of the Space Shuttle's main engine. ■

An anti-jam RPV down link that delivers high-resolution video.



Motorola's developing a new tactical RPV down link with sufficient margin designed in to provide a high order of AJ while delivering high resolution (525 line) video.
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Standardization—that perennial NATO article of faith—remains an elusive goal. There may, however, be an indirect route to its achievement through . . .

The Back Door to NATO Standardization

By Gen. T. R. Milton, USAF (Ret.)

LAST fall, then Defense Secretary Donald Rumsfeld struck a great blow for NATO standardization, or so it seemed at the time. He directed the Army, you will recall, to get together with the Germans on the matter of a new tank. His purpose was to salvage some commonality—to use that jinxed word from the McNamara era—between the German Leopard II and the Army's new main battle tank, the XM-1.

Those of us who, in our ignorance, think of all armored and tracked vehicles as tanks find it hard to realize that a new, and genuine, tank has the same emotional effect on the armored soldiers as a new airplane has for an aviator. Difficult to believe, but true. With that in mind, it is understandable that the Army has resisted compromising its XM-1 in the interests of standardization. Mr. Rumsfeld's agreement with German Defense Minister Leber now seems to be in a certain amount of jeopardy. In retaliation, the Germans may cool their support for NATO procurement of AWACS, and that would be a severe setback to that badly needed program.

This whole business of standardization in NATO has been, for many years, a divisive one. As an article of faith, standardization is unchallenged. The problem begins whenever there is a serious effort to achieve it. Gen. Johannes Steinhoff, the former Chairman of NATO's Military Committee, has referred to the NATO arsenal as a military museum, and so it is: different rifles, tanks, artillery pieces, and aircraft wherever one looks.

From time to time there is a slight movement toward standardization, as in the case of the F-16 procurement by Belgium, the Netherlands, Denmark, and Norway, but there is no discernible trend. NATO is, after all, made up of free countries. Such considerations as jobs and profits enter the deliberations on weapons procurement. Since standardization inevitably means compromise and concession, these considerations of self-interest are apt to come first. Nowhere, according to our allies, is this more evident than in the United States. The American definition of standardization is, in their view, "Buy American." The tank dispute, in which the Germans evidently feel their Leopard II was not given a fair shake, will simply reinforce that view of American chauvinism.

At this point, maybe it would be a good idea to redirect our missionary zeal toward some more achievable goal. Standardization can remain a NATO article of faith, but, as is sometimes the case with articles of faith, a little out of reach.

There is something NATO could do to improve its capability, and it is, at least in theory, within reach. It has to do with an improved ability to respond to a crisis in the Central Region, which is the true heartland of the Alliance. This is the region where we have our forces. It is the region that takes in West Germany, the Netherlands, Belgium, the United Kingdom, Luxembourg, and France on the NATO side, and East Germany, Czechoslovakia, Hungary, and Poland on the Warsaw Pact side, plus the main concentration of Soviet troops facing the West. War, at least a calculated war, is unlikely in that region, but crises and confrontations are not. A slow and disorganized NATO reaction to a confrontation might prove an irresistible encouragement to the Soviets.

The crisis management machinery in NATO is a splendid example of how free, independent, and equal these allies are. Each, whether tiny Luxembourg or the United States, has an equal voice. Each NATO Ambassador in Brussels, when deliberating what actions to take in a crisis, must communicate with his authorities back home for instructions. Meanwhile, the military forces in NATO remain under national control. The Supreme Allied Commander Europe, Gen. Alexander Haig, can only plan. His command and control machinery is ticking over but not engaged. Any meaningful military display of Allied unity and resolve must await the political deliberations.

There is a long and complex NATO alert system designed to chart actions in a crisis. Some of these actions, because of their impact on normal peacetime activities and economy, must await a true crisis. But giving SACEUR a more direct day-to-day role in the command and control of NATO forces in the Central Region could be done in peacetime. It could even be argued that taking this step before a crisis would be less provocative than trying to integrate in the face of a threat.

At any rate, it is an idea that would seem to be attainable. Once attained, such things as standardization might even be within reach. ■

THE ELECTRONIC AIR FORCE

In July, AIR FORCE Magazine will once again present its annual "Electronic Air Force" issue.

This year the editors will focus on a broad range of subject matter, including a report from AFSC's Electronic Systems Div., . . . Command, Control and Communications . . . latest Electronic Warfare developments and ongoing programs . . . advanced computer technology . . . what's new in the labs . . . a checklist of major Air Force electronic projects and prime contractors.

These are only a few of the special features planned for this issue.

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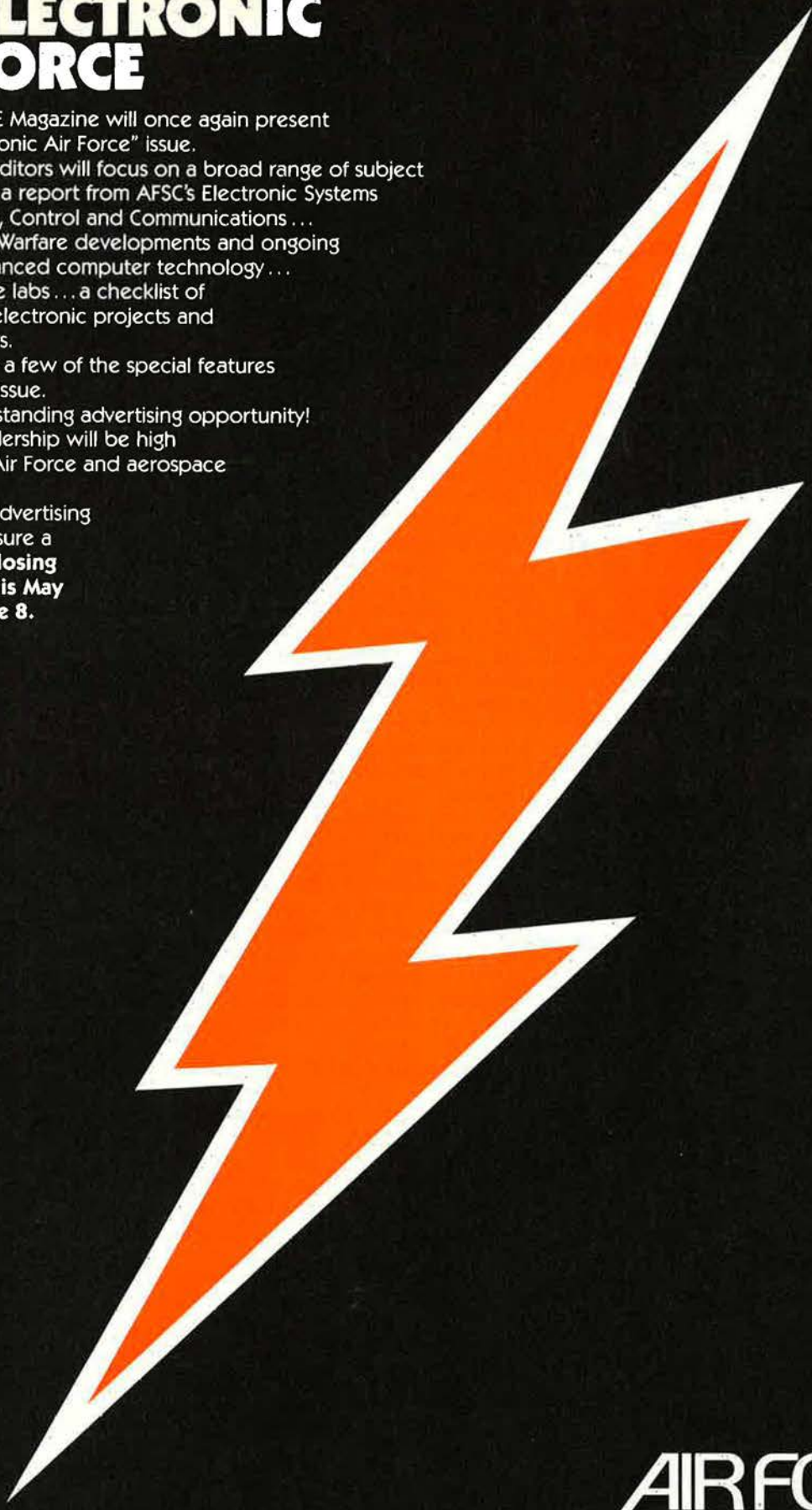


AIR FORCE MAGAZINE

PUBLISHED BY THE AIR FORCE ASSOCIATION

The Bulletin Board

By James A. McDonnell, Jr., MILITARY RELATIONS EDITOR

Officer Force Stabilizing

A reduction in "early release" opportunities, and level production of about 2,800 AFROTC graduates annually—these are among USAF plans for increasing the stability of the officer force. Key to the drive is the apparent end of the annual personnel strength cuts which lasted nearly a decade, according to Lt. Gen. Kenneth L. Tallman, the Hq. USAF DCS/Personnel.

Wholesale early outs in recent years have staved off officer RIFs. But General Tallman now feels that starting next fiscal year, USAF can trim voluntary exits sharply and still avoid RIFs, which he noted "are not exactly cost-effective." He hopes soon to end them entirely.

To better handle the influx of new officers, Headquarters is curbing its "long lead-time" AFROTC source, and expanding OTS, its "short lead-time" source. This will mean about 2,500 new AFROTC acquisitions this fiscal year and about 2,800 annually thereafter, General Tallman told AIR FORCE Magazine. OTS is expanding to turn out nearly 1,500 graduates in FY '78, including 200 from the Airman Education and Commissioning Program. The service is trying hard to get Congress to fund the AECP slots in OTS. Academy production will remain unchanged.

The Defense Department, meantime, is limiting the Air Force to use of 4,375 of its authorized 6,500 AFROTC scholarships. While the figure may rise to 4,775 in FY '78, General Tallman says he'll continue to press for the full 6,500. They're needed to help Air Force compete with industry and the other services for outstanding "technically-oriented people."

Longer tours and new voluntary assignment policies adopted recently have also curbed personnel turbulence.

Air Force officer strength stood at 98,200 in late February. The Defense-directed targets are 96,200 by September 30, 1977, and 95,000 a year later. While USAF doesn't "anticipate" any significant changes, the Administration, in a quest for savings, could suddenly carve those manpower goals. And that could mean a whole new ball game.

Union Decision Near

At press time, the explosive military union issue—seemingly the main topic of conversation in the Pentagon—had reached a new boiling point. Among the developments:

• The American Federation of Government Employees was preparing to poll its 350,000 members on whether or not to organize military people. The poll will be conducted by AFGE's 1,500 locals. If the vote is favorable, organizing will start in the fall, but if not the issue will be discarded, a spokeswoman said.

• Defense Secretary Harold Brown, at a Senate hearing on the union question, told the Armed Services Committee that existing rules are adequate to handle the problem, though he said he would draw up a tougher directive "if events require it." Saying that a strong anti-union law might backfire, the Secretary urged the lawmakers to exercise caution in pursuing antiunion legislation.

• Armed Services Committee Chairman Sen. John Stennis (D-Miss.) reintroduced a bill prohibiting military unions, which he had sponsored last year, but with a major change: This one contains language that specifically permits associations such as AFA to operate. There was concern that last year's bill would have outlawed military associations.

• The US Chamber of Commerce joined many other prominent organizations in flat opposition to any "attempts to organize the US armed forces."

• The arguments for and against military unionization were presented in detail in the first issue of the *American Enterprise Institute Defense Review*, a new magazine covering national security issues. David Cortright, described by AEI as "an expert" on European unions, asserts that they "have not had a negative impact on national security." The opposing argument is presented by Sen. Strom Thurmond (R-S. C.), who also has introduced a bill, along with thirty-seven cosponsors, prohibiting unionization of the military. Former Defense Secretary Melvin R. Laird is chairman of AEI's Advisory Council.

AFA's position on unions remains unchanged. Acknowledging that unions are fundamental in our system, AFA unequivocally rejects military unionization and believes that existing statutory provisions permit the Administration to prohibit it.

USAF's first women navigator trainees line up by their T-43 trainer at Mather AFB, Calif. From the top, Capt. Elizabeth A. Koch, 2d Lt. Ramona L. Roybal, 1st Lt. Mary K. Higgins, 2d Lt. Florence E. Fowler, Capt. Margaret M. Stanek, and 1st Lt. Bettye J. Payne. They began their training March 10 and, if successful, will win their wings after a thirty-three-week stint.

AFA Resolution Backs WASPs

A resolution adopted March 5

by AFA's Board of Directors urges the government to officially recognize the important contribution the Women's Airforce Service Pilots made to the country during World War II and extend them veterans benefits.

A bill sponsored by Sen. Barry M. Goldwater (R-Ariz.), which AFA supports, would provide the recognition and benefits. The WASPs, all civilian volunteer pilots, flew more than 60,000,000 miles between September 1942 and December 1944, and thirty-eight lost their lives during operational flights or training missions. Besides having no military status, they received less pay than their male counterparts. Fewer than 1,000 WASPs remain, some of whom need VA hospitalization and pensions. Senator Goldwater inserted AFA's resolution supporting the WASPs in the March 18 edition of the *Congressional Record*.

AFJROTC Units Compete

The winning entries in the 1976–77 AFJROTC contest, sponsored by AFA's Aerospace Education Foundation, are to be announced next month. Theme of the competition is "The Imperatives of National Readiness." More than half of the 275 AFJROTC units earlier indicated they would submit entries, which can be in the form of scripts, videotapes, films, audio presentations, etc. Cadets from the winning units will be guests at the AFA Convention in Washington, D. C., in September. The top prize is a $4,000 scholarship that may go to one member of the winning unit or be divided among up to four members.

In a related development, Air University has announced that more than 100 AFJROTC instructor jobs will be available to retired USAF members this fall. Details are available by telephoning AUTOVON 875-7741, commercial (205) 293-7741, or writing AFJROTC/JRI, Maxwell AFB, Ala. 36112.

New Leadership at VA

"I'm well aware of the work the good AFA people in Georgia are doing, and I look forward to working with AFA and the other veterans groups." So said Max Cleland, the new Administrator of the Veterans Administration, during a recent exchange with AFA's Deputy Assistant Executive Director James A. McDonnell, Jr. The occasion, at the Administrator's office, followed the swearing-in of Cleland's new deputy, Rufus H. Wilson.

Mr. Cleland, thirty-four, is a triple amputee. He was an Army captain in Vietnam in 1968 when he was severely wounded. He spent eighteen months in military and VA hospitals before returning home to Lithonia, Ga., and winning a seat in the state senate. Later he served on the Senate Veterans Committee staff. Cleland replaces Richard L. Roudebush as head of the government's largest independent agency.

Mr. Wilson, a disabled World War II Marine Corps veteran who was wounded on Saipan, is a VA career employee who supervised the agency's vast GI Bill and home loan, compensation, and pension programs.

VA serves nearly 30,000,000 living veterans, dependents, and survivors of deceased veterans. It employs some 200,000 persons.

AFAers Underwrite VA Show

Patients in thirteen VA hospitals were entertained during March by a live-wire collegiate song-and-dance group funded by the contributions of AFA members to the recent USO fund drive. The eight-state, twelve-day USO Shows VA Hospital tour, featuring "The Oklahomans" from East Central University, Ada, Okla., visited VA hospitals in Oklahoma City, Amarillo, Cheyenne, Albuquerque, and other western and southwestern cities. Some of the hospitals had not had a USO hospital show in three years, while others had never had one.

In announcing the tour, the USO lauded AFA and its members for financing the event. AFA members contributed about $30,000 to the USO fund drive and part of that money was used, at AFA's request, to underwrite the tour.

Special Duty Openings

Hq. USAF is looking for volunteers for assignments as basic training instructors, Officer Training School flight commanders, and AFROTC faculty members. NCOs eyeing the recruit training billets at Lackland AFB, Tex., can call AUTOVON 487-3363 (Captain Duerbig). The OTS openings, also at Lackland, are for captains who, USAF underscored, can simultaneously earn a master's degree during off-duty time at one of the San Antonio area colleges. About 300 O-3s through O-5s, all armed with MAs, are needed for AFROTC faculty posts. For both the OTS and AFROTC openings, the contact at the Military Personnel Center is Captain Treger, AFMPC/DPMROS6A, AUTOVON 487-4941.

USAF Tough on Disability Exits

Five years ago the Pentagon put out new guidelines designed to curb the high rate of disability retirements, which was running from twenty to twenty-two percent. Since then they have fallen, but not evenly

JULY 15 DEADLINE FOR SCAMP SCHOLARSHIPS

Application deadlines for one-year college or university scholarships of up to $1,000 have been announced by the Board of Trustees of Scholarships for Children of American Military Personnel (SCAMP), a private, nonprofit education organization in Southern California.

Eligible for the scholarships are sons and daughters, no matter where they reside, of American military personnel of any service, who were either killed in action, are missing, or were prisoners of war in Southeast Asia. Applicants will be judged on academic qualifications, need, extracurricular activities, and potential.

Letters of request for scholarship application forms should be sent to:

Mr. Martin M. Ostrow
President, SCAMP
280 So. Beverly Drive
Beverly Hills, Calif. 90212

Requests for applications should reach Mr. Ostrow no later than June 15, and completed applications must be returned to him by July 15.

SCAMP scholarships are made possible by revenues derived from the annual Air Force Association-sponsored Air Force Ball held in Los Angeles.

The Bulletin Board

among all the services. USAF is particularly tough.

New statistics show that at the end of FY '76 some 1,131,000 persons were receiving military retired pay, including 156,000 for disability. That's fourteen percent overall. But a breakdown by service reveals that 17.5 percent of Army's retirees and 22.5 percent of USMC's were drawing disability retired pay, compared to ten percent for the Navy and about twelve percent (48,000 of 392,000) for USAF.

During FY '76, USAF really clamped down. Of the 20,799 members who retired during that year and were drawing retired pay at the end of the year, only 1,343, or about 6.5 percent, retired for disability. This compares with FY '76 disability retirement percentages of 11.5 for the Navy and 15.0 for the Army. In the Marine Corps, a staggering twenty-five percent—987 out of 3,885 retirees—got disability ratings.

A disability retirement rating, particularly a high one, can mean huge tax savings over a lifetime.

In related FY '76 retirement statistics, California remained the most popular retirement state with 177,964 persons residing there. Texas and Florida were tied for second Defense-wide, but among USAF retirees the Lone Star State prevailed by 45,790 to 37,532. While all the states showed an increase of military retirees during the year, the District of Columbia dropped by thirty-nine (5,371 to 5,332).

CAP Cadets Head for Academy

Ninety-six former Civil Air Patrol cadets, including six women, are first-year enrollees at the Air Force Academy. Since the Academy's establishment in 1954, more than 1,400 former CAP cadets have entered, a record of which the Air Force auxiliary is proud.

So reports CAP's latest annual report, which was submitted to Congress on completion of the organization's thirty-five years of service to the nation.

During 1976, CAP pilots flew 17,604 hours on search missions and were credited with locating 395 search objectives and saving thirty-four lives. The report also noted that increased efficiency and improved search techniques resulted in a thirty percent increase in "finds" and a corresponding thirty percent decrease in flying hours.

The organization ended the year with 27,373 junior and 37,143 senior members, similar to the previous year. CAP-owned aircraft numbered 656 and member-owned craft totaled 5,735. Thirty-three states appropriated $1.4 million to support the CAP wings in their areas. Alaska provided $238,000, far the largest appropriation. Altogether, the organization has fifty-two wings; total units number 1,945.

CAP's new National Commander is CAP Brig. Gen. Thomas C. Casady, a long-time AFAer and an active participant of the Birmingham, Ala., chapter. AFA Executive Director James H. Straubel attended a special Capitol Hill ceremony at which CAP's annual report was submitted.

SBP Improvements Advance

Those important changes to the Survivor Benefits Plan, one of which reduces the Social Security offset from 100 to fifty percent when a widow reaches sixty-two, were approved by the House Armed Services Committee in early March. Because of scheduling problems, the full House may not vote on the measure until early May, but passage seems assured, a spokesman said. Other features of this important bill, H. R. 2702, were reported in last month's "Bulletin Board."

The same subcommittee which started H. R. 2702 on its way, the House Armed Services Compensation subcommittee, has outlined other military personnel measures it expects to take up soon. Heading the list is the same Defense Officer Personnel Management Act (DOPMA) the House okayed last year, only to see it die in the Senate. Other items the Staff Director, John Ford, indicated the subcommittee and subsequently the full committee would deal with include: extension of medical officers' variable incentive pay, continuation pay, and special pay, all of which otherwise expire in the fall; Soldiers' and Airmen's Home financing; and the need for survivor benefits if a Reservist dies before being eligible for retired pay (age sixty).

Mr. Ford left the door open for subcommittee action on military retirement changes. Any changes that might be adopted, he underscored, must be made with full protection of careerists' equity.

Lawmakers, meanwhile, introduced a flock of new bills affecting compensation, discharges, education, etc. Examples:

- H. R. 2015 (Rep. Dawson Mathis, D-Ga., and others) would help ex-service members with cloudy discharges to get them sanitized.
- H. R. 2472 (Rep. G. V. Montgomery, D-Miss.) would give most Viet-era veterans below major up to $350 in mustering-out pay.
- H. R. 3585 (Rep. James L. Oberstar, D-Minn.) would extend indefinitely the time veterans could use their GI education.
- H. R. 2679 (Rep. Thad Cochran, R-Miss.) would exempt the first $5,000 of pay received by members of the Reserve Forces from federal income tax.
- H. R. 1836 (Rep. Bill Alexander, D-Ark.) would recompute retired pay on the basis of January 1, 1971, basic pay rates. Other new recomp bills contain different formulas.
- S. 716 (Sen. Spark M. Matsunaga, D-Hawaii) would restore the cost-of-living allowance to civil servants in Hawaii who are military retirees or dependents. The COLA there was eliminated for persons with commissary and exchange privileges.

State Withholding Near

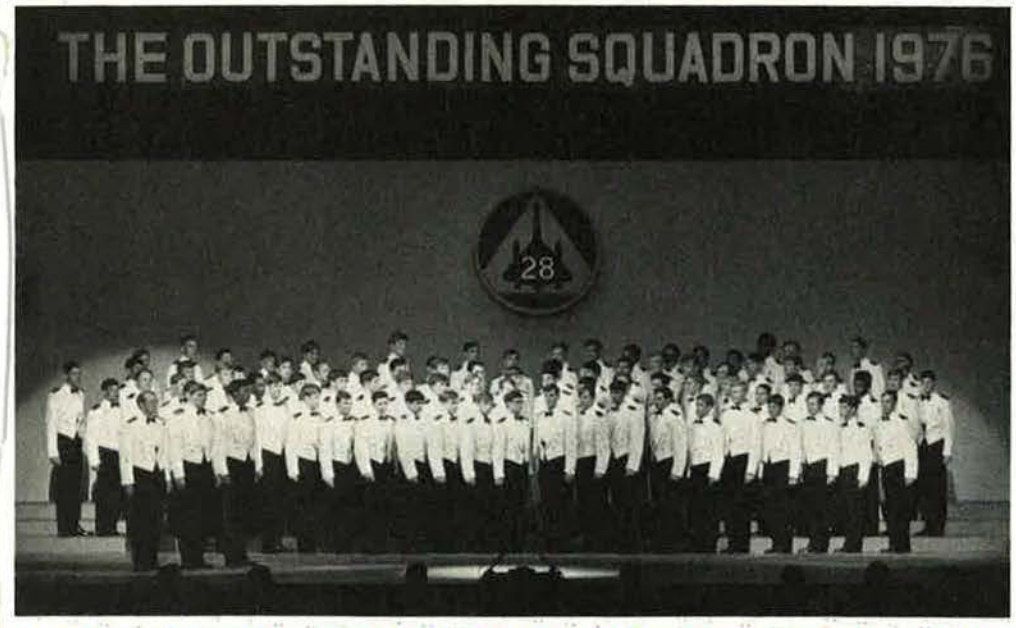
The services, starting July 1, will withhold state income taxes from active-duty military pay for thirty-six states and the District of Columbia. Retired military pay will not be withheld.

The withholding plans follow congressional passage of a law last year requiring such action if formally asked by the various states. The list below represents requests filed up to the last week in March a Pentagon spokesman said. Several states, like Florida, have no income tax and a few others exempt military pay.

The list of states set for tax withholding follows:

Alabama, Arizona, Arkansas, California, Colorado, Delaware, Dis

May 28 at The Broadmoor, Colorado Springs, Colorado



THE EIGHTEENTH ANNUAL OUTSTANDING SQUADRON DINNER

Saluting the 1977 Outstanding Squadron at the United States Air Force Academy
Cosponsored by the Air Force Association and its Colorado Springs Chapter

More than 600 guests—including parents and friends of many of the cadets, together with aerospace, AFA, and government leaders from throughout the country—will pay tribute to the Academy Squadron as it receives from AFA the Academy's most outstanding award of the year for excellence in all elements of cadet life, from academic standings and military leadership to drilling and intramural athletics.

Reception 6:15 p.m., Dinner 7:00 p.m., Dancing 10:00 p.m.; the International Center of The Broadmoor.

Dress: Black-tie for civilians, Summer Mess Dress for Military.

Cost: $30 single, $50 per couple.

Hotel reservations should be made directly with one of the following hotels: The Broadmoor, telephone (303) 634-7711; The Antlers, telephone (303) 473-5600; The Four Seasons Motor Inn, telephone (303) 576-5900. Call immediately for accommodations, and be sure to mention AFA when calling.

Golf and tennis tournaments will be conducted at The Broadmoor on Friday, May 27. Please write to AFA for details.

DINNER RESERVATION FORM

Return to: Air Force Association
1750 Pennsylvania Ave., N.W.
Washington, D. C. 20006

Please make the following reservations for me at AFA's 1977 Outstanding Squadron Dinner.

_____ singles @ $30 $_____ _____ couples @ $50 $_____

Enclosed is my check for $_____.

☐ Please send information on the golf and tennis tournaments.

Name _____

Address _____

City _____ State _____ Zip _____

Telephone ( ) _____

5/77

Wright Memorial Chapter AFA
Dayton Chapter NSIA
Symposium

"TRENDS IN SYSTEMS AND LOGISTICS"

Air Force Museum
Auditorium
Dayton, Ohio
June 28, 1977
9:00 AM-5:00 PM

Buffet-Reception
5:00 PM-6:30 PM

Featuring ranking
civilian Pentagon managers
and USAF commanders
with presentations and
question and answer sessions

Speakers include:

General Robert J. Dixon
Commander, TAC

•

General William J. Evans
Commander, AFSC

•

General F. M. Rogers
Commander, AFLC

•

Major General Howard W. Leaf
Commander, AFTEC

A unique forum highlighting new policies, programs and concepts in research, developme test, acquisition, and life cycle costing.

Registration fee of $35.00 includes luncheon and buffet-reception. Only the first 400 registrations received can be accepted. Registrations close June 13, 1977. For reservations and/or information call co-chairmen Mr. N. C. Heilman (AFA) or Mr. Ed Leach (NSIA) at (513) 228-4121; or send checks to "AFA/NSIA Symposium," Suite 236, 333 West First Street, Dayton, Ohio 45402.

Ed Gates . . . Speaking of People

CHAMPUS: All You Might Want to Know

The Civilian Health and Medical Program of the Uniformed Services, better known as CHAMPUS, has been a household word within the military community for many years. But so broad and complex is the overall subject that few members really have a firm grip on it. The same goes for the CHAMPUS beneficiaries—active-duty dependents, retirees, and their families.

A single document setting forth the complete CHAMPUS story has been lacking. This void has been largely responsible for the uncertainty and confusion; it has led to patients incurring unnecessary expenses, and to steady criticism of the overall program.

But help is on the way. The government has finally published the king-sized and long-awaited regulation that tells everything about CHAMPUS. The thick tome, known as DoD Regulation 6010.8-R and put out jointly with the Department of Health, Education and Welfare, was actually due early this year *(see recent "Bulletin Board" columns).* But it slipped at the last moment when the separate services objected to various provisions.

Service personnel officials, in fact, bluntly informed the Defense Department that some of the provisions of the draft regulation would reduce parts of the health-care program to unacceptable levels. Cuts in CHAMPUS, they said, would hurt recruiting and retention and expand the widely held in-service belief that the government is curtailing personnel benefits.

The services came up with about fifty specific complaints. One scored Defense's draft regulation for authorizing "minimum" rather than "appropriate" medical care. Others quarreled with what was considered inadequate coverage relative to ambulance service, admission approval for nursing homes, and cost-sharing involving two or more handicapped dependents in the same family. "Too tough," the services said of the rules in question.

So Defense retreated on most of them. For example, "appropriate" replaced "minimum." On others, Defense officials rewrote or expanded the explanations for greater clarity. In a few cases—such as its original refusal to include hypnosis in covered anesthesia services—Defense held firm.

The final consensus, among both service and Defense officials, is that the new landmark directive, with all its last-minute alterations, does not represent erosion of the CHAMPUS program. One problem now is to convince beneficiaries that this is the case.

In an effort to do this, officials of all the services recently met and hammered out an internal information campaign that calls on base newspapers to give the new directive frequent publicity and to explain key sections that might otherwise be misunderstood. Films and other material on DoD Reg 6010.8-R were also under preparation at press time. It's a drive to get the ungarbled word on this important subject to all hands.

Authors of the new directive correctly feel that with it in hand, CHAMPUS beneficiaries can secure prompt answers to most of their health-care questions. That's been impossible heretofore.

Although the new regulation carries an April 4 publication date, new cases will not be adjudicated under it until June 1.

DoD 6010.8-R explains that CHAMPUS "is similar to private medical insurance programs" and aims to provide "financial assistance" to eligible recipients "for certain prescribed medical care" from civilian sources. Thus, CHAMPUS is clearly not the all-inclusive medical-care umbrella some quarters have taken it to be.

The regulation first takes the reader through an easy-to-follow list of 180 basic medical definitions, ranging from "accidental injury" through "domiciliary care" to "X-ray services." By checking these definitions, misconceptions are erased. Consider, for example, "semi-private room," which most persons think of as meaning a room with two beds. Not necessarily so, the new reg advises; it means a room with "at least two beds but no maximum number. . . ."

The chapter on eligibility for CHAMPUS clarifies the tricky situations involving illegitimate children, divorce, adoption, marriage of children, full-time college students, etc. Also cleared up is the question of eligibility for an active-duty member who may also qualify as a dependent. He or she is *not* eligible for CHAMPUS.

The chapter on basic benefits needs all its nearly six dozen pages to explain exactly what kind of care and services are covered, to what extent, and under what circumstances.

Maternity care is treated fully. So is the highly sensitive "custodial" care for which, in many situations, CHAMPUS benefits are denied. Accordingly, this section is especially important to families with a disabled member who requires assistance in performing routine daily functions such as eating and bathing.

How CHAMPUS treats eyeglasses, kidney transplants, drug addiction, abortion counseling, cosmetic and plastic surgery, domiciliary care, and dozens of other conditions, medical procedures, and services are spelled out for the first time. The reader will learn that while CHAMPUS will pay for professional ambulance service, it will not pay for "medicabs" and "ambicabs."

The directive, at another point, limits the number of rehabilitation stays for alcohol detoxification/stabilization to "three episodes," each of which can last up to three weeks.

Seventy-six specific exclusions and limitations are listed. This no-no list includes weight-reduction programs, removal of corns and calluses, hair transplants, and acupuncture treatment. These exclusions closely parallel those not covered by private health-care programs.

The CHAMPUS charges—the deductibles, the cost-sharing, and the charges over and above reasonable amounts—while not new, are set down in greater detail than heretofore.

Some thirty pages are needed to explain the ins and outs of the handicapped dependents program. While no benefits have been added, parents will know better where they stand. A review and reevaluation of the handicapped is required at least annually, the new tome notes.

Another chapter explains the tough criteria providers of health care must meet if their services are to be cost-shared by CHAMPUS. Still another deals with beneficiaries' claims for payments. People who follow its instructions should no longer be plagued by claims returned, denials, or delay in payments, according to Defense Department officials.

With the new document, the authors assert, users can "determine before care is received whether CHAMPUS will share the cost." That's a big plus; if it works out that way the program's credibility should improve.

On the other hand, the fact that the new regulation provides few new benefits and in some cases tightens up on previous ones, indicates that CHAMPUS will continue to receive jabs from among its users.

There's a footnote to this report. Defense health officials, in moving to improve the overall administration of the CHAMPUS project, feel they can develop a case for adding at least a modest dependent dental care program. "It has a long way to go, but we're working on it," they told AIR FORCE Magazine. ■

The Bulletin Board

trict of Columbia, Georgia, Hawaii, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, and Nebraska.

Also, New Jersey, New Mexico, New York, North Carolina, North Dakota, Ohio, Oregon, Oklahoma, Pennsylvania, Rhode Island, South Carolina, Utah, Virginia, West Virginia, and Wisconsin. Michigan, while it does not tax military pay, is on the list for "information only." It wants the names of service members who are residents of that state.

Training Innovations Readied

USAF pilot trainees will soon receive instruction in simulators, which will cut their undergraduate flying time from 210 to 170 hours. Reese AFB, Tex., is scheduled to receive the first Instrument Flight Simulator complex this month, with other flying training bases to receive theirs over a two-year span.

Big training and dollar savings—and continued high-quality pilot production—are envisioned, Hq. USAF officials have told Congress. They also lauded results of navigator simulator training that began at Mather AFB, Calif., last year. Navigator trainees receive forty hours less actual flying time than in nonsimulator days. But commanders say the new UNT grads "are better prepared than their predecessors to meet the demands of operational duty."

Lawmakers on the Armed Services and Appropriations Committees welcome this kind of news; they have been pressuring the services to make greater use of simulators.

Headquarters, meanwhile, made it official that the end of the years' long cuts in UPT and UNT production is near. As recently as FY '72, the service turned out 5,356 new pilots and navigators for the active Air Force. But that dropped to a mere 1,500 (1,000 pilots and 500 navigators) this year.

Authorities now say that navigator production will rise to 550 in FY '78 and to 700 the following year. UPT production will hold at 1,000 next year, then go to 1,175 the following year. Worried over threats to overall readiness of the cumulative years of low production, USAF's top personnel official, Lt. Gen. Kenneth L. Tallman, told AIR FORCE Magazine he's seeking Defense Department approval to increase annual pilot production to the 1,700–2,000 range in the early 1980s.

Reserve Problems Mount

Strength of the several Reserve Forces has dropped sharply and recruiting has grown more difficult, Defense officials have been telling congressional committees. The officials are seeking extra funds to lay on more Reserve recruiters and boost Reserve advertising. Most of the problem is with the Army's components, but USAF's Reserve and Guard are hurting somewhat.

For example, the Air Reserve and Air Guard wound up FY '76 with selected Reserve strength shortages of 4,500 and 3,600, respectively. During the transition quarter (October–December 1976), the ANG recruited only 741 nonprior-service youths and the Air Reserve only 163. *(For a report on USAF active-duty recruiting problems, see last month's "Speaking of People" column.)*

Though they are singing the blues about Reserve Forces manning, Pentagon officials don't plan to send a new incentive package to Congress before early next year.

As reported in this space last month, decisions on incentives, such as bonuses and educational assistance, will await completion of Defense Department studies on several Reserve fronts—compensation, youth attitudes toward service, roles and missions, etc.

The House Armed Service Committee, however, wants quicker action. It has recommended putting $35 million worth of Reserve incentives into the FY '78 budget. AFA supports this action.

Military Mail Service Hit

There are "basic deficiencies" in the military mail system, and the Defense Department and Postal Service must get together and hammer out improvements. That's the nub of recent findings by a House Post Office and Civil Service subcommittee following a detailed probe of the military postal system. Many service people had beefed about slow mail service abroad. The subcommittee's report said the two agencies were not providing proper equipment and facilities or conducting on-site inspections of mail handling at military post offices overseas.

Chairman Charles H. Wilson (D-Calif.) said the subcommittee will continue to press for better mail service for the military.

Senior Staff Changes

PROMOTIONS: Nominated to be General: L/G William G. **Moore** Jr.; L/G John W. **Roberts.** Nominated to be Major General (Air Force Reserve): James D. **Isaacks** Jr.; Stephen T. **Keefe,** Jr.; Roy M

When Dorothy M. Saathoff, an executive in the Office of the Administrative Assistant to the Secretary of the Air Force, retired recently, she received AFA's President's Citation from the Association's John Gray and Dottie Flanagan. The event took place during a reception at Bolling AFB Officers' Club. Miss Saathoff also was presented the Air Force Exceptional Civilian Service Award.

Marshall; Sidney S. **Novaresi;** Ted W. **Sorensen.** Nominated to be Brigadier General: Richard D. **Anderegg;** Donald H. **Balch;** Milton J. **Eberle;** Sloan R. **Gill;** Thomas J. **Gregory;** Frank E. **Humpert;** Lewis E. **Jones;** Samuel K. **Lessey,** Jr.; Martin M. **Ostrow;** Albin H. **Schweers;** Joseph L. **Shosid;** Robert E. **Van Housen.**

CHANGES: B/G Richard T. Boverie, from Dir. of Prgm. Anal., NSC, Washington, D. C., to Spec. Asst. for Strat. Matters, DCS/P&O, Hq. USAF, Washington, D. C. . . . **Col. (B/G selectee) Irwin P. Graham,** from Exec. Asst. and Senior Aide to Ch. JCS, Washington, D. C., to Asst. Dep. Dir. Politico-Military Affairs, J-5, JCS, Washington, D. C. . . . **M/G Louis G. Leiser,** from Cmdr., 24th NORAD Rgn. and 24th AD, ADCOM, Malmstrom AFB, Mont., to C/S, Allied AF Southern Europe, Naples, Italy.

Col. (B/G selectee) Forrest S. McCartney, from Syst. Pgm. Dir., Fleet Satellite Comm. SPO, SAMSO, AFSC, Los Angeles AFS, Calif., to Dep. for Space Comm. Syst., SAMSO, AFSC, Los Angeles AFS, Calif. . . . **L/G (General selectee) William G. Moore, Jr.,** from Asst. Vice C/S, Hq. USAF, to CINC, MAC, and Exec. Dir. for Airlift Service, Scott AFB, Ill., replacing retiring Gen. Paul K. Carlton.

M/G Earl G. Peck, from DCS/Pers., Hq. SAC, Offutt AFB, Neb., to DCS/Ops., Hq. SAC, Offutt AFB, Neb. . . . **M/G Don D. Pittman,** from Cmdr., 314th AD, PACAF, and Cmdr., AF Korea, Osan AB, Korea, to Cmdr., 24th NORAD Rgn. and 24th AD, ADCOM, Malmstrom AFB, Mont., replacing M/G Louis G. Leiser. . . . **B/G Richard K. Saxer,** from Dep. for Reentry Syst., SAMSO, AFSC, Los Angeles AFS, Calif., to Dep. for Aeronautical Equip., ASD, AFSC, Wright-Patterson AFB, Ohio. . . . **M/G Robert C. Taylor,** from DCS/Plans, Hq. PACAF, Hickam AFB, Hawaii, to Cmdr., 314th AD, PACAF, and Cmdr., AF Korea, Osan AB, Korea, replacing M/G Don D. Pittman. ■

AFA News

By Don Steele, AFA AFFAIRS EDITOR

Units of the Month

THE EGLIN CHAPTER, FLA., AND THE RUSHMORE CHAPTER, S. D., cited fo effective programming in support of the Ai Force and AFA's mission and objectives, most recently exemplified in their fund-raising program and dinner honoring the Air Force Chief of Staff, respectively

—USAF PHOTO BY SGT. BOB TIPTON

Comedian Bob Hope was the star of a special three-hour show sponsored by AFA's Eglin Chapter in a huge hangar on Eglin AFB, Fla. More than 6,500 people attended, and net proceeds of almost $27,000 were donated to the Enlisted Men's Widows and Dependents Home (AFEMWDH) at Fort Walton Beach, Fla. The local Choctawhatchee High School Modern Jazz Ensemble played for the show, with warm-up entertainment by the Spiedels and Walt Richardson, both Eglin winners in Air Force Tops in Blue competitions. Ladies from the AFEMWDH were guests of honor, and AFEMWDH Foundation Executive Director Nick Masone presented Mr. Hope a plaque designating him an honorary member of the Foundation's Board of Directors. Chief Master Sergeant of the Air Force Thomas Barnes, holding the microphone, presented Mr. Hope, left, a plaque designating him an honorary Chief Master Sergeant of the Air Force. Shown with CMSAF Barnes are his three retired predecessors in that post, from left—Don Harlow, Dick Kisling, and Paul Airey. In recognition of this outstanding program, AFA National President George M. Douglas names the Eglin Chapter a corecipient of AFA's "Unit of the Month" award for May.

Gen. David C. Jones, Air Force Chief of Staff, and a native South Dakotan, was the honored guest and speaker at a recent dinner sponsored by AFA's Rushmore Chapter in Rapid City, S. D. More than 500 attended, including Rep. James Abdnor (R-S. D.), and many business and civic leaders. Participants included, from left, Hoadley Dean, Vice President for AFA's North Central Region; General Jones; Mrs. Goodwin; South Dakota Governor Richard F. Kneip; AFA National President George M. Douglas; and SMSgt. Ronald S. Goodwin, the 28th Bomb Wing's "NCO of the Year." In recognition of this oustanding program, which attracted the leaders and decision-makers from all areas of the local community, AFA National President George M. Douglas names the Rushmore Chapter a corecipient of AFA's "Unit of the Month" award for May.

COMING EVENTS . . .

South Carolina State AFA Convention, Charleston AFB, May 6–7 . . . **Connecticut State AFA Convention,** New Haven, May 7 . . . **Utah State AFA Convention,** May 13–14 . . . **New Jersey State AFA Convention,** Golden Eagle Inn, Cape May, May 20–22 . . . **Florida State AFA Convention,** The World Inn, Orlando, May 20–22 . . . **California State AFA Convention,** Newport Beach Marriott, May 20–22.

Missouri State AFA Convention, St. Louis, May 21 . . . **New Hampshire State AFA Convention,** Portsmouth, May 21 . . . **AFA Golf and Tennis Tournaments,** The Broadmoor, Colorado Springs, Colo., May 27 . . . **AFA Board of Directors and Nominating Committee Meetings,** The Broadmoor, Colorado Springs, Colo., May 28 . . . **AFA's Annual Dinner honoring the Outstanding Squadron at the Air Force Academy,** The Broadmoor, Colorado Springs, Colo., May 28 . . . **Colorado State AFA Convention,** Denver, June 3–5.

Pennsylvania State AFA Convention, George Washington Motor Lodge, Allentown, June 3–5 . . . **Ninth Annual Bob Hope AFA Charity Golf Tournament,** March and Norton AFBs, Calif., June 4–5 . . . **Alabama State AFA Convention,** Airport Holiday Inn, Mobile, June 9–11 . . . **Washington State AFA Convention,** Davenport Hotel, Spokane, June 17–19 . . . **New York State AFA Convention,** Dutch Inn, Long Island, July 15–17 . . . **Texas State AFA Convention,** St. Anthony Hotel, San Antonio, July 30–31 . . . Academy of Model Aeronautics' 1977 **National Model Airplane Championships,** March AFB, Calif. (AFA's Riverside County Chapter is a cosponsor), August 6–14.

AFA's 31st Annual National Convention, Sheraton-Park Hotel, Washington, D. C., September 18–21 . . . **AFA's Aerospace Development Briefings and Displays,** Sheraton-Park Hotel, Washington, D. C., September 20–22 . . . **Sixth Annual Air Force Ball,** Century Plaza Hotel, Los Angeles, Calif., October 28. ■

chapter and state photo gallery

US Sen. Barry M. Goldwater (R-Ariz.) was the featured speaker at a recent dinner sponsored by the Oklahoma State AFA and hosted by AFA's General Thomas P. Gerrity Chapter of Oklahoma City. Speaking to the more than 650 AFA members and guests, Senator Goldwater stressed the importance of the B-1 bomber and the Airborne Warning and Control System (AWACS) in enabling the US to hold its present position as a world power. He said, "It's in the air that we enjoy a place of superiority; elsewhere we are not so fortunate." Shown prior to the meeting are, from left, Chapter President Dr. Felix Kay; Senator Goldwater; Oklahoma State AFA President David Blankenship; and Maj. Gen. Carl G. Schneider, Commander, Oklahoma City Air Logistics Center, Tinker AFB, Okla.

Mr. Edward M. Raymond, left, director of Government and Agency Affairs for the Boeing Commercial Airplane Co., receives an AFA Certificate of Appreciation from Salt Lake, Utah, Chapter President George Thiergartner following his presentation on "Commercial Air Transportation Today" at a recent Chapter meeting.

he Andrews Area Chapter, Md., recently observed its first anniversary at dinner in the Andrews AFB Officers' Club. Some forty AFA Board lembers, who were in Washington to attend an AFA Board Meeting, were pecial guests. Net proceeds of more than $200 were donated to the 'amp Andrews Youth Camp. Program participants and head-table guests ıcluded, from left, Chapter Vice President Stan Stepnitz; Richard Emrich, Vice President for AFA's Central East Region; Joe Sharpless of the Maryland National Park and Planning Commission, a sponsor of Camp Andrews Youth Camp; Brig. Gen. William E. Brown, Jr., Commander, 1st Air Base Wing (MAC), Andrews AFB; Chapter President Tony Anthony; Father Donald Mowery, Executive Director, Youth Services, Inc., Memphis, Tenn.; AFA Board Chairman Gerald V. Hasler; and Art Curry, Camp Director.

This Is AFA

The Air Force Association is an independent, nonprofit, airpower organization with no personal, political, or commercial axes to grind; established January 26, 1946; incorporated February 4, 1946.

OBJECTIVES

The Association provides an organization through which free men may unite to fulfill the responsibilities imposed by the impact of aerospace technology on modern society; to support armed strength adequate to maintain the security and peace of the United States and the free world; to educate themselves and the public at large in the development of adequate aerospace power for the betterment of all mankind; and to help develop friendly relations among free nations, based on respect for the principle of freedom and equal rights to all mankind.

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Kinnelon, N.J.

Joe Foss
Scottsdale, Ariz.

James P. Grazioso
West New York, N.J.

John H. Haire
Huntsville, Ala.

George D. Hardy
Hyattsville, Md.

Martin H. Harris
Winter Park, Fla.

Roy A. Haug
Colorado Springs, Colo.

John P. Henebry
Chicago, Ill.

Joseph L. Hodges
South Boston, Va.

Robert S. Johnson
Woodbury, N.Y.

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Arthur F. Kelly
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George C. Kenney
Bay Harbor Islands, Fla.

Thomas G. Lanphier, Jr.
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Jess Larson
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Los Angeles, Calif.

Curtis E. LeMay
Newport Beach, Calif.

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Pittsburgh, Pa.

Howard T. Markey
Washington, D.C.

Nathan H. Mazer
Roy, Utah

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Edward T. Nedder
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J. Gilbert Nettleton, Jr.
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Beverly Hills, Calif.

Julian B. Rosenthal
Atlanta, Ga.

John D. Ryan
San Antonio, Tex.

Peter J. Schenk
Vienna, Va.

Joe L. Shosid
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Harold C. Stuart
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Zack Taylor
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James M. Trail
Boise, Idaho

Nathan F. Twining
Hilton Head Island, S.C.

A. A. West
Newport News, Va.

Herbert M. West, Jr.
Tallahassee, Fla.

Philip E. Adams
(ex officio)
National Commander
Arnold Air Society
Ruston, La.

Rev. Msgr. Rosario L. U. Montcalm
(ex officio)
National Chaplain
Holyoke, Mass.

Capt. Alan L. Strzemieczny
(ex officio)
Chairman, JOAC
Offutt AFB, Neb.

CMSgt. Alton G. Hudson
(ex officio)
Chairman,
Enlisted Council
Tyndall AFB, Fla.

VICE PRESIDENTS

Information regarding AFA activity within a particular state may be obtained from the Vice President of the Region in which the state is located.

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Dan Callahan
134 Hospital Dr.
Warner Robins, Ga. 31093
(912) 923-4288
Southeast Region
North Carolina, South Carolina, Georgia, Florida, Puerto Rico

William P. Chandler
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Tucson, Ariz. 85704
(602) 327-5995
Far West Region
California, Nevada, Arizona, Hawaii

Hoadley Dean
Box 8210
Rapid City, S.D. 57701
(605) 348-1660
North Central Region
Minnesota, North Dakota, South Dakota

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Richard Emrich
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McLean, Va. 22101
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Maryland, Delaware, District of Columbia, Virginia, West Virgini Kentucky

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Rocky Mountain Region
Colorado, Wyoming, Utah

Vic R. Kregel
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Dallas, Tex. 75222
(214) 266-2242
Southwest Region
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William C. Rapp
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(716) 842-7140
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Lyle O. Remde
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Omaha, Neb. 68107
(402) 731-4747
Midwest Region
Nebraska, Iowa, Missouri, Kansas

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Bellevue, Wash. 98006
(206) 342-0619
Northwest Region
Montana, Idaho, Washington, Oregon, Alaska

Jack Withers
P. O. Box 3036,
Overlook Br.
Dayton, Ohio 45431
(513) 426-2405
Great Lakes Region
Michigan, Wisconsin Illinois, Ohio, India

photo gallery

The recent weekend of AFA national meetings in Washington, D. C., included the first meeting of AFA's Ad Hoc Committee. Shown during their meeting are, from left, Jess Larson; John F. Loosbrock and James H. Straubel of the AFA Staff; John R. Alison; Chairman Martin H. Harris; William W. Spruance; Steve Ritchie; Tom Nelson; and Deane Sterrett.

n conjunction with the recent AFA Board of Directors meeting in Washington, D. C., all AFA Past National Presidents were invited to a inner meeting to informally discuss AFA's past, present, and future. ttending the dinner were, from left, Joe L. Shosid, C. R. Smith, AFA xecutive Director James H. Straubel, Peter J. Schenk, AFA National resident George M. Douglas, Martin M. Ostrow, Harold C. Stuart, Hon. oward T. Markey, John P. Henebry, and Jess Larson.

t. Gen. Kenneth L. Tallman, Deputy Chief of Staff for Personnel, USAF, vas the guest speaker at a recent dinner meeting sponsored by AFA's San Mateo County Chapter, Calif. General Tallman, left, is shown eceiving an AFA Certificate of Appreciation from Chapter Vice President ck Burton. Looking on are AFROTC Cadets James L. Walden and elores A. Johnson, both from the University of California at Berkeley, ecial guests at the dinner.

20% Dividend Declared for 1976! (To be paid June, 1977)

Dependable Protection from Yo

Air Force Associatio

Important Benefits!

COVERAGE YOU CAN KEEP. Provided you apply for coverage under age 60 (see "ELIGIBILITY") your insurance may be retained at the same low group rates to age 75.

FULL TIME, WORLD WIDE PROTECTION. The policy contains no war clause, hazardous duty restriction, combat zone waiting period or geographical limitation.

DISABILITY WAIVER OF PREMIUM. If you become totally disabled at any time prior to age 60 for at least a 9-month period, your coverage will be continued in force without further payment of premiums as long as you remain disabled.

FULL CHOICE OF SETTLEMENT OPTIONS. All standard forms of settlement options, as well as special options agreed to by the insured and United of Omaha, are available to insured members.

CONVENIENT PAYMENT PLANS. Premium payments may be made by monthly government allotment (payable to Air Force Association), or direct to AFA in quarterly, annual or semi-annual installments.

DIVIDEND POLICY. AFA's primary policy is to provide maximum coverage at the lowest possible cost. Consistent with this policy, AFA has provided year end dividends (20% for 1976) to insured members in twelve of the past fifteen years, and has increased the basic amount of coverage on four separate occasions.

Additional Information

Effective Date of Your Coverage. All certificates are dated and take effect on the last day of the month in which your application for coverage is approved, and coverage runs concurrently with AFA membership. AFA Military Group Life Insurance is written in conformity with the insurance regulations of the State of Minnesota. The insurance will be provided under the group insurance policy issued by United of Omaha to the First National Bank of Minnesota as trustees of the Air Force Association Group Insurance Trust.

EXCEPTIONS: There are a few logical exceptions to this coverage. They are:

Group Life Insurance: Benefits for suicide or death from injuries intentionally self-inflicted while sane or insane will not be effective until your coverage has been in force for 12 months.

The Accidental Death Benefit and Aviation Death Benefit shall not be effective if death results: (1) From injuries intentionally self-inflicted while sane or insane, or (2) From injuries sustained while committing a felony, or (3) Either directly or indirectly from bodily or mental infirmity, poisoning or asphyxiation from carbon monoxide, or (4) During any period a member's coverage is being continued under the waiver of premium provision, or (5) From an aviation accident, either military or civilian, in which the insured was acting as pilot or crew member of the aircraft involved, except as provided under AVIATION DEATH BENEFIT.

Eligibility

All active duty personnel of the Armed Forces of the United States and members of the Ready Reserve* and National Guard* (under age 60), Armed Forces Academy cadets*, and college or university ROTC cadets* are eligible to apply for this coverage provided they are now, or become, members of the Air Force Association.

*Because of restrictions on the issuance of group insurance coverage, applications for coverage under the group program cannot be accepted from cadets or Reserve or Guard personnel residing in Florida, New York, Ohio or Texas. Members in these states may request special application forms from AFA for individual policies which provide coverage quite similar to the group program.

Please Retain This Medical Bureau Prenotification For Your Records

Information regarding your insurability will be treated as confidential. United Benefit Life Insurance Company may, however, make a brief report thereon to the Medical Information Bureau, a nonprofit membership organization of life insurance companies, which operates an information exchange on behalf of its members. If you apply to another bureau member company for life or health insurance coverage, or a claim for benefits is submitted to such a company, the Bureau, upon request, will supply such company with the information in its file.

Upon receipt of a request from you, the Bureau will arrange disclosure of any information it may have in your file. (Medical information will be disclosed only to your attending physician.) If you question the accuracy of information in the Bureau's file, you may contact the Bureau and seek a correction in accordance with the procedures set forth in the federal Fair Credit Reporting Act. The address of the Bureau's information office is P.O. Box 105, Essex Station, Boston, Mass. 02112. Phone (617) 426-3660.

United Benefit Life Insurance Company may also release information in its file to other life insurance companies to whom you may apply for life or health insurance, or to whom a claim for benefits may be submitted.

CURRENT BENEFIT TABLES

AFA Standard Plan

PREMIUM: $10 per month

Insured's Attained Age	Coverage*	Extra Accidental Death Benefit*	Total Benefit
20-24	$75,000	$12,500	$87,500
25-29	70,000	12,500	82,500
30-34	65,000	12,500	77,500
35-39	50,000	12,500	62,500
40-44	35,000	12,500	47,500
45-49	20,000	12,500	32,500
50-54	12,500	12,500	25,000
55-59	10,000	12,500	22,500
60-64	7,500	12,500	20,000
65-69	4,000	12,500	16,500
70-75	2,500	12,500	15,000

AFA High Option Plan

PREMIUM: $15 per month

Insured's Attained Age	Coverage*	Extra Accidental Death Benefit*	Total Benefit
20-24	$112,500	$12,500	$125,000
25-29	100,000	12,500	112,500
30-34	97,500	12,500	110,000
35-39	75,000	12,500	87,500
40-44	52,500	12,500	65,000
45-49	30,000	12,500	42,500
50-54	18,750	12,500	31,250
55-59	15,000	12,500	27,500
60-64	11,250	12,500	23,750
65-69	6,000	12,500	18,500
70-75	3,750	12,500	16,250

*If accidental death occurs within 13 weeks of the accident, your AFA plan pays a lump sum benefit of $12,500 *in addition to your plan's* regular coverage, *except* as noted under AVIATION DEATH BENEFIT below.

Coverage For Flyers — Aviation Death Benefit

Personnel on flying status pay the same low premium as all other insured persons. When death is caused by illness or ordinary accident, appropriate benefits shown in the table above are paid. However, when death is caused by an aviation accident *in which the insured is serving as pilot or crew member of the aircraft involved*, a total sum of $15,000 is paid under the Standard Plan, or $22,500 under the High Option Plan. Under this condition, the Aviation Death Benefit is paid in lieu of all other benefits of this coverage.

OPTIONAL FAMILY COVERAGE

(Add to either the Standard or High Option Plan)
PREMIUM: $2.50 per month

Insured's Attained Age	Coverage for Spouse	Coverage for Each Child **
20-24	$10,000	$2,000
25-29	10,000	2,000
30-34	10,000	2,000
35-39	10,000	2,000
40-44	7,500	2,000
45-49	5,000	2,000
50-54	4,000	2,000
55-59	3,000	2,000
60-64	2,500	2,000
65-69	1,500	2,000
70-75	750	2,000

**Each child, regardless of number, is provided $2,000 of coverage between the ages of six months and 21 years. Children under six months are provided with $250 protection once they are 15 days old and discharged from the hospital.

fessional Association! Apply Now!

Military Group Life Insurance

APPLICATION FOR AFA MILITARY GROUP LIFE INSURANCE

United of Omaha

Group Policy GLG-2625
United Benefit Life Insurance Company
Home Office Omaha Nebraska

Full name of member _____
Rank Last First Middle

Address _____
Number and Street City State ZIP Code

Date of birth Mo. Day Yr.	Height Weight	Social Security Number

Please indicate category of eligibility and branch of service.

- ☐ Extended Active Duty
- ☐ Ready Reserve or National Guard
- ☐ Air Force Academy
- ☐ ROTC Cadet _____ Name of college or university
- ☐ Air Force
- ☐ Other _____ (Branch of service)
- ☐ _____ Academy

Name and relationship of primary beneficiary

Name and relationship of contingent beneficiary

This insurance is available only to AFA members

- ☐ I enclose $10 for annual AFA membership dues (includes subscription ($9) to AIR FORCE Magazine).
- ☐ I am an AFA member.

Please indicate below the Mode of Payment and the Plan you elect.

HIGH OPTION PLAN		Mode of Payment	STANDARD PLAN	
Members Only	Members and Dependents		Members Only	Members and Dependents
☐ $ 15.00	☐ $ 17.50	**Monthly** government allotment. I enclose 2 months' premium to cover the period necessary for my allotment (payable to Air Force Association) to be established.	☐ $ 10.00	☐ $ 12.50
☐ $ 45.00	☐ $ 52.50	**Quarterly.** I enclose amount checked.	☐ $ 30.00	☐ $ 37.50
☐ $ 90.00	☐ $105.00	**Semiannually.** I enclose amount checked.	☐ $ 60.00	☐ $ 75.00
☐ $180.00	☐ $210.00	**Annually.** I enclose amount checked.	☐ $120.00	☐ $150.00

Names of Dependents To Be Insured	Relationship to Member	Dates of Birth Mo. Day Yr.	Height Weight

Have you or any dependents for whom you are requesting insurance ever had or received advice or treatment for: kidney disease, cancer, diabetes, respiratory disease, epilepsy, arteriosclerosis, high blood pressure, heart disease or disorder, stroke, venereal disease or tuberculosis? Yes ☐ No ☐

Have you or any dependents for whom you are requesting insurance been confined to any hospital, sanitarium, asylum or similar institution in the past 5 years? Yes ☐ No ☐

Have you or any dependents for whom you are requesting insurance received medical attention or surgical advice or treatment in the past 5 years or are now under treatment or using medications for any disease or disorder? Yes ☐ No ☐

IF YOU ANSWERED "YES" TO ANY OF THE ABOVE QUESTIONS, EXPLAIN FULLY including date, name, degree of recovery and name and address of doctor. (Use additional sheet of paper if necessary.)

I apply to United Benefit Life Insurance Company for insurance under the group plan issued to the First National Bank of Minneapolis as Trustee of the Air Force Association Group Insurance Trust. 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 hereby authorize any licensed physician, medical practitioner, hospital, clinic or other medical or medically related facility, insurance company, the Medical Information Bureau or other organization, institution or person, that has any records or knowledge of me or my health, to give to the United Benefit Life Insurance Company any such information. A photographic copy of this authorization shall be as valid as the original. I hereby acknowledge that I have a copy of the Medical Information Bureau's prenotification information.

Date _____, 19 ____ _____
Member's Signature

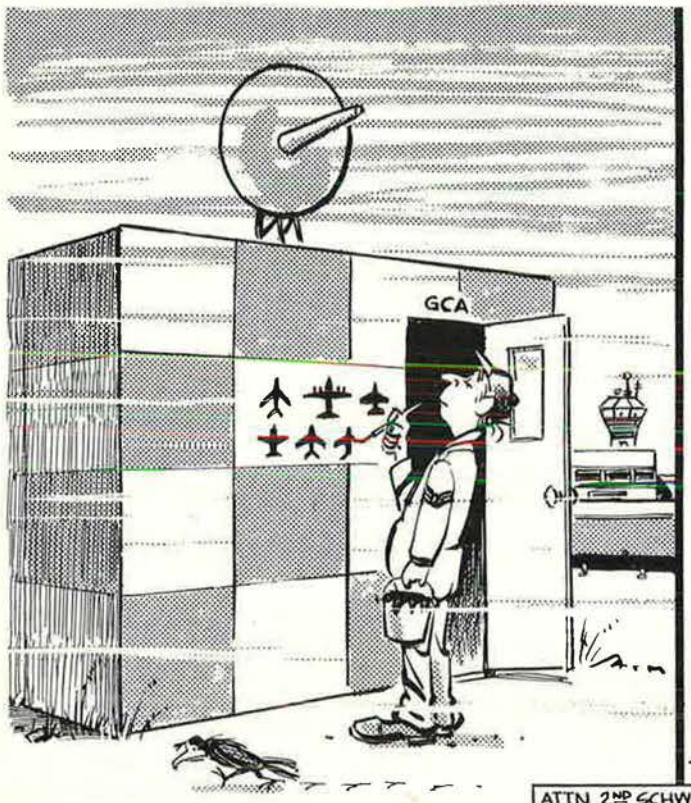
5/77
Form 3676GL App

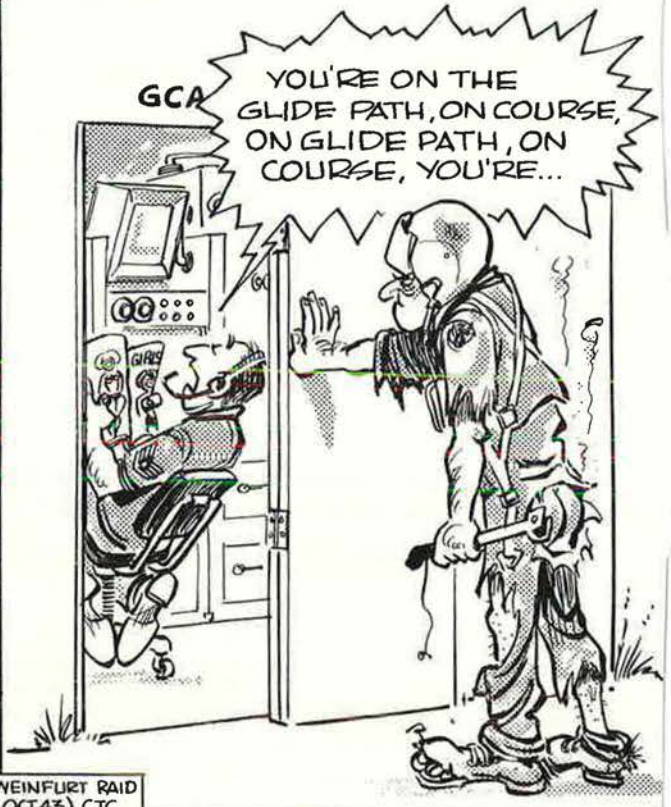
Application must be accompanied by check or money order. Send remittance to: Insurance Division, AFA, 1750 Pennsylvania Avenue, NW, Washington, D.C. 20006

Bob Stevens'

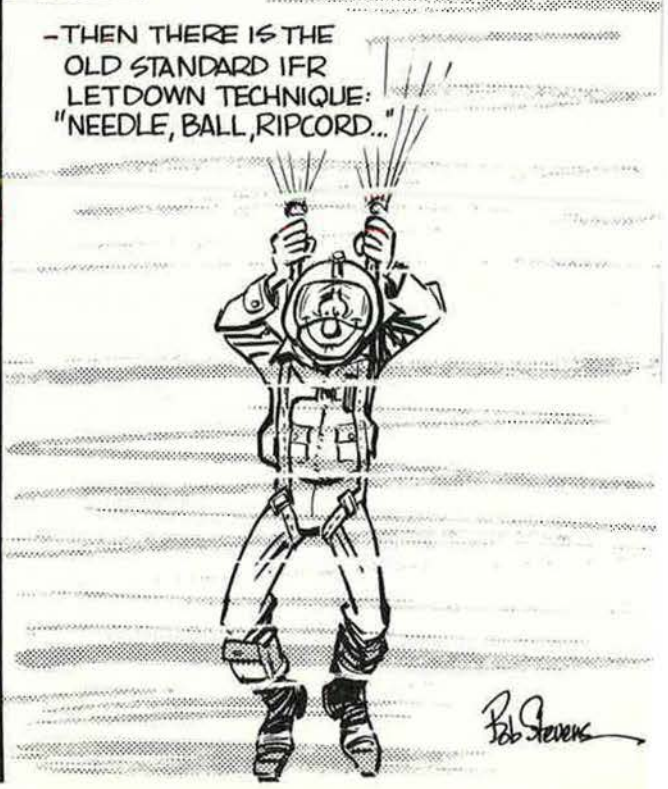
"There I was..."

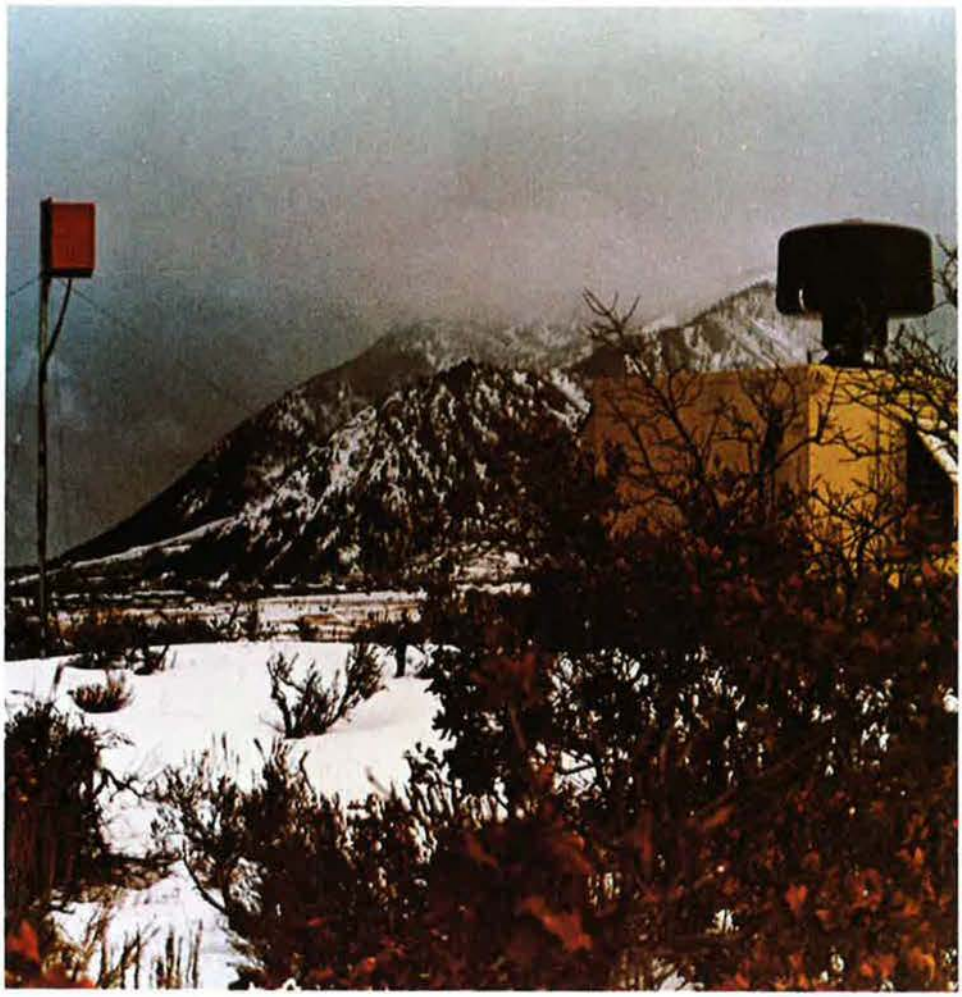
"IF GOD HAD INTENDED FOR MAN TO FLY, HE WOULD HAVE GIVEN HIM WINGS"...AN OLD SAW WHICH WE MIGHT AMEND TO; "IF GOD INTENDED FOR MAN TO FLY *INSTRUMENTS*, HE WOULD HAVE ALSO GIVEN HIM A BUILT-IN ARTIFICIAL HORIZON".





ATTN 2ND SCHWEINFURT RAID SURVIVORS (14 OCT 43) CTC PHIL TAYLOR 5158 FIJI LN. ALAMEDA, CA. 94501





Who keeps ski trips to Aspen from being grounded?

E-Systems TACAN (Tactical Air Navigation) systems have been guiding military aircraft over land and sea for many years. And our portable units have made landing in remote areas a safe procedure. And now, TACAN is finding civilian usage. Last year, an airline in Colorado flew over 10,000 more skiers into Aspen than in previous years by using our TACAN in adverse weather. Because of its higher UHF frequency ranges, TACAN is more effective in mountainous terrain than conventional navigational aids.

To make a long story short, TACAN has made a lot of people happier and safer.

For the systems answer to your problems, write: E-Systems, Inc., P.O. Box 6030 Dallas, Texas 75222.

E-Systems is the answer.

E-SYSTEMS

Five minutes ago, this pasture became an airfield.

The YC-15 tactical transport can land a 27,000-lb. payload on a pasture, or in a jungle clearing. Anywhere in the world you can clear a 2,000-ft. dirt strip.

The four YC-15 engines are 10.5 feet in the air. Up away from the dust and debris of dirt field operations. Reverse thrust flows only upward and forward. No cloud of dust swallowing the aircraft. Full STOL reverse is available down to zero forward speed and for backing the YC-15 into its parking space.

The four engines can be put in reverse idle for rapid unloading and loading in forward areas. Crew movements are unimpeded by engine intake or exhaust. Simple and effective. It's utility-proven in the flight test program.

The YC-15 has what it takes for the combat environment.

The YC-15
MCDONNELL DOUGLAS

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