MAY 1985/$5

AIR FORCE MAGAZINE

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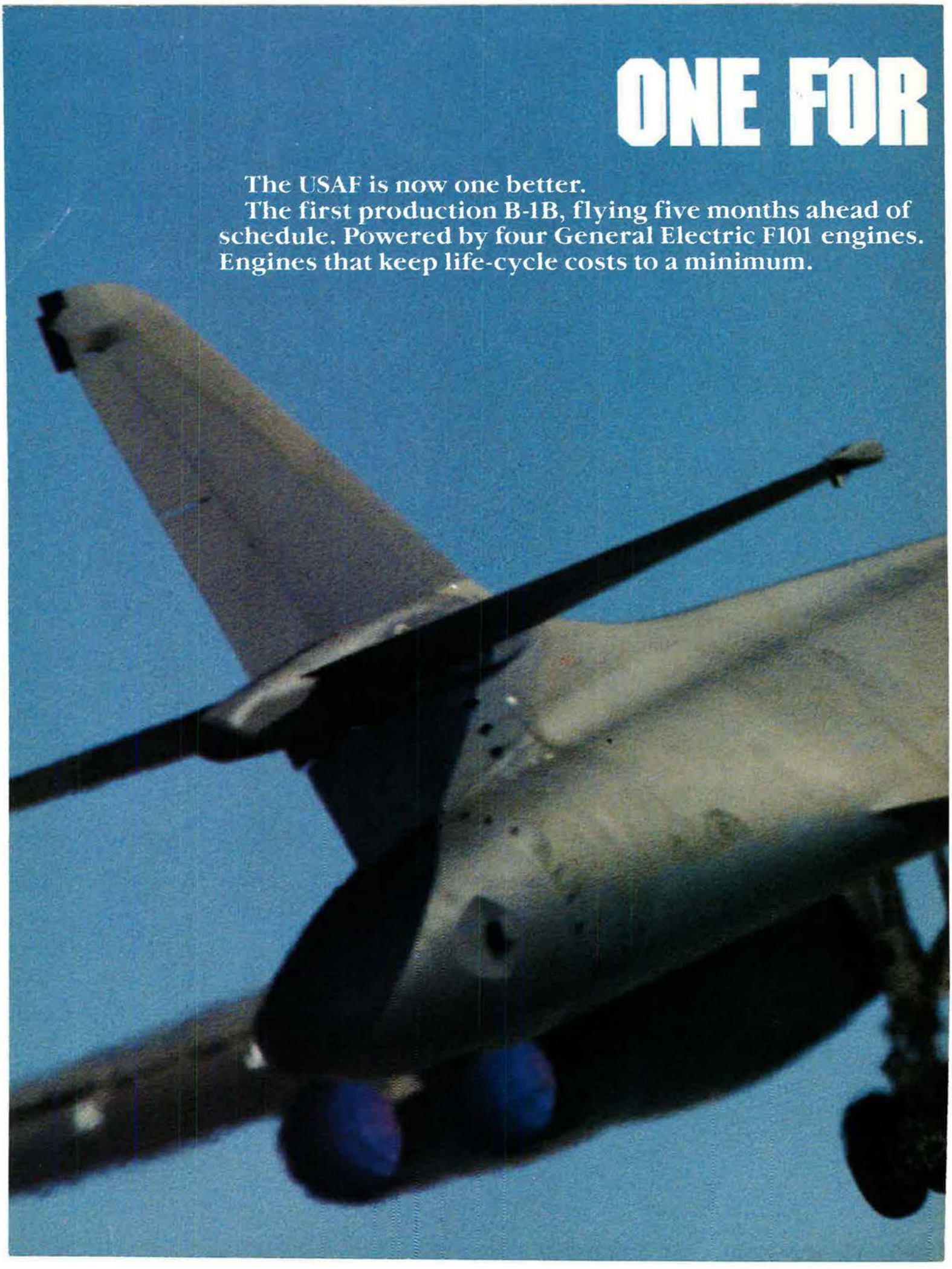
Air Force Almanac 1985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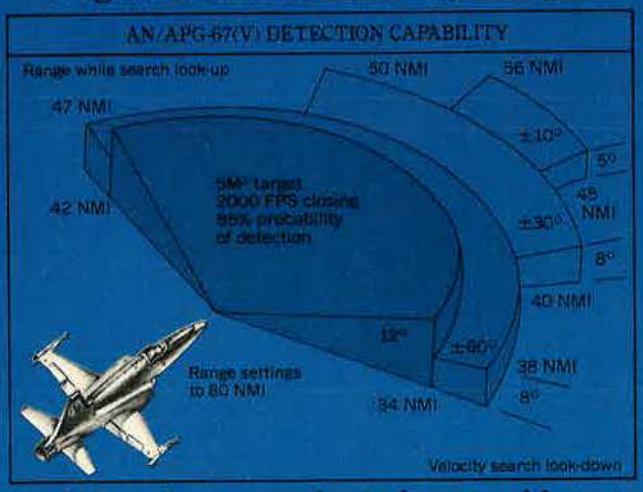

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MAY 1985
VOLUME 68, NUMBER 5

AIR FORCE MAGAZINE
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About the cover: This issue's Air Force Almanac 1985 marks the thirty-fourth annual publication of this comprehensive, year-round reference on the United States Air Force. (Cover design by Art Director Guy Aceto, photo by Paul Kennedy)

Air Force Almanac 1985

Departments

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AN EDITORIAL

Pressures in the Tunnel

By John T. Correll, EDITOR IN CHIEF

EARLIER this year, a blue-ribbon panel convened by the Georgetown Center for Strategic and International Studies examined the defense system acquisition process and found it wanting. This panel, like many another panel that went before it, said that major weapon systems often cost too much, take too long to produce, and frequently fail to perform as intended.

The specific faults identified in the Georgetown study are likewise familiar. There has been a lack of discipline in establishing requirements. Once set, requirements may be abandoned or changed suddenly in the annual budget shuffle. There has been too much fiddling with system designs while acquisitions were under way. This, along with fluctuations in funding, led to wasteful instability. There is too much high-level micromanagement. There is not enough competition for defense contracts, depriving the Pentagon of its best opportunity to keep system costs down.

The relevant question is whether the experience of decades and the findings of all the studies, panels, and commissions have had or will have a beneficial effect. Is there anything at the end of the tunnel except more tunnel?

Some indicators are encouraging. The rate of real cost growth on major defense systems has declined steadily and significantly for the past four years. More work is being awarded after competition by contending bidders, and more of the contracts are of the preferred fixed-price variety. A stiff new law curtails sole source procurements. Cost estimates used in budgeting are more realistic than in the recent past. Most of the Air Force's major programs are formally baselined, which reduces the temptation to redesign a system after acquisition has begun. Contract incentives for reliability and system quality loom much larger than before.

These measures, however, do not remove all of the tunnel at the end of the tunnel.

Official Washington revolves around the scramble for shares of the federal budget. Since this is an annual affair, the emphasis tends to be on outlays and potential savings this year and maybe next year. Programs are often stretched out over time, both to keep options open and to save money in the short term. The F-15 fighter acquisition is an example. Procurement of the original increment of F-15s was stretched out from six years to nine. Money was saved in the short term, but the additional cost in the long term was $2 billion. This sorry bit of history continues to repeat itself. Planned F-15 production has been stretched out again in each of the past two programming and budgeting cycles.

Despite the clear results of multiyear procurement—program stability, efficient production rates, and appreciable cost savings—this approach is underused. The F-15 is still funded on a year-by-year basis. The Air Force has a total of seven programs on multiyear procurement.

Micromanagement is another problem. Reasonable oversight is to be expected—indeed, is prudent—on major acquisitions, but congressional and Pentagon staffers overdo it. Excessive demands—sometimes approaching the ridiculous—for detailed data disrupt management schedules. The combined pressures for a little change here and a small adjustment there create turmoil.

Even at best, the acquisition process is subject to harshly conflicting influences. New systems are designed at or beyond the leading edge of technology. This generates risk in the venture. High-risk designs usually mean higher costs and extra difficulty in development. They are not easy to forecast or control. But conservative designs are vulnerable to technological bypass. The system may be obsolescent or nonresponsive to the evolving enemy threat by the time it's fielded. If development risk is high, however, contractors will be reluctant to bid a firm fixed price for producing it, wanting the protection of a cost-plus-fee arrangement. That leaves the door wide open for cost overruns.

The Georgetown study observes, correctly, that the very nature of the process encourages low cost estimating. The point could be taken further. No new system is ever approved without strong advocacy. Advocates tend to be enthusiastic and optimistic about what they're advocating. On top of this, the more certain and more reasonably priced a new concept sounds, the easier it is to sell. Adversaries of a system too often demand unrealistic assurances, and advocates are often all too ready to give them. Funding favors the bold.

For these reasons and others, the weapon system acquisition process will never be as simple or as efficient as buying potatoes at the supermarket. It is too complex and involves too much uncertainty. This is why the acquisition problems of the past twenty years defy simple solutions. New management initiatives, some of which are cited above, promise considerable improvement, though. These actions are already helping and will help more if given a fair chance to jell. Still greater improvement is possible if system acquisition, inherently a long-range proposition, can be addressed with long-range thinking and an understanding of the strange pressures in the tunnel. ■

As close as a CRT has ever come to thinking like a military pilot.

A pilot on a military mission has little time to make decisions. Split seconds at most.

Which means an avionics system has to do more than supply data. It has to supply the right information, at the right time, in an easy-to-read format.

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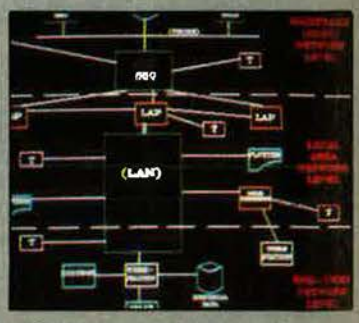
Whatever the reasons, it's certainly paying off. For us. And for our customers.

Command, Control, Communications, Intelligence



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Integrated Manufacturing Systems Grumman Data Systems focuses on four components of the manufacturing process: manufacturing cells, material handling systems, maintenance management software, and integrated manufacturing systems. We design, develop, test and install customized systems to suit specific customer needs.

For further information about any of our services, please contact Wesley Stout, Director of Technical Services at (516) 349-5541.

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AIRMAIL

"Deficits and Defense"

You cut me to the quick! *(See "Deficits and Defense," p. 8, April '85 issue.)* I agree 100 percent with your editorial views, and as an officer and citizen of a free nation, I would never suggest anything that would threaten our national security. Indeed, my oath of office dictates that I give my life if necessary toward our defense, and I would carry out my obligation without hesitation. I have never and will never endorse "substantial cutbacks in the defense budget"—nor did I in my previous letter to you *(see "Where Would You Start?" p. 17, March '85 issue).*

Like every American, I also prosper in the brightening economic situation. However, I am concerned about the growing deficit and would hate to see those who are perhaps not as concerned about national security have their way with the defense budget.

Capt. Glenn A. Walsh, USAF
Kokomo, Ind.

The Beautiful B-10

Re: Maj. Gen. Dale O. Smith's article, "But for the Captains," March 1985 issue *(p. 130).*

I, too, loved the B-10. It was my first multiengine aircraft. His 621 was not, however, the last operational B-10 in the Army Air Corps.

On May 8, 1941, the "assigned Clark Field" contingent of Class 41-B arrived in the Philippines. The first half of the class by alphabet went to the 28th Bomb Squadron; Hs and on went to the 2d Observation Squadron. So much for preference statements and instructor recommendations!

The 2d Observation Squadron had a mixed bag of aircraft, including the Martin B-10. B-10 checkout requirements were 300 hours total time, a blindfold cockpit check, engine start procedure, and "taxi it around the field until you get used to two engines."

I met all of those requirements in early September 1941, so, with crew chief Sergeant Rose as a volunteer backseater, I became a multiengine jockey. Did I have an instructor pilot aboard for the first flight? Don't be ridiculous!

Soon after, as more B-17s showed up at Clark Field, the 2d Observation Squadron moved to Nichols Field at Manila. On December 8, 1941, we were still there and still owned several B-10s.

My assignment at the outbreak of hostilities was to deploy one B-10 aircraft with crew chief and tool box to the airfield at Legaspi in southern Luzon. Unfortunately, when the first shot was fired, that plan was changed by the balloon pilot commanding Nichols Field. With no revetments and spur-of-the-moment operational planning, our beautiful old B-10s were on the ground too much. They made great targets for Japanese strafing and bombing attacks.

Before Christmas, all the B-10s had been destroyed or damaged beyond our repair capability. The 2d Observation Squadron, with no aircraft, moved to Bataan Peninsula and duty as "provisional infantry."

It was a sad ending for some eager pilots and a fine airplane. Some recce missions had been flown, but, to my knowledge, none of our B-10s ever dropped a bomb or fired a shot in anger.

However, it did beat the hell out of having to destroy them ourselves!

Col. Robert J. Jones,
USAF (Ret.)
Grants Pass, Ore.

The account by Maj. Gen. Dale O. Smith about the B-10, "But for the Captains," was a most welcome story. It sure brought on nostalgia and fond memories of life in the late 1930s.

I served in the Army Air Corps as a radio repairman with the Philippines Air Depot at Nichols Field from October 1937 to November 1940. In fact, I was on the last troop transport taking scheduled troops back to the States before the Japanese attack on the Philippines.

Part of my job was to check out the radio equipment whenever the engineering officer made his flight test of an overhauled or repaired aircraft. I took many such flights in B-10s. In fact, my first flight was in a B-10. I will never forget that moment—I was so excited. . . .

As a charter member and life member of AFA, I salute you for doing a wonderful job with the interesting and informative articles in AIR FORCE Magazine. Keep up the excellent work!

Lt. Col. Richard O. Shave,
USAFR (Ret.)
Gulfport, Miss.

Blood, Guts, and Feathers

Re: Your article "Nature's Aces" in the March 1985 issue of AIR FORCE Magazine.

I hereby enter a claim to having downed the most birds with one aircraft (a ten-engine B-36). The action took place at Lindbergh Field in San Diego in 1953. I was on final approach and had just begun the roundout when a large flock of seagulls took to the air from the right. The thirty- to forty-knot crosswind blew the birds directly in the flight path of the airplane. Talk about blood, guts, and feathers!

By personal count, we had ingested, chewed up, or otherwise mangled eighty-seven seagulls. Some were in the intakes, a few were lodged in the titanium leading edges, and the rest had gone through the props and were scattered over the approach and the adjacent Marine base.

One gull bloodied the canopy directly in front of my face, but—obviously!—didn't break through.

Lt. Col. William A. Callis,
USAF (Ret.)
Pawleys Island, S. C.

Do you have a comment about a current issue? Write to "Airmail," AIR FORCE Magazine, 1501 Lee Highway, Arlington, Va. 22209-1198. Letters should be concise, timely, and legible (preferably typed). We reserve the right to condense letters as necessary. Unsigned letters are not acceptable, and photographs cannot be used or returned.

Deadly Gs

I read Edgar Ulsamer's article in the March 1985 issue, "When Gs Get Deadly," with great interest *(p. 27)*.

It is imperative that Air Force primary research facilities—such as the School of Aerospace Medicine at Brooks AFB, Tex.—continue to direct their focus on the effects of G-induced loss of consciousness (GLC) in high-performance aircraft. The great degree of physiological stress imposed on the pilot's cardiovascular system and vestibular processes still cannot be measured reliably during actual tactical flight maneuvers.

New designs altering seat position and redesign of conventional G suits are only a beginning to combat GLC. With the advent of the X-29 and AFTI/F-16 aircraft, for example, an entirely new approach to this problem will have to be developed. We must deal with these new "decoupled" flight stress factors before the armed forces accept such aircraft and before delivery takes place.

By having advanced mandatory pilot "G Adaptation Training" and new cockpit designs in our newest generation of fighters to increase pilot physiological stability, we can be assured of continued pilot safety and effectiveness against any threat to our nation—manned or remotely piloted.

Robert J. Pegritz, P. A.
Wilmington, Del.

Look-alike Lavi?

I judge from the looks of the mockup of the Israeli Lavi fighter in the photo on page 43 of your March 1985 issue that the Soviets are not the only ones who are not averse to plagiarizing a proven aircraft design.

Your statement that "the exterior design is original" to the contrary, the lines of the Lavi look strikingly familiar to me.

SMSgt. Robert T. Dearman, USAF
Fort Ord, Calif.

Twice as Good

The first chart accompanying the article "Fourth Wheel on the Acquisition Wagon" in the March 1985 issue *(p. 123)* indicates that the maintenance man-hours per flight hour rate for the C-17 is "one-third fewer than C-5."

In actual fact, it should read "one-third as many as the C-5"—a rate twice as good as the mistaken words imply.

John C. Swonson, Jr.
Colorado Springs, Colo.

• *Reader Swonson is correct. Our apologies.*—THE EDITORS

B-58 Hustler

I am presently completing a definitive history of Convair's precedent-setting B-58 Hustler program. The book will be going to press soon and will include, among many other things, historical data and information pertaining to every one of the 116 B-58s built.

I am attempting not only to cover these aircraft textually, but also photographically. Unfortunately, there are still twenty B-58s for which I have no photos. This is a last-ditch request for help from readers who might have the photos I am seeking.

Specifically, I need photographs of the following aircraft: 55-669, 58-1022, 59-2447, 59-2449, 59-2459, 59-2461, 59-2462, 60-1114, 60-1115, 60-1116, 60-1122, 60-1123, 60-1128, 60-1129, 61-2056, 61-2057, 61-2063, 61-2065, 61-2072, and 61-2076.

Additionally, I am seeking a photo of any size, shape, form, or quality verifying once and for all that one or possibly two B-58s were camouflaged for a short while during a test program that allegedly took place at Eglin AFB, Fla., during the mid or late 1960s.

Any reader with any of the above items should feel free to contact me at the address below. Any material loaned will be returned, along with a free copy of the book, upon publication.

Jay Miller
Aerofax, Inc.
P. O. Box 120127
Arlington, Tex. 76012
Phone: (817) 261-0689

533d SMS

We are working on a history of the 533d Strategic Missile Squadron at McConnell AFB, Kan. The Titan II ICBMs located there are currently being deactivated and should be completely gone by June 1986.

Although we have access to the wing historian's documents, the information consists mostly of official reports, technical data, and the like. If you were a member of the 533d SMS from 1961 to the present, we would greatly appreciate any information you can give us—photographs, newspaper clippings, patches, personal anecdotes, etc. We are interested not only in information about the squadron, but also anything concerning the base and surrounding area as well. Anything would be helpful.

Please contact the address below.

Historian Committee
533d SMS/DO
McConnell AFB, Kan. 67221

Fifth Air Force

I am researching the Fifth Air Force in the Southwest Pacific during World War II.

I am especially interested in the 3d Attack Group, the 38th Bomb Group, and the 345th Bomb Group. These groups flew the A-20 and B-25 in strafing versions between 1942–45 in the Philippines. I need to hear from pilots and other crew members of these units.

The information I need from former members includes the time on station, base or bases, aircraft model, crew station, and unit.

Your assistance will be greatly appreciated. I can be contacted at the address below.

Gary Whitaker
6109 Estes Park Ct.
Halton City, Tex. 76137

Troop Carrier Groups

As most of the men who served in World War II get close to retirement age, they have time to slow down a bit. Many think back to the times forty years ago and wonder what happened to that best friend or old buddy after all these years.

Over the past eight years, the 315th Troop Carrier Group Association has been able to locate more than 825 of our former members. We have also located more than 200 families of members who have passed on since the end of World War II. We still probably have many more out there to locate.

During this time, we have received many letters from former troop carrier men who want to receive any information on their old troop carrier unit. This prompted us to put together a list of sixty unit contacts for WW II troop carrier groups and squadrons that are forming or have formed reunion associations. We would be happy to send a copy of this list to any former troop carrier.

There are probably between 30,000 and 40,000 former WW II troop carrier veterans out there still to be located. All of our contacts are now working together to locate them. Anyone formerly connected with a troop carrier unit who would like to learn more about troop carrier unit reunion associations should write to us at the address below. (Be sure to enclose a stamped, self-addressed envelope.)

Robert L. Cloer
1417 Valley View Dr.
Yuba City, Calif. 95991

Spanish F-86Fs

A group of Spanish aviation historians is writing a book and is looking for information about the previous assignments of F-86F aircraft delivered to the Spanish Air Force from 1955

Who took 3,000 lbs. out of the B-1B?

Harris did. With EMUX, the most advanced airborne electrical multiplexing system yet developed.

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It shows how *Harris Aerospace* meets unique challenges in the information field—by advancing systems technology. Harris Corporation, Government Aerospace Systems Division, Melbourne FL 32902. Phone (305) 727-5115.

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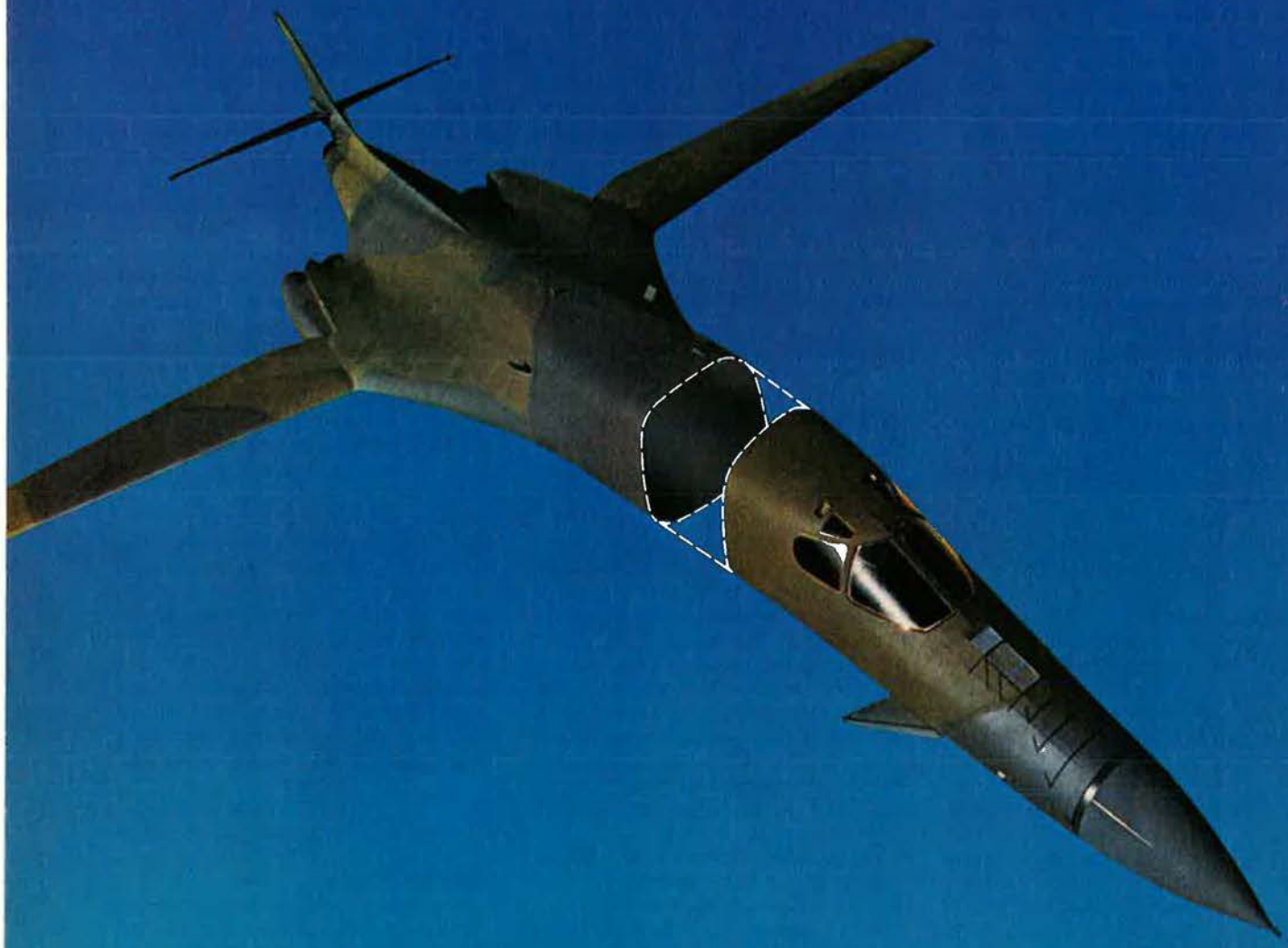

For your information, our name is Harris.

onward. After much hard work with the historical sources we have been able to consult, we have found a few clues regarding the previous bases of the aircraft in question.

We think that most of the F-86Fs that came to the Spanish Air Force were assigned to the 50th Fighter Bomber Group based at Hahn AB, Germany—specifically, to its 10th Fighter Bomber Squadron. On the other hand, we also suspect that the F-86Fs of the Soesterberg-based 512th Fighter Day Squadron (later the 32d Tactical Fighter Squadron) were sent to Spain, too. The only way to confirm any of this is to get the serial numbers of the aircraft equipping these units.

We would like to hear from any former members of these units who may be able to provide us with the serial numbers of any assigned F-86Fs. Please contact us at the address below.

Gonzalo Avila Cruz
Av. Dr. F. Rubio, 75 5°B
Madrid 28040
Spain

Bombardiers Library

Our organization of more than 1,000 members is assembling a central reference library of bombardier class rosters, classbooks, and other materials, such as transfer orders and personnel files. We believe that there are many untapped sources of bombardier training school classbooks—widows of bombardiers, parents of KIA personnel, support personnel, etc.

We would like to contact anyone having such material who would be willing to donate it to our library. For those who have such material and who would be willing to loan it so that we can copy it, please send a postcard stating class number, school, and any other relevant information.

Please contact the address below.
Col. E. C. "Ned" Humphreys, Jr., USAF (Ret.)
Bombardiers
Box 254
Eagle Harbor, Mich. 49951
Phone: (906) 289-4440

AFROTC Det. 005

If you are an Auburn alumnus, we would like to hear from you!

Air Force ROTC Detachment 005 of Auburn University is currently updating its files of alumni. If you are an alumnus of Auburn Air Force ROTC, we would appreciate it if you would send us your name, rank, current mailing address, job assignment, and year of graduation. In return, we will be sure to send you a copy of our alumni newsletter, "Bars to Stars."

Your cooperation will be greatly appreciated. Please contact the address below.

Air Force ROTC
Alumni Affairs
Auburn University, Ala.
36849-3501

AIRMAIL

Sluggin' Sal

I promised an Air Force veteran, Dick Von Spreckelsen, that I would make a model of his aircraft from World War II. He was a bombardier aboard a Consolidated B-24J Liberator named *Sluggin' Sal*.

In order to complete the model, I need to borrow any photographs of this aircraft showing the nose art. The aircraft was part of the 494th Bomb Group, 865th Bomb Squadron, Seventh Air Force.

Perhaps the pilot of this aircraft, Theodore Tanner, or another member of the crew will see this letter and be able to help me out. Any material sent will be copied and returned promptly. Please contact me at the address below.

Craig Wilson
791 N. Azalea Blvd.
Barberton, Ohio 44203

Texas Towers

I am presently doing a research project on the US Air Force's offshore early warning radar stations called "Texas Towers," which were in operation during the late 1950s and early '60s.

I would like to get in contact with anyone who served on these towers and, in particular, with members of the 4604th Air Defense Squadron who served on Texas Tower #4. The 4604th Squadron's home base was Otis AFB on Cape Cod, Mass.

Anyone who served on these towers or who knows of someone who did should contact me. Any photographs or other material lent for use in this project will be carefully copied and promptly returned. Full credit will be given for any material used.

Chuck Zimmaro
1111 Glenview St.
Philadelphia, Pa. 19111

B-24 Crash

Recently, I was given a photo album belonging to a deceased World War II Navy corpsman. One of the pictures in this album is of a B-24 (#240255) that had run off the airstrip and come to rest on an embankment, with its nose in a grove of palm trees. The fuselage is broken halfway between the trailing edge of the wing and the horizontal stabilizer. The tip of the starboard wing is gone. On the nose is what appears to be the name "Gus."

Could anyone—possibly a former crew member—tell me the bomb group that this aircraft belonged to, the cause, date, and location of the crash, the mission it was on before the crash, or any other pertinent information?

Please contact me at the address below.

J. R. "Bill" Bailey
1541 Eastwood Dr.
Slidell, La. 70458

AC-119 Gunships

As a "charter member" of the 17th Special Operations Squadron, which flew the AC-119 "Shadow" gunship in Vietnam from January 1969, I am interested in gathering personal histories of those involved in squadron operations from inception at Lockbourne AFB, Ohio, to the very end.

I am especially interested in pictures, personal experiences, humorous anecdotes, and so forth. I hope to write a book about this gallant old bird, its unique mission, and the extraordinary people who flew and maintained it.

Please contact me at the address below.

Lt. Col. Jack H. Morgan, USAF (Ret.)
P. O. Box 300
Christoval, Tex. 76935
Phone: (915) 896-2276

POWs in Romania

I am interested in learning about the experiences of POWs interned in Romania during World War II.

I would very much like to hear from any former POWs who might be willing to share their experiences. I am particularly interested in learning about camp locations, how POWs were treated, the daily camp routine, memorable events, etc.

Please contact me at the address below.

Donald R. Falls
3002 Eddy St.
Marina, Calif. 93933

Marianas College Library

Northern Marianas College, which is on Saipan in the Northern Mariana Islands and which serves Saipan, Tinian, and Rota with postsecondary education programs, is currently

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developing a reference library.

If any readers have books on the Mariana Islands and would be interested in donating them to the Northern Marianas College, I would be pleased to accept their contribution on behalf of the College. Any readers donating such material will receive a grateful acknowledgment.

Please contact me at the following address.

John M. Romisher
Associate Professor
Northern Marianas College
P. O. Box 1250
Saipan, C. M. 96950

Air Refueling

For the past ten years, I have been researching the history and development of air refueling in order to write a book on the subject. The book is due to be published in the US early next year.

While a considerable amount of material has been obtained on the history, development, and use of air refueling techniques in USAF, I have little in the way of personal reminiscences, anecdotes, and accounts of interesting personal experiences. I would therefore welcome such accounts from readers of AIR FORCE Magazine, particularly any regarding operations in Southeast Asia. All material sent will be duly credited.

Please contact me at the address below.

Brian Gardner
144 Grattons Dr.
Crawley
West Sussex RH 10 3JP
England

B-29 Photos

I'm looking for anyone who was part of the 501st Bomb Group or the 39th Bomb Group during World War II. I have pictures of B-29s that evidently belonged to these units and that may be of interest to airmen from those groups who flew and worked on these aircraft.

Interested persons can contact me at the address below.

Maj. Ron Carter, USAF
122 Norwood
San Angelo, Tex. 76903

AAF Bases

I am attempting to locate a reference source that will describe the US Army Air Forces bases and installations utilized in the US during the 1942–45 time frame.

I have seen and flown over dozens of abandoned airfields in Texas, New Mexico, Arizona, and Florida as well as visited fields converted to "municipal airports." I know by the huge hangars and derelict barracks that they were part of the WW II war effort. There must be some way to find out what went on at places like Fremont, Neb., Watertown, S. D., Pecos, Tex., and Sebring, Fla.

Can any readers help?

Roger C. Zweig
NASA-JSC
Houston, Tex. 77058
Phone: (713) 483-7256
AUTOVON: 954-2834

6917th ESG

The 6917th Electronic Security Group (formerly part of Security Service) at San Vito AS, Italy, is gathering facts and memorabilia for inclusion in a "Hall of History" of the 6917th ESG. We are especially looking for material on the base during the 1960s and early '70s, but all material is welcome. Any material received will be treated with care. Items will be returned promptly after reproduction, unless informed otherwise.

If there is anyone wishing to donate or loan material for our endeavor, please do so by writing to the address below.

Commander
6917th ESG
APO New York 09240

B-17 Over Hungary

I am presently engaged in some historical research with a former Me 109 pilot from World War II. We are looking for some information about the following mission.

On June 2, 1944, the 325th Fighter Group provided escort for the first shuttle bombing mission to Russia. A B-17 was lost over Debrecen, Hungary. If you have any information about this incident, please contact me at the address below.

Chet Sluder
1025 Cuatro Cerros Tr. SE
Albuquerque, N. M. 87123

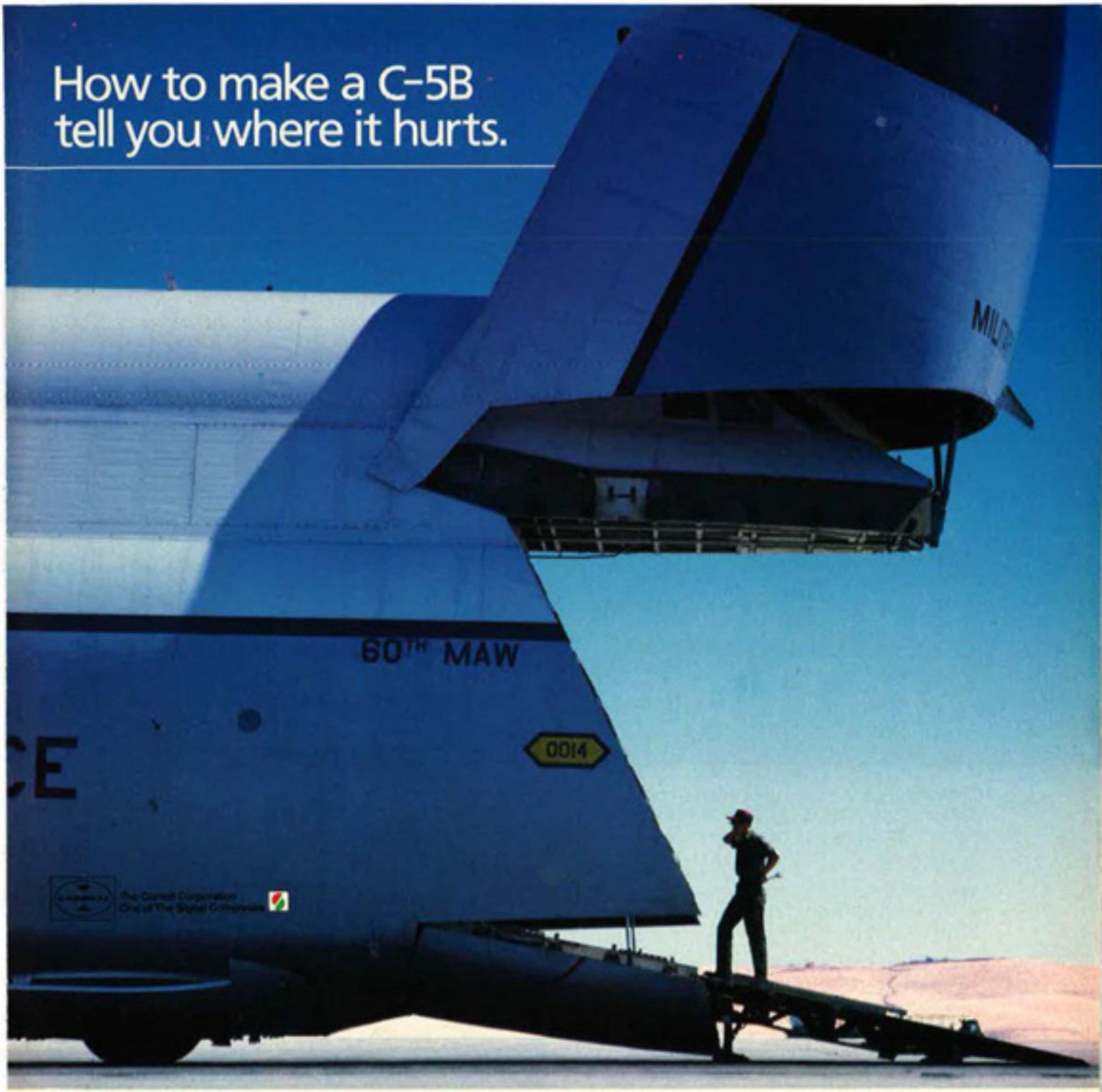
Bird Strikes

I am writing an aviation book and am interested in any information concerning bird strikes and the damage they have caused.

Please contact the address below.

Maj. Brian Power-Waters, USAF (Ret.)
Rte. 1, Box 53E
Church Hill, Md. 21623-9754
Phone: (301) 758-2622

How to make a C-5B tell you where it hurts.



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Looking for . . .

Thank you for publishing my letter regarding my search for lost flyers who flew out of England in World War II. Two of them have responded!

I am still looking for the following lieutenants: Charles L. Armstrong, Charles Coleman, Frank Sneff, Camille Pelletiere, Richard Robinson, Mark Schneider, William E. Eisenhart, B. L. Smith, M. E. Rudolph, Russell Maugans, Bud Church, Harold J. Hill, R. L. McCallister, Eugene J. Roberts, and Capt. (Flight Surgeon) Kaplan.

I have group photos of them taken in 1944.

R. C. Harris
4813 Burton SE
Albuquerque, N. M. 87108
Phone: (505) 255-6577
(505) 868-2276

I am trying to locate the following personnel, all formerly 821st CSP Squadron, Phan Rang, Vietnam, from 1968–70:

Capt. Robert E. Vent, Capt. Kenneth E. Messick, SMSgt. George E. Maurer, MSgt. John L. Henley, MSgt. George H. Nieman, TSgt. Floyd A. Blackwell, TSgt. William R. Taylor, TSgt. Kenneth P. Young, TSgt. Joseph G. Burge, SSgt. William M. Hubbard, SSgt. Raymond F. (Nitro) O'Hara, SSgt. Manuel Ramirez, Sgt. Michael A. Uram, A1C Edward D. Showers, A1C Gerald R. Blanchard, and others.

Please contact the address below.

Carey Stark
7601 E. Toronto St.
Tucson, Ariz. 85730

I am engaged in research about my uncle, 2d Lt. Ralph L. Pemberton.

He was a B-24 pilot killed on return from a bombing run over Ploesti, Romania, on June 6, 1944. The only additional information I have about him is that his normally assigned aircraft, *Question Mark*, was not the aircraft flown on that last mission.

Any information concerning my uncle would be greatly appreciated. I would be honored to correspond with anyone who knew him.

SSgt. Neil A. Crow, USAF
513 W. 26th St.
Cheyenne, Wyo. 82001
Phone: (307) 778-8536

I am trying to locate or contact any of my fellow former flight crew from B-24 *Nosie Rosie*, attached to the 24th Combat Mapping Squadron, 8th Photo Group, in the CBI during World War II. We were stationed in Gushkara, India, and flew the Hump to Kunming, China, for our missions.

I was crew chief and flight engineer on *Nosie Rosie* from 1943 to 1945. Crew members included Sgt. Earl C. Young, Cpl. Arlie W. Hickman, Sgt. Ned S. Goss, Sgt. Harlan S. Sanford, Sgt. Robert E. Edney, Sgt. Mario Milano, and Pvt. Kenneth Stevenson. I think our pilot's name was Warren.

Please contact me at the address below.

Hector C. Beltram
615 N. W. 25th St.
Fort Worth, Tex. 76106
Phone: (817) 626-9294

I am looking for Lt. R. W. Wille. He was with the William Tell '84 Project Office at Tyndall AFB, Fla., late last year. He is now probably at Grafenwöhr, Germany. However, letters mailed to him at Tyndall and Grafenwöhr have been returned.

Anyone knowing the whereabouts of Lieutenant Wille is asked to contact me at the address below.

Andreas Hunold
Einbecker-Landstr. 53
3410 Northeim
West Germany

I am attempting to locate members of my crew who served with the 774th Squadron, 463d Group, Fifteenth Air Force.

I would like to hear from Richard Ronzone, Irving Schwartz, Bill Varney, Bob Whitten, John Warren, Simon Richaud, Vince Morin, and Bill McGaughrin.

Please contact me at the address below.

Norris P. Stettler
1972 S. San Ray Dr.
Green Valley, Ariz. 85614
Phone: (602) 625-5263

I am attempting to locate pilot Elwood D. Arp of the B-17 crew *Bomb Boogie* in World War II. We were stationed in England with the 401st Bomb Squadron, 91st Bomb Group, Eighth Air Force.

Please write or call me at the address below.

Don Hayes
129 Whitburn Ct.
Stockton, Calif. 95207
Phone: (209) 477-7188

I am looking for Don E. Outland, who served with the 88th Bomb Group in World War II. In fact, I would like to hear from any former members of the 88th.

Please contact me at the address below.

Ted Q. Mahoney
1202 Indian Prairie
Victor, Mont. 59875

I am searching for any information on Sgt. Leslie Hanna, who was a tail gunner on a heavy bomber. He was reported killed in action over Germany on February 22, 1944.

Sergeant Hanna left the Boeing aircraft plant at Seattle, Wash., to join his crew at Kearney, Neb. They were stationed in England in November 1943. He was born in Gladwin, Mich., on June 3, 1914, and was known as "Lucky."

Any information on this mission and the circumstances surrounding the death of Sergeant Hanna would be gratefully accepted.

Col. William E. Willey, USAFR
341 W. Wilshire Dr.
Phoenix, Ariz. 85003

In 1942, I was a flight engineer flying out of Muroc in California in a B-17 of the 305th Bomb Group, 422d Bomb Squadron.

We were on a night transition training mission. I think the pilot's name was Lieutenant Stahl. We couldn't find the field, and we were running out of fuel. The pilot decided to land at a Piper Cub field in Blythe, Calif.

It was an amazing feat of flying. The field could not have been more than 1,500 feet in length, with no lights and a fence at the end of the runway. He had to ground-loop the plane to avoid the fence.

General LeMay and Captain Price of the 305th came out to fly it back to base, and they could not believe that that B-17 made it into that field. They had to use full flaps and full power to fly it out. They missed the fence by inches.

I would like to know if Lieutenant Stahl is still around.

Max Kahn
1395 Nancy Dr.
Southampton, Pa. 18966
Phone: (215) 355-6262

During World War II, I served aboard a destroyer of the US Navy on duty in the south Pacific. We rescued the flight crew of a B-17 that had ditched.

I am now trying to locate the crew members from this ditched B-17. I hope to be able to get together with them and to invite them to our ship's reunion.

The B-17's serial number was 41-2404, and it was named *Spider*. The names of the crew are Lt. A. W. Anderson, Lt. J. P. Van Hour, Sgt. R. P.

AIRMAIL

Anderson, Corporal D'Amour, Sergeant Gagnon, Lieutenant Darden, Cpl. Jim Hosegood, and Sergeant Rusesky.

I can be contacted at the address below.

Peter Karetka
40 Worthington St.
Chicopee, Mass. 01020-1015

I am looking for my old flying buddy, Robert O. Peterson, who served with the 79th Troop Carrier Squadron, 434th Troop Carrier Group.

We served together all the way from basic in the States through Swindon, England, to Melun, France, and, on our return, at George Field, Ind., until December 1945.

We lost touch fifteen years ago. His last known address was Park Forest, Ill. His occupation at that time was as a self-employed warehousing engineer.

Eugene I. Morris
75F New England Ave.
Summit, N. J. 07901

I am trying to contact some Army Air Forces officers who were prominent in aircraft testing during World War II. I am writing a history of the development of the P-51 Mustang and would like to correspond with them to learn their views on this aircraft.

They are Francis R. Griswold, W. G. Logan, Louis B. Meng, and Winthrop Towner III.

These men or anyone knowing their whereabouts are asked to contact me at the address below.

Paul A. Ludwig
P. O. Box 9844
Queen Anne Hill
Seattle, Wash. 98109
Phone: (206) 283-6863

I need to contact members of a B-24 crew that flew with the 721st Bomb Squadron in Italy during World War II.

They are Edward T. McFadden, Heber Guinn, Walter Brown, and Lennox Ransom.

Please contact the address below.

Clinton R. Lyons
216 Donald
Fort Worth, Tex. 76108

I am seeking information on a French-American test pilot killed in Texas in early 1960 while testing an aircraft of unknown type. His name was Andre Luis Dumont. At the time of his death, this aviator was an active-duty USAF major or lieutenant colonel.

Please contact me at the address below.

Maj. Norm Lockard,
USAF (Ret.)
4907 W. Royal Palm Rd.
Glendale, Ariz. 85302

I am seeking contact with former members of the 360th Fighter Squadron, 356th Fighter Group, during its term of operations at Martlesham Heath in 1945. I am specifically looking for Lt. Robert Rutland, who took many photographs during that period.

Please contact me at the address below.

James Charlton
2825 S. King St., #1803
Honolulu, Hawaii 96826

I am trying to locate Francis Bloyd, whose last known city of address was Orlando, Fla. I am also looking for Jack Hall, Lubbock, Tex.

I would appreciate hearing from these individuals or from anyone knowing their whereabouts. Please write me at the address below.

Wilmer E. Hussey
E. 11910 Broadway, #38
Spokane, Wash. 99206

I am looking for information on A. T. (Tom) Early of the Twentieth Air Force, 504th and 505th Bomb Groups. He was originally from Tennessee.

Please contact me at the address below.

MSgt. Clifton V. Ridgeway,
USA (Ret.)
4816 Ivy Lane
Evansville, Ind. 47710

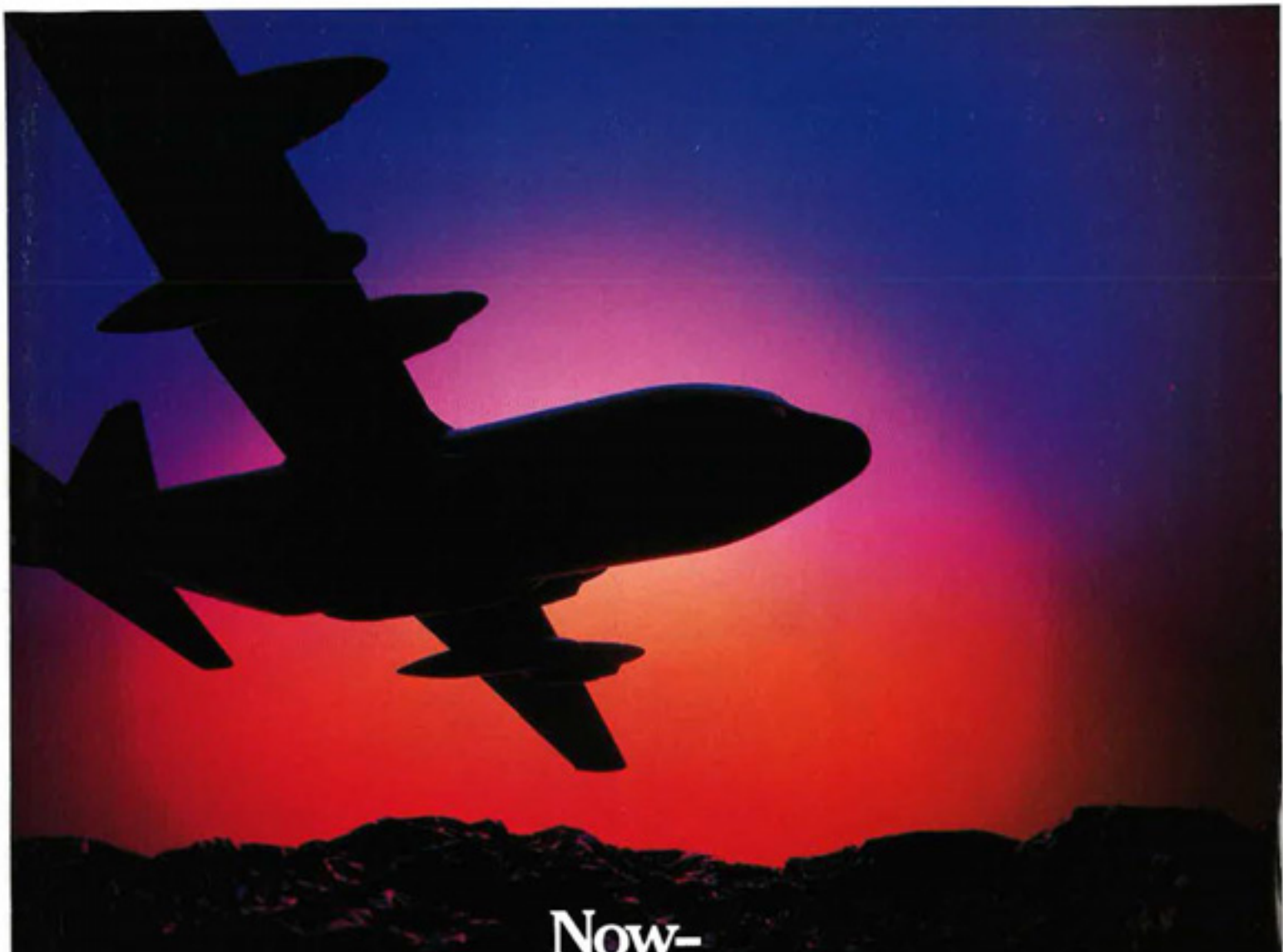
Collectors' Corner

I am an Air Force ROTC cadet interested in building an extensive collection of military patches. I have primarily been collecting Army patches for about two years, and this collection continues to grow. However, since joining ROTC, I have become interested in building an Air Force collection.

As far as my collection is concerned, I am looking for patches from Space Command, Pacific Air Forces, and Alaskan Air Command.

Anyone who wishes to sell, donate, or help me obtain these items is asked to contact the address below.

John Painter
1004 Briarwood Lane
Gaffney, S. C. 29340



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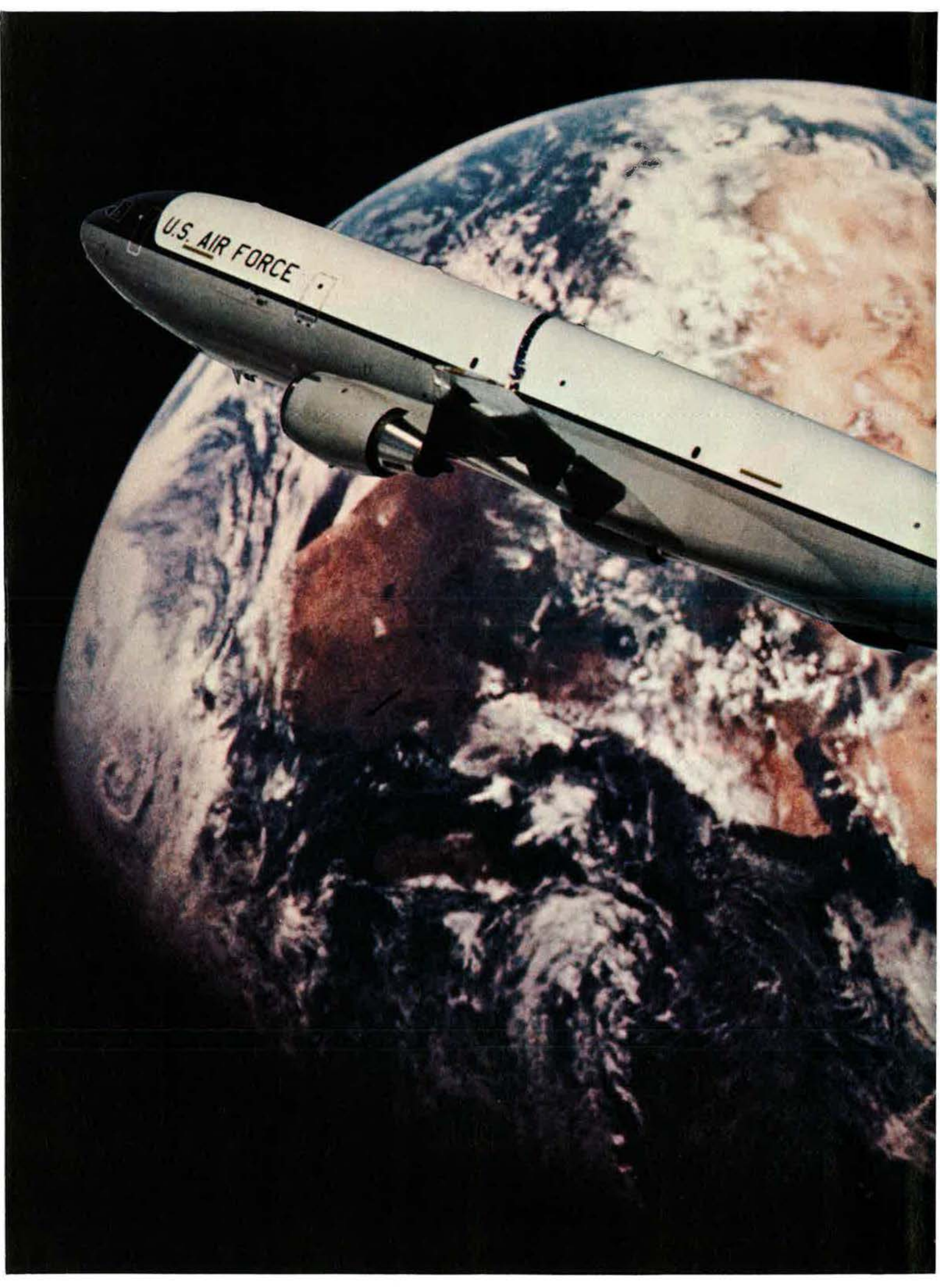
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IN FOCUS...

Meeting the Terrorist Challenge

By Edgar Ulsamer, SENIOR EDITOR (POLICY & TECHNOLOGY)

A recently issued Presidential directive outlines a strategy that includes the use of force to protect US citizens, property, and interests.

Washington, D. C., Apr. 2 The White House National Security Advisor, Robert C. McFarlane, recently served notice on international terrorists and on nations sponsoring terrorists that the United States "will consider an armed strike against terrorists and those who support them [in cases] where elimination or moderation of the threat does not appear to be feasible by any other means."

Speaking at a meeting of the National Strategy Information Center, the President's National Security Advisor stressed that "we cannot and will not abstain from forcible action to prevent, preempt, or respond to terrorist acts where conditions merit the use of force." He emphasized that the Administration has "identified unequivocally the Soviet Union as a principal sponsor and supporter of several states and groups involved in international terrorism."

He put the Soviets on notice that any identifiable Soviet involvement in terrorism will "affect our relationship with them" based on the principle of "linkage." Pointing out that with the help of sponsoring states, small groups of terrorists can achieve extraordinary power, he warned that terrorism has become "a fundamental challenge to our national security" that is insidious because it comes into play "below the threshold where [strategic] deterrence works."

A recently issued Presidential directive, he disclosed, sets forth new US policy concerning terrorism:

First of all, "the practice of terrorism by any person or group in any cause is a threat to our national security. The practice of international terrorism must be resisted by all legal means. State-sponsored terrorist acts or threats are hostile acts, and the perpetrators must be held accountable."

Also, "whenever we obtain evidence that an act of terrorism is about to be mounted against us, we have a responsibility to take measures to protect our citizens, property, and interests," according to Mr. McFarlane.

As a result, it becomes essential "to improve the collection and assessment of information on groups and states involved in terrorism to prevent attacks or counterattacks."

Other guidelines set forth by the Presidential directive call for close cooperation with allied and friendly nations in combating international terrorism, greater application of diplomatic and political leverage, and assistance to countries threatened by terrorism. This assistance would include intelligence sharing, antiterrorist training, and, when requested, the use of force.

Lastly, the President's National Security Advisor stressed that "acts of state-sponsored organized terrorism should be appropriately exposed and condemned in every available forum."

Maintaining the Aeronautical Lead

A just-completed White House study concludes that robust foreign competition is eroding the traditional US lead in aeronautical technology. If current trends are not corrected, the consequence would be a weakened national economy and a shaky national security posture. The study was conducted by a high-powered group of experts from government—including the Pentagon—and aerospace industry who jointly called for broad revitalization of the nation's aeronautical research and development efforts in three key areas.

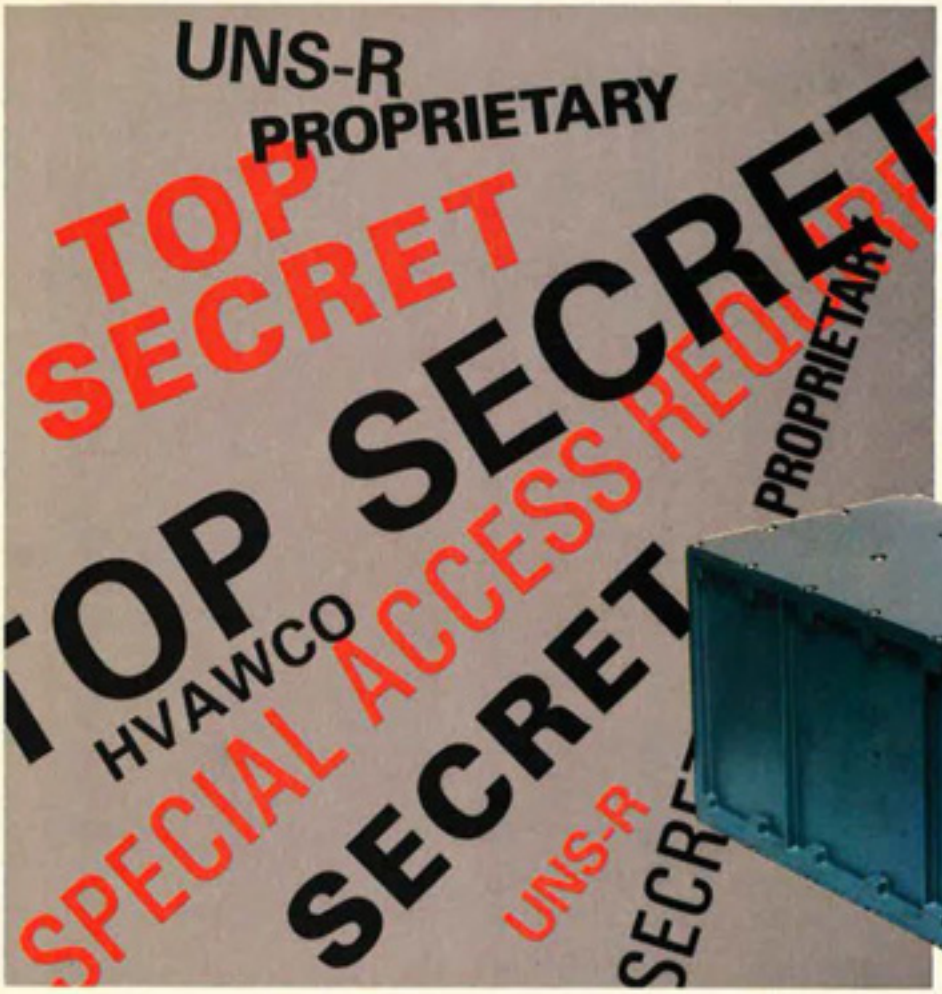
First, in a chronological sense, is subsonic aircraft technology, an area where foreign competition has made major inroads, especially in terms of rotorcraft and business and commuter aircraft.

Stressing the importance of civil aviation programs to national security, the group of experts pointed out that nondefense business makes up about sixty percent of the total revenue volume of aerospace industry. The economic health and technological competence of the US aerospace industry, in turn, directly affect national security, especially in terms of the supplier base.

The panel of experts predicted that the possibilities for "high-leverage" advancements in subsonic aircraft technology between now and the end of this century far exceed the evolutionary gains attained over the past fifteen years. This translates into commercial airliners that can be operated at about half the cost of present-generation designs and military

Renascence of Parochialism?

Congressional quarters bent on bringing all military space functions under one roof—that of a Unified Space Command—are expressing irritation over what they perceive is a widening rift in the Joint Chiefs of Staff arena with regard to what should, and what should not, be incorporated into such an organization. The Army is allegedly gaining support at the highest JCS level for withholding space-based ballistic missile defense R&D from the Unified Space Command, which is scheduled to be formed by October 1 of this year. The Navy putatively is trying to retain autonomy for some of its space functions and, along with the Army, is seeking to keep air defense out of the new command. Congressional experts attribute this renascence of parochialism to weakness of the Joint Chiefs of Staff structure as presently constituted.



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Program Development Manager
TRW Electronic Products Inc.
3650 North Nevada
Colorado Springs, CO 80907
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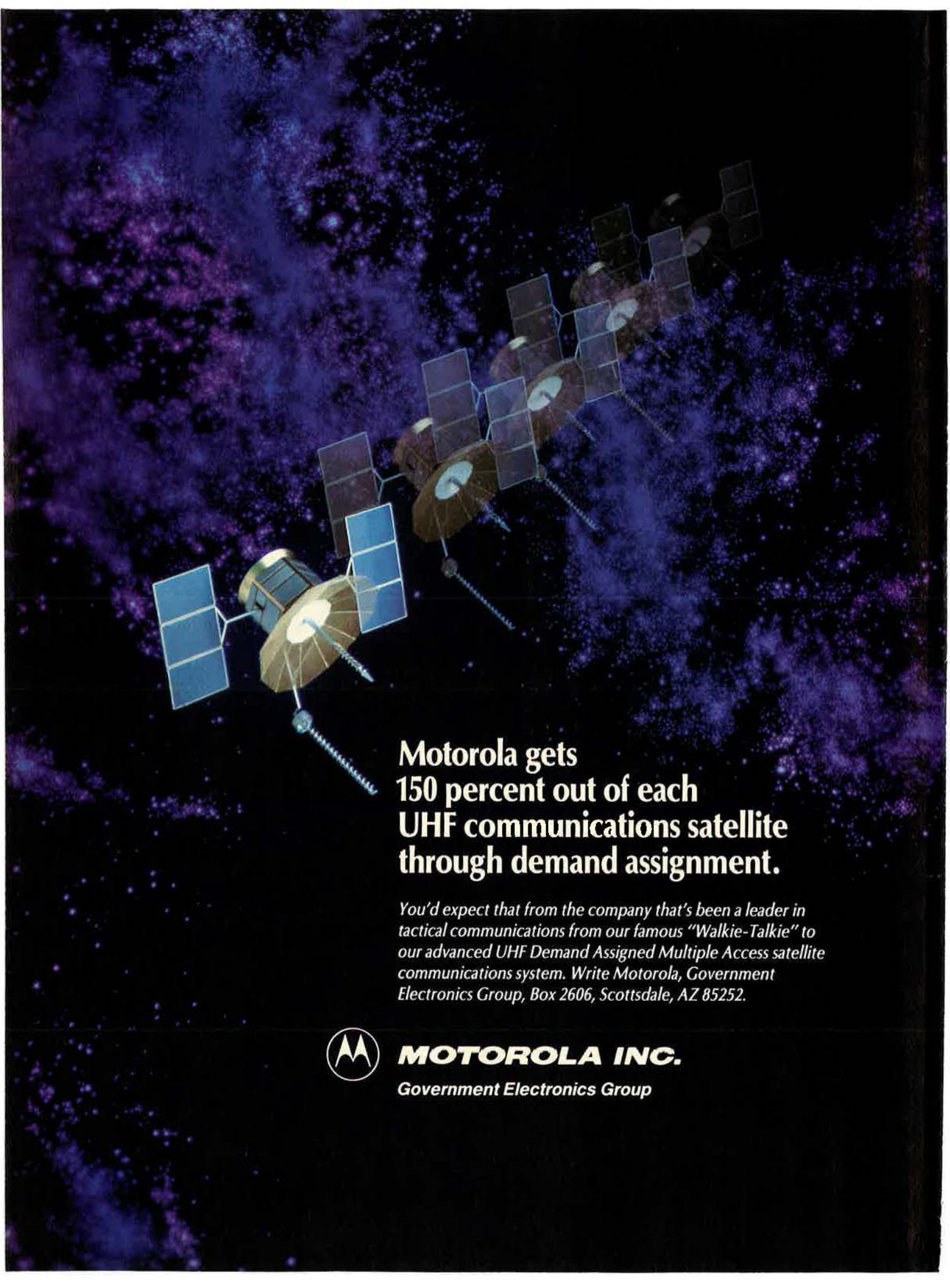
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aircraft that could offer great endurance and feature advanced low-observable, "Stealth" characteristics.

Pacing technologies that the White House study recommended be readied for production by the mid-1990s include laminar-flow control techniques to reduce aerodynamic drag markedly, all-composite, highly resilient structures, new generations of high-bypass and propfan engines, and fully integrated flight-control systems.

Technological advances in the subsonic regime could serve as the stepping-stone to technologies essential for a sustained supersonic cruise capability—the second goal outlined in the report.

The White House panel rated supersonic cruise critical to the survivability and responsiveness of future military aircraft. Impelled by the overriding military importance of sustained supersonic cruise, advances in this area also could be spun off into the field of commercial aviation and thus trigger a two-way technology flow. Bemoaning the moribund state of US supersonic cruise technology, the report, nevertheless, saw a silver lining in the form of the NASA-funded Supersonic Cruise Research program that was terminated in 1981 and that established "a good base for further advancement."

The White House experts cited here the potential for development of single-crystal turbine blades, improved coatings, better cooling methods, and better internal aerodynamics that open the door to significant improvements in the thrust-to-weight rating of military aircraft engines.

Incorporated into variable-cycle engines, these technologies can sharply reduce fuel consumption across the board. On the commercial side, such designs might lead to truly fuel-efficient supersonic transports.

The White House study concluded that the airframes of future supersonic cruise vehicles will benefit from the application of powder metallurgy technology and superplastic forming techniques as well as thermoplastics, carbon-carbon, and metal matrix fibers. Also, the combination of fault-tolerant computers that provide load alleviation and dynamic damping and the structural cooling that results from supersonic laminar flow can significantly drive down the structural weight of supersonic cruise vehicles.

Military and commercial supersonic cruise aircraft that capitalize on advanced laminar-flow control techniques might operate at three times the fuel efficiency of current designs.

The third—and most ambitious—goal the White House panel outlined centers on eventual development of hybrid aerospace vehicles that can operate in the atmosphere as well as in space. Such transatmospheric vehicles, the report suggested, would be able to maneuver routinely into and beyond the atmosphere, provide rapid, flexible access to low earth orbits by manned or unmanned systems, and set the stage for hypersonic transports.

Pointing out that the US tends to rigidly separate aeronautical and space technologies, the White House panel warned that foreign competitors might not accept such a line of demarcation and instead might work toward a rapid confluence of the two types of technology.

The first step recommended by the study is comprehensive analysis of the transatmospheric environment to determine the high payoff technologies requisite for the eventual development of an aerospace plane. Technological fallout from the Space Shuttle as well as advances in aeronautics can be expected to pave the way toward the transatmospheric era.

In addition, there is a strong potential for significant advances in lightweight structural and thermal protection concepts as well as blended body aerodynamics. The White House panel predicted that over the long term hybrid propulsion systems will become available and that gradually they might open the door to high-earth-orbit missions.

Transatmospheric vehicles, the White House study suggested, could provide important military options for weapons delivery over global ranges, reconnaissance, and space-support missions.

Realization of the three goals spelled out by the report is predicated on stepped-up national research programs. The White House panel also called for specific changes in how the nation goes about its research and technology (R&T) business. Problems that historically have hindered technological innovation in the US need to be corrected:

- Federal contracting procedures should reflect a precise distinction between the procurement of R&T and the procurement of hardware.
- Regulatory policy should be amended to encourage rather than proscribe cooperative efforts among US companies in the field of technological developments.
- Federal tax legislation should encourage private investment in high-technology projects.
- Lastly, elements of the executive branch with relevant oversight or management responsibility should strive to maintain the continuity of R&T activities.

IN FOCUS...

Washington Observations

★ The former Deputy Under Secretary of Defense for Policy, Gen. Richard G. Stilwell, USA (Ret.), warned at a Washington press conference sponsored by the National Strategy Information Center that US Special Operations Forces lag qualitatively behind those of the Soviet Union. He said these deficiencies stem in part from inadequate foreign language training and the absence of a joint command structure for these forces.

The new issue of *Soviet Military Power*, meanwhile, disclosed that the Soviet Special Purpose Forces, known by the Russian acronym SPETSNAZ and controlled by the Main Intelligence Directorate (GRU) of the Soviet General Staff, are receiving demolition training involving accurate full-scale mockups of such US weapon systems as the ground-launched cruise missile (GLCM), Pershing, and Lance, as well as of nuclear storage facilities, airfields, and communication centers.

One typical example of how SPETSNAZ works, according to Dr. John J. Dziak, Senior Soviet Specialist of the Defense Intelligence Agency, was Moscow's blitzkrieg intervention in Czechoslovakia in 1968 when these special-purpose forces seized key nodes in Prague, the country's capital, arrested Czechoslovak Party leader Alexsandr Dubcek, and turned the short-lived "Prague spring" into perpetual winter.

Another prominent instance of SPETSNAZ's lethality was the assassination of Afghan President Hafizullah Amin in 1979 as part of an attack involving several hundred commandos. This overt attack followed a botched, covert attempt by Soviet KGB agents to poison President Amin.

SPETSNAZ's wartime task, according to US intelligence, is to operate far behind enemy lines for long periods to conduct reconnaissance, sabotage, and attacks on a wide variety of military and political targets.

★ Air Force experts see a compelling need to resurrect the Hypervelocity Missile R&D effort that Congress

halted last year because of the services' alleged duplication in antiarmor programs. This multiservice R&D program was meant to provide fighter pilots with multiple, low-cost, terminally guided, very-high-speed missiles capable of killing armor and other vehicles from standoff ranges. The weapon would complement the electro-optically and imaging infrared guided Mavericks and take its place along with the Sensor Fuzed Weapon and the Extended Range Antiarmor Munition (ERAM) as a next-generation tank killer.

As such, the Hypervelocity Missile is an important element of the Antiarmor Master Plan drawn up last year by the Defense Department in response to a congressional mandate to streamline the current and evolving arsenal of antiarmor munitions. The Air Force has concluded that a mix of direct-delivery munitions, mines, and standoff weapons is required for the antiarmor mission.

★ Last year's historic agreement between the US and the Federal Republic of Germany on beefing up air defenses in NATO's central region is taking on tangible forms in the FY '86 Defense budget. The bilateral accord calls for the deployment of fourteen Patriot tactical fire units to Germany. In return, Germany will operate twelve US Patriot fire units for ten years.

IN FOCUS...

Further, Germany will operate twenty-seven Roland air defense units for ten years on three USAF bases in Germany. In addition, Germany will purchase and operate sixty-eight Roland fire units for deployment at German bases, some of which are USAF collocated airfields. The agreement also stipulates German purchase—through Foreign Military Sales—of another fourteen Patriot fire units.

Included in the agreement is a provision to establish a common logistics capability in NATO to support the Patriot systems deployed in Germany.

In a related field, the Air Force has entered into an agreement with Great Britain under which the US will be procuring thirty-two Rapier rapid-fire units and supporting elements. British forces will operate and maintain these systems for the US. The new budget request includes funding for the final complement of the Rapier units to be deployed in Great Britain. A few months ago, the US signed a similar broad agreement with the Turkish government. The US will procure and the Turkish Air Force will operate a significant number of Rapier fire units and support equipment to provide point air defense for USAF air bases in that country. Details of the agreement are under negotiation.

★ The prestigious nonpartisan Committee on The Present Danger points out in a recently released analysis entitled "Defense and the Deficit" that current defense expenditures expressed as a fraction of the Gross National Product are smaller than in any year between 1951 and 1972. In 1969, the last year that the US maintained a balanced federal budget, defense expenditures were nine percent of GNP, compared to 6.6 percent in the current fiscal year.

During the four years of the Reagan Administration's defense revitalization, defense spending increased by $19 billion while the output, mea-

sured in 1972 dollars, used for nondefense purposes in the private and public sectors increased by $145 billion, according to The Present Danger study.

Under the Administration's present plans, defense expenditures would rise to 7.5 percent of GNP by 1990—a lower percentage than in any year of the Eisenhower and Kennedy Administrations.

Output available for nondefense use in 1990 would be twenty-five percent higher than in 1984, according to current budget plans. If defense expenditures were held to three percent—as favored by influential elements of Congress—the resultant cut would only increase the output available for nondefense purposes in 1990 by about two percent over the level proposed by the Administration.

The report points out that the notion that it is only fair to cut defense when other elements of the federal budget are being trimmed to alleviate the deficit misses the real point: "The question of fairness involved is whether it is fair to risk the lives, fortunes, and freedom of future generations of Americans in order to raise the consumption level of this generation by two percentage points."

★ The Defense Advanced Research Projects Agency (DARPA) will kick off a pioneering technology program next year to establish the feasibility of a liquid-hydrogen-fueled, air-breathing, propelled vehicle capable of sustained hypersonic flight, according to DARPA Director Dr. Robert S. Cooper.

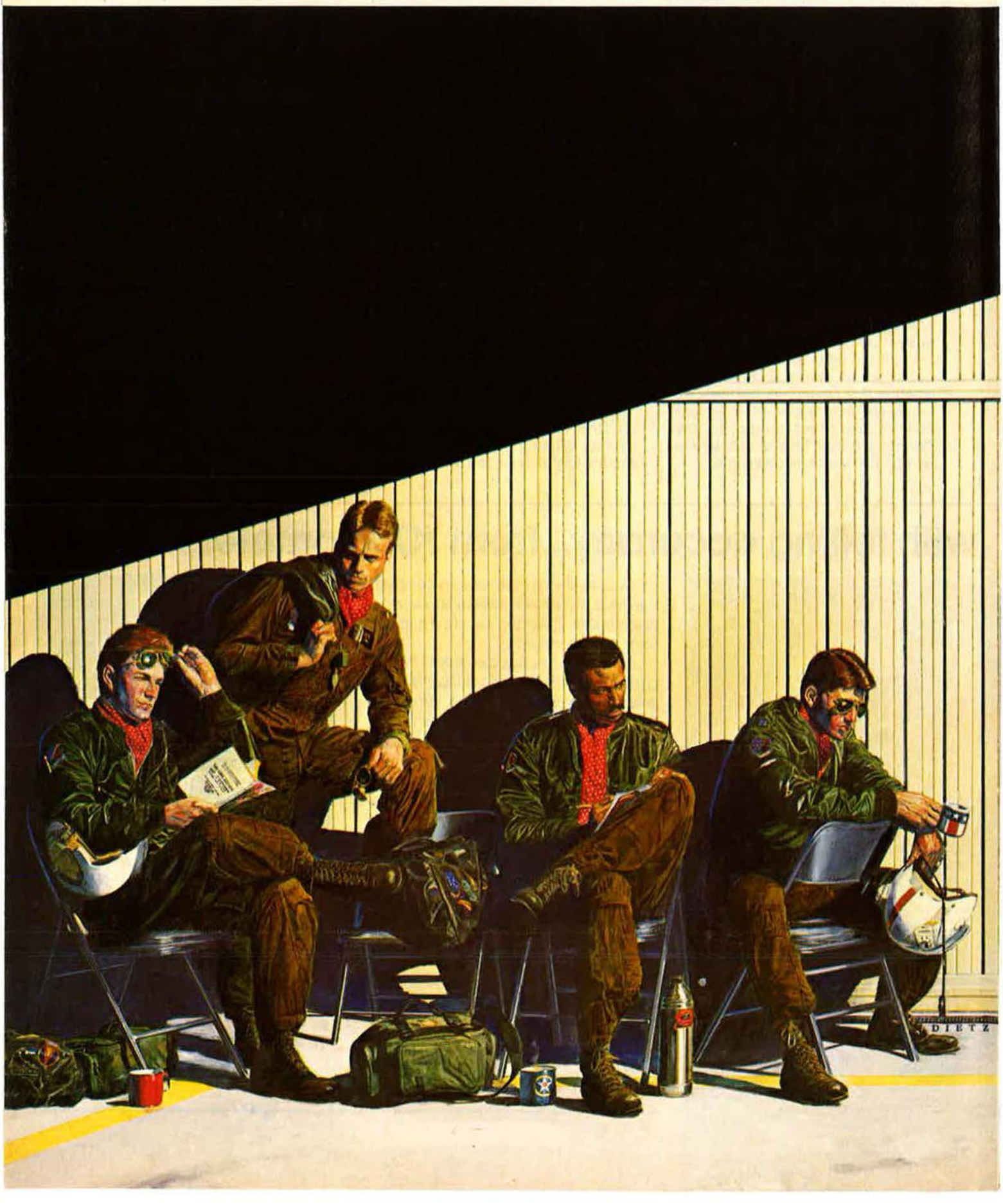
This Supersonic Combustion Ramjet Technology program, he told Congress, is to set up the technology base for a "horizontal takeoff aircraft that cruises in the atmosphere at very high Mach numbers and up to 150,000 feet altitude to reach any point in the world from a conventional runway within CONUS and return with tremendously reduced operational costs and increased basing flexibility needed for military operations."

DARPA's new budget request also seeks funds for its Nuclear Monitoring Research program to improve verification techniques for monitoring Soviet compliance with existing nuclear test-ban agreements and to develop options for monitoring future arms-control accords. Among the new technologies associated with this DARPA program are a seismic array that is being installed in Norway and the use of deep-sea drilling technology to deploy sensors beneath the ocean floor.

Dr. Cooper disclosed that DARPA recently completed a large-scale test under the auspices of the Geneva Conference on Disarmament of an international seismic data-exchange system that includes an international data center in the US. Other elements of the agency's Nuclear Monitoring Research involve development of technologies to detect and characterize special nuclear materials and new detection devices that will be test-flown next year on the Space Shuttle and high-altitude aircraft.

DARPA, according to Dr. Cooper, also has made substantial progress in its Autonomous Terminal Homing (ATH) program that seeks to provide cruise missiles with "zero CEP [circular error probable]" guidance. Purpose of the program is to make possible the destruction of hard targets with long-range cruise missiles using conventional, nonnuclear warheads. The prospect of such weapons is of major interest to various elements of the Defense Department—notably the Air Force and the Navy—in the context of both strategic and tactical missions, the DARPA Director told Congress. ■

THE BOEING ATF CAN KEEP OUR



DEFENSE SYSTEM IN THE AIR. NOT ON THE GROUND.

If a fighter is grounded for maintenance, our country could be left scrambling for defense.

The advanced tactical fighter (ATF) can change that. Because it's designed to be more reliable. To be flight-ready time after time.

But for the ATF to be an ultra-reliable aircraft, it must go beyond today's technology. That's why Boeing is the one contractor that's too valuable to ignore.

Our strength is the tremendous resources of our company. Resources responsible for winning and performing 325 advanced fighter technology contracts in the last ten years.

Resources that are already hard at work on composite plastics for a lighter, stronger airframe with 50% fewer fasteners and parts.

Resources that have put Boeing at the forefront of built-in test equipment, which will provide the ATF with onboard diagnostic capability.

Resources that have combined electronic functions into fewer microchips, which require less maintenance.

All of which will help the ATF have 40% of the maintenance requirements on its airframe and avionics compared to current fighters. Sixty percent of the maintenance on mechanical and electrical equipment.

In fact, in 1995, with its improved reliability and greater performance, the Boeing ATF will be four times as effective as our current fighters.

With our country's defense at stake, we need the most reliable fighter available. And the most reliable contractor to build it. The ATF and Boeing.

BOEING

CAPITOL HILL

By Kathleen G. McAuliffe, AFA DIRECTOR OF LEGISLATIVE RESEARCH

Washington, D. C., March 22

Freezing Defense

The Senate Budget Committee dealt a serious blow to the Administration's request for a 5.9 percent real growth for defense by voting overwhelmingly to limit the FY '86 increase to the rate of inflation—about four percent. The surprise "real growth freeze" would be followed by inflation-adjusted hikes of three percent in FY '87 and FY '88. The three-year proposal would yield savings of $83.9 billion in outlays—about $11 billion in FY '86 alone.

The defense proposal, offered by Sen. Ernest Hollings (D-S. C.), was supported by all of the Democrats on the panel and eight of twelve Republicans. This indicates an uphill fight to reverse it in the full Senate.

The Senate action could result in the House Budget Committee cutting even further into defense in order to gain some bargaining leverage for conference. In recent years, the House defense budget level has come in below Senate plans. House Budget Committee Democrats will be looking at a range of options for defense, including a freeze at the FY '85 level, which would mean a decrease in funds, and a three percent real increase.

MX Funds

Senate approval of the release of $1.5 billion in FY '85 funds for production of twenty-one MX ICBMs and anticipated House approval have not eased concern for the FY '86 request, which calls for $3.2 billion to buy an additional forty-eight missiles.

The vote on the FY '86 request will probably center less on the impact of MX on the Geneva arms talks, as was the case in the recent votes, and more on missile survivability and cost. Sen. Sam Nunn (D-Ga.), a key MX supporter, pointed out, for instance, that his vote for the FY '85 funds does not mean he will support the total deployment of 100 missiles or the acquisition of forty-eight missiles in FY '86.

Predictions are that DoD will be lucky to get another twenty-one MX/Peacekeepers next year. Some lawmakers want to limit total production to fifty or even to halt production after the FY '85 buy, which would result in a total of forty-two MXs instead of the planned 100. But senior USAF officials say that forty-two MX ICBMs would not constitute a militarily significant force, especially for holding Soviet hardened targets at risk.

A possible budget freeze and perceived vulnerability of the Minuteman silos in which MX will be based will affect the FY '86 outcome. Future hardening of the current silos to a level three to four times that of existing holes is possible, but at considerable cost. USAF estimates that hardening fifty Minuteman silos could cost $9 billion beyond the $21.5 billion for the MX program.

Base Closings

The chairman of the Senate Armed Services Committee, Sen. Barry Goldwater (R-Ariz.), expects his committee to consider closing military bases in order to achieve required defense savings. While DoD did not recommend any closings for FY '86, it gave Senator Goldwater an "unofficial" list of twenty-two facilities that, if closed, could yield savings of $500 million a year. The closings would affect the refueling wing at McConnell AFB, Kan., the bomb wing at Blytheville AFB, Ark., the W. K. Kellogg Regional Airport ANG unit at Battle Creek, Mich., and the Reserve component at Chicago-O'Hare IAP, Ill.

Senator Goldwater believes DoD thinks the facilities could be closed with no harm to national security. But base closings are political dynamite, and getting congressional support will be difficult. One senator whose state would be affected called the list "a complete outrage." Further, the White House has not endorsed the closings for fear that affected members of Congress would then hold their votes on other matters hostage to concessions on the base closings.

As Senator Goldwater succinctly put it, "While my colleagues clamor for additional reductions in the defense budget, they do not want such reductions when they affect programs or facilities located within their states and districts."

Rogers Urges Improvements

The Supreme Allied Commander Europe has again warned Congress that NATO's major weakness is its insufficient conventional forces. If attacked conventionally by the Warsaw Pact, the Alliance would have to resort to the early use of nuclear weapons, Army Gen. Bernard Rogers reiterated. He blamed the situation on the lack of sustainability—not enough trained manpower, ammunition, and war reserve materiel. NATO strengthens conventional forces each year, but is far outpaced by the Warsaw Pact. The result is a continually widening gap.

General Rogers also pointed to some positive signs indicating that NATO's conventional capability will improve—to wit, a substantial increase in the commonly funded infrastructure program, the commitment to raise ammunition stocks, and the acceptance of the follow-on forces attack (FOFA) plan to strike and disrupt the Pact's second and third echelons before they reach NATO defensive positions.

Congress is concerned about low sustainability in Europe and wants the allies to do more to beef up force structure. But while US levels are generally higher than other NATO nations, according to General Rogers, shortages remain in air-to-air missiles, certain artillery munitions, and stockage levels of major end items of Army equipment and USAF war reserve kits.

Ironically, a congressionally imposed limit on the number of US personnel stationed in Europe is adversely affecting Alliance capabilities across the board. In particular, continued deployment of GLCM requires trading off manpower spaces from essential conventional forces. General Rogers asked Congress to rescind the US European troop ceiling of 326,400. Congress, however, is unlikely to increase the number of military personnel in Europe, especially as the defense budget is being squeezed. ■

First annual C-21A report

52 weeks...52 C-21As

On schedule... exceeding the required mission capable rate... over 18,900 flight hours... 20,000 takeoffs and landings... 10 of 16 bases activated.

During its first year in the U.S. Air Force inventory, the C-21A already has established an enviable record of achievement.

In early April, for the 52nd time in as many consecutive weeks, the USAF Military Airlift Command (MAC) accepted a new Learjet C-21A. Since delivery of the first aircraft on April 6, 1984, the USAF C-21A fleet has achieved a mission capable rate in excess of 95 percent. Well above the required 85 percent rate.

In performing its missions of passenger airlift, medical evacuation, and high priority cargo transport, the C-21A fleet has accumulated over 18,900 flight hours and 20,000 landings. In the U.S., Europe and the Far East.

Its sophisticated, well-integrated and reliable systems and equipment provide a cost-effective platform to hone the skills of newly rated pilots and retain the high-level proficiency of veteran crew members.

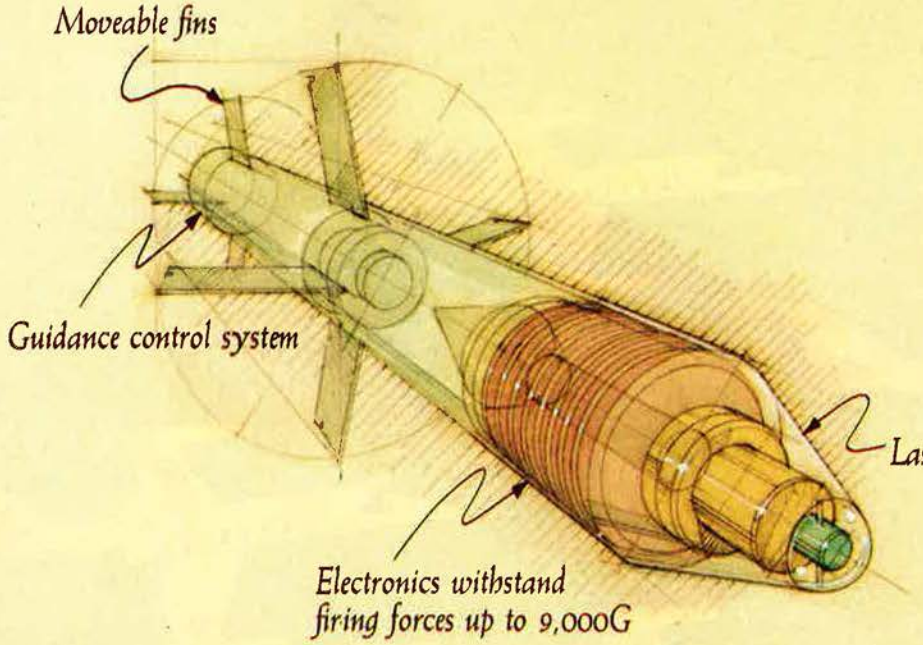
By October, the Air Force will have taken delivery of 80 C-21As, and the remaining six bases will be operational. And Gates Learjet will continue staying close to all 80 aircraft, providing total logistics support. Our subsidiary, Gates Learjet Aircraft Services Corporation (GLASCO), will continue to ensure that C-21A maintenance manhours per flight hour and overall operating costs remain but a fraction of its USAF CT-39 predecessor.

The C-21A. A U.S. product proudly representing the high quality standards the U.S. Air Force demands of itself and its aircraft. At home and abroad. And ready to meet additional rigid requirements of future Air Force missions.

For full particulars on the C-21A, and other off-the-shelf models in the Learjet family, contact Dane Jenning, Director-Government Marketing, P.O. Box 11186, Tucson, AZ 85734. 602-294-4422.

Gates Learjet

Systems that search, sense, seek...and succeed.

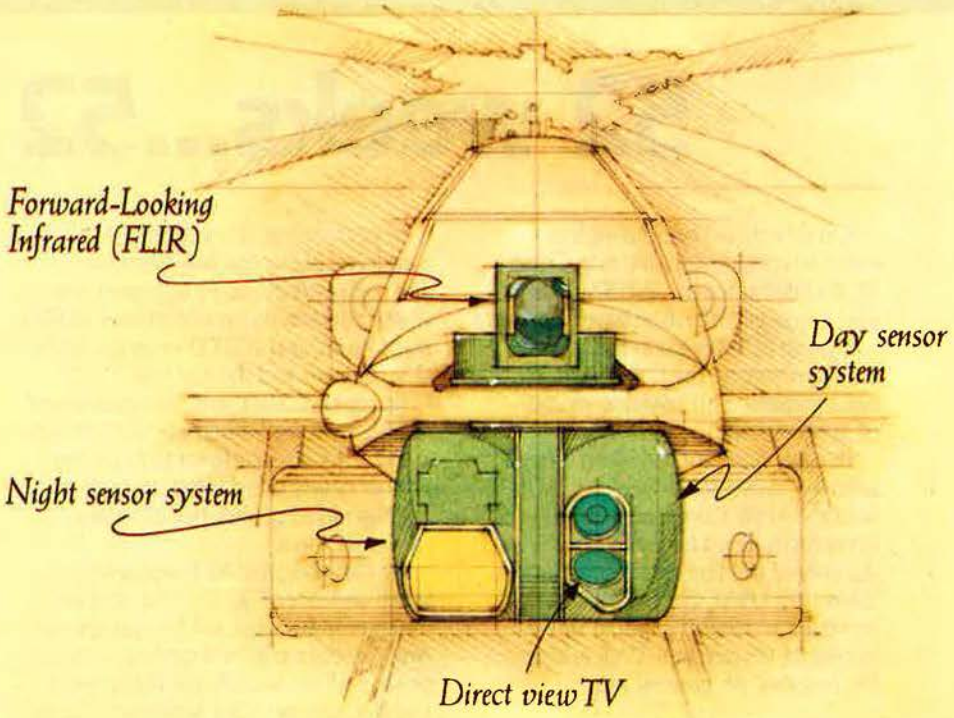


Copperhead

Copperhead, Hellfire, the Navy Guided Projectile—Martin Marietta laser technology guides them all—with adverse-weather, first-round accuracy.

TADS/PNVS

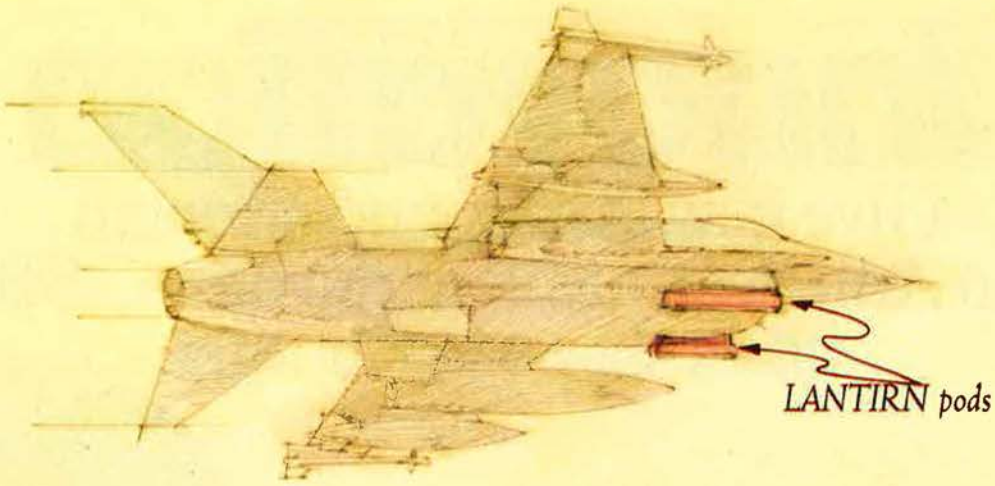
Martin Marietta has pioneered the application of laser, infrared and other electro-optical technologies for navigation and fire control systems like TADS/PNVS. It guides pilots of advanced attack helicopters to targets, day or night, and in adverse weather.

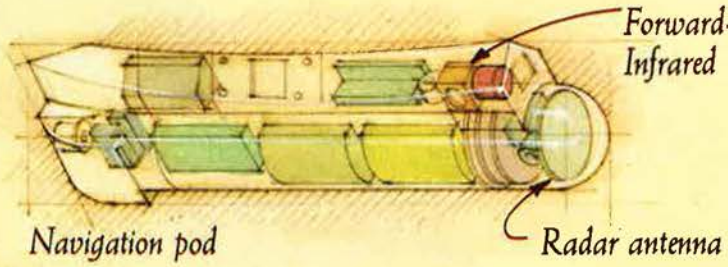


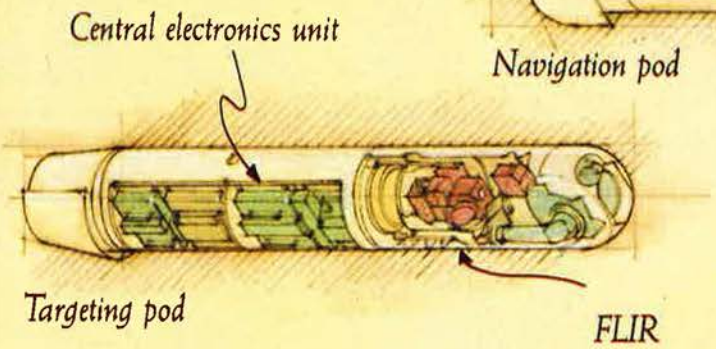
OUR COMMITMENT IS TOTAL. OUR CAPABILITIES

LANTIRN

LANTIRN is a system which incorporates Martin Marietta's advanced sensor technology to increase the mission effectiveness and strike capability of attack aircraft. It will allow pilots to operate at night and under the weather to find and destroy ground targets.







Sensors and seekers aimed at tomorrow

Today, Martin Marietta is developing new generations of all-weather guidance and control systems employing state-of-the-future advances in electro-optics, millimeter-wave and infrared technologies. Whatever the mission, whatever the threat, Martin Marietta systems know how to search, sense, seek...and succeed.

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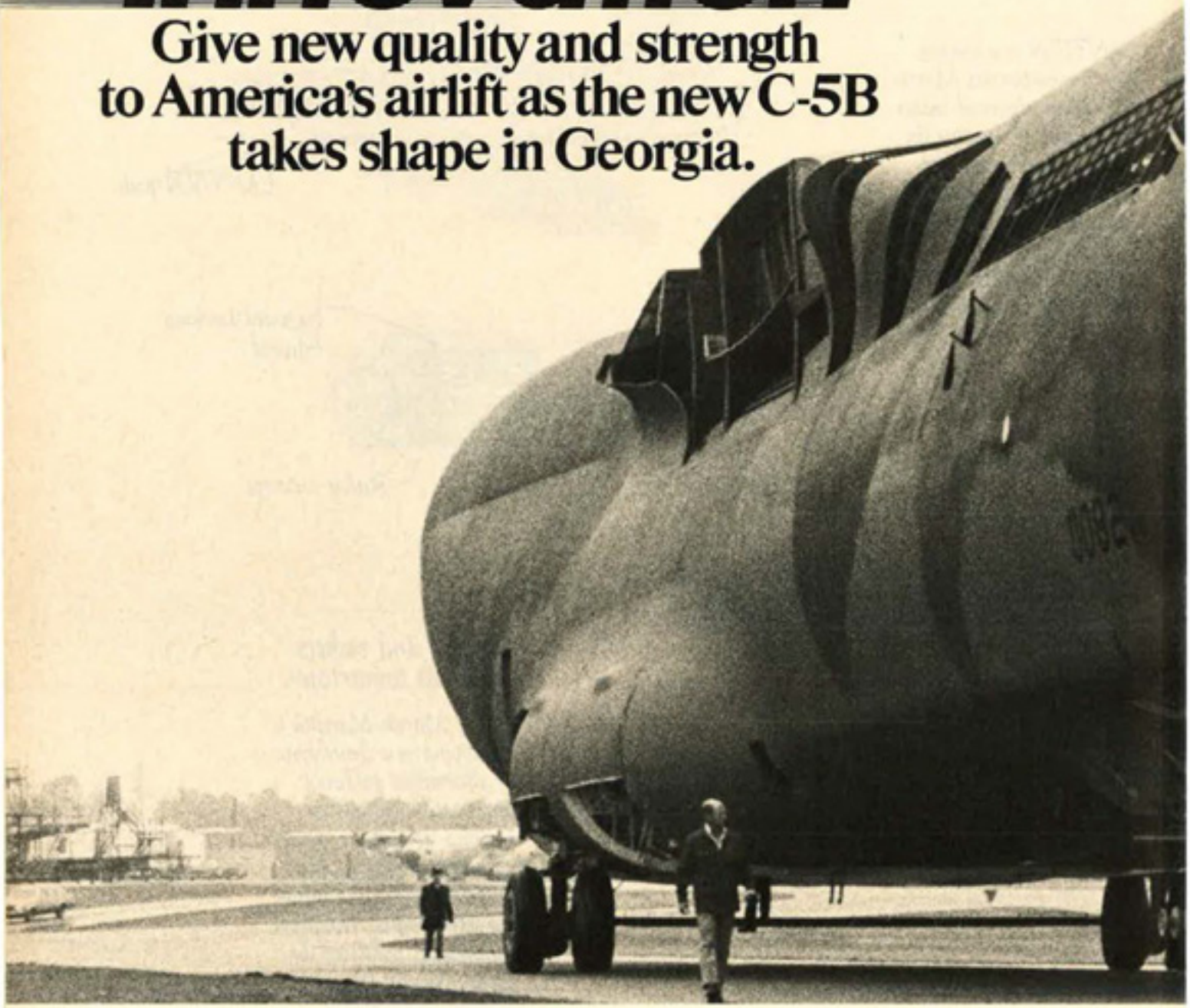
ARE PROVEN. OUR MISSION IS SUCCESS.

Innovation

Give new quality and strength to America's airlift as the new C-5B takes shape in Georgia.

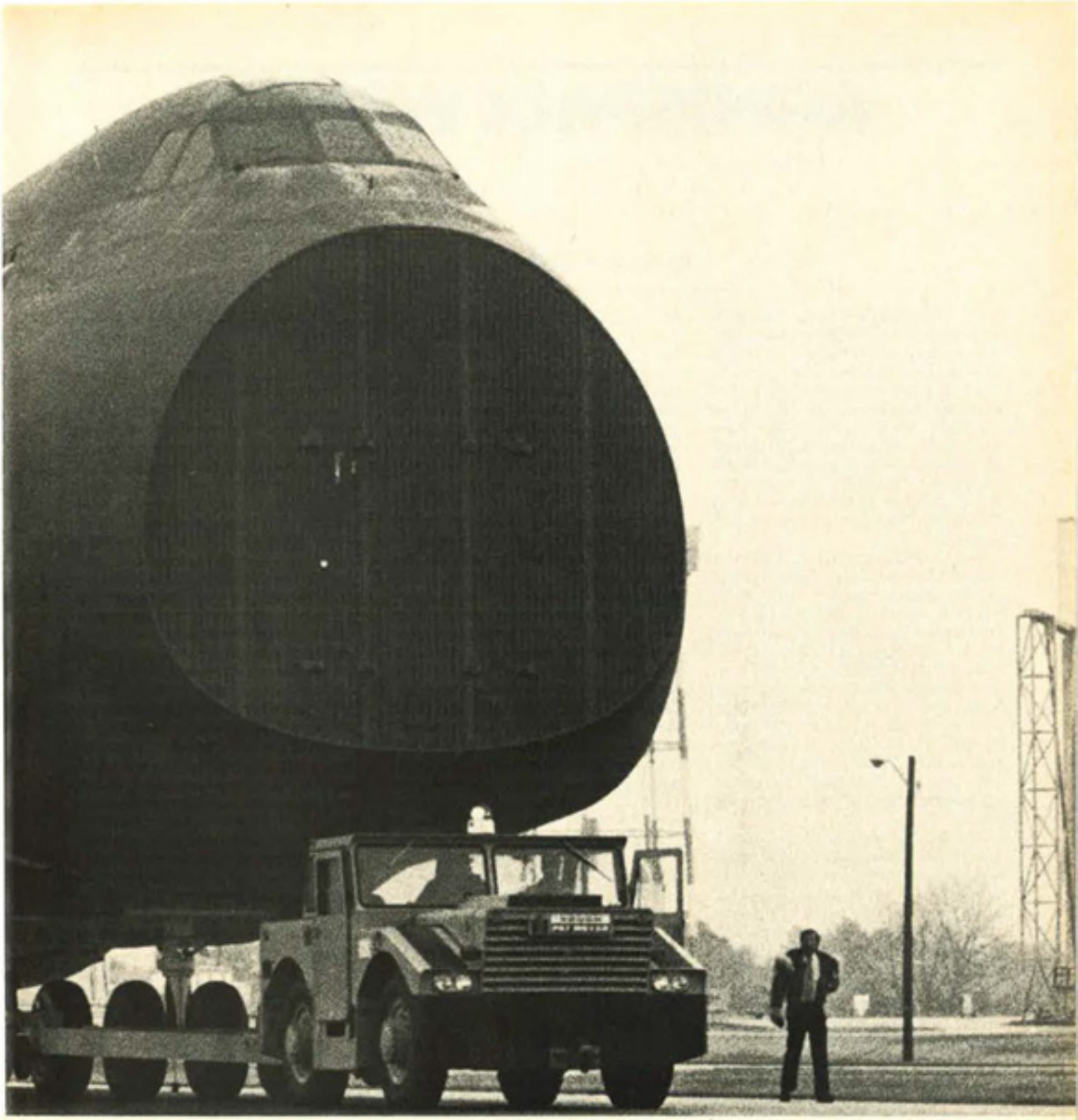


Lockheed-Georgia
Giving shape to imagination.

Marietta— April 1985

The fuselage of the first of the USAF's new C-5B aircraft has passed its pressure testing with flying colors and has donned its battle colors. Shown on its way to final assembly, C-5B #1 now is receiving at a rapid rate its wings, engines, tail section and other major components.

When this historic C-5B rolls out



this summer, it will be an aircraft virtually ready for check flights and delivery. It also will set new standards of quality and reliability while still meeting budget and schedule targets.

A modern, improved airlifter, the C-5B is a superior example of innovation in aircraft design, materials, and manufacturing. It has *improved* avionics, engines with increased reliability, and new alloys with greater resistance to fatigue and corrosion.

Among the advanced techniques used in C-5B manufacturing is the new L&F Stretch Forming Press for fabricating large skins and heavy aluminum extrusions such as the huge C-5B wing root caps much more quickly and efficiently.

The fixed-price C-5B program will increase America's outsize cargo capacity by 65%. Airlift, vital to deterrence, will be greatly enhanced, increasing the nation's ability to move troops and all of their equipment anyplace in the world they are needed.

As the first C-5B approaches rollout, the men and women at Lockheed-Georgia, along with the thousands of employees at Lockheed's C-5B suppliers in 45 other states, take pride in their contributions to the quality and success of the C-5B program.

AEROSPACE WORLD
News, Views & Comments

By James P. Coyne, SENIOR EDITOR

Washington, D. C., March 25 ★ The US and Canada have agreed to completely modernize the North American air defense system, providing for the first time a contiguous surveillance barrier around the entire continent, according to a Memorandum of Understanding (MOU) signed by Secretary of Defense Caspar Weinberger and Canadian Minister of National Defense Erik Nielsen during President Reagan's March visit to Canada.

The old Distant Early Warning (DEW) Line, which protects against enemy attacks over the north polar regions, will be replaced by a new North Warning System (NWS). In addition, a new Over-the-Horizon Backscatter (OTH-B) radar system will protect against threats from the east, west, and south. The $1.29 billion cost of the NWS will be split sixty-forty, with the US contributing approximately $778 million and Canada $511 million. The entire $2.3 billion cost of the OTH-B will be borne by the US.

The MOU also provides for Canadian manning, when appropriate, of the Airborne Warning and Control System (AWACS) over North America, evaluation of requirements for Forward Operating Locations (FOLs) and Dispersed Operating Bases (DOBs) for AWACS and NORAD fighter operations, interoperability of communications networks, and the application of advanced technologies for North American aerospace defense.

The DEW Line first went into operation on an experimental basis in Alaska in 1953. The 2,000-mile Canadian segment was completed in 1956. In 1959, construction began on four sites in Greenland and was completed in 1961 (the Greenland segment is known as DEW East). At its peak in the early 1960s, the DEW Line consisted of seventy-eight stations, sixty-one of which had the primary missions of radar surveillance and initiation of early warning.

Today, after nearly three decades of service, the DEW Line consists of thirty-one sites—four in Greenland, twenty-one in Canada, and six in Alaska. The system is manned and operated under contract by FELEC Services, Inc., Colorado Springs, Colo.

Recent developments in Soviet attack capability necessitate replacement of the DEW Line with something better. Its radar is outmoded, there are numerous low-altitude coverage gaps, and it is expensive to operate and maintain.

The new NWS is a state-of-the-art system that will consist of thirteen "minimally attended" long-range radar stations and thirty-nine gapfiller unattended short-range radars. "Minimally attended" means the stations will be manned by groups of six to nineteen technicians. These fifty-two radars will be deployed across northern Alaska, northern Canada, and the coast of Labrador. General Electric Co., Syracuse, N. Y., was awarded the contract in February for ten of the thirteen long-range radars. The short-range radar equipment design and development contract was awarded to Sperry Corp., Great Neck, N. Y., in August 1984. Canada will design and construct the short-range radar stations, procure systems communications, and provide total system integration for Canadian sites.

The OTH-B radars providing east, west, and south coverage will scan twelve overlapping sectors to detect and track air-breathing targets at all altitudes at ranges from 500 to 1,800 nautical miles. All OTH-B radars do this by transmitting a signal that "bounces" off the ionosphere and is deflected toward the earth "over the horizon." If a target reflects a signal, it returns to the receiver via a similar bounce path.

To gather a significant backscatter radar reflection, the OTH-B radar must be large. Each fixed linear-array antenna is 4,980 feet in length. The transmitter antenna is geographically isolated from the receiver antenna by approximately 100 miles. An operations center for radar control and signal processing is integral to each OTH-B sector system.

All OTH-B radars will be on US territory and will provide around-the-clock tactical warning of aircraft and air-to-surface missile attacks on North America. Performance tests and limited Initial Operational Test and Evaluation (IOT&E) of an experimental OTH-B radar system constructed in Maine were concluded in June 1981. General Electric won a contract in June 1982 to begin the first of several phases of development, to upgrade the experimental system to the Initial Operating Sector

One of four new Lockheed LC-130H Hercules aircraft, largest in the world to be outfitted with skis, demonstrates the Lockheed ski-and-wheel system, which enables operation from both paved and snow or ice runways.

of the east coast system, and to construct a prototype operations center.

The NWS and OTH-B systems are projected to be completed in the early 1990s.

★ Four new Lockheed LC-130H ski-equipped Hercules aircraft, largest airplanes in the world outfitted with skis, have been delivered by the Lockheed-Georgia Co. to the New York Air National Guard's 109th Tactical Airlift Group at Schenectady, N. Y.

They replace the unit's twenty-four-year-old C-130Ds. The 109th uses the aircraft to carry out the annual resupply airlift to the Greenland ice cap DEW Line radar sites. The Air Guard took over the Greenland DEW Line resupply mission in 1975. Two of the aircraft were flown to Greenland in March to conduct ski trials. The resupply season began in April. The aircraft deliver fuel oil, supplies, and equipment to radar sites that are accessible only by air.

The LC-130s are fitted with a Lockheed-designed ski-and-wheel system that enables them to operate either from conventional paved runways or from snow/ice runways. This flexibility enables the aircraft to take off on wheels from Sondrestrom AB and to land on skis at DEW Line snow runways. The skis, coated with Teflon to reduce friction, weigh one ton each. The 109th also has taken delivery of four advanced model C-130H wheeled aircraft for use on USAF worldwide logistic supply missions.

★ Gen. Charles A. Gabriel, Air Force Chief of Staff, has presented the Lance P. Sijan Leadership Award to two USAF officers and two noncommissioned officers for their demonstrated outstanding leadership abilities.

Recipients in the senior and junior officer categories are Brig. Gen. Ronald R. Fogelman, Commander, 836th Air Division, Davis-Monthan AFB, Ariz., and Capt. David R. Beecroft, operations officer, 435th Security Police Squadron, Rhein-Main AB, Germany.

Winners in the senior and junior enlisted categories are SMSgt. Ronald L. Dawson, a chief master sergeant selectee and bomber branch superintendent, 97th Organizational Maintenance Squadron, Blytheville AFB, Ark., and TSgt. Richard T. Brisson, an instructor flight engineer in the 20th Military Airlift Squadron, Charleston AFB, S. C.

The award, presented annually, is named in honor of Capt. Lance P. Sijan, who was shot down over Southeast Asia in 1967. Although badly injured, he avoided capture for six weeks and then endured North Vietnamese tortures until he died. Sijan was posthumously awarded the Medal of Honor.

Full-scale development of the new USAF C-17 transport has been approved by DoD. The Douglas aircraft will be capable of carrying large Army combat equipment over intercontinental ranges, yet be able to land at small, austere strips near the battle area. (Artist's concept by Erik Simonsen)

★ The new USAF C-17, under development since 1982 by Douglas Aircraft Co., Long Beach, Calif., has passed a major milestone—formal approval by Secretary of Defense Caspar W. Weinberger for full-scale development.

A high-wing, four-engine wide-body jet transport with a cockpit crew of two and one loadmaster, the C-17 will be able to carry the Army's large combat equipment over intercontinental ranges and land at small austere airstrips near potential trouble spots. It is designed to fill the Air Force's shortfall in long-range aircraft while significantly adding to intratheater airlift capability.

Full-scale development will continue through the final design and testing phases of the program, scheduled to end in 1992. Included in the development program is the construction of three test aircraft—one for flight test and two for structural testing.

Total cost of the development program is estimated at $4 billion. Congress has appropriated $123 million for FY '85 work.

The C-17 will utilize technology proven over the past twenty years in commercial and military aircraft. Externally blown flaps, so called because engine exhaust blows onto and through the aircraft's large wing flaps, will provide extra lift to enable it to operate from unpaved airstrips 3,000 feet long by using a steep angle of approach and a relatively slow approach speed. Another concept resulting in shorter landing rollouts on unpaved or unprepared surfaces is directed flow thrust reversing, in which exhaust air only from the upper half of the engine is deflected up and forward, reducing the chance of the engines ingesting surface debris.

The C-17 will be about the same size as the DC-10 commercial transport or the C-141 military transport, with a wingspan of 165 feet and a length of 175 feet. The four Pratt & Whitney PW2037 engines each develop 37,000 pounds of thrust.

With a maximum payload of 172,000 pounds, an unrefueled C-17 can fly 2,400 nautical miles, land on an austere airfield only 3,000 feet long, unload, and then fly to a destination 500 miles away. Range can be extended almost indefinitely because the aircraft has an in-flight refueling capability.

First flight of the C-17 is scheduled for 1989. The Air Force Airlift Master Plan calls for procurement of 210 C-17s by 1998.

★ Tactical Air Command has won the Secretary of the Air Force Safety Award for having the best overall safety program of any Air Force command in 1984. This is the highest Air Force safety award, presented to the major air command with the most effective safety program in all functional areas, including flight, ground, and weapons safety.

TAC won the Category I level of the award for major air commands that fly two percent or more of the total Air

Force flying hours during the year (TAC flies about twenty-one percent of total USAF flying hours).

In 1984, TAC had the fewest number of Class A aircraft accidents and its lowest aircraft accident rate in the past ten years—twenty-three accidents and a rate of 3.2 accidents per 100,000 flying hours. Class A accidents result in loss of life or more than $500,000 damage. This was the sixth consecutive year that TAC has sustained a downward rate trend.

In ground safety, TAC experienced thirty-one accidents, a forty-six percent reduction from the previous year. Ground fatalities and injuries to military personnel were forty percent lower than the previous year.

"These achievements, compiled while flying more than 716,931 hours performing realistic combat-training missions in eighteen different high-performance aircraft, testify to the highest degree of professionalism among pilots, aircrew, and support personnel," Secretary of the Air Force Verne Orr said as he presented the award to Gen. Jerome F. O'Malley, TAC Commander.

★ The oldest, continuously operating NCO Academy in the Air Force—the Air Force Systems Command NCO Academy at Kirtland AFB, N. M.—celebrated its thirtieth anniversary with the graduation of Class 85-2 on February 14.

The Systems Command school traces its roots back to the predecessor of Systems Command, the Air Research and Development Command (ARDC), which founded the school in 1955 "to help assure that the position, prestige, and dignity of the NCO is forever preserved."

The ARDC NCO Academy opened its doors February 1, 1955, with a class of sixty-two NCOs. An NCO Leadership School was added in January 1974. Originally, the school commandant was an officer. The first enlisted commandant was appointed in July 1980. The present commandant is CMSgt. Michael Di Gregorio. With the graduation of Class 85-2, the NCO Academy and Leadership School has graduated 18,034 noncommissioned officers.

★ The first C-5B being assembled at Lockheed-Georgia Co., Marietta, Ga., entered the final assembly stage in April and has been painted in the new "European I" camouflage pattern of a gray background and shades of green and olive trim. This replaces the gray-and-white paint scheme on many C-5As. The C-5A fleet will be in the new paint by 1988.

AEROSPACE WORLD

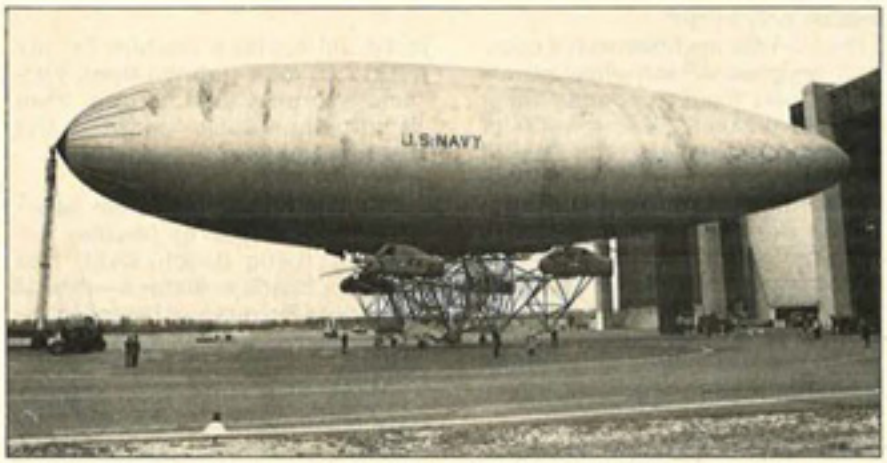
In painting the first giant C-5B fuselage, Lockheed used fifty-six gallons of primer, ninety-five gallons of gray, and forty gallons of varying shades of green. The first C-5B will be delivered to the US Military Airlift Command in December. Production will peak in early 1987, when a new Galaxy will roll out the plant door every ten working days. The fiftieth and last aircraft is scheduled to be delivered in the first quarter of 1989.

★ The twenty-four-ton-payload Heli-Stat, a hybrid airship and helicopter heavy vertical lift aircraft billed by its manufacturer, Piasecki Aircraft Corp., Sharon Hill, Pa., as the world's largest aircraft, has started ground testing.

The Heli-Stat is a composite of a 343-foot ex-Navy airship and four helicopter power sections. It is under consideration by the US Forest Service for transportation of heavy timber loads. Other uses envisioned by the Piasecki Corp. include precision placement of prefabricated building structures and outsize military equipment and offloading of container ships at undeveloped harbors.

★ The Army has begun testing a UH-60A Black Hawk helicopter with a composite rear fuselage (CRF) funded by the Air Force. The Air Force will buy the Black Hawk for search and rescue and other missions.

Using advanced composite materials and manufacturing techniques, the CRF is lighter and stronger than



Ground testing is under way on this hybrid airship and helicopter heavy lift aircraft, the Piasecki Heli-Stat, billed by its manufacturer as the largest aircraft in the world.

Sporting the new European I camouflage paint scheme, the fuselage of the first Lockheed C-5B military transport rolls out of the company's huge paint hangar. Delivery to the US Military Airlift Command is scheduled for December.

The Army, with USAF funding, is testing a new version of the Sikorsky UH-60A Black Hawk helicopter that has a composite rear fuselage instead of the standard metal fuselage. USAF will use the Black Hawk for search and rescue.

the metal Black Hawk rear fuselage and requires far fewer parts and fasteners. Its maintainability will be tested in a two-year field service evaluation at Fort Rucker, Ala.

★ The British Ministry of Defense has selected GEC Avionics, Ltd., Rochester, England, as prime contractor for the British Army's new remotely piloted Phoenix surveillance system.

Phoenix, the British Army's first fully equipped pilotless aircraft system for real-time remote targeting and battlefield surveillance, utilizes a small propeller-driven drone with advanced avionics, an infrared imaging system, and an air/ground data link. The system includes a mobile ground station and logistics vehicles for launch and recovery.

The Phoenix is highly mobile and capable of fast deployment and flexibility in operation, especially in extreme environments with intensive electronic warfare. The infrared sensor utilizes thermal imaging common modules and a zoom telescope.

The air vehicle is designed to present low radar, infrared, and acoustic signatures in order to complicate the enemy's detection problem. Modular construction and small size make it easy for troops to assemble, launch, and recover. It is launched pneumatically from its launching platform and returns to earth by parachute.

★ The first of two planned squadrons of Harpoon-equipped B-52G aircraft has reached initial operating capability at Loring AFB, Me. The second squadron, at Andersen AFB, Guam, is expected to be operational this year.

The modified B-52s can carry twelve of the antiship missiles. The B-52's range and endurance expand the tactical use of the Harpoon and give the Navy more flexibility for defense of sea lines of communications. The Harpoon increases USAF's maritime warfighting capability further—SAC already carries out minelaying and sea surveillance operations.

★ Dr. Nicholas J. Pagano, materials research engineer in Aeronautical System Division's Materials Laboratory, is the winner of the 1984 Air Force Basic Research Award.

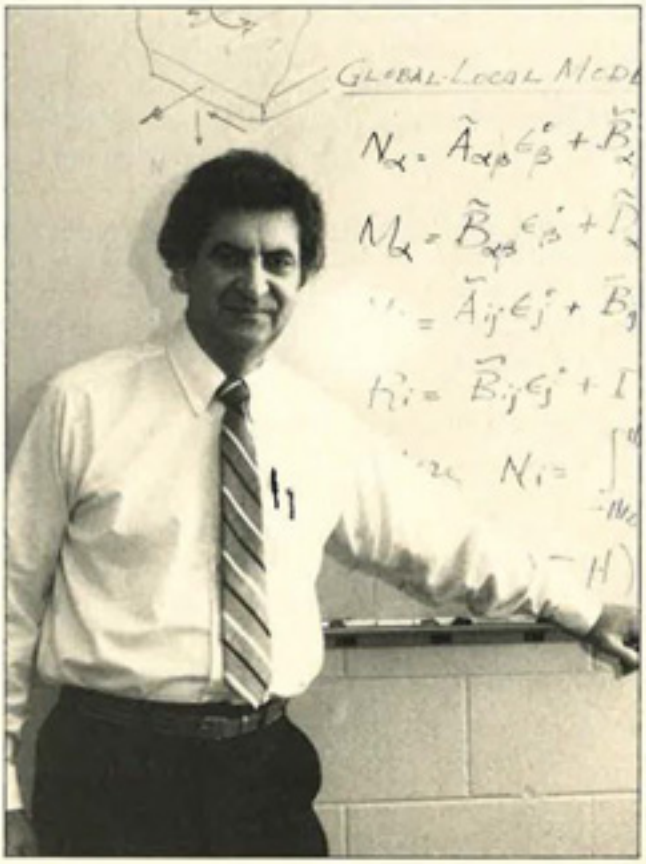
Dr. Pagano developed a mathematical approach to testing new laminated composite materials for use in aircraft structures. His theory, "Global-Local Model," enables scientists to predict the effects of stress on these materials and to change the design orientation of the fiber layers to allow optimum resistance to stress. Today, these stresses may be accurately calculated, and fibers may be designed for maximum strength.

The composite materials are used in such aircraft as the B-1B, the F-15, the F-16, and the EF-111. "Dr. Pagano has made a significant contribution to the advancement of the state of the art in composite materials technology," said Gen. Lawrence A. Skantze, Commander, Air Force Systems Command, during presentation ceremonies.

★ Saudi Arabia will deploy a large aerostat radar in 1986 to supplement the E-3A aircraft now being used to detect intruders. The Royal Saudi Air Force has issued a $12.6 million contract for a TCOM/Westinghouse Low-Altitude Surveillance System (LASS) demonstration.

The Saudi-LASS will consist of a TCOM 365,000-cubic-foot 365 aerostat equipped with a Westinghouse AN/TPS-63 radar modified for aerostat application. The helium-filled aerostat is designed to operate from a tether at an altitude of about 10,000 feet.

The AN/TPS-63 radar, with a detection range of eighty to 100 kilometers,



Dr. Nicholas J. Pagano has received the 1984 Air Force Basic Research Award for developing a more efficient method of calculating stress in new, strong, lightweight composite materials. His global-local model for calculating stress in such materials will allow engineers to design composites to sustain greater stress forces.

SCIENCE/SCOPE

The first full-scale development AMRAAM missile was fired successfully at the White Sands Missile Range in New Mexico. The missile was launched from a U.S. Air Force F-16 at 40,000 feet at a speed of Mach 1.2. It flew a preprogrammed course designed to evaluate the missile's control system and separation from the launch aircraft. It did not have a seeker but instead was programmed through its autopilot to fly a prescribed route. The Advanced Medium-Range Air-to-Air Missile is in full-scale development at Hughes Aircraft Company for the U.S. Air Force and Navy.

An Air Force radar is helping customs officials detect drug smugglers along the southern border of the U.S. The radar, a current production version of the AN/APG-63 installed in the F-15 Eagle fighter, is carried by a Navy P-3A Orion long-range patrol aircraft. The APG-63 radar was adapted easily to the special requirements of the U.S. Customs Service by making small changes to its versatile software system. These special requirements include detecting and tracking slow, small low-flying aircraft of the type used to smuggle contraband into the country. The radar detects both airborne and surface moving targets and provides vectoring information to enable the U.S. Coast Guard or other government agencies to intercept suspects. The Customs Service plans to operate a fleet of six Orions equipped with the Hughes radar.

In the 25 years since the birth of the world's first laser at Hughes Research Laboratories, the "light fantastic" has grown from a laboratory curiosity into an indispensible tool in medicine, industry, electronics, data processing, communications, and scientific research. That first laser, built by Dr. Theodore H. Maiman, was operated on May 15, 1960. It used a flash lamp coiled around a solid ruby crystal to produce an intense pulse of red light with a wavelength of precisely 6943 angstroms. Lasers today employ various gases or crystals and operate throughout the electromagnetic spectrum. They are used as tools for cutting, welding, drilling, and marking metals; as alignment and measuring devices; as the sources of signals in fiber-optic communications systems; and as rangefinders and target illuminators in military systems. Promising new medical uses include advanced eye surgery techniques, internal cauterization, and treatment of cancer. Already used in some computer printers, lasers one day will be widely used in high-speed optical computers to process and store data.

An advanced factory management system model, developed by Computer Aided Manufacturing-International and Hughes, will help optimize use of manufacturing resources. The model will address interactions of all work areas within every level of the organization. It will precisely identify department production capacities, queue bottlenecks, and resource flow. Managers now must make decisions without knowing all interactions among workstations, cells, and departments.

A system that detects and snuffs explosions in less time than it takes to blink can be used in any enclosed spaces, including armored personnel carriers, helicopters, aircraft, paint lockers, and engine compartments. The Dual Spectrum™ fire sensing and suppression system is carried by the U.S. Army's M1 Abrams main battle tank and the two versions of the Bradley Fighting Vehicle. At the start of an explosion, the system detects the fireball and triggers the release of a gaseous-liquid substance. The snuffing occurs in one tenth of a second—well before heat or energy can do any damage. By comparison, an eye blinks in one fourth of a second. The system is produced by the Santa Barbara Research Center, a Hughes subsidiary, and is licensed to Wormald International of Australia.

For more information write to: P.O. Box 11205, Dept. 69-3, Marina del Rey, CA 90295

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was designed to operate at ground level for the US Marine Corps. Slightly modified and attached to the aerostat, the radar can detect low-flying aircraft at distances greater than 100 kilometers.

Upon successful completion of the demonstration, it is anticipated that Saudi Arabia will purchase production systems.

★ Lt. Gen. Winfield W. Scott, Jr., Superintendent of the US Air Force Academy, has been sworn in as a Confederate Air Force "Colonel" by Academy Cadet First Class Albert E. Robertson, who has been a CAF "Colonel" since before attending the Academy. (All CAF members are Colonels.)

The Confederate Air Force is a public foundation incorporated in Texas as a nonprofit, tax-exempt, educational organization dedicated to the acquisition and preservation of World War II combat aircraft in airworthy condition. Almost 200 World War II aircraft are owned by the CAF, which puts on several "Airshos" each year, recreating famous air battles of World War II. *(See also "World War II in Three Hours" on p. 208 of this issue.)*

General Scott is one of many new members the CAF has inducted as part of its ongoing worldwide membership drive toward a goal of 10,000 members. The Confederate Air Force will take part in the activities of "AFA's Gathering of Eagles," April 27 to May 1, 1986, in Las Vegas, Nev.

AEROSPACE WORLD

Confederate Air Force "Colonel" Cadet Albert E. Robertson swears in a new CAP "Colonel"—US Air Force Academy Superintendent Lt. Gen. Winfield W. Scott, Jr. The CAF has begun a worldwide membership drive toward a goal of 10,000 members.

★ The Yankee Air Force, based near Detroit, Mich., has announced its Third Annual Memorial Day Celebration on Monday, May 27.

The celebration, open to the public, will include flybys of an Air Force B-52 bomber and flights by A-7 and F-4 fighters. There will be a fly-in and display of World War II aircraft as well. Activities will take place at the Yankee Air Force Museum, on the east side of Willow Run Airport in Ypsilanti, Mich.

The Yankee Air Force was organized in 1981 to research, restore, and preserve the history of Willow Run Airport, site of one of the most famous aircraft plants in the world during World War II—the Ford Motor Co.'s B-24 bomber plant. The first aircraft manufacturing plant to use Ford's mass-production techniques, it produced more than 8,600 B-24s in three and a half years.

At its peak, the Willow Run plant employed 42,000 people and rolled out a B-24 every fifty-five minutes. One of the aims of the Yankee Air Force is to locate and restore a B-24. Only fifteen are known to exist, and only one of them (the Confederate Air Force's) is in flyable condition. The YAF Museum does, however, own a B-52.

Capt. Linda M. Phillips, first woman instructor pilot in the Strategic Air Command, is a KC-135 pilot with the 97th Air Refueling Squadron, Blytheville AFB, Ark. The daughter of an Air Force pilot, she entered USAF pilot training in 1978 from ROTC.

★ US military and commercial aircraft will soon be operating with radial tires instead of the bias-ply tires used today, the Michelin Tire Corp., Lake Success, N. Y., states.

The company bases its prediction on extensive testing of Michelin radials on US aircraft as well as normal operation with radials on French fighters and transports.

More than 4,000 failure-free flights have been made by Fairchild A-10s equipped with radials. Pilots report no significant handling differences with the radials, with some improved cushioning effect during taxi, takeoff, and landing on rough or uneven surfaces. Reduced sidewall plies and the one-bead rim wire for radials, instead of the multiple plies and bead wires used in bias tires, have reduced weight twenty to thirty percent when replacing bias, size-for-size, with radials, the company reports. When flexed, radials build up less heat.

Michelin expects to receive FAA certification soon for use of radials on US commercial aircraft and even-

tually to see them used on US high-performance fighter aircraft. "Radials took time to establish their superiority in the passenger car and truck market. We expect their acceptance in the aircraft industry to proceed relatively quickly with the growing bank of performance data gained through in-flight experience," a company spokesman said.

★ Air Force members and their families will soon be able to eat at Burger King restaurants on sixteen bases worldwide, according to the Army and Air Force Exchange Service.

The Exchange Service will test-market the fast-food chain eateries at five bases in CONUS, eight bases in Europe, and three in the Pacific. The bases are Edwards and Travis AFBs, Calif.; England AFB, La.; Keesler AFB, Miss.; Luke AFB, Ariz.; Rhein-Main, Ramstein, and Spangdahlem ABs and Vogelweh, Germany; RAF Alconbury and Bentwaters, England; Aviano AB, Italy; Incirlik AB, Turkey; Hickam AFB, Hawaii; Clark AB, the Philippines; and Misawa AB, Japan.

Tentative opening dates have been set for four of the locations. Edwards and Misawa restaurants are to open in August, Keesler in September, and Spangdahlem in October. Prices are expected to average five to ten percent lower than in civilian Burger King stores.

AEROSPACE WORLD

★ The Fourth Annual ICAF Mobilization Conference will be held on May 16–17 at the Industrial College of the Armed Forces, National Defense University, Fort McNair, Washington, D. C. With a theme of "Mobilization: What Should Be Done? What Can Be Done?", the conference will focus on three subject areas: National Security and Mobilization, Manpower Resources Management, and Industrial Resources Management.

One of the purposes of the conference is to refine and clarify the importance of the military reserves and US industrial production in the warfighting strategy of the United States. Attendees will include senior executives from labor and industry, professors and scholars from leading universities and research organizations, senior-level managers from the Department of Defense and other government agencies, and faculty and students from senior service colleges.

For information, write Mobilization Conference Committee, Industrial College of the Armed Forces, Fort McNair, Washington, D. C. 20319-6000.

★ Air Force Magazine readers interested in aviation records should be in Frederick, Okla., on Saturday, June 1, when AFA member Col. Tom A. Thomas, Jr., USAF (Ret.), will attempt to set a record by flying sixty-five different aircraft, including antique and World War II aircraft, homebuilts, and business turboprops, on his sixty-fifth birthday. A representative of the *Guinness Book of World Records* will observe the flights and authenticate the record.

Colonel Thomas, who is founder and wing leader of Mid-America Air

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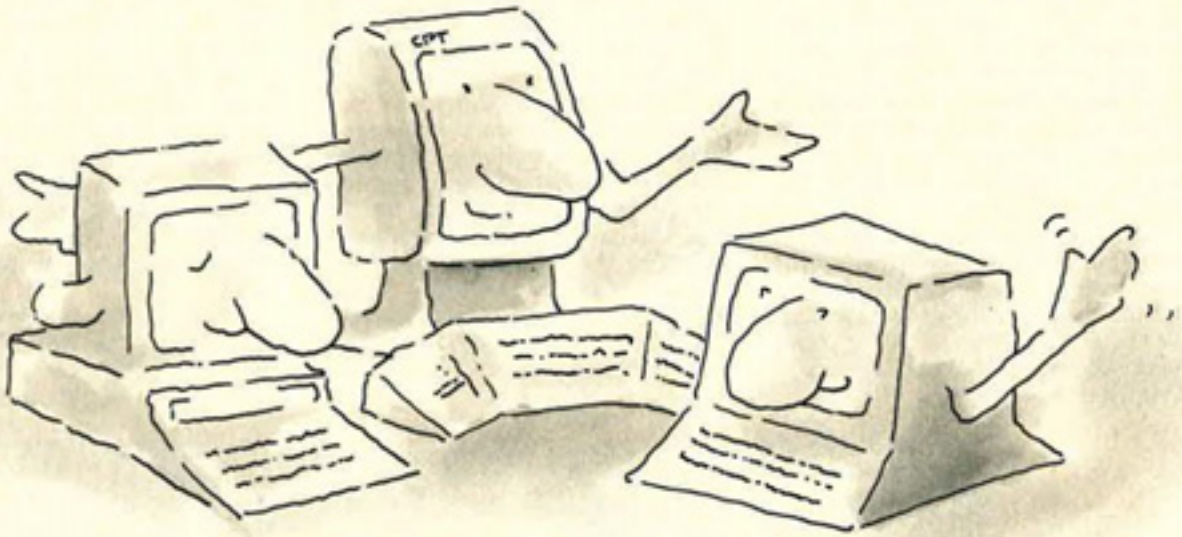

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Group, a tax-free educational foundation supporting aviation, owns most of the aircraft he intends to fly. The flights will be part of two days of flying activities at Frederick, designed to call attention to the Mid-America Air Group and its ongoing membership drive.

The organization has its own museum and a program aimed at interesting young Americans in aviation. With 350 charter members, the organization is looking for a total of 1,000 charter members at $125 each. For information, write Mid-America Air Group, P. O. Box 935, Frederick, Okla. 73542.

★ Wright-Patterson AFB, Ohio, and the Air Force Museum will cosponsor an all-day general aviation fly-in on September 21, 1985, as part of the celebration of the thirty-eighth anniversary of the US Air Force. Fly-in visitors will be transported between their aircraft and the Air Force Museum free of charge. There will be no charge for registration, landing, tiedown, or admission.

Nonjet aviation fuel will be available, but there will be no aircraft maintenance. Specific details for arrival will be sent to those pilots writing Air Force Anniversary Fly-In, 2750th Air Base Wing/OTM, Wright-Patterson AFB, Ohio 45433-5000.

AEROSPACE WORLD

★ Mustang International, a British-based organization that its President, Paul A. Coggan, states was formed "to preserve the tradition of what we consider to be the finest all-round piston-engine fighter aircraft ever manufactured," is looking for new P-51s and new members.

Formed in October 1978, the organization's worldwide membership operates 120 Mustangs. Membership is open to "enthusiast, pilot, engineer, historian, modeler, or veteran pilot/ground crew from any air force that operated the type."

Mustang International is a nonprofit association run by volunteers. All are active members of organizations like the British Aircraft Preservation Council, the Experimental Aircraft Association, Warbirds of America, and the National Air Racing Group. Members include Edgar Schmued, Chief Designer of the Mustang, Ed Horkey, Chief Aerodynamicist, and Robert Chilton, Chief Test Pilot.

The organization produces a quarterly journal and has a large stock of Mustang photos and slides available to members. Dues are $16 per year. Write Paul Coggan, 19 Esmonde Gardens, Bishopmill, Elgin, MORAY IV30 2LB, Scotland, UK.

★ Shaw AFB, S. C., is the first Tactical Air Command base to be certified in all phases of aircraft surge launch and recovery (ASLAR) procedures. Designed for use in wartime conditions, ASLAR standardizes arrival and departure procedures and terminology for pilots and air traffic controllers.

Standardization creates predictable aircraft movement and control instructions and allows a maximum number of aircraft to be launched and recovered.

An ASLAR-certified unit can recover seventy-five to ninety aircraft per hour using normal navigational aids and radar equipment. Such a unit can also launch and recover aircraft without tactical air navigation equipment, relying solely on radar vectors issued by air traffic controllers.

A final certification step is radar-out operations, in which aircraft are surge-launched and recovered without vectors. ASLAR goals are to han-

Dolly, which served at one time with the El Salvadoran Air Force, is one of 120 beautifully restored P-51s operated by members of Mustang International, a British-based organization dedicated to the preservation of the history and tradition of "the finest all-round piston-engine fighter aircraft ever manufactured."

Undergoing a meticulous restoration process is P-51D 44-72216, which was flown during World War II by Eighth Air Force pilots and later by the Swedish and Israeli air forces. This aircraft, named Silver Dollar, is being rebuilt at Duxford, Cambridgeshire, UK.

dle large numbers of aircraft safely in wartime conditions.

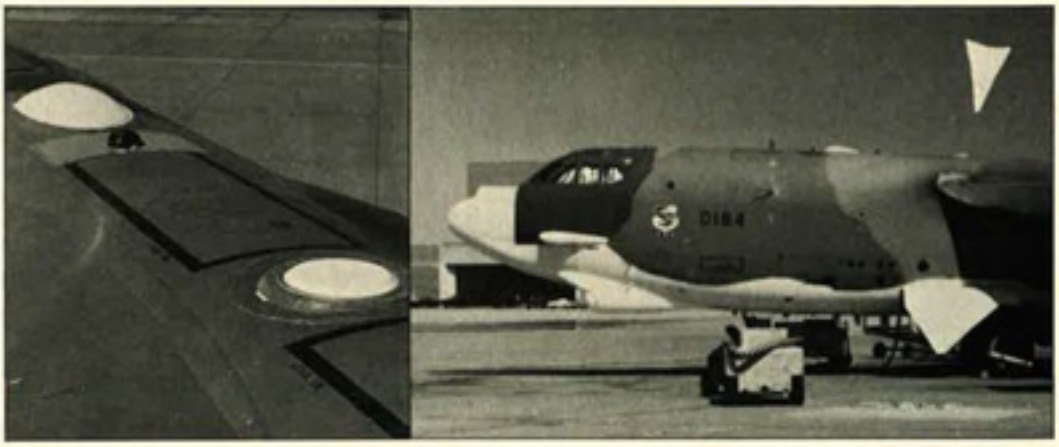
★ USAF will purchase approximately 6,100 Navstar Global Positioning System (GPS) user equipment sets from Rockwell International Corp., Collins Government Avionics Div., Cedar Rapids, Iowa. The total DoD requirement is projected to exceed 21,000 sets through the end of the century. The sets will be installed in a variety of military equipment owned by all four services.

Navstar GPS is a space-based radio navigation system designed to provide US land, sea, and air forces with worldwide, three-dimensional position and velocity information. It will utilize eighteen satellites in circular 10,900-nautical-mile earth orbits.

Users will be able to determine their positions within fifteen meters in three dimensions, the correct time to within one-billionth of a second, and velocity to within one-tenth of a meter per second. GPS is the most precise radio navigation system ever developed and will provide worldwide, twenty-four-hour service in all weather. The complete eighteen-satellite "constellation" is planned to be in place by the end of 1988.

The Air Force is testing user equipment on the B-52G and the F-16A. The Navy has successfully tested the equipment on an A-6E Intruder in an aircraft carrier electromagnetic interference (EMI) environment.

DoD will make Navstar GPS navigation, position, and time information available to civilian users. ■



USAF aircraft are being fitted with Navstar Global Positioning System (GPS) user equipment. The GPS antenna installed on the B-52G in the adjacent photo is the flat white circular disc aft of the black dome-shaped retroreflector, used for current testing. In the far photo, the arrow indicates the position of the antenna, forty-two feet aft of the aircraft nose.

VIEWPOINT

Nuclear Virginity

By Gen. T. R. Milton, USAF (Ret.), CONTRIBUTING EDITOR

Alliances are two-way affairs. If the free world wants US nuclear protection, it must curb its aversion to nuclear forces.

When Prime Minister David Lange announced New Zealand's policy of nuclear virginity, the United States responded by canceling an exercise and cutting off certain intelligence. More to the point, we have, in effect, acknowledged that the ANZUS alliance is dead, or at least dormant. Australia and the US will henceforth go it alone so far as the antipodes are concerned, yet even there, there is uncertainty. Australia's refusal to allow its territory to be used to monitor MX tests has cast a shadow over what is left of ANZUS, although there is reason to hope Australia will stop short of its neighbor's stand.

America's action against New Zealand was plainly designed to stop a run on the bank. Many countries in the world—friends of ours, moreover—harbor an intense dislike of nuclear weapons. Japan, for instance, not only has such an understandable aversion, but bars nuclear weapons from its soil. Yet the Japanese have the good sense not to ask awkward questions.

When a retired US Navy rear admiral told the Japanese that the US was breaking the rules, they were content with an official denial. A former US ambassador to Japan, for reasons known only to him, has made similar charges. Still, this sort of antic behavior by former American officials has done no lasting damage. The Japanese understand where their security lies.

A forgiving attitude toward New Zealand, however, could very possibly have started a chain reaction, and so we have sent a clear signal to the rest of our friends. If New Zealand wants to pretend it is located on the moon, it is all right with us. New Zealanders just shouldn't expect too much in the way of help if danger should come their way.

The trouble (and it is a very nice sort of trouble) lies in the fact that we have gone a long time without a major war—that is, an all-out, no-holds-barred war involving the superpowers, as distinct from peripheral conflicts. This May 7, celebrated as V-E Day before enemies became friends, will mark an unusual forty years of European peace.

There have been, of course, serious confrontations between the US and the USSR. Berlin in 1948 was a grave crisis, one that carried with it the distinct possibility of World War III. That crisis was defused by the successful, if strategically evasive, airlift, which, in turn, succeeded because there were nuclear-armed B-29s in England. We can leave to the imagination what might have happened had the British taken a position like that taken by New Zealand.

The Cuban missile crisis was another near showdown, but once again, the fear of nuclear war caused the Soviets to pull back. Since then, we have gone twenty-three years without another such confrontation. While the Soviets have closed the nuclear gap and may even now have the edge, they still risk unacceptable damage in a nuclear exchange.

It may be that the Strategic Defense Initiative will one day make ICBMs obsolete, or at least make the first strike a doubtful option, but whatever happens, nuclear weapons will continue to be with us, along with the means to deliver them. They cannot be wished away. It follows, then, that we must have these weapons in their latest and most accurate form, as reliable insurance. After all, these things have been used only when there was no chance of retaliation.

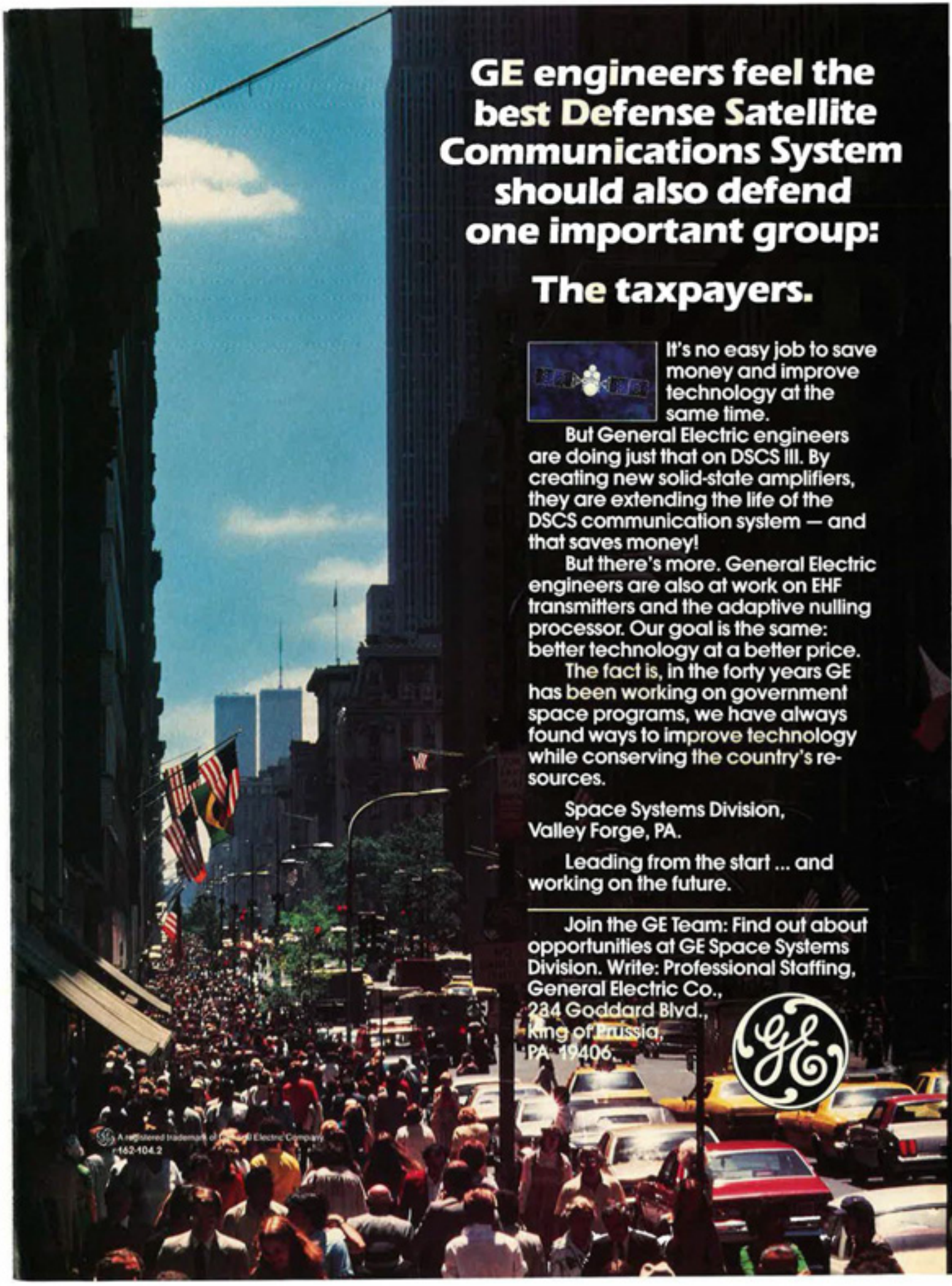
The New Zealand episode, unimportant in any real sense, nevertheless raises questions. May 7, 1945, not only marked the end of the war against Hitler, it also began a US protectorate of the free world, although we didn't know it at the time. The troops have never left Europe. They merely changed their role as occupiers to that of allies and protectors.

On the other side of the world, the troops were shifted from occupation duty in Japan to combat in Korea, and they, too, remain. We have obligations around the world, with a thin line of professional forces to carry them out. Without the implied threat and the capacity to go nuclear if matters got out of hand, our promises would carry little credibility against a Soviet challenge.

The questions raised by the New Zealand episode have to do with the obligations themselves. When we had undisputed nuclear superiority, it was easy to take on the burden. It was also easy for our friends to bear less than their share of military preparedness. After all, in the event of war, it was up to us, and they could watch from a safe place in the bleachers. Those days are gone. If our allies want to keep conflicts nonnuclear, they must help.

New Zealand would presumably like another forty years of tranquility, in which case it should reflect upon how the last forty years of tranquility were achieved. Alliances are two-way affairs, and, as in any partnership, there has to be a little give and a little take.

It is especially sad in this case, for New Zealand is a longtime friend and ally. We fought side by side in the Pacific, and New Zealand was one of the few to lend us a hand in Vietnam. Remembering this, we can still remain friends, but that, it would seem, is as far as it goes. ■



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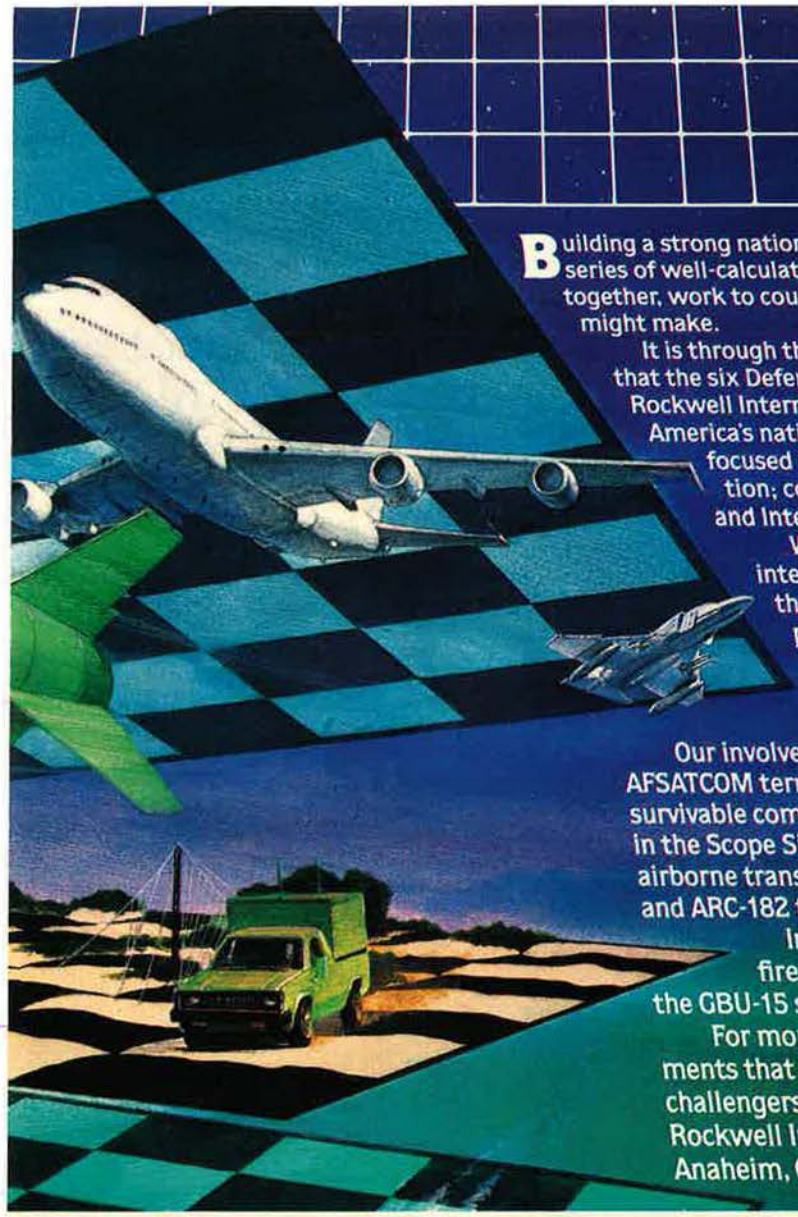

Building a strong national defense requires a series of well-calculated moves that, when taken together, work to counter any move your opponent might make.

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Our involvement in C^3I ranges from MILSTAR and AFSATCOM terminals to VLF systems for high priority survivable communications. It includes participation in the Scope Signal HF Upgrade program and involves airborne transceivers, the ARC-190 for SAC bombers, and ARC-182 for high performance Navy aircraft.

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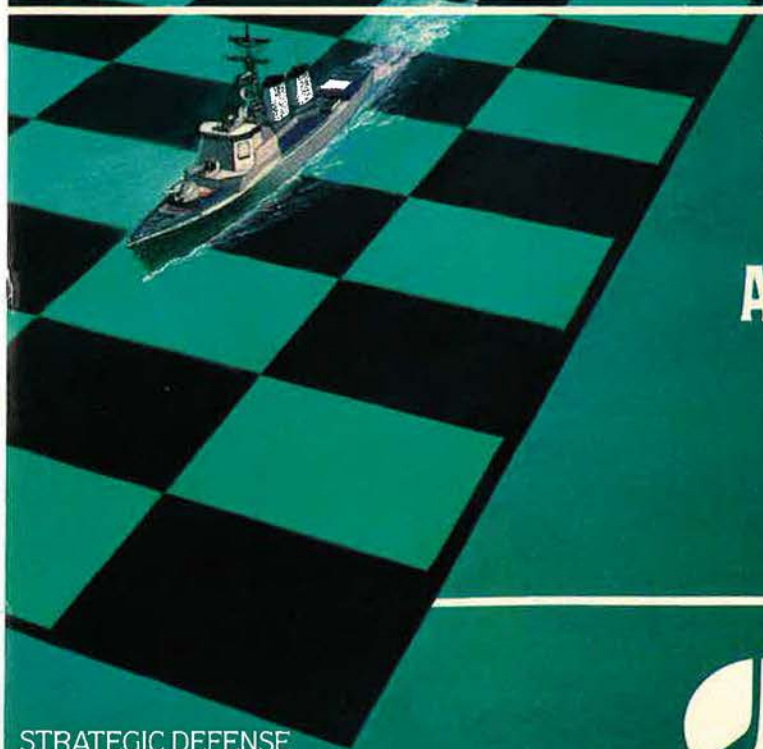

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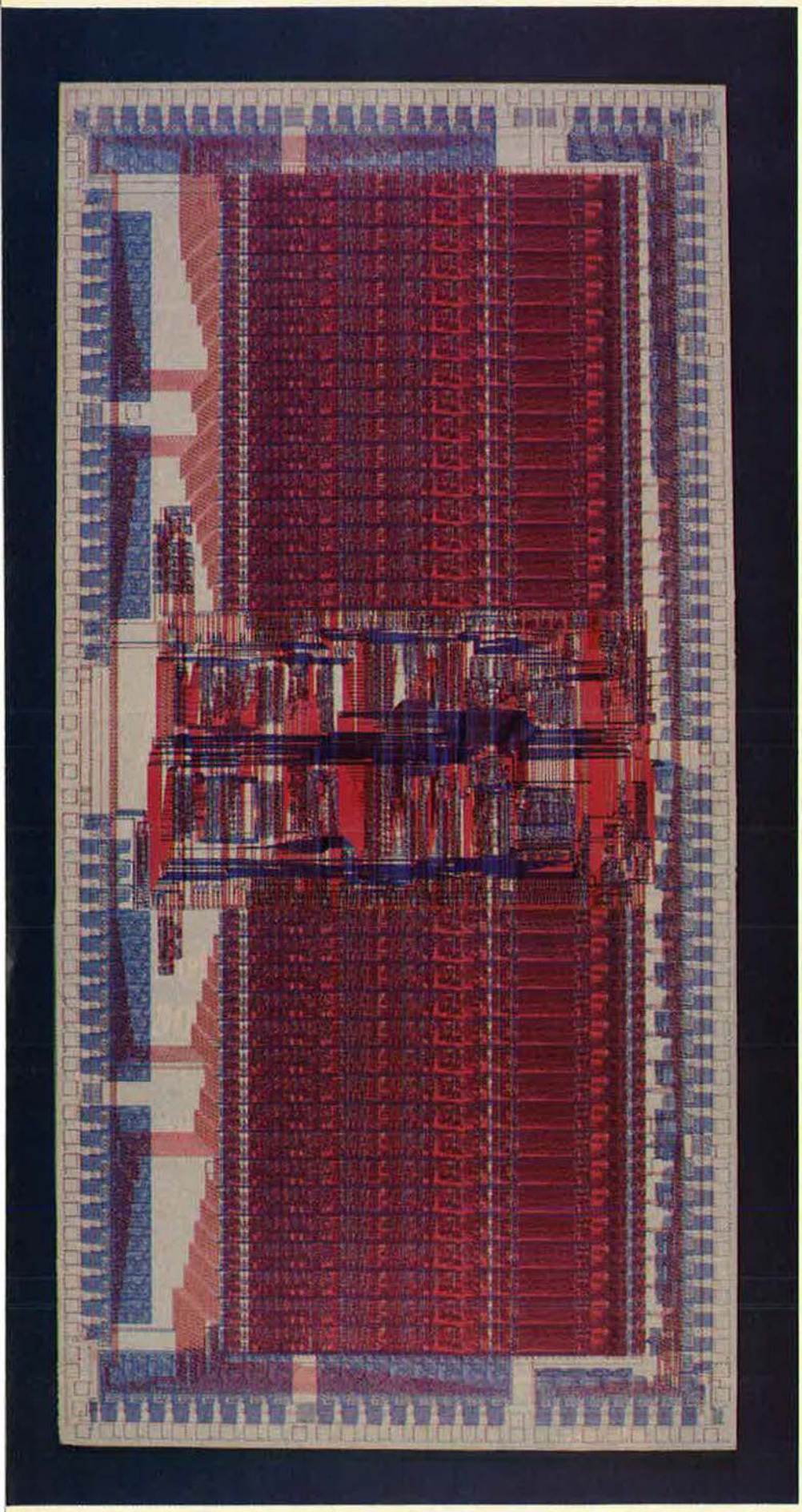

The US will emphasize artificial intelligence, sensor fusion, and other technologies to offset the Soviet advantage.

BY EDGAR ULSAMER
SENIOR EDITOR
(POLICY & TECHNOLOGY)

USAF's Westinghouse-Control Data contractor team designed this very-high-speed integrated circuit (VHSIC) data-processing chip. VHSIC work has high R&D priority.

R&D At the Razor's Edge

SRAM missiles mounted on the wing of a B-52. USAF is now developing the SRAM II missile for newer bombers.

THE Defense Department plans to spend about $107 billion on procurement and $39.3 billion on research, development, test, and evaluation (RDT&E) in FY '86. The Air Force's share of the procurement spending is about $46.6 billion—or almost forty-four percent—and $15.6 billion—or about forty percent—of the RDT&E total, according to recent congressional testimony by senior Pentagon officials.

Contrasting US R&D funding trends with those of the USSR, the Pentagon reported that this country "no longer enjoys the unchallenged technological superiority it once held over the Soviet Union." Military R&D in the USSR has risen to where it now accounts for about half of all Soviet R&D. The US, on the other hand, devotes more than seventy percent of its R&D to nonmilitary fields.

In the seedbed area of basic research and advanced technology development, the Air Force expects to spend only about $1.5 billion in the next fiscal year, significantly less than the customary two percent of the service's total budget. Spending at this level or higher is deemed vital to maintaining a sound science and technology reservoir. Air Force witnesses told Congress, however, that the service would seek gradual increases in subsequent budget years, with the goal of returning to the two percent level. The limited investment in the Air Force's science and technology program will continue to be channeled into areas thought to have the highest potential payoffs.

Central here, according to the joint testimony by the Assistant Secretary of the Air Force for Research, Development and Logistics Thomas E. Cooper and the Deputy Chief of Staff for Research, Development and Acquisition Lt. Gen. Robert D. Russ, is artificial intelligence. While progress in this field—which attempts to replicate the rudimentary workings of the human mind—has been painfully slow, even limited incremen-

tal advances hold out the potential for vast payoffs. The reason is that artificial intelligence could "enable us to automate some functions now accomplished manually in command and control systems, such as targeting and mission planning." Further, "the commander's job will be made easier through the analytical power and speed of the artificial intelligence systems he can use to aid force employment/disposition decisions in complex battle scenarios."

A second area of high technological potential, according to the joint testimony, involves sensor fusion to "facilitate real-time target classification and multisensor correlation, thus increasing the quality and timeliness to military intelligence."

Other high payoff areas to be pursued by next year's modestly funded science and technology program are advanced composite materials, advanced avionics architectures, and work on the Defense Department's high-order computer language, Ada. Ada is to be a DoD-wide computer language that will be essential in halting the rapid rise in computer software costs.

Lastly, USAF's FY '86 science and technology program will stress very-high-speed integrated circuit (VHSIC) technology efforts and initiate the transition from Phase 1, which involves 1.25-micrometer chips, to Phase 2, which is centered on 0.5-micrometer chips. Such miniaturization makes possible significant size and weight reductions of avionics systems and increases their speed and capacity. To date, six VHSIC contractors have produced more than 2,000 first-generation, fully functional Phase 1 chips. First insertion of VHSIC into an operational system is scheduled for this year. This technology is to be incorporated in a total of thirty-seven weapon systems programs.

The Strategic Sector

The Soviet Union "has overtaken and surpassed the US in numbers of [strategic] delivery vehicles and bomber weapons," according to a report from the office of the Under Secretary of Defense for Research and Engineering (USDR&E). The same applies to total throw-weight, yield, and equivalent megatonnage.

The accuracy of the most advanced deployed Soviet ICBMs, however, is no longer better than that of those Minuteman III ICBMs that have undergone software changes in their guidance systems. This guidance upgrade program is to be completed by 1986 and makes these missiles slightly more accurate than the best deployed Soviet ICBMs. But because these Soviet missiles, the Mod 4 versions of the SS-18, carry a higher-yield warhead than Minuteman III, their lethality and hard-target kill probability continues to exceed that of the US ICBM.

The USDR&E report provides convincing evidence to back up the contention that the USSR has taken the lead in strategic nuclear capability: Over the past ten years, the Soviets produced 2,200 new ICBMs vs. 223 by the US; 1,900 SLBMs vs. 540; thirty ballistic missile submarines vs. five; and forty bombers vs. zero.

The new budget emphasizes ICBM silo hardness as a means for ameliorating the vulnerability problem that ensues from the increasing hard-target kill capability of the Soviet ICBM force. The 308 Mod 4 SS-18s, for instance, are probably capable of destroying eighty percent of US ICBM silos by using two nuclear warheads against each target. The Mod 3 SS-19s (360 missiles) could be assigned similar missions. Additionally, the less capable Mod 3 SS-17s also are formidable silo killers, even though only 150 of these missiles have been deployed.

The initial US response to these threats is based more on serendipity than on design. Recent systematic analyses of the hardness levels of individual Minuteman ICBM silos by the Air Force, the Defense Nuclear Agency (DNA), and other elements of the Defense Department have established considerable variations in hardness, based on prevailing geological factors. Silos situated in dry, loose soil were found to be many times "harder" than those in wet clay. (In retrospect, it appears clear to US intelligence experts that the Soviets understood these geological factors much earlier than did the US and, as a result, capitalized on them more.)

The inherent geological characteristics at F. E. Warren AFB, Wyo., where MX is to be deployed, turn out to be extremely favorable, with the result that silos in that complex are much harder than originally thought, Gen. B. L. Davis, Commander in Chief of the Strategic Air Command, recently told the Senate Armed Services Committee. President Reagan, in his special report to Congress on ICBM modernization, disclosed that existing Minuteman silos could be modified to yield hardness levels three to four times greater than those of the existing structures. Such an upgrade "would add some degree of survivability to any ICBM deployed in [upgraded silos]—Minuteman II, Minuteman III, Peacekeeper, and the small ICBM."

The President warned Congress, however, that these modifications would be "extensive," with the silos receiving a new top closure about two or three feet thicker than the current covering device. At launch, this cover would be lifted by the missile's canister and then tipped off to one side. Key elements of the silo, such as the launch tube, the President reported to Congress, "would be substantially strengthened by adding more steel and concrete. The launch tube to hold the missile's launch canister would be lengthened, from five to fifty-five feet [deeper], depending on whether the small ICBM, Minuteman II or III, or Peacekeeper were deployed in it." Protection against such nuclear effects as electromagnetic pulse (EMP) would be beefed up, according to the President's report.

Beyond upgrading existing silos, there is the potential for marked survivability gains through superhardening, which, according to President Reagan, makes it possible to construct new silos "perhaps twenty-five to forty times as hard as current silos." These designs, largely built of steel, use metal to "confine concrete sufficiently to resist—rather than [propagate]—airblast-induced loads." In addition, highly efficient shock-absorbing materials can be used to "distribute a nearly constant force against the missile canister, even when the outer silo structure moves violently, thus mitigating the otherwise destructive effects of a nuclear blast." The USDR&E report added that these breakthroughs in silo-hardening technologies will be applicable to all future ICBMs, with the prospects for yet harder designs to be examined later this year.

In addition to pursuing superhardening in FY '86, the

Air Force personnel work in CBW protective gear. Most USAF CBW funding goes for defensive equipment and disposal.

Air Force is also making significant progress in deep-basing techniques, especially in terms of subsystem engineering. This development work, according to Secretary Cooper, concentrates on the effects of nuclear weapons on deep underground facilities; evaluation of alternative power, heat-sink, and life-support systems; through-the-earth communications; and improved tunneling technologies.

The Air Force, acting as the Defense Department's executive agent, will continue to pursue ASMS, the Advanced Strategic Missiles Systems program, in the coming year. This high-priority program "will develop and flight-test ICBM penetration system options to provide an effective penetration counter to . . . Soviet ballistic missile defense (BMD) upgrades." At the same time, work carried out under the ASMS program seeks to "increase US reentry vehicle accuracy and survival as a hedge against Soviet target-hardening and expanded BMD capabilities."

The USDR&E's report to Congress pointed out that the sea-based leg of the US strategic triad is being modernized on schedule, with delivery of the sixth *Trident*-class missile-launching nuclear-powered SSBN expected in June of this year and initial operational capability (IOC) of a new, advanced SLBM, designated alternately as the Trident II or D-5, slated by December 1989. The new SLBM is being described as having "sufficient accuracy to place Soviet hard targets at risk."

The air-breathing component of the US strategic triad consists at present of 263 B-52s, sixty-one FB-111s, and about 1,100 air-launched cruise missiles (ALCMs). Production of the ALCM-B, or AGM-86B, is winding down toward delivery of the last missile of this type in FY '87. By that time, about 1,750 ALCM-Bs will have been produced. Following ALCM-B is the Advanced Cruise Missile (ACM), which the Air Force terms a potent standoff weapon for the 1990s and beyond. The ACM will have greater range, accuracy, and survivability than the AGM-86B.

Development of the ACM dovetails with the ALCM-B's procurement schedule to permit introduction of the advanced design "at the fastest prudent pace," according to Air Force testimony. First deliveries of ACM are planned for the late 1980s. About 1,250 ACMs are to be built, bringing the total Air Force inventory of cruise missiles to about 3,000.

Another weapon system designed to enhance the effectiveness of the air-breathing component of the strategic triad is the Short-Range Attack Missile II (SRAM II). The Air Force plans to enter this system, previously known as the Advanced Air-to-Surface Missile, into full-scale development early in FY '86. This new missile will be carried by both the B-1B and the Advanced Technology "Stealth" Bomber. In justifying the need for SRAM II, the Air Force pointed out to Congress that "the unique capability to severely stress terminal defenses with such missiles must be retained to prevent optimization of defenses against cruise missiles."

Both USDR&E and the Air Force reported to Congress that the two strategic bomber programs—the B-1B and ATB—were progressing smoothly. Delivery of the first squadron of fifteen B-1Bs to the Strategic Air Command will occur in 1986. In the case of the "Stealth" bomber, the Air Force reported that "although develop-

A Minuteman III ICBM poised in its test-launch silo at Vandenberg AFB, Calif. Operational ICBM silos are amenable to much hardening.

ment and procurement plans remain classified, we can state that the program is fully funded, is within cost, and remains on schedule for an early 1990s initial operational capability." First flight of the aircraft is expected to occur in 1987. Apparently, no decision has been made on whether or not the first flight will occur under hush-hush conditions—possibly at night—or with full publicity.

The pending advent of the B-1B has led to the assignment of sixty-nine B-52Gs to conventional warfare missions. As a result, these aircraft will not be modified for cruise-missile carriage, but equipped to accommodate the AGM-84 Harpoon antiship missile. In addition, the Strategic Conventional Standoff Capability program, designed for various bomber aircraft, might be grafted onto the B-52Gs. This new program, in part an integrated, conventional stores-management system, is meant to handle the programming, monitoring, and launching of modern standoff weapons. The system's improved targeting sensors will make it possible to detect, classify, and engage virtually any kind of target.

For the long term, the Defense Department is working on a new generation of cruise missiles. This effort is being carried out by the Defense Advanced Research Projects Agency (DARPA) under the Advanced Cruise Missile Technology program. This project has already led to significant advances in the areas of autonomous terminal-homing accuracy—meaning extremely low target errors for cruise missiles—and propulsion technology.

A sophisticated gas turbine rotor built entirely of carbon-carbon materials has already proved its mettle in stringent dynamic spin tests. Exotic metallic slurry fuels also have undergone rigorous testing and demonstrated extremely high payoff potentials. According to USDR&E, full-scale carbon-carbon hot section components will be built and tested in a "turbine hot section demonstrator" in the near future. In combination, these demonstration programs are expected to lead to a two-fold extension of the range-payload capabilities of future cruise missiles. Other applications of this technology encompass all manned and unmanned vehicles using gas turbines, including presumably new generations of stealthy systems.

Strategic Command and Control

Along with modernization of strategic nuclear weapon systems, the new research and development budget seeks improvements in associated command and control capabilities. A major milestone here is delivery of the final E-4B aircraft for the National Emergency Airborne Command Post (NEACP). The new budget calls for the installation of a superhigh-frequency system upgrade for these aircraft, beginning in FY '86. The E-4Bs will also receive the initial Milstar (a new survivable, jam-resistant satellite communications system of the National Command Authorities) modification as well as Nuclear Detonation Detection System terminals. Also retrofitted will be terminals of the Ground Wave Emergency Network (GWEN) and the Diversity Reception Equipment.

In the case of Milstar, the new budget provides for the means to begin deployment of this jam-resistant global system—which will link the NCA with essential strategic and tactical elements of all four services—in the late 1980s. Work will also continue on the Aircraft Alerting Communications EMP (AACE) upgrade program for detection of high-altitude EMP bursts and for EMP protection of selected communications equipment at SAC wing command posts.

GWEN is slated to come up for a production decision in FY '86, with full operational capability to be achieved three years later. GWEN's initial operational capability—termed the Thin Line Connectivity Capability—is to be achieved next year, according to USDR&E. This system will provide assured communications among the NCA, major command centers, missile warning sites, and US-based nuclear forces. GWEN makes possible survivable communications through a network of radio-relay stations that interconnect user terminals by means of ground-wave relay technology and proliferated operating nodes.

Under the new budget, upgrades of the Navy's "Take Charge and Move Out" (TACAMO) aircraft will continue next year, including the transition from EC-130 to E-6A (Boeing 707) aircraft. Fifteen of these aircraft are to be built to transmit the "go code" to submerged SSBNs in case ground-based transmitters are destroyed in a nuclear war.

To upgrade peacetime communications with deployed SSBNs and to aid in the transition to wartime operations, construction of a dual-site, extremely-low-frequency (ELF) communications system has been started. At present, submerged submarines have to deploy an antenna at or close to the ocean's surface to receive messages, thus potentially betraying their position. ELF communications alleviate this problem, since their extremely-low-frequency signals penetrate sea water down to the operating depths of SSBNs. The two ELF transmitter sites in Wisconsin and Michigan—once completed—will provide a highly reliable means for maintaining continuous contact with the submerged submarine force.

Nonstrategic Nuclear Forces

While the US has removed more than 2,300 nuclear warheads from its theater nuclear forces since 1979, the Soviet Union has beefed up its corresponding capabilities by introducing about 400 SS-20 IRBMs (intermediate-range ballistic missiles) over the past five years. The Soviets are also upgrading their previously deployed SS-12s and are deploying two other tactical ballistic missiles, the SS-21 and SS-23. In addition, development of two new ground-launched cruise missiles—one of them an extremely large, long-range design—is nearing completion and deployment. Intensive work on accuracy improvements for the SS-20 and some of the other tactical ballistic and cruise missiles suggests that the Soviets plan to use these missiles not just for delivery of nuclear warheads but also for chemical or even conventional warfare.

As a counter to these growing Soviet capabilities, the US is deploying the 1,800-kilometer-range Pershing II missile in Europe. By the end of this year, 108 of these ballistic missiles will be operational. No additional deployments of Pershing II are planned. Also under way is the deployment of the ground-launched cruise missile (GLCM). With a range of 2,500 kilometers, these mis-

siles can be deployed farther back from NATO's borders with the Warsaw Pact, thereby enhancing survivability.

GLCM deployment is to be completed by 1988, with 464 missiles in place. Pershing IIs are deployed in the Federal Republic of Germany, while GLCM is deployed in Britain and Italy, with future deployments planned in Belgium, the Netherlands, and Germany. In addition to easing the Soviet lead in nuclear tactical weapons in Europe, the deployment of Pershing II and GLCM also reduces the number of nuclear-capable tactical fighters required for nuclear missions—thereby boosting NATO's tactical air capability. Air Force witnesses have informed Congress that "GLCM's small radar cross section and low-altitude flight profile make it survivable and complicate the enemy's targeting and defense problems."

Chemical Warfare Requirements

This country's crusade to eliminate the threat of chemical and biological warfare has to date only elicited efforts by the Soviets to expand further their advantages in this area. Large quantities of chemical agents are stored in at least nine chemical depots located throughout the USSR, and CW research and development is being stepped up, with several new facilities constructed at their Chemical Agent Proving Grounds since the late 1970s. The new US Defense budget, therefore, emphasizes the importance of reestablishing a credible deterrent to chemical warfare. The following initiatives are being taken:

- Equipping and training US forces with protective systems to allow sustained operations in a chemical-bacteriological warfare (CBW) environment while reducing the degradation in individual and unit performance imposed by protective systems and procedures.
- Supplying US forces with the capabilities to treat casualties in an integrated nuclear, biological, chemical, and conventional combat environment.
- Reestablishing the capability to retaliate effectively with chemical weapons in order to deny an aggressor a significant military advantage from the first use of CBW.

A pivotal step toward shoring up this country's and NATO's ability to deter chemical warfare is development of the Bigeye binary chemical bomb. Developmental testing of this weapon is to be completed within a year. Operational testing will be completed a year later.

The new budget envisions continued development of a standoff delivery system for the Bigeye chemical bomb. About eighty percent of CBW funds requested for FY '86 is earmarked for protective capabilities and the safe disposal of aging chemical munitions. Only twenty percent of the requested funding goes toward reestablishing what the USDR&E report termed a "critically needed credible chemical retaliatory capability required to ensure deterrence and provide an incentive for conclusion of an effective ban on chemical weapons." There is no evidence that Congress will prove less chary of funding CW weapons programs this year than it has been in the past.

Tactical Air Warfare

The value of all tactical combat aircraft—including attack helicopters—in the Soviet operational inventory is about fifty percent above that of the US. Twenty years ago, the reverse condition obtained. Last year, for example, the Soviet Union provided its armed forces with 640 fixed-wing combat aircraft and 250 attack helicopters. The US totals were 250 and sixteen, respectively.

Accompanying the numerical growth of Soviet tactical airpower has been a doctrinal reorientation. According to USDR&E, the Soviets are developing training for a variety of new missions, "including fighter escort, use of electronic countermeasures (ECM), maneuvering air combat, independent search missions, and air accompaniment of ground forces." The Air Force reported to Congress that "the US [tactical air warfare] advantage is eroding" because of the great strides made by the Soviets in avionics and propulsion technology.

The service rates the newest Soviet fighters, the MiG-29 Fulcrum, the MiG-31 Foxhound, and the Su-27 Flanker, as "comparable to our current F-15 and F-16." Both the MiG-29 and the Su-27 are supersonic, all-weather, counterair fighters with look-down/shoot-down weapon systems and beyond-visual-range air-to-air missiles. The two aircraft are thought to have a secondary ground-attack role. The MiG-29 became operational last year, and the Su-27 is expected to follow suit this year. The steep step-up in technological sophistication reflected by these aircraft appears to have delayed their production somewhat, according to USDR&E's testimony, but large-scale series production is about to get under way.

In phase with the numerical and technological advances in Soviet tactical airpower, US intelligence suspects an organizational revamping of these fighter forces. Involved here is a merger of the interceptor and tactical fighter/attack aircraft in most land areas near Soviet borders. According to USDR&E, "This new centralized control of fighter-type aircraft is expected to permit greater flexibility in the offensive and defensive orientation of the overall force structure." The gradual modernization of some former strategic defensive units, in the view of US experts, "also suggests that Soviet tactical capabilities will be increased as a result of the reorganization."

The Air Force's response to the increasing tactical threat is an expeditious buildup of the force structure to forty wings, along with comprehensive modernization of both aircraft and munitions.

Noteworthy among the comprehensive modernization efforts called for by the new budget in the tactical air warfare arena is a new start—the Advanced Tactical Air Reconnaissance System (ATARS). Purpose of this program is to pioneer an electro-optical sensor that produces a digital image and has a data link. The sensor, the Air Force told Congress, "will be developed for use either in an unmanned vehicle or a reconnaissance pod for carriage on a tactical aircraft." Next year, ATARS is also to "focus on the concept validation of unmanned vehicles' contribution to the tactical reconnaissance mission." In cooperation with the Navy, the Air Force next year "will incorporate a suite of imagery sensors into vehicles capable of ground or air launch. Additionally, cost and performance analyses will be conducted to determine whether or not the vehicles should be expendable or recoverable."

It would seem that the age of unmanned platforms is about to start in earnest. ■

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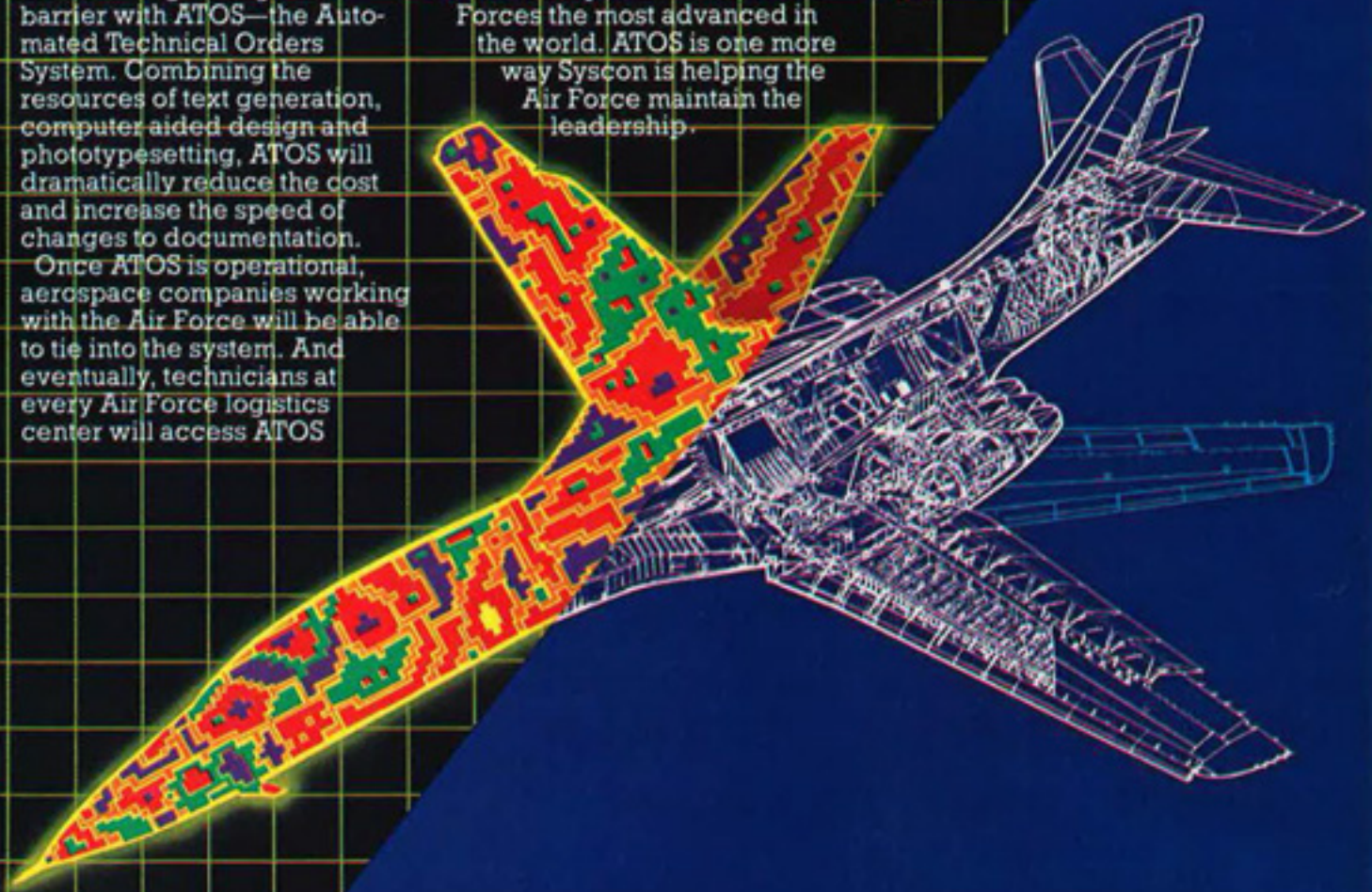

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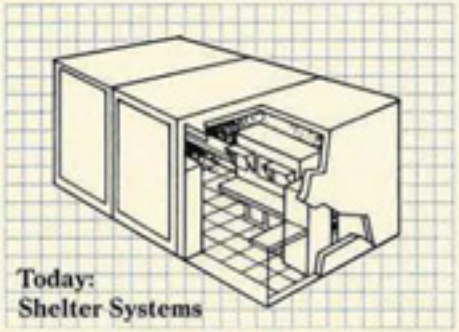

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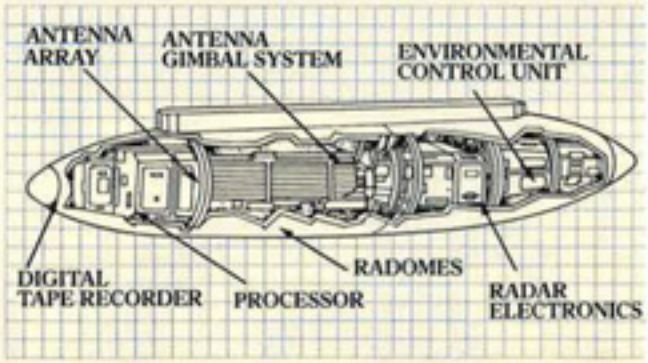

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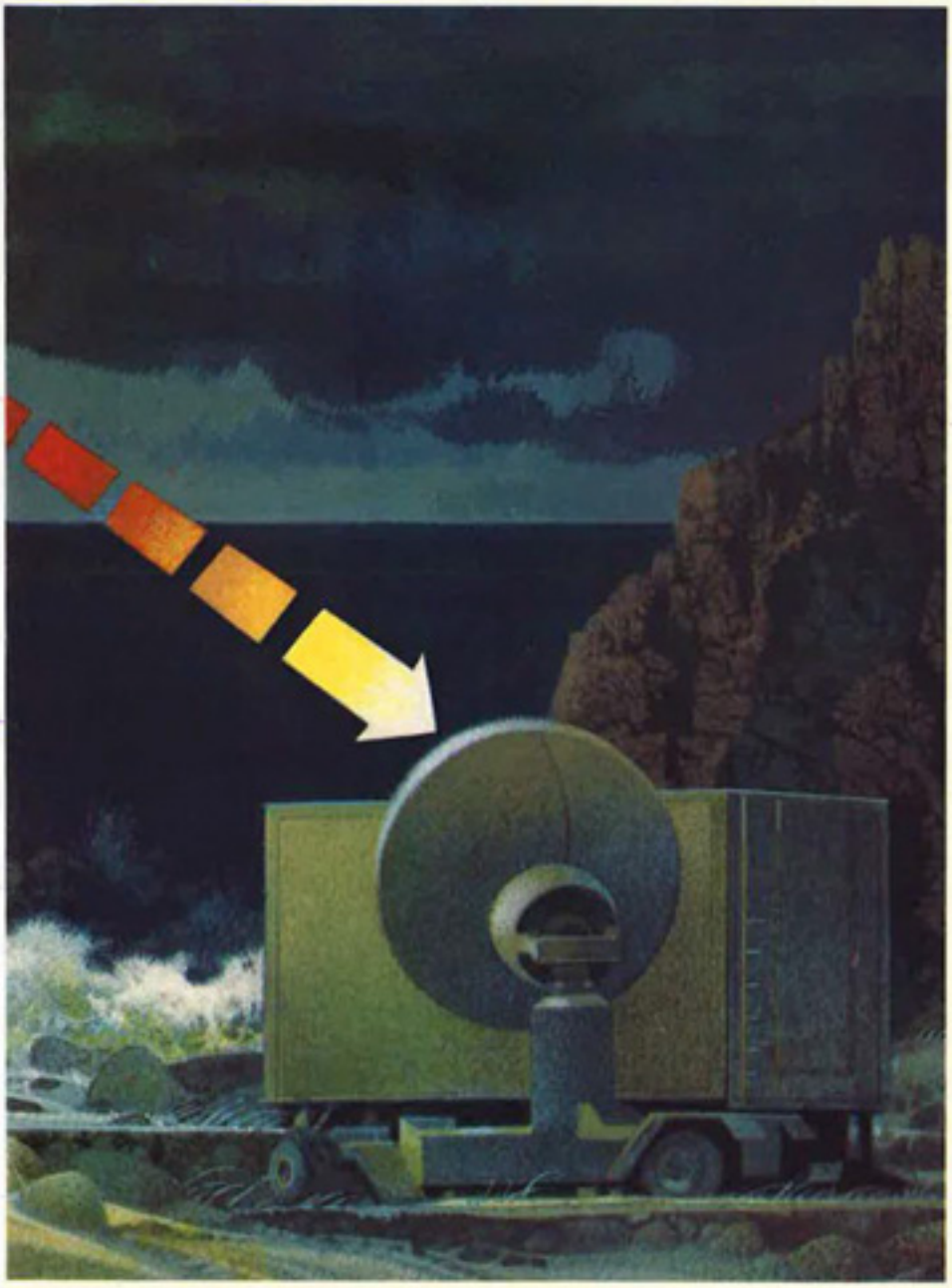

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GOODYEAR AEROSPACE

Despite high public approval of NATO participation, Denmark's air force is small and short on money to modernize.

The Danish Air Force Looks Ahead

BY B. AALBAEK-NIELSEN

Royal Danish Air Force F-16 makes a low pass over an ancient castle on Bornholm Island in the Baltic Sea. RDAF fighters must stay ready around the clock to make quick identification of intruding aircraft from nearby Warsaw Pact air bases and turn them back from Danish airspace. Such intrusions are rare, but are always a threat.

DENMARK lies only ten to twenty minutes by modern combat aircraft from the nearest Warsaw Pact airfields. This puts strict demands on Danish defense, especially on the Royal Danish Air Force. In case of an armed attack, the reaction time would be extremely short.

Therefore, Danish aircraft are on alert day and night, ready in less than two minutes to go up, identify, and, if necessary, turn away intruding aircraft. Actual violation of Danish airspace by Warsaw Pact military aircraft is a rare event, and it never seems to be deliberate. The air forces of Warsaw Pact nations keep to the rules, unlike their navies, whose submarines operate regularly in the coastal waters of neighboring Sweden and Norway.

On patrol over the Baltic (the Russians prefer to call it "The Ocean of Peace"), Danish reconnaissance and fighter pilots often have the opportunity to fly formation with aircraft from the USSR, Poland, and East Germany. Each side, of course, is most interested in the doings of the other.

The Danish islands of Zealand (Sjaelland) and Fyn (Fünen) and the Jutland peninsula guard the Atlantic approaches to the Baltic. Denmark lies as a barrier to all shipping into and out of Soviet Baltic Fleet bases and obstructs access to the most important Warsaw Pact dockyards. Because of this strategic position, Denmark must be considered a prime and early target in case of armed East-West conflict.

If Denmark fell into Warsaw Pact hands, it would mean more than removal of this barrier, though. Bases, especially in Jutland, would position Warsaw Pact forces for attack on NATO's north German flank. Britain would be within easy reach of both bombers and fighter/attack aircraft.

This is why Danish territory is of decisive importance to NATO and why the United States, Great Britain, Canada, and the Netherlands have units committed to the reinforcement of Danish defense.

Organization of Forces

In peacetime, the armed forces of Denmark report to the Chief of Defense and Defense Command. During a period of tension or when deemed necessary by the Defense

Minister, operational control of the Army, Navy, and Air Force may be transferred to the Commander, Operational Forces Denmark, who is also Commander, Allied Forces Baltic Approaches (COMBALTAP). In turn, BALTAP reports to the Commander in Chief, Northern Europe (CINCNORTH), in Kolsaas, Norway.

(Denmark, Schleswig-Holstein—the northernmost part of West Germany—Hamburg north of the Elbe, and adjacent waters come under the responsibility of BALTAP. Headquarters is at Karup in Jutland. The integrated NATO staff is one-third Danish, one-third German, and one-third British, American, and Norwegian.)

Having few peacetime tasks, the Danish Army relies on mobilization. The standing army has 20,300 troops, but in less than forty-eight hours it can be brought up to its wartime strength of 72,000. The mix is different for the Navy, which has a great number of peacetime tasks, such as surveillance and fishery protection. The peacetime Navy of 8,100 men and women increases to 12,840 with mobilization.

Most areas of Danish defense were cut back in major program revisions in January 1985, but the Air Force will be strengthened in one respect. A decision was made to procure twelve more F-16 aircraft over a four-year period. The total number of combat aircraft will be reduced from ninety-six to eighty-nine, but an even greater reduction had been feared, and those twelve versatile F-16s will replace sixteen old F-104G Starfighters, which will be phased out gradually.

As of February 1985, the Danish Air Force was structured this way:

- Three fighter/attack (F/A) squadrons with sixteen F-16A/Bs each.
- One F/A squadron with sixteen F-35 Drakens.
- One reconnaissance-F/A squadron with sixteen RF-35 Drakens.
- One air defense squadron with sixteen F-104G Starfighters.
- One transport squadron with three C-130H Hercules, three Gulfstream IIIs, and seven Saab T-17s.
- One search and rescue squadron with eight S-61 Sea Kings.
- One flying school with fifteen Saab T-17s.
- An air defense group with one battalion of Improved Hawks, organized in six batteries (two more to be formed).

The combat aircraft are deployed at three air bases in Jutland: Skrydstrup (F-16), Karup (F-35 and RF-35), and Ålborg (F-16 and F-104). The transport squadron has its base at Vaerløse near Copenhagen. Two air bases—also in Jutland—are intended primarily for the American and the British reinforcement units: Tirstrup and Vandel. Vandel is also the peacetime base for the Army Air Group and its sixteen Saab T-17s and twelve Hughes 500M helicopters.

The flying school has an airfield of its own, Avnoe, in the south of Zealand. In addition, the Danish military aircraft fleet includes eight Lynx helicopters operated by the Navy, mainly for fishery inspection. Four of them are deployed on frigates.

The Air Force has a number of radar sites and command and control facilities. One of these, on the island of Bornholm in the middle of

A C-130 and a Gulfstream III of the RDAF 722 Transport Squadron taxi and take off, respectively, at Kulusak Airfield in Greenland, where much of the squadron's flying takes place. The squadron is made up of three C-130H, three Gulfstream III, and seven Saab T-17 aircraft.

the Baltic, functions as an advance observation post.

Danish Air Force strength is about 5,800 long-term professional men and women and 2,300 civilian employees. Some 1,200 conscripts also serve, mainly in jobs that do not demand long training because the term of service is only nine months.

The Home Guard

An important personnel supplement for the Danish Air Force is the Air Force Home Guard. Of a total of 75,000 men and women in the Danish Home Guard, about 10,200 serve in the special Air Force branch. This special branch consists of the Ground Observer Corps and the Air Station Defense Corps.

The Ground Observer Corps is part of the air defense warning service. Observers are responsible for reporting violations of Danish airspace and are alert for airborne, seaborne, or land incursions. Some of the posts supply meteorological data. There are approximately 400 posts located about twenty kilometers apart to ensure comprehensive observation of the lower airspace.

These observation posts are a supplement to radar stations. In case the radars are knocked out, visual observation provides backup. Ground Observer Corps Operation Centers participate in control of air defense aircraft. In exercises, many USAF pilots have flown air defense missions over Denmark under the control of these centers, and they have commented favorably on the efficiency of the system.

Among the duties of the transport squadron are missions to the Greenland Arctic, where, in wintertime, the C-130s often supply remote settlements and small military dogsled patrols. Most of the time, at least one C-130 is employed in Greenland.

In 1977, the so-called economic zones around Greenland and the Faeroe Islands were extended to reach 200 nautical miles from shore. Thus, the area of Danish sovereignty in which fishing must be controlled grew from 18,000 to 55,000 square miles. Three Gulfstream III aircraft, specially equipped with appropriate electronics for such missions, were bought in 1982.

Another unit with a demanding

Warsaw Pact Surveillance of the Danish Straits

The Warsaw Pact's first surveillance post of the Danish straits was established in 1958 off Trelleborg (1) and in the Fehmarn Belt (2). A new post was established in 1968 off Moen (3), and two years later in the Skagerrak (4). The post off Ruegen (5) was established in 1973. These five patrols are in operation year-round and can follow any passage through the straits without difficulty.

RDAF student pilots attack the problem as part of the 80th Flying Training Wing's Euro-NATO Joint Jet Pilot Training program at Sheppard AFB, Tex. Back to front: Henrik Kanstrup, Jan C. Mortensen, Tage H. Sorensen, and Thomas T. Hansen. Twelve nations take part in the ENJJPT program.

An RDAF F-35 Draken on patrol. Along with its three fighter/attack squadrons of F-16s, the RDAF deploys two squadrons of Drakens in the fighter/attack and reconnaissance modes. It also features one air defense squadron of F-104G Starfighters.

peacetime job is the search and rescue squadron. Since 1965, it has been equipped with Sea King helicopters and has flown more than 5,800 rescue missions.

Pilot Training

In Denmark, it is looked upon as desirable to be an air force pilot, and every year about 400 young men apply. Only ten to fifteen of them will be selected.

After two months of initial training at Avnoe, student pilots receive basic flying training in the Saab T-17. After eight months and about twenty-five hours of flying, they are ready for transition to jet aircraft.

Since 1951, all Danish Air Force pilots have received their jet training in the United States or Canada. In the early years, this training was given as American aid, but Denmark now pays for it. Euro-NATO Joint Jet Pilot Training (ENJJPT) at Sheppard AFB, Tex., is NATO's biggest cooperative training project.

After fifty-five weeks in T-37s and T-38s at Sheppard, pilots return to Denmark for final preparation before joining their operational units. Helicopter pilots for the Army and Navy also train in the United States.

In June 1984, the Danish Air Force took part, for the first time, in Tactical Air Command's Red Flag exercises at Nellis AFB, Nev. Danish combat aircraft had never been in the United States before. Four Danish F-16s made the long trip. Twenty-two pilots and twenty-four technicians participated in the four-week exercise, with good results.

One of the great problems in Danish defense is funding for procurement of equipment. About fifty-five percent of the total defense budget is spent on personnel, and only fifteen to seventeen percent is available for upgrading equipment. Currently, the F-16 acquisition consumes some two-thirds of the entire system procurement budget, so there is little left over for other equipment.

The Future

There had been some hope that the new defense program, which became effective in January of this year, would provide greater funding for modernization, but political support for that objective was insufficient. In many respects, the new defense program is merely a continuation of the previous one.

Denmark is often accused of spending too little on its own defense and therefore leaving its NATO partners, particularly the United States, to bear an inordinate share of the defense burden for the Alliance. Many people in Denmark feel the same way, but Danish politics do not make a change in the situation likely.

Opinion surveys, conducted annually since NATO was established in 1949, show that public approval of Danish NATO membership has never been greater than it is now. Also indicative of Danish interest in defense is considerable participation in the Home Guard. About 200,000 Danes are serving or have served in the Home Guard. Their service is unpaid, and training takes place in the evenings, on weekends, or during vacations.

In May 1945, German forces in Denmark surrendered before Allied forces arrived. The liberation of most of Denmark became a British responsibility. But the Danish island of Bornholm in the Baltic, with its 47,000 inhabitants, was to be liberated by the Soviets. The Germans on the island refused to surrender at first, so Bornholm was bombed by the Soviet Air Force. A large Soviet contingent landed on the island and did not leave until ten months later.

So Denmark—or at least part of it—has suffered both a German and a Soviet military occupation. Nobody wants to be occupied again. ■

B. Aalbaek-Nielsen has been President of the Danish Air Force Association since 1960 and Editor of its official publication, Propel, since 1970. He is founder and head of Danish Aviation and Space Publishing. A former captain in the Danish Air Force, he serves presently as a group leader in the Ground Observer Corps of the Danish Home Guard.


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VISIT CAE AT THE PARIS AIR SHOW — CANADIAN PAVILION, HALL 2

The voters have rejected the protest platform, and idealistic young people are beginning to have second thoughts.

Germany and Its Peace Protesters

BY PETER PETERSEN

In 1982–83, we Germans experienced the biggest public demonstrations since the last war. Hundreds of thousands of young people were persuaded that they could preserve peace if they took to the streets to demonstrate against the deployment of American Pershing II and cruise missiles on our territory.

My colleagues and I, like traveling preachers, went up and down the country to speak at mass meetings. Often we were shouted down, because fear had become stronger than reason.

Many people in and out of Germany wondered what had happened to a seemingly stable society. Presidents Reagan of the United States and Mitterrand of France came to address us in Parliament while the whole nation watched on television.

In his inimitable way, Mr. Reagan directed his remarks to the women of Filderstadt to make his point. (Hardly anybody in our packed chamber knew where Filderstadt was—until the next day, when TV crews from all over the world descended on the little town near the Black Forest.)

"To those who march for peace, my heart is with you," President Reagan said. "I would be at the head of your parade if I believed marching alone could bring about a more secure world. And to the 2,800 women in Filderstadt who sent a petition for peace . . . let me say I myself would sign your petition if I thought it could bring about harmony. I understand your genuine concerns. The women of Filderstadt and I share the same goal.

"We are with you, Germany. You are not alone.

"Let me assure you that the American commitment to Europe remains steady and strong. Europe's shores are our shores. Europe's borders are our borders."

The speech was a masterly attempt to convince my people that we are in the same boat with the US, threatened by the same enemy, and committed to the same values.

Mitterrand's Approach

Mitterrand was much more French in his approach. On the way to Bonn, where he was to speak in our Parliament, he read the speech that his staff had prepared for him. Instead of going to a scheduled conference with our Chancellor Helmut Kohl, he asked for a private room and a piece of paper to rewrite the speech himself.

"How many lives were sacrificed in confrontations between France and Germany," he asked, "in which sometimes the one and sometimes the other was victorious? Where always the victor was condemned to build on blood, and the vanquished to plan revenge? [There have been] wars based on different religions, family fights between kings and emperors, wars between brothers, civil wars. Only after the most terrible of all wars led by a barbaric dictatorship—an occupied France, a Germany torn apart, a Europe divided and destroyed—have we Europeans, and first of all we French and Germans, had sense enough to decide to prevent such evil fate forever. . . . There is no inevitable fate. Our people know that [and] today consider peace of the highest value. . . ."

On that basis, the French President explained, deployment of American missiles on German soil would be necessary unless the Sovi-

West German protesters congregate outside a NATO air base in objection to the deployment of American land-based nuclear missiles on West German soil. The author claims that many thousands of idealistic young West Germans are now having second thoughts about their previous viewpoint, given the events in Poland and Afghanistan.

ets dismantled their new mobile missiles—each with three warheads, a range of 5,000 kilometers, and increased accuracy. The range of the missiles, he pointed out, covers all of Europe.

These speeches were important. We Germans sometimes irritate our friends and allies because deep down we are an insecure people, not quite sure where we come from and where we belong.

Three times in this century we have gotten a new flag, a different national anthem, new elites, and new values. It happened in 1918, after the loss of the First World War, in 1933, when Hitler came to power, and again in 1945, when we ended up with Russian troops in Berlin and a country in ruins, both physically and morally.

Questions About Morality

To understand the impact of the peace movement and the hysterics it produced, one must keep in mind this aspect of our history. Young people, often idealistic, *know* (consciously or not) that it was moral indifference in us—their parents and grandparents—that made Hitler possible. They wonder if the same lack of morality made us, the responsible political leaders of 1982, request and get from our US allies the most terrible weapons that human minds can think up and develop—weapons a thousand times worse than those that rained on us during World War II.

Dreams coming to life at the right time and inspiring millions are the strongest force in history. The dream for peace and justice is alive in every country. Since the days of Lenin, the Soviets have taken hold of such dreams. Nobody in the Soviet Empire, however, believes any longer that communism is a road to a world of justice where everybody gives what he can and gets what he needs. That dream has drowned in a sea of blood and terror. You might find true believers in communism in New York and Frankfurt, but you will not find them in Moscow or Dresden.

For sixty years, the Communists have skillfully played the tune of peace, often while preparing for or waging war. Thus, "peace" movements are suspected, often rightly, of springing from Communist inspiration—and even of following Communist guidance.

Combine the dream for peace with the kindling of fear, and you get a powerful message. In a nation where every person over the age of fifty has experienced war in his own country, fear of war is always present.

Members of West Germany's "Green" party meet the press to give their analysis of the Hesse state elections in 1982. The Greens scored well on that occasion, but the German peace movement as a whole suffered a severe setback in the March 1983 general election. (UPI/BETTMANN NEWSPHOTOS)

Three Years Later

So what has become of the peace movement now, three years later? In November 1983, after a heated debate, we decided to honor the commitment of former Chancellor Helmut Schmidt and accepted the missiles, with most of the Pershing IIs going into my own state of Baden-Württemberg. In a March 1983 general election, parties supporting the deployment won a big victory. Voter turnout was almost ninety percent.

The first focus of the peace movement had been the Pershings and

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cruise missiles. The second, contested with equal bitterness, was that election. It was a double defeat for the movement.

We Germans have some experience with movements. If you are a committed member of a movement, anybody who does not share your conviction and does not join your cause is either a fool or a criminal. So some fanatics went underground, shrouding their criminal acts with high-sounding ideals.

A second observation about movements: Numbers are taken for truth. "Five hundred thousand demonstrated against the Pershings; therefore it cannot be right to deploy."

At the peak of the campaign, I was visited by a group insisting that "a thousand people from the district you represent have been in Bonn to demonstrate. Therefore, we demand that you, as a representative of the people and a democrat, vote against the deployment." I asked: "What about the other 349,000 who have not come with you to Bonn to demonstrate?" The answer was typical of those committed to movements: "They don't have the right awareness yet; they still need to be made conscious of the truth."

A third important point: Movements always have to move. Once they stand still, they slide back. The "Greens," who have often been at the core of the movement, are trying desperately to become an established political party now, precisely because the movement is sliding. Evidence of this slide was seen when a rally with a predicted attendance of 100,000 drew an actual turnout of only 10,000. In 1984, they decided to stop holding mass meetings altogether.

The Coordinating Committee of the movement—a mixed group of ecologists, pacifists, left-wing socialists, theologians, and Communists—had lost its common focus by the end of 1983. The Pershings were being deployed, and the sky did not fall. Helmut Kohl was reelected, but war did not start.

The Communists were a small minority within that committee, but they were better organized, better financed, more disciplined, and they understood strategy better than their partners in the movement. Their justification of the Soviet buildup of SS-20s, SS-22s, and SS-23s caused some other groups to resign from the Coordinating Committee. The demise of the committee was in sight.

Second Thoughts

Many thousands of idealistic young people are beginning to have second thoughts. They look at Poland and Afghanistan. Are the Russians really as peace-loving as they claim, and might it not be necessary to deter them after all? Can you really put democratically elected leaders on the same moral level with the members of Moscow's Politburo? Can you compare Grenada and Afghanistan? Why do Germans who try to go from one part of their own country to the other still get shot or put in jail? Why the wall in Berlin and through 1,000 miles of our country, if communism is a system that makes everybody happy?

These are the questions we address when we go to schools and universities to meet with young people. These discussions are often thoughtful, and we learn a great deal.

I believe we have to find new ways to express old truths. What does freedom—as compared to license—really mean? What are the basic values of democracy? And again and again: What does America really stand for? We don't understand why America allows its image to the world to be shaped almost exclusively by Hollywood and Madison Avenue.

In a true sense, we all are in the peace movement. More and more people realize that the leaders in the Kremlin cannot rest so long as there are free people living at their borders. So long as *we* are free, the dream of freedom will not die in Russia. The Politburo is much more afraid of that dream than of American missiles. ■

Peter Petersen is the ranking member of the West German Bundestag's Armed Services Committee. A native of Hamburg, Mr. Petersen is a member of Germany's Christian Democratic Union and the German Society for Foreign Policy. His earlier article for AIR FORCE *Magazine, "How the Burden Is Borne," appeared in the December '84 issue.*

The Air Force has made progress toward a number of its objectives since 1981—but still has a long way to go.

The Past Four

BY THE HON. VERNE ORR
SECRETARY OF THE AIR FORCE

THE Almanac issue of this year's AIR FORCE Magazine is a particularly fitting place to pause and reflect on the past four years I have been privileged to serve as Secretary of the Air Force. Much has happened in that time—many challenges met and many solutions started (and some left unfinished). This article briefly recounts some of the goals we have set and how well we've met them.

Quality People: From my first day, in February 1981, attracting and keeping the best young people America could offer became a top priority. In the last four years, the quality of our people has risen markedly. With pay comparability and attention to benefits, we have consistently brought in new recruits with high school diplomas (ninety-nine percent currently have them) and officers at the top of their schools (the average GPA of entering officers is now 3.4).

Science and Technology: Recognizing the critical role science and technology play in Air Force affairs, we have encouraged smart young scientists and engineers to come into the Air Force. With bonuses and other tangible encouragements, our scientific and engineering retention rates are solid, and most all of our scientific fields are adequately manned—but we cannot afford to be complacent.

Rated/Nonrated: During this period, the trend has been toward an Air Force with more nonrated than rated officers. We need to be constantly alert to the many factors affecting promotion, balancing promotion opportunities for individuals with the needs of the service. The last brigadier general and colonel promotion lists indicate that we're moving in the right direction.

Women: In 1981, the Air Force rosters consisted of nine percent women. Today, leading all services, we have more than eleven percent. As I mentioned in a recent issue *(see "Finishing the Firsts," February '85 issue, p. 85)*, in that time women have been included in flight crews of KC-10s and KC-135s in addition to C-5s, C-141s, and C-9s. We have had female Titan missile crew members, and in the near future Minuteman missile crew positions will be open to women. Women can now also choose to be security specialists in the security police—a field previously closed to them. The Air Force leads within DoD in the number of different fields open to our women. To continue this trend, we have increased the accession goals for enlisted women to seventeen percent this year.

Quality of Life: Quality of life has remained the key to keeping these fine Air Force people. The Air Force is working hard to improve the quality of Air Force housing, both overseas and in the United States. We are encouraged that we have funding in this FY '85 budget that triples new family housing construction starts. We have asked Congress to maintain that momentum with the comparable funding requested in the FY '86 budget.

Military families will continue to be vital contributors to readiness. The Air Force remains a leader in recognizing family needs and responding to them and has included several key initiatives in this year's budget request to ease the financial burdens on our families (increased PCS reimbursements, funding for a dependent dental-care program, and support for legislation to exempt military allowances from taxation permanently).

Strategic Modernization: Our goal from the beginning has been to help the President rebuild America's defenses—atrophied by a decade of un-

Secretary of the Air Force Verne Orr talks shop with a visitor to the aerospace exhibits at last September's AFA National Convention. Herein, Secretary Orr sizes up USAF's progress toward goals it set four years ago—and problems still extant.

derfunding. We began by restarting the B-1 program and promising to build it for $20.5 billion. We marked a critical milestone by rolling out the B-1B last September—six months ahead of schedule and within that original $20.5 billion!

An integral part of the President's Strategic Modernization Program, the Peacekeeper continues to play a crucial part. We have tested the Peacekeeper seven times so far, with exceptional results, and are in production for the first twenty-one missiles. Although critics again promise a real challenge this year to that program, we are confident we can persuade Congress of the need to modernize our land-based ICBM force to counter the larger, more accurate Soviet ICBMs. We are also actively involved in research and development of the small ICBM.

Contractor Wages: Early efforts were focused on the need to look hard at the process we use to contract those goods and services we buy from industry. We started with close inspection of industry wages and salaries to determine how they affect the prices they charge us for their goods. We met with chief executive officers of major suppliers and advised them that while we certainly could not tell them how much to pay their employees, excessive wages and salaries inflate prices and affect our willingness to buy their products. Industry wages remain a key subject of attention, since they have a significant bearing on how corporations figure overhead into the prices they negotiate with us.

Spares: We also started our examination of the entire spares procurement process—first with Corona Require, which examined how we determine the number of spares we need, then with an Air Force Management Analysis Group on how we actually buy those spares. We have since done the same thing with support equipment and our disposal process and have generated a list of improvements we need to make to these systems. While progress has been made, there is still work left to do.

Data Rights: One of the ways to improve the way we do business is to limit the time contractors can hold technical data rights on things we buy from them—to some given time, like five years. While we are still exploring the precise time period a company may consider data proprietary, the days of open-ended proprietary rights are over!

Competition: We have also accomplished much to make our buying process more competitive—one that produces a more realistic price for us and more of a chance for all interested contractors, especially the smaller ones. We have added new Competition Advocate people and streamlined the system. In FY '84, only eighteen percent of our contracts were noncompetitive—down from twenty-nine percent ten years ago! A recent example of the benefits of competition are the contracts we awarded for the Alternate Fighter Engine—contracts that give us a fine, warranted engine and dual-source production of our fighter engines.

We have also encouraged our people to report incidents of potential overpricing. We hope they are few, but in a huge system like ours, the possibility is always there. With Zero Overpricing and our revised acquisition system, we think we are licking the tough problem of making those exceptions known.

•••

Of course, we aren't through. Challenges remain. But given the start we've made with those I've mentioned, there is room for some optimism.

Systems: Convincing everyone of the Soviet threat to our Minuteman ICBMs—not to mention the value Peacekeeper has to our negotiating position—is a challenge in this day of $200 billion deficits, but we must persist. Nothing will be given higher priority in our deliberations this year.

Crucial on the list of unfinished business is completion of the bomber force modernization. We must ensure the Advanced Technology Bomber is ready in the early '90s to augment our fleet of 100 B-1Bs.

Similarly, having laid out a fine Tactical Fighter Roadmap, we must now follow it. We produce the finest fighters in the world, and this plan ensures we shall continue that dominance.

Another difficult chore will be to persevere with the C-17. A central part of the Airlift Master Plan to replace the workhorse C-130s and C-141s as airlifters used *inside* theaters, the C-17 is essential to increasing our lift capability to carry the material and people *to* those theaters as well.

Finally, we recognize the important role that special operations forces play today in military operations. As a result, we have begun to emphasize our role in how they are employed. With the other services, we are working to improve systems and procedures and will continue to strengthen capabilities.

Space: The President's decision to make a unified command for space shows the level of priority this government places on it. As part of that commitment, the Air Force must complete the Vandenberg Launch Facility and make it an efficient point for launching hardware into polar orbits. Our plans to buy expendable launch vehicles (ELVs) must continue in order to give us the backup capability we believe is mandatory.

Additionally, the Air Force is committed to the technology research outlined in the President's Strategic Defense Initiative.

Business: In our business practices, we still have work to do. While pricing is receiving more attention, we must ensure the acquisition system reinforces these efforts.

Other nagging problem areas remain: ensuring quality in the products built for us, measuring and monitoring standard and actual work hours, and becoming smart enough to know when warranties, baselining, and should-cost are useful and productive and when they are not. We are in a demanding transition period in how we and our contractors operate—the system that evolves will, with everyone's support, be far better than what we have had before.

Pay and Benefits: Perhaps the most difficult challenge we face is to keep the quality of Air Force life competitive. Pay and benefits for our people must be kept at levels where they convince people that a commitment to serve is worth the sacrifices demanded.

An important part of retaining good people in a career that demands much sacrifice is the military retirement system. Any changes to it must reflect its retention function and our commitment to those Air Force people now on active duty and those already retired. We are doing all we can to convince the critics that a substantive tampering with it, with both its economic advantages and quality disadvantages, will never compare with the professional and economic value of volunteer Air Force people who are glad to serve and adequately compensated to stay!

•••

The wise Samuel Johnson once said: "Few things are impossible to diligence and skill. Great works are performed not by strength but perseverance." This has never been more true than in the complex economic and regulatory environment in which the Air Force finds itself operating. Significant progress has been made these past four years through the diligence and skill of the entire service. With continued help like this, we will persevere with what remains.

We all are part of the best Air Force in the world—but we can always make it better! ■

A top-level assessment on strategic and tactical modernization, force projection, capabilities in space, and joint service cooperation.

The Force And the Future

BY GEN. CHARLES A. GABRIEL, USAF
CHIEF OF STAFF, UNITED STATES AIR FORCE

TO MANY people, the year just past brings to mind George Orwell's famous novel *1984*. Fortunately, the world portrayed in Orwell's book hasn't come to pass. This is because Americans are willing to make the sacrifices necessary to defend our free society. Nowhere is this willingness more pronounced than in the increased defense budgets of the past several years. These budgets have allowed the services to begin correcting the serious military deficiencies that developed in the 1970s—a decade when we didn't provide adequate resources for national defense.

We and our allies have been working hard to counter the growing Soviet threat and can point with pride to the success of our efforts to improve our warfighting capabilities and increase the readiness and sustainability of our forces.

In this Almanac issue of AIR FORCE Magazine, I want to bring you up to date on what we're doing to modernize our strategic forces, increase our force projection capabilities, and expand and modernize our tactical forces. I'll also talk about space—an area of increasing importance to our defense posture. Finally, I'll cover the Army-Air Force Memorandum of Agreement on Joint Force Development. Both services are committed to increased cooperation—working, planning, and training together to ensure the most affordable and effective combined combat capability.

Air Force Chief of Staff Gen. Charles A. Gabriel, shown here addressing AFA's 1984 National Convention, assesses the future of USAF.

Strategic Modernization

We've been making substantial progress to redress the serious strategic nuclear imbalance that resulted from two decades of neglect. The B-1B, cornerstone of our modernized bomber force, rolled out last September. It is presently undergoing flight tests, and the program is still ahead of schedule and within budget. We're requesting funds in the FY '86 budget to buy the final forty-eight of a planned 100 aircraft procurement.

Research and development on the Advanced Technology Bomber is also on schedule, and we have an early 1990s deployment goal for ATB. Five squadrons of B-52s are now equipped with AGM-86B air-launched cruise missiles. We're also developing an Advanced Cruise Missile with greater capability to avoid detection and to penetrate increasingly sophisticated Soviet strategic defenses. In addition, the bombing accuracy of the B-52 has been increased by fifty percent through offensive avionics systems modifications, and defensive avionics modifications have made it more survivable.

All of our strategic offensive and defensive programs are being linked by more survivable command control and communications systems. We're improving and hardening Aircraft Alerting Communications, procuring the Ground Wave Emergency Net, and developing the Milstar satellite system.

Our ICBM modernization efforts are moving ahead smartly. The small ICBM program is on solid footing, and we're maximizing competition for propulsion, the hardened launcher, and the guidance system. Also, through the Minuteman III guidance system upgrade program, we've improved Minuteman III effectiveness by nearly thirty percent through improved accuracy. Even with these improvements, Minuteman III will not provide the badly needed capability that Peacekeeper will give us.

The real success story is the Peacekeeper ICBM. It's performing far beyond our expectations in tests. An essential part of the President's strategic modernization plan, the Peacekeeper will counter Soviet superiority in prompt countermilitary capability and deter by taking their silo-based weapons out of the virtual sanctuary they now enjoy. The Soviets know the effectiveness of Peacekeeper, and it surely was a factor in their decision to return to the talks to consider meaningful nuclear-arms reductions.

We will be pressed by some in Congress to cut the Peacekeeper. It's our number-one program, and we have to keep it on track. Otherwise, we send the wrong message to adversaries and friends about our commitment to deterrence.

Overall, each element of the President's comprehensive strategic modernization program is vitally important to arms-control initiatives to reduce nuclear arms, provide a credible deterrent, and promote a stable and peaceful world. Successful arms reduction depends on our ability to negotiate from a position of strength: a position that can be maintained only by modernizing all legs of our triad.

Force Projection

American interests and commitments are worldwide, and to defend them properly, we need the capability to deploy our combat forces rapidly to wherever those interests may be threatened. Today, because of aircraft modifications and increased stocks of spares, our airlift force can deploy

about twenty-eight percent more combat power. With fifty new C-5Bs, a complete buy of sixty KC-10s, and cargo-convertible features on commercial passenger aircraft, we will ultimately have seventy-five percent more intertheater airlift capability than we had in 1980. This is a great improvement, but still much less than we need.

The C-17 is the key to our future force projection capability. For the first time, we'll be able to deliver a full range of Army equipment directly to where it's needed, including to the many small, austere airfields currently inaccessible to our long-range airlift force. It will operate in both inter- and intratheater roles, will have significantly increased maintainability and survivability, and will be warranted for about one-third of the C-5 maintenance man-hours per flying hour—big savings in dollars and people.

In recent years, air-refueling requirements have risen for both strategic and conventional forces. New CFM56 engines and additional improvements on the KC-135s will give us half again as much capability, while a single KC-10 has the equivalent capability of about three of our current KC-135s. In addition, they can carry a substantial amount of cargo.

Tactical Modernization

As the Soviets expand and modernize their tactical forces, our technological advantage is being reduced. To meet this threat, we've designed a comprehensive plan to increase and modernize our tactical forces and to provide extended deterrence.

The Tactical Fighter Roadmap addresses our force requirements in terms of quantity and quality. It prescribes a procurement strategy that will increase the current force of thirty-six tactical fighter wings to forty wings while sustaining the force at an acceptable age.

The flexibility and capability of our fighters will increase as we acquire the Advanced Medium-Range Air-to-Air Missile (AMRAAM) and the Low-Altitude Navigation and Targeting Infrared for Night (LANTIRN) system. We're also committed to improving our electronic combat, tactical reconnaissance, and command control and communications (C^3) systems.

Finally, our ground-launched cruise missile (GLCM) deployment in Europe is on schedule as part of the counter to the Soviet SS-20 deployments. GLCM is now operational at RAF Greenham Common, UK, and Comiso, Italy. Last March, it also became operational at Florennes, Belgium.

Space

Space has become essential to successful military operations. The efforts we spend on developing our capabilities in space depend on how we and the Soviets perceive the advantages and disadvantages of such use. Since Sputnik was launched twenty-seven years ago, we and the Soviets have increased our reliance on space systems for communications, navigation, weather observation, and surveillance.

For the last twenty-five years, the Soviets have focused their space efforts primarily on military uses, capabilities, and systems. Soviet initiatives in space represent a major threat to US and allied security interests.

To meet this threat, and to meet the challenges of our own growing dependence on space systems, we formed and activated Air Force Space Command in September 1982. Space Command significantly improved our ability to support and control our valuable space assets and their associated ground-based elements.

Space systems, as with land, sea, and air forces, are best employed through the unified and specified command structure. Yet, our space systems still aren't formally integrated into this structure. To correct this deficiency, the President directed that we establish a new Unified Space Command. The new command will exercise operational responsibility for US military space systems, plan for joint wartime use of space assets, and be the focal point for military requirements in space.

Finally, we're emphasizing programs to make our space systems more survivable to ensure they can operate in hostile environments. And we're working to complete the Space Shuttle launch facility at Vandenberg AFB, Calif. The first Shuttle launch from this facility is planned for early next year. Also, DoD has approved a Defense Space Launch Strategy that will permit us to acquire a complementary expendable launch vehicle (ELV). The Shuttle will remain DoD's primary launch vehicle; however, ELVs will provide a prudent hedge against unforeseen Shuttle problems, give us launch-on-demand flexibility, and allow us to maintain a space launch industrial base.

Joint Service Cooperation

Last May, Army Chief of Staff Gen. John A. Wickham, Jr., and I emphasized our commitment to increased cooperation by signing a Memorandum of Agreement (MOA) on Joint Force Development. The MOA identified thirty-one initiatives aimed at improving joint cooperation and providing the most effective joint air-land combat capability. To date, nine of the thirty-one initiatives have been implemented, with the major decisions and staff actions on the remainder to be completed by June of this year.

There has been significant progress in many areas—one of the most noteworthy is the development of the Joint Surveillance and Target Attack Radar System (Joint STARS), which is a surveillance system to support both services that will be flown on an Air Force aircraft. Great strides have also been made toward providing better defense for our air bases and in the Air Force's ability to provide air support for the Army.

Aside from hardware decisions, the most important aspect of the process has been a significant improvement in our joint approach to major force-structure issues, and that bodes very well for the future. General Wickham and I are committed to the fullest implementation of all the initiatives, and progress has been excellent.

We're also working more closely with the Navy. We've increased joint exercises to enhance our total force capability to conduct maritime operations in defense of the sea lines of communication and to prosecute antisubmarine and antisurface warfare. These are primarily air defense exercises: extending the US Navy/carrier battle group outer air battle capability. More than forty-two percent of all joint exercises last year involved maritime operations, and we're coordinating with the Navy on joint operation of training ranges and establishment of a mobile sea range. In addition, we're working with them in the area of combat identification, friend or foe, and in munitions research, development, test, and evaluation.

Interservice cooperation increases our warfighting capability, meets the needs of our commanders, and produces the most cost-effective forces possible.

Winston Churchill said, "There are two supreme obligations of government. They are of equal importance. One is to prevent war, and the other is to be ready if war should come." We've made good progress in correcting the problems caused by nearly two decades of neglect. Our deterrent posture has been strengthened, and our forces are much more capable than they were four years ago.

However, we must keep the momentum, if we are to meet our obligation to ensure deterrence, and be prepared to fight if deterrence should fail. ■

The year 1984 was a very good one, but the enlisted force is expressing several concerns.

Taking Care of The Troops

BY CMSGT. SAM E. PARISH, USAF
CHIEF MASTER SERGEANT OF THE AIR FORCE

CONTRARY to what was said by many pessimists, 1984 was a very good year in many, many ways. We got a small pay raise, our retirement system remained intact, we got a new GI Bill, and we did make some gains in other quality-of-life items. We had one of our best recruiting years, from a quality standpoint, and our retention in the first-term, second-term, and career force met our expectations. Discipline-problem indicators were down, even with the reemphasis placed in the quality force areas. So, all in all, it wasn't a bad year.

The year 1984 was also exciting for me—it provided memories that I will never forget. Much of the year was spent visiting with our enlisted men and women throughout the world. During these visits, I had the pleasure of meeting with the most dedicated and determined enlisted force any nation could hope to have. The hospitality that Inge and I received—well, I just wish there was some way we could reciprocate.

As we move into 1985, we can expect some belt-tightening, but I still believe we will see some gains in our quality-of-life areas—gains that are sorely needed if we are to continue retaining the experienced airmen and NCOs we need for tomorrow. We continue to receive very strong support from our senior leadership, whose number-one priority remains "people and their quality of life." Select members of Congress continue to provide support.

Items picked up in my travels that remain major areas of concern among our enlisted personnel include:

- **PCS Entitlements.** We did not get all the relief we needed in this area in 1984. In 1985, we need additional aid, with most individuals being concerned about weight allowances and funding for transient lodging entitlements. Another area where a large group of our people need help is in CONUS travel allowances for the families of E-4s under two years and lower grades. I'm optimistic that we'll see some changes in 1985.
- **Dependent Dental Care.** We did not get what we asked for or needed in this area last year. We did get space-available care authorized for the CONUS, effective July 1, 1985. However, our families still indicate a need, and most that I talk to are willing to contribute to such a program. My outlook is optimistic.
- **GI Bill Extension.** We did not get an extension to the Vietnam GI Bill last year, but we did get a new bill. The new bill currently pertains to those who enter the Air Force after July 1, 1985, and to the Vietnam veterans who serve during the period July 1, 1985, through June 30, 1988. There are provisions and exclusions in the bill that we are seeking some changes to, and, based on conversations I've had with some of our congressional offices, they are willing to listen.
- **Retirement.** This area remains the number-one area of concern that I

Chief Master Sergeant of the Air Force Sam E. Parish autographs a copy of* The Chiefs, *published by AFA in tribute to the eight men who have served as CMSAF since 1967. Chief Parish hails gains in caring for the troops.

hear voiced by our enlisted men and women. The Air Force position remains the same as it's been: first, no changes to the present system, and second, if changes are made, do not break the faith with those of us who are serving today and those who are retired. My outlook is guarded to optimistic.

• **Pay Raise.** This is very controversial at this point, and what happens in 1985, in my opinion, will depend on a couple of factors—what happens to our fellow government workers and what happens to our economy. The senior leadership is very supportive of a raise and is working the issue hard.

• **Join Spouse Assignments.** This issue continues to be a major topic of conversation and interest. At the end of 1984, ninety percent of our military couples were stationed together. While this percentage does fluctuate from time to time, based on Air Force requirements and the personal desires of the couples, the increase in numbers and rank of our military couples may make the success of this program more difficult. Rest assured though, our personnel folks will continue to work the issue and attempt to keep our military couples together—consistent with the mission and requirements.

Our military couples can do much in this area also. They can keep their records current, ensure that their assignment preferences (AF Forms 392) are the same and volunteer only for assignments as a couple (if you volunteer for an assignment on your own and get selected, don't expect the other member to be automatically selected for a join spouse), know the rules that pertain to join spouse, and always, always try to plan ahead.

These are the major issues I get asked about in my travels. Now, some of this may sound like "gloom and doom" for 1985, but it's not meant to be. Our senior leadership continues to work and support those issues so necessary for us to retain and maintain the quality-of-life needed to ensure we continue to have the strongest Air Force ever.

What we need to do is to maintain a positive attitude about those issues we have gained or retained and to project this attitude to our people. It doesn't do any good for us to adopt a pessimistic approach and believe all the dark and dire speculative headlines. Let's stay positive and exert the positive leadership that we are going to need in the coming year.

As a final note: On December 7, 1984, I completed thirty years of Air Force life. It has been a most exciting—sometimes turbulent—thirty years, but I wouldn't change a day of it, even if I could. It's been a career of excitement, with each new job bringing new challenges and offering new opportunities.

Inge and I will leave with very mixed emotions—extremely proud at how far we have come as an Air Force, but saddened that we will be leaving a way of life that means more to us than anything else. The changes we have seen—well, I could never adequately describe them in the space so generously provided by the Air Force Association. It's truly been an honor for us to serve in our great Air Force, and we will miss each and every one of you.

Keep up the good work, the dedication, and the enthusiasm. Give my successor the same support you have given me, and I'll guarantee that we'll continue to have the best enlisted force any nation could ever hope to have. ■

Since Chief Parish wrote this article, USAF has announced that he has been extended as CMSAF until mid-1986.

As NCO in charge of the dental prosthetics lab at Osan AB, Korea, SSgt. Darrell Grigsby exemplifies the wide range of specialties practiced by USAF enlisted men and women.

A1C Thomas Smith works on an F-4E Phantom II fighter at Karup Air Base, Denmark, during Exercise Reforger 82. USAF's maintenance crews are staying in uniform longer, performing better, and taking greater pride in their handiwork.

Air Force Communications Command

New systems, new ideas, and a high-technology environment are routine daily challenges to the men and women of Air Force Communications Command (AFCC). These men and women are not only meeting the operational needs of today's Air Force, but they are reaching into the future to support the Air Force in the twenty-first century. The frontiers opened by the information systems technological explosion present healthy and robust challenges for this rapidly growing command.

AFCC has more than 55,000 people (8,170 civilians) dispersed at more than 435 worldwide locations. This work force is complemented by 15,000 members of the Air National Guard and Air Force Reserve. These vital partners contribute nearly 79,000 work-days each year in planning, programming, installing, and maintaining the vast network of Air Force information systems. The synergistic actions of these reserve forces with the active-duty force enable AFCC to provide the "reins of command" for DoD, the Air Force, and other federal agencies.

Information systems, a relatively new Air Force term, appeared on the scene with a revolutionary assault of technological advances in the world of communications and data automation. In 1983, the Air Force created an Assistant Chief of Staff for Information Systems to consolidate USAF actions and provide central direction and management to Air Force teleprocessing and data-automation efforts. Since that time, the merger of these disciplines has resulted in significant reorganizations in Air Force Communications Command.

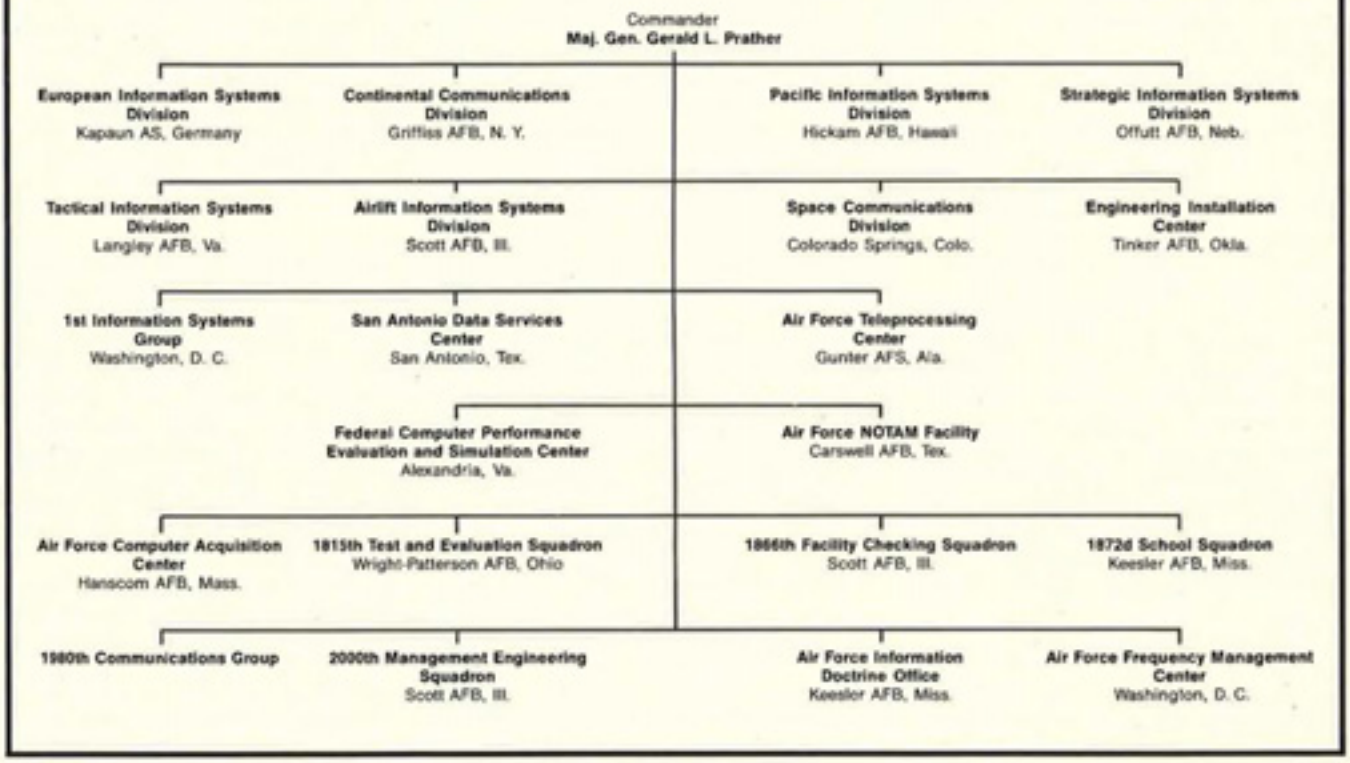
With the merger of these formerly separated areas under the single "hat" of Air Force Communications Command, a single manager for the integration of automated data processing and communications into Air Force operations has evolved. As the data-automation functions became a responsibility of AFCC, major commands began to transfer their separate, command-related data-processing functions to AFCC. The first command-level mergers started on July 1, 1984. At that time, Tactical, Strategic, and Alaskan Air Commands and Pacific Air Forces transferred data-processing functions to their "dual-hatted" information systems organizations. The major commands maintained operational control of the information systems people while AFCC provided centralized management as the administrative command.

As the integration continues, other major commands are transferring their data-processing functions to AFCC to provide that centralized management. United States Air Forces in Europe merged their functions in October 1984, and Military Airlift Command did so in December 1984.

An Air Force Communications Command "Hammer Ace" team deploys an antenna. Such teams are charged with ensuring rapid and secure communications capability. AFCC is now the single manager of USAF's recently integrated communications and automated data-processing operations.

AIR FORCE COMMUNICATIONS COMMAND

Headquarters, Scott AFB, Ill.



With the consolidation of communications and data processing, AFCC has become responsible for managing the complete spectrum of information systems for the Air Force. For example, while an AFCC information systems organization is currently responsible for the acquisition of at least 55,000 microcomputers for the Air Force, it is at the same time managing the consolidation of data-processing installations and telecommunications centers in a "one-stop" information center at our bases across the Air Force.

Future uses of information systems technology are not the sole concern of Air Force Communications Command. It continues to meet the daily requirements of the Air Force fly-and-fight mission. Basically, the continuing mission of AFCC is to provide information systems—inter- and intrabase communications, data automation, and air traffic systems and services—to the Air Force that are second to none.

"One unit, many missions," the motto of one of AFCC's units, aptly describes the multidirectional effort in air traffic and information systems support that AFCC provides the operational commanders, today and in the future. There are four "gates" to our Air Force bases: the main gate for entry with automobiles, the air traffic gate for entry by air, the voice gate for entry by telephone, and the data gate for entry with messages and data. Three of the four gates are managed by an AFCC unit.

Today, Air Force air traffic services furnish the largest military air traffic control system in the free world, second in size only to that managed by the Federal Aviation Administration. During 1984, AFCC air traffic controllers assisted in the safe and expeditious movement of more than 13,000,000 aircraft operations, nearly twenty-five percent of which was civilian air traffic. Working from the quiet confines of control towers and modern computer-assisted radar approach controls (RAPCONs), Air Force Communications Command air traffic controllers integrate the movement of air traffic with FAA facilities to meet the mission requirements of the fighters, the airlifters, and the strategic bomber and tanker forces as well as providing service to other users of the national airspace system.

Air Force-owned and AFCC-operated and -maintained navigational aids, from instrument landing systems (ILS) and very-high-frequency omnirange stations (VORs) to tactical air navigation stations (TACANs), constitute major components of the military and civil air traffic network. To ensure that these ATC system components are meeting AFCC's high standards, six AFCC-owned and -operated facility checking aircraft (four C-140s and two T-39s) evaluate the air traffic control equipment, procedures, and controllers in the USAF system to ensure that safe, quality service is provided in peacetime and that our service in wartime is the best in the world. Since 1961, AFCC controllers have been directly responsible for the recovery of more than 1,900 imperiled aircraft and credited with saving more than 7,000 lives as they brought those aircraft to safety.

Meeting the operational requirements of today's Air Force is a major undertaking, which AFCC embraces with the determination of making Air Force information systems the best in the world. To accomplish this, AFCC is in the midst of several programs to upgrade today's equipment to meet tomorrow's challenges. To meet unit- and base-level information system requirements of tomorrow, AFCC is replacing, through its Scope Dial program, eighty government-owned, inefficient, hard-to-maintain electromechanical telephone switch-

boards with advanced, computer-assisted digital telephone exchanges. Its sister program, Scope Exchange, will replace leased telephone switches around the world to provide the same upgraded communications capabilities at the remaining Air Force installations.

Providing secure, positive, and reliable C^3 capabilities to the operational commanders is a prime element of AFCC's efforts. AFCC's most visible services are on-base communications, which include everything from telephones to intrabase radios to telecommunications centers and navigational aids. However, AFCC also provides long-haul, intrabase connectivity interfaced into the Defense Communications System (DCS). AFCC maintains forty-seven percent of DoD's DCS facilities. To provide more advanced C^3 ability in the future, AFCC is working with Air Force Systems Command to develop high-technology solutions to field commanders' needs as well as exploring off-the-shelf solutions available from industry.

In Europe, AFCC is improving these communications by integrating digital capability into the DCS system. The Digital European Backbone (DEB) will increase commanders' communications capabilities through Europe, the Mediterranean, and into Turkey and provide for security of our transmissions on our mainline communications system.

Recent experiences have highlighted the need for rapid and secure deployable communications ability as well. Hammer Ace, the combat information systems units, and the contingency communications elements in AFCC's Airlift Information Systems Division are specialized units that provide this capability. In Grenada, all three of these capabilities were employed.

These quick-reaction units also have the ability to provide communications from remote locations. One of Hammer Ace's most recent deployments was to support an aircraft accident team in an isolated area. Hammer Ace assistance was requested, and, within hours, secure communications were on line from the remote location. In order to meet the challenges of tomorrow's Air Force, AFCC is providing heads-up planning, programming, and installation, all of which are required for providing state-of-the-art information systems.

The deployment or use of forces in a crisis is a major concern shared by many. For AFCC, the readiness of C^3 to support such an effort is paramount. Successful employment of tactical and strategic forces requires secure, reliable, and sustainable on-site information and air traffic systems. AFCC solves this readiness concern with its combat information systems groups, which can be deployed to any worldwide location in a matter of hours. Those same services that AFCC provides to the fixed-base environment are also available from these combat assets. These groups establish and sustain both routine and secure communications connectivity with employed forces as well as provide the information and air traffic systems needed for bare-base deployed operation.

To train for war, elements of the combat information systems assets routinely participate in such joint exercises as Gallant Eagle, Cope Thunder, Bright Star, Team Spirit, and TAC's "Flag" exercises, to name a few.

Currently, major AFCC efforts are under way to install equipment needed to support the beddown of the B-1B strategic bomber, the Space Shuttle at the Vandenberg AFB, Calif., complex, the Peacekeeper missile at F. E. Warren AFB, Wyo., and F-16s at Misawa AB, Japan. The communications and information systems requirements to meet the mission demands of these complex, highly technical systems are diverse. AFCC's role is to engineer, install, operate, and maintain the communications, data-processing, and air traffic systems when operational command requirements are validated and funded. Incorporation of state-of-the-art concepts, such as fiber optics, on AFCC's "front burner" will currently allow the flexibility for evolutionary growth of information system networks—so critical for the success of information support to those weapon-system beddowns.

Acquisition of military hardware and software is a very long process, often consuming several valuable years of time and effort. To shorten this, AFCC has initiated a concept called "Hammer Combat." Hammer Combat's target is to cut the acquisition cycle by using currently available off-the-shelf equipment from private industry. These will keep the Air Force at the leading edge of today's technological advances and will provide a springboard for research efforts to launch us into the twenty-first century.

A second AFCC initiative is directed at fixing those nagging, often languishing information systems problems perplexing our operational commanders. That initiative is the formation of the "A-Team." The A-Team is a group of highly qualified technical experts who can tackle those problems, pull together a game plan to fix them, and give the operational commander the solution and a road map to achieve it—fast.

The information systems explosion that brought "smart" information systems and air traffic control equipment to the private sector has provided a golden opportunity for the Air Force to increase its mission capabilities for applications not requiring research and development to meet unique military needs. AFCC's role is to ensure that this capability is available so that the operational commanders can successfully employ their forces whenever they are called upon to do so.

The men and women of AFCC are united in their effort to provide the United States Air Force with information systems that are second to none—"One unit, many missions," today and in the future, providing the reins of command for our Air Force. ■

AFCC air traffic controllers in chemical-warfare gear work under simulated combat conditions in Europe. All are capable of controlling both civilian and military traffic.

Air Force Logistics Command

Air Force Logistics Command (AFLC) moved steadily forward in 1984 toward its goal of providing ever-increasing levels of combat readiness to the Air Force's operating commands. AFLC's 97,000 people are adapting to the new programs, advanced initiatives, and the challenge of technology.

"We're changing the entire thrust of the way we do business. We're practicing wartime logistics in peacetime," says Gen. Earl T. O'Loughlin, AFLC Commander.

AFLC's first consideration has to be its customers—the major air commands that operate the weapons that AFLC supports and whose state of readiness determines the level of combat capability.

To improve the level of support to these systems, AFLC has undertaken a number of initiatives. The Logistics Operations Center (LOC)—established last year—has given the operating commands a major point of contact within AFLC. In addition to a weapon system control officer assigned to each system, the LOC recently has taken a significant step forward by going on line as a participant in the World-Wide Military Command and Control System (WWMCCS). This computer and information system ties AFLC together with Air Force and major military headquarters of the other services, thus facilitating the coordination of real-time information. WWMCCS enhances the command's focus on weapon system management and permits the tracking of a vast array of current data on weapon system readiness and capability.

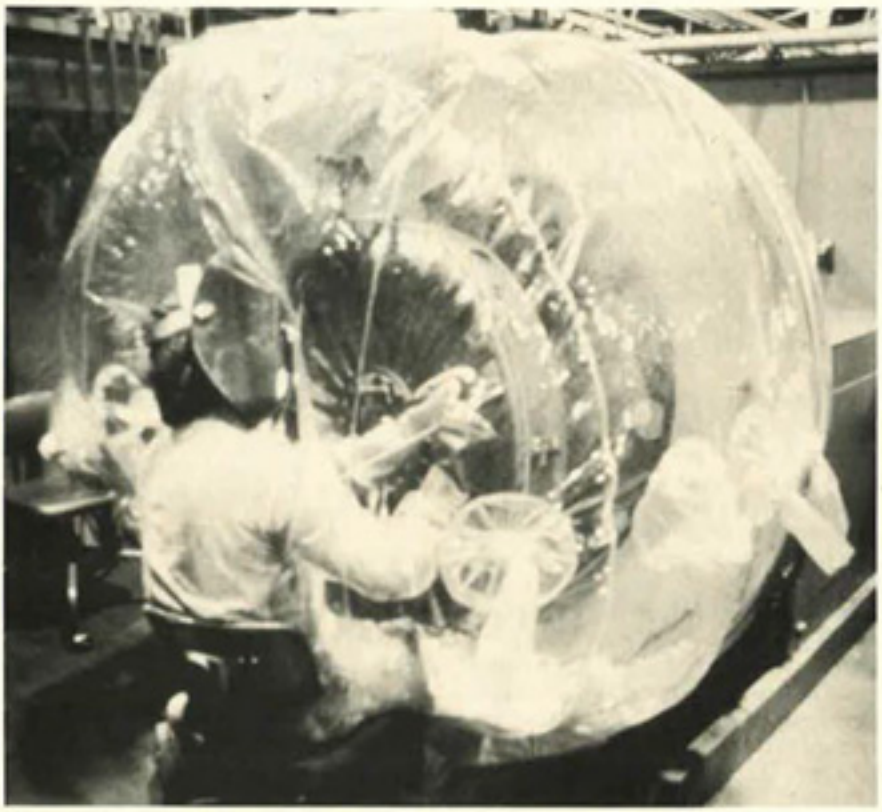
With these initiatives, AFLC is in much better position to determine aircraft force readiness and calculate the sustainability posture of combat forces. By using these and other indicators, such as numbers of sorties generated, flying hour totals, and aircraft possessed, the command finds that USAF warfighting capability has increased considerably since 1980. Increased funding for spares, stepped-up weapons procurement, and improved operations and maintenance all have played roles in this improvement.

AFLC is moving out on other fronts, too. The command recently let a contract for its new Requirements Data Bank (RDB) system, a sophisticated and responsive computerized method of determining requirements for materiel needed to support the combat forces. Some $140 million will be spent over the next ten years on RDB. A companion Stock Control and Distribution system is also under development. It will support item management, requisitioning, warehousing, and distribution of Air Force materiel worldwide.

Managing a $52 billion-plus financial program last year, the command is ever alert to new equipment and techniques to aid in managing such a vast financial program. Improvements in working conditions for the command's military and civilian work force are also under way. And AFLC is seeking out newer and more effective ways to keep its customers and others better informed as to the vast range of materiel and services it provides.

At AFLC's five air logistics centers (ALCs), members of the military-civilian team are looking for improved ways of supporting the command's major objectives. Each ALC has achieved a number of recent successes.

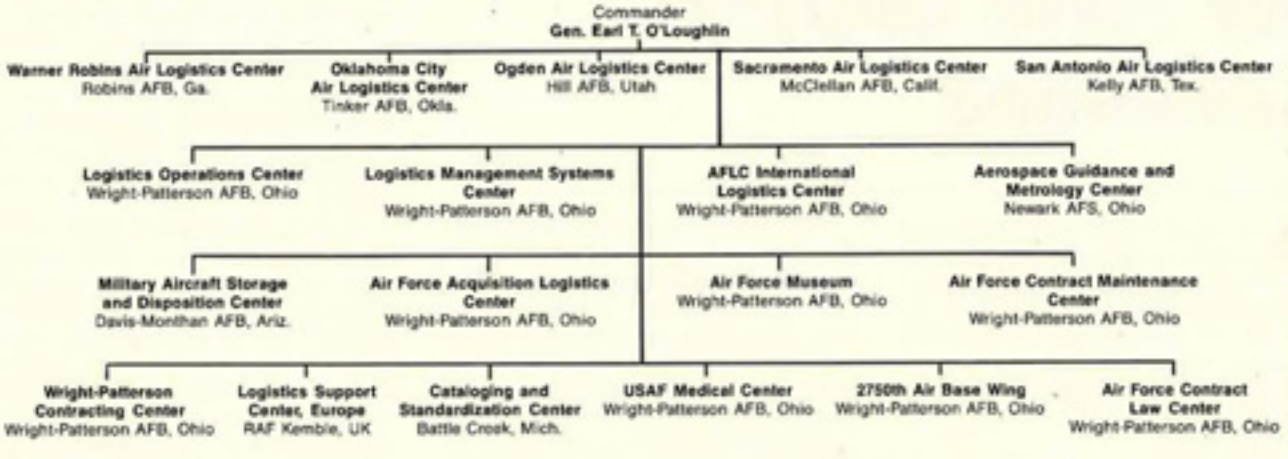
- **Warner Robins ALC,** Robins AFB, Ga., successfully tested the concept of using bar-code optical scanning technology for improved automation of base and depot logistics operations. By May 1985, all air logistics centers will process in-bound materiel using the LOGMARS (Logistics Applications of Automated Marking and Reading Symbols) Wholesale Receiving System. The system is one of twelve LOGMARS projects, which jointly will reduce the costs of Air Force logistics operations by more than $8 million per year. Readiness will be increased as a result of improved speed and accuracy in the materiel processing cycle—from receipt through distribution.
- **Oklahoma City ALC,** Tinker AFB, Okla., recently established a moving maintenance line for depot maintenance on KC-135 Stratotanker aircraft. This dynamic approach is more cost-effective than the static method



Worker at Oklahoma City Air Logistics Center, Tinker AFB, welds a jet-engine inlet section inside a bag filled with argon gas. The technique is called argon welding.

AIR FORCE LOGISTICS COMMAND

Headquarters, Wright-Patterson AFB, Ohio



and increases the number of aircraft available to SAC, the primary KC-135 user. The moving line reduces flow time by more than five days while increasing maintenance productivity.

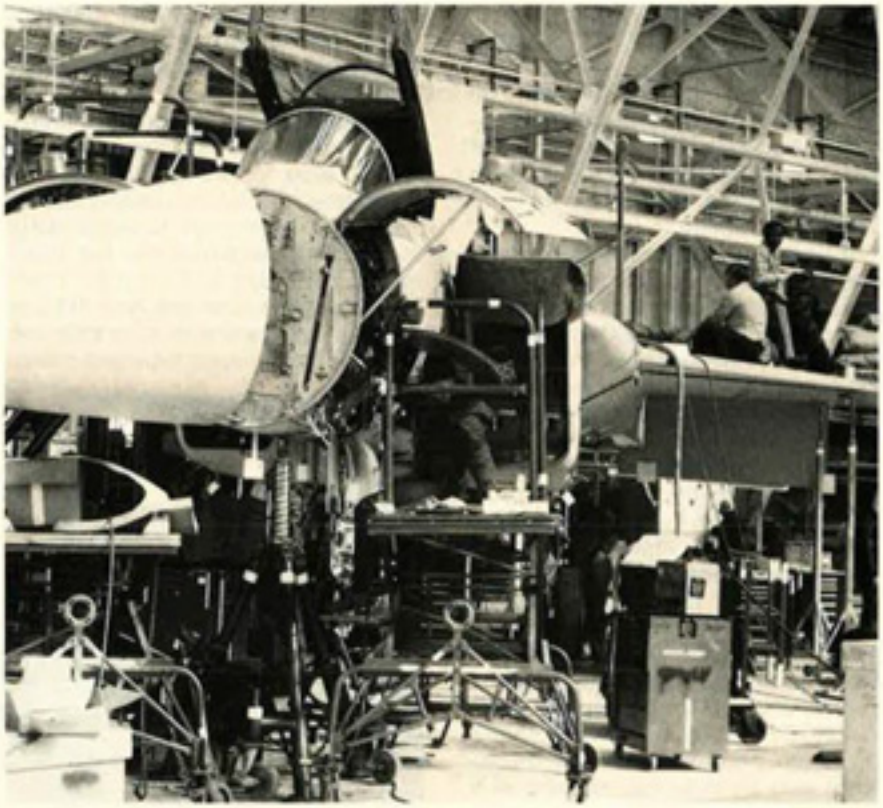
• **Ogden ALC,** Hill AFB, Utah, completed the initial phase of the Automated Technical Order System, the first of its kind. This system will computerize the retrieval and storage of technical orders to make the data accessible to the user faster than ever before.

The command is also gearing up for logistics support of new, technologically superior front-line weapon systems.

• **Sacramento ALC,** McClellan AFB, Calif., is responsible for management and repair of the Advanced Tactical Fighter. The ATF, now in development, will be the Air Force's air-superiority fighter for the 1990s and beyond and will incorporate a variety of new technologies, such as composites, very-high-speed integrated circuits, and automated tech data, that are currently under study by the ALC.

• **San Antonio ALC,** Kelly AFB, Tex., will manage logistics support for the C-17 cargo aircraft now in development. This aircraft will carry state-of-the-art advances in digital avionics, built-in test capability, and increased component accessibility. ALC representatives work closely with Air Force Systems Command on logistics planning for these and all new aircraft to ensure that the most efficient and economical maintenance and repair capability possible is incorporated into aircraft design.

In the upcoming year, AFLC will be refining plans for the future support of the Air Force mission around the world. Currently, the command is finalizing the details of its European Distribution System, which was developed to ensure that critical assets are moved quickly throughout the United States Air Forces in Europe (USAFE) area of responsibility.



Workers at Warner Robins ALC, Ga., apply their skills to an F-15. The ALC tested and proved the value of bar-code optical scanning technology in enhancing the automation of base and depot logistics operations.

Under the contract for this effort, the first of eighteen C-23A Sherpa aircraft rolled out in August 1984 at Short Brothers Ltd. in Belfast, Northern Ireland. The EDS aircraft will be stationed at Zweibrücken AB, Germany, to provide a rapid, dedicated airlift distribution capability for USAFE.

In 1984, the value of AFLC's capital assets exceeded $100 billion for the first time, and the command managed a total cash flow of $52.5 billion. From these figures alone, it is clear that the mission of AFLC is an ever-growing management challenge that is becoming more complex and more vital to the Air Force every year. ■

Air Force Systems Command

THE primary mission of Air Force Systems Command (AFSC) is to advance aerospace technology, apply it to operational aerospace systems development and improvement, and acquire qualitatively superior, cost-effective, and logistically supportable aerospace systems.

AFSC also supports the major space responsibilities of the Department of Defense, including research, development, test, and engineering of satellites, boosters, space probes, and associated systems. In addition, the command supports specific NASA projects and programs arising under basic agreements between DoD and NASA.

The command designs, constructs, tests, and purchases weapons and equipment and initial spare parts for Air Force operational and support commands. Primary emphasis is given to aeronautical, space, electronic, missile, and armament systems.

The command has approximately 27,500 military and 29,500 civilians. The nature of its research, development, test, and acquisition mission makes AFSC the Air Force's major employer of scientists and engineers.

Systems Command will manage approximately $38 billion in FY '85. Of this amount, $23.1 billion goes for procurement of aircraft ($16 billion), missiles ($5.3 billion), and other equipment ($1.8 billion). In addition, $10 billion goes for research, development, test, and evaluation (RDT&E); $1.5 billion for operation and maintenance; and $540 million for military construction. The remaining $3 billion includes foreign military sales ($1 billion), reimbursables ($1.2 billion), and military pay ($900 million).

AFSC administers thirty-eight percent of the total Air Force budget, although comprising only 6.5 percent of Air Force people. The command currently administers more than 29,000 active contracts valued at approximately $108 billion.

The following research, development, and systems acquisition milestones are among the most significant accomplishments recorded by AFSC during the past year:

The B-1B bomber, now in production, represents one of Air Force Systems Command's most noteworthy achievements. With only 6.5 percent of Air Force personnel, AFSC administers thirty-eight percent of the total Air Force budget.

- Electronic Systems Division (ESD) delivered the last of thirty-three operational E-3 Airborne Warning and Control System (AWACS) aircraft for the US Air Force and neared the end of delivery of eighteen for the North Atlantic Treaty Organization (NATO). ESD is continuing to upgrade the US fleet and is directing the acquisition of five E-3s and eight tankers for Saudi Arabia.
- The rollout of the first of 100 B-1B strategic bombers took place on September 4, 1984, five months ahead of schedule and within budget. It made its first flight last October 18. The first B-1B will remain at Edwards AFB, Calif., for two years of flight testing. The second B-1B is scheduled to be delivered to Dyess AFB, Tex., in the summer of 1985.
- Other rollouts for 1984 were: March 13, C-21 at Tucson, Ariz.; April 11, C-12 at Wichita, Kan.; August 8, C-23A at Belfast, Northern Ireland; and August 27, X-29 at Calverton, N. Y. The X-29 made its first flight on December 14.
- To begin the new year, Aeronautical Systems Division's 4950th Test Wing rolled out the first of four EC-18B Advanced Range Instrumentation Aircraft (ARIA) on January 4. Involving more than 100,000 workhours, the conversion of the former Boeing 707 was accomplished completely in-house.
- Eastern Space and Missile Center, Patrick AFB, Fla., supported the space programs of NASA and Department of Defense organizations with support of twenty-two space launches, including five Space Shuttle launches. ESMC also supported

the first East Coast Space Shuttle landing at the Kennedy Space Center. The R&D testing of the Pershing II missile program was also completed at Cape Canaveral AFS, Fla.

• Wilford Hall USAF Medical Center, Lackland AFB, Tex., opened a $6 million Clinical Investigation Facility that will enhance all aspects of medical research. The Neonatal Nursery Division continued its superb performance. The Division was already nationally known for the lowest mortality rate of premature infants. Additionally, three years of preparation and training for medical readiness culminated with a deployment of 350 medical professionals to Little Rissington, England, and a successful four-day test of the 500-bed contingency hospital in support of Reforger 84.

• Armament Division, Eglin AFB, Fla., unveiled the new Combined Effects Munition early in FY '84. CEM contains 202 bomblets developed to give the tactical air forces a single weapon with multiple-target attack capability, including personnel, trucks, and armor. Planned procurement levels of the CEM over the next five years make it the largest conventional munitions procurement program in the Air Force during peacetime.

• Phase I of the HH-60A Night Hawk helicopter test program at Edwards AFB, Calif., was completed in November, sixty days ahead of schedule and under budget.

• Edwards AFB was the site of a NASA and FAA "Controlled Impact Demonstration" of a Boeing 720 jetliner to test safety features and a special antimisting fuel.

• Arnold Engineering Development Center, Arnold AFS, Tenn., conducted four test firings in support of Space Division's investigation into problems associated with the inertial upper stage (IUS) during the April 1983 STS-6 mission.

• AEDC also completed construction of the Air Force's new Aeropropulsion Systems Test Facility and is conducting activation testing of the complex's systems and subsystems to prepare for late 1985 operation. The ASTF will be used to test the complex propulsion systems being proposed and designed for advanced military aircraft.

• The flight-test program of the Peacekeeper missile continued at Vandenberg AFB, Calif. By the end of 1984, six launches had been completed, with the initial test flight in June 1983. The remaining fourteen launches are planned through 1987. ■

The first X-29 advanced technology demonstrator aircraft, featuring forward-swept wings, takes flight at Edwards AFB, Calif. AFSC teamed with Grumman Aeorspace Corp. and the Defense Advanced Research Projects Agency in developing and building two X-29 test-bed aircraft.

AIR FORCE SYSTEMS COMMAND

Headquarters, Andrews AFB, Md.

Air Training Command

NAME an institution of post-secondary school education that has 1,250 admissions offices.

Describe a school system that spans the globe.

What school's course catalog has more than 3,000 offerings?

Counting only landings and take-offs, can you think of a school that operates five of the fifteen busiest airports in the United States?

And, in an era of magazine articles, newspaper headlines, and radio and television commentary about problems in the nation's educational institutions, would you like to know about a gigantic school system—the largest in the free world—that claims it's never been better?

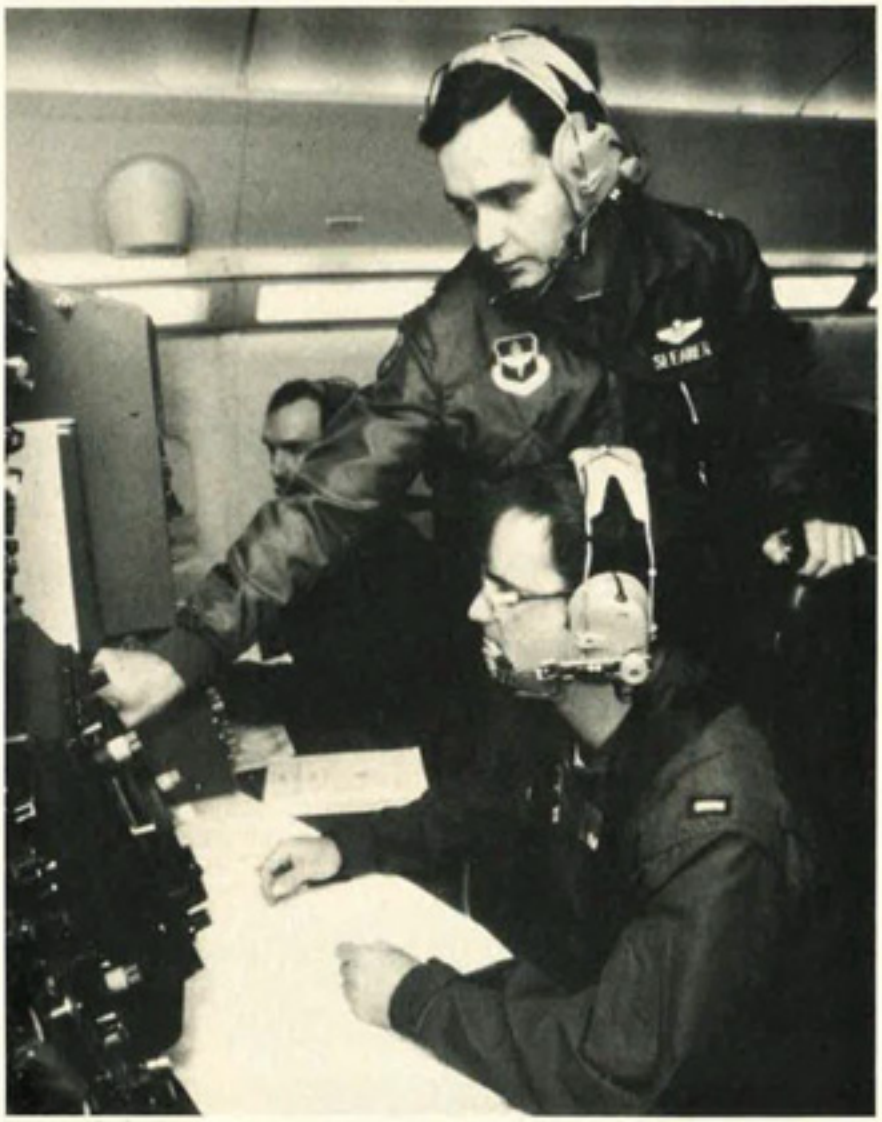
The answer is Air Training Command, where the tough questions about the ability of Air Force people to cope with the high-tech age of the microchip are being handled today for a better tomorrow.

ATC is "The First Command," responsible for the Air Force's most important resource—people. Specifically, ATC must recruit, train, motivate, and retain the numbers and kinds of military professionals to meet current and future Air Force mission requirements.

Headquartered near San Antonio at historic Randolph AFB, Tex., ATC is the world's largest training system, consisting of thirteen major installations, more than 85,000 people (permanent party military, civilian employees, and students), assets of approximately $4 billion, and an annual operating budget of nearly $3 billion.

The command includes six technical training centers, six undergraduate pilot training wings, one pilot instructor training wing, one basic and advanced navigator training wing, four survival training locations, a network of field training units at ninety-six locations worldwide, and 150 Air Force Reserve Officer Training Corps units at colleges and universities—among other things.

During the course of their careers, virtually every Air Force officer and enlisted member receives some type of ATC training. Approximately eighty-seven percent of officers are commissioned either through the AFROTC, headquartered at Maxwell AFB, Ala., or the Officer Training School at Lackland AFB, Tex.



An Air Training Command instructor navigator supervises a student on board a T-43 flight. Called "The First Command" in recognition of its recruiting and training function, ATC is the world's largest training system, touching virtually all USAF personnel.

More than 61,000 enlisted men and women, including Air National Guard and Air Force Reserve personnel, completed basic military training at Lackland AFB last year. Approximately ninety-five percent of enlisted members receive follow-on technical training from the ATC schoolhouse in nearly 350 technical skills. This technical training continues throughout their careers in the form of refresher, upgrade, and cross-training courses.

In all during 1984, the command's technical training centers and the USAF School of Health Care Sciences at Sheppard AFB, Tex., conducted more than 3,800 resident and nonresident courses that produced approximately 322,000 graduates, including 166,500 who attended field training courses at ATC's worldwide field training detachments.

ATC trained 2,305 pilots and 1,195

Recruiting: The Best Year Yet

For the United States Air Force Recruiting Service, with headquarters at Randolph AFB, Tex., 1984 was the best year in its thirty-year history.

Recruiting Service, whose commander also functions as Air Training Command's Deputy Chief of Staff for Recruiting, met or exceeded all of its recruiting goals, including the traditionally tough areas of engineer and medical doctor recruitment.

Almost 65,000 officers and airmen joined the Air Force in 1984. Of that number, 60,000 airmen enlisted without prior military service, and approximately 1,000 people with prior military service were recruited. College graduates entering Officer Training School at Lackland AFB, Tex., numbered 2,686, and 1,013 health-care professionals received direct commissions in the Air Force Medical Service. Another 346 received health professions scholarships.

The quality of these new officers and enlisted people coming into the Air Force in 1984 was excellent. Almost ninety-nine percent of the nonprior-service enlisteas were high school graduates, with fifty-one percent of them scoring in the top two mental categories on their qualifying tests. Twenty percent of those enlisting had fifteen or more hours of college credit. Those entering Officer Training School had a mean grade point average of 3.12.

During FY '85, recruiters will seek about 71,200 people in all programs to volunteer in today's high-technology Air Force.

Recruiting Service is composed of a headquarters staff, five recruiting groups, and thirty-five recruiting squadrons. Approximately 1,250 recruiting offices are staffed by some 1,600 recruiters assigned throughout the fifty states, Puerto Rico, and Guam. Because of the large number of military families living overseas, recruiters are also located in West Germany, England, and the Philippines.

About 400 new recruiters are needed each year to help meet Air Force personnel requirements. Career noncommissioned officers interested in learning more about this challenging duty should call CMSgt. Fred Negast, Recruit-the-Recruiter Team chief, AUTOVON 487-2812.

navigators, including 160 international pilots and seventy-six international navigators, in FY '84. Programmed flying training production for FY '85 is 2,060 pilots, 1,097 navigators, and 196 international pilots.

Air Force helicopter pilots are trained in association with the US Army at Fort Rucker, Ala. Another Undergraduate Pilot Training program, called Euro-NATO Joint Jet Pilot Training (ENJJPT), began in 1981 at Sheppard AFB and has trained 240 US and 238 non-US pilots. Programmed production for 1985 for the eleven allied nations involved with ATC's 80th Flying Training Wing is 234 pilots.

More than 360 women, trained as pilots and navigators in ATC flying training programs, are now serving on active duty. Some seventy more are currently in flying training.

In addition to nearly 1,200 Air Force graduates it trained, the 323d Flying Training Wing at Mather AFB, Calif., produced 217 US Navy and Marine Corps navigators in FY '84. More than 12,000 Air Force crew members received survival training during the year from the 3636th Combat Crew Training Wing, Fairchild AFB, Wash., and from the wing's squadron at Homestead AFB, Fla., and detachments at Nellis AFB, Nev., and Eielson AFB, Alaska.

The US Air Force Occupational Measurement Center at Randolph AFB operates the Air Force occupational analysis program, develops the Military Training Standard for all noncommissioned officers, and constructs all promotion tests administered to Air Force personnel as part of the Weighted Airmen Promotion System. The Center also includes the Training Development Service and the Training Technology Applications Program, which assist in training development efforts and application of new training technologies throughout the Air Force.

ATC's AFROTC program commissions approximately 3,200 graduates a year in 150 detachments at host institutions across the nation. Crosstown and consortium agreements make AFROTC available to students enrolled in 756 colleges and universities. AFROTC is the Air Force's primary commissioning source. Approximately 7,500 AFROTC cadets are on scholarship annually.

Also part of the ROTC program is Junior ROTC, which provides aerospace science education for approximately 40,000 students at 286 high

Aircraft Maintenance Specialist A1C Timothy Hicks finishes installing a T-38 nose gear at Reese AFB, Tex., home of the 64th Organizational Maintenance Squadron. One of ATC's most important tasks is the training of such specialists to keep USAF aircraft ready to fly and to fight.

schools in the United States, Europe, and Guam.

ATC's other commissioning program, OTS, provides a flexible source of new officer accessions. During FY '84, more than 2,500 officer candidates completed the twelve-week course and received commissions.

Another ATC organization at Maxwell AFB is the Community College of the Air Force. Although the administrative offices are there, CCAF "classrooms" are located on Air Force installations around the world. CCAF is an accredited institution of higher learning open only to enlisted members of the Air Force, the Air National Guard, and the Air Force Reserve. Since its founding in 1972, CCAF has awarded more than 33,000 degrees and grown to include more than 217,000 registered students.

Professional skills are not all that begin in ATC—professional will, the "warfighting spirit," begins there too. A motivational program vigorously promotes a sense of team spirit and pride in ATC people. The ATC logo, "Show the Way," headlines the program designed to "forge the first command attitude—patriotism and professionalism," an attitude ATC graduates will take to their next assignment and build upon throughout their careers.

Finally, in addition to training, ATC has a wartime combat mission. More than half the command's security police as well as a significant number of its engineers, medics, and maintenance and morale, welfare, and recreation personnel are committed to immediate deployment during contingencies and wartime.

Training is the peacetime investment the Air Force makes in its people to build wartime capability. The will, like the skill, to wage war must be developed to ensure national security. Building the foundation of patriotism and professionalism is but one of ATC's immediate major challenges. Another is keeping pace with the explosive rise in high technology for the future. But providing high-quality people for the Air Force will always be ATC's first priority. ■

AIR TRAINING COMMAND

Headquarters, Randolph AFB, Tex.

Commander
Gen. Andrew P. Iosue

Technical Training Center
Lowry AFB, Colo.

3400th Technical Training Wing
3320th Correction and Rehabilitation Squadron

Technical Training Center
Chanute AFB, Ill.

3300th Technical Training Wing

Technical Training Center
Keesler AFB, Miss.

3300th Technical Training Wing

Technical Training Center
Goodfellow AFB, Tex.

3480th Technical Training Wing

Community College of the Air Force*
Maxwell AFB, Ala.

Air Force Reserve Officer Training Corps*
Maxwell AFB, Ala.

Foreign Military Training Affairs Group
Randolph AFB, Tex.

Officer Training School, USAF
Lackland AFB, Tex.

San Antonio Contracting Center

San Antonio Real Property Maintenance Agency

Technical Training Center
Sheppard AFB, Tex.

3700th Technical Training Wing
3785th Field Training Wing
USAF School of Health Care Sciences

Air Force Military Training Center
Lackland AFB, Tex.

Basic Military Training School, USAF
3250th Technical Training Wing
Defense Language Institute English Language Center**

USAF Recruiting Service
Randolph AFB, Tex.

Recruiting Groups

3501st—Hanscom AFB, Mass.
3503d—Robins AFB, Ga.
3504th—Lackland AFB, Tex.
3505th—Chanute AFB, Ill.
3506th—Mather AFB, Calif.

ATC Specialized Direct Reporting Units

3302d Computer Services Squadron
Randolph AFB, Tex.
3303d Contracting Squadron
Randolph AFB, Tex.
3304th School Squadron (ATC NCO Academy)
Lackland AFB, Tex.
3305th School Squadron
Randolph AFB, Tex.
3306th Test and Evaluation Squadron*
Edwards AFB, Calif.
3307th Test and Evaluation Squadron
Randolph AFB, Tex.
3314th Management Engineering Squadron
Randolph AFB, Tex.
3507th Airman Classification Squadron
Lackland AFB, Tex.
3588th Flying Training Squadron
Fort Rucker, Ala.
USAF Occupational Measurement Center
Randolph AFB, Tex.
3308th Technical Training Squadron (Advisory)
Randolph AFB, Tex.
3309th Training Readiness Squadron
Randolph AFB, Tex.
USAF Instrument Flight Center
Randolph AFB, Tex.

Undergraduate Pilot Training

14th Flying Training Wing
Columbus AFB, Miss.

47th Flying Training Wing
Laughlin AFB, Tex.

64th Flying Training Wing
Reese AFB, Tex.

71st Flying Training Wing
Vance AFB, Okla.

80th Flying Training Wing
Sheppard AFB, Tex.

82d Flying Training Wing
Williams AFB, Ariz.

Navigator Training
323d Flying Training Wing
Mather AFB, Calif.

Pilot Instructor Training
12th Flying Training Wing
Randolph AFB, Tex.

3636th Combat Crew Training Wing* (Survival)

Eielson AFB, Alaska*
Nellis AFB, Nev.*
3612th Combat Crew Training Squadron*
(Fairchild AFB, Wash.)
3613th Combat Crew Training Squadron*
(Homestead AFB, Fla.)
3614th Combat Crew Training Squadron*
(Fairchild AFB, Wash.)

*Tenant unit
**DoD Executive Agent

Air University

Air University (AU), headquartered at Maxwell AFB, Ala., provides professional military education (PME) and degree-granting and continuing career education for officers, NCOs, and civilians.

Most of AU's PME schools are located at Maxwell AFB. These include Air War College (AWC) for senior officers, Air Command and Staff College (ACSC) for mid-career officers, and Squadron Officer School (SOS) for company-grade officers. The Air Force Senior Noncommissioned Officer Academy, the highest level of NCO PME, is located at nearby Gunter AFS.

Other major AU organizations include the Leadership and Management Development Center (LMDC); the Center for Aerospace Doctrine, Research, and Education (CADRE); the Educational Development Center (EDC); the Air University Library; and Headquarters Civil Air Patrol-USAF (all at Maxwell); the Extension Course Institute (ECI) and the Air Force Logistics Management Center at Gunter AFS; and the Air Force Institute of Technology (AFIT), located at Wright-Patterson AFB, Ohio.

Nearly 3,250 military and 1,640 civilian personnel are permanently assigned, while more than 11,125 military and civilians completed resident AU classes last year. Thousands more completed courses through nonresident seminar and correspondence programs.

AU, during its first year as a major command, continued to improve existing programs to meet the needs of tomorrow's Air Force leaders.

Construction began in earnest on the Air Force's first computerized wargaming center. Called the Command Readiness Exercise System, CRES will be operated by the Air Force Wargaming Center to provide sophisticated, real-world wargaming capability for educating officers and for testing new concepts, doctrines, and strategies. Late last year, the Air Force announced the awarding of a $14.2 million contract for computer hardware and software for the Center. CRES will be acquired in three incremental phases over the next five years.

ECI added a new course, "History of U.S. Air Power," to almost 400 extension education courses. This course contributes to the Project Warrior goal of fostering knowledge of military history and theory. Also, ECI began a resident course to train career development course writers by providing hands-on experience throughout course development and planning. During 1984, ECI had more than 344,000 enrollments.

The AU Air Force National Security Briefing Team completed its second successful year of increasing public awareness of key national security issues. The team presented 360 briefings in thirty-seven states.

The PME schools also continued their tradition of excellence. AWC's program for middle-grade officers, Combined Air Warfare Course, received high marks from supervisors. Credited with better preparing personnel assigned to combined, joint, and supporting commands, this course addresses the threat and US/allied command arrangements and employment capabilities. The capstone to the course is a computer-assisted theater war exercise.

ACSC hosted a two-day Latin American Symposium. Thirty military officers, career diplomats, and private

Students at Air War College plot strategy in a theater war exercise. The college is an element of USAF's Air University headquartered at Maxwell AFB, Ala. More than 11,125 military and civilian students completed AU resident courses last year, and construction began on the Command Readiness Exercise System (CRES), USAF's first computerized wargaming center.

citizens from fifteen countries attended. The AU text produced by ACSC, *Tongue and Quill: Communicating to Manage Tomorrow's Air Force*, became the new AFP 13-2.

SOS expanded class enrollments from 688 to 800, or approximately 4,000 officers a year; while the Senior NCO Academy dedicated the USAF Enlisted Heritage Hall and an AC-47 gunship to commemorate contributions of enlisted men and women.

LMDC continued its thrust to help enhance Air Force leadership. LMDC provided ninety-one research consultation services to units worldwide, working directly with all levels of Air Force leaders. Also, more than 3,800 students graduated from forty-three LMDC courses, six of which were new courses. Among the graduates were wing and base commanders, judges advocate, and maintenance officers.

One of EDC's three diverse functions, Academic Instructor School, reached a milestone when it became the first in the Air Force to implement a completely competency-based education program to enhance instructor preparation for varied teaching roles. EDC also manages the International Officer School and Air University Television.

AFIT, which celebrated its sixty-fifth anniversary, develops, conducts, and administers degree-granting, professional continuing education and special programs in scientific and technical engineering, systems and logistics management, civil engineering, medicine, and other fields. More than 27,000 Air Force, DoD, and international personnel will take part in AFIT programs in Fiscal Year 1985. Its Civilian Institutions program manages academic programs for more than 5,000 students at more than 300 colleges and universities worldwide. AFIT also conducts basic and applied research and provides technical and managerial consulting services to various Air Force and DoD agencies.

Last year also marked AU's first full year of volunteer assistance to local schools. Among its many achievements, MAXHELP succeeded in providing microcomputer orientation courses for more than 300 local teachers, summer computer camps for more than 100 children (many disadvantaged or learning-disabled), computer orientation for more than 1,000 Scouts, assistance to schools in selecting educational computers and software; and workshops for young adults in communication-skills development.

Other AU activities also had a good year. The *Air University Review*, the professional journal of the Air Force, won a first-place Blue Pencil Award. Published bimonthly in English and quarterly in Spanish and Portuguese, its English circulation is 28,000.

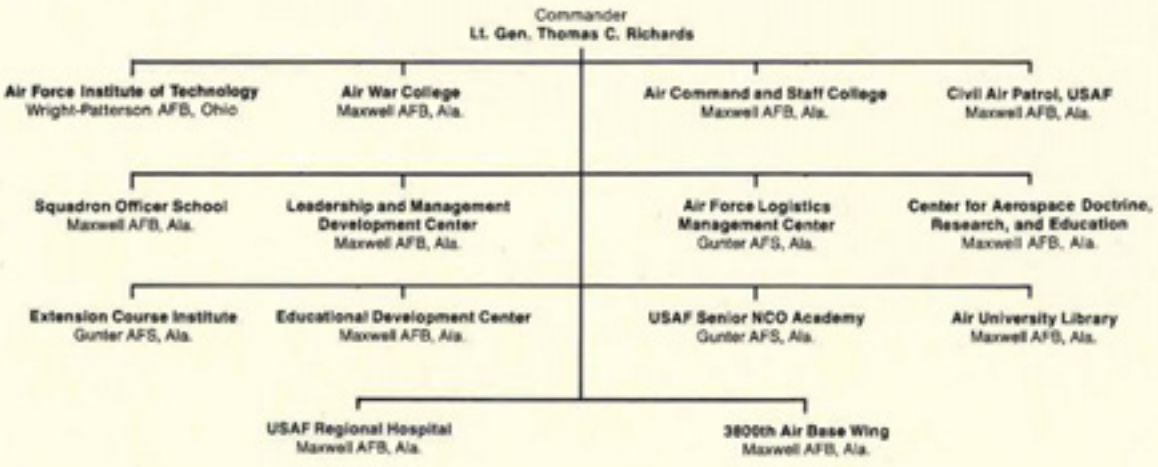
The AU Library completed a two-year, $6 million addition and renovation project, making it the largest military library in the free world. To improve its resources and services further, the library will implement the first stage of a $500,000 minicomputer-based Integrated Library System that will automate most research and circulation functions.

Also active under the AU umbrella is Headquarters CAP-USAF, the Air Force organization that advises and assists Civil Air Patrol. Its primary missions are emergency services, cadet programs and aerospace education, and training. Under CAP's "Operation Friendship," its members supported such organizations as SAC and NORAD. CAP-USAF has some 260 Air Force military and civilian personnel assigned throughout the US and Puerto Rico. ■

Civil Air Patrol Maj. Karl Townsend, right, shows senior CAP members how to use emergency transmitter locator directional-finding equipment. CAP comes under AU's umbrella.

AIR UNIVERSITY

Headquarters, Maxwell AFB, Ala.



Alaskan Air Command

ALASKA, with its 586,000 square miles, is not always a land of ice and snow, yet the harsh Arctic environment and the war against cold are factors the men and women of Alaskan Air Command (AAC) must contend with in fulfilling the command's motto of providing "Top Cover for America."

AAC is charged with providing early warning of an air attack on the US and Canada, guarding the sovereignty of US airspace, and providing air-to-ground support of Alaskan-based ground forces.

Responsibilities for AAC's vast area of operations lie with the 806 officers, 6,733 enlisted people, and 1,190 civilian employees of the command.

Alaska's military significance and strategic location have been recognized for many years. At no other place on the globe are the US and USSR closer together. The two land masses are separated by only forty-four nautical miles at the Bering Strait.

Alaska lies across the Great Circle routes connecting the Orient with Europe and North America, making Alaska an ideal location for deployment or refueling of aircraft flying polar routes.

The AAC commander also serves as commander, Alaskan North American Aerospace Defense Command Region. As the senior military officer in Alaska, he is the coordinating authority for all joint military administrative and logistical matters in Alaska and is the military point of contact for the state.

In the event of natural disaster, emergency, or when directed by the Joint Chiefs of Staff, the AAC commander becomes the commander, Joint Task Force-Alaska (JTF-AK).

In addition to numerous command post exercises, the JTF-AK concept of operations is field-tested every other year during Brim Frost, a major joint Arctic training exercise.

AAC people are assigned to three main bases and two forward operating bases. The main bases are Elmendorf AFB, adjacent to Anchorage; Eielson AFB, twenty-six miles southeast of Fairbanks; and Shemya AFB, near the tip of the Aleutian Islands chain. Galena and King Salmon Airports are forward operating bases that host alert F-15 Eagle aircraft from Elmendorf.

AAC is headquartered at Elmendorf AFB, home also of the 21st Tactical Fighter Wing and 21st Combat Support Group. Assigned to the 21st Tactical Fighter Wing are the 43d Tactical Fighter Squadron, flying F-15 Eagles, and the 5021st Tactical Operations Squadron, flying T-33 Shooting Stars.

Celebrating its fortieth anniversary, the 21st Tactical Fighter Wing earned its twelfth Air Force Outstanding Unit Award since 1966 during 1984. Aircraft and personnel from the wing deployed to Aggressor instructor course upgrade training, Copper Flag, Opportune Journey, and Red Flag exercises during the past year.

Alaskan Air Command F-15 Eagles patrol AAC's vast area of operations. Eye to eye with the Soviet Union, AAC is responsible for early warning of an air attack on North America, beating back any such attack, and supporting ground forces in Alaska.

while continuing intercept of several different types of Soviet aircraft in Alaskan airspace.

Eielson AFB is headquarters for the 343d Tactical Fighter Wing and 343d Combat Support Group. The Wing's 18th Tactical Fighter Squadron operates the command's A-10 Thunderbolt IIs, while the 25th Tactical Air Support Squadron flies O-2A forward air control aircraft.

In order to bring the 343d Wing in line with its mobility taskings, it was upgraded from a composite wing to a tactical fighter wing during ceremonies conducted on June 8, 1984. Aircraft, equipment, and personnel of the 343d deployed to Team Spirit (Korea), Opportune Journey (Hawaii), and Coronet Oiler (Norway) during 1984.

The 11th Tactical Control Group operates the Region Operations Control Center (ROCC) and the command's thirteen long-range radar sites. Modernization and innovation characterized the 11th TCG during 1984. This modernization of the thirty-year-old Alaskan Air Defense System was marked by radar system conversion and continued integration of the Joint Surveillance System (JSS) into the 11th TCG's ROCC.

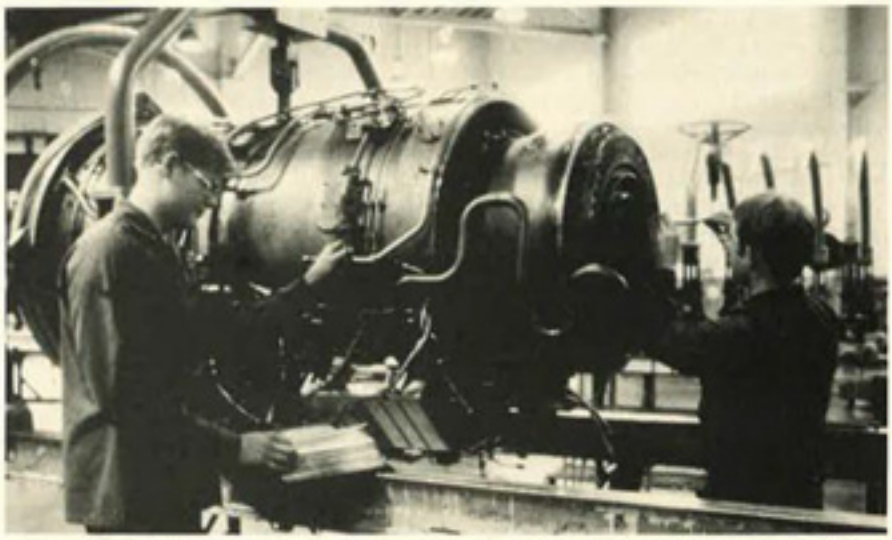
In the new JSS system, data from the 11th TCG's thirteen radar sites is received via satellite and displayed on consoles at the ROCC. F-15 fighters are directed by the ROCC to locations anywhere in Alaska by radios that are remoted over satellite.

The radar system modernization, called Seek Igloo, includes conversion to new solid-state, minimally attended radars, or MARs, and new facility construction at the remote sites. The thirteen long-range radar sites located along the western periphery and interior of the state are now maintained and operated by contractor personnel, saving the Air Force about $102 million annually compared to costs in the mid-1970s. Also, 1,500 blue-suit remote assignments have been totally eliminated as a result of these successful programs.

Under the Seek Igloo program in 1984, AAC successfully installed seven new MARs on schedule at Kotzebue, Galena, Fort Yukon, Indian Mountain, Tin City, Sparrevohn, and Cape Newenham. The combination of the JSS and Seek Igloo upgrade programs will save the Air Force more than $1 billion over the next twenty years.

To provide backup for current single-thread satellite communications, AAC successfully tested Meteor Burst communications technology. In addition to providing radar data from remote long-range radar sites, Meteor Burst communications can also be used to direct fighter intercepts.

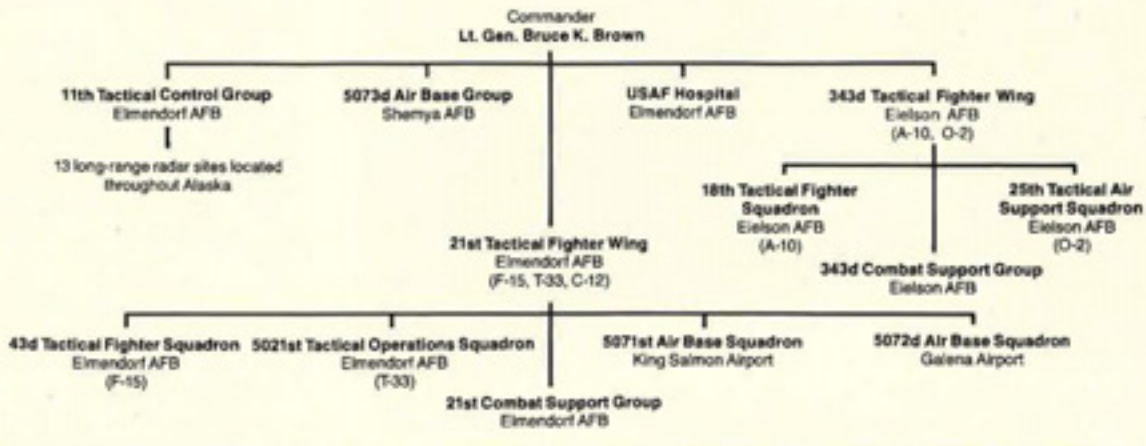
AAC operates the Elmendorf Rescue Coordination Center (RCC). The RCC coordinates search and rescue efforts involving aircraft and people from all military services in the state, plus many civil agencies. During 1984, the RCC coordinated emergency assistance for 114 military and civilian persons in distress and was credited with saving sixty-nine lives. Since its inception in October 1961, the RCC has recorded more than 3,798 saves and assisted more than 10,967 people. ■



A1C Randy Libsack and Amn. Todd Greenly of the 21st Component Repair Squadron work on an F100 engine at Elmendorf AFB, Alaska. For those who maintain and fly Elmendorf's F100-powered F-15 fighters, readiness is not an idle word.

ALASKAN AIR COMMAND

Headquarters, Elmendorf AFB, Alaska



Electronic Security Command

THE Electronic Security Command (ESC) is an Air Force major command with headquarters at Kelly AFB, Tex. Commanded by Maj. Gen. John B. Marks, the 13,250-member command provides all-source intelligence, electronic combat (EC), operations and communications security (OPSEC and COMSEC), and communications support. These specialized services are provided to the US Air Force and unified and specified commands for exercises, contingencies, and real-world events.

The command plays an important role in developing US Air Force electronic warfare (EW) and command control and communications countermeasures (C^3CM) capabilities, techniques, and systems. By providing C^3CM training to operational and support elements during exercises, ESC helps prepare the Air Force team for combat operations in a hostile electromagnetic environment. To help the tactical commander satisfy his C^3CM requirements, ESC develops, maintains, updates, and disseminates the Air Force C^3CM support data base—an all-source intelligence data base. The command also advises combat commanders of their electronic combat options.

In addition, ESC plays a vital role in developing ways to exploit, analyze, jam, confuse, or destroy the command control and communications systems of opposing forces. At the same time, it ensures that Air Force communications are protected from enemy exploitation.

ESC is made up of two centers, three wings, six groups, twenty-six squadrons, numerous operating detachments and locations, and five major command liaison staffs at locations around the world. Additional support is provided by mobile units and US Air Force Reserve mobilization augmentees. Ninety percent of ESC's people are enlisted, and the command has the highest percentage of women specialists in the Air Force.

Backdropped by Electronic Security Command's headquarters building at Kelly AFB, Tex., this dish antenna is part of a worldwide communications network linking all ESC units. ESC is a far-flung, electronically versatile major command.

Closely supporting efforts of ESC field units are the Air Force Electronic Warfare Center (AFEWC) and the Air Force Cryptologic Support Center (AFCSC). Both, although subordinate to the command, are also primary managers of Air Force-wide programs. AFEWC is a primary source of EW/C^3CM analysis and advice for the Air Force. Its members use high-speed computers to provide senior battle commanders with analytical reports on major exercises and on EW-systems effectiveness worldwide. They also perform analysis to support planning, developing, testing, and using the latest electronic warfare equipment.

Besides providing engineering and logistics support for all ESC operational mission activities, AFCSC is responsible for the Air Force communications security (COMSEC) program. In support of this mission, ESC COMSEC units monitor USAF radio and telephone communications to determine whether information of intelligence value is being exposed to enemy exploitation. They report their findings to USAF commanders, who can then take corrective action by changing mission plans to minimize the damage from such intelligence leaks.

AFCSC accounts for cryptographic documents, codes, call signs, and equipment that protect our communications systems, performs all necessary depot-level maintenance, and develops COMSEC multimedia education material for intraservice distribution.

Related to the COMSEC program but wider in scope is the operations security program (OPSEC). Early in 1982, Hq. USAF assigned ESC the responsibility for supporting the OPSEC programs of all major commands and strengthening the OPSEC education program for the entire USAF.

The command's mobile units deploy to support such major theater exercises as Team Spirit, Bright Star, Cold Fire, Red Flag, Central Enterprise, Brim Frost, Green Flag, and many others. During these exercises, ESC provides a hostile electronic war-

fare environment that US forces would encounter in actual combat—to include electronic disruption techniques through the use of mobile and self-contained jamming and deception vans.

Support to tactical and strategic commanders is given by ESC officers stationed at the headquarters of SAC, TAC, Space Command, USAFE, and PACAF. These staff officers are integrated into the commands they support and assist the commanders in their daily operations and planning.

Command units around the world are linked to the headquarters through the facilities of the twenty-four-hour alert center at Kelly AFB. This nerve center provides immediate guidance to its worldwide units.

Electronic Security Command activities have reaped great benefits for the United States by strengthening US defense. The success of ESC's mission continues to be dependent on the excellence of its people worldwide. ■

An electronic equipment van is loaded aboard a C-141 as part of an ESC unit deployment for a field exercise. Such mobile units create hostile electronic warfare conditions to test US forces' countervailing capabilities.

ELECTRONIC SECURITY COMMAND

Headquarters, San Antonio, Tex.

Commander
Maj. Gen. John B. Marks

Hq. 6940th Electronic Security Wing
Fort George G. Meade, Md.

6941st Electronic Security Squadron
Fort George G. Meade, Md.

6942d Electronic Security Squadron
Fort George G. Meade, Md.

6943d Electronic Security Squadron
Fort George G. Meade, Md.

6944th Electronic Security Squadron
Fort George G. Meade, Md.

6945th Electronic Security Squadron
Fort George G. Meade, Md.

6947th Electronic Security Squadron
Homestead AFB, Fla.

6994th Electronic Security Squadron
Fort George G. Meade, Md.

Hq. 6960th Electronic Security Wing
San Antonio, Tex.

6906th Electronic Security Squadron

6923d Support Squadron

6948th Electronic Security Squadron

6960th Security Police Squadron

6964th Computer Services Squadron

6993d Electronic Security Squadron

Hq. Electronic Security Alaska
Elmendorf AFB, Alaska

6981st Electronic Security Squadron
Elmendorf AFB, Alaska

6985th Electronic Security Squadron
Eielson AFB, Alaska

Hq. Electronic Security Strategic
Offutt AFB, Neb.

6949th Electronic Security Squadron
Offutt AFB, Neb.

Hq. Electronic Security Europe
Ramstein AB, Germany

Hq. 6910th Electronic Security Wing
Lindsey AS, Germany

6913th Electronic Security Squadron
Augsburg, Germany

6918th Electronic Security Squadron
Sembach AB, Germany

6911th Electronic Security Squadron
Hahn AB, Germany

6952d Electronic Security Squadron
RAF Alconbury, UK

Hq. 6912th Electronic Security Group
Tempelhof Airport, Berlin

6915th Electronic Security Squadron
Bad Aibling, Germany

6916th Electronic Security Squadron
Hellenikon AB, Greece

Hq. 6917th Electronic Security Group
San Vito AS, Italy

6931st Electronic Security Squadron
Iraklion AS, Crete, Greece

Hq. 6950th Electronic Security Group
RAF Chicksands, UK

6988th Electronic Security Squadron
RAF Mildenhall, UK

Hq. Electronic Security Pacific
Hickam AFB, Hawaii

Hq. 6903d Electronic Security Group
Osan AB, Korea

Hq. 6920th Electronic Security Group
Misawa AB, Japan

6922d Electronic Security Squadron
Clark AB, Philippines

6924th Electronic Security Squadron
Wheeler AFB, Hawaii

Hq. 6990th Electronic Security Group
Kadena AB, Japan

DIRECT REPORTING UNITS

Hq. Electronic Security Tactical
Langley AFB, Va.

Hq. Air Force Electronic Warfare Center
San Antonio, Tex.

Hq. Air Force Cryptologic Support Center
San Antonio, Tex.

Electronic Security Combat Operations Staff
San Antonio, Tex.

6962d Management Engineering Flight
San Antonio, Tex.

Military Airlift Command

A Military Airlift Command C-5 Galaxy delivers a UH-1 utility helicopter to US Army personnel. Wings of all MAC C-5s will have been strengthened by mid-1987, thus extending the lives of the aircraft well into the twenty-first century.

From headquarters at Scott AFB, Ill., the Military Airlift Command (MAC), a specified command of the Department of Defense and a major command of the Air Force, directs more than 93,000 active-duty military and civilians as well as more than 1,000 aircraft at more than 340 locations in twenty-six countries. MAC-gained ANG and AFRES assets comprise 63,000 people and approximately 390 aircraft.

MAC operates fourteen bases in the United States and controls US facilities at Lajes in Portugal's Azores and at Rhein-Main AB, West Germany. The command's inter- and intratheater airlift for Department of Defense units provides a key element of US deterrence posture. MAC's major missions include deployment, employment, and redeployment of combat forces and their support equipment and logistical resupply.

The command also serves as the executive agent for DoD airlift, moving more than 489,000 tons of cargo and more than 2,100,000 passengers in 1984.

MAC's active-duty airlift forces constitute about half of the capability available to the command under full mobilization. When mobilized, the Air Reserve Forces (ANG and AFRES) provide approximately sixty percent of tactical airlift capability. Reserve Associate units provide half of the aircrews and more than a third of the maintenance personnel for the C-141 and C-5 strategic airlift aircraft. Additionally, they provide forty-two percent of the aircrews and twenty percent of the maintenance personnel for the C-9 aeromedical airlift aircraft. Additional airlift is also available through the Civil Reserve Air Fleet (CRAF) program to meet contingency and wartime requirements.

The CRAF is a significant part of MAC's total airlift capability. The partnership between the civil aviation industry and Department of Defense began more than three decades ago to meet airlift requirements for contingencies or wartime. CRAF currently consists of twenty-five commercial carriers providing more than 300 cargo and passenger aircraft. Should CRAF be activated, these aircraft represent approximately one-half of the intertheater airlift capability available to DoD during times of crisis.

In a related effort to secure more airlift capability, the Air Force awarded a contract to Pan American World Airways to modify Boeing 747 passenger aircraft to have cargo features. The modification adds a cargo door and reinforced floor to existing passenger aircraft. The first aircraft entered the Boeing Wichita facility on February 1, 1985, and three more will enter the facility during this year. After modification, the planes will fly in a passenger configuration until needed by MAC. Nine aircraft are presently on contract, and the Air Force has options for ten more. The average cost for retrofit of each of the nineteen aircraft and for twelve years of increased operating expense is $26.7 million in Fiscal Year 1983 dollars. The addition of these nineteen aircraft will add another 2,900,000 ton-miles per day to our airlift capability.

Several other initiatives are also under way to enhance the posture of airlift forces. MAC placed three C-20 (Gulfstream III) aircraft into service to support the special airlift mission of the 89th Military Airlift Wing, Andrews AFB, Md. MAC plans to receive eight more C-20s in Fiscal 1987.

MAC's C-5 Galaxy fleet continued the wing modification started in 1983. Lockheed had delivered thirty-three modified aircraft to the command as of January 14 and plans to complete all C-5s by mid-1987. The modifications strengthen the wings of the C-5 fleet and will provide 30,000 flying hours of aircraft service life after modification. This program extends the life of the C-5 well into the twenty-first century.

To increase near-term airlift, the Air Force began acquisition of fifty C-5B aircraft for MAC and forty-four more KC-10 aircraft for SAC. MAC expects delivery of the first C-5B aircraft in December.

Responding to congressional direction and the Air Force plan to transfer additional strategic airlift assets to the Air Reserve Forces (ARF), MAC will begin transferring C-5As to the Air Force Reserve and the Air National Guard in July. The 433d Tactical Airlift Wing at Kelly AFB, Tex., is the lead unit for the Reserve, and the 105th Military Airlift Group at Stewart International Airport, N. Y., is the first for the Guard. Ultimately, MAC plans to transfer forty-four C-5s to the ARF.

The Air Force currently is awaiting a decision from the Defense Systems Acquisition Review Council on fund-

ing for full-scale engineering and development of the C-17 aircraft. The C-17 will increase MAC's long-range airlift capability, provide an outsize intratheater airlift capability, and serve as a replacement for some of the aging C-141 intertheater aircraft and the intratheater capability lost as MAC retires its older, less maintainable C-130s. If approved, McDonnell Douglas Aircraft Co. should produce the first C-17 aircraft in 1989.

In addition to its airlift mission, which is managed by the Twenty-first Air Force, McGuire AFB, N. J., and Twenty-second Air Force, Travis AFB, Calif., MAC is responsible for a number of other demanding missions.

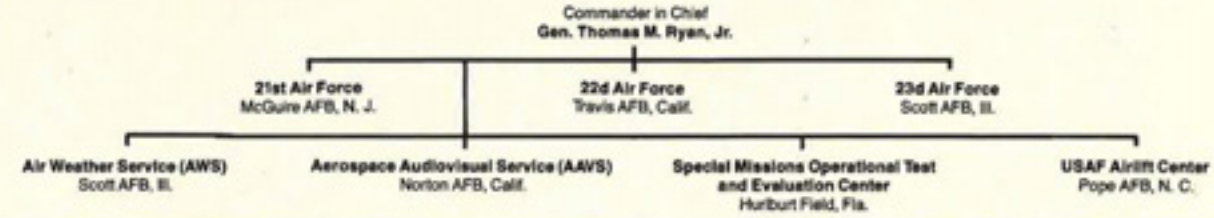
Twenty-third Air Force is MAC's only numbered Air Force with worldwide responsibility. From Scott AFB, it commands all Air Force special operations forces (SOF), combat rescue and recovery forces, and weather reconnaissance aircraft. The Twenty-third Air Force also commands CONUS aeromedical evacuation and operational support airlift forces and helicopter security support for SAC missile sites; supports air sampling, drone recovery, and the Space Shuttle; and is responsible for coordinating federal search and rescue activities in the CONUS. ANG and AFRES forces significantly augment the diverse mission of the Twenty-third Air Force.

Special operations include unconventional warfare, collective security, counterterrorist operations, psychological operations, and civil affairs measures. SOF units fly MC-130 and AC-130 fixed-wing aircraft and UH-1N and HH-53 helicopters. Beginning in 1987, special operations forces will receive the first delivery of twenty-one new MC-130 aircraft to augment the current force and enhance operational capability and deployment flexibility. Additionally, AFRES operates AC-130A and CH-3 SOF aircraft, and the ANG flies EC-130s.

Combat rescue units of the Twenty-third Air Force operate the HH-1H, UH-1N, UH-60A, CH/HH-3E, and HH-53B/C helicopters and the HC-130 fixed-wing aircraft to recover downed crew members in peacetime and wartime. The HH-60A Night Hawk, specifically designed for combat rescue, completed airframe performance and characteristic testing and is undergoing avionics modifications. Upon completion of these modifications in July, initial operational test and evaluation of the HH-60A will begin. MAC expects deliveries of this next-generation rescue helicopter in 1988.

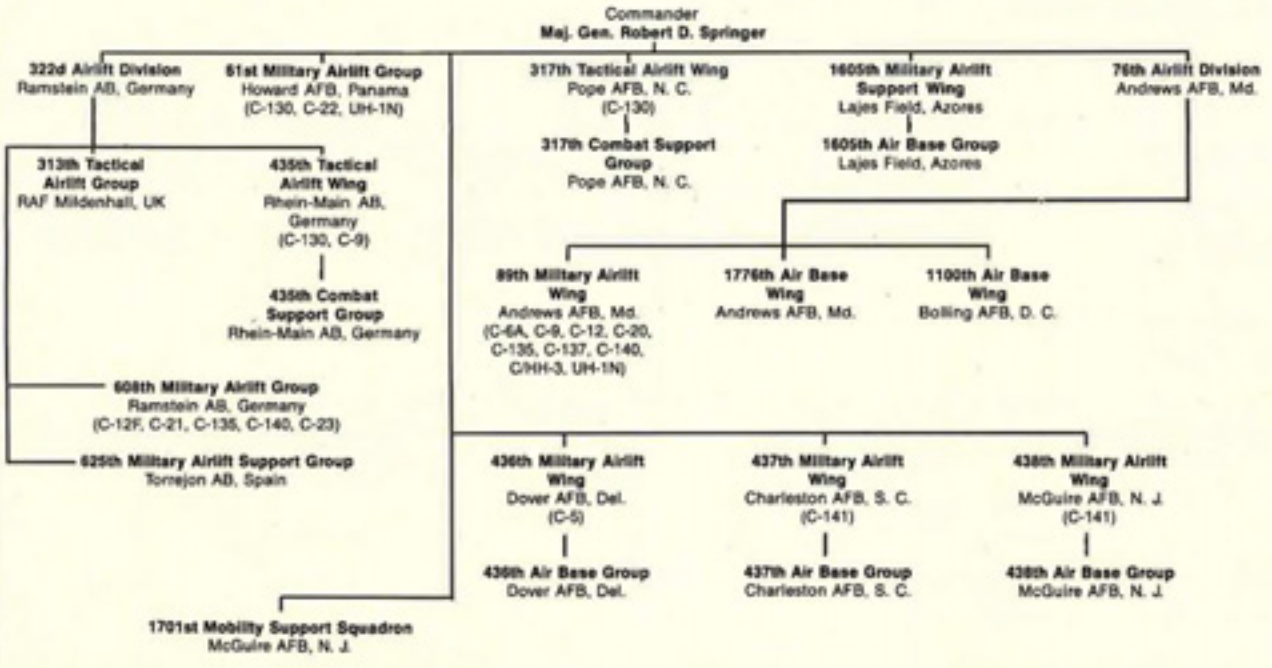
MILITARY AIRLIFT COMMAND

Headquarters, Scott AFB, Ill.



TWENTY-FIRST AIR FORCE (MAC)

Headquarters, McGuire AFB, N. J.



The Twenty-third Air Force weather reconnaissance units fly the WC-130 and WC-135 aircraft, providing MAC's Air Weather Service the aerial platforms it needs to perform its mission.

Aerospace Rescue and Recovery Service, an element of the Twenty-third Air Force, is the executive management agency for search and rescue (SAR) within the forty-eight continental United States. ARRS operates the Air Force Rescue Coordination Center (AFRCC) at Scott AFB to provide humanitarian assistance by coordinating all inland SAR using USAF Rescue, Civil Air Patrol, and other military and federal assets. The AFRCC works closely with state and local agencies and solicits services of police and sheriff departments as well as the US Coast Guard. Rescue forces saved more than 21,000 lives during the past thirty-nine years.

ARRS also operates the US Mission Control Center for the Search and Rescue Satellite-Aided Tracking (SARSAT) system. The United States joined several other nations in using low-orbit satellites to "listen" for distress signals from aircraft and ships. SARSAT began as an experiment in 1982 and is now an operational program that greatly assists in locating emergency transmitter signals coming from various points on the globe. Worldwide, SARSAT information helped save more than 340 lives.

Aeromedical airlift is another vital MAC mission. The C-9 Nightingale "air ambulances" of the Twenty-third Air Force's 375th Aeromedical Airlift Wing tie into the MAC airlift system to move thousands of patients to medical facilities all over the world. In Fiscal Year 1984, MAC aircrews and 375th AAW nurses and medical technicians provided aeromedical evacuation for more than 18,000 airmen, 12,000 sailors, 8,000 soldiers, 17,000 dependents of active-duty military members, 21,000 retired personnel

US Army troops board a MAC C-141 StarLifter capable of carrying 200 fully equipped combat soldiers. Like the C-5, the C-141 is a strategic airlifter serving MAC's major missions of deployment, employment, and redeployment of combat forces and their supporting equipment, plus logistical resupply. MAC is a USAF major command and a DoD specified command.

TWENTY-SECOND AIR FORCE (MAC)

Headquarters, Travis AFB, Calif.

Commander
Maj. Gen. Donald D. Brown

- **834th Airlift Division**, Hickam AFB, Hawaii
  - **374th Tactical Airlift Wing**, Clark AB, Philippines (C-130, C-9, C-12F)
    - **316th Tactical Airlift Group**, Yokota AB, Japan (C-130)
- **60th Military Airlift Wing**, Travis AFB, Calif. (C-5, C-141)
  - **60th Air Base Group**, Travis AFB, Calif.
- **62d Military Airlift Wing**, McChord AFB, Wash. (C-130, C-141)
  - **62d Air Base Group**, McChord AFB, Wash.
- **63d Military Airlift Wing**, Norton AFB, Calif. (C-141)
  - **63d Air Base Group**, Norton AFB, Calif.
- **314th Tactical Airlift Wing**, Little Rock AFB, Ark. (C-130)
  - **34th Tactical Airlift Training Group**, Little Rock AFB, Ark.
  - **314th Combat Support Group**, Little Rock AFB, Ark.
- **443d Military Airlift Wing, Training**, Altus AFB, Okla. (C-5, C-141)
  - **443d Air Base Group**, Altus AFB, Okla.
- **463d Tactical Airlift Wing**, Dyess AFB, Tex. (C-130)
- **616th Military Airlift Group**, Elmendorf AFB, Alaska (C-130)
- **1702d Mobility Support Squadron**, Travis AFB, Calif.

and their dependents, and 1,000 others (civilians, foreign nationals, etc.). In all, MAC transported 79,177 patients—a three percent increase over 1983—on a total of 4,485 C-5, C-9, C-130, C-141, C-21, and C-12F aeromedical evacuation missions.

The 375th AAW also manages the operational support airlift fleet, which in 1984 carried more than 77,000 passengers on time-sensitive government missions. During 1984, C-21 and C-12F aircraft began replacing the CT-39 fleet. MAC will phase out all CT-39s from its inventory by the end of 1985.

The newly developed European Distribution System will operate eighteen C-23 Sherpa aircraft from Zweibrücken AB, Germany, to provide dedicated airlift of critical spare parts for Air Force weapon systems in Europe.

With initial operational capability of this twin-engine turboprop aircraft scheduled for March 1985, MAC expects all C-23s to be in place by the middle of October 1985.

Another airlift unit, the 89th Military Airlift Wing, uses a variety of aircraft to provide airlift for the President, other US government officials, and foreign dignitaries.

The Air Weather Service (AWS), a technical service of MAC with headquarters at Scott AFB, provides staff and operational weather support to active, Guard, and Reserve Air Force and Army units, unified and specified commands, and other agencies as directed. Air Weather Service has more than 4,800 military and civilian personnel serving in more than 270 worldwide locations.

Weather support includes various combinations of scientific, technical, and advisory activities to acquire, produce, and supply information on the past, present, and future state of space, atmospheric, oceanographic, and terrestrial surroundings for use in military planning and decision-making.

During contingencies and wartime, weather support is a vital part of the decision process in the use of air and ground forces. Peacetime weather support is essential for protection of military personnel and national resources from severe weather, for safe and efficient air and ground operations, for realistic and productive training exercises, and for research and development of effective weapon systems.

With Twenty-third Air Force, AWS provides critical tropical storm surveillance through aerial weather reconnaissance. AWS also uses a series of satellite and ground-based facilities to observe, forecast, and provide information on hazards resulting from solar activity. The space program needs this information to ensure the safety of man's activities in space as well as to measure and predict the effect of solar activity on surveillance and warning systems, satellite tracking systems, and communications.

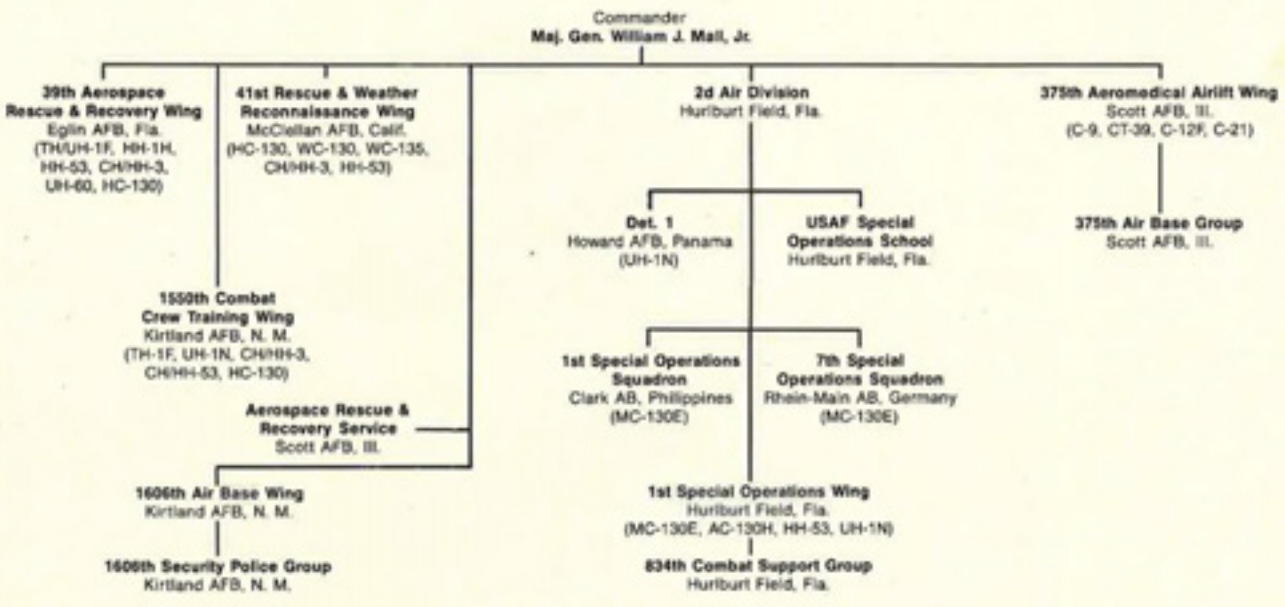
MAC's other technical service, the Aerospace Audiovisual Service (AAVS) headquartered at Norton AFB, Calif., is the Air Force's single management agency for audiovisual documentation of combat, operational, and humanitarian activities. AAVS operates five squadrons and fifty-two detachments and operating locations around the world. These units provide motion picture, television, and still photographic coverage for all Air Force activities. In addition, AAVS produces video, motion picture, and still photographic training products, provides optical instrumentation and technical documentation of Air Force space, missile, and other weapon systems, and manages base audiovisual service centers and regional audiovisual libraries.

"The ability of the United States to deter aggression, limit conflict, or successfully wage war depends on our country's ability to rapidly deploy and sustain fighting units. A combat unit—no matter how well-trained and equipped—cannot influence the outcome of a conflict or preclude one unless its firepower is available within the battle area in the most timely manner," says Gen. Thomas M. Ryan, Jr., MAC Commander in Chief.

The worldwide MAC mission is an integral part of our nation's defense posture. Because of its ability to project American muscle anywhere in the world on short notice, MAC is known as "The Backbone of Deterrence." ■

TWENTY-THIRD AIR FORCE (MAC)

Headquarters, Scott AFB, Ill.



Pacific Air Forces

PACIFIC Air Forces (PACAF) continues its push to increase readiness and improve the quality of life in an area of growing strategic, economic, and political importance. PACAF acquired the US Air Force's first ground-based air defense capability, opened a new operations control center, activated a new tactical fighter wing, and compiled a number of significant "milestones" in 1984.

Gen. Robert W. Bazley became Commander in Chief of PACAF, the principal air arm of the US Pacific Command, in September 1984. Under his direction, PACAF maintains security and defends US interests in an area extending from the west coast of the US to the east coast of Africa and from the Arctic to the Antarctic—more than half the earth's surface and home for 2,000,000,000 people living under more than three dozen flags.

Over the past decade, the Soviets have completely modernized their Far Eastern airpower. They have replaced virtually their entire fighter inventory with third-generation aircraft and assigned some eighty Backfire bombers. Major Soviet Far East forces include forty ground divisions, about 1,800 fighter aircraft, and some 350 bombers. They also have approximately 800 ships and submarines. Some of these ships operate from Cam Ranh Bay, along with Badger, Bear, and Flogger aircraft.

The PACAF tactical air team includes about 300 aircraft. Among them are F-15s, F-16s, F-4s, A-10s, RF-4s, F-5s, and OV-10s. In spring 1985, the first maintenance training aircraft for a new F-16 wing at Misawa AB, Japan, will arrive. The F-16s that will constitute the first USAF fighter squadron of the new wing at Misawa began arriving in July 1984.

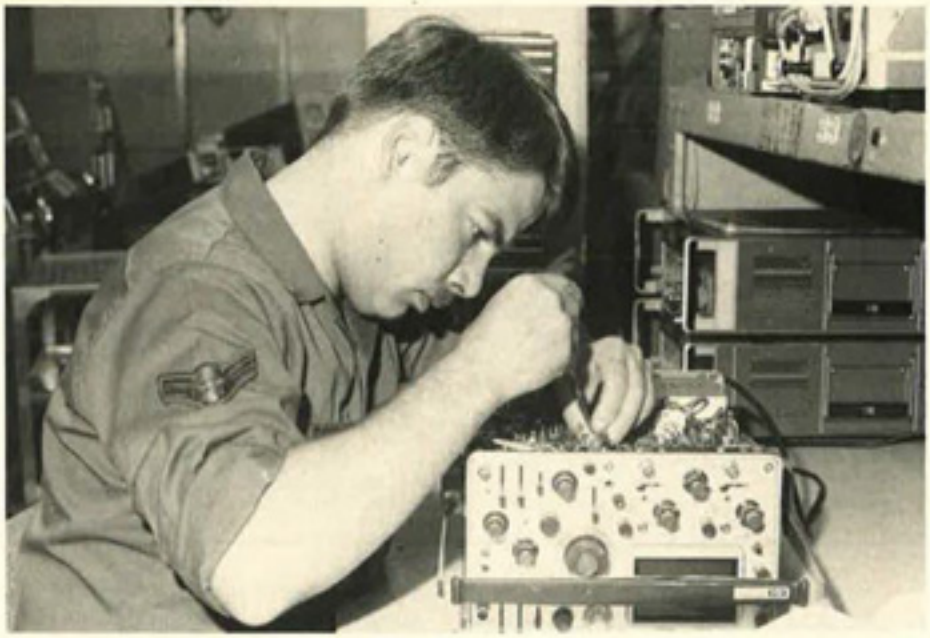
The arrival of these F-16s will be another chapter in the ongoing effort to upgrade US capabilities in the Pacific. In 1984, this modernization extended to the Military Airlift Command, which replaced the CT-39 with the C-12F at Clark AB, the Philippines, and Kadena AB, Japan, and added the C-12F to Osan AB, Korea. Two C-21A aircraft were added at Yokota AB, Japan, in January 1985.

PACAF's intensive training and evaluation programs remain key ingredients in maintaining a high level of readiness. PACAF units flew in some seventy major exercises, ninety percent of which were conducted with another US service. Seventy percent were conducted with the military forces of other nations. PACAF exercised several times during the past year in maritime operations with the US Navy. Exercise and training highlights include Team Spirit, Cope Thunder, and Cope North.

Team Spirit '85, the free world's largest joint combined training exercise with more than 200,000 participants, was held in the Republic of Korea during February and March. This annual exercise demonstrates PACAF's ability to augment assigned forces rapidly and to integrate combat operations with other US and Republic of Korea forces.

Cope Thunder, held seven times a year in the Republic of the Philippines, gives aircrew members realistic tactical air warfare training with other services and other countries. The scenarios test their air-to-air and air-to-ground skills against simulated enemy ground defenses and "aggressor" aircraft. For the first time, a Theater Force Employment Exercise was conducted during a Cope

F-16s of the 80th Tactical Fighter Squadron, Kunsan AB, Korea, form up during a Pacific Air Forces (PACAF) exercise. Last June, Kunsan AB and Osan AB, Korea, became the first USAF bases to operate the Stinger surface-to-air missile system. At the same time, PACAF opened a new operations control center at Wheeler AFB, Hawaii. In July, F-16s began arriving at Misawa AB, Japan, for the newly activated fighter wing there. PACAF defends US interests over more than half the earth's surface. Its tactical air team is composed of about 300 aircraft.



A1C C. P. Porter repairs an oscilloscope at Osan AB's Precision Measurement Equipment Laboratory. Streamlining of logistics operations has drastically cut the time it takes PACAF to get and install spare parts. Quality-of-life improvements have been instrumental in achieving a fifty percent reduction of shortages in PACAF career maintenance specialties since 1980. Pilot retention has also soared. Upgrading of PACAF living and working quarters is continuing apace this year.

Thunder. This exercise initiative served to demonstrate PACAF's ability to conduct mass air strikes against several target arrays with multiwing-size strike forces. Approximately 200 aircraft from PACAF, SAC, and MAC were involved.

Adding cement to the US-Japan relationship, Cope North is an air defense exercise held several times annually with the Japanese Air Self-Defense Force.

In June 1984, PACAF significantly enhanced its base defense capability when airmen at Osan and Kunsan ABs, Korea, became the first in the US Air Force to operate the Stinger surface-to-air missile system.

In the same month, the Hawaii Region Operations Control Center (HIROCC) became operational at Wheeler AFB, Hawaii. HIROCC provides primary command and control for air defense of the Hawaiian Islands and is one of only eight such facilities located in the US and Canada.

At Kadena AB, Japan, the Air Force Logistics Command activated the Support Center Pacific (SCP), collocated with the PACAF Logistics Support Center (PLSC). The SCP adds a depot-level maintenance capability at the site of PACAF's centralized intermediate-level maintenance. The result has been a significant reduction of pipeline transient time from CONUS sources of repair and an overall improvement of critical-part availability for PACAF weapon systems. The SCP's mission is to improve PACAF readiness through the expedient repair of critical aircraft components.

Clark AB's 26th Aggressor Squadron reached a milestone by recording 20,000 accident-free flying hours in the F-5 over a period of seven years.

Overall, the command's front-line fighter/reconnaissance force set an all-time high mission-capable rate in Fiscal Year 1984 that was almost a ten percent increase over the 1983 rate.

To ensure that these trends continue, PACAF continues to make improvements to sustain and enhance the command's operational capability. In 1984, PACAF became the first major air command to have all its bases certified for aircraft surge launch and recovery (ASLAR) approaches. Using ASLAR procedures, air traffic controllers are capable of recovering up to ninety aircraft per hour.

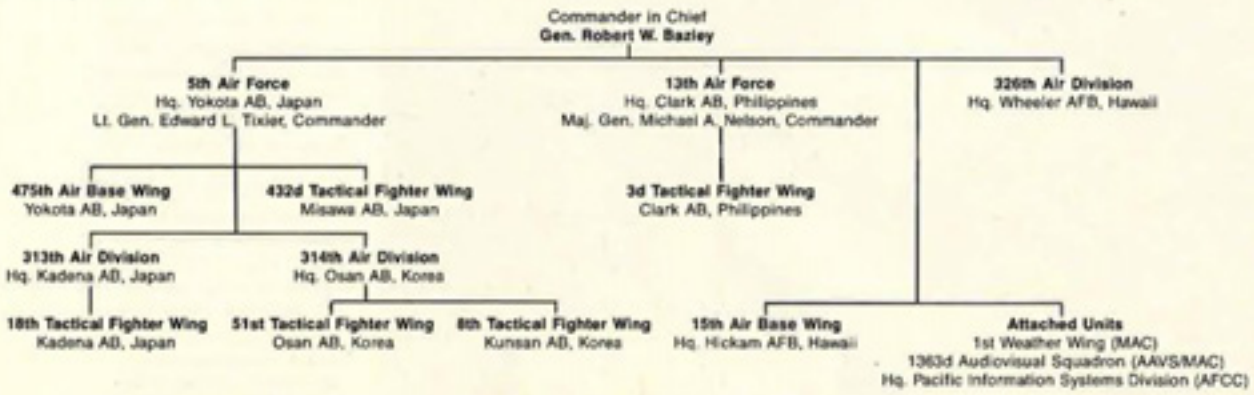
The largest project on the horizon for PACAF is the beddown of the F-16s at Misawa AB in mid-1985. Phases I and II of the construction project to support the new aircraft are under way. The F-16s will significantly improve the military balance in the Far

The Major Units of Pacific Air Forces (PACAF)

Unit	Location	Aircraft
326th Air Division	Wheeler AFB, Hawaii	OV-10
15th Air Base Wing	Hickam AFB, Hawaii	EC-135, T-33 (+ ANG F-4C)
Fifth Air Force, Hq. Yokota AB, Japan		
314th Air Division	Osan AB, Republic of Korea	
8th Tactical Fighter Wing	Kunsan AB, Republic of Korea	F-16
51st Tactical Fighter Wing	Osan AB, Republic of Korea	F-4E C-12, HH-3 (MAC)
5th Tactical Control Group	Osan AB, Republic of Korea	OA-37
497th Tactical Fighter Squadron	Taegu AB, Republic of Korea	F-4E
25th Tactical Fighter Squadron	Suwon AB, Republic of Korea	A-10
313th Air Division	Kadena AB, Japan	
18th Tactical Fighter Wing	Kadena AB, Japan	F-15, RF-4C E-3A (TAC) C-12 (MAC)
475th Air Base Wing	Yokota AB, Japan	UH-1 C-21 (MAC)
432d Tactical Fighter Wing	Misawa AB, Japan	F-16
6171st Air Base Squadron	Kwangju AB, Republic of Korea	
Thirteenth Air Force, Hq. Clark AB, Republic of the Philippines		
3d Tactical Fighter Wing	Clark AB, Republic of the Philippines	F-4E, F-4G, F-5E, T-33, C-12, C-130, MC-130, HH-3 (MAC)

PACIFIC AIR FORCES

Headquarters, Hickam AFB, Hawaii



East, where the US and its allies face the fastest growing air threat in the world.

The emphasis being placed on PACAF is reflected in the military construction program (MCP) budgets for Fiscal Years 1984 and 1985. In FY '84, $117 million was funded. About $119.6 million was approved by Congress for the FY '85 MCP.

Several major projects budgeted in previous fiscal-year MCPs were completed in 1984. Some of the more notable construction projects improving the quality of life in PACAF included the completion of four 200-bed enlisted dormitories and two Child-Care Centers in Japan and Korea.

A new commissary at Clark AB and the construction of a new middle school and high school at Misawa AB were some of the other major building projects that were finished. About $7.3 million in operations and maintenance funds were spent to upgrade furniture and equipment in unaccompanied housing as well as in dining facilities.

In the last three years, forty-six morale, welfare, and recreation projects have been completed, with a value of $11 million. Included are nineteen recreation centers/sports facilities, thirteen open messes, and fourteen miscellaneous facilities (libraries, youth centers, etc.).

In 1985, PACAF will get a new airmen's dining facility and flight-line dining facility, while five more are to be upgraded. Four more 200-bed dorms, two eighty-man officer dorms, and a Child-Care Center will also be built. Nine more dorms will be upgraded. Overall, $20 million in requirements for the upgrade of dormitory furnishings and equipment has been identified.

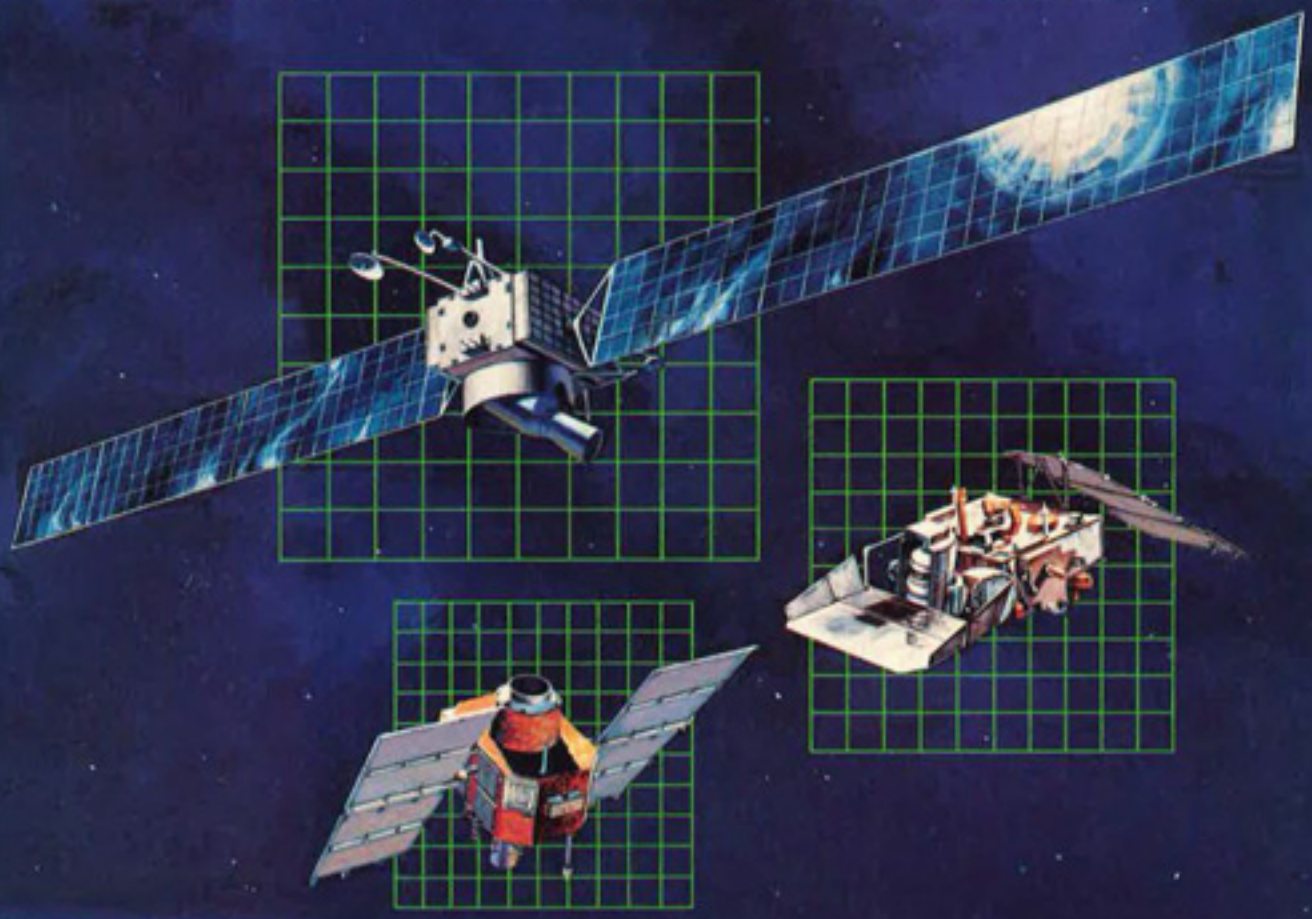
As PACAF's quality of life has improved, so has the quality of command personnel strengths. Shortages of people in critical maintenance career fields have nearly been cut in half since 1980 in spite of a growing requirement.

Pilot retention rates jumped from sixty-nine percent in 1980 to eighty-six percent in 1984. PACAF currently has 27,724 military people and 9,361 civilians assigned.

As the 1990s approach, many of America's major challenges will be centered in the Pacific basin. PACAF forces there have the best training, leadership, and modern equipment to meet the challenge. ■

F-4 Phantoms of the 3d Tactical Fighter Squadron get ready to go at Clark AB, Republic of the Philippines. Last year, PACAF's front-line fighter/reconnaissance force set a record-high mission-capable rate that marked a ten percent improvement over the 1983 rate. In keeping with their rigorous readiness requirements, PACAF units flew in some seventy major exercises in 1984, nearly three-fourths of them with military forces of other nations.

Tracking the Surveillance Leader



If you're tracking the latest developments in space surveillance technology, then you're tracking the space surveillance leader, Rockwell International.

For over a decade under government contracts, we've been the pathfinder on the technology trail to the next generation of strategic space based surveillance systems. At every opportunity, from concept through production, we've delivered sensors and spacecraft with advances such as these:

- **First charge-coupled device mosaic sensors to track satellites in real time (Teal Amber).**
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- **First Mercury-Cadmium-Telluride detectors for an operational space program.**

Through these accomplishments and many more, we've laid the groundwork necessary for the next generation of strategic space based surveillance programs. We recognize their importance, and we've been preparing for some time the approaches that will make them the space success stories of tomorrow.

For space surveillance sensorcraft™ that blaze new trails, keep on tracking the space surveillance leader, Rockwell International, Satellite Systems Division.

Rockwell International

...where science gets down to business

Space Command

AIR Force Space Command (SPACECMD), established in September 1982, is the major command focal point for the strategic aerospace defense mission area and for the management of Air Force space systems as they pass from the development stage to the operational arena. The command's motto, "Guardians of the High Frontier," reflects the sense of purpose with which the military has traditionally protected our dynamic nation. That same sense of purpose is the hallmark of Space Command as the Air Force prepares to meet the challenges of the new frontier.

The Space Command mission is to manage and operate assigned space assets, centralize planning, consolidate requirements, provide operational advocacy, and ensure a close interface between research and development activities and operational users of Air Force space programs. Space Command is the major command responsible for the aerospace defense mission area, managing and operating assigned assets in support of the North American Aerospace Defense Command (NORAD), a binational command consisting of US and Canadian forces, and the Aerospace Defense Command (ADCOM), a US specified command.

Space Command assumed DoD responsibilities for manned spaceflight contingency support operations. This means that Space Command manages and trains people to support Shuttle contingencies, such as an early deorbit requirement at any of several worldwide recovery bases.

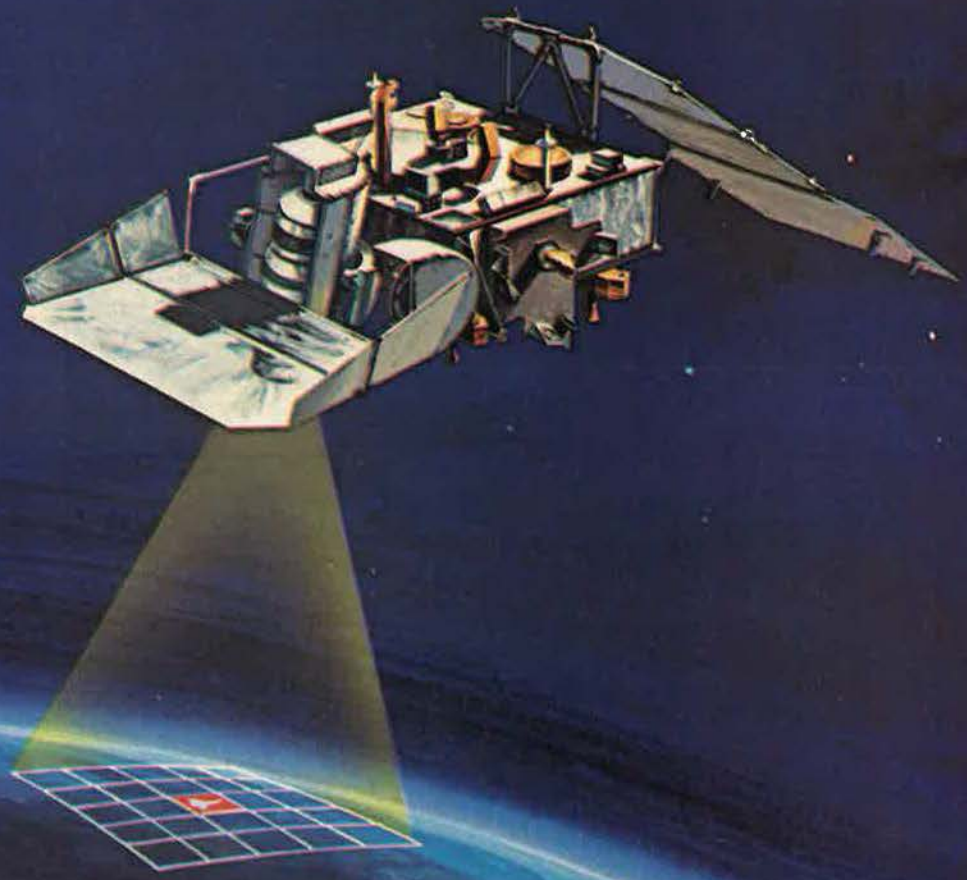
The Commander of Space Command serves as CINCNORAD and as CINCAD. The Vice Commander of Space Command is the Commander of the Air Force Systems Command's (AFSC) Space Division, located at Los Angeles AFS, Calif.

There are approximately 6,200 Air Force military and civilian personnel and about 2,000 contractors worldwide assigned to Space Command. The command has three bases: Peterson AFB, Colo., and Thule and Sondrestrom ABs in Greenland, and four Air Force stations: Clear AFS, Alaska, Cavalier AFS, N. D., Falcon AFS, Colo., and Cape Cod AFS, Mass.

- The 1st Space Wing was established on January 1, 1983, at Peterson AFB to manage the operational satellite systems and the worldwide ground-based sensor network. Together, these sensors continuously monitor strategic ballistic missile and space launch sites as well as provide more than 20,000 space observations a day for satellite tracking to the Space Defense Operations Center in the Cheyenne Mountain Complex. The 1st Space Wing is responsible for the operational readiness of all assigned assets, to include administration, training, standardization, and evaluation functions.
- The Space Communications Division, one of seven divisions under Hq. Air Force Communications Command, supports the communications needs and air traffic control services of Space Command and NORAD. The Division, with fifteen subordinate units and more than 1,500 personnel located worldwide, operates and maintains communications-electronics systems for space surveillance and missile warning and also selected data-processing equipment for the Cheyenne Mountain Complex. The Commander, Space Communications Division, is dual-hatted as the Deputy Chief of Staff, Communications, Electronics, and Computer Resources, on the Space Command staff.
- The 4th Weather Wing, a Military Airlift Command unit, manages the twenty-two worldwide solar observatories and weather detachments that provide a full range of weather services to Space Command.
- Two operational satellite systems, the Satellite Early Warning System and the Defense Meteorological Satellite Program, are assigned with associated ground control and tracking networks to Space Command. The command will also operate and manage two satellite systems currently under development—the DoD navigational satellite system called the Global Positioning System (GPS) and Milstar, the next-generation strategic and tactical military satellite communications system.
- Space Command operates twenty-two worldwide space surveillance and missile warning units that include both radar and optical sensors. During 1984, ground was broken for two new radar sites, Pave Paws Southeast at Robins AFB, Ga., and Pave Paws Southwest at Goodfellow AFB, Tex. These two new sites will incorporate the latest phased-array radar technology to provide significantly improved detection and tracking capability for submarine-launched ballistic missiles.
- The three space defense tasks—satellite surveillance, satellite protection, and satellite negation—will be

This Tactical Operations Room at Space Command's Ballistic Missile Early Warning System radar site, Clear AFS, Alaska, is typical of such SPACECMD installations worldwide. The command is responsible for strategic aerospace defense and for managing US space systems that have made the transition from development to operation.

Tracking the Sensor Innovator



If you're tracking the latest developments in space surveillance technology, then you're tracking the sensor innovator, Rockwell International.

For over a decade under government contracts, we've been the pathfinder on the technology trail to the next generation of strategic space based surveillance systems. The results include our Teal Ruby sensorcraft.™ Teal Ruby is the most sensitive, most complex proof-of-concept system ever designed, built, and verified through thermal vacuum radiometric test, with advances such as these:

- Mass production of charge-coupled device infrared mosaic detectors.
- Ultralight telescope, with the largest infrared mosaic focal plane ever built.
- First demonstration of on-board signal processing for target extraction.

Our process for applying Mercury-Cadmium-Telluride to Sapphire, which earned us the Defense Advanced Research Projects Agency's Innovation of the Year Award, and our patented Blocked Impurity Band® Silicon detectors are examples of breakthroughs that have made us a world leader for infrared mosaic sensors. This same technology is necessary for the next generation of strategic surveillance programs. We recognize their importance, and we've been preparing for some time the approaches that will make them the success stories of tomorrow.

For space surveillance sensorcraft™ that see infrared, keep on tracking the sensor innovator, Rockwell International, Satellite Systems Division.

Rockwell International

...where science gets down to business

performed from the Space Defense Operations Center located in the Cheyenne Mountain Complex. This one-of-a-kind space command post is a fusion center where intelligence and operations come together. This Center also maintains the status of all national security and civilian satellites.

• The new Space Operational Intelligence Center (SOIC), which is assigned to the DCS/Intelligence at Space Command headquarters, will meet the future intelligence needs of military space operations.

• The Consolidated Space Operations Center (CSOC) at the new Falcon AFS located nine miles east of Peterson AFB will have two primary missions: controlling operational spacecraft and planning, managing, and controlling all DoD Space Shuttle flights. By 1986, CSOC will have more than 2,000 personnel, of whom about half will be active-duty Air Force personnel. Total manning is programmed to increase to about 3,000 by 1990.

The CSOC Satellite Operations Complex will control DoD satellite systems through a worldwide tracking network, supported by the Satellite Test Center at Sunnyvale, Calif. The CSOC Shuttle Operations and Planning Complex will allow full exploitation of unique Shuttle capabilities at security levels consistent with DoD mission objectives. Thus, CSOC will give Space Command the capability to provide centralized command and control over DoD satellite and Shuttle operations, including the ground-based Air Force Satellite Control Network. This will allow Space Command to be responsive to the real-time operational requirements of the DoD unified and specified command structure.

The CSOC will be operated by the 2d Space Wing. The first satellite operations are scheduled for early 1987, and the first Shuttle operations with contingency recovery capability will begin in 1988. A Shuttle flight execution capability will follow in the early 1990s.

• Space Command is building a Test, Development, and Training Center at Peterson AFB. The Center will perform software and hardware testing and maintenance and operational training to support Space Command systems and the Cheyenne Mountain Complex. Ground-breaking for the new facility occurred in September 1984, with occupancy projected for late 1985.

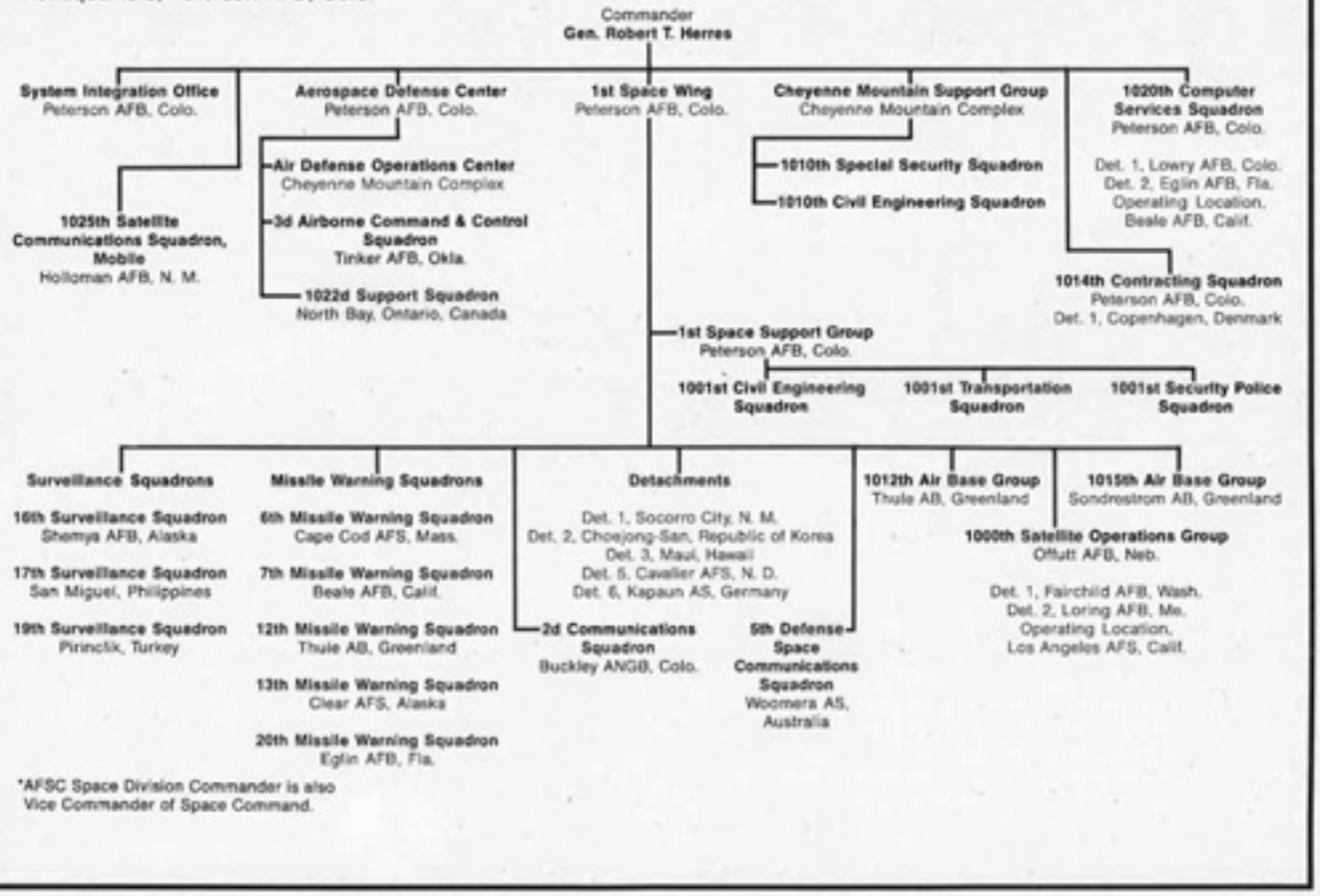
• With the recent announcement by the President of a unified Space Command (USSPACECOM), Air Force Space Command is looking forward to participating with the other services in forming an integrated command structure for space operations. Space Command will play a big role in developing the capabilities needed to manage and protect our critical space assets.

Today, Space Command is facing ever-increasing challenges and opportunities. Despite the fact that the command was formed only about two and a half years ago, its growth and contribution to our national defense have been dramatic. As the importance of space-based assets continues to increase, Space Command will have an ever-increasing role in assuring our national security.

As the command supporting the strategic aerospace defense mission and as the Air Force command for space, the future offers tremendous opportunities as well as challenges for the "Guardians of the High Frontier." ■

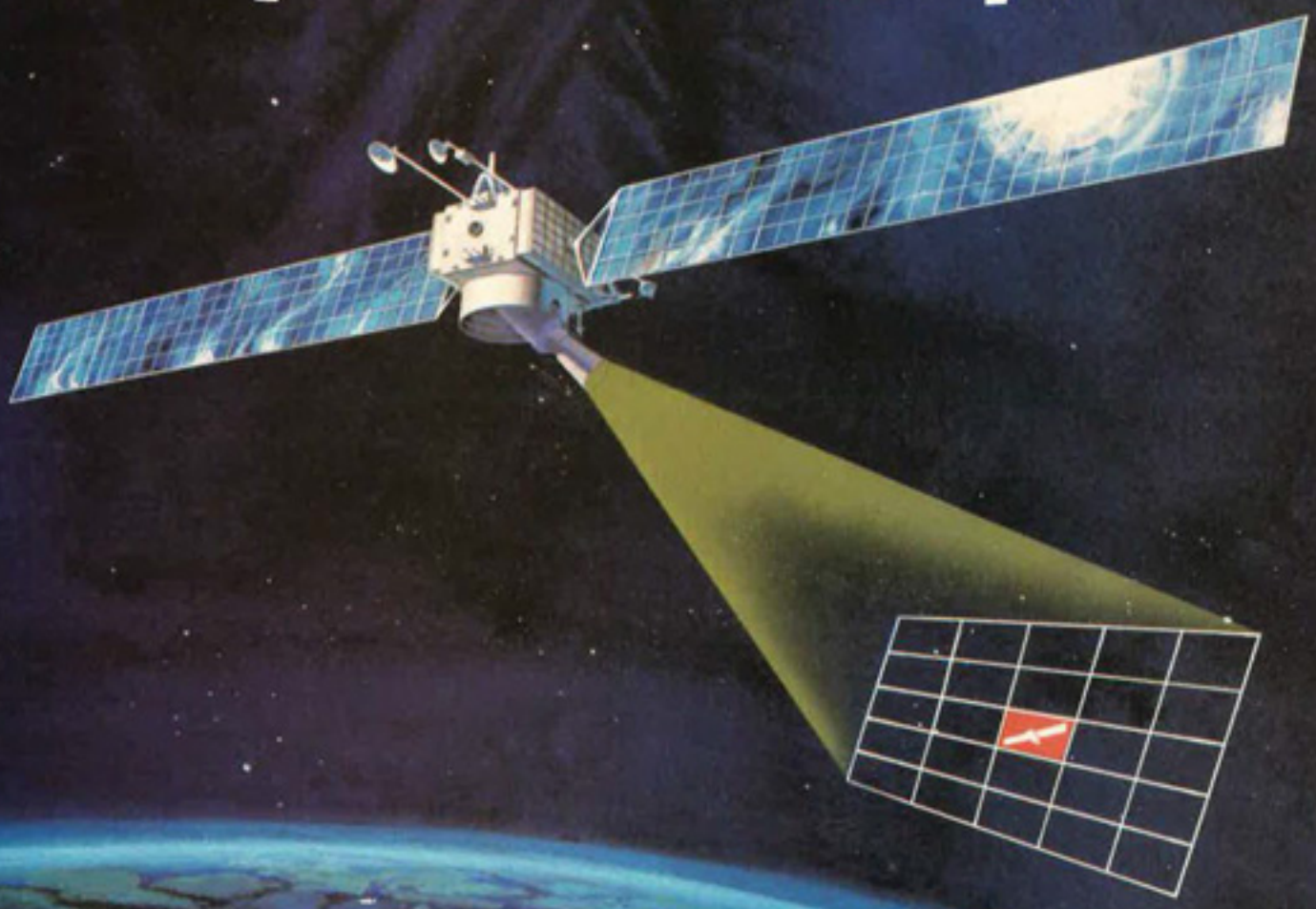
SPACE COMMAND

*Headquarters, Peterson AFB, Colo.



*AFSC Space Division Commander is also Vice Commander of Space Command.

Tracking the System Developer



If you're tracking the latest developments in space surveillance technology, then you're tracking the system developer, Rockwell International.

For over two decades under government contracts, we've been the pathfinder on the technology trail to the world's major space systems. From concept through production, we've set the state of the art in space transportation, global navigation, and space based surveillance with achievements such as Space Shuttle, the Navstar Global Positioning System, and Teal Ruby. We're ready now with the high technology, expert personnel, and modern manufacturing facilities to provide the next generation of strategic surveillance systems.

We already understand the mission requirements. Whether the need is to monitor a missile in the atmosphere, track a satellite against the Milky Way, or observe an aircraft over the Himalayas, we're working day-in and day-out on sensorcraft™ technologies that will get the job done and deliver the high performance systems needed for space based surveillance. We recognize their importance, and we've been preparing for some time the approaches that will make them the success stories of tomorrow.

For space surveillance sensorcraft™ that watch over earth and space, keep on tracking the system developer, Rockwell International, Satellite Systems Division.

Rockwell International

...where science gets down to business

Strategic Air Command

The Strategic Air Command's overriding objective has always been and always will be to provide the cornerstone for our nation's nuclear deterrent capability. Besides this nuclear role, SAC has a long-range conventional capability to support theater commanders throughout the world.

—Gen. B. L. Davis, USAF

With more than 118,000 people, SAC's ready and flexible offensive force of manned bombers and intercontinental ballistic missiles (ICBM) constitutes two parts of the United States' strategic triad. In addition to these long-range strategic strike forces, the command is responsible for strategic reconnaissance, worldwide intercommand and interservice air refueling support, and airborne vehicles for command and control of strategic forces.

The offensive punch of the Strategic Air Command is built around a force of approximately 260 B-52G and H Stratofortresses, sixty supersonic FB-111s, 1,000 Minuteman missiles (450 Minuteman IIs and 550 Minuteman IIIs), and the Titan IIs (currently being deactivated). To ensure that SAC's offensive forces are ready to carry out their mission in the future, the command is currently pursuing a substantial weapons and support systems modernization program. June 1985 will see the introduction of the first new heavy bomber, the B-1B, into the SAC inventory since the last B-52 rolled off the assembly line in 1962. Dyess AFB, Tex., is scheduled to have the first operational B-1B squadron in September 1986.

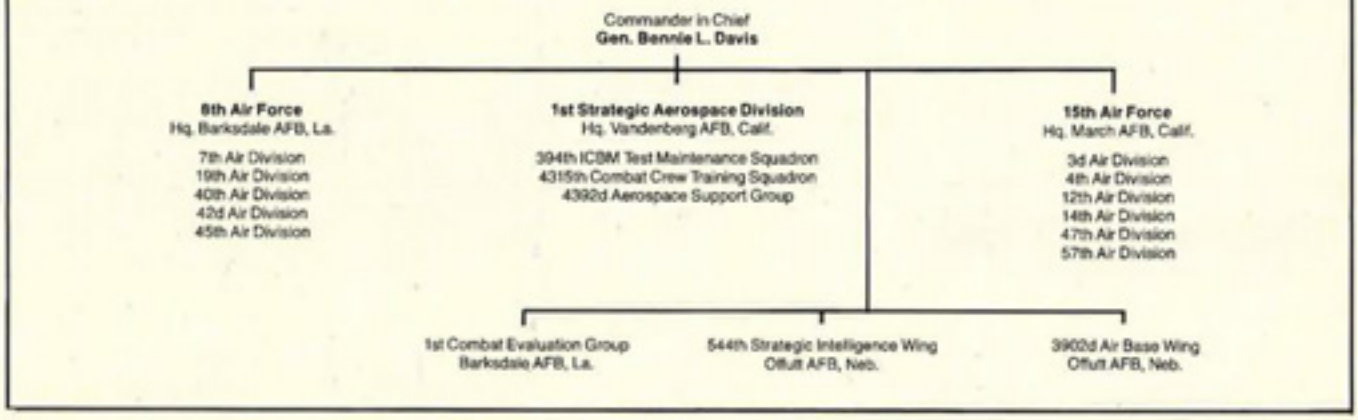
As SAC awaits the arrival of the B-1B, the command must ensure that today's bomber force maintains the capability to carry out its intended mission. Consequently, the B-52s are being modernized with state-of-the-art avionics, many are being modified as cruise missile launch platforms, and others are being modified to launch Harpoon antiship missiles. B-52 units equipped with air-launched cruise missiles are assigned to Griffiss AFB, N. Y., Wurtsmith AFB, Mich., Grand Forks AFB, N. D., Blytheville AFB, Ark., and Fairchild AFB, Wash. By mid-1985, SAC will attain full operational capability with the Harpoon missile for two B-52 squadrons located at Loring AFB, Me., and Andersen AFB, Guam.

Supporting and sustaining all flying forces are some 615 KC-135 Stratotankers. The KC-135 fleet is currently being revitalized through the KC-135R modification program that is producing a more capable, efficient, and reliable aircraft at considerably less cost than it would take to replace older models. SAC's 384th Air Refueling Wing, McConnell AFB, Kan., took delivery of the first KC-135R in July 1984. Combined with the new KC-10 Extenders, the KC-135s give SAC's bomber force a global capability and provide deployment and employment support for Military Airlift Command's airlifters as well as the fighters of the tactical air forces.

A Strategic Air Command B-52H Stratofortress moves out for takeoff at Darwin, Australia, during an exercise. SAC's offensive punch comes from approximately 260 B-52G and H bombers, sixty FB-111 supersonic bombers, 1,000 Minuteman ICBMs, and Titan II ICBMs now being deactivated. (USAF photo by TSgt. Alex R. Taningco)

STRATEGIC AIR COMMAND

Headquarters, Offutt AFB, Neb.



KC-10 Extenders are modified commercial DC-10 freighters with substantially greater fuel-carrying capacity than the KC-135 and are able to perform double-duty during unit deployments, with 12,000 cubic feet of available cargo space. Extenders are located at Barksdale AFB, La., and March AFB, Calif., and will soon arrive at Seymour Johnson AFB, N. C.

Though bombers and tankers are at the center of SAC's flying mission, important roles are also carried out by the SR-71s, U-2s, TR-1s, RC-135s and EC-135s, and E-4s. Strategic reconnaissance provides critical information to decision-makers ranging from National Command Authorities to operational theater commanders. The mix of all SAC reconnaissance forces provides broad coverage as well as backup capabilities during peacetime and crisis situations.

Complementing these efforts to modernize SAC's flying forces, important initiatives are also under way to strengthen the ICBM leg of the strategic triad. SAC and Air Force Logistics Command are involved in a joint program, called Rivet Mile, to extend the useful life of Minuteman launch control facilities and launch facilities. Actual Rivet Mile work to identify and repair problems in the Minuteman force that result from aging began in April 1985.

Modernization of the ICBM force continues to center on a two-phased program to develop and deploy the Peacekeeper (MX) and small ICBM. The Peacekeeper test program continues to provide outstanding results. In a December 1984 speech, SAC Commander in Chief Gen. B. L. Davis spoke on one of the reasons we need to deploy the Peacekeeper. He said, "Even with only 100 Peacekeeper missiles, the United States can place enough Soviet silos at risk to encourage them to lessen their emphasis on ICBMs. That move, in turn, would lessen the pressure on our own silo-based retaliatory systems. Both sides benefit."

The small ICBM provides a stimulating new technological approach to building and basing ICBMs in the future. Though still in the concept development stage, deployment of the small ICBM will ensure SAC's ICBM force remains strong and viable well into the twenty-first century.

Aircraft and missiles are the tools of SAC, but without trained people to use them, those tools are nothing but big pieces of metal. As the largest

MX Peacekeeper missile thunders into test flight at Vandenberg AFB, Calif. Peacekeeper test program has produced "outstanding" results. USAF plans to deploy 100 of the ten-warhead ICBMs while also developing its single-warhead small ICBM for deployment in the 1990s, thus ensuring a strong, viable SAC ICBM force well into the next century. Force modernization is SAC's top priority.

command in the Air Force. SAC's officers, enlisted members, and civilians serve at forty-five SAC locations in the United States and overseas. They are dedicated men and women, working to ensure that the tools of the command are, in fact, ready and flexible strategic offensive forces. Their tremendous efforts in training and during operational exercises finely hone essential warfighting skills to ensure that potential adversaries never confuse our desire for world peace with weakness.

Force modernization is SAC's top priority, and the past twelve months have seen tremendous progress toward fulfillment of that goal. New and updated tankers are entering the inventory, B-1B delivery begins next month, Peacekeeper launch-facility preparation is under way—these are just a few concrete examples of the strategic modernization program. The future holds the promise of advanced technology bombers and small ICBMs.

The reality of why we are here remains, and that is why SAC's motto is "Peace Is Our Profession." ■

EIGHTH AIR FORCE (SAC)

Headquarters, Barksdale AFB, La.

Commander
Lt. Gen. K. L. Peek, Jr.

7th Air Division
Ramstein AB, Germany

306th Strategic Wing*
RAF Mildenhall, UK

11th Strategic Group
RAF Fairford, UK

17th Reconnaissance Wing
RAF Alconbury, UK

19th Air Division
Carswell AFB, Tex.

340th Air Refueling Wing*
Altus AFB, Okla.
(KC-135)

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

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)

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

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)

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

42d Air Division
Blytheville AFB, Ark.

19th Air Refueling Wing*
Robins AFB, Ga.
(KC-135)

68th Air Refueling Group*
Seymour Johnson AFB, N. C.
(KC-135)

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

2d Bomb Wing
Barksdale AFB, La.
(B-52, KC-10, KC-135)

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

45th Air Division
Pease AFB, N. H.

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)

*Tenant Units

FIFTEENTH AIR FORCE (SAC)

Headquarters, March AFB, Calif.

Commander
Lt. Gen. James E. Light, Jr.

3d Air Division
Andersen AFB, Guam

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

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

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

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

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

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

12th Air Division
Dyess AFB, Tex.

22d Air Refueling Wing
March AFB, Calif.
(KC-10, KC-135)

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

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

14th Air Division
Beale AFB, Calif.

9th Strategic Reconnaissance Wing
Beale AFB, Calif.
(SR-71, U-2, TR-1, KC-135)

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

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

6th Strategic Wing
Elelson 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)

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

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

*Tenant Units

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Power that comes with an SFC far ahead of anything else in its class. And technology we are using efficiently in our LHX engine.

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Tactical Air Command

THE mission of Tactical Air Command (TAC) is to organize, train, equip, and maintain combat-ready forces capable of rapid deployment and employment and strategic air defense forces ready to meet the challenges of peacetime air sovereignty and wartime air defense.

TAC's emphasis on realistic training for operational, maintenance, munitions, and support personnel is the key to its many successes. Units mobilize and deploy to both Stateside and overseas locations on a continuing basis, and they practice daily those combat skills necessary to destroy enemy air and ground forces.

TAC's active force consists of more than 113,000 people and almost 2,400 aircraft. When mobilized, 69,000 members of the Air National Guard and Air Force Reserve, along with their 1,500 aircraft, are assigned to TAC.

TAC provides the Air Force component of the US Readiness Command, US Central Command, US Atlantic Command, and US Southern Command. The TAC Commander is triple-hatted as TAC/CC, CINCAFRED, and CINCAFLANT. TAC's Ninth Air Force Commander doubles as COMUSCENTAF, and the Southern Air Division Commander at Howard AFB, Panama, is responsible for the air component tasks of US Southern Command.

As AFRED, TAC performs tactical fighter, reconnaissance, command and control, and electronic combat operations during worldwide contingencies. In support of USCENTCOM, TAC provides combat-ready units for operations in Southwest Asia. When activated as Air Forces Atlantic under the unified Atlantic Command, TAC conducts air operations within the LANTCOM area, which includes the North Atlantic and Caribbean. And, in support of the joint US Southern Command in Latin America, TAC provides air defense and tactical support for the region as required.

TAC also provides strategic air defense forces to the Commander in Chief, North American Aerospace Defense Command, and to USCINCLANT for operations in Iceland. Air Defense TAC (ADTAC), with headquarters at Langley AFB, Va., maintains personnel, equipment, aircraft, and munitions to provide peacetime air sovereignty and early warning, attack assessment, and damage limitation from airborne threats to North America.

F-5E fighter of Tactical Air Command's aggressor forces, foreground, prepares to go up against a top-of-the-line TAC F-15 Eagle, background, in a combat-realistic Red Flag exercise at Nellis AFB, Nev. (Photo by William A. Ford)

TAC's forces are organized under two numbered air forces, plus ADTAC and four direct reporting units.

The Ninth Air Force at Shaw AFB, S. C., has ten wings performing tactical fighter operations and training as well as reconnaissance and the tactical air control mission. The commander of Ninth Air Force, when serving as COMUSCENTAF, commands all US Air Force forces made available to the Air Force component of the US Central Command, which has responsibility for Southwest Asia (including the Persian Gulf area).

The Twelfth Air Force at Bergstrom AFB, Tex., has four air divisions and thirteen wings performing tactical fighter operations and training, reconnaissance, tactical air control, ground-launched cruise missile training, and a wide range of electronic combat tasks, including F-4G Wild Weasel and EF-111A Raven support jamming.

ADTAC has four air divisions that conduct peacetime command and control of interceptor squadrons and the surveillance radars for strategic air defense of North America. ADTAC provides air defense forces to Air Forces Iceland (AFI), located at Keflavik NS. ADTAC is also responsible for support of the personnel and equipment of the Distant Early Warning (DEW) system.

TAC's USAF Southern Air Division at Howard AFB, Panama, is the air arm of the joint US Southern Command in Latin America. USAFSO is responsible for air defense of the Panama Canal, assists in training Latin American air forces, provides air support for combined training exercises with Latin American military forces, and operates search-and-rescue activities in the region.

The USAF Tactical Air Warfare Center (TAWC), Eglin AFB, Fla., is respon-

sible for all aspects of electronic combat activities and, through Blue Flag exercises, provides training and evaluation of C³I assets. TAWC also conducts testing and evaluation of our latest air-to-air and air-to-ground tactical weapons, ground-launched cruise missiles, flight simulators, and reconnaissance systems.

The USAF Tactical Fighter Weapons Center (TFWC), Nellis AFB, Nev., conducts advanced schooling and testing in tactical air concepts, doctrine, weapons, and tactics. TFWC also evaluates equipment and munitions designed for tactical fighter operations. The USAF Air Demonstration Squadron, the Thunderbirds, is a TFWC unit. The Center is also responsible for all Red Flag activities and for TAC's aggressor forces.

The 552d Airborne Warning and Control Wing, Tinker AFB, Okla., operates E-3 AWACS, EC-130E, EC-130H, and EC-135 aircraft. The Wing maintains squadrons at Tinker AFB, Okla., Kadena AB, Japan, Keflavik NS, Iceland, Davis-Monthan AFB, Ariz., and Keesler AFB, Miss. The E-3 provides surveillance and warning, control of friendly fighters, and airborne battle management. The two versions of the C-130 provide for airborne battlefield command and control and jamming of enemy command control and communications networks. The EC-135s serve as flying command posts to assist overseas deployments of tactical fighter aircraft.

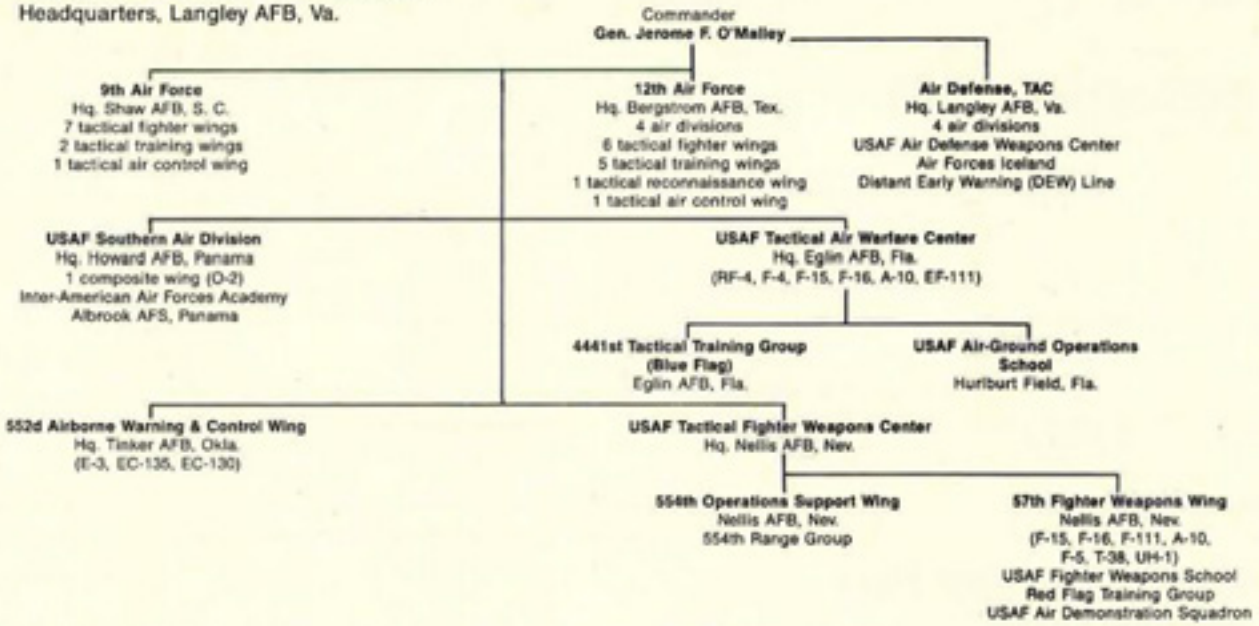
To maintain their high state of readiness, TAC personnel conduct training exercises and overseas deployments and participate in numerous joint exercises. During the last year, TAC and TAC-gained units conducted thirty-one overseas deployments to eleven countries, including Korea, Germany, Italy, the United Kingdom, and Norway. Additionally, TAC fighter and tactical air control forces participated in several contingency operations, including the rescue operations in Grenada.

TAC also continued its highly praised "Flag" programs to provide combat training under realistic conditions. Key Flag programs include the following:

- **Blue Flag** provides real-time command control and communications training for battle staff personnel in realistic NATO, Korean, and Southwest Asian scenarios.
- **Checkered Flag** provides unit preparation for operations from overseas bases. Under Checkered Flag,

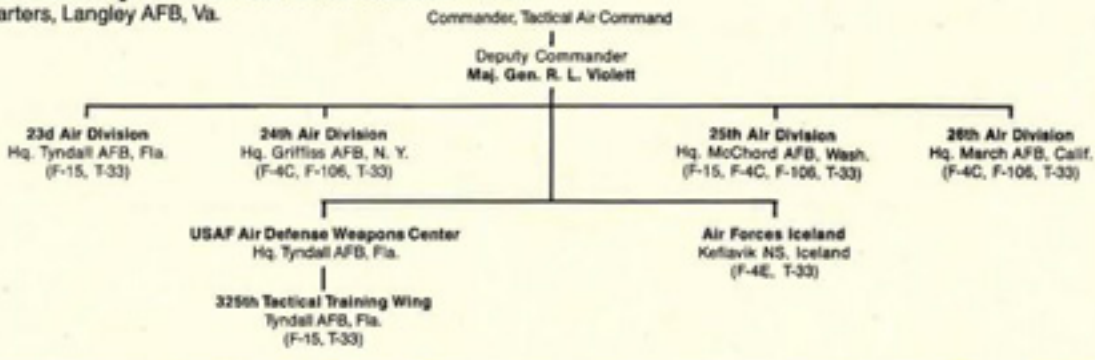
TACTICAL AIR COMMAND

Headquarters, Langley AFB, Va.



AIR DEFENSE, TACTICAL AIR COMMAND

Headquarters, Langley AFB, Va.



every TAC fighter squadron is specifically assigned an overseas deployment base. Aircrews study and practice all facets of operation from these bases. Unit leaders visit their assigned bases yearly, and the units deploy to their overseas bases at least once every three years for realistic on-scene training.

- **Red Flag** furnishes tactical fighter training in a very large, combined exercise and gives aircrews training against simulated enemy ground and air opposition. As many as 250 aircraft fly up to 4,200 sorties during each six-week exercise.
- **Copper Flag** is the ADTAC equivalent of Red Flag and is conducted at Tyndall AFB, Fla., to increase the readiness of strategic air defense forces. These exercises provide aircrew, weapons controller, and command and control training against enemy tactics and capabilities in scenarios covering the full range of attack and defensive options.
- **Green Flag** focuses on coordinating and increasing the electronic combat (EC) capabilities of the tactical air forces. Under the direction of TAWC, Green Flag personnel develop EC tactics and then provide the exercise scenarios in which to test and evaluate these tactics and our electronic combat systems.

Significant events in TAC over the past year include the Thunderbirds performances. The Thunderbirds flew sixty-eight Stateside and fifteen European demonstrations before more than 10,000,000 spectators.

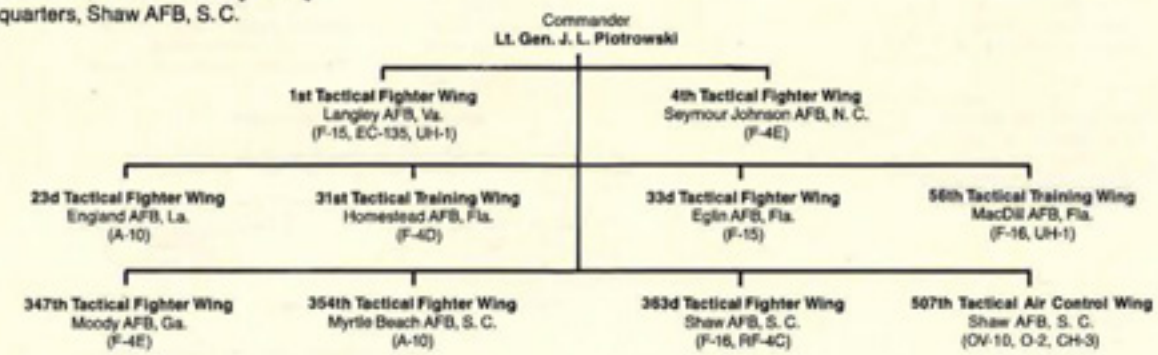
TAC's 1984 Class A mishap rate tied the safest year ever—3.2 per 100,000 flying hours. The Class A fighter attack mishap rate was the lowest ever at 3.7, surpassing 1983's previous low of 4.7.

TAC's planned conversion of ADTAC squadrons from the F-106 Delta Dart to the F-15 Eagle continued with the conversion of the 5th Fighter Interceptor Squadron, Minot AFB, N. D. Also reequipped and renamed, the 325th Fighter Weapons Wing at Tyndall AFB became the 325th Tactical Training Wing, conducting F-15 aircrew training.

Finally, during the past year TAC once again received a number of prestigious awards. The Daedalian Foundation presented the command with the Foulois Memorial Award for flying safety. TAC also received the Colonel L. Joseph Brown Award for the Air Force's most outstanding major air command social actions program. The American Petroleum Institute presented its trophy for the best fuels management operation in the Air Force to the 832d Air Division, Luke AFB, Ariz. The England AFB, La., and Mountain Home AFB, Idaho, commissaries received first and second place, respectively, in the L. Mendel Rivers Best Commissary in the Continental United States competition. This was the first time that two stores from one command have taken the top two places in a single category. Mountain Home AFB also won the Air Force Innkeeper Award. ■

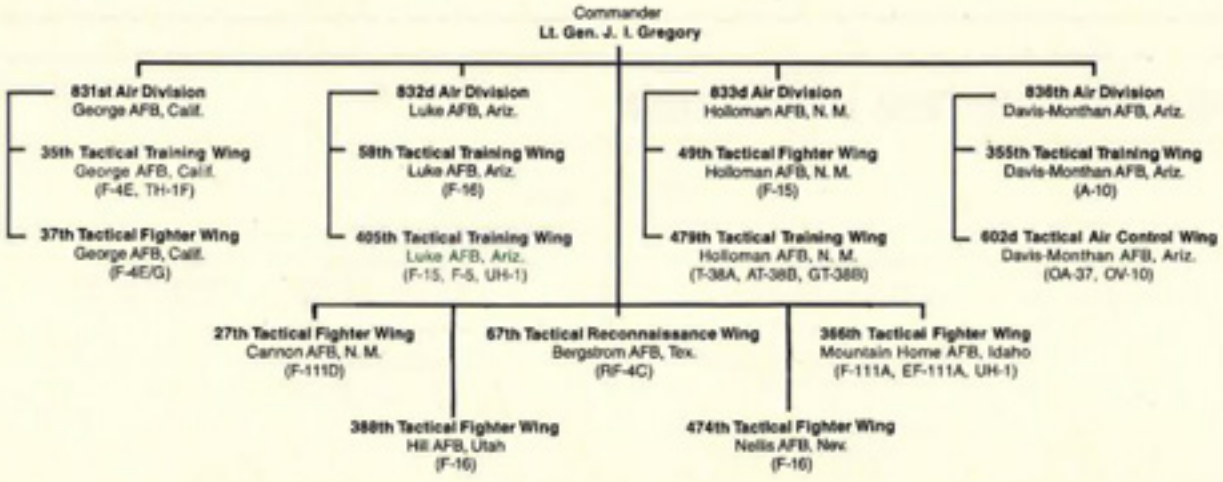
NINTH AIR FORCE (TAC)

Headquarters, Shaw AFB, S.C.



TWELFTH AIR FORCE (TAC)

Headquarters, Bergstrom AFB, Tex.



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United States Air Forces in Europe

RIGHT people, right mission, right now: This R³ formula is the philosophy for United States Air Forces in Europe (USAFE) as it prepares to mark its fortieth anniversary in August.

The command, with more than 61,000 blue-suiters, their families, and about 11,000 civilian workers, was established August 7, 1945. To deter the threat, it now has people in seventeen countries—from Norway and England to Turkey and Greece—standing ready in partnership with NATO air forces.

Gen. Charles L. Donnelly, Jr., who became the Commander in Chief and Commander, Allied Air Forces Central Europe, in August 1984, told a United States audience: "In terms of warfighting capability, there is no tomorrow. We have no time to gather resources. USAFE's mission is to provide NATO with people, aircraft, and missiles on a moment's notice. For us, the future is right now."

A number of new systems, organizational refinements, and other changes have helped to make the command ready—right now. USAFE has:

- Activated three ground-launched cruise missile wings in England, Italy, and Belgium and has an advance party in Germany.
- Received the first three of a planned eighteen C-23A Sherpa aircraft buy to form part of the European Distribution System (EDS). The EDS consists of three elements: Sherpas for distribution of critical parts and equipment, a logistics command control and communications (C^3) system, and prestocked assets in the theater.
- Signed cooperative air defense agreements with two NATO allies—Germany and the United Kingdom—to supply Roland and Rapier ground-to-air missile systems respectively to provide air defense for USAFE bases.
- Awarded a four-year, competitive bid contract for word-processing equipment. The single vendor will replace more than 1,300 leased machines from twenty-nine different vendors. Maintenance and support will improve as a result, and a savings of twenty-five to fifty percent over the cost of the present word processors is estimated.

An array of modern weapon systems form a potent deterrent to potential aggression. These include ground-launched cruise missiles and such front-line fighters as F-15s, F-16s, F-111s, A-10s, and F-4s. The replacement of F-4s at Ramstein AB, Germany, with state-of-the-art F-16s will add significantly to the command's readiness posture. Electronic combat assets include EF-111 electronic jammers and F-4 Wild Weasels. TR-1s and RF-4s are included in the command's tactical reconnaissance assets.

In the area of command control communications and intelligence (C^3I), USAFE has a number of new initiatives under way. These "force multipliers" include a new system that rapidly combines, correlates, and displays multisource intelligence information. While the Joint Tactical Fusion-Limited Operational Capability Europe (JTF-LOCE) is only a test-bed, it permits the sharing of the near real-

The Major Operating Units of USAFE

Unit	Location	Weapon Systems/Missions
	England	
10th Tactical Recon Wing	RAF Alconbury	RF-4, F-5, TR-1 (SAC)
20th Tactical Fighter Wing	RAF Upper Heyford	F-111, EF-111
48th Tactical Fighter Wing	RAF Lakenheath	F-111
81st Tactical Fighter Wing	RAF Bentwaters/Woodbridge	A-10, MAC rescue HC-130, HH-53
501st Tactical Missile Wing	RAF Greenham Common	GLCM BGM-109G
513th Tactical Airlift Wing	RAF Mildenhall	USAFE EC-135, MAC rotational C-130, SAC rotational KC-135
Det. 1, 10th Tactical Recon Wing	RAF Wethersfield	Support/civil engineer heavy repair squadron
7020th Air Base Group	RAF Fairford	SAC rotational KC-135
7274th Air Base Group	RAF Chicksands	Support and communications
	Spain	
401st Tactical Fighter Wing	Torrejon AB	F-16
406th Tactical Fighter Training Wing	Zaragoza AB	Tactical range support weapons training school SAC rotational KC-135
	Italy	
40th Tactical Group	Aviano AB	Rotational USAFE aircraft
487th Tactical Missile Wing	Comiso AS	GLCM BGM-109G
7275th Air Base Group	San Vito AS	Support and communications
	Turkey	
Hq TUSLOG	Ankara AS	
7217th Air Base Group	Ankara AS	Command and logistical management
39th Tactical Group	Incirlik AB	Rotational USAFE aircraft
7241st Air Base Group	Izmir AS	Support of NATO units
	Greece	
7206th Air Base Group	Hellenikon AB	Support and communications
7276th Air Base Group	Iraklion AS, Crete	Support and communications
	The Netherlands	
32d Tactical Fighter Squadron	Camp New Amsterdam	F-15
	Belgium	
485th Tactical Missile Wing	Florennes	GLCM BGM-109G
	Germany	
26th Tactical Reconnaissance Wing	Zweibrücken AB	RF-4, C-23A
36th Tactical Fighter Wing	Bitburg AB	F-15
50th Tactical Fighter Wing	Hahn AB	F-16
52d Tactical Fighter Wing	Spangdahlem AB	F-4
86th Tactical Fighter Wing	Ramstein AB	F-4, MAC UH-1, C-21, C-140, C-12
601st Tactical Control Wing	Sembach AB	Command control communications
38th Tactical Missile Wing	—	GLCM BGM-109G
7100th Air Base Group	Lindsey AS	Command control communications
7350th Air Base Group	Tempelhof Central Airport, Berlin	Support and communications

A fully armed USAFE F-15 flies a high-speed intercept course over the border between West and East Germany. USAFE marks its fortieth anniversary in August.

time enemy ground situation picture among Air Force, Army, and NATO battlefield commanders. USAFE is also developing survivable, jam-resistant communications to support systems like JTF-LOCE as well as hardened critical C³I facilities.

USAFE people continue to hone their abilities to survive wartime operations by conducting realistic field training and command post exercises. Another refinement is the Warrior Preparation Center, a combined Army-Air Force training facility that provides a fully computerized electronic battlefield and threat-training facility. Combined ground and air tactical situations taking shape on computer screens can be tested by commanders.

Another improvement is the weapons training detachment operating spares program. Spares are now kept at Incirlik AB, Turkey, and Zaragoza AB, Spain, to ensure parts are readily available at these weapons training sites.

Other changes include merging communications and data-automation organizational elements to form single units. CINCUSAFE now has an assistant for counterintelligence and special investigations to provide investigative operational expertise.

A major problem facing USAFE in acquisition of new systems is a restrictive European troop-strength ceiling. The command must identify people and return them to the United States to offset manpower necessary to bring more advanced systems on line. The new systems make the command much more competitive on the battlefield and provide the necessary deterrence; however, manpower limitations do not allow the command to plan adequately for controlled growth and may actually cut into warfighting capabilities.

People continue to be the command's top priority. A number of initiatives to improve the quality of life for USAFE's people are under way. For example, 1,440 new quarters have been approved and will help ease the critical shortage of adequate family housing. New dormitories were also constructed to accommodate more than 1,000 additional unaccompanied members.

USAFE people can look back at a record of maintaining peace with freedom for forty years—a proud record, to be sure. But only through diligence, readiness, and continued training can the command be ready to respond—right now. ■

UNITED STATES AIR FORCES IN EUROPE

Headquarters, Ramstein AB, Germany

US European Command (USEUCOM) — **US Air Force (USAF)**

Headquarters
United States Air Forces in Europe (USAFE)
Hq. Ramstein AB, Germany
Gen. Charles L. Donnelly, Jr., Commander in Chief

3d Air Force
Hq. RAF Mildenhall, UK
Maj. Gen. William P. Acker, Commander

3 tactical fighter wings
1 tactical reconnaissance wing
1 tactical missile wing
1 tactical airlift wing (rotational)
2 USAFE support bases

16th Air Force
Hq. Torrejon AB, Spain
Maj. Gen. William A. Gorton, Commander

1 tactical fighter wing
1 tactical fighter training wing
1 tactical missile wing
2 tactical groups
5 USAFE support bases

17th Air Force
Hq. Sembach AB, Germany
Maj. Gen. William J. Breckner, Jr., Commander

5 tactical fighter wings
2 tactical missile wings
1 tactical reconnaissance wing
1 tactical control wing
2 USAFE support bases

The USAFE organization chart above shows the lines of command that exist during peacetime. This chart shows the NATO command lines that would obtain in time of war.

Allied Command Europe (ACE)

Allied Forces Central Europe (AFCENT)

Allied Air Forces Central Europe (AAFCE)
Hq. Ramstein AB, Germany
Gen. Charles L. Donnelly, Jr., Commander

Second Allied Tactical Air Force (2ATAF)
Hq. Moenchen-Gladbach, Germany
Air Marshal Sir Patrick Hine, Commander

Fourth Allied Tactical Air Force (4ATAF)
Hq. Heidelberg, Germany
Lt. Gen. Horst Jungkurth, Commander

Air Force Accounting and Finance Center

THE Air Force Accounting and Finance Center (AFAFC) is located at Lowry AFB, Colo., and is the focal point of Air Force financial operations for the worldwide network of 122 Air Force accounting and finance offices (AFOs).

The Center provides centralized pay service to all Air Force military members, including active duty, retired, Air National Guard, and Air Force Reserve. AFAFC also accounts for all money appropriated to the Air Force and reports to Congress and financial managers throughout the government on the use of these funds.

Through the Security Assistance Accounting Center, AFAFC informs the Pentagon and Congress on the financial status of the DoD Foreign Military Sales Program. The Center bills, collects, and accounts for all DoD foreign military sales.

In 1984, the Center's seventy-one officers, 168 enlisted, and 2,200 civilians paid more than 770,000 active, Guard, and Reserve personnel from combined appropriations totaling more than $12 billion. AFAFC personnel accounted for more than $125 billion, submitted more than 31,000 reports, and processed more than 12,000,000 disbursement and collection vouchers.

Retired pay operations paid more than $6 billion to 524,000 Air Force retirees and 24,000 annuitants under the Survivor Benefit Plan (SBP). In addition, retired pay customer service at base accounting and finance offices (AFOs) continued to expand. This service is now available at 100 AFOs, both in CONUS and overseas.

The Flat Rate Per Diem test, implemented throughout the Air Force in February, was favorably received by both Air Force travelers and the accounting and finance work force. The new system makes it easier for both military members and civilians to calculate temporary duty per diem. More than eighty percent of Air Force travelers indicated that the new system is more understandable. Likewise, seventy-five percent felt flat rate reimbursement was fair and equitable. An automated flat rate per diem system was tested at nine locations, with excellent results. In the future, the new automation will be expanded to other accounting and finance offices.

A total of $1 million a year in postage is being saved by a new distribution system for leave and earning statements, net pay advices, and recertification statements.

The first phase of the departmental status of funds design has been completed by the Departmental On-Line Accounting and Reporting System (DOLARS) Program Management Office. Starting October 1, 1984, DOLARS has produced all Air Force status of funds reports and products required by the Air Staff, OSD, and other governmental agencies.

The Accounting and Finance Office of the Future program is developing standard base-level accounting and finance systems for implementation. Starting in Fiscal Year 1986, these systems will be operated on the Sperry System 11 minicomputer in each accounting and finance office, using the latest technology. AFAFC received the first System 11 for software development in August 1984. Four additional deliveries are planned in 1985 for field testing. Several systems are currently operational in a prototype environment at accounting and finance offices at Lowry AFB, Colo., and Bolling AFB, D. C., and the software will be matched to the System 11 with other software under development. These accounts payable, accounts receivable, paying and collecting, and travel systems streamline accounting and finance operations, increasing efficiency and productivity.

The Joint Uniform Military Pay System (JUMPS) Data Collection System was implemented at fifty-six bases in Fiscal Year 1984, for a total of seventy-four installed systems. The remaining fifty bases will start in Fiscal Year 1985. JUMPS data collection allows base AFOs to make changes to a member's pay record using a minicomputer in the finance office rather than through the base-level computer. The transaction turnaround time with the new system is one day, in most cases, instead of the previous five to seven days. Additionally, AFAFC is embarked on a programmed upgrade of active and Air Reserve Forces pay systems software. This should result in pay systems that are more responsive to change, that are easier to maintain, and that provide enhanced pay service to the Total Force.

Several initiatives are under way at AFAFC to improve collections from Air Force debtors who have left the service. These include: charging interest, administrative, and penalty fees; comparing files with DoD and other federal government agencies; referring debtor cases to commercial collection agencies; and reporting debtors to credit bureaus. Only cases considered uncollectible and that would otherwise be written off are sent to collection agencies. In 1984, the two collection agencies under Air Force contract collected $203,000 for the Air Force.

The Directorate of Data Automation continued the major effort to upgrade the Center's computer systems. The AMDAHL 5850 was upgraded to a 5860 in November, and an AMDAHL 5870 was installed in December. The new computer capacity almost doubled the Center's previous processing capability and provided a timely and minimum-cost solution to AFAFC's processing problems.

AFAFC and the United States Treasury implemented a Replacement Check information exchange via magnetic tape. This new system is faster, more accurate, and gets the individual experiencing pay problems on track as quickly as possible. The Center will begin issuing a new Treasury Department paper check to replace the green card check that has been used for many years. The Treasury Department will be issuing the new check on a test basis in the Philadelphia area in late spring of this year. On approval, the Air Force will then follow on with its program, which will result in checks being distributed throughout the world. All government disbursing activities are expected to issue paper checks by the end of calendar year 1986.

While continually looking for ways to improve efficiency, productivity, and service to its customers—Air Force people—AFAFC takes pride in providing today's Air Force with the best in modern financial management. ■

MILAN.
Anti-Tank missile system for use by the infantry.

ROLAND.
Guided missile system mounted on a shelter for use against low-flying aircraft.

MW-1.
Multipurpose weapon system to be used on the Tornado.

CGIVS.
Computer-generated image visual system for the Tornado training simulator.

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MILAN and HOT: Anti-Tank missile systems of medium and long ranges, respectively.*
ROLAND: Surface-to-air missile system for use against low-flying aircraft.*
MW-1: Conventional multi-purpose weapon for anti-tank defense and against enemy airfields.
KORMORAN: Air-to-ship guided missile.
CGIVS: Computer-generated image visual system.

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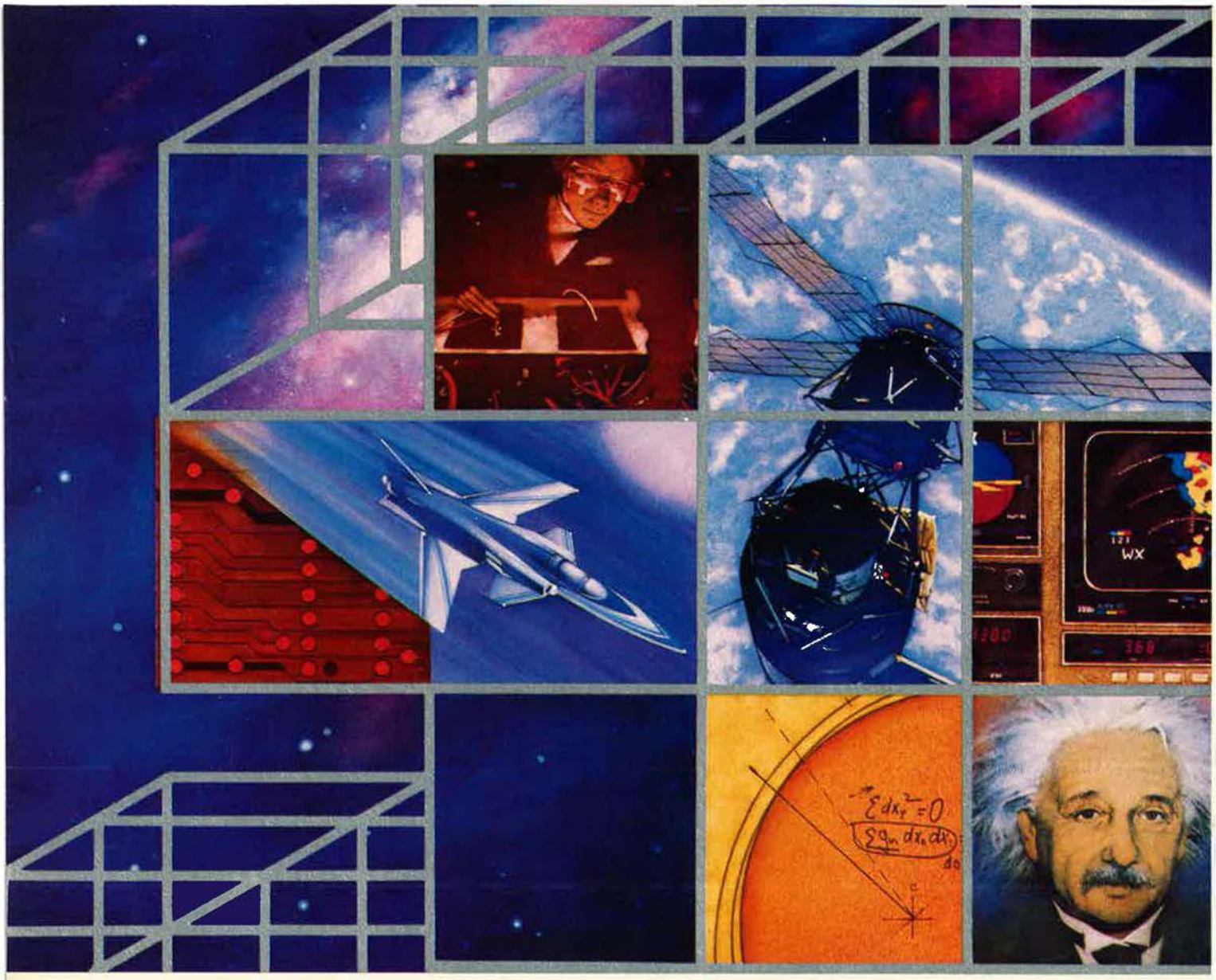

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Air Force Audit Agency

THE Air Force Audit Agency (AFAA), a separate operating agency headquartered at Norton AFB, Calif., provides all levels of Air Force management with independent, objective, and constructive evaluations of the effectiveness and efficiency with which managerial responsibilities (financial, operational, and support) are carried out.

J. H. Stolarow, the Auditor General of the Air Force, reports to the Secretary of the Air Force and has direct access to the Chief of Staff. This enables AFAA to independently assess the activities and functions it audits. (The Assistant Secretary of the Air Force for Financial Management provides technical guidance and supervision on audit policy and management matters.) Brig. Gen. Basil H. Pflumm, the Deputy Auditor General, is stationed in the Pentagon and acts for the Auditor General at the Air Staff and Secretariat.

AFAA is comprised of two staff directorates (Operations and Resource Management) and the following three line directorates:

- The Acquisition and Logistics Directorate, located at Wright-Patterson AFB, Ohio, directs the development and management of audits relating to supply, maintenance, acquisitions, weapon systems, and installation-level logistics concerns.
- The Forces and Support Management Directorate, located at Norton AFB, Calif., directs the development and management of audits relating to personnel and support services, comptroller and nonappropriated fund activities, automatic data processing, force readiness, and communications and transportation functions.
- The Field Activities Directorate, also at Norton AFB, manages installation-level audit work at eighty area audit offices located at major Air Force installations worldwide. Supervision of the eighty offices is exercised through five geographic region offices located at Andrews AFB, Md. (Northern); Langley AFB, Va. (Southern); Offutt AFB, Neb. (Central); McClellan AFB, Calif. (Western); and Ramstein AB, Germany (European).

The Agency has two basic procedures for reporting audit results to Air Force management:

- Reports of audit containing the overall results of centrally directed audit efforts (audits performed concurrently at several locations) are addressed to top major command and Air Staff management levels. Seventy-six reports were issued in FY '84.
- Reports of audit containing results of installation-level audits are addressed to local commanders. More than 1,800 installation-level reports were issued in FY '84.

The Agency is authorized more than 1,000 personnel and has a civilian/military ratio of seventy-five percent to twenty-five percent. Ninety-seven percent of the auditors have at least one college degree; forty-one percent also have graduate degrees. In addition, thirty-one percent have professional certifications as certified public accountants, certified internal auditors, or certified information system auditors. ■

Air Force Acquisition Logistics Center

THE mission of the Air Force Acquisition Logistics Center (AFALC), headquartered at Wright-Patterson AFB, Ohio, is to improve and support Air Force readiness and to reduce life-cycle costs of Air Force weapon systems. This support begins in the preconceptual phase and extends through the production phase of new weapon systems. AFALC's Commander, Maj. Gen. Monroe T. Smith, receives technical guidance from both Air Force Systems Command and Air Force Logistics Command.

AFALC assists the AFSC product divisions in developing logistics requirements that will ensure that reliable and maintainable systems are acquired, fielded, and fully supported when they're delivered to the using commands. AFALC also works with AFLC's air logistics centers to ensure that AFLC is prepared to provide system support on a continuing basis when program management transfers from AFSC to AFLC.

AFALC consists of five deputies: the Deputy for Aeronautical Programs, Deputy for Engineering and Evaluation, Deputy for Advanced Technology and Logistics Strategies, Deputy for Acquisition Plans and Analysis, and the Deputy for Strategic Missiles, Space, Electronics, and Armament Programs. AFALC also manages with the Aeronautical Systems Division the Productivity, Reliability, Availability, and Maintainability (PRAM) Program Office and the Deputy for Avionics Control.

In 1984, the Air Force Acquisition Logistics Center marked these achievements:

- Established a Deputy for Advanced Technology and Logistics Strategies. The mission of the Advanced Technology Deputy is to manage the Center's involvement in logistics research and development activities as well as the early phases of acquisition programs. The deputy will ensure that a smooth transition of technology to the acquisition programs will occur. In addition, the deputy will identify efforts, opportunities, and risks that produce new products, production methods, and processes. The deputy will create new performance capabilities to influence logistics concerns in research and development as well as in system and acquisition programs.
- Provided ongoing support to the avionics standardization program and continued maintenance of architectural standards, such as MIL-STD 1589 and 1750, as well as published the Air Force Avionics Master plan.
- Implemented the use of Scotchweld adhesive sealant in the center and aft fuselage fuel tanks on the F-16, resulting in an estimated savings of $1.24 million through reduced fuel leaks and repairs.
- Presented a series of spare parts workshops to all the AFSC product divisions and AFLC air logistics centers. Participants in the workshops were shown how differing factors, such as business strategy, competi-

tion advocates, contractor support, and model contracts, affect the planning and buying of spares.

• The PRAM program office completed forty-three projects in Fiscal Year 1984, saving the Air Force more than $136 million.

• Improved usage of the Acquisition Logistics Management Information System. ALMIS is an automated data-base management system containing information on more than 400 acquisition programs currently managed by AFALC and Headquarters AFSC. ALMIS provides a method for the deputy program managers for logistics to communicate current program information, status, and issues to program managers and decision-makers at all levels.

• Developed the strategy to procure C-5B initial spare parts directly from the vendors in order to avoid the thirty-five percent pass-through charges of the prime contractor. By eliminating these pass-through charges, the Air Force will realize a savings of more than $2.5 million.

• Enhanced the Computer Supported Network Analysis System. CSNAS is currently in use in more than sixty program offices, providing managers with computer assistance in tracking the various individual program tasks that need to be accomplished. The Defense Systems Management College's Program Management School has a contract to convert CSNAS into a desk-top minicomputer so that it can be used more widely.

• The Air Force Coordinating Office for Logistics Research, in cooperation with AFALC, published the Logistics Research and Studies Program Document. This document provides Air Force and other Department of Defense agencies as well as the contractor community with a current picture of logistics research and studies, structured under a long-range planning baseline. ■

Air Force Commissary Service

THE primary mission, today, of the Air Force Commissary Service (AFCOMS) is to provide subsistence support to all authorized personnel in peace and wartime. This means ensuring that there are skilled personnel who are available to order, receive, store, and issue subsistence items to food-service and other authorized users.

Headquartered at Kelly AFB, Tex., AFCOMS manages 114 troop support operations around the world. Last year, they supplied subsistence supplies worth more than $145.1 million.

AFCOMS's most visible mission is the day-to-day operation of 139 commissary stores at Air Force installations in the US and abroad. Authorized commissary patrons spent more than $2.1 billion in the stores in Fiscal Year 1984. This represents forty-six percent of Department of Defense commissary sales.

Air Force commissaries sell goods at cost, plus a five percent surcharge required by law to pay for equipment, supplies, and construction. The commissary is a benefit—a form of nonpay compensation—and patrons save an average of $950 a year by shopping in the commissary. Other customer savings include $64 million from special sales and $21 million from cents-off coupons.

Recent surveys show the commissary benefit is the second most important nonpay compensation for Air Force people. It ranks just behind medical benefits as the reason why second-term airmen and above remain with the Air Force.

In 1984, AFCOMS increased the savings to their patrons, improved the operation and management of commissaries and troop support functions, and pursued an active new store construction program. In some recent initiatives, AFCOMS has:

• Installed scanning checkout and general-purpose automatic data-processing equipment in three Air Force commissaries. Scanning will improve customer throughput and increase checkout accuracy, eliminate long waits for price checks due to unmarked or unreadable prices, and spell out items purchased, enabling patrons to pinpoint exactly where their food dollar has gone. It will also allow managers to track their item movement and stock positions automatically, thereby reducing out-of-stock items. Other stores will install the equipment this year, and virtually all Air Force commissaries will have it within the next four years.

• Opened five new commissaries at Avon Park Radar Bombing Site, Fla.; Camp New Amsterdam, the Netherlands; Clark AB, the Philippines; McClellan AFB, Calif.; and Vance AFB, Okla. The new stores have wider aisles, energy-saving features, more attractive decors, and floor plans that ensure customers the fastest, easiest shopping possible.

• Started a new pricing program for overseas commissaries that resulted in lower prices for Air Force patrons. Also, AFCOMS reduced overseas shipment time of commissary goods from ninety days to fifty-five days so that patrons can get the products quicker.

• Began "resetting" commissary warehouses to follow the same layout as the sales area. This allows commissary managers to determine their warehouse stock position rapidly and to control out-of-stocks better.

• Continued sending staff assistance teams to help store managers resolve problems quickly. The teams travel from store to store, looking for potential problems and training workers.

• Continued the aggressive Inspector General store inspection program to keep on top of operational compliance, internal controls, and potential fraud, waste, and abuse.

• Tested a daily delivery system of goods to selected Air Force commissaries. The expanded delivery system released valuable warehouse space and reduced the number of items out of stock on the shelves.

• Became the first separate operating agency to win the Air Force's Professional Excellence Productivity Award for working smarter and more productively to improve patron service and efficiency.

• Won the Air Force Outstanding Unit Award for "doing things smarter, not harder." AFCOMS was recognized for saving their patrons more than $900 million during the award period.

• Received the Distinguished Equal Employment Opportunity Award for outstanding support and contributions to the Air Force's equal employment and affirmative action programs.

AFCOMS continues to strive for excellence and to look for new and better ways to serve its patrons.

In 1985, AFCOMS will open five more new replacement commissaries and improve existing ones, both overseas and in the United States. AFCOMS's challenge for the future is to give customers what they want, if possible, and at the lowest possible price. ■

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- Maintenance for the Air Force KC10/CF6-50 engine.
- Maintenance analysis of the Navy TF34 and T56 engines.
- Maintenance and logistic support for the U.S. Air Force C-22A Program.
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Ford Aerospace:

Developing

We are now developing and demonstrating fully telescoped ammunition for future high-performance U.S. armament systems.

Ford Aerospace:

Planning

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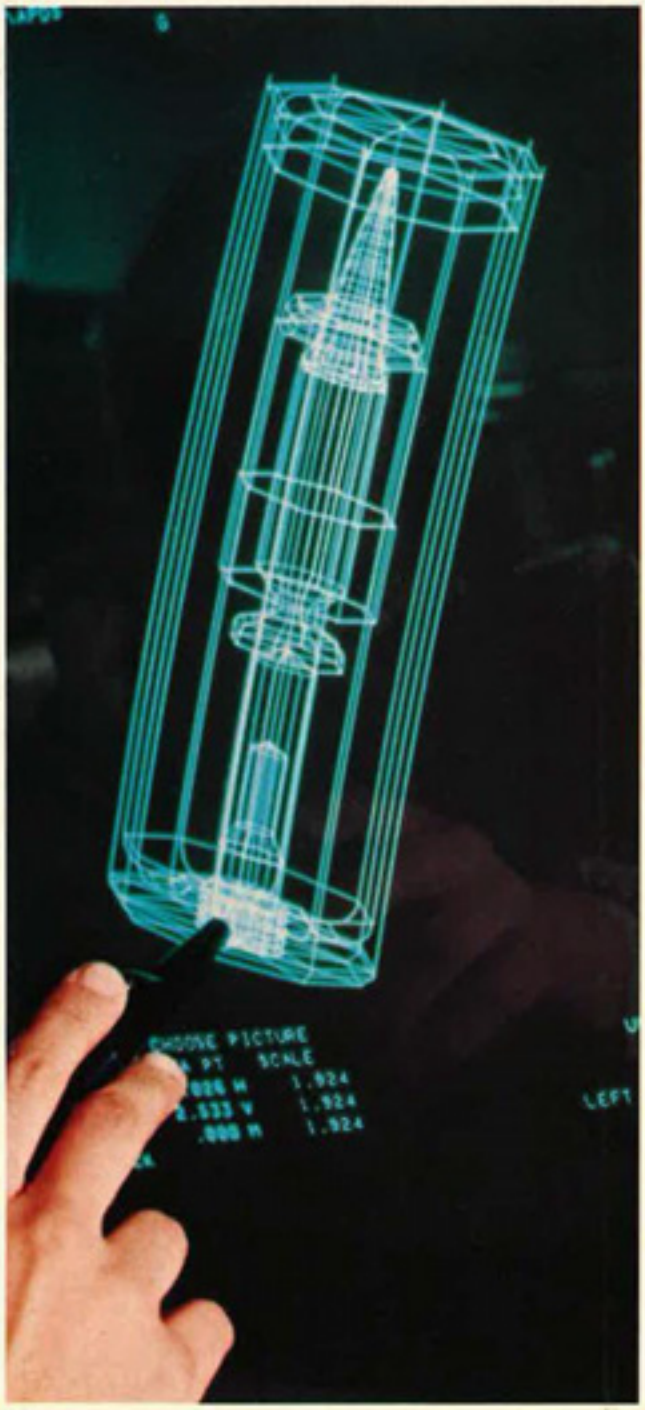

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Dedicated

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Air Force Engineering and Services Center

THE Air Force Engineering and Services Center (AFESC), with headquarters at Tyndall AFB, Fla., has a dual role: the first is recommending and developing programs and technical policies in support of the Air Force Director of Engineering and Services; the other is assisting all commands and installations in solving civil engineering and services problems through consultant services, hands-on assistance, and the development of new products and procedures.

More than 600 highly qualified, carefully selected professionals provide engineering and services guidance and assistance worldwide in the areas of readiness, fire protection, facility energy, environmental planning, billeting, food services, mortuary services, and the overall operation and maintenance of Air Force installations. The Center also has the Engineering and Services Laboratory, devoted to civil engineering and environmental research, development, test, and evaluation.

By providing expertise with its headquarters staff and traveling teams, the Center helps solve the problems of today as well as planning for the engineering and services needs of the future.

The AFESC Commander reports directly to the Director of Engineering and Services at Air Force Headquarters in Washington, D. C.

Last year, Hq. AFESC and its traveling teams:

- Validated a new polyurethane concrete for rapid runway repair that can be poured into place over gravel or stone, in any weather, and that can support aircraft loads in less than thirty minutes.
- Completed awarding contracts for Phase I of the Installation Restoration Program for all Air Force installations, helping to determine the need for clean-up of hazardous wastes.
- Developed facility energy programs with a cost avoidance of $140 million in energy costs through the Energy Conservation Investment Program, energy management programs, and energy awareness programs.
- Introduced new concepts and programs in energy security to assure the availability of energy at key mission facilities in war and peace.
- Led efforts to revise procedures for buying generators for the Air Force Bare Base Program, resulting in competitive bidding and a projected savings of more than $95 million.
- Secured funding for two new computer systems to manage information more efficiently in both civil engineering and services organizations throughout the Air Force, with a projected savings of more than $50 million.
- Developed a new wartime food menu that consists of all nonperishable items, thus reducing refrigeration requirements, increasing readiness, and improving mobility.
- Sponsored development of a new runway radioluminescent lighting system that needs no external power or wiring, is totally portable, and can be installed on a 10,000-foot runway, by four people, in five hours.
- Managed award of nearly $15 million in contracts for military family housing energy conservation projects. These included air infiltration reduction, more efficient installation of storm windows and insulation, and improvements to air conditioning and heating systems—not only to save money and energy, but also to improve comfort and appearance.
- Introduced a "nondestructive" method of determining the condition of airfield pavements, without boring holes or having to close the runway for an extended period.
- Developed and provided specialized wartime training for more than 9,000 Prime Base Engineer Emergency Forces (Prime BEEF) and more than 1,000 Prime Readiness in Base Services (Prime RIBS) personnel.
- Identified more than forty specific management changes to increase civil engineering work efficiency and eliminate past constraints, using the techniques of Project IMAGE (Innovative Management Achieves Greater Effectiveness).
- Developed and began procurement of a new multifunction excavator that can perform the functions of a bulldozer, grader, compactor, and front-end loader during rapid runway repair. The development came from modifying basic off-the-shelf equipment.
- Tested, evaluated, and monitored the delivery of a new, medium-weight, highly mobile, air-transportable crash fire rescue vehicle (the A/32P-19) to replace the present P-4 vehicle.
- Completed the successful testing of a new automated pricing system for laundry and dry-cleaning plants. This system will reduce the number of people required for the work, reduce the amount of paperwork, and produce more accurate, readily available data for management.
- Implemented new standardized guidance for the more efficient construction and modernization of fire stations throughout the Air Force.
- Broke ground for a new Engineering and Services Laboratory to replace the World War II-era facilities.

AFESC's prime mission continues to be the improvement of air base facilities to enhance the daily operation, readiness, and survivability of Air Force operational forces. ■

Air Force Inspection and Safety Center

THE Air Force Inspection and Safety Center (AFISC), Norton AFB, Calif., provides the Secretary of the Air Force, the Chief of Staff, and major command and separate operating agency commanders an assessment of Air Force fighting capability and resource management effectiveness. Maj. Gen. Gordon E. Williams commands AFISC and is also the Deputy Inspector General for Inspection and Safety, Hq. USAF.

AFISC has an authorized work force of 347 military and 141 civilian personnel, representing 111 Air Force specialties. It is divided into four directorates and three offices.

- The Directorate of Inspection determines operational readiness status within the major commands by monitoring their operational readiness inspection (ORI) reports and by con-

ducting over-the-shoulder inspections of command inspector general teams during ORIs. The Directorate also evaluates the effectiveness and efficiency of USAF management systems through functional management inspections (FMIs), system acquisition management inspections (SAMIs), and follow-up inspections.

• The Directorate of Aerospace Safety is the Air Force manager for flight, ground, missile, explosives, and systems safety programs. The Directorate provides guidance and monitors the implementation and effectiveness of mishap prevention programs. This includes administering the investigation and reporting of mishaps to determine causative factors and positive corrective measures. Air Force safety programs continue paying large dividends. The 1984 aircraft mishap rate of 1.78 nearly equaled the record low of 1.73 mishaps per 100,000 flying hours achieved in 1983, which was the lowest in USAF history.

• The Directorate of Medical Inspection plans and conducts Air Force and Air Reserve Forces biennial Health Services Management Inspections (HSMIs) and special investigations to ensure efficient and effective management of health-care resources. In addition to the 290 functional areas inspected in each medical facility, Special Interest Items (SIIs), as selected by the Air Force Surgeon General, are given increased emphasis.

• The Directorate of Nuclear Surety at Kirtland AFB, N. M., is the focal point for management of the worldwide Air Force nuclear surety programs. The Directorate's primary responsibility is to develop, direct, and evaluate nuclear inspection and safety programs to ensure that Air Force nuclear resources are efficiently managed and that programs provide maximum safety consistent with operational need. The Directorate works closely on a daily basis with many members of the nuclear community at Kirtland AFB and in the Albuquerque area.

• The Office of Management Support manages manpower, personnel, budget, and plans and programs development and administrative services for the Center and monitors major command and Air Force inspection schedules and activities.

• The Office of Data Automation provides the commander and his staff with automatic data processing and data systems support. It designs and develops all computer application software and operates a centrally located computer system to support all aspects of the AFISC mission. It also serves as USAF custodian and repository for flight records of rated individuals dating from the year 1911. ■

Amid wreckage of a crashed aircraft, Maj. Kurt Smith and Lt. Col. Paul Rost of the Air Force Inspection and Safety Center try to reconstruct what happened in the air prior to the accident. AFISC teams are on constant alert for deployment to such crash locations.

Air Force Intelligence Service

THE Air Force Intelligence Service (AFIS), comprising more than 2,200 active-duty, Reserve, and civilian personnel, is completing its thirteenth year as a separate operating agency. The AFIS mission is to provide accurate, timely, and reliable intelligence; trained intelligence personnel; and intelligence support resources to Hq. USAF and combatant commands during peacetime, wartime, and contingency situations.

Brig. Gen. Paul H. Martin serves in a dual role as the Commander of AFIS and as the Deputy Assistant Chief of Staff, Intelligence, Hq. USAF. With its headquarters in Washington, D. C., and operational elements in more than forty locations in the CONUS and overseas, AFIS is involved in the full spectrum of intelligence activities. AFIS conducts intelligence collection operations, processes and disseminates intelligence information, and manages programs to provide the Air Force with the intelligence personnel and systems needed to identify and define the threat through the 1990s and beyond.

Air Force Intelligence Service directorates support US Air Force planning and combat operations, responding to changing Air Force intelligence requirements.

• Operational Intelligence Directorate ensures that the Secretary of the Air Force, the Chief of Staff, and other key Air Staff officers receive the timely and accurate intelligence necessary for indications and warning, contingency planning, and force deploy-

ment and employment. It also provides special intelligence research as required and experts on photo research and signals intelligence (SIGINT) analysis.

• Target Intelligence Directorate plans, coordinates, and exercises managerial control of Air Force target intelligence. Responsibilities include weaponeering, target analysis, force application, and mission planning; target materials; and mapping, charting, and geodesy (MC&G). The Directorate serves as the program monitor for Air Force support and MC&G to the Defense Mapping Agency.

• Security and Communications Management Directorate oversees worldwide Air Force Special Security Offices and ensures compliance with special intelligence and intelligence telecommunications security policies.

• Intelligence Data Management Directorate plans, coordinates, and exercises managerial control of worldwide Air Force intelligence data-handling systems.

• Attaché Affairs Directorate supports the Defense Attaché System and monitors all matters concerning Air Force participation in that program.

• Intelligence Reserve Forces Directorate manages the Air Force Intelligence Service's Intelligence Reserve program. Responsibilities include the recruitment, administration, readiness training, and operational utilization of intelligence mobilization augmentees in support of active-duty forces, peacetime requirements, and contingency mission requirements.

• Soviet Affairs Directorate conducts the Air Force's Soviet Awareness Program. Responsibilities include the *Soviet Military Thought* and *Studies in Communist Affairs* series, the *Soviet Press Selected Translations* periodical, the Soviet Military Power Week and Soviet Awareness Team, and the Soviet Military Literature Research facility.

• Joint Services Support Directorate provides centralized management and cohesive direction to all aspects of intelligence support for USAF Prisoner of War (POW) matters. The Directorate serves as the action office in the Department of Defense for Code of Conduct training, manages the peacetime Hostage Survival Program, and produces finished intelligence in support of combat survival.

• Special Studies Division provides all-source analysis, reporting, and intelligence production on foreign denial and deception activities.

• Air Force Special Activities Center provides centralized management of all the Air Force activities involved in the collection of information from human resources. Major subordinate units are located in Air Force European and Pacific commands.

The Air Force Intelligence Service participates in joint and Air Force training exercises each year to improve the readiness of active-duty and Air Force Reserve intelligence personnel. AFIS also sponsors a multinational exercise for DoD survival instructors, Exercise Ridge Runner. AFIS demonstrated its readiness in the deployment of intelligence specialists to Grenada in support of Operation Urgent Fury. ■

Air Force Legal Services Center

AIR Force Legal Services Center (AFLSC), with headquarters in Washington, D. C., provides Air Force-wide legal services in military justice, claims for and against the Air Force, tort litigation, general litigation, labor law, preventive law, and legal aid.

The Center handles all Air Force patents, copyrights, and other property matters and is responsible for providing the trial officials for general or special courts-martial and for reviewing trial results. It also operates the automated legal research service center for DoD and other federal agencies through the federal legal information through electronics (FLITE) system.

Maj. Gen. Thomas B. Bruton serves in a dual role as the Commander of AFLSC in addition to his duties as the Judge Advocate General of the Air Force. About 600 people are assigned to the Center staff legal offices in Washington, D. C., and at virtually every Air Force installation in the world.

Several divisions of AFLSC administer or manage a variety of military justice functions.

• Court of Military Review reviews all courts-martial resulting in dismissal, confinement of one year or more, or dishonorable/bad conduct discharges. Decisions made by the Court of Military Review are appealable to the US Court of Military Appeals. The Court of Military Review is located in Washington, D. C.

• Military Justice Division reviews those records of trial by general court-martial not required to be reviewed by the Court of Military Review. It advises the Judge Advocate General on petitions for new trial or for relief from conviction. The Division prepares regulations, manuals, and policy letters relating to the preparation of responses to high-level inquiries concerning military justice matters. In addition, the Division provides legal advice to members of the Air Staff on issues related to criminal activities and the military justice system.

• Defense Services Division provides defense services to Air Force members appearing before the Air Force Court of Military Review, the US Court of Military Appeals, and the US Supreme Court. The Division also supervises 120 area defense counsel, nineteen circuit defense counsel, and seven chief circuit defense counsel, who provide defense services for Air Force personnel involved in special and general courts-martial and other adverse actions.

• Trial Judiciary Division oversees seven judiciary circuits and other subordinate districts throughout the world. The Chief Judge of each circuit is responsible for supervising the military judges and court administrators of the circuit. All Air Force judges are assigned to Air Force Legal Services Center to ensure independence from local commanders.

• Government Trial and Appellate Counsel Division represents USAF before the Air Force Court of Military Review and the US Court of Military Appeals. This Division also supervises the twenty-one full-time circuit trial counsel who prosecute most general and some special courts-martial.

• Special Assistant for Clemency and Rehabilitation Matters recommends appropriate clemency actions, including reduction in sentence, change in place of confinement, or substitution of administrative discharge for selected court-martial convictions. The Assistant responds to all congressional, executive, and individual correspondence dealing with confinement, clemency, and post-trial matters.

• Claims and Tort Litigation Staff

performs both operational and management functions over claims and tort litigation arising from Air Force activities worldwide. It settles or recommends settlement of certain claims above the base-level authority and provides litigation support to the Department of Justice in defending Air Force tort suits, including aviation cases.

• General Litigation Division protects Air Force interests in all domestic litigation except for copyright and patent cases and cases arising under the Federal Tort Claims Act. These actions are concentrated in five areas: information privacy and personal torts; personnel matters (retirement, pay, and allowance rights of Air Force military and civilian personnel, including individual or class discrimination); contracts (litigation brought by contractors for money damages, injunctions against award of contracts, bankruptcies, and collections of indebtedness to nonappropriated funds); general litigation (including environmental law litigation and actions under other federal and state laws, public utility rate litigation tax disputes, and civil-rights litigation involving equal opportunity in off-base housing); and administrative labor law (provides attorney representation for management in unfair labor practices cases, discrimination complaints, Merit System Protection Board cases, labor arbitration, negotiability disputes, and other administrative labor law cases).

• Patents Division provides direction, control, and coordination of invention, patent copyright, trademark, trade secret, and rights in technical data matters for the Air Force.

• Preventive Law and Legal Aid Group supervises the worldwide Air Force preventive law and legal assistance program, through which installation legal offices assist Air Force members with their legal affairs. In 1984, about 475,000 clients were advised in about 1,100,000 different personal civil matters. ■

Air Force Manpower and Personnel Center

THE programs managed by the Air Force Manpower and Personnel Center (AFMPC) affect nearly 600,000 Air Force men and women around the world. The AFMPC mission is people, and its personnel policies and programs affect the lives of Air Force people from their initial enlistment through retirement.

As stated in the Center's motto, "Responsive to the Mission—Sensitive to the People," the primary emphasis is on the mission—putting the right people in the right grades and skills at the right locations so that field commanders can accomplish their mission. That objective is primary, but the 2,138 officers, airmen, and civilian employees at the Center try to accommodate individual preferences and career goals while meeting the manpower needs of field commanders.

A separate operating agency located at Randolph AFB, Tex., AFMPC is commanded by Maj. Gen. J. B. Davis, who also serves as the Assistant Deputy Chief of Staff for Manpower and Personnel for Military Personnel, Headquarters, US Air Force.

AFMPC is most often associated with assignments. In Fiscal 1984, more than 246,000 airmen and nearly 49,000 officers were reassigned using a proven concept that matches career goals and personal preferences with Air Force needs. But even before the initial assignment, AFMPC works closely with Air Force Recruiting Service and Air Training Command to acquire, classify, and train the numbers and types of people the Air Force needs.

Promotions are important to all Air Force people. Last year, the Center hosted fourteen selection boards for promotion of officers up to the grade of colonel and for promotions to senior and chief master sergeant. In addition, boards were conducted to select 635 officers for the Air Force Institute of Technology, 135 for Education With Industry, 4,000 to attend professional military education (PME) in residence, and 180 to attend special flying programs. Other boards at the Center identified individuals for special recognition, including the Twelve Outstanding Airmen of the Year.

AFMPC also administers the Weighted Airman Promotion System (WAPS) and the Stripes for Exceptional Performers (STEP) programs. In Fiscal 1984, more than 41,000 enlisted members received promotions under WAPS, and 460 were selected by commanders for STEP promotions.

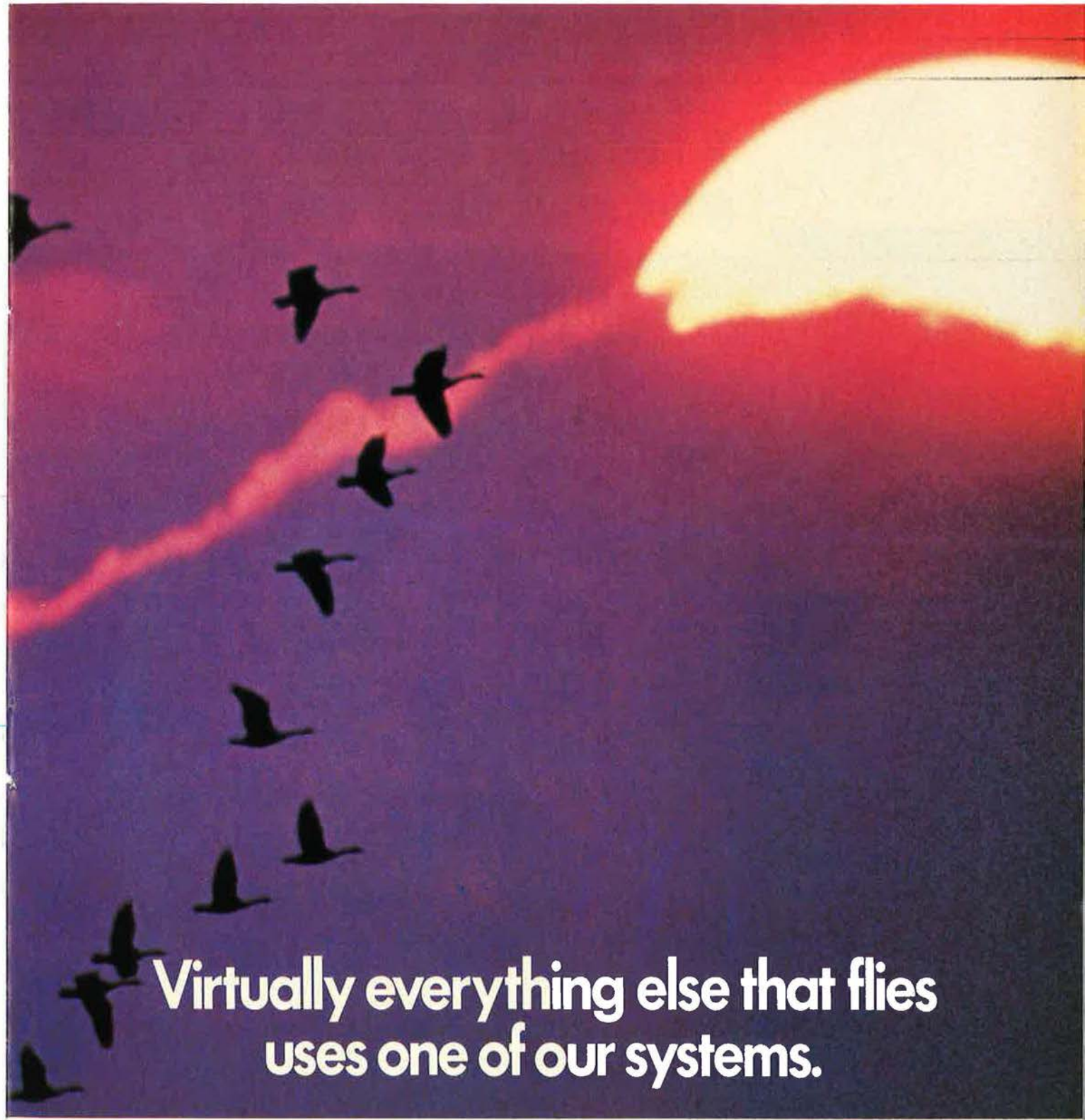
But AFMPC handles more than assignments, promotions, and PME selections. Quality of the force, awards and decorations, physical fitness, dress and personal appearance, and the $94 million-saving Air Force Suggestion Program also fall within AFMPC's responsibility. The Center also handles all separations and retirements and is the focal point for retiree activities.

Quality-force concepts continued as a focal point for reenlistment and retention-related activities in 1984. The Selective Reenlistment Program (SRP) was expanded to apply to second-term and career airmen, allowing commanders to ensure that only the most highly qualified members were allowed to reenlist. During Fiscal 1984, more than 10,000 people were retrained into new career fields through voluntary and selective retraining programs to achieve a better balance in career field manning.

To help keep quality people, many compensation and retention initiatives were conceived or supported by AFMPC reports, surveys, and field visits. The Center conducted numerous field visits, including Personnel Management Team visits to four European and two CONUS bases during 1984 to take the pulse and alleviate the concerns of Air Force people.

AFMPC is also the hub of all Air Force morale, welfare, and recreation (MWR) activities, such as libraries, open messes, aero clubs, arts and crafts and recreation centers, child-care centers and preschools, and entertainment, sports, and youth programs. The highlight of the year for MWR was the selection of the "Tops in Blue" entertainment group to perform at the Super Bowl XIX halftime show for 1985.

Initiatives in the open mess area include reinstatement of slot machines in overseas locations and a concentrated effort to upgrade the ambience and quality of service to open messes through two programs: Culinary Upgrade Program (CUP) and Tabletop Enhancement Program (TEP). CUP



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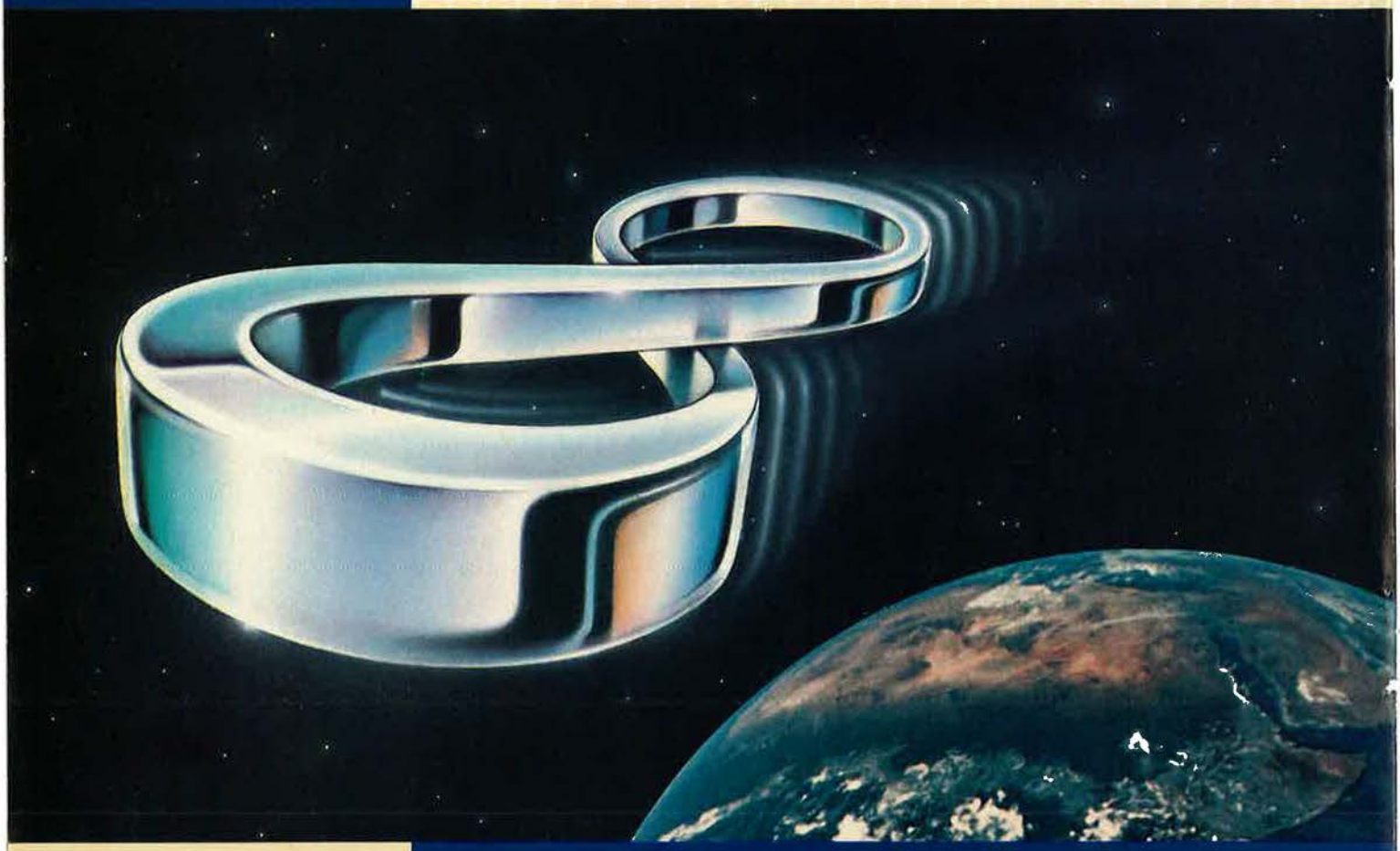

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graduated 247 club management people, bringing the total to 601 graduates since 1981. Now in its second year, TEP training teams visited 151 bases and trained 3,919 employees. Open mess membership grew to its largest level since 1970, with 553,000 members, an increase of 21,000 since 1983.

Another MWR initiative authorizes bases to establish family day-care programs. This program allows qualified people to care for children in their quarters, augmenting the child-care centers.

Programs to help those in need also are managed at AFMPC. Last year, Air Force members donated more than $6.4 million to help others through the Air Force Assistance Fund.

The Office of the Surgeon is responsible for assuring full staffing of health professions officers. At the present time, more than 1,600 physicians are being trained in active duty or deferred status to meet physician specialty requirements. The Surgeon's Office is also responsible for monitoring nonflying physical standards, and it reviewed 4,500 physical exams in Fiscal 1984.

AFMPC is responsible for administering the Air Force Casualty Service Program. In addition to assisting families of active-duty casualties, the Center maintains contact with the families of the 941 unaccounted-for Air Force personnel in Southeast Asia. As DoD executive agent for the award of the POW/MIA Commemorative Medal, AFMPC works with congressional delegations of all fifty states to present the medal to family members of those 2,490 men who are unaccounted for as a result of the conflict in Southeast Asia.

During 1984, the Center's Social Actions staff assumed responsibility for the Air Force Drug Testing Program. The staff developed a worldwide training program to ensure a smooth transition of assuming this responsibility at base level. The Social Actions staff also developed a revised affirmative action plan that contains an improved assessment method and adds several new objectives.

The Assistant for Colonel Assignments is also part of AFMPC. In addition to assignment actions, they work executive development opportunities, maintain master selection folders, process nondisability retirements, and manage the senior service school program for all colonels and colonel-selectees.

The entire personnel network is linked together by a worldwide computer system, providing current information on personnel actions twenty-four hours a day. AFMPC has recently replaced its 1970-vintage mainframe computers in order to provide better support and growth potential for the expanding needs of personnel managers. The system also includes newer, more powerful minicomputers at major commands and separate operating agencies as well as more than 600 remote terminals placed throughout the Air Force personnel community. In addition, a project called Advanced Personnel Data System-II (APDS-II) is well under way, supporting office-automation functions of the base personnel activities and linking them to data stored on the AFMPC mainframe computers.

AFMPC works closely with the Office of Civilian Personnel Operations and the Air Force Management Engineering Agency. Each receives operational direction and guidance from its Air Staff counterpart. The Office of Civilian Personnel Operations performs functions for Department of the Air Force civilian employees similar to what AFMPC does for the active-duty force. The Air Force Management Engineering Agency (AFMEA) represents the manpower arm of AFMPC. With staff elements at Randolph AFB, Tex., and field units located across the United States, AFMEA builds and approves peacetime and wartime manpower requirements determinants for all Air Force functions. ■

Air Force Medical Service Center

THE Air Force Medical Service Center (AFMSC) is a separate operating agency with headquarters at Brooks AFB, Tex. The Center was established July 1, 1978, and became operational on October 1 of that year. The AFMSC Commander also serves as the Deputy Surgeon General for Operations.

AFMSC assists the Air Force Surgeon General in developing operational policies and practices concerning routine and emergency health care in peace and war. The Center acts as the Air Force Surgeon General's agent in implementing policies, studies, and management and administrative research.

AFMSC has two directorates. The Health Care Support Directorate develops plans and procedures to ensure that needed medical facilities are available; that required medical supplies and material are provided; that patient affairs, including medical records and statistics, are properly managed; and that information management systems are developed and implemented.

The Professional Services Directorate is involved in programs associated with the practice of medicine in the Air Force, including clinical, flight, and preventive medicine and professional specialties associated with these areas.

This Directorate is also responsible for the USAF Radioisotope Committee, which coordinates all administrative and regulatory aspects of licensing, possession, use, storage, handling, and disposal of all radioactive material in the Air Force. This committee also acts as the Air Force point of contact with the United States Nuclear Regulatory Commission on licensing matters. Another function of this Directorate is to review all Air Force clinical investigations and human-use studies conducted in the medical service to ensure that they meet appropriate Air Force, DoD, and other federal standards.

Within the Professional Services Directorate is the Consumer Health Education Division, which was relocated from Sheppard AFB, Tex., in February 1981. The Division works primarily in three areas of health education: community, outpatient, and inpatient.

AFMSC is directly involved on a daily basis with the Air Force Surgeon General, other Air Staff directorates, major commands, and other federal agencies. A continuing interchange is required as operational policy and practices for medical support are developed and implemented.

Effective July 1, 1985, AFMSC will complete a major reorganization with movement of the Professional Services Directorate to the Office of the Surgeon General, Washington, D. C. AFMSC will then be redesignated the Air Force Office of Medical Support (AFOMS). ■

Air Force Office of Security Police

THE Air Force Office of Security Police, located at Kirtland AFB, N. M., was established as a separate operating agency on September 1, 1979. The Commander, Brig. Gen. P. Neal Scheidel, also serves as the Air Force Chief of Security Police and the Assistant Inspector for Security Police. In these capacities, he is responsible to the Inspector General, US Air Force. A staff of ninety is assigned to Kirtland AFB; an additional forty-five people are part of the Air Force Security Clearance Office, an operating location in Washington, D. C., and twelve are assigned to the Inspector General's staff.

AFOSP develops operational policies and practices that relate to new and existing programs for the security of Air Force resources, law enforcement services, air base ground defense, ground weapons training and field maintenance, as well as information security.

AFOSP plans, directs, and supervises all Air Force security police activities. These include physical security of Air Force resources, maintenance of law and order, terrestrial nuclear reactor protection, vehicle traffic management, the military working dog program, information security program, base defense, security police and combat-arms training, security police systems and equipment programs, security education, and prisoner rehabilitation and corrections.

AFOSP accomplishments during the past year include:

- AFOSP continues to develop a ground defense program to enhance air base survivability and contribute to sortie generation. As a result of the Memorandum of Agreement between the Chiefs of Staff of the US Army and USAF on the Joint Force Development Process, AFOSP and Army representatives are developing joint service agreements to allow increased cooperation with the Army for air base ground defense and training.
- The agency contributed in developing physical security requirements and concepts for such programs as the Peacekeeper missile, the ground-launched cruise missile (GLCM), the antisatellite (ASAT) system, and the Space Transportation System.
- AFOSP has accelerated efforts to develop concepts of operations for the use of emerging intrusion-detection system technology, including robotics.
- AFOSP sponsored an air base ground defense exercise, Safe Defender One, in July at Little Rock AFB, Ark., and Camp Robinson, Ark. The exercise tested and refined the air base ground defense group headquarters structure.
- AFOSP has established an antiterrorism branch to provide improved security police doctrine, tactics, and equipment to combat the terrorist threat to Air Force resources.
- As a result of Secretary Verne Orr's decision to allow women to enter the security specialist career field, AFOSP worked with the manpower and personnel community to develop new policy guidance.
- AFOSP implemented drugged/drunk driver countermeasures, including education and enforcement and patrol strategy, to reduce the incidence of alcohol and drug-related accidents. AFOSP provided explosive-detector dog teams to support the 1984 Olympics and the Presidential campaign.
- The agency began implementing the Security Police Automated System this past year. This system will eventually automate the majority of security police functions in a worldwide communications network.
- AFOSP sponsored four regional seminars to enhance understanding of the personnel security clearance system.
- The AFOSP-sponsored worldwide security police competition, Peacekeeper Challenge, included a new information security competition. The fourth annual event drew teams from the Royal Air Force Regiment, the US Army Military Police, the Air Force Reserve, the Air National Guard, and from all major commands. ■

Air Force Office of Special Investigations

THE Air Force Office of Special Investigations (AFOSI), headquartered at Bolling AFB, D. C., has been in operation since August 1, 1948. It is the major investigative service for the Air Force. AFOSI is commanded by Brig. Gen. Richard S. Beyea, Jr.

AFOSI gathers and provides the facts that Air Force commanders need to take judicial or administrative action in cases of criminal or fraudulent activity. It also conducts counterintelligence, antiterrorism, and personal protective service operations. Since the organization is a fact-finding agency only, the requesting authority always determines the appropriate action to be taken after AFOSI has conducted its investigation. AFOSI has more than 2,800 special agents, reservists, and support personnel stationed at almost every Air Force installation worldwide.

AFOSI recruits, selects, and trains its own special agents from highly qualified Air Force men and women. Officer, enlisted, and civilian selectees attend a fourteen-week investigators' course at the US Air Force Special Investigations Academy, collocated with the headquarters.

AFOSI special agents are trained in fraud and criminal investigations, forensic sciences, technical services, polygraph, counterintelligence, antiterrorist operations, and personal protective services.

About twenty-five percent of AFOSI's investigative resources are assigned to fraud investigations. This includes violations of the public trust involving Air Force contracting matters, appropriated and nonappropriated funds activities, computer systems, pay and allowance matters, acquiring and disposing of Air Force property, and major administrative irregularities. AFOSI used fraud surveys to determine the existence, location, and extent of fraud in Air Force operations or programs and provides briefings to base- and command-level resource managers to help them identify indications of and to prevent fraud, waste, and abuse involving Air Force or Department of Defense resources.

As a result of AFOSI fraud and criminal investigations, the Air Force recouped $30.6 million in recoveries and savings of assets in 1984, plus $5.4 million in fines.

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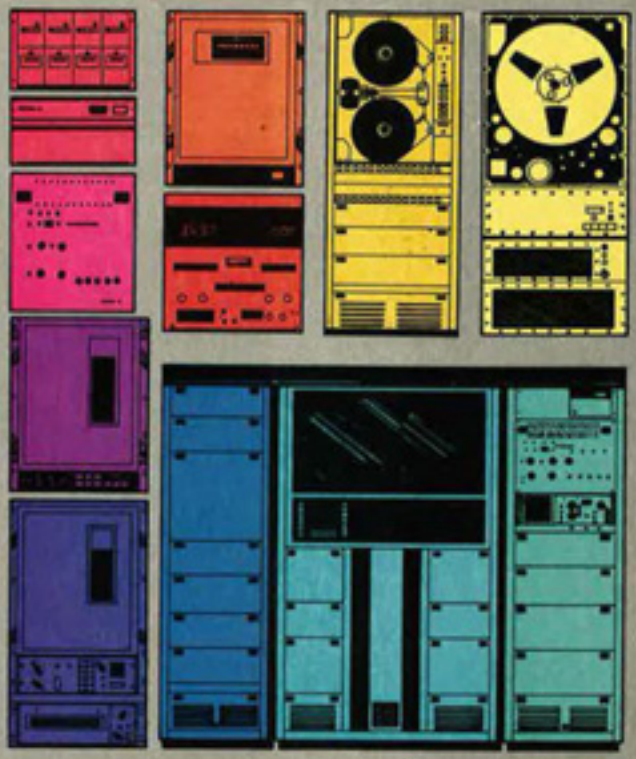

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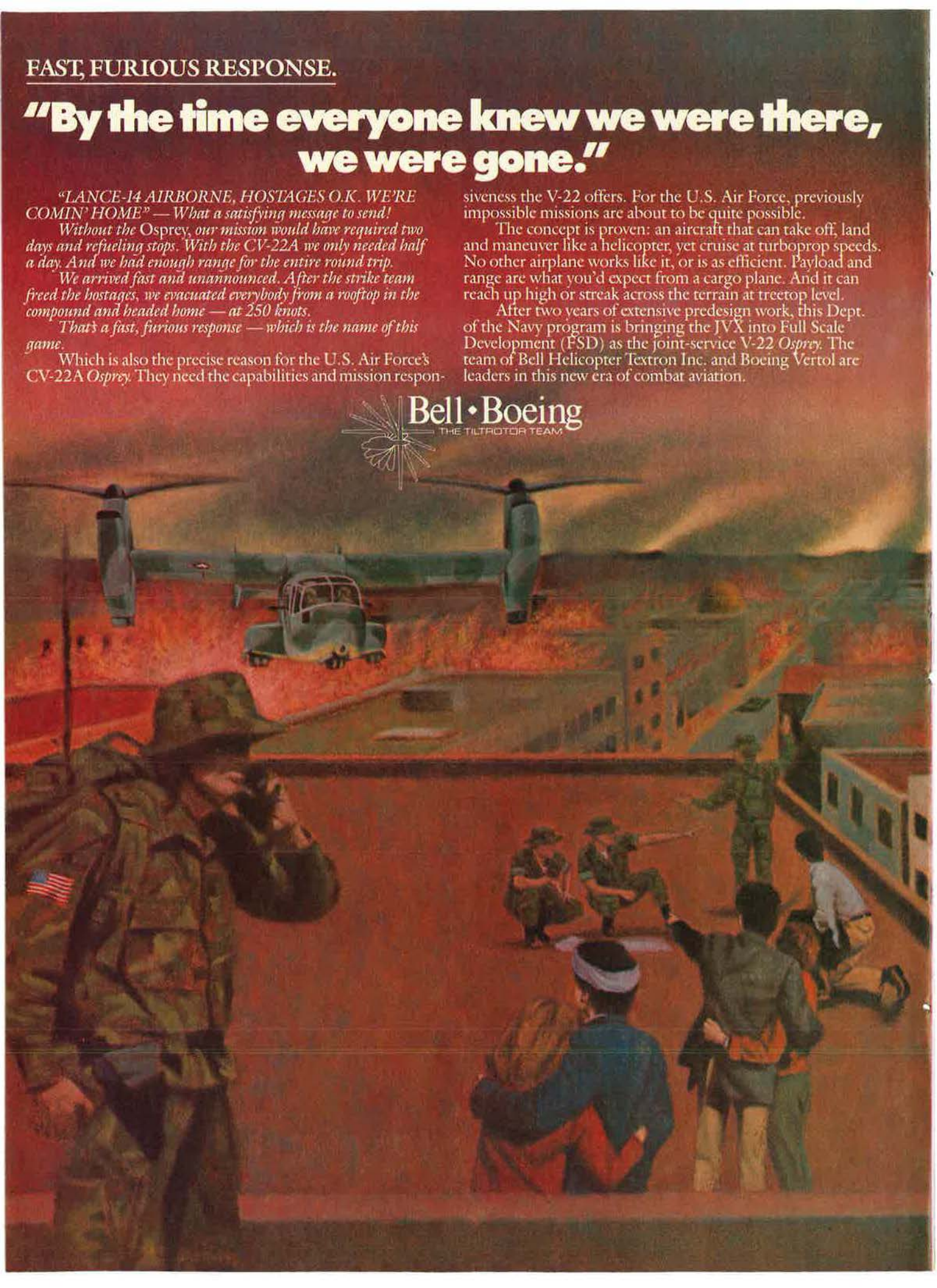

About forty-three percent of AFOSI's investigative resources are devoted to criminal investigations. The most frequently conducted investigations involve drug abuse, but may include crimes against the Air Force, its personnel, or their property, ranging all the way from housebreaking to homicide.

Because of the potential for computer-related crime in the Air Force, AFOSI computer experts are developing a new Computer Crime Investigative Assistance program. In addition, they are expanding the array of methods available for using computers as investigative tools.

The AFOSI counterintelligence mission is concerned with threats to the security of Air Force operations and human material resources posed by foreign intelligence services and terrorist groups. AFOSI carries out this mission through an integrated program of offensive and defensive services designed to detect, assess, and neutralize the threats. These services include investigations of espionage, threat awareness briefings to Air Force people, operations to protect critical weapon systems technology from foreign acquisition, and personal protection for senior Air Force, DoD, and US officials in high-risk environments.

Terrorism is a primary concern of AFOSI in its counterintelligence mission. This threat has not lessened, nor is it expected to do so in the immediate future. AFOSI is USAF's clearinghouse for analysis and reporting of all terrorist information affecting Air Force interests worldwide.

AFOSI uses a variety of special investigative techniques to aid in performing its investigative tasks. These include forensic science skills, such as forensic hypnosis, and computer analyses of patterns and trends in criminal activity, such as rape, arson, and intentional damage to Air Force aircraft.

AFOSI also uses closed-circuit television and other electronic surveillance techniques to gather evidence in criminal investigations. The organization directs the worldwide Air Force polygraph and identi-kit programs, manages and trains undercover agents and other investigative sources worldwide, and employs a clinical psychologist.

AFOSI is increasing its wartime readiness posture by participating in Joint Chiefs of Staff and major command exercises to ensure that its special agents are prepared to support combat commanders. This training paid off for the command during the 1983 Operation Urgent Fury. Thirty-one AFOSI members, agents, and support personnel provided counterintelligence support for Air Force elements deployed to Grenada.

AFOSI exists solely to serve Air Force commanders and better enable them to accomplish their assigned missions. ■

Air Force Operational Test and Evaluation Center

THE Air Force Operational Test and Evaluation Center (AFOTEC) is the Air Force independent test agency responsible for testing and evaluating, under operationally realistic conditions, new systems being developed for Air Force and multiservice use. The purpose of its testing is to ensure that the new equipment meets the users' requirements and that it will operate effectively and be supportable under actual field conditions.

The Center is designated as a separate operating agency under Headquarters, United States Air Force. The Commander of the Operational Test and Evaluation Center reports directly to the Chief of Staff of the Air Force.

Results from the Center's testing are used at all levels in the Air Force, the Department of Defense, and Congress in making program decisions leading to the production and fielding of the systems. The Center's efforts focus on providing assessments of the operational effectiveness and suitability of the Air Force's future weapons and supporting equipment as well as identifying deficiencies requiring corrective action.

The Center tests equipment ranging from the low-altitude navigation and targeting infrared for night (LANTIRN) system to the Navstar global positioning system. In addition to the extensive tests being done on strategic systems, such as the B-1B bomber and Peacekeeper missile, the Center recently completed Maverick air-to-ground missile and ground-launched cruise missile operational tests. Test efforts will continue on systems, such as the TRI-TAC multiservice communications system, the airborne self-protection jammer, T-46A trainer aircraft, HH-60 Night Hawk helicopter, Space Transportation System (Space Shuttle), and antisatellite systems.

The Center has approximately 470 people assigned to the headquarters at Kirtland AFB, N. M. The total number assigned full-time is 712, including those in the five detachments and two dozen test teams throughout the country and in Europe. The Center has detachments at Eglin AFB, Fla., Nellis AFB, Nev., Edwards AFB, Calif., Colorado Springs, Colo., and Kapaun AS, Germany.

Other commands supplement the test teams at the detachments and operating locations so that approximately 2,200 people are under the Center's operational control at any given time. Those additional 1,500 people are the ultimate users of a system: operators, maintainers, and other support and training specialists. ■

An AFOTEC ground crew begins preparation of an F-111 for an operational test of Maverick air-to-ground missiles. Test result analysis will be used by USAF and DoD in making production and weapon fielding decisions.

Air Force Service Information and News Center

THE Air Force Service Information and News Center (AFSINC), Kelly AFB, Tex., is a key contributor to the Air Force public affairs mission. That mission is to help Air Force leaders keep their people informed. In 1984, a number of AFSINC's tasks were computerized, enabling the Center to assist those leaders more effectively.

AFSINC, responsible to the Director of Public Affairs in the Office of the Secretary of the Air Force, was activated on June 1, 1978. It is commanded by Col. Donald Hilkemeier.

• The Directorate of Internal Information produces printed and audiovisual materials to assist commanders in keeping Air Force military and civilian members and their families informed about Air Force and DoD national policies, decisions, actions, and activities. Printed products include *Airman* magazine, the Air Force Policy Letter for Commanders, Air Force News Service, Aerospace Speeches, and Family News. Audiovisual products include Air Force Now films, the lithograph series, and Air Force Radio News Service.

• The Army and Air Force Hometown News Service provided news about 375,000 soldiers and airmen to their hometown newspapers and broadcast outlets in 1984. About 15,000 news media received a record 1,750,000 releases on accomplishments of service members. The Hometown News Service also provided 1,424 feature-length articles accompanied by photos. In addition, Army and Air Force television teams and an Air Force Radio unit produced 1,005 broadcast interviews for their respective services.

• The Air Force Broadcasting Service, responsible for directing the Air Force's Armed Forces Radio and Television Service (AFRTS) operations overseas, added television service to Camp New Amsterdam, the Netherlands, and Camp O'Donnell, the Philippines, and radio service to Oslo, Norway, during 1984. The Service directs broadcasting squadrons at Ramstein AB, Germany, Elmendorf AFB, Alaska, and Yokota AB, Japan.

Information and entertainment are provided to DoD personnel and their families worldwide. This year, Clark AB, the Philippines, was added to the AFRTS Satellite Network, bringing timely programming to that area.

• The Directorate of Administration and Resources provides administrative, information systems, reprographic, and distribution services for AFSINC headquarters and budget and personnel support for all AFSINC units. This includes budgetary and administrative support for Air Force regional public affairs units in Chicago, Los Angeles, and New York City and for the Air Force Orientation Group at Gentile AFS, Ohio.

• The Air Force Office of Youth Relations provides liaison between the Air Force and the national and regional offices of the Boy Scouts of America, the Girl Scouts of the United States of America, Camp Fire, Inc., and other appropriate nationwide youth organizations. The national office at Kelly AFB and the six one-person field offices throughout the United States assisted in hosting 3,396 events involving 92,697 youth and 24,557 adults in 1984.

As of December 31, 1984, AFSINC was authorized 717 active-duty and thirty-three reserve Air Force personnel, 180 Air Force civilian personnel, eighteen Army military personnel, and ten Army civilian personnel for a total authorized strength of 958. ■

Air Reserve Personnel Center

THE primary mission of the Air Reserve Personnel Center (ARPC), Denver, Colo., is mobilization—providing resources and maintaining administrative capability to effect call-up of sufficient Air Reserve Forces to assure Air Force combat capability in the event of national emergency. In support of this mission, the Center's nearly 850 military and civilian personnel provide numerous personnel services as well as maintain the master personnel records on Air National Guard and Air Force Reserve members not on extended active duty.

This resource of pretrained, readily available reservists consists of the more than 100,000 members of the Air National Guard, the more than 70,000 participating members of the Air Force Reserve, and the more than 80,000 other former active-duty Air Force members subject to mobilization. Together, this group constitutes the Air Reserve Forces and makes up nearly one-half of the manpower available to the Air Force in time of national emergency. The personnel readiness of this group is an important contribution to national defense and is the mission responsibility of ARPC.

Participation point accounting, reserve retirements, and administration of the Reserve Component's Survivor Benefit Plan are a few of the basic services provided by ARPC to all of those nearly 250,000 Guard and Reserve members, regardless of their participation program. In addition, ARPC handles officer promotions from captain through lieutenant colonel for the Guard and from captain through colonel for the Reserve. ARPC also provides assignment assistance for these reservists at many points during their careers.

ARPC provides even broader services to reservists who serve as Individual Mobilization Augmentees (IMAs). IMAs are reservists who are individually assigned to positions with the active Air Force or other government agencies. They do not have a reserve unit assignment.

If a mobilization were ordered, IMAs would report to their positions on a full-time basis. Because IMAs do not have a unit personnel office to handle base-level support, it is provided by ARPC. This operation at ARPC serves nearly 13,000 reservists, mostly by mail or telephone, and is the largest base-level personnel office in the Air Force.

Another special operation with ARPC is the Single Manager program, which serves the special requirements of reserve medical personnel, attorneys, legal specialists, and chaplains.

In addition to programs supporting actively participating reservists, ARPC also maintains the master records and address data for nearly a

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Because of the firepower and versatility packed into each 19 round Hydra 70 launcher, pilots flying close air support missions can lay down effective suppressive fire while still beyond the range of most ground-to-air gun systems. Warhead choices include nine submunition anti-armor/personnel rockets, shaped charge, chaff, flechette, smoke, flare and high explosive rounds. Any five types can be loaded in the launcher and fired to a precise point in space. Range in 100-meter increments and rocket selection is made by the pilot just prior to firing.

Selective Anti-Armor

When launched at massed armor formations, Hydra 70 chaff and submunition rockets can cause an enemy formation to "button-up," disperse and seek cover. Dispersion reduces his ability to mass his defensive weapons against the attacking aircraft and the chaff cloud obscures his radar fire control picture. Thus Hydra 70 helps clear the way for pilots to carefully select targets for attack by rockets or guns.

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quarter of a million inactive reservists. These individuals—many of whom have a remaining military service obligation—could, in a mobilization, be called to fill vacancies in active Air Force units.

This level of activity makes ARPC a busy place. More than 700,000 personnel actions are completed annually. To handle this work load, the Center depends heavily on computer, microform, and numerous other sophisticated data-management procedures.

As the role of the Air Reserve Forces grows under the Total Force policy, ARPC continues to seek ways of improving its responsiveness and efficiency in its mission of reserve personnel administration. For more than thirty years, ARPC has served the Air Reserve Forces and the nation by keeping these reservists ready for mobilization. This important contribution to national defense is the mission of ARPC. ARPC is ready, when needed, to fulfill it. ■

Air Force Reserve

MODERNIZATION, expanding responsibilities, and achievement highlighted 1984 for the Air Force Reserve as its men and women continued to demonstrate their readiness as full partners in today's Air Force.

"This has certainly been a dynamic year for the Air Force Reserve," noted Maj. Gen. Sloan R. Gill, Chief of Air Force Reserve and AFRES Commander. "There can be little doubt that we play a vital role in national security. Our active-duty counterparts routinely call on us to share important USAF missions, and we are answering with new weapons, modernized aircraft, and highly skilled people."

Since delivery of the Air Force Reserve's first F-16 Fighting Falcons in October 1983, the 419th Tactical Fighter Wing, Hill AFB, Utah, has received its full complement of twenty-four of the high-performance aircraft. In the first full year of operation, the proficiency of 419th members in flying and maintaining the F-16 earned the unit a Tactical Air Command flying safety award.

Aircraft modernization also impacted the airlift arena as Gen. Thomas M. Ryan, Jr., Commander in Chief of Military Airlift Command, flew the Reserve's first C-5A to Kelly AFB, Tex., in December. The 433d Military Airlift Wing there will operate five unit-assigned C-5As by the end of FY '86. Eight of the wing's C-130Bs are going to the 302d Tactical Airlift Wing at Peterson AFB, Colo. The wing replaced the 901st Tactical Airlift Group there on April 1. The 433d's remaining eight C-130s are being transferred to the 943d TAG, which was reactivated at March AFB, Calif., also on April 1. The 303d Aerospace Rescue and Recovery Squadron at March AFB is to be inactivated and its HC-130 aircraft transferred to the newly activated 939th Aerospace Rescue and Recovery Group, a composite rescue unit at Portland IAP, Ore.

In other programmed actions, a new KC-10 associate squadron will be formed at Seymour Johnson AFB, N. C., on October 1, in conjunction with activation of the Strategic Air Command's third KC-10 squadron. The 700th TAS at Dobbins AFB, Ga., will receive two additional C-130Hs in July 1985.

Support unit changes in AFRES centered on increases in the medical and civil engineering areas. Continuing a five-year medical buildup begun in 1981, the 13th USAF Contingency Hospital (USAFCH) was activated at Scott AFB, Ill., in October, with detachments at Little Rock AFB, Ark., Langley AFB, Va., and Robins AFB, Ga. This contingency hospital will provide support to USAF Medical Center, Scott, upon deployment of its active-duty personnel to a theater of operations. In September, at Lackland AFB, Tex., nearly 280 reservists of the 11th USAFCH provided medical manpower to staff Wilford Hall USAF Medical Center, the Air Force's largest and most modern medical facility, simulating a national emergency in which the active-duty staff deployed to RAF Little Rissington.

Nine additional civil engineering units are to be activated in October 1985 and three more in 1987, with an increase of more than 1,200 personnel, continuing the Reserve's buildup in the engineering field.

The coming years will see even further changes affecting Air Force Reserve units. In Fiscal Year 1986, the 459th TAW at Andrews AFB, Md., will convert from its tactical mission in C-130Es to a military airlift wing and will become the first AFRES unit to be equipped with C-141s. The aircraft from Andrews will be transferred to the 934th TAG at Minneapolis-St. Paul IAP, Minn., and the C-130s already assigned there will transfer to the 907th TAG at Rickenbacker ANG Base, Ohio. AFRES C-141 associate units at Charleston AFB, S. C., McGuire AFB, N. J., Norton and Travis AFBs, Calif., and McChord AFB, Wash., will each lose aircraft and personnel to support the transfer of C-141s to the Reserve unit at Andrews AFB as well as the Air National Guard unit at Jackson, Miss.

In other actions announced by Headquarters Air Force in January, the 337th Tactical Airlift Squadron at Westover AFB, Mass., will convert from sixteen C-130Es to eight C-5A aircraft and will be redesignated the 337th Military Airlift Squadron. Luke AFB, Ariz., will become the new home for AFRES's second F-16 unit, as the 302d Special Operations Squadron will convert from CH-3 helicopters to the new Fighting Falcons in 1988. The 914th TAG at Niagara Falls IAP, N. Y., will convert from C-130As to the new model C-130Es in 1987.

In one other significant change, the Air Force also announced that the three active KC-10 units at March AFB, Calif., Barksdale AFB, La., and Seymour Johnson AFB, N. C., will transfer a portion of the responsibilities for the maintenance of the KC-10 Extender aircraft to the Air Force Reserve, thus providing a cost-effective means of balancing the shortfall between peacetime manpower levels and wartime requirements and enhancing the Air Force's strategic mobilization capability.

"We are especially proud of our people," commented General Gill. "Through their efforts, the Reserve has been able to keep its modernization program on track and, at the same time, continue to support the Air Force's varied missions on a day-to-day basis. On virtually any day of the week, Air Force reservists can be found around the globe, working alongside active-duty members to get the job done."

Augmenting the Military Airlift Command's global airlift mission, AFRES strategic associate and tactical airlift units logged nearly 141,500 flying hours in FY '84, air-drop-

ping or air-landing more than 416,000 people and nearly 146,000 tons of cargo. Operations included ongoing rotations at Howard AFB, Panama, shared with the Air National Guard, to meet US airlift requirements in Latin America. In the United States, associate aeromedical evacuation crews and their MAC counterparts flew 2,436 live missions, carrying more than 80,000 patients.

In support of other MAC missions, the command's 815th Weather Reconnaissance Squadron—the "Storm Trackers"—at Keesler AFB, Miss., spent nearly 1,300 flying hours conducting weather surveillance, including the tracking of eight major tropical storms and four hurricanes. The Reserve's four aerospace rescue and recovery squadrons saved twenty-eight people. Elsewhere, domestic entomological control programs found Reserve crews spraying 387,713 acres to help eradicate harmful insects. As DoD's sole fixed-wing aerial spray unit, the 907th TAG at Rickenbacker ANG Base, Ohio, also has the distinction of flying the only C-123K aircraft in the Air Force, plus C-130A and UC-123K aircraft for its tactical airlift mission.

In support of SAC's worldwide aerial refueling mission, AFRES KC-10 associate and KC-135 crews flew more than 6,700 missions during FY '84, refueling more than 9,000 airborne receivers. Tasking included continued augmentation of the European Tanker Task Force.

AFRES fighter units, which have undergone numerous conversions to update weapon systems, flew more than 46,600 hours on varied training missions, including participation in Red Flag and its Canadian equivalent, Maple Flag; the joint-service Ocean Venture exercises in the Caribbean; the Tenth Air Force-sponsored Phantomcomp and Thundercomp tactical bombing and gunnery competitions for AFRES F-4 and A-10 aircraft; and deployments to Alaska, Germany, and Hawaii.

In a unique test of reserve force readiness, members of the 514th MAW, McGuire AFB, N. J., operated Europe's largest aerial port at Rhein-Main AB, Germany, for two weeks in June. The deployment, Patriot Partner 84, was the first time AFRES had exercised a near-total "takeover" of an overseas base aerial port. Also, in July, four Air Force Reserve units took part in Palace Ready 84. Sponsored by the Air Reserve Personnel Center, this Total Force exercise was a top-to-bottom evaluation of the systems used to mobilize the Air Reserve Forces in a national emergency.

An AFRES F-16 of the 419th Tactical Fighter Wing, Hill AFB, Utah, refuels from an AFRES KC-135, demonstrating that Air Force Reserve units today participate on an equal footing with USAF units in exercises and operations worldwide.

Overall, more than 86,000 reservists participated in some sixty-nine exercises during the year, including C-130 missions to Alaska in support of Brim Frost, intratheater airlift in the Pacific as part of Team Spirit, and airlift support of Central Command's Gallant Eagle exercise in the deserts of California and Nevada.

The Air Force Reserve also continued its support of NASA's Space Shuttle program during FY '84, deploying aircraft and support equipment for surveillance before each launch as part of the contingency force.

Throughout the year, Air Force Reserve units garnered many awards reflecting outstanding performance.

Leading the list was recognition of a command-wide rate of only 0.7 major flight mishaps per 100,000 flying hours—the third consecutive decline and lowest rate in fourteen years. In addition to the TAC safety award earned by the 419th TFW, other organizations throughout the command received thirty-one flight, ground, or explosives safety awards.

At Volant Rodeo, MAC's annual international combat airlift competition, the 445th MAW, Norton AFB, Calif., won the best C-141 aircrew award, while the 514th MAW, McGuire AFB, N. J., took top honors in C-141 maintenance. In MAC's annual search-and-rescue competition (SAREX), the 303d ARRS, March AFB, Calif., won the award for best individual para-rescue parachuting, while earlier efforts by reservists from the 304th ARRS at Portland IAP in rescuing three severely injured climbers on the slopes of Mount Hood, Ore., earned that unit the Jolly Green Association's 1983 Rescue Mission of the Year Award.

"It's fine to talk about our equipment and our mission," observed General Gill, "but people are what make the Air Force Reserve a viable force. Our missions are expanding, and our role is taking on increased importance. Such growth would not be possible without a history of outstanding performance. With that in mind, I salute each and every reservist who has helped to establish our past track record."

To support the ongoing need for trained personnel to perform the AFRES mission, recruiters were tasked to bring manning of the Selective Reserve to 69,880 by September, an increase of 3,200 over 1983. In September, the 70,000th reservist was sworn in at Kelly AFB, Tex., marking the seventh consecutive year that recruiting efforts surpassed objectives.

Direct management of the Reserve's field units continued to be provided in 1984 by three numbered air force headquarters: Fourth Air Force, McClellan AFB, Calif., Tenth Air Force, Bergstrom AFB, Tex., and Fourteenth Air Force, Dobbins AFB, Ga., with Hq. Air Force Reserve at Robins AFB, Ga., providing overall unit-program management.

"Today's Reserve is meeting the defense challenge with readiness and willingness. All in all, it has been an important and exciting year for us, and we are looking forward with great anticipation to a future of increased defense partnership," concluded General Gill. ■

AIR FORCE RESERVE FLYING WINGS AND ASSIGNED UNITS

Air Force	Wing Hq.	Group	Squadron	Type Aircraft	Location	Gaining Command
			302d SOS	CH-3E	Luke AFB, Ariz.	MAC
		919th SOG	711th SOS	AC-130A	Eglin AFB, Fla. (Aux. 3)	MAC
	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-141B	Travis AFB, Calif.	MAC
			710th MAS (Assoc)	C-141B	Travis AFB, Calif.	MAC
	403d RWRW		815th WRS	WC-130H	Keesler AFB, Miss.	MAC
			301st ARRS	HC-130H/N, HH-3E	Homestead AFB, Fla.	MAC
Fourth Air Force			305th ARRS	HC-130H/N, HH-3E	Selfridge ANGB, Mich.	MAC
(Hq. McClellan AFB, Calif.)		939th ARRG	304th ARRS	UH-1N, HH-1H, HC-130H	Portland IAP, Ore.	MAC
Brig. Gen. (Maj. Gen. selectee) Robert G. Mortensen Commander	433d MAW		68th MAS	C-5A	Kelly AFB, Tex.	MAC
	302d TAW		731st TAS	C-130B	Peterson AFB, Colo.	MAC
		934th TAG	96th TAS	C-130A	Minneapolis-St. Paul IAP, Minn.*	MAC
		943d TAG	303d TAS	C-130B	March AFB, Calif.	MAC
	440th TAW		95th TAS	C-130A	Gen. Billy Mitchell Field, Wis.*	MAC
		927th TAG	63d TAS	C-130A	Selfridge ANGB, Mich.	MAC
		928th TAG	64th TAS	C-130A	O'Hare ARFF, Ill.*	MAC
	445th MAW (Assoc)		728th MAS (Assoc)	C-141B	Norton AFB, Calif.	MAC
			729th MAS (Assoc)	C-141B	Norton AFB, Calif.	MAC
			730th MAS (Assoc)	C-141B	Norton AFB, Calif.	MAC
	446th MAW (Assoc)		97th MAS (Assoc)	C-141B	McChord AFB, Wash.	MAC
			313th MAS (Assoc)	C-141B	McChord AFB, Wash.	MAC
	301st TFW		457th TFS	F-4D	Carswell AFB, Tex.	TAC
		924th TFG	704th TFS	F-4D	Bergstrom AFB, Tex.	TAC
	419th TFW		466th TFS	F-16A/B	Hill AFB, Utah	TAC
		507th TFG	465th TFS	F-4D	Tinker AFB, Okla.	TAC
Tenth Air Force	434th TFW		45th TFS	A-10A	Grissom AFB, Ind.	TAC
(Hq. Bergstrom AFB,Tex.)		917th TFG	46th TFTS	A-10A	Barksdale AFB, La.	TAC
			47th TFS	A-10A	Barksdale AFB, La.	TAC
	442d TFW		303d TFS	A-10A	Richards-Gebaur AFB, Mo.*	TAC
		926th TFG	706th TFS	A-10A	New Orleans NAS, La.	TAC
Maj. Gen. James C. Wahleithner Commander	452d AREFW (H)		336th AREFS (H)	KC-135	March AFB, Calif.	SAC
			78th AREFS (H) (Assoc)	KC-10A	Barksdale AFB, La.	SAC
			79th AREFS (H) (Assoc)	KC-10A	March AFB, Calif.	SAC
		931st AREFG (H)	72d AREFS (H)	KC-135	Grissom AFB, Ind.	SAC
		940th AREFG (H)	314th AREFS (H)	KC-135	Mather AFB, Calif.	SAC
	482d TFW		93d TFS	F-4D	Homestead AFB, Fla.	TAC
		906th TFG	89th TFS	F-4D	Wright-Patterson AFB, Ohio	TAC
		932d AAG (Assoc)	73d AAS (Assoc)	C-9A	Scott AFB, Ill.	MAC
	94th TAW		700th TAS	C-130H	Dobbins AFB, Ga.*	MAC
		907th TAG	356th TAS	C-130A, C-123K#	Rickenbacker ANGB, Ohio	MAC
		908th TAS	357th TAS	C-130E	Maxwell AFB, Ala.	MAC
	315th MAW (Assoc)		300th MAS (Assoc)	C-141B	Charleston AFB, S. C.	MAC
			701st MAS (Assoc)	C-141B	Charleston AFB, S. C.	MAC
Fourteenth Air Force			707th MAS (Assoc)	C-141B	Charleston AFB, S. C.	MAC
(Hq. Dobbins AFB, Ga.)	439th TAW		337th TAS	C-130E	Westover AFB, Mass.*	MAC
		911th TAG	758th TAS	C-130A	Greater Pittsburgh IAP, Pa.*	MAC
		914th TAG	328th TAS	C-130A	Niagara Falls IAP, N. Y.*	MAC
Maj. Gen. Alan G. Sharp Commander	459th TAW		756th TAS	C-130E	Andrews AFB, Md.	MAC
		910th TAG	757th TAS	C-130B	Youngstown MAP, Ohio*	MAC
		913th TAG	327th TAS	C-130E	Willow Grove ARF, Pa.*	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-141B	McGuire AFB, N. J.	MAC
			702d MAS (Assoc)	C-141B	McGuire AFB, N. J.	MAC
			732d MAS (Assoc)	C-141B	McGuire AFB, N. J.	MAC

AAG (Assoc)	Aeromedical Airlift Group (Assoc)	SOG	Special Operations Group
AREFW	Air Refueling Wing	TAG	Tactical Airlift Group
ARF	Air Reserve Facility	TAW	Tactical Airlift Wing
ARFF	Air Reserve Forces Facility	TFW	Tactical Fighter Wing
ARRG	Aerospace Rescue and Recovery Group	#	AFRES will retain 4 C-123Ks for aerial spray mission
MAW (Assoc)	Military Airlift Wing (Associate)	*	Indicates AFRES base
RWRW	Rescue and Weather Reconnaissance Wing		

Air National Guard

With both a state and a federal mission, the Air National Guard (ANG) is unique among the air reserve forces. This twofold mission requires the Air National Guard to provide trained and equipped units to augment the active force during times of crisis, national emergencies, or war and also to provide the state a disciplined force to protect life and property during natural disasters, civil disorders, or other emergencies.

Air National Guard units in a nonmobilized status are commanded by the governors of the fifty states, the Commonwealth of Puerto Rico, the Territories of Guam and the Virgin Islands, and the Commanding General of the District of Columbia. All units in a state are responsible to the governor, who is represented in the state or territory chain of command by the Adjutant General.

Units may be called for federal service by the President to enforce federal authority, suppress insurrection, or repel invasion. They may also be ordered to active duty by Congress. During peacetime, all Air National Guard units are assigned to gaining Air Force commands. These commands establish unit training standards, provide advisory assistance, and evaluate unit training, safety, and readiness programs.

The role of the Air National Guard today is more dynamic and challenging than it has ever been. As the Air National Guard enters the latter half of the 1980s, it has taken on a greater responsibility as a vital member of the Total Force.

The importance of the Air National Guard as part of the Total Force is evident in both operational and mission support areas. In both areas, the emphasis is on modernization and growth.

Today, the Air National Guard is providing sixty-eight percent of the Air Force's interceptor force, fifty-one percent of the reconnaissance force, twenty-nine percent of the tactical air support, thirty-two percent of the tactical airlift, twenty-five percent of the tactical fighters, seventeen percent of the air refueling tankers, and fourteen percent of the rescue and recovery capability.

To perform this large role successfully, the Air National Guard is acquiring new aircraft and modernizing existing aircraft.

This year, the Air National Guard will fly the world's number-one air-superiority fighter—the F-15 Eagle. One Air National Guard F-16 Fighting Falcon unit is already operational, with a second one scheduled to be operational in 1986.

The Air Guard will also pick up a strategic airlift mission this year when the 105th Military Airlift Group of the NYANG begins flying the world's largest aircraft, the C-5A Galaxy. This mission will be expanded in 1986 when the Mississippi ANG begins flying the C-141 StarLifter.

Two units, the 109th Tactical Airlift Group in New York and the 166th Tactical Airlift Group in Delaware, are in the process of receiving new C-130H aircraft to replace older D and A models.

Perhaps the most important modernization program undertaken by the Air National Guard is the reengining of the KC-135 Stratotanker. As FY '84 came to a close, all Air National Guard KC-135 units but one were flying tankers with reconditioned JT3D engines in place of the older J57 engines. These reconditioned engines provide greatly improved reliability. Environmentally, there is a sixty percent reduction in noise, a ninety percent reduction in smoke, and a twelve to fourteen percent increase in fuel efficiency.

The Air National Guard is also contributing a large share of the Total Force mission in support areas. Air National Guard mission support areas include tactical control units, combat communications units, engineering and installation squadrons, communications support flights, weather flights, special communications squadrons, and civil engineering flights and Red Horse squadrons.

Today, more than 20,000 Air National Guard men and women are in 235 mission support units that augment either Air Force Communications Command, Tactical Air Command, or PACAF when mobilized.

Air National Guard combat communications units represent seventy percent of the people and equipment used in Air Force combat communications and air traffic services roles. Air Guard tactical control units represent sixty percent of the Air Force's Ground Tactical Air Control System, and the Engineering and Installation units represent fifty-five percent of the total Air Force E&I capability.

The Air Guard is also assuming a growing mission in the area of civil engineering and services. The Air Na-

The Air National Guard's 169th Tactical Fighter Group now flies F-16s, including this one on a training flight. A second ANG F-16 unit is scheduled to become operational in 1986. Meanwhile, the ANG will also begin flying F-15s this year and will assume a strategic airlift mission by operating C-5A airlifters.

THE AIR NATIONAL GUARD BY MAJOR COMMAND ASSIGNMENT

(As of October 1, 1984)

AEROSPACE DEFENSE COMMAND

F-106A/B Delta Dart

102d Fighter Interceptor Wing	Otis ANG Base, Mass.
120th Fighter Interceptor Group	Great Falls, Mont.
125th Fighter Interceptor Group	Jacksonville, Fla.
177th Fighter Interceptor Group	Atlantic City, N. J.

F-4C Phantom

107th Fighter Interceptor Group	Niagara Falls, N. Y.
142d Fighter Interceptor Group	Portland, Ore.
114th Tactical Fighter Training Squadron*	Kingsley, Ore.
147th Fighter Interceptor Group	Ellington ANG Base, Tex.
191st Fighter Interceptor Group	Selfridge ANG Base, Mich.

F-4D Phantom

144th Fighter Interceptor Wing	Fresno, Calif.
119th Fighter Interceptor Group	Fargo, N. D.
148th Fighter Interceptor Group	Duluth, Minn.

STRATEGIC AIR COMMAND

KC-135E Stratotanker

101st Air Refueling Wing	Bangor, Me.
126th Air Refueling Wing	Chicago, Ill.
141st Air Refueling Wing	Fairchild AFB, Wash.
171st Air Refueling Wing	Pittsburgh, Pa.
128th Air Refueling Group	Milwaukee, Wis.
134th Air Refueling Group	Knoxville, Tenn.
151st Air Refueling Group	Salt Lake City, Utah
157th Air Refueling Group	Pease AFB, N. H.
160th Air Refueling Group	Rickenbacker ANG Base, Ohio
161st Air Refueling Group	Phoenix, Ariz.
170th Air Refueling Group	McGuire AFB, N. J.
189th Air Refueling Group	Little Rock AFB, Ark.
190th Air Refueling Group	Forbes Field, Kan.

TACTICAL AIR COMMAND

A-7D/K Corsair II

121st Tactical Fighter Wing	Rickenbacker ANG Base, Ohio
127th Tactical Fighter Wing	Selfridge ANG Base, Mich.
132d Tactical Fighter Wing	Des Moines, Iowa
140th Tactical Fighter Wing	Buckley ANG Base, Colo.
112th Tactical Fighter Group	Pittsburgh, Pa.
114th Tactical Fighter Group	Sioux Falls, S. D.
138th Tactical Fighter Group	Tulsa, Okla.
150th Tactical Fighter Group	Kirtland AFB, N. M.
156th Tactical Fighter Group	San Juan, Puerto Rico
162d Tactical Fighter Group*	Tucson, Ariz.
152d Tactical Fighter Training Squadron*	Tucson, Ariz.
195th Tactical Fighter Training Squadron*	Tucson, Ariz.
178th Tactical Fighter Group	Springfield, Ohio
180th Tactical Fighter Group	Toledo, Ohio
185th Tactical Fighter Group	Sioux City, Iowa
192d Tactical Fighter Group	Byrd, Va.

F-16 Fighting Falcon

169th Tactical Fighter Group	McEntire ANG Base, S. C.

A-10 Thunderbolt II

128th Tactical Fighter Wing	Truax Field, Wis.
174th Tactical Fighter Wing	Syracuse, N. Y.
103d Tactical Fighter Group	Bradley, Conn.
104th Tactical Fighter Group	Barnes, Mass.
175th Tactical Fighter Group	Baltimore, Md.

F-4C Phantom

122d Tactical Fighter Wing	Fort Wayne, Ind.
131st Tactical Fighter Wing	St. Louis, Mo.
149th Tactical Fighter Group	Kelly AFB, Tex.
159th Tactical Fighter Group	New Orleans NAS, La.
163d Tactical Fighter Group	March AFB, Calif.
181st Tactical Fighter Group	Terre Haute, Ind.
188th Tactical Fighter Group	Fort Smith, Ark.

F-4D Phantom

108th Tactical Fighter Wing	McGuire AFB, N. J.
113th Tactical Fighter Wing	Andrews AFB, Md.
116th Tactical Fighter Wing	Dobbins AFB, Ga.
158th Tactical Fighter Group	Burlington, Vt.
183d Tactical Fighter Group	Springfield, Ill.
184th Tactical Fighter Group*	McConnell AFB, Kan.
127th Tactical Fighter Training Squadron*	McConnell AFB, Kan.
177th Tactical Fighter Training Squadron*	McConnell AFB, Kan.
187th Tactical Fighter Group	Montgomery, Ala.

RF-4C Phantom

117th Tactical Reconnaissance Wing	Birmingham, Ala.
123d Tactical Reconnaissance Wing	Louisville, Ky.
124th Tactical Reconnaissance Group	Boise, Idaho
189th Tactical Recon Training Flight*	Boise, Idaho
152d Tactical Reconnaissance Group	Reno, Nev.
155th Tactical Reconnaissance Group	Lincoln, Neb.
186th Tactical Reconnaissance Group	Meridian, Miss.

OA-37 Dragonfly

110th Tactical Air Support Group	Kellogg, Mich.
111th Tactical Air Support Group	Willow Grove ARF, Pa.
182d Tactical Air Support Group	Peoria, Ill.

MILITARY AIRLIFT COMMAND

C-130 Hercules

118th Tactical Airlift Wing	Nashville, Tenn.
133d Tactical Airlift Wing	Minneapolis/St. Paul, Minn.
136th Tactical Airlift Wing	Dallas NAS, Tex.
137th Tactical Airlift Wing	Will Rogers, Okla.
146th Tactical Airlift Wing	Van Nuys, Calif.
109th Tactical Airlift Group	Schenectady, N. Y.
130th Tactical Airlift Group	Charleston, W. Va.
135th Tactical Airlift Group	Baltimore, Md.
139th Tactical Airlift Group	St. Joseph, Mo.
143d Tactical Airlift Group	Quonset Point, R. I.
145th Tactical Airlift Group	Charlotte, N. C.
153d Tactical Airlift Group	Cheyenne, Wyo.
164th Tactical Airlift Group	Memphis, Tenn.
165th Tactical Airlift Group	Savannah, Ga.
166th Tactical Airlift Group	Wilmington, Del.
167th Tactical Airlift Group	Martinsburg, W. Va.
172d Tactical Airlift Group	Jackson, Miss.
176th Tactical Airlift Group	Anchorage, Alaska
179th Tactical Airlift Group	Mansfield, Ohio

HC-130 Hercules/HH-3 Jolly Green Giant

106th Aerospace Rescue & Recovery Group	Suffolk, N. Y.
129th Aerospace Rescue & Recovery Group	Moffett NAS, Calif.

C-5A Galaxy

105th Military Airlift Group	Stewart, N. Y.

EC-130E

193d Special Operations Group	Harrisburg, Pa.

PACIFIC AIR FORCES

F-4C Phantom

154th Composite Group	Hickam AFB, Hawaii

*Replacement Training Unit (RTU).

tional Guard recently established Prime RIBS teams that contribute a substantial portion of the total Air Force wartime requirement for food service and base services personnel.

Air National Guard Prime BEEF units were reorganized late in FY '84 to meet changing Air Force requirements and currently make up approximately thirty percent of the worldwide mobility engineering resources. Also, in FY '85, two Red Horse engineering units will be activated at Camp Blanding, Fla., and Camp Pendleton, Va.

Air National Guard medical units are also experiencing growth. In FY '84, four more mobile aeromedical staging flights were funded, bringing the total to eight.

This growth and modernization has greatly enhanced the readiness of the Air National Guard. An all-time high level of readiness has been achieved through performance of actual day-to-day missions and participation in realistic exercises and deployments, both at home and overseas.

FY '84 saw Air National Guard men and women deployed to every theater of operations. These deployments have moved units along with mission support personnel and equipment to locations all over the world.

On the flying side of the picture, Air National Guard C-130 Hercules aircraft provide more than six months of support annually to the US Southern Command. This JCS-directed deployment, named Volant Oak, positions six C-130s at Howard AFB, Panama, on a rotational basis. Also, all ANG A-7 units share a continuous rotational commitment, called Coronet Cove, in Panama. Coronet Cove provides close air support in joint training programs with the US Army.

Around the clock, 365 days a year, Air National Guard F-106 and F-4 air defense units perform a vital alert mission along the coasts of the United States. Units in Hawaii are responsible for the total air defense of that state.

Air National Guard tanker units also stood alert, full time, in addition to supporting the European, Pacific, and Alaskan Tanker Task Forces, thus improving their ability to deploy to any worldwide location. Under a new concept, each tanker unit annually deploys four aircraft and as many as 200 support personnel and aircrews to Spain, Guam, and Alaska for two weeks.

RF-4 reconnaissance units in FY '84 participated in numerous Shield and Flag exercises as well as deployments to Norway, Turkey, and the Middle East.

Training was no less hectic for the mission support units. During FY '84, the Air National Guard deployed 100 Prime BEEF fire protection teams as well as 100 Prime BEEF teams to CONUS and overseas locations. Firefighters and Prime BEEF and Prime RIBS personnel annually participate in Team Spirit in Korea. Prime RIBS also supported special deployments to England, Germany, and Sicily.

More than 1,400 combat communications, tactical control, and engineering installation personnel deployed to Europe, Honduras, Egypt, and Korea in support of major exercises.

The medical units were also tasked to support such exercises as Reforger, Team Spirit, and Bright Star, providing excellent training for medical personnel.

To accomplish all of these missions and deployments, Air National Guard aircraft flew approximately 419,000 hours in 1984. The outstanding flying safety record of the Air Guard continued with a Category A accident rate of 1.9.

The Air National Guard also set another record in FY '84 with an all-time high of more than 105,000 members. The goal for FY '85 is 108,000 members.

Emphasis is also being placed on professional military education to increase the quality of leadership in the Air National Guard. Air National Guard members receive professional military education at the I. G. Brown ANG Professional Military Education Center at McGhee Tyson ANG Base near Knoxville, Tenn.

The Air National Guard Leadership School graduated 233 NCOs in grades E-4 and E-5, and 469 technical sergeants and master sergeants graduated from the Noncommissioned Officers Academy during FY '84.

The Academy of Military Science prepares qualified people for commissions in the Air National Guard. In FY '84, 456 men and women received commissions upon completion of the course.

Modernization, deployments, training, and direct support to the Air Force on a day-to-day basis have made today's Air National Guard a proud, prepared, professional, and vital component of the Total Force. ■

Air Force Technical Applications Center

The Air Force Technical Applications Center (AFTAC), a direct reporting unit, operates and maintains the US Atomic Energy Detection System (AEDS). The AEDS is a worldwide system with operations in more than thirty-five countries. AFTAC efforts involve comprehensive research and development programs designed to increase the understanding of the complex technical problems associated with the detection and identification of nuclear events in the atmosphere, under water, under ground, and in space. The Center provides inputs to DoD policies regarding nuclear arms-control issues and contributes to the nation's ability to monitor international agreements in these areas.

The concept of the AEDS originated in the minds of several senior government leaders, including Gen. Hoyt S. Vandenberg and Adm. Lewis L. Strauss, after World War II, when it became apparent that other nations would develop a nuclear weapons capability and that it was in the best interest of the US to be aware of these developments. A committee of experts subsequently endorsed the concept of a detection system, and in September 1947, Gen. Dwight D. Eisenhower directed the Army Air Forces "to detect atomic explosions anywhere in the world."

The mission remained with the Air Force when it became a separate agency, and AFTAC proved its value when an AFTAC sensor aboard a B-29 flying between Alaska and Japan detected debris from the first Russian atomic test in September 1949. The detection was even more noteworthy, considering that most experts had predicted that the first Russian atomic test would not occur until the mid-1950s.

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During subsequent years, new detection systems were developed, and older systems were improved. When the Limited Test-Ban Treaty was signed in 1963, the primary role of monitoring certain provisions of the treaty was assigned to AFTAC. The treaty prohibited the signatory states from testing nuclear weapons in the atmosphere, under water, or in space. It also prohibited the venting across international boundaries of nuclear debris from underground tests.

To accomplish its mission, approximately 1,380 men and women are assigned to AFTAC to operate and maintain the worldwide system. AFTAC Headquarters is located at Patrick AFB in Florida. Personnel assigned to the Headquarters perform normal staff functions and provide for management, technical evaluation, and reporting of data.

Located at the Headquarters, the Satellite, Electromagnetic Pulse, Hydroacoustic, and Seismic Operations Centers receive data twenty-four hours per day. These Centers are responsible for the initial detection and identification of nuclear events occurring anywhere in the world. The Centers have 130 officers and airmen assigned to accomplish their initial detection and data-collection mission.

To manage the AEDS properly, AFTAC has three major geographically separated units plus a worldwide network of seventeen detachments, five operating locations, and more than seventy equipment locations. The three major subordinate units include the Technical Operations Division, McClellan AFB, Calif.; Hq., Pacific Technical Operations Area, Wheeler AFB, Hawaii; and Hq., European Technical Operations Area, Lindsey AS, Germany. The Area Headquarters in Germany and Hawaii provide administrative, logistic, and other support to subordinate activities in their geographic areas of responsibility. The role of the Technical Operations Division is more complex. It supports a Central Laboratory and an air-sampling operation and operates a logistics depot providing specialized support for the AEDS network.

AFTAC's people possess a wide range of technical expertise, including personnel with advanced degrees in chemistry, physics, nuclear engineering, and electrical engineering. More than sixty-two percent of AFTAC's officers have master's degrees, and nine percent have doctorates. Among the enlisted force, more than forty percent have between one and four years of college.

Complementing this impressive scientific capability is an experienced and talented operational force that is supported by skilled, handpicked technicians. ■

USAF Historical Research Center

THE USAF Historical Research Center is the repository for Air Force historical documents. The Center's collection, begun in Washington during World War II, moved in 1949 to Maxwell AFB, Ala. Today, it consists of nearly 50,000,000 pages devoted to the history of the service and constitutes the largest and most valuable organized collection of documents on US military aviation in the world.

On July 1, 1979, the Center became a direct reporting unit of the Air Force, receiving policy guidance and technical direction from the Chief, Office of Air Force History. It is collocated with the Air University and provides research facilities for professional military education students, the faculty, and visiting scholars. More than eighty-five percent of the Center's pre-1955 holdings are declassified. Almost the entire collection is recorded on 16-mm microfilm, with microfilm copies deposited at the National Archives and Records Service, Washington, D. C., and at the Office of Air Force History, Bolling AFB, D. C.

Center holdings consist largely of periodic unit histories prepared by the major commands, numbered air forces, and other subordinate organizations. These histories provide comprehensive coverage of Air Force activities beginning in 1942, when President Franklin Roosevelt authorized the program. Extensive primary source material is attached to the histories, greatly enhancing their value.

Special collections complement the unit histories. Among them are historical monographs, end-of-tour reports, joint and combined command documents, aircraft record cards, and materials from the US Army, British Air Ministry, and the German Air Force. The Center also houses the personal papers of key retired Air Force leaders and a substantial collection of their oral history interviews. About 6,000 documents and collections of all types are accessioned annually.

In 1974, the Center adopted automatic data processing as a finding aid and, in 1980, began to enter abstracts of the documents into a computer. The Inferential Retrieval Index System, or IRIS, became operational in 1983 when the Center acquired an IBM 4341 computer. Plans call for the collection to become accessible in 1986 to the Air Force history program, through remote terminals.

The Center collection has been used by the Air Force in the preparation of plans and the development of programs, analyses and evaluation of operations, staff studies, textbooks and other course materials for service schools, student papers and theses, and in the orientation of personnel. Among other uses, the collection has provided information for Congress, the military services, other government agencies, scholars, students, and writers of books, magazine articles, as well as for television and movie scripts.

The Center is organized into four divisions:

- **Reference.** Maintains documents and microfilm, answers inquiries about holdings, produces bibliographies, collects personal papers, and provides other services to users.
- **Research.** Writes books and papers; prepares lineage and honors of Air Force units; maintains records of the Air Force seal and flag, the records of unit and establishment emblems and flags, and the records of Air Force organizations; determines aerial victory credits; and performs other research and teaching services.
- **Oral History.** Conducts oral history interviews, monitors the USAF end-of-tour report program, and provides a training course for oral historians.
- **Technical Services.** Accessions, catalogs, abstracts, and indexes documents; conducts automatic data processing and microfilming for the Center; and coordinates IRIS applications for the Air Force history program. ■

Air Force Academy

THE Air Force Academy's mission is to provide cadets with instruction, knowledge, and character essential to leadership and with the motivation to become career officers in the US Air Force.

Each year, nearly 13,000 men and women try to pursue their goal by seeking entry into the Academy, with approximately 1,500 gaining appointments. These appointees are intelligent and aggressive and know what they want—a career in the United States Air Force. Ninety percent rank in the top twenty-five percent of their high school classes, and approximately eighty percent have earned high school athletic letters.

Cadets at the Academy are involved in one of the finest academic programs in the nation, designed to develop future Air Force officers who are innovative, analytical, and resourceful. A core curriculum comprised of basic and engineering sciences, social sciences, and humanities provides the foundation that prepares cadets for their Air Force careers. Cadets can select from twenty-three academic majors, and approximately sixty percent of those cadets with majors select engineering sciences and basic sciences.

Throughout the academic year, cadets participate in a number of extracurricular learning experiences. One example is the Academy Assembly. The Assembly brings students from other colleges and universities to the Academy each year to discuss with cadets the major issues confronting the nation. Another example is the Distinguished Speakers Program, featuring a variety of guest speakers who have distinguished themselves nationally and internationally as military leaders and statesmen.

Each summer, approximately ninety selected cadets spend six weeks at various Air Force and Department of Defense research facilities around the world under the auspices of the Cadet Summer Research Program.

The Air Force Academy has taken a first step toward the installation of microcomputers. This new "explosion" will afford cadets a new tool in education to stimulate learning and assist them in mastering the important process of complex problem-solving.

The Air Force Academy is now playing a leading role in the preparation for space. Academy graduates are America's current and future astronauts, engineers, and mission-support specialists.

Space has always been a part of the Academy curriculum. Since 1965, the Academy has offered a major in astronautics—America's only accredited undergraduate astronautics program. The Physics Department also offers a major in space physics, which deals with environmental problems in space. In addition, the Academy offers cadets an interdisciplinary space sciences major. This major provides the necessary background for graduates to meet the requirements of the Air Force Space Command.

Academy graduates also participate in space research. Cadets developed the first completely successful student experiments on a Space Shuttle program. The experiments were carried on *Challenger's* maiden flight in 1983. Another experiment is scheduled to be flown in the near future. Thirteen Academy graduates are involved in the astronaut program, including Col. Karol Bobko, a 1959 graduate who piloted the Space Shuttle *Challenger*.

Military studies are central to the Academy experience and distinguish it from other institutions of higher learning. Following Basic Cadet Training, new cadets enter the Cadet Wing and receive a four-year, balanced program providing them with the necessary knowledge, skills, values, and behavior patterns. Graduating cadets receive bachelor of science degrees and commissions as second lieutenants.

Part of their military training includes parachuting, sailplaning (soaring), T-43 navigation training, and T-41 pilot orientation. The Academy's goal is for seventy percent of each graduating class to be pilot-qualified. Under its "Soar for All" program, the Academy has acquired new powered sailplanes to afford every third-class (sophomore) cadet the opportunity to solo in a sailplane.

The soaring program is a definite success, as sixty-nine of the seventy-one cadets who entered the first Summer Training Period made solo flights. Graduating classes at the Academy have described the soaring program as one of the most motivational facets of the curriculum. Positive rewards are found in all courses, and each cadet is given a glimpse of an operational flying unit and a better understanding of the mission of the Air Force.

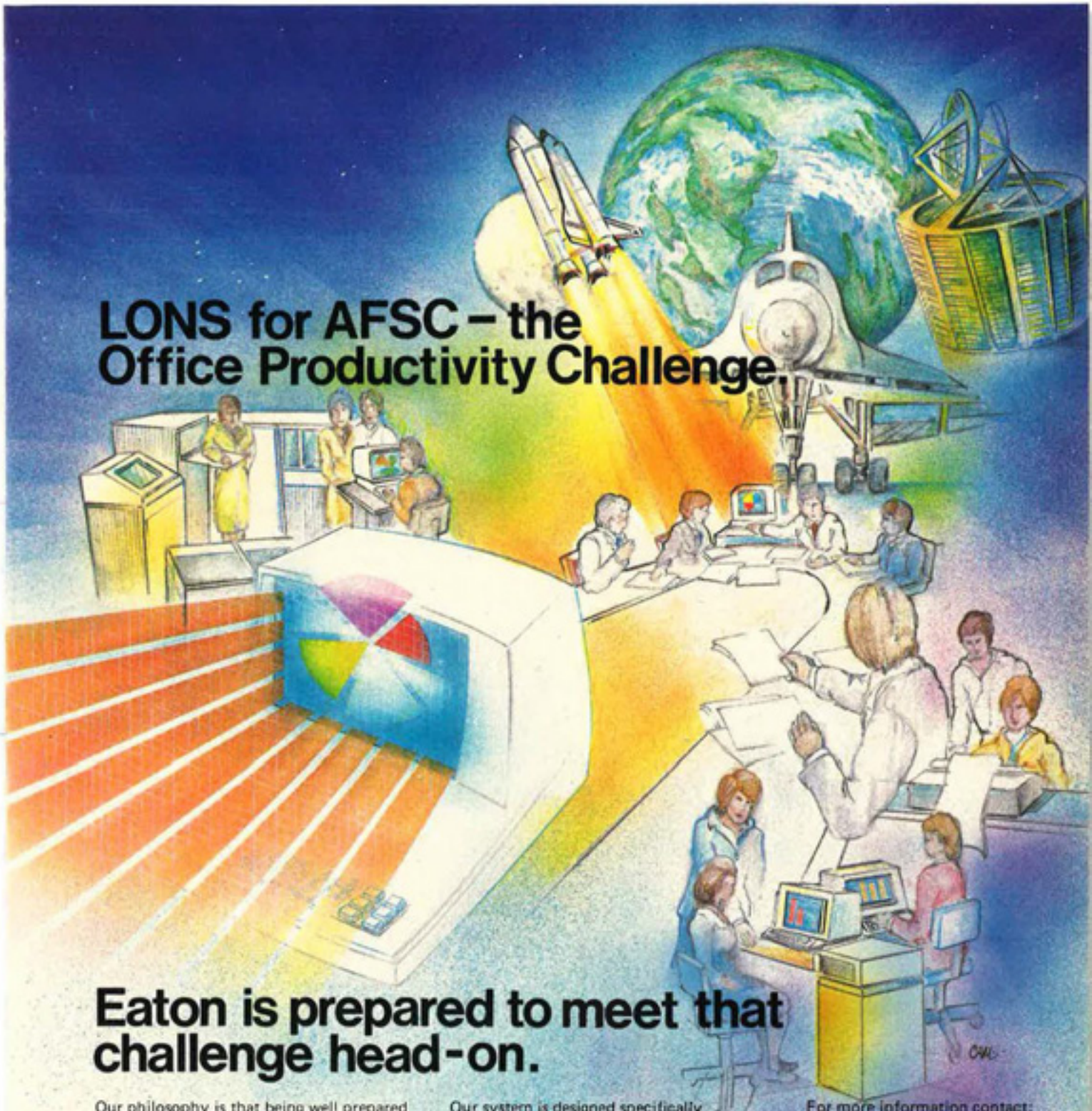
The leadership program, under the direction of the Commandant of Cadets, molds the basic cadet without military experience into an officer prepared and motivated to defend our nation.

The athletic program makes a vital contribution to the preparation for Air Force leadership. All cadets participate in intramural or intercollegiate athletics. Cadets may compete for nationally recognized intercollegiate teams in a variety of varsity sports.

To date, approximately 17,600 cadets have been graduated from the Air Force Academy. Of this number, 486 are women. The Academy has produced twenty-six Rhodes scholars in its brief thirty-year history. Since 1959, 11,439 graduates commissioned in the Air Force entered pilot training, 1,181 entered navigator training, and 351 entered helicopter training.

That's the Academy experience—meeting new challenges every day and producing our "leaders of tomorrow." ■

President Reagan congratulates Cadet (now 2d Lt.) Keith W. Helen at Air Force Academy's Class of 1984 graduation ceremonies. The Academy provides one of the finest academic and leadership training programs in the nation.



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EDITED BY JOHN W. R. TAYLOR, EDITOR IN CHIEF, JANE'S ALL THE WORLD'S AIRCRAFT

Bombers

ATB

Most details of the Advanced Technology Bomber (ATB) are highly classified. The program calls for development of an advanced, manned, penetrating bomber (seen by USAF as complementary to the B-1B), which will employ low-observable (Stealth) techniques to negate present and projected Soviet air defenses. Technologies still at an early developmental stage are intended to extend the ATB's capability well into the next century.

Northrop is prime contractor; Boeing and Vought are key members of the development team, with General Electric Engine Group responsible for power plant provision. The program is described officially as proceeding at a vigorous pace toward a planned initial deployment date in the early 1990s. The first flight of an ATB is reportedly scheduled for November 1987.

B-1B

This long-range penetrating derivative of the original B-1 is being developed as USAF's next-generation multirole bomber. The second of the original B-1 prototypes flew for the first time in modified form, embodying B-1B features, in March 1983, and was used to evaluate weapons carriage and separation characteristics and to confirm flight-control system modifications and flying qualities until its loss in August 1984. Two other aircraft are now being used in the test and evaluation program. B-1 prototype No. 4 incorporates several of the B-1B improvements and is being used for verification testing of the defensive and offensive avionics systems. The first production B-1B entered the test program with its first flight in October 1984. While smaller than the B-52, an operational B-1B will carry a considerably greater weapons load because of improved engine performance and advanced aerodynamic technology. Three weapons bays provide the flexibility to carry long- and short-range nuclear air-to-surface missiles, nuclear or conventional gravity bombs, mines, other weapons, or fuel, as required by the assigned mission.

The B-1B is equipped with electronic jamming equipment, infrared countermeasures, radar location and warning systems, and other devices necessary to defeat enemy defensive systems. To facilitate very low-level penetration of sophisticated enemy defenses, it has a terrain-following radar system that allows it to follow "the nap of the earth" at near supersonic speeds. This ability would make it extremely difficult for enemy defensive radar systems to track the B-1B, as hills, mountains, towers, buildings, and even trees will clutter the radar screen. Flying low at high speeds also negates the effectiveness of enemy interceptors because it is difficult to acquire and track B-1Bs flying close to the ground. This will enable the B-1B to penetrate sophisticated enemy defenses well into the 1990s and to operate within less heavily defended areas into the next century.

Outwardly, the B-1B is generally similar to B-1 prototype No. 4, but has structural strengthening to facilitate an increase in gross takeoff weight from 395,000 lb to 477,000 lb. The variable-geometry wing of the B-1 is retained, its unswept setting permitting rapid takeoff from a base threatened by imminent attack, or operation from shorter runways and less-sophisticated airfields; the fully swept position is used in supersonic flight and for the primary role of high-subsonic, low-level penetration. Major airframe improvements include a strengthened landing gear; a movable bulkhead in the forward weapons bay to allow for the carriage of a wide range of different-sized weapons, including eight ALCMs or twenty-four SRAMs; optional weapons bay fuel tanks to give extended range; and external stores stations beneath the fuselage to accommodate additional fuel or weapons, including up to fourteen ALCMs or SRAMs. The use of radar-absorption materials reduces further the aircraft's radar cross section (the radar signature is already significantly less than that of the B-52). Ejection seats replace the crew ejection capsule of B-1 prototypes. The variable engine inlets of the original B-1 are replaced by fixed inlets, and new engine nacelles and simplified overwing fairings have been introduced. These modifications are designed to provide optimum performance for the high-subsonic, low-altitude penetration role.

Rockwell B-1B

Boeing B-52G Stratofortress

Offensive and defensive electronics systems are much improved over the B-1. The offensive avionics include modern forward-looking and terrain-following radars, an extremely accurate inertial navigation system, a link to the Air Force Satellite Communications (AFSATCOM) system, and much of the new Offensive Avionics System (OAS) package being installed in B-52Gs and Hs (strategic Doppler radar and radar altimeter). The defensive avionics package is built around the ALQ-161 electronic countermeasures (ECM) system with an extended frequency coverage. This flexible, reprogrammable system automatically detects and analyzes radars illuminating the aircraft. A central computer then selects an appropriate countermeasure and applies the best ECM technique at precisely the right time, with the right power and optimal angle to protect the aircraft from the probing radar. The defensive avionics package also includes a tail warning function using the ALQ-161 system and such expendables as chaff and flares. Of the total planned inventory of 100 B-1Bs, 52 have already been procured and a request for the remaining 48 is included in the FY '86 budget proposals. The first B-1B was delivered in September 1984, and the flight-test program began in October. Emphasis is on cruise missile integration. The first operational B-1Bs will be based at Dyess AFB, Tex., beginning in mid-1985, with IOC (15 aircraft) scheduled for 1986. Deliveries will then continue at the rate of approximately four aircraft per month to Ellsworth AFB, S. D., Grand Forks AFB, N. D., and McConnell AFB, Kan., ending with the 100th aircraft in 1988.

Contractors: Rockwell International, North American Aircraft Operations; Eaton Corporation, AIL Division; Boeing Military Airplane Company; and General Electric.

Power Plant: four General Electric F101-GE-102 turbofan engines; each 30,000 lb thrust class.

Accommodation: four: pilot, copilot, and two systems operators (offensive and defensive); provisions for two instructors.

Dimensions: span spread 136 ft 8½ in, fully swept 78 ft 2½ in, length 147 ft, height 34 ft.

Weight: max operating weight 477,000 lb.

Performance: max speed at low-level high subsonic (supersonic at altitude); range intercontinental.

Armament: nuclear/nonnuclear, 125,000 lb.

B-52 Stratofortress

Although nearing the end of its third decade of operational service, the B-52 Stratofortress still constitutes the major piloted element of SAC's bomber force. Retirement of the B-52D in FY '83 left 263 aircraft operational and capable of delivering a wide range of weapons, including conventional and nuclear bombs, air-launched cruise missiles, and nuclear-tipped air-to-surface short-range attack missiles. Apart from its primary nuclear mission, the B-52 can be deployed in various

conventional roles: show of force, maritime interdiction, precision strikes, and defense suppression. Other collateral missions in recent years have included sea-surveillance flights, aerial minelaying and antisurface warfare operations in cooperation with the US Navy, and support for NATO exercises.

The two versions still in service are the **B-52G,** which introduced important changes including a redesigned wing containing integral fuel tankage, fixed underwing tanks, a new tail fin of reduced height and broader chord, and a remotely controlled tail turret that allowed the gunner to be repositioned with the rest of the crew; deliveries began in February 1959, and 193 were built; and the **B-52H,** the final version, which switched to TF33 turbofan engines, providing increased unrefueled range, and which has improved defensive armament, including a Vulcan multibarrel tail gun; 102 were built, with deliveries starting in May 1961.

Since 1971, 281 B-52Gs and Hs have been modified to carry 20 AGM-69A Short-Range Attack Missiles (SRAM), six under each wing and eight in the bomb bay. Additionally, all Gs and Hs 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. Under USAF improvement programs begun in 1974, about 265 Gs and Hs have been progressively updated with Phase VI avionics. This includes ALQ-122 SNOE (Smart Noise Operation Equipment) countermeasures and AN/ALQ-155(V) advanced ECM; an AFSATCOM kit permitting worldwide communication via satellite; a Dalmo Victor ALR-46 digital radar warning receiver and Westinghouse ALQ-153 pulse-Doppler tail warning radar. Boeing is also producing the Offensive Avionics System (OAS) to upgrade the navigation and weapons delivery of the B-52G/H. This is a digital-based, solid-state system, and includes inertial guidance and microprocessors. The program is scheduled for completion by FY '87.

Because of the long range and diversified payload capabilities of their aircraft, two B-52H wings of the 57th Air Division at Minot AFB, N. D., and Ellsworth AFB, S. D., have been assigned to support conventional operations by employing airpower over great distances on short notice. However, with the continued improvement of Soviet defenses and the development of USAF's next-generation bombers, the primary role of the B-52 is as an ALCM (AGM-86) carrier. USAF completed deployment of AGM-86s on 90 on-line B-52Gs, each with 12 external cruise missiles, in December 1984. Starting this year, as B-1Bs enter service, USAF will begin to modify its B-52Hs to carry ALCMs, for service well into the 1990s. Development of the Common Strategic Rotary Launcher, initiated in 1982, will further permit internal carriage of eight AGM-86s in the B-52H. Those B-52Gs not scheduled for use as cruise-missile carriers will replace the now-retired B-52Ds in conventional roles. The B-52G achieved an initial operational capability in December last year to support naval antisurface warfare operations through Harpoon employment. Thirty B-52s are being equipped for this role. At present, modified aircraft are based at Loring AFB, Me., for Atlantic operations; a number of Harpoon-capable B-52Gs will also be based at Andersen AFB, Guam, for Pacific operations. (Data for B-52G, except where noted.)

Contractor: Boeing Military Airplane Company.

Power Plant: eight Pratt & Whitney J57-P-43WB turbojet engines, each 13,750 lb thrust.

Accommodation: two pilots, side by side, plus navigator, radar navigator, ECM operator, and fire-control system operator (gunner).

Dimensions: span 185 ft 0 in, length 160 ft 11 in, height 40 ft 8 in.

Weights: G/H models gross more than 488,000 lb.

Performance (approx): max level speed at high altitude 595 mph, service ceiling 55,000 ft, range more than 7,500 miles.

Armament: G model has four 0.50-caliber guns in tail turret; H model has 20-mm gun; up to 20 SRAM missiles can be carried on G/H models, plus nuclear free-fall bombs. G/H models are being adapted to carry 12 AGM-86B ALCMs externally, instead of SRAMs, with internal provision for eight more on H model. Alternatively, 30 modified G models can carry 12 Harpoons in underwing clusters of three.

General Dynamics FB-111A

FB-111A

Capable of providing accurate, low-altitude weapons delivery at night and in poor weather, the FB-111A is a two-seat, medium-range, strategic bomber version of the swingwing F-111, developed originally to provide SAC with a replacement for early versions of the Stratofortress and supersonic B-58A Hustlers. The first of 76 production aircraft flew in July 1968, and the initial delivery was made in October 1969 to the 340th Bomb Group. Although the FB-111A is currently assigned to the nuclear mission, its conventional weapons capability will suit it to a tactical role when deployment of the ATB occurs. FB-111s will remain operational throughout the 1990s, with several Class IV modifications including avionics modernization, engine work, and escape capsule modifications sought or under way. Operational units equipped with a total of 56 FB-111As 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 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.

McDonnell Douglas F-4 Phantom II

Fighters

F-4 Phantom II

Although the F-4 is being replaced by the F-15 and F-16 in active USAF units, many hundreds are still operational and are replacing older aircraft in reserve units. Designed in the mid-1950s, the F-4 has moved to a predominantly air-to-ground role, although it retains residual air-to-air capability. Continuous updating has maintained the effectiveness of the F-4s, some of which are scheduled to receive a low-smoke engine modification and radar warning receiver update during the FY '85–89 tactical aircraft modification program. First version supplied to USAF was the **F-4C,** a two-seat twin-engine all-weather tactical fighter with J79-GE-15 turbojet engines, dual controls, an inertial navigation system, and boom flight refueling. F-4Cs still equip Air National Guard and Air Force Reserve units. The **F-4D** introduced major systems changes, including new weapon ranging and release computers to increase accuracy in air-to-air and air-to-surface weapon delivery. The **F-4E** was developed as a multirole fighter capable of performing counterair, close-support, and interdiction missions. A 20-mm Vulcan multibarrel gun is fitted, together with an improved fire-control system and an additional fuselage fuel tank. Leading-edge slats, to improve maneuverability, were retrofitted to all USAF F-4Es. In addition, from early 1973, some 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. System improvements include the Pave Tack system, which provides a day/night adverse weather capability to acquire, track, and designate ground targets for laser, infrared, and electro-optically guided weapons; the Pave Spike day tracking/laser ordnance designator pod, for use with "smart" weapons; and a digital intercept computer that includes launch computations for USAF AIM-9 and AIM-7 missiles. As this version is replaced by F-15s and F-16s in the active force, it will transfer to the ANG, replacing earlier C and D models. The **F-4G** "Advanced Wild Weasel" is a modified F-4E with electronic warfare equipment that enables it to detect, identify, and locate enemy radars and to direct against them weapons for their destruction or suppression. Primary armament includes Shrike (AGM-45) and Standard ARM (AGM-78), with optional availability of the CBU Rockeye area weapon for suppression purposes, and the AGM-65 Maverick. First F-4Gs entered service with 35th TFW at George AFB, Calif., in October 1978; modification of 96 aircraft was completed by the beginning of 1981. Introduction of the AGM-88 HARM antiradiation missile will increase the F-4G's lethality; accuracy will be enhanced when the Precision Location Strike System (PLSS) is deployed. (Data for F-4E.)

Contractor: McDonnell Aircraft Company, Division of McDonnell Douglas Corporation.

Power Plant: two General Electric J79-GE-17A turbojets, each 17,900 lb thrust with afterburning.

Accommodation: pilot and weapon systems operator in tandem.

Dimensions: span 38 ft 7½ in, length 63 ft 0 in, height 16 ft 5½ in.

Weights: empty 30,328 lb, gross 61,795 lb.

Performance: max speed at 40,000 ft Mach 2.0 class, range with typical tactical load 1,300 miles.

Armament: one 20-mm M61A1 multibarrel gun; provision for up to four AIM-7E Sparrow, AGM-45A Shrike, or AIM-9 Sidewinder missiles on four underfuselage and four underwing mountings, or up to 16,000 lb external stores.

F-5E/F Tiger II

Developed as the successor to Northrop's F-5A export fighter, the Tiger II is intended primarily to provide America's allies with an uncomplicated air-superiority tactical fighter, which can be operated and maintained relatively inexpensively. 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. Well over a thousand F-5Es and two-seat **F-5Fs** have been delivered. TAC, assisted by ATC, trains pilots and technicians of user air forces. For this purpose, 20 F-5Es were supplied to USAF, beginning in April 1973, before deliveries to foreign governments began in early 1974. 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; and by PACAF's 26th Tactical Fighter Training Squadron, located at Clark AB, Philippines. (Data for F-5E.)

Contractor: Northrop Corporation, Aircraft Division.

Power Plant: two General Electric J85-GE-21B turbojet engines; each 5,000 lb thrust with afterburning.

Accommodation: pilot only.

Dimensions: span 26 ft 8 in, length 47 ft 4½ in, height 13 ft 4 in. (F-5F length 51 ft 4 in, height 13 ft 2 in.)
Weights: empty 9,723 lb, gross 24,722 lb.
Performance (at 13,350 lb): max level speed at 36,000 ft Mach 1.64, service ceiling 51,800 ft, range with max fuel, with reserve fuel for 20 min max endurance at S/L (with external tanks retained), 1,543 miles.
Armament: two AIM-9 Sidewinder missiles on wingtip launchers; two M39-A2 20-mm cannon in nose, with 280 rounds per gun (one 20-mm in F-5F); up to 7,000 lb of mixed ordnance on four underwing attachments and one underfuselage station. Optional armament and equipment includes AGM-65 Maverick, laser-guided bombs, centerline multiple ejector rack, and centerline-mounted 30-mm gun pod.

F-15 Eagle

Since the mid-1970s, the Eagle has replaced the F-4 progressively as USAF's primary air-superiority aircraft. The original single-seat **F-15A** and two-seat **F-15B** were followed from June 1979 by the **F-15C** and **F-15D** respectively, with 2,000 lb of additional internal fuel and provision for carrying conformal fuel tanks (CFTs). The CFTs can accommodate reconnaissance sensors, radar detection and jamming equipment, a laser designator, low-light-level TV and cameras, as well as fuel. These aircraft can also be equipped with BRU-26A/A six-station bomb racks, permitting multiple bomb drops at supersonic speed; 325 sets of CFTs and 150 BRU-26A/As have been ordered to ensure optimum effectiveness of F-15s assigned to the Rapid Deployment Force. Standard F-15 equipment includes a Hughes Aircraft APG-63 lightweight X-band pulse-Doppler radar for long-range detection and tracking of small high-speed objects down to treetop level. Under contracts initiated in February 1983, the F-15 is undergoing a Multi-Staged Improvement Program (MSIP). Improvements include a Programmable Armament Control Set (PACS), improved central computer, MIL-STD 1760 incorporation, APG-70 radar, and an expanded Tactical Electronic Warfare System (TEWS) allowing for the addition of weapons such as advanced versions of the AIM-7 and AIM-9, and AMRAAM. Delivery of the first MSIP-equipped F-15 is scheduled for the middle of this year.

An F-15B fitted with a chin pod capable of housing a variety of sensors has been undergoing tests to gauge the F-15's potential in the kind of air defense suppression missions now flown by F-4G "Wild Weasel" fighters.

In February 1984, USAF announced selection of the derivative **F-15E** as the service's new dual-role fighter for all-weather air-to-air and deep interdiction missions. It will be a two-seater with ability to carry up to 23,500 lb of ordnance, a weapon load comparable to that of the F-111. Internal fuel capacity will be unchanged, and equipment will include CFTs modified to carry ordnance tangentially to reduce drag. Some of the F-15E's new systems have already been funded as part of the MSIP. The current pilot's armament control panel will be replaced by a single multipurpose color video screen. For low-altitude, high-speed penetration and precision attack on tactical targets at night and in adverse weather, the F-15E will carry a LANTIRN (Low-Altitude Navigation and Targeting Infrared for Night) pod. Production of up to 392 F-15Es is scheduled to begin in 1986.

Planned production of all models of the F-15 (unchanged as a result of the F-15E selection) totals 1,356 aircraft for USAF, plus the original 20 R&D models, by the early 1990s. Orders to date total 834 for operational use by USAF, and 48 proposed for FY '86. Units already equipped with Eagles include TAC's 57th FWW, 405th TTW, and 1st, 33d, and 49th TFWs; USAFE's 32d TFS and 36th TFW; and PACAF's 18th TFW. Five squadrons in the USA are being allocated to air defense with F-15s. The 325th FWW (redesignated 325th TTW) at Tyndall AFB, Fla., began conversion from F-106s to F-15s in October 1983. First US air defense squadron to receive Eagles was the 48th FIS at Langley AFB, Va., followed by the 318th FIS at McChord AFB, Wash., and the 5th FIS at Minot AFB, N. D.; AAC's base at Elmendorf became operational in 1982 in support of air defense. Part of the F-15 FIS role at Langley and McChord will be an anti-satellite mission, using the ALMV weapon described briefly on page 164. The 159th TFG will be the first ANG unit to reequip with F-15s when it receives the first of its 24 Eagles this Summer.

In response to a USAF request made in September 1983, McDonnell Douglas is to develop and flight test an **Advanced Technology Version** of the F-15, with short takeoff and landing (STOL) and new maneuvering capabilities. Scheduled to begin flight trials in 1988, the airplane will have movable foreplanes mounted at the front of its engine air intake trunks, forward of the wings, to increase lift and reduce overall drag. Rectangular jet nozzles will vector engine thrust during takeoff and in-flight maneuvers, and will reverse thrust to shorten the landing run. The aircraft is expected to be capable of takeoff with full internal fuel and a 6,000 lb payload from a 1,000 ft runway; landing run with payload expended is expected to be under 1,250 ft on a wet runway. Flying control, engine, steering, and braking functions will be integrated with existing F-15 controls through a digital fly-by-wire system to take optimum advantage of the aircraft's added capability while reducing the pilot's work load. Radar, infrared, and inertial navigation systems will generate data to locate the runway and furnish guidance cues.

Northrop F-5 Tiger II

McDonnell Douglas F-15 Eagles

General Dynamics F-16 Fighting Falcon

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. In addition, six F-15s from the 18th TFW at Kadena AB, Okinawa, Japan, made the longest nonstop flight by single-seat combat aircraft when, in 1982, they flew 7,000 miles to Tyndall AFB, Fla., in fifteen hours. (Data for F-15C.)

Contractor: McDonnell Aircraft Company, Division of McDonnell Douglas Corporation.
Power Plant: two Pratt & Whitney F100-PW-100 turbofan engines; each approx 23,830 lb thrust. Improved F100-PW-220 will equip new F-15s.
Accommodation: pilot only.
Dimensions: span 42 ft 9¾ in, length 63 ft 9 in, height 18 ft 5½ in.
Weights: empty 27,300 lb; gross 68,000 lb.
Performance: max speed Mach 2.5, service ceiling 60,000 ft, ferry range, without external fuel tanks, more than 2,878 miles; with CFTs, 3,570 miles.
Armament: one internally mounted M61A1 20-mm multi-barrel cannon; four AIM-9L/M Sidewinder and four AIM-7F/M Sparrow air-to-air missiles, or eight AMRAAMs, carried externally. Provision for carrying up to 23,600 lb of ordnance on weapon stations.

F-16 Fighting Falcon

Advanced technologies incorporated in the original single-seat **F-16A** and two-seat **F-16B** versions of the Fighting Falcon made them two of the most maneuverable fighters ever built. The advances include decreased structural weight through the use of composites, decreased drag resulting from reduced static stability margin, 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-edge flaps. The F-16 is powered by a single afterburning turbofan engine. All digital avionics are integrated through a digital multiplex system to reduce permanent wiring as well as to take advantage of the versatility of modern high-speed computers. Other equipment includes a multimode radar with clutter-free look-down capability, advanced radar warning receiver, a head-up display, internal chaff or flare dispensers, and a 500-round 20-mm internal gun. The aircraft also has provisions for ECM. To date, USAF has initiated procurement of 1,139 F-16s and an advance buy of additional F-16s under a multiyear contract for 180 aircraft per year in FY '86 and FY '87, with a planned increase to 216 per year from FY '88. The total planned purchase of F-16s has been increased from the initial 1,388 to 2,795 to support USAF efforts to build toward a force structure that increases the number of tactical wings.

The F-16 was developed to replace F-4 aircraft in the active force and to modernize the air reserve forces. It entered operational service initially with TAC's 388th TFW at Hill AFB, Utah, in January 1979. Last year USAF had approximately 750 F-16s in its inventory. F-16-equipped units include TAC's 56th and 58th TTWs, and 363d, 388th, and 474th TFWs; USAFE's 50th TFW at Hahn AB in West Germany, and 401st TFW at Torrejon AB, Spain; PACAF's 8th TFW at Kunsan AB, Korea, with the first elements of a new F-16 wing scheduled to arrive at Misawa AB, Japan, this year; and the 169th TFG at McEntire ANGB, S. C., the first ANG squadron with F-16s, with the 149th TFG at Kelly AFB, Tex., scheduled to convert next year; the 419th TFW at Hill AFB, Utah, was the first AFRES unit to convert to F-16s, replacing F-105s. F-16s also equip USAF's Thunderbirds Air Demonstration Squadron. More than 1,000 more have been delivered to, and ordered for, the air forces of Belgium, Denmark, Egypt, Israel, Netherlands, Norway, Pakistan, South Korea, Turkey, and Venezuela.

A forward-looking plan for the F-16, known as the Multinational Staged Improvement Program (MSIP), was implemented by USAF in February 1980. This assures the aircraft's capability to accept systems now under development, thereby minimizing retrofit costs. As a first stage, all F-16s delivered since November 1981 have built-in structural and wiring provisions and systems architecture that will expand the single-seater's multirole flexibility to perform precision strike, night attack, and beyond-visual-range interception missions. Advanced cockpit displays and controls have been introduced subsequently, and an improved fire control radar will enable F-16s to launch AMRAAM air-to-air missiles at multiple targets in rapid succession. Future systems improvements will include installation of the LANTIRN navi/attack

system and the airborne self-protection jammer (ASPJ) now under development. Initial deliveries to TAC of the MSIP-configured **F-16C** (single-seat) and **F-16D** (two-seat) took place in January this year. The F-16D is also seen as a potential replacement for the RF-4 toward the end of this decade. A sophisticated research version, **AFTI/F-16,** is being used to test and evaluate advanced fighter technologies, including flight-control systems, pilot/vehicle interface, an automated maneuvering attack system, and an advanced weapon interface, at Edwards AFB, Calif.

In late 1980, General Dynamics initiated company-sponsored development of a new version of the F-16, designated **F-16XL,** to enhance its air-to-surface capabilities while still maintaining air-superiority characteristics. The major difference between the F-16XL and the basic F-16 is its significantly enhanced aerodynamic configuration, with a unique "cranked-arrow" wing planform, which allows improved range, military load, penetration speed, and maneuverability. Flight demonstration testing of the first (single-seat) prototype started in July 1982, followed by the first flight of a second (two-seat) prototype in October 1982. Although the F-15E was selected to meet USAF's dual-role fighter requirement, Air Force evaluation of the F-16XL has continued, and the type features in USAF's "Tactical Fighter Roadmap." Any future production variant would be designated **F-16F.** (Data for F-16A.)

Contractor: General Dynamics Corporation.

Power Plant: one Pratt & Whitney F100-PW-200(3) turbofan engine; approximately 25,000 lb thrust with afterburning. General Electric F110-GE-100 augmented turbofan will be alternative standard engine in future production aircraft.

Accommodation: pilot only.

Dimensions: span over missiles 32 ft 10 in, length overall 49 ft 5.9 in, height 16 ft 8½ in.

Weights: empty 15,586 lb; gross with external loads 35,400 lb.

Performance: max speed Mach 2 class, service ceiling more than 50,000 ft, ferry range more than 2,000 miles.

Armament: one M61A1 20-mm multibarrel cannon, with 500 rounds, mounted in fuselage; externally mounted infrared missiles; seven other external stores stations for fuel tanks and air-to-air and air-to-surface munitions.

ATF

Seven aerospace companies (Boeing, General Dynamics, Grumman, Lockheed-California, McDonnell Douglas, Northrop, and Rockwell) have completed contracts for conceptual designs of the Advanced Tactical Fighter (ATF). The ATF will be primarily a low-signature air-superiority aircraft, but will have some inherent air-to-surface capability. STOL characteristics are considered important. Technologies of special note include use of composites and advanced metallic materials, advanced cockpit automation, integrated fire and flight controls, advanced radar and sensors, vectored thrust, and built-in test and support equipment. FY '85 funding of $94.3 million will begin the demonstration/validation phase and support efforts that will lead to a full-scale development decision in FY '89 and an initial operational capability by the mid-1990s.

F-106 Delta Dart

The F-106 air defense fighter was developed in the mid-1950s. Constant updating enabled USAF to maintain its effectiveness, but only seven squadrons still serve with active Air Force and ANG units. The two production versions are the **F-106A** single-seat interceptor and the **F-106B,** a tandem two-seat dual purpose combat trainer. (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 3½ in.

Weights (approx): empty 25,300 lb, gross 42,400 lb.

Performance (approx): max speed at 40,000 ft Mach 2.0, service ceiling 65,000 ft, range 1,200 miles.

Armament: one AIR-2A Genie unguided nuclear-warhead rocket; four AIM-4F/G Falcon air-to-air missiles carried internally; and a 20-mm cannon on most F-106As.

F-111

Representing USAF's only current long-range, around-the-clock, interdiction fighters, four versions of this pioneer variable-geometry tactical aircraft are currently in service with USAF. Initial **F-111A** aircraft, delivered to a training unit in July 1967, were development models. Deliveries of production aircraft to the first operational wing began in October 1967. A total of 141 production F-111As was built; this version served with distinction in SEA in 1972–73 and currently equips the 366th TFW. The A was superseded in production by the **F-111E,** a version with modified air intakes that improved engine performance above Mach 2.2. Ninety-four were built, and most of these serve with the 20th TFW, based at RAF Upper Heyford in the UK, in support of NATO. The replacement of current analog bombing and navigation systems with digital equipment is planned for 1987. This will enable F-111A/E aircraft to handle modern guided munitions and advanced sensors as well as future systems, such as Global Positioning System (GPS) and JTIDS. The **F-111D** was designed with advanced avionics, offering improvements in navigation and air-to-air weapon delivery. Ninety-six were built and equip the 27th TFW at Cannon AFB, N. M. The **F-111F,** of which 106 were built, has uprated turbofans. Equipping the 48th TFW at RAF Lakenheath, this version is now modified to carry in its weapons bay the Pave Tack system, which provides a day/night capability to acquire, track, and designate ground targets for laser, infrared, and electro-optically guided weapons.

Production of the F-111 was completed in 1976. Its EW capabilities are being updated with the ALQ-131 ECM pod system, and future improvements will include AIM-9L/M self-defense capability. In addition, French Durandal parachute-retarded, rocket-boosted, runway attack bombs were introduced into TAC's inventory during 1984 to equip F-111s, each of which is capable of carrying up to twelve bombs and delivering them at low altitudes and high speed.

The **AFTI/F-111** is the test-bed for the Mission Adaptive Wing (MAW) developed by ASD's Flight Dynamics Laboratory and Boeing Military Airplane Company. Research is directed at developing a smooth-skin, variable-camber wing system that will increase range, maneuverability, and survivability for tactical and strategic missions, using automatic wing configuration control to maintain peak aerodynamic efficiency.

The **EF-111A** is an ECM conversion of the F-111A *(see page 155)*; SAC has a strategic bomber version, designated **FB-111A** *(see page 150)*. The Royal Australian Air Force acquired 24 **F-111Cs** for strike duties, four of which have since been modified for tactical reconnaissance.

Convair F-106A Delta Darts

General Dynamics F-111

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-111F): empty 47,481 lb, gross 100,000 lb.

Performance (F-111F): max speed at S/L Mach 1.2, max speed at altitude Mach 2.5, service ceiling more than 59,000 ft, range with max internal fuel more than 2,925 miles.

Armament: one 20-mm M61A1 multibarrel cannon and two nuclear bombs in internal weapon bay; four swiveling wing pylons carrying total external load of up to 25,000 lb of bombs, rockets, missiles, or fuel tanks.

Attack and Observation Aircraft

A-7D/K Corsair II

The **A-7D** Corsair II is a single-seat, subsonic close air support aircraft, with limited interdiction capabilities; 459 were delivered to USAF between 1968 and 1976. Since 1973, all A-7Ds, including those operated formerly by the active Air Force, have been delivered to ANG units in eleven states and Puerto Rico. The aircraft's outstanding target kill capability, first demonstrated in Southeast Asia, is achieved with the aid of a continuous-solution navigation and weapon-delivery system, including all-weather radar bomb delivery. Additionally, 383 A-7Ds were modified to carry a Pave Penny laser target-designation pod.

A combat-capable two-seat training version, the **A-7K,** was funded to facilitate transition training. Thirty-one were delivered, from April 1981, comprising one for each of ANG's 13 A-7D units, and 18 for the 162d Tactical Fighter Training Group in Tucson, Ariz. (Data for A-7D.)

Contractor: Vought Corporation, subsidiary of the LTV Corporation.

Power Plant: one Allison TF41-A-1 nonafterburning turbofan engine; 14,500 lb thrust.

Accommodation: pilot only.

Dimensions: span 38 ft 9 in, length 46 ft 1½ in, height 16 ft 0¾ in.

Weights: empty 19,781 lb, gross 42,000 lb.

Performance: max speed at S/L 698 mph, ferry range with external tanks 2,871 miles.

Armament: one M61A1 20-mm multibarrel gun; up to 15,000 lb of air-to-air or air-to-surface missiles, bombs, rockets, or gun pods on six underwing and two fuselage attachments; Pave Penny AN/AAS-35 laser target-designation pod installed on 383 aircraft.

A-10 Thunderbolt II

Designed specifically for the close air support (CAS) mission, the A-10 offers a combination of large military load, long loiter, and wide combat radius. In a typical antiarmor close air support mission, the A-10 could fly 150 miles and remain on station for an hour. It can carry up to 16,000 lb of mixed ordnance with partial fuel or 12,086 lb with full internal fuel. The 30-mm GAU-8/A gun 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. An inertial navigation system (INS) is being added by retrofit.

Funding was terminated in 1983, and delivery of 713 production A-10s was completed in March 1984. The first operational squadron was activated at Myrtle Beach AFB, S. C., in June 1977, and achieved operational capability in October. Pave Penny laser target-designation pods, introduced in 1978, are now standard equipment for the aircraft. Future A-10 enhancements are expected to include installation of the Martin Marietta LANTIRN fire control pod to improve night/adverse weather capability.

Six squadrons of A-10s have been deployed at RAF Bentwaters and Woodbridge in the UK; TAC A-10 units include the 23d and 354th TFWs, 355th TTW, and 66th FWS; the 18th TFS is located at Eielson AFB, Alaska, and the 25th TFS at Suwon Afb, Korea. A-10 equipment of the

126th and 174th TFWs and the 103d, 104th, and 175th TFGs of the ANG has been completed—the A-10 being the first first-line aircraft to be assigned to ANG units. A-10s also equip the 434th and 442d TFWs and the 917th and 926th TFGs of the AFRES.

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.
Weights: empty 24,959 lb, max gross 50,000 lb.
Performance: combat speed at S/L, clean, 439 mph; range with 9,500 lb of weapons and 1.7 hr loiter, 20 min reserve, 288 miles.
Armament: one 30-mm GAU-8/A gun; eight underwing 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 six AGM-65 Maverick missiles, and jammer pods. Chaff and flares carried internally to counter radar or infrared directed threats. The centerline pylon and the two flanking fuselage pylons cannot be occupied simultaneously.

Fairchild Republic A-10 Thunderbolt II

AC-130A

AC-130A/H

During the Grenada rescue operations in October–November 1983, AC-130 gunships provided vital support for US Army ground operations. **AC-130As** serve with the Air Force Reserve's 711th SOS at Eglin AFB, Fla. **AC-130Hs** continue in active service with MAC's 1st Special Operations Wing. AC-130As are equipped with two 40-mm cannon, two 20-mm Vulcan cannon, and two 7.62-mm Miniguns. AC-130Hs are similar, except that one 40-mm cannon is replaced with a 105-mm howitzer. Both models are equipped with sensors and target-acquisition systems, including forward-looking infrared and low-light-level TV. AC-130Hs are equipped for in-flight refueling.

Contractor: Greenville (Texas) Division of E-Systems, Inc. Other data basically as for C-130 *(page 157)*.

O-2A

A total of 346 specially equipped variants of the "push-and-pull" Cessna 337 Skymaster entered USAF service in 1966, originally to replace the Cessna O-1 in the forward air controller role in Vietnam. Though OA-37s and OV-10s have replaced O-2s, a few of these aircraft still serve with TAC's 507th TACW at Shaw AFB, S. C., and AAC's 25th TASS at Elefson AFB. Specialized equipment and electronics installed in the O-2A permit control of air strikes, visual reconnaissance, target identification and marking, ground-air coordination, and damage assessment.

Contractor: Cessna Aircraft Company.
Power Plant: two Continental IO-360-C/D piston engines; each 210 hp.
Accommodation: pilot and observer side-by-side; one passenger 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.

OA-37B Dragonfly

A-37B Dragonfly ground support aircraft withdrawn from operational service with AFRES have been adapted for forward air control duty, replacing O-2As in three ANG Tactical Air Support Groups and the 16 OV-10s of PACAF's 5th Tactical Control Group, Osan AB, South Korea. There are some OA-37Bs in the 602d TACW at Davis-Monthan AFB, Ariz.

Vought A-7K Corsair II

Cessna O-2A

Cessna OA-37B Dragonfly

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.

OV-10A Bronco

This counterinsurgency combat aircraft, first flown in August 1957, was acquired by USAF for use in the forward air control role, and for limited quick-response ground support pending the arrival of tactical fighters. One hundred and fifty-seven were delivered to USAF before production of the OV-10A for the US services ended in April 1969. Some have replaced older O-2As in such units as the 22d Tactical Air Support Squadron at Wheeler AFB, Hawaii. Versions are also in service with USN, US Marine Corps, and foreign air forces.

Contractor: Rockwell International Corporation, Aircraft Operations.
Power Plant: two Garrett T76-G-416/417 turbopeop 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 6,893 lb, overload gross weight 14,444 lb.
Performance: max speed at S/L, without weapons, 281 mph; service ceiling 24,000 ft; combat radius with max weapon load, no loiter, 228 miles.
Armament: four fixed forward-firing M60C 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.

Rockwell OV-10A Bronco

Reconnaissance and Special-Duty Aircraft

Lockheed SR-71A Blackbird

SR-71A/B Blackbird

Fastest, highest-flying production aircraft yet built, the multisensored **SR-71A** Blackbird is assigned to the 9th Strategic Reconnaissance Wing, Beale AFB, Calif.; its mission is to respond to national and strategic requirements and to support theater commanders throughout the spectrum of conflict. Equipment carried is capable of specialized coverage of up to 100,000 sq miles of territory in one hour. In July 1976, flown by three USAF crews, the SR-71 set an absolute world 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-km closed circuit, and a sustained altitude of 85,069 ft in horizontal flight. Another SR-71A flew from New York to London, England, in 1 hr 54 min 56.4 sec in September 1974, at an average speed of 1,806.987 mph. The prototype flew for the first time in December 1964, and delivery of production aircraft began in January 1966. The **SR-71B** is a two-seat training version, with elevated rear cockpit.

Contractor: Lockheed Corporation.
Power Plant: two Pratt & Whitney JT11D-20B(J58) turbojet engines; each 34,000 lb thrust with afterburning.
Accommodation: crew of two in tandem.
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.
Armament: none.

U-2 and TR-1

Production of the basic U-2 began in the late 1950s. It is essentially a powered glider, with high aspect ratio wing and lightweight structure, designed to carry out strategic reconnaissance for long periods at very high altitudes. Fifty-five are believed to have been built, including two prototypes, 48 single-seat **U-2A** versions, and five 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-2CT** tandem-cockpit trainer, **U-2EPX** (electronics patrol experimental), **WU-2** weather reconnaissance model, and **HASPU-2** (high-altitude sampling program) were conversions of basic models. All have similar dimensions except for the **U-2R,** which has much increased span and length. This is now the primary version. Air Force U-2s have performed important nonmilitary missions, including flights for the Department of Agriculture land management and crop estimate programs; photographic work in connection with flood, hurricane, and tornado damage; data gathering for a geothermal energy program; and search missions for missing boats and aircraft.

A derivative of the U-2R, the **TR-1A,** is a single-seat tactical reconnaissance aircraft designed for high-altitude standoff surveillance missions, primarily in Europe. Initial funding was provided by the FY '79 budget. A total of 19 was requested through FY '84, three more in FY '85, and two in FY '86, completing the planned inventory for USAF. There are also two two-seat **TR-1Bs.** Each TR-1 is equipped with electronic sensors to provide continuously available, day or night, all-weather surveillance of the battle area, or potential battle area, in direct support of US and allied ground and air forces during peace, crises, and war situations. They include a UPD-X side-looking airborne radar, a T-35 tracking camera, and modern ECM. The first TR-1A flew on August 1, 1981, and pilot training at Beale AFB began later that year. The first of 12 TR-1s to be stationed at RAF Alconbury in the UK arrived in February 1983; the last is scheduled to arrive by the end of next year. These TR-1As are operated by SAC for USAFE.

Since December 1983 a TR-1A has been used to evaluate in-flight equipment for the Precision Location Strike System (PLSS), which will locate enemy defense emitters in near-real time and all weathers, to allow attack from standoff ranges by ground or airborne weapons systems. (Data for TR-1A.)

Contractor: Lockheed Corporation.
Power Plant: one Pratt & Whitney J75-P-13B turbojet engine.
Dimensions: span 103 ft 0 in, length 63 ft 0 in, height 16 ft 0 in.
Weight: gross 40,000 lb.
Performance: max cruising speed at over 70,000 ft more than 430 mph, range more than 3,000 miles.
Armament: none.

Lockheed TR-1

McDonnell Douglas RF-4C

RF-4C

This unarmed multisensor version of the F-4C Phantom II was developed to replace the day-only RF-101 for day/night, all-weather reconnaissance operations. The first production RF-4C flew in May 1964, and 505 were built before manufacture ended in December 1973. They are operated by six TAC, USAFE, and PACAF tactical reconnaissance squadrons and by six squadrons of the ANG. The RF-4 was the first tactical aircraft equipped with a forward-looking radar capable of simultaneous terrain-following and low-altitude navigation. The basic aircraft is configured with conventional optical cameras for day operations and infrared (IR) sensors for night. Both the radar and the camera systems are housed in a modified nose, which increases the length of the aircraft by 33 in compared with the fighter version. Sixteen RF-4Cs are equipped with side-looking airborne radar (SLAR) for all-weather standoff battlefield surveillance, and 24 with a tactical electronic reconnaissance (TEREC) sensor for locating electronic emitters. Other new equipment includes the ARN-101 digital avionics system for improved navigation accuracy and greater reconnaissance capability; the Pave Tack IR pod for improved target locating by day, night, or in marginal weather; and data link transmission of SLAR and TEREC intelligence in near-real time to enhance timeliness of information to tactical decision-makers. (Data similar to F-4.)

Boeing RC-135

EC-130

A number of variants of the basic C-130 have been produced for specialized missions, including the **EC-130E ABCCC** (known until 1977 as C-130E-II) used by the 7th Airborne Command and Control Squadron of the 522d AWACW from Keesler AFB, Miss., as an Airborne Battlefield Command and Control Center; **EC-130E "Coronet Solo II"** electronic surveillance version operated by the 193d Special Operations Group, ANG, from Harrisburg IAP, Pa.; **EC-130H "Compass Call"** enemy communications jammer operated by 41st Electronic Combat Squadron of the 552d AWACW from Davis-Monthan AFB, Ariz. (Data basically as C-130, page 157.)

EC-135, etc.

Several aircraft in the KC-135 Stratotanker series were modified for specialized missions during production or at a later date. Thirty-nine are modified for strategic airborne command and control missions. Five KC-135A tankers were converted for Airborne Command Post use by SAC in 1960. Additional aircraft were modified in 1962, and 17 new production KC-135B turbofan aircraft entered the system in 1965. Currently, **EC-135A/C/G/L/H/P/Y** aircraft are assigned to SAC, TAC, PACAF, and USAFE. They are fitted with extensive communications equipment to support strategic command and control missions of their respective CINCs. At least one SAC EC-135C is airborne at all times, accommodating a flight crew of five, a general officer, and a staff of 18. EC-135Cs can be refueled by SAC tankers. Fourteen were built and have been adapted to provide control of Minuteman ICBMs. TAC provides overseas deployment control of tactical fighters with the **EC-135K.**

Seven derivative **Advanced Range Instrumentation Aircraft (ARIA),** developed originally for the Apollo program, are operated by ASD's 4950th Test Wing as telemetry and voice relay stations to supplement land and sea receiver stations for DoD and NASA space and missile programs. The aircraft's distinctive bulbous nose houses the world's largest airborne steerable antenna.

Versions of the C-135 Stratolifter series used for reconnaissance include turbofan **RC-135Vs** and **RC-135Ws,** equipped also for electronic reconnaissance with SAC. **RC-135Ss,** and **RC-135Us. WC-135Bs,** converted C-135Bs, are used by MAC for long-range weather recon-

Grumman EF-111A Raven

naissance missions. In addition, a highly instrumented version, designated **NKC-135** ALL (Airborne Laser Laboratory), has been utilized by USAF as a test-bed in support of the HEL (High Energy Laser) research program. The primary objective has been to acquire technology data on laser operations that might have combat potential in the airborne environment.

In order to minimize the cost of retrofitting the special-purpose -135s with more efficient turbofan engines, USAF has installed in some aircraft refurbished Pratt & Whitney JT3D-3Bs taken from Boeing 707-100B aircraft, purchased as surplus from commercial air carriers. The reengined aircraft were redelivered between January and July 1981. (Data basically as C-135, page 156.)

EF-111A Raven

The EF-111A Raven is a conversion of the basic General Dynamics F-111A airframe fitted with mainly off-the-shelf components that enable it to accomplish important defense suppression missions in worldwide support of US tactical strike forces. Its ALQ-99E primary jammer is a modification of the Navy ALQ-99, and is carried internally. This extremely powerful system's frequency coverage, reliability, and effective use of available jamming power enables the EF-111A to suppress the densest known electronic defenses. Other equipment includes self-protection systems from the F/FB-111 (ALQ-137/ALR-62). The crew capsule is revised, and a new vertical stabilizer houses ALQ-99E receivers. An upgrade to the ALQ-99E computers and processors, awarded to Eaton Corporation's AIL Division in 1984, will enable the EF-111A to counter advanced electronic defenses for the 1990s.

Forty-two EF-111As are being produced for missions that include barrier surveillance jamming, suppression of surface-to-air missile threats during close air support operations, and escort jamming for deep strike missions. Flight testing began in March 1977, and the first "production" EF-111s were delivered in late 1981 to the 366th TFW, at Mountain Home AFB, Idaho, where they achieved initial operational capability with the 390th Electronic Combat Squadron in December 1983. Second operational location was at RAF Upper Heyford in the UK, where the first EF-111 arrived in February 1984 for the 42d ECS.

Contractor: Grumman Aerospace Corporation.
Power Plant: two Pratt & Whitney TF30-P-3 turbofan engines, each 18,500 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 76 ft 0 in, height 20 ft 0 in.
Weights: empty 55,275 lb, gross 89,000 lb.
Performance: max combat speed 1,377 mph, service ceiling with afterburning at combat weight 45,000 ft, combat radius with reserves 230–929 miles, according to mission.
Armament: none.

E-3 Sentry (AWACS)

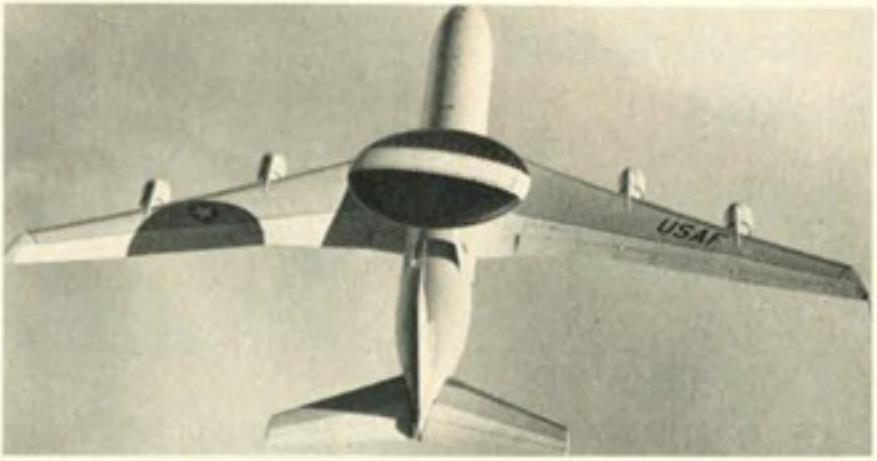
AWACS is a mobile, flexible, survivable, and jamming-resistant surveillance and command control and communications (C^3) system, capable of all-weather, long-range, high- or low-level surveillance of all air vehicles, manned or unmanned, above all kinds of terrain. A modified Boeing 707-320B carries an extensive complement of mission avionics, including computer, radar, IFF, communications, display, and navigation systems. The capability of AWACS is provided by its Westinghouse Electric Corporation look-down radar, which makes possible all-altitude surveillance over land or water, thus correcting a serious deficiency in earlier surveillance systems.

USAF indicated an initial requirement for 34 AWACS aircraft. Deliveries of the basic version, designated **E-3A** Sentry, began in March 1977, when the first aircraft was handed over to TAC's 552d Airborne Warning and Control Wing at Tinker AFB, Okla. All aircraft have been delivered. The 34th is presently a test system aircraft assigned to AFSC. Eighteen further E-3s are being acquired by NATO to upgrade the command and control of its air defense forces.

A maritime surveillance capability was developed by Westinghouse for retrospective incorporation in the radar of all operational E-3s. Aircraft from production system 22 embody this maritime mission capability, including the NATO models. Each of the first 24 E-3As is being updated to **E-3B** standard. Improvements include faster computer capabilities; antijam communications; an austere maritime surveillance capability; additional radio communications; and five additional display consoles. The first E-3B was redelivered to the 552d AWACW in July last year. A new **US/NATO Standard E-3A** configuration was introduced from the 25th USAF Sentry, delivered in December 1981, in which the data processing capability is improved. Beginning last year, the US Standard E-3A aircraft are being upgraded with additional command and control capability and are being redesignated **E-3C.** NATO Sentrys will continue as E-3As.

E-3s have had a role in US continental air defense since January 1979, when NORAD personnel began augmenting TAC E-3 flight crews on all operational NORAD missions by the 552d AWACW from Tinker AFB. Overseas detachments of the 552d include the 960th and 961st AWAC Support Squadrons based respectively at Keflavik, Iceland, and Kadena AB, Okinawa, Japan. Deployments have been made to the Pacific, the Middle East, the Mediterranean area, and Europe. AWACS aircraft are also used extensively in support of the US drug enforcement program.

Contractor: Boeing Aerospace Company.
Power Plant: four Pratt & Whitney TF33-PW-100/100A turbofan engines; each 21,000 lb thrust.
Accommodation: operational crew of 20, including 16 AWACS specialists.
Dimensions: span 145 ft 9 in, length 152 ft 11 in, height 41 ft 9 in.
Weight: gross 325,000 lb.
Performance: max speed 530 mph, service ceiling above 29,000 ft, endurance six hr on station 1,000 miles from base.



Boeing E-3A Sentry (AWACS)

Boeing E-4B

Boeing EC-18B ARIA

Grumman X-29

E-4B

SAC is the Air Force single resource manager for the E-4 airborne command post aircraft, the main operating base for which is Offutt AFB, Neb. Three **E-4As,** modified Boeing 747 aircraft, were built initially to support the National Emergency Airborne Command Post (NEACP) and provided an interim capability by utilizing existing EC-135 command control and communications (C^3) equipment. Four fully-developed **E-4B** Airborne Command Post aircraft (three of them converted from E-4A) now support the NEACP mission. They are hardened against the effects of nuclear explosions, including electromagnetic pulse, equipped for in-flight refueling, contain a new 1,200kVA electrical system designed to support advanced electronics, and have a wide variety of new communications equipment. This includes a more powerful LF/VLF system, improved satellite communications system, and communications processing equipment. These systems have antijam features and will support operations in a nuclear environment over extended ranges. The E-4B system is capable of tying in to commercial telephone and radio networks and could, potentially, be used for radio broadcasts to the general population. Additional improvements, to include a data processing capability and more survivable C^3, are programmed. The first E-4B entered service with SAC in January 1980, and the first operational mission was flown in March that year. In mid-1980, Boeing Aerospace, together with E-Systems, Inc, was contracted to modify one E-4A to B standard, with options to modify the other two; these options have been exercised; the first converted E-4B was redelivered in July 1983; redelivery of the remaining two was due by January this year.

Contractor: Boeing Aerospace Company.
Power Plant: four General Electric CF6-50E2 turbofan engines, each 52,500 lb thrust.
Dimensions: span 195 ft 8 in, length 231 ft 4 in, height 63 ft 5 in.
Weight: gross 800,000 lb.
Performance: unrefueled endurance in excess of 12 hours.

EC-18B ARIA

First rolled out early this year, the EC-18B Advanced Range Instrumentation Aircraft (ARIA) is a modified former American Airlines Boeing 707-320 series transport, six of which were procured as replacements for the EC-135 ARIAs operated by ASD's 4950th Test Wing. In common with the EC-135 ARIAs, the 707s are being converted to house the world's largest airborne steerable antenna in a bulbous nose, will have a probe antenna on each wingtip, and will embody a completely new cockpit configuration; range, cabin space, and fuel efficiency will all be increased, to provide greater support for the expanding ARIA mission, including DoD and NASA space and missile programs.

Contractor: Boeing Military Airplane Company.

WC-130E/H

Modified C-130 Hercules transports, designated WC-130E 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 403d Rescue and Weather Reconnaissance Wing of the Air Force Reserve. (Data similar to C-130.)

X-29 Forward Swept Wing Demonstrator

Flight testing of the X-29 FSW has been under way at Edwards AFB, Calif., since December 1984, conducted by NASA's Dryden Flight Research Center in coopera-

tion with DARPA, USAF, USN, and Grumman, which built the two demonstrator aircraft. The program's initial phase is concentrated on "conceptual evaluation." Integrated with a "triplex" fly-by-wire flight-control system, the X-29's forward-swept wings, made of strong, lightweight graphite composites, and its stubby canards, which act as its main control surfaces, combine to enhance lift and reduce drag. In flight, the wings' trailing-edges change shape continuously to match flight conditions. A standard Northrop F-5A forward fuselage and nose landing gear and many off-the-shelf components, such as F-16 main landing gear and control surface actuators, were utilized to reduce costs.

Contractor: Grumman Aerospace Corporation.
Power Plant: one General Electric F404-GE-400 turbofan engine; 16,000 lb st class.
Accommodation: pilot only.
Dimensions: span 27 ft 2½ in, length overall 53 ft 11¼ in, height 14 ft 3½ in.
Weights: empty 13,326 lb, gross 17,303 lb.
Performance: max level speed approx Mach 1.6.

Transports and Tankers

C-5 Galaxy

This air-refuelable, long-range, heavy logistics transport flew for the first time in June 1968. Deliveries of the basic **C-5A** to MAC began in December 1969, and all 81 of these aircraft had been received by May 1973. Each is capable of airlifting loads up to 261,000 lb, such as two M60 tanks or three CH-47 Chinook helicopters, over transoceanic ranges. Under a major modification program, Lockheed is producing kits of components to extend the service life of the C-5A's wings by 30,000 flight hours, without load restrictions. These kits replace only the five main load-carrying wing boxes, to which other existing components are transferred. The use of 7175-T73511 aluminum alloy provides greater strength and resistance to corrosion. Flight testing of a prototype installation was completed successfully during 1980, the converted C-5A being redelivered to USAF early in 1981. Installation of production kits began in 1982, and all 77 aircraft now in the inventory should be modified by FY '87. The 433d TAW at Kelly AFB, Tex., became the first AFRES unit to receive the C-5A when the first of 16 was delivered in December last year. The unit is being renamed the 433d MAW. It is also planned to transfer C-5As to ANG's 105th MAG at Stewart IAP, N. Y.

To meet an urgent need for additional heavy airlift capacity, USAF will acquire 50 **C-5Bs,** generally similar to the C-5A but embodying all the improvements that have been introduced since completion of C-5A production. These include the strengthened wings, General Electric TF39-GE-1C turbofans, and updated avionics, including Bendix color weather radar and Delco triple INS. The original MADAR (MAlfunction Detection Analysis and Recording instrument) units are to be replaced by the more advanced MADAR II. Five aircraft have been funded in FY '83/84, with the first delivery scheduled for December this year. Planned procurement is eight aircraft in FY '85, 16 in FY '86, and 21 in FY '87. Final delivery is scheduled for February 1989. (Data for C-5B.)

Contractor: Lockheed-Georgia Company.
Power Plant: four General Electric TF39-GE-1C turbofan engines; each 41,100 lb thrust.
Accommodation: crew of five, rest area for 15 (relief crew, etc); 75 troops and 36 standard 463L pallets or assorted vehicles, or additional 270 troops.
Dimensions: span 222 ft 8 in, length 247 ft 8 in, height 65 ft.
Weights: empty 374,000 lb, max payload 261,000 lb, gross (for 2.25g) 769,000 lb.
Performance: max speed at 25,000 ft 571 mph, service ceiling (at 615,000 lb) 35,750 ft, range with max payload 2,729 miles.

C-9A Nightingale and VC-9C

Derived from the DC-9 Srs 30 commercial airliner, the **C-9A** is an aeromedical airlift transport, in service since August 1968. Modifications include a special-care compartment with separate atmospheric and ventilation controls. Delivery of 21 to MAC's 375th Aeromedical Airlift Wing was completed by February 1973. The Nightingale also performs overseas theater aeromedical evacuation missions in Europe and the Pacific. Three specially configured **VC-9Cs** were delivered to the 89th Military Airlift Wing at Andrews AFB, Md., in 1975 for Presidential and other US governmental duties. (Data for C-9A.)

Contractor: Douglas Aircraft Company, Division of McDonnell Douglas Corporation.
Power Plant: two Pratt & Whitney JT8D-9 turbofan engines; each 14,500 lb thrust.
Accommodation: crew of three; 40 litter patients or 40 ambulatory patients, or a combination of both, plus five medical staff.
Dimensions: span 93 ft 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.

McDonnell Douglas C-17 (artist's concept)

Beech C-12A

McDonnell Douglas C-9 Nightingale

Lockheed C-5A

C-12

Thirty military versions of the Beechcraft Super King Air 200 were delivered to USAF under the designation **C-12A.** Their 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. The ANG has six passenger/cargo **UC-12Ds,** with added freight door, ordered under FY '84 funding; six more were ordered in FY '85. Also, under a contract awarded in September 1983, USAF is leasing 40 Super King Air B200Cs to replace (with C-21As) the fuel-inefficient CT-39s used in operational support missions. Deliveries to MAC began in May 1984, as **C-12Fs.** A purchase option may be exercised at the end of the lease period. (Data for C-12A.)

Contractor: Beech Aircraft Corporation.
Power Plant: two Pratt & Whitney Canada PT6A-38 turboprop engines; each 750 shp. (C-12F: 850 shp PT6A-42s.)
Accommodation: crew of two; up to eight passengers or 4,764 lb of cargo.
Dimensions: span 54 ft 6 in, length 43 ft 9 in, height 15 ft 0 in.
Weight: gross 12,500 lb.
Performance: max speed at 14,000 ft 299 mph, service ceiling 31,000 ft, range at max cruising speed 1,824 miles.

C-17

Full-scale development of the C-17 is to begin in FY '86. It was conceived to meet USAF's requirement for a heavy-lift, air-refuelable cargo transport able to provide intertheater and intratheater airlift of military equipment, including the M1 tank, directly into airfields in potential combat areas. Operation will be possible from runways only 3,000 ft long and 90 ft wide. On the ground, the C-17 would be able to make a 180° turn in only 82 ft. A fully loaded aircraft, using thrust reversal, would be able to back up a two percent gradient.

McDonnell Douglas was announced as the selected prime contractor in August 1981, and received a low-level research and development contract the following July. This was intended to cover C-17 technologies that would also benefit other airlift programs while preserving the option to proceed to full-scale work on the C-17. Technologies investigated include a blown flap system on a swept supercritical wing with winglets, and an engine fan and redirected flow thrust reverser. The FY '86 request of $453.7 million would initiate full-scale development toward a production start in FY '88, with first delivery following delivery of the last C-5B, and leading to an FY '92 IOC. Pratt & Whitney 2037 engines were FAA-certified in 1983 and entered commercial service in 1984 on Boeing 757s.

Contractor: McDonnell Douglas Corporation.
Power Plant: four Pratt & Whitney PW2037 turbofan engines; each 37,000 lb thrust.
Accommodation: normal flight crew of two, plus loadmaster. Provision for a variety of military airlift roles.
Dimensions: span 165 ft 0 in, length 175 ft 2 in, height 55 ft 3 in.
Performance (estimated): cruising speed at high altitude 518 mph, typical range with 172,200 lb payload 2,765 miles.

C-18A

The designation C-18A has been given to eight former American Airlines Boeing 707-323C transports acquired for service with USAF. (Data similar to C-137.)

C-20A

Selected to replace the aging, fuel-inefficient C-140B, the C-20A is a Gulfstream III executive transport acquired by USAF for VIP duties. Three aircraft were delivered to the 89th Military Airlift Wing under a lease/purchase agreement beginning September 1983, and were subsequently purchased in November 1984; eight more are requested in FY '86. Eight will eventually be assigned to Andrews AFB, Md., and three to Ramstein AB, West Germany.

Contractor: Gulfstream Aerospace Corporation.
Power Plant: two Rolls-Royce RB163-25 turbofan engines; each 11,400 lb thrust.
Accommodation: crew of five; 14–18 passengers.
Dimensions: span 77 ft 10 in, length 83 ft 1 in, height 24 ft 4½ in.
Weight: gross 69,700 lb.
Performance: max cruising speed 509 mph, service ceiling 45,000 ft, range 4,718 miles.

C-21A

In a program designed to replace aging, fuel-inefficient CT-39s, USAF is acquiring 80 Learjet 35As (together with 40 C-12Fs) under a lease contract in which the contractor will provide maintenance and logistics support for the aircraft at various USAF bases. A purchase option may be exercised later. The first aircraft, designated C-21A, was delivered in April 1984. The C-21As are operated by MAC as part of its Operational Support Aircraft fleet, delivering high-priority, time-sen-

sitive cargo, seasoning newly rated pilots, and, as a by-product, providing passenger airlift. They are also capable of quick and easy conversion to such missions as medical evacuation and long-range ferry flights. C-21As are being based throughout the United States and in Japan and Germany. (Data for Learjet 35A.)

Contractor: Gates Learjet Corporation.

Power Plant: (C-21A) two Garrett TFE731-2-2A turbofan engines; each 3,500 lb thrust.

Accommodation: crew of two; cargo or eight passengers.

Dimensions: wing span over tip-tanks 39 ft 6 in, length 48 ft 8 in, height 12 ft 3 in.

Weight: gross 17,000 lb.

Performance: max level speed at 25,000 ft 542 mph, service ceiling 45,000 ft, range with four passengers, max fuel, and 45 min reserves 2,634 miles.

C-23 Sherpa

The first of 18 Sherpas was delivered to the Air Force in October 1984, with the remaining aircraft due to be delivered by August this year. They are operated by MAC and controlled by CINC USAFE, primarily to ferry aircraft spares and complete engines to bases throughout Europe. The contract includes options for 46 more Sherpas.

First flown on December 23, 1982, the Sherpa is an all-freight version of the Shorts 330 regional airliner, with a 6 ft 6 in square cabin section over an unimpeded hold length of 29 ft. Through loading is provided via a large forward freight door, a full-width hydraulically operated rear ramp door, and removable roller conveyors. The USAF aircraft are used in the European Distribution System Aircraft (EDSA) program, centered on Zweibrücken, in Germany, with main warehousing facilities at RAF Kemble in the UK and Torrejon AB in Spain. In peacetime, the Sherpas service at least 20 USAF bases, in a system analogous with the civil air freight operation carried out by Federal Express in the US.

Contractor: Short Brothers PLC.

Power Plant: two Pratt & Whitney Canada PT6A-45R turboprop engines; each 1,198 shp.

Accommodation: crew of two; up to 7,500 lb of freight, including four LD3 containers, and engines the size of the F100 series.

Dimensions: span 74 ft 8 in, length 58 ft 0½ in, height 16 ft 3 in.

Weight: gross 22,900 lb.

Performance: max cruising speed at 10,000 ft 218 mph, range 700 miles with 4,500 lb payload.

CT-39 Sabreliner

Acquired in the late 1960s and early 1960s, the CT-39 Sabreliner has become increasingly less cost-effective and is being replaced by the C-12F and C-21A. Versions utilized by USAF are **CT-39A/B** basic utility and training aircraft, of which 143 were delivered. MAC's 115 CT-39s will all be replaced by the end of FY '85. Those still in the inventory are in service with AFSC and with AFCC facility checking squadrons, which use two Sabreliners, together with four C-140As, to evaluate communications and navigation aids at Air Force bases. In addition, ATC has acquired CT-39As in support of the Air Force Instrument Flight Center.

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; four to seven 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.

C-123K

Four C-123K aircraft, operated by AFRES's 907th TAG, are being retained for aerial spray missions.

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.

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.

C-130 Hercules

Although developed more than 30 years ago, the C-130 remains in production, with basic and specialized versions continuing to perform a diversity of roles worldwide, including airlift support, DEW Line and Arctic ice-cap resupply, aeromedical missions, and firefighting duties for the US Forest Service. The initial production model was the **C-130A**, first flown in April 1955, with 3,750 ehp Allison T56-A-11 or -9 turboprops; 219 were ordered, and deliveries began in December 1956. Two **DC-130As** (originally GC-130As) were built as drone launchers/directors for ARDC (now 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** introduced 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 by 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 large underwing fuel tanks; 389 were ordered for MAC and TAC with deliveries beginning in April 1962. Wing modifications to correct fatigue and corrosion on USAF's current force of 492 C-130B/Es, already under way, will extend the life of the aircraft well into the next century. C-130A wing repairs will allow operation into the 1990s. Fourteen C-130Es were modified to **MC-130E** standard and equipped for use in low-level deep-penetration tactical missions by the 1st, 7th, and 8th Special Operations Squadrons based in the Philippines, West Germany, and Florida, respectively. This version has been supplemented by the **MC-130H (Combat Talon II)** from FY '83. Two were funded in the FY '84 budget, with a further two in the FY '85 budget proposals and one proposed in FY '86. By 1992 the inventory is expected to include 21 of these aircraft, equipped with terrain-following radar, precision navigation/airdrop, in-flight refueling, and self-protection systems. Generally similar to the E, the basic **C-130H** has uprated T56-A-15 turboprop engines, a redesigned outer wing, and other, minor, improvements; delivery began in April 1975. Eighteen C-130Hs (four ski-equipped for deployment with the ANG) were funded by Congress in the FY '83/84 budgets. C-130s are currently active in USAF regular, Reserve, and ANG airlift squadrons. Other variants include **HC-130H/N/P** for MAC's 23d Air Force and MAC-gained units of the ANG and Reserve, and the **AC-130A/H** and **WC-130E/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 six standard freight pallets, etc.

Dimensions: span 132 ft 7 in, length 97 ft 9 in, height 38 ft 3 in.

Weights: empty 76,469 lb, gross 175,000 lb.

Performance: max cruising speed 374 mph, service ceiling at 130,000 lb AUW 33,000 ft, range with max payload 2,356 miles.

Gulfstream C-20A

Short Brothers C-23 Sherpa

Gates Learjet C-21A

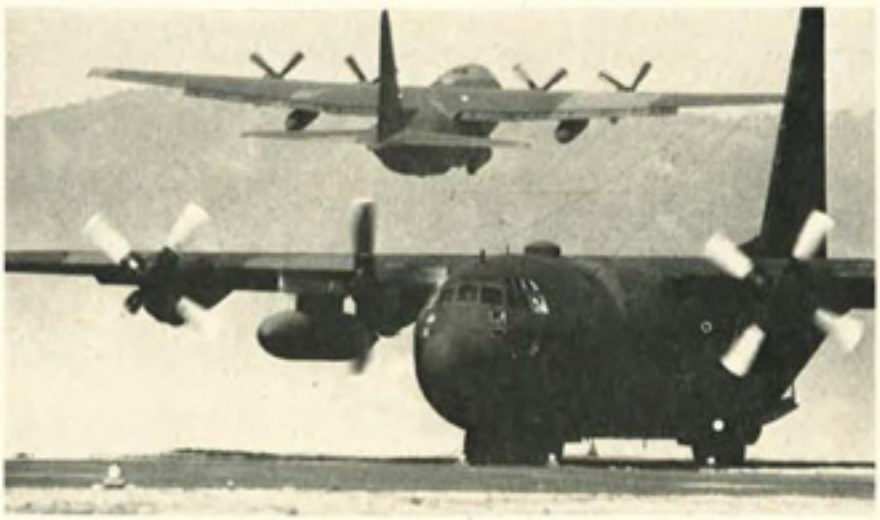
Rockwell CT-39 Sabreliner

HC-130

Constituting a major element of MAC's 23d Air Force, the **HC-130H** is an extended-range version of the C-130, ordered in 1963, 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 air-to-air recovery (AIAR) systems. Initial flight was made in December 1964. Crew complement is ten to twelve. A total of 43 was delivered. Twenty **HC-130Ps** are similar, but adapted to refuel helicopters in flight. Four **JHC-130H** conversions were fitted with equipment for aerial recovery of reentering space capsules. Under a 1974 USAF contract, 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 search-and-rescue version of the HC-130P with advanced direction-finding equipment, were ordered in 1969; these aircraft also are capable of refueling helicopters in flight. (Other data similar to C-130.)

C-131

Thirty-three C-131 twin-engine transports, with an average age of around 30 years, remain in service with the ANG for support airlift.



Lockheed C-130 Hercules

Boeing KC-135R Stratotanker

KC-135 Stratotanker

As single manager of all USAF KC-135 tanker aircraft, SAC supports its own refueling requirements as well as aerial refueling requirements of other Air Force commands, the US Navy and Marines, and other nations. Although similar in size and appearance to commercial 707 aircraft, the KC-135 was designed to military specifications, incorporates different structural details and materials, and was designed to operate at high gross weights. The KC-135 fuel tankage is located in the "wet wings" and in fuel tanks below the floor in the fuselage. The first flight of the **KC-135A** was in August 1956. By 1966, a total of 732 had been built. Today, 615 KC-135s are in operational service, including those currently assigned to three Air Force Reserve units and to thirteen Air National Guard units. There are three ongoing programs designed specifically to enhance KC-135 capability and extend its operational utility beyond the year 2000. First, the selection of the 22,000 lb thrust General Electric/SNECMA CFM56 modern technology engines for retrofit of the KC-135 fleet was announced in 1980. Reengined aircraft not only carry more fuel farther, but also have reduced maintenance costs, are able to operate from shorter runways, and are less pollution-prone. The first reengined aircraft, redesignated **KC-135R**, made its first flight in August 1982. The KC-135R program includes modification of 25 major systems/subsystems. The Air Force expects to modify 389 aircraft through FY '90. SAC took delivery of the first KC-135R in July 1984. Second, the JT3D reengining program will upgrade 128 of the ANG and AFRES fleet of KC-135As by the end of 1985. These aircraft, redesignated **KC-135E**, use JT3D turbofan engines removed from surplus commercial 707s. Finally the Life Extension Structural Modification provides for renewal of the lower wing skin, which eliminates peacetime airframe restrictions by ensuring the structural integrity of the aircraft. Development of new and improved aerial refueling systems is also currently under way. (Data for KC-135A.)

Contractor: Boeing Military Airplane 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.

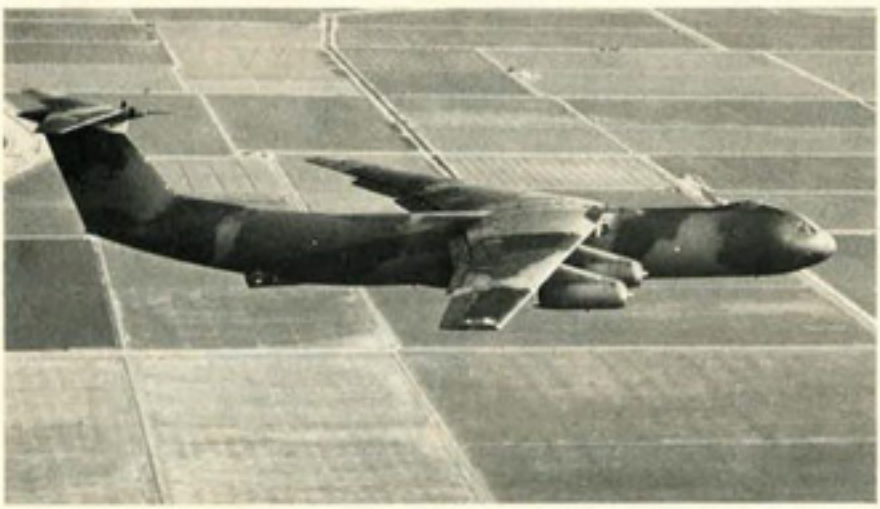
Boeing C-137C

Lockheed C-140 JetStar

C-135 Stratolifter

Thirteen C-135 transports and variants, without the KC's refueling equipment, remain operational with MAC. They were ordered originally to serve as interim jet passenger/cargo transports, pending delivery of C-141s. Three converted KC-135s were followed by 45 production Stratolifters in two versions: the **C-135A** with J57-P-59W turbojet engines, and **C-135B** with Pratt & Whitney TF33-P-5 turbofans. Eleven Bs were retrofitted 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.



Lockheed C-141B StarLifter

C-137

Five specially modified Boeing 707 transports are operated by MAC's 89th Military Airlift Wing from Andrews AFB, Md., for VIP duties. Best known is "Air Force One," a **C-137C** for use by the President. It is basically a 707-320B with a special VIP interior. A second C-137C is also operated, together with three smaller 707-120s, originally designated VC-137As but later modified to **C-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: C-137B span 130 ft 10 in, length 144 ft 6 in, height 42 ft 0 in; C-137C span 145 ft 9 in, length 152 ft 11 in, height 42 ft 5 in.
Weights: C-137B gross 258,000 lb; C-137C gross 322,000 lb.
Performance (C-137C): max speed 627 mph, service ceiling 42,000 ft, range about 7,000 miles.

C-140 JetStar

JetStars entered USAF service in 1961. Four **C-140As** are used by Air Force Communications Command (AFCC) to evaluate landing systems, navigational aids, radar approach control equipment, and controllers and tower operators. Scheduled for replacement by the C-20A, MAC has eleven **C-140B** transport versions; six of which serve with the 89th Military Airlift Wing, operating from Andrews AFB, Md; four are used by USAFE for operational support airlift.

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; C-140B crew of three and eight 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

The **C-141A** began operations with MAC in April 1965. Two hundred and eighty-five were built, some of which were structurally modified to accommodate the 82,207 lb Minuteman ICBM. During operational use it became clear that the cargo compartment was often fully loaded without the aircraft's maximum payload capability being utilized. In order to realize the C-141's full potential, USAF funded modification of the entire force of 270 (now 267) aircraft to **C-141B** standard. The fuselage was lengthened by 23 ft 4 in, and an in-flight refueling capability was added. The first production C-141B was delivered to USAF in December 1979, and the final modified StarLifter was obtained in June 1982, ahead of schedule and below projected cost. The modification significantly increased MAC's airlift capability, giving USAF the equivalent of 90 additional C-141A aircraft. Current C-141 modifications include the installation of new digital flight data recorders, enhanced station keeping equipment capability, 50 kHz VOR/ILS receivers, and secure voice capability on UHF and HF radios. In addition, twenty 437th MAW C-141Bs will have electroluminescent (EL) light panels installed on the flight deck for use in the Wing's Special Operations Low Level (SOLL) mission. (Data for C-141B.)

Contractor: Lockheed-Georgia Company.
Power Plant: four Pratt & Whitney TF33-P-7 turbofan engines; each 21,000 lb thrust.
Accommodation: crew of five; cargo on 13 standard 463L pallets. Alternative freight, vehicle, or passenger payloads.
Dimensions: span 159 ft 11 in, length 168 ft 3½ in, height 39 ft 3 in.
Weights: operating 149,000 lb, max payload 90,000 lb, gross 343,000 lb.
Performance: max cruising speed 566 mph, range with max payload 1,970 miles (range significantly increased if air refueling used).

KC-10A Extender

By the beginning of this year, 27 of a planned procurement of 60 KC-10As had been delivered to USAF, with a further 12 requested in the FY '86 budget proposals. The KC-10 was conceived to meet specific USAF requirements for an Advanced Tanker/Cargo Aircraft (ATCA); it is based on the commercial DC-10 Series 30CF, modified to include body bladder fuel cells in the lower cargo compartments, a boom operator's station, an aerial refueling boom, a refueling receptacle, and military avionics. In its primary role of increasing US air mobility on a worldwide scale, a single KC-10A is able to combine the tasks of tanker and cargo aircraft by refueling fighters and simultaneously carrying the fighters' support equipment and support personnel on overseas missions. It can refuel strategic transports such as the C-5 and C-141, nearly doubling, for example, the nonstop range of a fully loaded C-5. It can refuel strategic offen-

sive and reconnaissance aircraft during long-range conventional operations, and it can augment cargo-carrying capability on a selected basis. The range of refueling equipment installed also enables the KC-10A to service USN, USMC, and NATO aircraft. In terms of active deployment, the KC-10A's refueling capabilities and long range will, in most situations, dispense with the need for forward bases, while also leaving vital fuel supplies in the theater of operations untouched. In addition, similarity to the civilian DC-10 has led to a system whereby the Extender can use commercial facilities for most maintenance. The manufacturer orders parts and handles heavy repairs; only routine and flight line maintenance is done by the Air Force.

The first KC-10A made its maiden flight in July 1980 and delivery of the first KC-10A to enter service took place in March 1981, for operation by SAC. USAF units equipped with KC-10As include the 9th ARS at March AFB, Calif., and 32d ARS at Barksdale AFB, La.; AFRES's 78th ARS (Associate) at Barksdale and 79th ARS (Associate) at March AFBs share the aircraft with the active-duty squadrons at their respective bases. This year, Seymour Johnson AFB, N. C., will become the third KC-10-equipped base. From the twenty-sixth model onwards, all KC-10As are to be painted in a subdued color.

Contractor: McDonnell Douglas Corporation.
Power Plant: three General Electric CF6-50C2 turbofan engines; each 52,500 lb st. Design fuel capacity 356,065 lb.
Accommodation: crew of four on flight deck; seating for limited number of essential support personnel; max 25/27 pallets; max cargo payload 169,409 lb.
Dimensions: span 165 ft 4.4 in, length 181 ft 7 in, height 58 ft 1 in.
Weight: gross 590,000 lb.
Performance: max speed at 42,000 ft 526 mph, service ceiling 42,000 ft, max range with max cargo 4,370 miles; or delivery of 200,000 lb of transfer fuel to a receiver 2,200 miles from its home base, and return.

Trainers

T-33A Shooting Star

A few of these Shooting Star jet fighter derivatives remain in service for combat support missions and for proficiency and radar target evaluation training. Combat armament is replaced by an all-weather "navigational nose."

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 15,100 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

USAF's first purpose-built jet trainer, the T-37 is Air Training Command's standard two-seat primary trainer. The original T-37A was superseded in November 1959 by the T-37B, and all A models were converted subsequently to B standard. Well over a thousand T-37s were 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 and standard tankage 870 miles.

T-38 Talon

Almost identical in structure to the F-5A tactical fighter, the T-38 is a lightweight twin-jet advanced trainer that was in continuous production from 1956 to 1972. The first T-38 flew in April 1959, and production models entered operational service in March 1961. Of the total 1,187 T-38s built, more than 1,100 were delivered to USAF, and about 900 remain in service throughout the Air Force. Most are used by ATC; others fly with the 479th Tactical Training Wing at Holloman AFB, N. M., and with SAC.

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.

McDonnell Douglas KC-10A Extender

Lockheed T-33A Shooting Star

Cessna T-37B

Northrop T-38 Talon

Boeing T-43A

Fairchild Republic T-46A

Cessna T-41A Mescalero

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-41 Mescalero

The **T-41A** trainer is a standard Cessna Model 172 light aircraft acquired by USAF for use in a preliminary flight screening program for USAF pilot candidates. An initial order for 170 aircraft in 1964 was supplemented by a further 34 in July 1967. More powerful **T-41Cs,** based on the Cessna Model R172E, are used for cadet flight training at the USAF Academy. (Data for 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

Derived from the commercial Boeing Model 737-200, the T-43A navigation trainer made its first flight in April 1973. It was developed as a replacement for the piston-engine T-29 and was equipped with the same on-board avionics as the most advanced USAF operational aircraft of that time, including celestial, radar, and inertial navigation systems, LORAN, and other radio systems. Deliveries of the 19 aircraft ordered for ATC were completed in July 1974. Fifteen remain in the ATC inventory; the other four are assigned to the ANG.

Contractor: Boeing Aerospace Company
Power Plant: two Pratt & Whitney JT8D-9 turbofan engines, each 14,500 lb thrust.
Accommodation: crew of two, 12 students, five advanced students, and three instructors.

Dimensions: span 93 ft 0 in, length 100 ft 0 in, height 37 ft 0 in.
Weight: gross 115,500 lb.
Performance: econ cruising speed at 35,000 ft Mach 0.7, operational range 2,995 miles.

T-46A

Under a contract awarded in 1982, Fairchild Republic Company is developing USAF's next-generation trainer (NGT), designated T-46A. The initial contract covers design, development, construction, and testing of two development aircraft and two ground test airframes, a static loads test airframe, and a durability test airframe. Included in the development proposal were production

options for the first two procurements of the planned buy of 650 aircraft. Funding for the initial procurement of ten aircraft was contained in the FY '85 budget; 33 are requested in FY '86.

Intended as a primary trainer to replace the T-37, the T-46A retains the twin-engine and side-by-side seating features of its predecessor, but adds pressurization, increased range, and greatly improved adverse weather capability, which will decrease significantly the number of training flights lost through weather factors. The combination of pressurization and the greater thrust of the engines will also enable the aircraft to utilize training airspace up to 35,000 ft, thereby reducing problems caused by growing commercial and private air activity. Operational cost savings will result from the use of more fuel-efficient engines and from reliability improvements incorporated in the airframe, avionics, and power plant. Inherent in the basic T-46 design is a built-in flexibility that permits modification for a potential operational attack role. First flight was scheduled for April of this year, and delivery of two aircraft to Edwards AFB, Calif., for test and evaluation is expected in Spring 1986. Student training in the T-46A is scheduled to begin in late 1987.

Contractor: Fairchild Republic Company.
Power Plant: two Garrett F109-GA-100 turbofan engines; each 1,330 lb thrust.
Accommodation: pupil and instructor, side-by-side.
Dimensions: span 38 ft 7¾ in, length 29 ft 6 in, height 9 ft 11¾ in.
Weights: empty 5,275 lb, gross 6,962 lb.
Performance: max level speed at 35,000 ft 436 mph, service ceiling 46,500 ft, range with max fuel 1,150 miles.

UV-18B

The UV-18B is a military version of the DHC-6 Twin Otter STOL utility transport. Two were procured in FY '77 for use as parachute jump training aircraft at the Air Force Academy. A third was acquired later.

Contractor: The de Havilland Aircraft of Canada Ltd.
Power Plant: two Pratt & Whitney Canada PT6A-27 turboprop engines; each 652 ehp.
Accommodation: crew of two, and up to 20 passengers.
Dimensions: span 65 ft 0 in, length 51 ft 9 in, height 19 ft 6 in.
Weight: gross 12,500 lb.
Performance: max cruising speed 210 mph, service ceiling 26,700 ft, range with 2,500 lb payload 806 miles.

Helicopters

TH/UH-1F, UH-1P, and HH-1H

Basically a military version of the Bell Model 204, the **UH-1F** was developed for missile site support duties. USAF ordered 146, of which a few were modified to **UH-1Ps** for classified psychological missions in Vietnam. **TH-1F** is a version of the UH-1F for instrument training. In November 1970, USAF ordered 30 larger 12/15-seat **HH-1Hs,** based on the Model 205, for local base rescue duties. All four models continue in service, and a UH-1F, assigned to the 37th ARRS (MAC), has become the first USAF helicopter to pass the 10,000-hr flying mark.

Electroluminescent lighting has been installed in a UH-1 and an HH-53 (described later) used for low-level night rescue missions under a program to develop improved pilot night vision aids. (Data for UH-1F.)

de Havilland UV-18B

Sikorsky CH-3E

Sikorsky HH-3E Jolly Green Giant

Sikorsky HH-53B

Bell UH-1Ns

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 (9,500 lb for HH-1H).
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

The UH-1N is a twin-engine version of the UH-1 utility helicopter. Seventy-nine were ordered for USAF, most of which remain in the inventory for combat rescue and special operations duties with MAC's 23d Air Force.

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 1,290 shp.
Accommodation: pilot and 14 passengers or cargo; or external load of 4,000 lb.
Dimensions: rotor diameter (with tracking tips) 48 ft 2⅛ in, length of fuselage 42 ft 4¾ in, height 14 ft 10⅛ in.
Weight: gross and mission weight 11,200 lb.
Performance: max cruising speed at S/L 115 mph, service ceiling 13,000 ft, max range, no reserves, 261 miles.
Armament (optional): two General Electric 7.62-mm Miniguns or two 40-mm grenade launchers; two seven-tube 2.75-in rocket launchers.

CH-3E

This twin-engine amphibious transport helicopter, based on the US Navy's SH-3A Sea King, incorporates important design changes that permit speedier cargo handling and ease of maintenance, with built-in equipment for the removal and replacement of all major components in remote areas. The initial version was the CH-3C. Introduction of uprated engines led to the designation CH-3E in February 1966, applicable to 42 new production aircraft and 41 reengined CH-3Cs, of which 50 were adapted subsequently as HH-3Es *(see below)*. CH-3 missions include natural disaster relief and evacuation operations.

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 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

Modified version of the CH-3E for USAF's Aerospace Rescue and Recovery Service, originally to facilitate penetration deep into North Vietnam on rescue missions. Additional equipment includes self-sealing fuel tanks, armor, defensive armament, a rescue hoist, and a retractable in-flight refueling probe. HH-3s are now assigned also to rescue units of the Reserve and ANG. (Data basically similar to CH-3E above.)

HH-53B

This twin-turbine heavy-lift helicopter was ordered in September 1966 for USAF's Aerospace Rescue and Recovery Service to supplement the HH-3E. The HH-53B carries the same general equipment as the HH-3E, including the in-flight refueling probe and all-weather avionics and armament, but is faster and larger. The first flew in March 1967; delivery began in June the same year. After extensive use for rescue operations in Southeast Asia, HH-53Bs continue in first-line service.

Contractor: Sikorsky Aircraft, Division of United Technologies Corporation.
Power Plant: two General Electric T64-GE-7 turboshaft engines; each 3,925 shp.
Accommodation: crew of five, basic accommodation for 38 combat-equipped troops or 24 litters and four 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,** an improved version of the HH-53B, was first delivered to USAF in August 1968. With a maximum speed of 196 mph, it can transport 38 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 was built. Eight generally similar **CH-53Cs** are used to provide battlefield mobility for the Air Force mobile Tactical Air Control System.

HH-53H Pave Low III

Under USAF's Pave Low III program, nine HH-53Cs were modified for night and adverse weather operations and redesignated HH-53H. Equipment includes a stabilized FLIR installation mounted below the refueling boom, an inertial navigation system, a new Doppler navigation system, and the computer-projected map display and radar from the A-7D, with the radar installed in an offset "thimble" fairing on the nose.

The first of the Pave Low aircraft was delivered to Pensacola, Fla., in March 1979, and the last in 1980. These helicopters are part of USAF's Special Operations Forces.

UH-60A Black Hawk and HH-60A Night Hawk

Under a $38 million contract, Sikorsky Aircraft modified a standard US Army Black Hawk into a prototype of a combat rescue helicopter designated **HH-60A** Night Hawk, first flown in February 1984. Changes include uprated engines, extended range capability, and integrated avionics. If the modified aircraft satisfies USAF's requirement for a new-generation helicopter able to conduct aircrew rescue missions deep behind enemy lines, in darkness, and at treetop level to avoid radar detection, 90 production Night Hawks will be ordered as combat rescue aircraft. Funding requested in FY '85 included $34.3 million for R&D and $6 million for advance procurement. Purchase of the first three aircraft is proposed in FY '86, and 25 more in FY '87.

Although the cabin of the basic UH-60A is large enough to make possible a variety of missions without modification, the airframe is so compact that the helicopter can be airlifted over long ranges. Equipment specified for the HH-60A includes an air-to-air refueling system, auxiliary internal and external fuel tanks, FLIR, and rescue hoist. Avionics integration will be by IBM's Federal Systems Division.

Delivery of HH-60As to replace MAC's HH-3s is planned to begin in June 1988. Meanwhile, USAF has received ten **UH-60A** Black Hawks. These helicopters are in standard US Army configuration, including a rescue hoist, deicing system, and winterization and air transportability kits. (Data, except where indicated, for standard UH-60A.)

Contractor: Sikorsky Aircraft, Division of United Technologies Corporation; IBM will install the HH-60A avionics.
Power Plant: two General Electric T700-GE-700 turboshaft engines; each 1,560 shp. (HH-60A: two T700-GE-401s; each 1,690 shp.)
Accommodation: crew of two or three; ten passengers or four litters, or internal or external cargo.
Dimensions: rotor diameter 53 ft 8 in, length of fuselage 50 ft 09¼ in (HH-60A, incl retracted refueling probe, 57 ft 01¼ in), height 16 ft 10 in.
Weights: empty 10,624 lb, gross 16,260–20,250 lb. (HH-60A: empty 12,671 lb, gross 20,088–22,000 lb.)
Performance: max speed 184 mph (HH-60A: 167 mph), service ceiling 19,000 ft (HH-60A: 17,000 ft), max range, with reserves, 373 miles (internal fuel), 1,350 miles (external tanks). (HH-60A: 800 miles unrefueled.)
Armament (HH-60A): 7.62-mm machine guns.

Strategic and Tactical Nuclear Missiles

LGM-25C Titan II

Phaseout of the Titan II two-stage liquid-fueled ICBM is under way. More than 20 years old, it is expensive to maintain and of decreasing value to the overall US strategic posture. Twenty-nine Titan IIs were still deployed in four squadrons at McConnell AFB, Kan., and Little Rock AFB, Ark., in February of this year. Deactivation will be complete by 1987.

Titan II has a thermonuclear warhead with the largest yield of any carried by a US missile and a launch reaction time of one minute from its fully hardened underground silo.

Contractor: Martin Marietta Aerospace.
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: inertial.

Sikorsky HH-60A Night Hawk

LGM-25C Titan II

Minuteman III

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

Minuteman remains a key element of the US strategic deterrent posture despite its 20 years of operational service. It is a three-stage, solid-propellant ICBM, smaller and lighter than the liquid-propellant Titan and with a smaller payload. The operational missiles are housed in underground silos, for which an upgrade program was completed in 1980 to provide increased launch facility protection. The current 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 based at Malmstrom AFB, Mont.; Ellsworth AFB, S. D.; and Whiteman AFB, Mo.

LGM-30G Minuteman III: new third-stage motor with fluid-injection thrust vector control gives longer range and, allied to MIRV capability, enables this version to place warheads on three targets with a high degree of accuracy. Minuteman III also increases the probability of penetrating enemy defense systems. First test launch was made in 1968, and Minuteman III is operational at Minot AFB, N. D.; F. E. Warren AFB, Wyo.; Grand Forks AFB, N. D.; and Malmstrom AFB, Mont. A command data buffer system permits rapid missile retargeting.

The Minuteman force is made up of 450 Minuteman IIs and 550 Minuteman IIIs. Recent modifications have been aimed at providing improved command control and communications and at refinements to improve accuracy. Deployment of the Mk 12A RV was completed in early 1983.

Assembly and Checkout: 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: Thiokol SR73-AJ-1 solid-propellant motor; both 34,400 lb thrust.
Guidance: Autonetics Division of Rockwell International inertial guidance system.
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.

LGM-118A Peacekeeper (MX)

Initiated in response to the improved hardness of Soviet strategic forces, the MX program continues on schedule and within budgeted cost. The US plans to deploy 100 Peacekeeper missiles in existing Minuteman III silos near F. E. Warren AFB, Wyo. Twenty-one missiles were funded in FY '84, followed by 21 more in FY '85 and 48 requested in FY '86. Initial operational capability for the first ten Peacekeeper missiles is planned for late 1986, with full operational capability scheduled for 1989.

The Peacekeeper is a four-stage ICBM that carries up to ten independently targetable reentry vehicles. It has many advantages over missile weapon systems currently in the US inventory. Peacekeeper will be more accurate, carry more warheads, and have greater range and target flexibility than the Minuteman ICBMs. Together with these advantages, its greater resistance to nuclear effects and its more capable guidance system provide the Peacekeeper with a much improved ability to destroy very hard targets. The prompt retaliation made possible by these factors is expected to provide a decisive deterrent to any Soviet first strike. It is expected also to provide the Soviets with incentive to negotiate reduced force levels. The initial flight test schedule is more than one-third complete, and results have been excellent. The seventh flight test was completed successfully on February 1 this year, when six Mk 21 reentry vehicles were carried 4,800 miles down the test range and all impacted in the target area.

Basing: Boeing Aerospace Company.
Assembly and Test: Martin Marietta, Denver Aerospace.
Power Plant: first three stages solid-propellant, fourth stage storable liquid; by Thiokol, Aerojet, Hercules, and Rocketdyne, respectively.
Guidance: inertial; integration by Rockwell, IMU by Northrop.
Warheads: 10 Avco Mk 21 reentry vehicles.
Dimensions: length 70 ft, diameter 7 ft 8 in.
Weight: approx 192,000 lb.

Small ICBM

Currently in the R&D phase, this weapon will carry a single Mk 21 reentry vehicle and weigh less than 30,000 lb, making it compatible with a hard mobile launcher (HML). New lightweight high-strength casing materials will avoid sacrifice of range or payload. Accuracy will be ensured by use of a lightweight version of the advanced Peacekeeper inertial guidance system, with advanced technology alternatives such as ring-laser gyroscopes and stellar inertial updates. Prototypes of the HML will be designed, built, and tested by Boeing and Martin Marietta under 21-month pre-full-scale development contracts. Funding approved and requested through FY '84–86 to-

tals $1.4 billion, including sums for continued hard-silo technology studies. Full-scale development is planned to begin in FY '87, for initial deployment in the early 1990s.

AGM-69 SRAM

This defense suppression and primary attack missile was deployed initially with the B-52Gs of SAC's 42d Heavy Bombardment Wing at Loring AFB, Me., in 1972. USAF contracts covering the production of 1,500 AGM-69As were authorized, and deliveries to equip 17 B-52 wings and two FB-111 wings at 18 SAC bases were completed in July 1975.

Armed with a nuclear warhead, the supersonic air-to-surface SRAM was designed to attack and neutralize enemy terminal defenses, such as surface-to-air missile sites. An inertial guidance system makes the missile impossible to jam. Each SAC B-52G/H can carry eight AGM-69A SRAMs on a rotary dispenser in the aft bomb-bay, together with up to four nuclear bombs. 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 reduce drag.

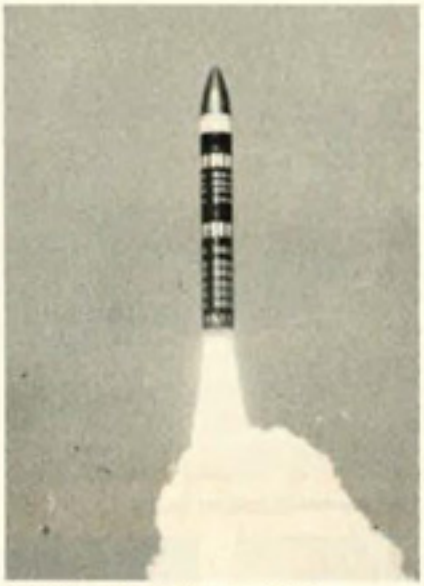
Contractor: Boeing Aerospace Company.
Power Plant: Lockheed Propulsion Company LPC-415 restartable solid-propellant two-pulse rocket engine.
Guidance: General Precision/Kearfott inertial system, permitting attack at high or low altitude and dogleg courses.
Warhead: nuclear, of similar yield to that of 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.

SRAM II

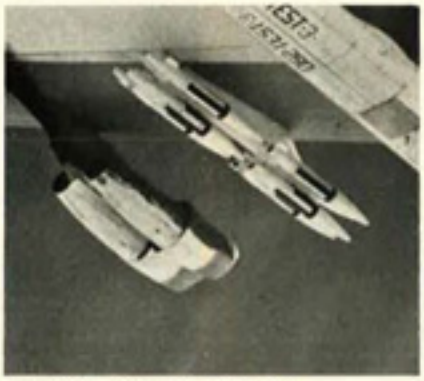
Funding sought in the FY '85 budget to allow full-scale development of this advanced air-to-surface missile to supplement and eventually replace SRAM has been delayed. As well as more modern warhead safety and improved performance, SRAM II will incorporate advances in low-observable technology, navigation systems, propulsion efficiency, and system accuracy. Greater compactness will enable carrier aircraft, such as the B-1B and ATB, to be equipped with more SRAM IIs than SRAMs, and the new weapons will offer improved capability against imprecisely located targets.

AGM-86B ALCM

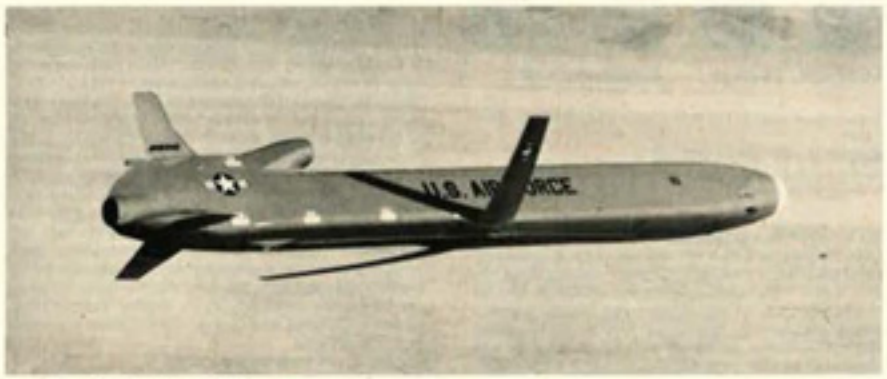
The AGM-86B air-launched cruise missile is a small, unmanned winged air vehicle capable of sustained subsonic flight following launch from a carrier aircraft. It has a turbofan engine and a nuclear warhead and is programmed for precision attack on surface targets. When launched in large numbers, each of the missiles would have to be countered, making defense against them both costly and complicated. Additionally, by diluting defenses, the ability of manned aircraft to penetrate to major targets is improved. Small radar signature and low-level flight capability enhance the missile's effectiveness. Production is expected to total 1,739 missiles, with deliveries to be completed in FY '87. SAC's 416th Bombardment Wing at Griffiss AFB, N. Y., became the first Air Force unit to attain operational capability with ALCM in December 1982, with 12 missiles fitted externally to each of its B-52Gs. This was followed by the 379th Bomb Wing at Wurtsmith AFB, Mich., and the 319th Bomb Wing at Grand Forks AFB, N. D. Other units that have received ALCMs are at Fairchild AFB, Wash., and Blytheville AFB, Ark. B-52Hs will begin similar conversion this year; the new B-1B will also carry ALCMs. Ultimately, each B-52H is intended to be modified further to have a bomb-bay rotary launcher for eight more ALCMs, eight SRAMs, or a mix of both.



LGM-118A Peacekeeper (MX)



AGM-69 SRAMs aboard B-52



Boeing AGM-86B ALCM

Contractor: Boeing Aerospace Company.
Power Plant: Williams International Corporation/Teledyne CAE F107-WR-100 turbofan engine; 600 lb thrust.
Guidance: inertial plus Tercom, by Litton.
Warhead: W80-1 nuclear.
Dimensions: length 20 ft 9 in, body diameter 2 ft 0½ in, wing span 12 ft.
Weight: 3,200 lb.
Performance (approx): speed 500 mph, range 1,500 miles.

ACM

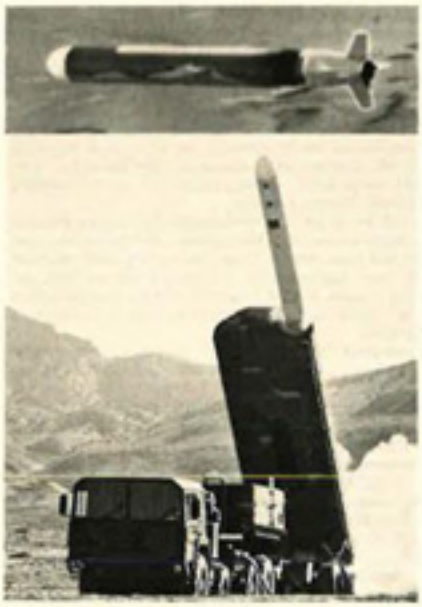
Convair Division of General Dynamics was selected in April 1983 to develop and manufacture an air-launched advanced cruise missile (ACM) to arm the B-52G/H and B-1B, superseding the AGM-86 in production in the later 1980s. The ACM will have improved range, accuracy, survivability, and targeting flexibility, notably through embodiment of low-observability technology and carbon-carbon composite engine turbine components.

BGM-109G GLCM

The GLCM is a small, mobile, ground-to-ground cruise missile developed to modernize NATO's intermediate-range nuclear forces (INF). Its characteristics include a small radar cross section, very low altitude flight profile, and all-weather capabilities; it is designed to complicate the enemy's targeting and defenses, thereby helping the survivability of other allied systems.

Deployment of the GLCM is well under way, with the first flight operational at RAF Greenham Common, UK, since December 1983; the second operational at Comiso, Sicily, since March 1984; and a third at Florennes, Belgium, since August 1984. Current planning calls for twenty-nine flights, stationed at six main operating bases, in five European countries. A GLCM mobile flight comprises four transporter-erector launchers, each carrying four missiles, and two launch control centers. A total of 464 missiles is expected to be deployed.

Contractor: General Dynamics (Convair)/McDonnell Douglas Astronautics.
Power Plant: Williams International Corporation/Teledyne CAE F107-WR-400 turbofan engine; 600 lb thrust. Atlantic Research Corporation solid-propellant booster.
Guidance: inertial plus Tercom, by Litton.
Warhead: W84 nuclear.
Dimensions: length 20 ft 6 in, diameter 1 ft 8½ in, wing span 8 ft 7 in.
Weight: with booster 3,250 lb.
Performance: max speed high subsonic, range 1,500 miles.



UPPER: GLCM in flight.
LOWER: GLCM launch.

Airborne Tactical and Defense Missiles

AIR-2A Genie

Produced in many thousands before production ended in 1962, the AIR-2A Genie continues in first-line service with the F-106 squadrons of USAF. Genie was the first nuclear-tipped air-to-air rocket ever tested in a live firing when, in July 1957, it was launched from an F-89J Scorpion. 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 KT.
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-4F/G Super Falcon

These developed versions of the original AIM-4A/C Falcon were introduced simultaneously in 1960 to provide reduced susceptibility to enemy countermeasures and higher performance. The Super Falcon arms the F-106 Delta Dart, on which a mixed armament of four AIM-4F/Gs is carried internally.
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.

AIM-7 Sparrow

Sparrow is a radar-guided air-to-air missile with all-weather, all-altitude, and all-aspect capability. Approximately 34,000 AIM-7C, D, and E versions were produced. The **AIM-7E** is standard armament of the F-4 Phantom and is also used as a Sea Sparrow version against shipping targets. The **AIM-7E-2** is an improved version, providing better maneuverability and "dogfight" capability. A later version is the advanced solid-state **AIM-7F**, with larger motor, Doppler guidance, improved ECM, and better capability over both medium and "dogfight" ranges; this version equips USAF and USN F-4, F-14, F-15, and F-18 aircraft. Approximately 5,400 AIM-7Fs were produced. A monopulse version of Sparrow designated **AIM-7M**, aimed at reducing cost and improving performance in the ECM and look-down/clutter regions, entered production in FY '80 and began operational service during FY '83. Procurement has been extended to FY '87, when AMRAAM production is scheduled to start. (Data for AIM-7F.)
Contractors: Raytheon Company/General Dynamics Pomona Division.
Power Plant: Hercules Mk 58 Mod 0 boost-sustained rocket motor.
Guidance: Raytheon semiactive Doppler radar homing system.
Warhead: high-explosive, blast fragmentation.
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 more than 25 miles.

AIM-9 Sidewinder

The AIM-9 Sidewinder is a close-range air-to-air missile using infrared guidance. Versions currently in production for USAF or in service are:

AIM-9E: modification by Philco of original-production AIM-9B, with improved guidance and control. Production completed, with more than 3,000 in service.

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: modification of AIM-9B/E, with increased range and new "front end" to improve maneuvering capability for dogfighting. About 14,000 were delivered to USAF by Ford Aerospace in 1977–78 to equip the F-15 and other Sidewinder-compatible aircraft.

AIM-9P: improved version of AIM-9J, produced by Ford Aerospace by conversion of existing AIM-9Es and -9Js. Increased target-acquisition envelope, solid-state electronics, and increased lethality due to seeker improvements.

AIM-9P-3: improved version of AIM-9P, with increased lethality due to fuze improvements and a new rocket motor, providing reduced smoke and increased range.

AIM-9L: third-generation Sidewinder for USAF and USN, with all-aspect intercept capability. New motor. Double-delta nose fins for improved inner boundary performance and maneuverability. AM-FM conical scan for increased seeker sensitivity and improved tracking stability. Annular blast fragmentation warhead and active optical fuze for increased lethality and low susceptibility to countermeasures. This version arms USAF F-15 and F-16 aircraft and features in USAF plans to provide self-defense capability for its A-7s, A-10s, F-4s, and F-111s.

AIM-9M: improved version of AIM-9L, with increased ECCM capability, improved background discrimination, and reduced-smoke rocket motor. Full production began in FY '81 with an order for approximately 1,850 missiles. Procurement funded or proposed from FY '84 through FY '87 totals 3,269 missiles for USAF and USN. (Data for AIM-9L.)
Contractor: Raytheon Company/Ford Aerospace and Communications Corporation.
Power Plant: Rocketdyne/Bermite Mk 36 Mod 7/8 solid-propellant motor.
Guidance: solid-state infrared homing guidance.
Warhead: high-explosive, weighing 20.8 lb.
Dimensions: length 9 ft 5 in, body diameter 5 in, fin span 2 ft 1 in.
Weight: launch weight 191 lb.
Performance: max speed above Mach 2, range more than 10 miles.

AIR-2A Genie

AIM-4F Super Falcon

AGM-45A Shrike

Twelve versions of this supersonic air-to-surface missile were produced for USAF and USN, differing primarily in the frequency coverage of the front end detachable seeker sections. Designed to home automatically on enemy radar installations, the AGM-45 entered operational service in Vietnam during 1965. Thereafter, it played an important part in the US air offensive, becoming a standard penetration aid on US tactical aircraft. More than 13,000 were delivered to USAF between 1965 and 1978, and Shrikes continue to equip "Wild Weasel" F-4Gs and F-4Es. Modification under the Shrike gravity bias modification program will result in improved capabilities at low altitude.
Contractor: Naval Weapons Center.
Power Plant: Rocketdyne Mk 39 Mod 7 or Aerojet Mk 53 solid-propellant rocket motor.
Guidance: passive homing head by Texas Instruments.
Warhead: high-explosive/fragmentation, weighing 145 lb.
Dimensions: length 10 ft 0 in, body diameter 8 in, span 3 ft 0 in.
Weight: launch weight 400 lb.
Performance (estimated): range more than 3 miles.

AIM-7F Sparrow

AIM-9L Sidewinder

AGM-45A Shrike

AGM-65 Maverick

AGM-65 Maverick

The basic **AGM-65A** Maverick is a launch-and-leave TV-guided air-to-surface missile that enables the pilot of the launch aircraft to seek other targets or leave the target area once it has been launched. Production was initiated in 1971, following successful test launches over distances ranging from a few thousand feet to many miles and from high altitudes down to treetop level. Maverick missiles were first employed by USAF in Vietnam and are now carried by the A-7D, A-10, F-4D/E/G, F-5E/F, F-111F, and F-16, normally in three-round underwing clusters, for use against pinpoint targets, such as tanks and columns of vehicles. Orders totaled 19,000. **AGM-65B** has a "scene magnification" TV seeker that enables the pilot to identify and lock on to smaller or more distant targets.

To overcome limitations of the TV Maverick, which can be used only in daylight clear-weather conditions, a new version was developed:

AGM-65D: with imaging infrared seeker (IIR). Developmental and operational flight testing ended in August 1982. USAF is considering procurement of 60,664 AGM-65D Mavericks: 3,080 were authorized in FY '82–84; a further 2,600 were planned for FY '85, and 3,000 requested for FY '86.

AGM-65G: uses the IIR seeker with an alternate 300-lb blast/fragmentation warhead for use against hardened targets. Procurement included in AGM-65D totals. (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 2 in, body diameter 1 ft 0 in, wing span 2 ft 4½ in.
Weight: launch weight 462 lb.
Performance: classified.

AGM-88A HARM

AGM-78A Standard ARM

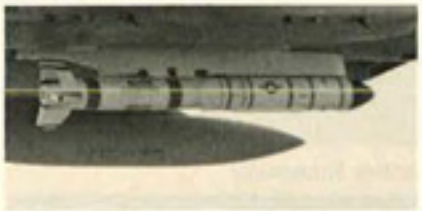
AGM-78 Standard ARM

Although no longer in production, this air-launched, antiradar missile continues as a significant item in the USAF and USN inventories. The original **AGM-78A** version of Standard ARM (Anti-Radiation Missile) was designed to provide a significant increase in capability over earlier weapons in countering the threat of radar-controlled antiaircraft guided missiles and guns. It used the passive homing target-seeking head of the Shrike missile. Later 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-4G and 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. Final production version was **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 1,306 lb.
Performance: max speed Mach 2, max range 15.5 miles.

AGM-88A HARM

Initial operational capability (IOC) of the HARM (High-speed Anti-Radiation Missile) was achieved in September last year. The emphasis on high speed reflects experience gained in Vietnam, where Soviet-built surface-to-air missile radar systems sometimes detected the approach of first-generation Shrikes and ceased operation before the missiles could lock on them. HARM can cover a wide range of frequency spectra through the use of programmable digital processors in both the aircraft's avionics equipment and the missile. USAF intention to equip the F-4G "Wild Weasel" with the AGM-88A will greatly enhance that aircraft's lethality. The missile is also suitable for adaptation to the F-4E, B-52, and F-15 and F-16. Procurement of 532 AGM-88As for USAF and USN was approved through FY '82–84, and 871 more in FY '85. The FY '86 request is for 1,715 missiles.
Contractor: Texas Instruments, Inc.
Power Plant: Thiokol smokeless dual-thrust solid-propellant rocket motor. Hercules second source.
Guidance: passive homing guidance system, using seeker head that homes on enemy radar emissions.
Warhead: high-explosive.
Dimensions: length 13 ft 8½ in, body diameter 10 in, wing span 3 ft 8½ in.
Weight: 807 lb.
Performance: cruising speed supersonic, altitude limits S/L to 40,000 ft, range more than 10 miles.

GBU-15 on an F-4E



ALMV (ASAT) on an F-15

AGM-84 Harpoon launch from a B-52

AIM-120A (AMRAAM) on an F-16

GBU-15 and AGM-130

The **GBU-15** is an air-launched cruciform-wing glide bomb fitted with a guidance system designed to give it pinpoint accuracy from low altitudes over short standoff ranges. Development began in 1974, based on experience gained in Vietnam with the earlier Pave Strike/GBU-8 HOBOS modular weapon program. The GBU-15 is intended for tactical use to suppress enemy defenses and to destroy heavily defended targets. The target-detecting device is carried on the front of the warhead; the control module, with autopilot, and data link module attach to the rear.

The weapon offers two basic trajectories. For direct trajectory, the weapon is locked on target before launch and flies a near line-of-sight profile to impact. The indirect profile includes a midcourse glide phase, which extends standoff capability. In this profile, the seeker can be locked on to the target after launch, or the operator can fly the weapon manually to impact, using guidance updates provided through the data link. Successful launches have been achieved from F-4s and F-111s. The first operational unit was qualified in 1983.

In addition, Rockwell has received a contract to develop and test a rocket-powered version of the GBU-15, designated **AGM-130,** which is intended to give the Air Force improved standoff capability. There will be two versions, with a unitary warhead and an SUU-54 dispenser respectively. Ninety-seven have been requested in the FY '86 budget proposals. (Data for GBU-15.)
Contractor: Rockwell International Corporation.
Guidance: TV or imaging infrared seeker.
Warhead: Mk 84 bomb (2,000 lb unitary). Adaptable to CBU-75 cluster munition and other warheads.
Dimensions: length 12 ft 10½ in, body diameter 1 ft 6 in, wing span 4 ft 11 in.
Weight: approx 2,617 lb.
Performance: cruising speed subsonic.

ALMV (ASAT)

Under USAF contract, Vought Missiles and Advanced Programs Division of LTV and the Boeing Company are developing and flight-testing a small high-technology air-launched antisatellite (ASAT) weapon capable of destroying enemy satellites at low orbital altitudes. This consists of a modified SRAM first stage, a Thiokol Altair III solid-propellant second stage rated at 6,000 lb thrust, and a Vought air-launched miniature vehicle (ALMV) with Hughes infrared terminal seeker and conventional warhead mounted forward of the second stage. The guidance system is by Singer-Kearfott. ASAT is about 17 ft long, with a launch weight of 2,600 lb.

ASAT will be carried by two squadrons of designated air defense F-15s, based at Langley AFB, Va., and McChord AFB, Wash. The operational ASAT will be released from the F-15 in a zoom climb. Immediately before separation from the Altair, the miniature homing vehicle will be spun up to 20 rps for stabilization. Small solid-propellant rocket motors will then provide course corrections as a laser gyro and the infrared seeker guide it to target impact at heights up to 620 miles.

Firing trials from an F-15 began in 1983 and are continuing. One ASAT test aimed at a predesignated point in space has been conducted successfully. Additional testing is dependent on congressional approval, which may be conditioned by US-USSR arms-limitation talks involving space weaponry. Nevertheless, USAF hopes to complete the testing and evaluation phase of its ASAT program in FY '87.

AIM-120A (AMRAAM)

Full-scale development of this launch-and-leave radar-guided advanced medium-range air-to-air missile (AMRAAM) has been under way since December 1981. Intended as a replacement for the AIM-7 Sparrow, AMRAAM will provide an all-weather, all-environment capability for USAF's F-15 and F-16 and the Navy's F-14 and F/A-18 fighters.

Designated AIM-120A, it has inertial midcourse guidance and active radar terminal homing that provides launch-and-maneuver, launch-and-leave, and autonomous modes. There are significant improvements in operational effectiveness over the AIM-7 Sparrow, including increased average velocity, reduced miss distance, improved fuzing, increased warhead lethality, multiple target engagement capability, improved clutter rejection in low-altitude environments, improved ECCM capability, increased maximum launch range, reduced-smoke motor, and improved maintenance and handling.

The first FSD launch was accomplished successfully in December 1984. A leader/follower (Hughes Aircraft/Raytheon) production program is planned, with delivery of the first missile in FY '85. Procurement of a low rate

initial production lot (90) is proposed for FY '86. Total planned USN and USAF buy is 20,000 missiles.
Contractor: Hughes Aircraft Company.
Guidance: Inertial midcourse, with active radar terminal homing.
Dimensions: length 11 ft 9 in, body diameter 7 in, span of tail control fins 2 ft 1 in.
Weight: 326 lb.
Performance: cruising speed approx Mach 4.

AGM-84 Harpoon

USAF plans to procure sufficient Harpoon all-weather antiship missiles to equip two 15-aircraft B-52G squadrons for maritime duties in support of Navy antisurface warfare operations. Compatibility testing began in Spring 1983, and limited operational capability was achieved that October. Currently, modified aircraft are located at Loring AFB, Me., for Atlantic operations. As others are modified, Harpoon-compatible B-52Gs will also be based at Andersen AFB, Guam, for Pacific operations. Each B-52G carries up to 12 missiles.
Contractor: McDonnell Douglas Astronautics Company.
Power Plant: Teledyne CAE J402-CA-400 turbojet engine; 660 lb thrust.
Guidance: sea-skimming cruise monitored by radar altimeter; active radar terminal homing.
Warhead: penetration/high-explosive blast type, weighing 500 lb.
Dimensions: length 12 ft 7½ in, body diameter 1 ft 1½ in, wing span 3 ft.
Weight: 1,145 lb.
Performance: speed high subsonic, range over 57 miles.

HVM

Under a USAF contract awarded in late 1981, Vought Missiles and Advanced Programs Division of LTV is developing a guided air-to-surface hypervelocity missile (HVM) system capable of defeating all types of vehicles in an armored assault force. The system will consist of pods containing launch tubes for up to 19 HVMs per pod and a laser radar guidance system; each HVM will carry an inert, high-density warhead. Simultaneous multiple target engagement is an important requirement, and the small low-cost missiles will rely on kinetic energy derived from their speed for penetration. Initial ground-launched flight tests have demonstrated the missile's ability to receive laser guidance signals through the rocket motor plume and its ability to respond to signals from a ground-based laser and then maneuver to its target. HVM will reach a speed of more than 3,355 mph and is expected to weigh less than 48 lb. This is a joint USAF/Marine/Army program.

Rapier

Rapier is unique in that US land-based antiaircraft missiles are normally operated by the Army. Under a decision confirmed by an initial contract for 32 fire units in February 1981, British-built Rapier missile systems will be deployed at seven USAF bases in the UK to protect Air Force installations. The first USAF unit, at RAF Lakenheath, became operational in November 1984. Manned by RAF Regiment personnel, the USAF version of Rapier is intended primarily for defense against fast (Mach 1+) maneuvering, low-flying targets by day and night. The four-round fire unit, Blindfire radar, and a trailer of reload missiles are towed by Land-Rovers loaded with support equipment.
Contractor: British Aerospace Dynamics Group.
Power Plant: IMI two-stage solid-propellant motor.
Guidance: Racal-Decca surveillance radar and command to line-of-sight guidance. Optional Marconi DN181 Blindfire radar or optical target tracking, according to conditions.
Warhead: semi armor-piercing, with impact fuze.
Dimensions: length 7 ft 3 in, body diameter 5 in, wing span 1 ft 3 in.
Weight: approx 92 lb.
Performance: max speed more than Mach 2, range 4 miles.

Launch Vehicles

Agena

Since 1959, Agenas have served as satellite or booster on more missions than any other spacecraft in the world. An inherent versatility, permitting a wide range of applications, derives basically from a payload section (nosecone) able to accommodate a variety of earth-orbiting and space probes weighing up to several hundred pounds. Agena has been utilized as the upper stage of such launchers as Atlas and Titan III, but is no longer used with Atlas. 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. The current **Agena D** version was first tested successfully in June 1962 and is able to accept a variety of payloads, unlike the earlier A and B, which had integrated payloads. The restartable engine permits the satellite to change its orbit in space.
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.
Launch Weight (typical Agena D): 15,037 lb.

Atlas Launchers

Atlas is a "stage-and-a-half" vehicle, consisting of side booster and central sustainer sections. Current launch versions are as follows:

Atlas SLV-3A: An upgraded version of the earlier SLV-3 for USAF and NASA, with lengthened propellant tanks. No longer used with the Agena upper stage, but able to serve as a direct-ascent vehicle or in conjunction with other upper stages.

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. First launch of a new, stretched, version of the Atlas/Centaur took place in Spring 1984. This is able to place satellites weighing up to 5,000 lb into geosynchronous orbit.

Atlas E: ICBMs modified to space launch configuration, used to launch various USAF, Navy, and NOAA satellites.
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).

Rapier

Agena

Atlas-Centaur

Scout

Titan III(34)D

Dimensions: length SLV-3A 78 ft 11 in; SLV-3D/Centaur 131 ft, max body diameter 10 ft 0 in.
Launch Weight (SLV-3A): 314,000 lb.
Performance (SLV-3A/Centaur): capable of putting payload of 11,300 lb into a 100 nm circular orbit, of launching 4,150 lb into synchronous transfer orbit, or of sending 1,250 lb to nearest planet.

Centaur

Centaur was the first US high-energy upper stage and first to utilize liquid hydrogen as a propellant. Its multiburn and extended coast capability were first used operationally during the 1977 Mariner Jupiter/Saturn missions. The D-1A version is used currently with the Atlas SLV-3D and has demonstrated widely ranging applications and capabilities. The nose section of Atlas is modified to a constant 10 ft diameter to accommodate the Centaur, which, in turn, generates most of the electronic command and control systems for the launch vehicle. A 10 ft diameter fairing protects payloads for Centaur D-1A. Two Centaur G variants are being developed for use on the Space Shuttle, instead of uprated versions of the IUS originally planned.
Prime Contractor: General Dynamics Corporation, Convair Division.
Power Plant: two Pratt & Whitney RL10A-3 liquid oxygen/liquid hydrogen engines; each 16,500 lb thrust.
Guidance: inertial guidance system.
Dimensions (Centaur only): length 30 ft 0 in, diameter 10 ft 0 in.
Launch Weight (approx): 35,000 lb.

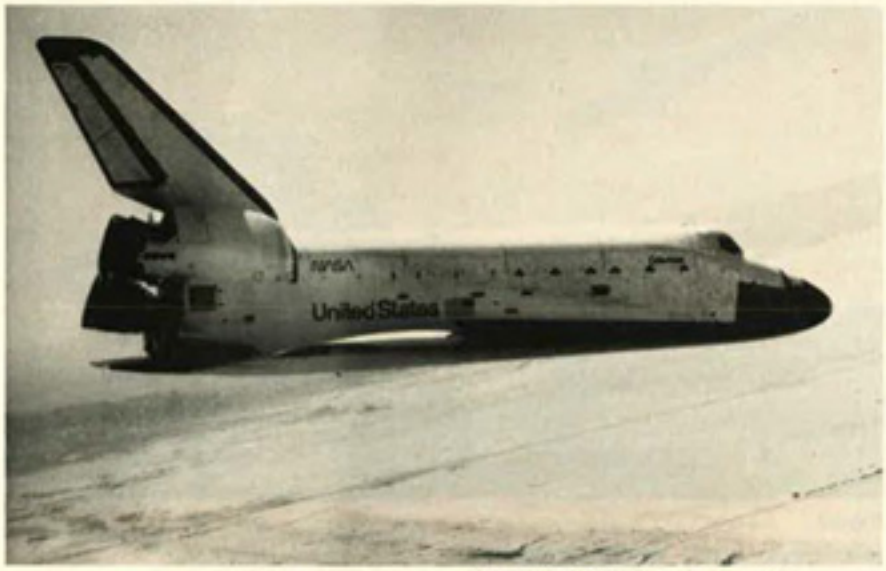
Scout

Scout was designed to enable NASA and DoD to conduct space, orbital, and reentry research at comparatively low cost, using off-the-shelf major components where available. The basic current version, with 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. Using the Algol IIIA first-stage motor, Scouts can put 377 lb payloads into a 310-mile polar orbit and have been used to launch many unmanned spacecraft, including satellites for DoD, NASA, and international groups.
Prime Contractor: LTV Aerospace and Defense Company (subsidiary of LTV Corporation).

Power Plant: first stage: CSD Algol IIIA; 109,000 lb thrust; second stage: Thiokol Castor IIA solid-propellant motor; 64,000 lb thrust; third stage: Thiokol Antares IIIA solid-propellant motor; 18,700 lb thrust; fourth stage: Thiokol Altair IIIA solid-propellant motor; 5,800 lb thrust.
Guidance: simplified Honeywell gyro guidance system.
Dimensions: height overall 75 ft 5 in, max body diameter 3 ft 9 in.
Launch Weight: 47,619 lb.

Titan III

Titan III has been produced in several versions, able to launch a wide variety of payloads, ranging from 35,000 lb in earth orbit to 7,000 lb for planetary missions. The basic core section consists of two booster stages based on the Titan II ICBM. In the current Titan III(34)D, it is utilized in conjunction with either the Boeing Inertial Upper Stage developed for the Space Shuttle or the Transtage, an upper stage capable of functioning both in the boost phase of flight and as a restartable space propulsion vehicle. Sixteen Titan III(34)D vehicles have been ordered to date by USAF. The first flight, from Cape Canaveral in October 1982, orbited a military payload.



Space Shuttle Orbiter **Columbia**

Prime Contractor: Martin Marietta Denver Aerospace.
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 III(34)Ds have two CSD five and one-half segment solid-propellant booster rocket motors; each more than 1,150,000 lb thrust.
Dimensions: first and second stages of core: height 101 ft, diameter 10 ft; Transtage: height 14 ft 8 in, diameter 10 ft.
Launch Weight (approx): 1,400,000 lb.
Performance (Titan III(34)D/Transtage): 4,000 lb to geosynchronous orbit.

Space Shuttle Transportation System

Developed for use by both DoD and NASA, the Space Shuttle is the first reusable space vehicle. It consists of an Orbiter, similar in configuration to a delta-wing airplane but powered by liquid-propellant rocket motors; a large jettisonable tank carrying the fuel for these motors, which is attached to the Orbiter at liftoff; and two solid-propellant rocket boosters, mounted on each side of the fuel tank for liftoff.

The Shuttle is launched vertically, with all engines firing in both the Orbiter and the boosters. At an altitude of approximately 28 miles, the booster stages separate and descend by parachute into the ocean for recovery and eventual reuse. The Orbiter then continues under its own power, jettisoning the external fuel tank just before attaining orbit. The Orbiter is provided with a series of smaller rocket engines for maneuvering and attitude control, and these ensure insertion of the vehicle into the final desired orbit. Its main tasks are to place satellites into orbit, retrieve satellites from orbit, and repair and service satellites in orbit. It can be used to place a propulsive stage and satellite into precise low earth orbit for subsequent transfer into synchronous orbit or to an "escape" mission into space. It also carries a pressurized and manned space laboratory in its payload bay on some missions, with a basic seven-day duration, extendable up to 10–12 days. On completion of a mission, the Orbiter flies back into the atmosphere and, once through the reentry phase, lands like an airplane, but without power.

Accommodation is provided in a two-level cabin for up to seven crew members. The upper flight deck level has side-by-side seating for two flight crew, with dual controls. Behind them are seats for one or two mission specialists. Three more mission specialists can be located on the mid-deck. Bunks on this deck can be removed to provide three additional seats in a rescue mission.

Four operational Orbiters, named *Columbia*, *Challenger*, *Discovery*, and *Atlantis*, have been funded to date. The first of four test flights (STS-1) was made by *Columbia* from Kennedy Space Center, Fla., in April 1981. The first operational mission ejected two satellites into space in November 1982. During subsequent missions, by *Columbia*, *Challenger* and *Discovery*, further satellites have been deployed and recovered for repair; Spacelab was carried for the first time on STS-9; during the tenth mission, two astronauts made the first untethered orbital EVAs, using Martin Marietta's manned maneuvering units (MMUs). First payload deployment for DoD, using the IUS booster, took place on January 24 this year. To ensure adequate security and West Coast launch capability, new Shuttle facilities are scheduled for completion at the Vandenberg AFB launch and landing site by October.

Prime Contractors: Rockwell International (Orbiter), Martin Marietta (propellant tank), Thiokol (boosters).
Power Plant: three Rocketdyne main engines, each 375,000 lb thrust at liftoff. Two Thiokol solid-propellant rocket boosters, each 3,300,000 lb thrust at liftoff.
Guidance: automatic and manual control.
Dimensions: Orbiter: length 122 ft, wing span 78 ft 0.7 in, height 56 ft 7 in.
Launch Weights: Shuttle complete approx 4,500,000 lb, Orbiter (empty) 150,000 lb, external tank (full) 1,655,600 lb, boosters (2) each 1,292,000 lb. (The original steel-skin boosters are being replaced this year by boosters with lighter-weight filament-wound casings.)

Inertial Upper Stage (IUS)

Used for the first time on January 24 this year, the IUS is intended to serve as an upper stage for both the Titan III(34)D and the Space Shuttle. Consisting of an aft skirt, an aft-stage solid rocket motor, an interstage, a forward-stage solid rocket motor, and an equipment support structure, it has the capability of boosting 5,000 lb into geosynchronous orbit during Shuttle missions and 4,000 lb into geosynchronous orbit when used with the Titan III(34)D.

Prime Contractor: Boeing Aerospace Company.
Power Plant: aft-stage solid rocket motor 21,400 lb thrust, forward-stage solid rocket motor 18,500 lb thrust.
Guidance: inertial, plus star tracker.
Dimensions: length 17 ft, diameter 9 ft 2¼ in.
Launch Weight: 32,500 lb.

Remotely Piloted Vehicles (RPVs)

MQM-107B

A longer, reengined version of the earlier MQM-107A, originally ordered for the US Army in 1975, the **MQM-107B** is a recoverable, variable-speed target drone. Improvements tested and proven on the A version are incorporated on the B version. MQM-107Bs assigned to Tyndall AFB, Fla., and Wallace Air Station in the Philippines are used to test and evaluate air-to-air missiles. An initial order for ten each for the USAF and US Army was supplemented in April 1983, with the USAF to receive an additional 133 and the Army 39. Deliveries were made between August 1984 and May of this year.

Contractor: Beech Aircraft Corporation.
Power Plant: one Microturbo TRI 60-2 Model 074 turbojet engine; 827 lb thrust.
Guidance and Control: analog or digital, for both ground control and preprogrammed flight. Terrain-following capability; high-*g* autopilot provisions.
Dimensions: length 18 ft 1 in, body diameter 1 ft 3 in, span 9 ft 10 in.
Weight: launch weight (incl booster) 1,090 lb.
Performance: operating speed 317–615 mph, operating height 50–40,000 ft, endurance more than 3 hours.

MQM-107B

BQM-34 Firebee

BQM-34 Firebee

Since initial development of the **BQM-34A** in the late 1950s, more than 5,000 of these jet target vehicles have been delivered to support weapon system and target research, development, test, evaluation, quality assurance, training, and annual service practices by all three of the US services and foreign governments. The BQM-34s deployed at Wallace Air Station in the Philippines and Tyndall AFB, Fla., are used in the testing and evaluation of air-to-air missiles. In addition, the BQM-34A and supersonic **BQM-34F** Firebee II are used as targets in the William Tell exercise held every two years at Tyndall AFB. (Data for BQM-34A.)

Contractor: Teledyne Ryan Aeronautical.
Power Plant: one Teledyne CAE J69-T-29 turbojet engine; 1,700 lb thrust; latest models have one General Electric J85-GE-7 turbojet engine; 2,450 lb thrust.
Guidance and Control: remote control methods include choice of radar, radio, active seeker, and automatic navigator developed by Teledyne Ryan; Vega DTCS (drone tracking and control system); microwave command and guidance system also available.
Dimensions: length 22 ft 10.8 in, body diameter 3 ft 1.2 in, span 12 ft 10.8 in.
Weight: launch weight 2,500 lb.
Performance: max level speed at 6,500 ft 690 mph, operating height range 20 to more than 60,000 ft, max range 796 miles. ■

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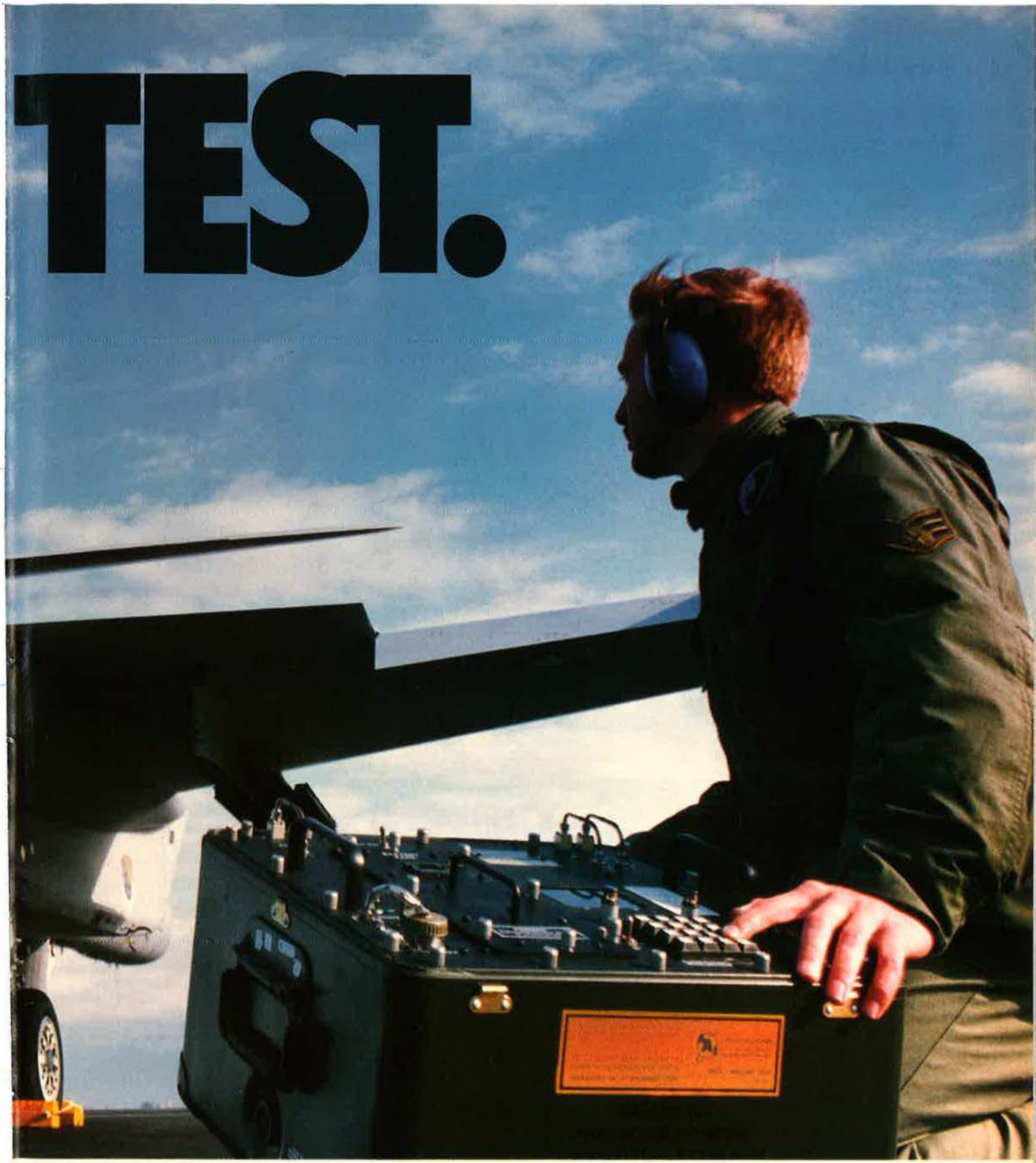

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Guide to USAF Bases at Home and Abroad

(Includes civilian airports and airfields of other military services that provide basing for USAF units and activities.)

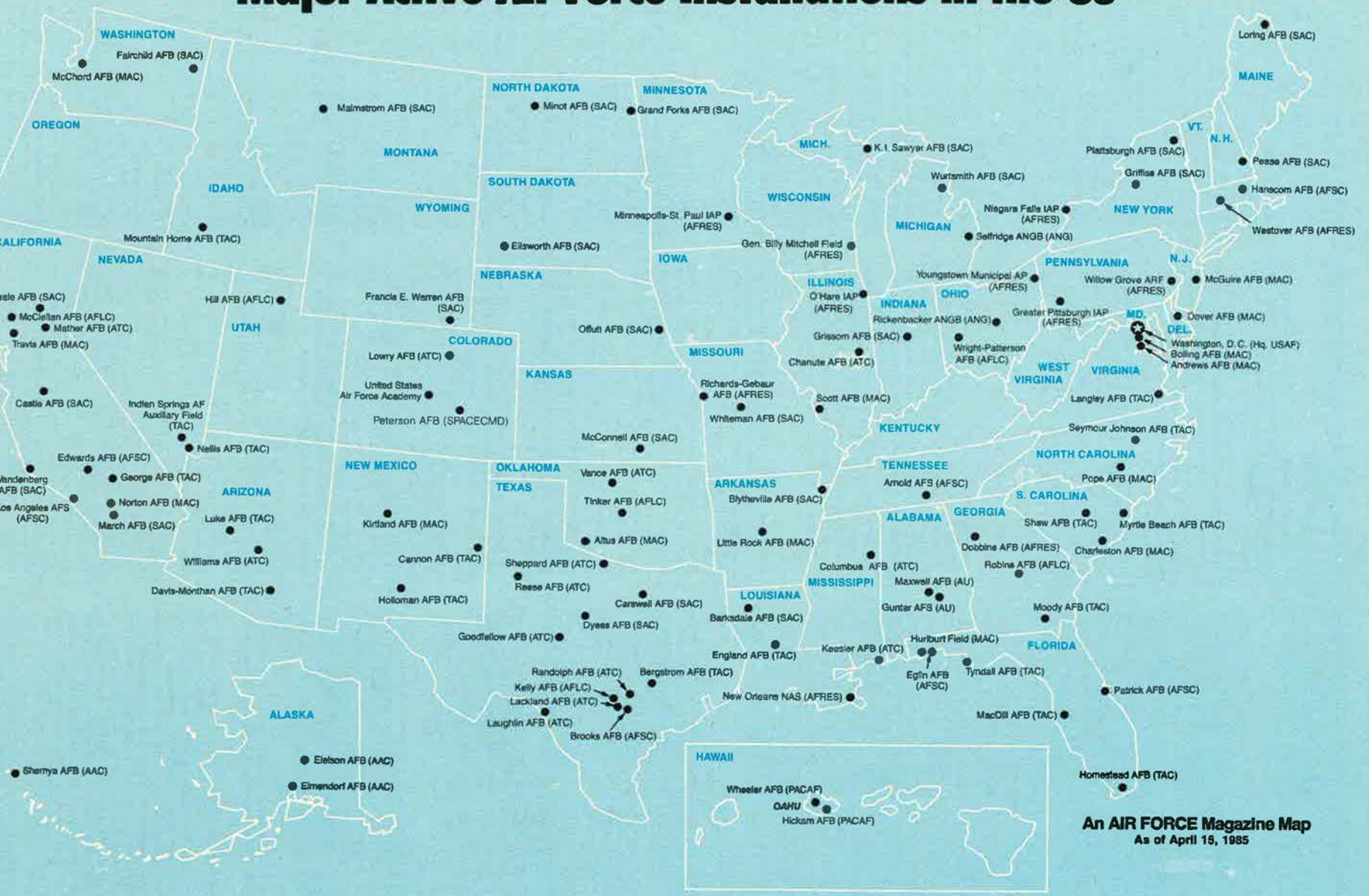
Altus AFB, Okla. 73523-5000; within Altus city limits. Phone (405) 482-8100; AUTOVON 866-1110. MAC base. 443d Military Airlift Wing (Training). Field Training Det. 403; 47th Flying Training Wing, OLC (ATC), T-37 aircraft operations; Det. 4, 17th Weather Sqdn.; Det. 3, 1600th Management Engineering Sqdn.; Det. 4, 1365th Audiovisual Sqdn.; basic flight engineer course; 340th Air Refueling Wing (SAC); 2002d Information Services Sqdn. (AFCC). Base activated Jan. 1942, inactivated May 1945, reactivated Jan. 1953. Area 3,582 acres plus 818 leased. Altitude 1,376 ft. Military 3,605; civilians 931. Payroll $97.2 million. Housing: 163 officer; 637 NCO; 158 VAQ, 338 VOQ, 4 transient family units. 25-bed hospital.

Andersen AFB, Guam 96334; 16.8 mi. N of Agana. Phone (671) 322-1110; AUTOVON 366-4110. SAC base. 3d Air Div.; 43d Strategic Wing; 605th Military Airlift Support Sqdn. (MAC); 54th Weather Reconnaissance Sqdn. (MAC); 27th Information Systems Sqdn. (AFCC); Det. 11, 2d Aircraft Delivery Gp. (TAC). Base activated as North Field, 1945; renamed Oct. 7, 1949, in memory of Brig. Gen. James Roy Andersen, reported missing on a flight from Guam to Hawaii, Feb. 26, 1945. Area 20,500 acres, including off-base facilities. Altitude 525 ft. Military 4,696; civilians 534. Payroll $94.9 million. Housing: 331 officer; 1,421 NCO; 263 transient. Clinic, outpatient care only. 62-bed hospital at Naval Regional Medical Center, Agana, Guam.

Andrews AFB, Md. 20331; 11 mi. SE of Washington, D. C. Phone (301) 981-9111; AUTOVON 858-1110. MAC base. 1776th Air Base Wing; Hq. Air Force Systems Command; 76th Airlift Div.; 89th Military Airlift Wing; 113th Tactical Fighter Wing (ANG); 459th Tactical Airlift Wing (AFRES); 2045th Information Systems Gp. (AFCC); Det. 11, 1361st Audiovisual Sqdn.; Naval Air Facility; Marine Aircraft Gp. 41, Det. A. Base activated May 1943; named for Lt. Gen. Frank M. Andrews, military air pioneer, WW II commander of the European theater, killed in aircraft accident May 3, 1943, in Iceland. Area 4,982 acres. Altitude 281 ft. Military 5,700; civilians 2,212. Payroll $261.5 million. Housing: 389 officer; 1,695 NCO; 212 mobile home spaces; 354 transient (incl. 68 temp. living quarters for incoming personnel, 54 DV suites, 176 VOQ, 56 TAQ). 350-bed hospital.

Arnold AFS, Tenn. 37389; approx. 7 mi. SE of Manchester. Phone (615) 455-2611; AUTOVON 340-5011. AFSC station; site of Arnold Engineering Development Center, 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 USAF, other ser-

Major Active Air Force Installations in the US



An AIR FORCE Magazine Map
As of April 15, 1985

vices, 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. Military 186; civil service 230; contractor employees 3,600. Payroll $142.2 million. Housing: 24 officer; 16 NCO; 45 transient. Dispensary.

Barksdale AFB, La. 71110; in Bossier City. Phone (318) 456-2252; AUTOVON 781-1110. SAC base. Hq. 8th Air Force; 2d Bomb Wing (B-52G, KC-135, and KC-10 aircraft operations); 1st Combat Evaluation Gp.; 46th Communications Gp. (AFCC); Det. 1, 307th Civil Engineering Sqdn. (Red Horse) (AFRES); Det. 1, 14th Flying Training Wing (ATC), T-37 aircraft operations; Det. 5, 3904th Management Engineering Sqdn.; 26th Weather Sqdn. (MAC); Det. 3, 1401st Military Airlift Sqdn. (MAC), CT-39 aircraft operations; 4201st Test Sqdn.; 3097th Aviation Depot Sqdn. (AFLC); Det. 2, 4200th Test Sqdn.; 3903d School Sqdn. (SAC NCO Academy); 745th Air Force Band Sqdn.; 78th Air Refueling Sqdn. (AFRES), KC-10 aircraft operations; 917th Tactical Fighter Gp. (AFRES), operating A-10s. Also home of the 8th Air Force Museum. The 917th TFG's 46th Tactical Fighter Training Sqdn. trains all ANG and AFRES A-10 pilots. Base named for Lt. Eugene H. Barksdale, WW I airman killed in Aug. 1926 in crash near Wright Field, Ohio. Base activated Feb. 2, 1933. Area 22,000 acres (20,000 acres reserved for recreation). Altitude 166 ft. Military 7,000; civilians 1,100. Payroll $145.3 million. Housing: 205 officer; 828 NCO; 29 transient. 70-bed hospital.

Beale AFB, Calif. 95903; 13 mi. E of Marysville. Phone (916) 634-3000; AUTOVON 368-1110. SAC base. 14th Air Div.; 9th Strategic Reconnaissance Wing; 7th Missile Warning Sqdn. (SPACECMD); 1883d Information Systems Sqdn. (AFCC). Aircraft include the SR-71, U-2, and TR-1 reconnaissance aircraft, KC-135 aerial tankers, and T-38 trainers. Originally US Army's Camp Beale, became Air Force installation in Apr. 1948; became AFB in Nov. 1951. Named for Brig. Gen. E. F. Beale, Indian agent in California prior to Civil War. Area 22,944 acres. Altitude 113 ft. Military 5,051; civilians 544. Payroll $150.6 million. Housing: 395 officer; 1,330 NCO; 63 transient. 30-bed hospital.

Bergstrom AFB, Tex. 78743; 7 mi. SE of downtown Austin. Phone (512) 479-4100; AUTOVON 685-4100. TAC base. 67th Tactical Reconnaissance Wing, RF-4C reconnaissance operations; Hq. 12th Air Force; Hq. 10th Air Force (AFRES); 924th Tactical Fighter Gp. (AFRES), F-4D fighter operations; TAC NCO Academy West; Det. 8, 602d Tactical Air Control Wing; Det. 1, 4400th Management Engineering Sqdn.; Det. 12, Tactical Information Systems Div. Base activated Sept. 22, 1942; named for Capt. John A. E. Bergstrom, first Austin serviceman killed in WW II; died Dec. 8, 1941, at Clark Field, Philippines. Area 3,998 acres. Altitude 541 ft. Military 5,199; civilians 960. Payroll $129.73 million. Housing: 78 officer; 707 enlisted; 235 transient. 35-bed hospital.

Blytheville AFB, Ark. 72317-5000; 4 mi. NW of Blytheville. Phone (501) 762-7000; AUTOVON 637-1110. SAC base. 42d Air Div.; 97th Bomb Wing; aircraft include B-52s and KC-135s. Base activated June 1942; inactivated Feb. 1947; reactivated Aug. 1955. Area 3,092 acres. Altitude 254 ft. Military 2,894; civilians 334. Payroll $65.1 million. Housing: 197 officer; 733 NCO; 79 transient. 25-bed hospital.

Bolling AFB, D. C. 20332; 3 mi. S of US Capitol. Phone (202) 545-6700; AUTOVON 227-0101. MAC base. 1100th Air Base Wing; Air Force Office of Scientific Research (AFSC); Air Force Chief of Chaplains; Air Force Surgeon General; Air Force Office of History; Hq. Air Force Office of Special Investigations; Defense Intelligence Agency; US Air Force Honor Guard and US Air Force Band. Activated Oct. 1917; named for Col. Raynal C. Bolling, first high-ranking Air Service officer killed in WW I. Area 605 acres. Altitude 16 ft. Military 2,166; civilians 2,428. Payroll $256.3 million. Housing: 296 officer; 1,100 NCO; 186 transient (incl. 46 VAQ, 76 VOQ, 2 DV suites, 62 TLF units).

Brooks AFB, Tex. 78235; 7 mi. SE of San Antonio. Phone (512) 536-1110; AUTOVON 240-1110. AFSC base. Home of Aerospace Medical Div., USAF School of Aerospace Medicine; the Harry G. Armstrong Aerospace Medical Research Lab; USAF Occupational and Environmental Lab; USAF Human Resources Lab; AFSC Systems Acquisition School; tenant units include the USAF Medical Service Center, a security squadron, and a communications group. Base activated Dec. 8, 1917; named for Cadet Sidney J. Brooks, Jr., killed Nov. 13, 1917, on his final solo flight before commissioning. Area 1,310 acres. Altitude 600 ft. Military 1,500; civilians 1,100. Payroll $54.9 million. Housing: 70 officer; 100 NCO; 8 transient. Dispensary.

Cannon AFB, N. M. 88101; 7 mi. W of Clovis. Phone (505) 784-3311; AUTOVON 681-1110. TAC base. 27th Tactical Fighter Wing, F-111D fighter operations. Activated Aug. 1942; named for Gen. John K. Cannon, WW II commander of all Allied air forces in the Mediterranean theater. Area 25,663 acres. Altitude 4,295 ft. Military 3,885; civilians 706. Payroll $96 million. Housing: 149 officer; 862 NCO. 40-bed hospital.

Carswell AFB, Tex. 76127; 7 mi. WNW of downtown Fort Worth. Phone (817) 735-5000; AUTOVON 739-1110. SAC base. 19th Air Div.; 7th Bomb Wing (SAC); 301st Tactical Fighter Wing (AFRES); aircraft include B-52s, KC-135s, and AFRES F-4s. Activated Aug. 1942; named Jan. 30, 1948, for Maj. Horace S. Carswell, Jr., native of Fort Worth, WW II B-24 pilot, and posthumous Medal of Honor recipient. Area 2,750 acres. Altitude 650 ft. Military 5,050; civilians 961. Payroll $134 million. Housing: 98 officer; 709 NCO; 44 VOQ, 22 TLF, VAQ under renovation. 120-bed hospital.

Castle AFB, Calif. 95342; 8 mi. NW of Merced. Phone (209) 726-2011; AUTOVON 347-1110. SAC base. 93d Bomb Wing. Conducts training of all SAC B-52G and H and KC-135 aircrews. Also houses 84th Fighter Interceptor Sqdn. (TAC) and is site of Castle Air Museum. Activated Sept. 1941; named for Brig. Gen. Frederick W. Castle, WW II B-17 pilot and Medal of Honor recipient. Area 2,700 acres. Altitude 188 ft. Military 5,068; civilians 421. Payroll $100.9 million. Housing: 92 officer; 842 NCO; 432 transient (incl. 108 VAQ, 296 VOQ, 4 family quarters, and 24 DV quarters). 30-bed hospital.

Chanute AFB, Ill. 61868-5000; 14 mi. N of Champaign at Rantoul, Ill. Phone (217) 495-1110; AUTOVON 862-1110. ATC base. Chanute Technical Training Center provides training in missile and aircraft mechanics, aerospace ground equipment, life support, metallurgy and nondestructive inspection, weather forecasting, weather equipment, and fire protection and rescue. Chanute Technical Training Display Center is base museum. Base activated May 1, 1917; named for Octave Chanute, aeronautical engineer and glider pioneer who died in 1910. Area 2,125 acres. Altitude 735 ft. Military 6,574; civilians 1,236. Payroll $124.46 million. Housing: 160 officer; 1,344 enlisted; 194 VOQ, 948 VAQ, 30 TLF. 35-bed hospital.

Charleston AFB, S. C. 29404-5000; in North Charleston. Phone (803) 554-0230; AUTOVON 583-0111. MAC base. Joint-use airfield. 437th Military Airlift Wing and 315th MAW (AFRES Assoc.). Also 1968th Information Systems Sqdn. (AFCC); Det. 1, 87th Fighter Interceptor Sqdn. (TAC); Det. 7, 1361st Audiovisual Sqdn. Base activated Dec. 1941; inactivated Feb. 1946, reactivated 1952. Area 6,314 acres. Altitude 45 ft. Military 7,541 (incl. AFRES); civilians 1,500. Payroll $130 million. Housing: 142 officer; 813 NCO; 75 trailer spaces; 472 transient (150 VOQ, 322 VAQ). Dispensary.

Columbus AFB, Miss. 39701-5000; 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 6,013 acres. Altitude 214 ft. Military 3,073; civilians 535. Payroll $74.5 million. Housing: 234 officer; 586 NCO. 20-bed hospital.

Davis-Monthan AFB, Ariz. 85707; within city limits of Tucson. Phone (602) 748-3900; AUTOVON 361-1110. TAC base. 836th Air Div.; 355th Tactical Training Wing, A-10 combat crew training; 602d Tactical Air Control Wing, headquarters for OA-37, OV-10, and ground FAC tactical air control operations; 868th Tactical Missile Training Sqdn., ground-launched cruise missile training operation; 41st Electronic Combat Sqdn. (EC-130H). Also site of AFLC's Military Aircraft Storage and Disposition Center. Base activated in 1927; named for two local early aviators—1st Lt. Samuel H. Davis, killed Dec. 28, 1921; and 2d Lt. Oscar Monthan, killed Mar. 27, 1924. Area 11,000 acres. Altitude 2,620 ft. Military 5,550; civilians 1,687. Payroll $164 million. Housing: 136 officer; 1,119 enlisted; 374 transient. 65-bed hospital.

Dover AFB, Del. 19902-5000; 4 mi. SE of Dover. Phone (302) 678-7011; AUTOVON 455-1110. MAC base. 436th Military Airlift Wing and 512th MAW (AFRES Assoc.). Dover is the largest air cargo port on the East Coast. Base activated Dec. 1941; inactivated 1946; reactivated Feb. 1951. Area 3,734 acres. Altitude 28 ft. Military 4,874; civilians 1,360. Payroll $133.1 million. Housing: 229 officer; 1,327 NCO; 297 transient. 30-bed hospital.

Dyess AFB, Tex. 79607; WSW border of Abilene. Phone (915) 696-0212; AUTOVON 461-1110. SAC base. 12th Air Div. and 96th Bomb Wing (SAC); 463d Tactical Airlift Wing (MAC); 1993d Information Systems Sqdn. (AFCC); 417th Field Training Det. (ATC). Selected as the first base to activate an operational B-1B wing as well as conduct B-1 combat crew training for the Air Force. First B-1B aircraft slated to arrive in June 1985. Base activated Apr. 1942; deactivated Dec. 1945; reactivated as Abilene Air Base, Sept. 1955. In Mar. 1956, renamed for Lt. Col. William E. Dyess, WW II fighter pilot known best for his escape from a Japanese prison camp, killed in P-38 crash at Burbank, Calif., Dec. 1943. Area 6,058 acres. Altitude 1,789 ft. Military 5,934; civilians 463. Payroll $117.5 million. Housing: 150 officer; 848 NCO; 128 transient. 40-bed hospital.

Edwards AFB, Calif. 93523; 20 mi. E of Rosamond. Phone (805) 277-1110; AUTOVON 350-1110. AFSC base. Site of Air Force Flight Test Center (AFFTC), which conducts new and follow-on testing of aircraft and related avionics and weapon systems. AFFTC also operates the USAF Test Pilot School, which trains pilots and flight-test engineers. Also the site of the Air Force Rocket Propulsion Laboratory, US Army Aviation Engineering Flight Activity, and the NASA Dryden Flight Research Facility. Edwards is the primary landing site for all Space Shuttle test and evaluation flights and is a backup landing site for all Shuttle missions. Base activated Sept. 1933 as Muroc Army Air Field, renamed for Capt. Glen W. Edwards, killed June 5, 1948, in crash of YB-49 "Flying Wing." Area 301,000 acres. Altitude 2,302 ft. Military 4,344; civilians 5,808. Payroll $235.9 million. Housing: 558 officer; 2,997 enlisted; 92 transient. 15-bed hospital.

Eglin AFB, Fla. 32542; 2 mi. SE of the twin cities of Niceville and Valparaiso; 7 mi. NE of Fort Walton Beach. Phone (904) 881-6666; AUTOVON 872-1110. AFSC base. Eglin is the free world's largest air force base and home of the Air Force Armament Div.; Air Force Armament Test Lab; 3246th Test Wing; 39th Aerospace Rescue and Recovery Wing; 33d Tactical Fighter Wing; Tac Air Warfare Center; 1972d Communications Sqdn.; 55th Aerospace Rescue and Recovery Sqdn.; 919th Special Operations Gp. (AFRES). 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. Military 10,501; civilians 5,177. Payroll $310.8 million (includes AFRES). Housing: 322 officer; 2,014 NCO; 84 transient. 160-bed regional hospital.

Eielson AFB, Alaska 99702; 26 mi. SE of Fairbanks. Phone (907) 377-1178; AUTOVON (317) 377-1110. AAC base. 343d Tactical Fighter Wing; 343d Combat Support Gp.; 18th Tactical Fighter Sqdn.; 25th Tactical Air Support Sqdn. 343d Tactical Fighter Wing is host unit. Close air support for ground forces and search and rescue for AAC; 6th Strategic Wing (SAC) tanker operations; communications for AFCC; Arctic Survival School (ATC). Activated Oct. 1944; named for Carl B. Eielson, Arctic aviation pioneer, died Nov. 1929. Area 23,500 acres (approx). Altitude 534 ft. Military 3,672; civilians 314. Payroll $65.1 million. Housing: 148 officer; 1,015 NCO; 40 transient. Clinic.

Ellsworth AFB, S. D. 57706; 11 mi. ENE of Rapid City. Phone (605) 342-2400; AUTOVON 747-1110. SAC base. 44th Strategic Missile Wing; 28th Bomb Wing; Det. 2, 37th Aerospace and Recovery Sqdn.; OL A, 64th Flying Training Wing (ATC); Det. 17, 9th Weather Sqdn.; 2146th Information Systems Sqdn. (AFCC). Activated July 1942 as Rapid City Army Air Base; named for Brig. Gen. Richard E. Ellsworth, killed Mar. 18, 1953, in crash of RB-36. Area 4,906 acres. Altitude 3,200 ft. Military 6,698; civilians 535. Payroll $123.5 million. Housing: 331 officer; 1,526 NCO; 173 transient. 30-bed hospital.

Elmendorf AFB, Alaska 99506; bordering Anchorage. Phone (907) 552-1110; AUTOVON (317) 552-1110. Hq. Alaskan Air Command; 21st Tactical Fighter Wing; NORAD Region Operations Control Center; Rescue Coordination Center; 11th Tactical Control Gp.; 43d Tactical Fighter Sqdn.; 5021st Tactical Operations Sqdn.; 1931st Information Security Wing (AFCC); 6981st Electronic Security Sqdn. (ESC); 616th Military Airlift Gp. (MAC); 17th Tactical Airlift Sqdn. (MAC); 71st Aerospace Rescue and Recovery Sqdn. (MAC); 11th Weather Sqdn. (MAC); plus varied US Army and Navy activities. 21st Tactical Fighter Wing is host unit. Base activated July 1940; named for Capt. Hugh M. Elmendorf, killed Jan. 13, 1933, at Wright Field, Ohio, while flight-testing a new type of pursuit plane. Area 13,130 acres. Altitude 118 ft. Military 6,174; civilians 1,216. Payroll $165 million. Housing: 232 officer; 1,638 NCO; transient incl. 52 family units (no pets), 140 VOQ, 230 VAQ. 95-bed hospital.

England AFB, La. 71301; 5 mi. W of Alexandria. Phone (318) 448-2100; AUTOVON 683-1110. TAC base. 23d Tactical Fighter Wing, A-10 fighter operations. Base activated Oct. 1942; named for Lt. Col. John B. England, WW II P-51 pilot and ace credited with 17.5 victories, killed Nov. 17, 1954, in F-86 crash in France. Area 2,282 acres. Altitude 89 ft. Military 3,142; civilians 567. Payroll $49 million. Housing: 109 officer; 491 NCO; 44 transient. 40-bed hospital.

Fairchild AFB, Wash. 99011; 12 mi. WSW of Spokane. Phone (509) 247-1212; AUTOVON 352-1110. SAC base. 47th Air Div.; 92d Bomb Wing (SAC); 3636th Combat Crew Training Wing (ATC); 141st Air Refueling Wing (ANG); Det. 24, 40th Aerospace Rescue and Recovery Sqdn. (MAC); Det. 1, 1000th Satellite Operations Gp. (SPACECMD); 2039th Information Systems Sqdn. (AFCC). Base activated Jan. 1942; named for Gen. Muir S. Fairchild, USAF Vice Chief of Staff at his death in 1950. Area 6,127 acres. Altitude 2,462 ft. Military 4,364; civilians 584. Payroll $101.1 million for civilian and active-duty military and $12 million for ANG. Housing: 502 officer; 1,079 NCO; transient incl. 60 VOQ and 62 VAQ, no family transient quarters. 45-bed hospital.

USAF's Principal Bases Overseas

Ankara AS, Turkey
APO New York 09254
AUTOVON 672-1110
Hq. TUSLOG
7217th Air Base Group, USAFE
Support base, USAFE

Aviano AB, Italy
APO New York 09293
AUTOVON 632-1110
40th Tactical Group, USAFE
Support base, USAFE

Bitburg AB, Germany
APO New York 09132
AUTOVON 453-1110
36th Tactical Fighter Wing, USAFE

Camp New Amsterdam, The Netherlands
APO New York 09292
(Call Ramstein, AUTOVON 480-1110; ask for Camp New Amsterdam.)
32d Tactical Fighter Squadron, USAFE

Clark AB, Republic of the Philippines
APO San Francisco 96274-5000
AUTOVON 822-1201
Hq. 13th Air Force, PACAF
3d Tactical Fighter Wing, PACAF
374th Tactical Airlift Wing, MAC
6922d Electronic Security Squadron, ESC

Comiso AS, Italy
APO New York 09694
AUTOVON 628-8110
487th Tactical Missile Wing, USAFE

Florennes AB, Belgium
APO New York 09188
(Call Bitburg, AUTOVON 453-1110; ask for Florennes.)
485th Tactical Missile Wing

Hahn AB, Germany
APO New York 09109
AUTOVON 450-1110
50th Tactical Fighter Wing, USAFE

Hellenikon AB, Greece
APO New York 09223
AUTOVON 662-1110
7206th Air Base Group, USAFE
Support base, USAFE

Hessisch-Oldendorf AS, Germany
APO New York 09669
(Call Sembach, AUTOVON 496-1110; ask for Hessisch-Oldendorf.)
600th Tactical Control Squadron, USAFE
Tactical air control base, USAFE

Howard AFB, Panama
APO Miami 34001-5000
AUTOVON 284-1110
Hq. USAF Southern Air Division, TAC

Incirlik AB, Turkey
APO New York 09289
AUTOVON 676-1110
39th Tactical Group, USAFE
Support base, USAFE

Iraklion AS, Greece
APO New York 09291
AUTOVON 668-1110
7276th Air Base Group, USAFE
Support base, USAFE

Izmir AS, Turkey
APO New York 09224
AUTOVON 675-1110
7241st Air Base Group, USAFE
Support base, USAFE

Kadena AB, Okinawa, Japan
APO San Francisco 96239-5000
AUTOVON 630-1110
313th Air Division, PACAF
18th Tactical Fighter Wing, PACAF
376th Strategic Wing, SAC
6990th Electronic Security Group, ESC
961st Airborne Warning and Control Squadron, TAC

Keflavik NS, Iceland
FPO New York 09571
AUTOVON 231-1290
Fighter-interceptor unit, TAC

Kunsan AB, Republic of Korea
APO San Francisco 96264-5000
AUTOVON 272-2345
8th Tactical Fighter Wing, PACAF

Kwangju AB, Republic of Korea
APO San Francisco 96264-5000
(Call Korea, AUTOVON 272-2345; ask for Kwangju AB.)
6171st Air Base Squadron, PACAF

Lajes Field, Azores
APO New York 09406
AUTOVON 723-1410
Airlift support base, MAC

Lindsey AS, Germany
APO New York 09633
AUTOVON 895-1110
7100th Combat Support Wing, USAFE
Support base, USAFE

Misawa AB, Japan
APO San Francisco 96519-5000
AUTOVON 248-1101
432d Tactical Fighter Wing, PACAF
6920th Electronic Security Group, ESC

Osan AB, Republic of Korea
APO San Francisco 96570-5000
AUTOVON 284-4110
314th Air Division, PACAF
51st Tactical Fighter Wing, PACAF
6903d Electronic Security Group, ESC

RAF Alconbury, United Kingdom
APO New York 09238
AUTOVON 223-1110
10th Tactical Reconnaissance Wing, USAFE
17th Reconnaissance Wing, SAC

RAF Bentwaters, United Kingdom
APO New York 09755
AUTOVON 225-1110
81st Tactical Fighter Wing, USAFE

RAF Chicksands, United Kingdom
APO New York 09193
AUTOVON 234-1110
7274th Air Base Group, USAFE
Support base, USAFE

RAF Fairford, United Kingdom
APO New York 09125
AUTOVON 247-1110
7020th Air Base Group, USAFE
KC-135 refueling support base, USAFE

RAF Greenham Common, United Kingdom
APO New York 09150
(Call RAF Upper Heyford, AUTOVON 263-1110; ask for Greenham Common.)
501st Tactical Missile Wing, USAFE

RAF Lakenheath, United Kingdom
APO New York 09179
AUTOVON 226-1110
48th Tactical Fighter Wing, USAFE

RAF Mildenhall, United Kingdom
APO New York 09127
AUTOVON 238-1110
Hq. 3d Air Force, USAFE
513th Tactical Airlift Wing, USAFE
306th Strategic Wing, SAC (Rotational)
313th Tactical Airlift Group, MAC (Rotational)

RAF Upper Heyford, United Kingdom
APO New York 09194
AUTOVON 263-1110
20th Tactical Fighter Wing, USAFE

RAF Woodbridge, United Kingdom
APO New York 09405
AUTOVON 225-1110
81st Tactical Fighter Wing, USAFE
67th Aerospace Rescue and Recovery Squadron, MAC

Ramstein AB, Germany
APO New York 09012
AUTOVON 480-1110
Hq. USAFE
86th Tactical Fighter Wing, USAFE
Hq. European Information Systems Division, AFCC
7th Air Division, SAC
322d Airlift Division, MAC
2d Weather Wing, MAC

Rhein-Main AB, Germany
APO New York 09057
AUTOVON 330-1110
435th Tactical Airlift Wing
Tactical airlift base, MAC

San Vito AS, Italy
APO New York 09240
AUTOVON 622-1110
7275th Air Base Group, USAFE
Support base, USAFE

Sembach AB, Germany
APO New York 09130
AUTOVON 496-1110
Hq. 17th Air Force, USAFE
601st Tactical Control Wing, USAFE
Command Control Communications
Allied Tactical Operations Center (ATOC)

Sondrestrom AB, Greenland
APO New York 09121
(Call AUTOVON 834-1211; ask for Sondrestrom AB.)
Support base, SPACECMD

Spangdahlem AB, Germany
APO New York 09123
AUTOVON 452-1110
52d Tactical Fighter Wing, USAFE

Suwon AB, Republic of Korea
APO San Francisco 96461-5000
(Call Korea, AUTOVON 284-4110; ask for Suwon AB.)

Taegu AB, Republic of Korea
APO San Francisco 96213-5000
(Call Korea, AUTOVON 284-4110; ask for Taegu AB.)

Tempelhof Central Airport, West Berlin
APO New York 09611
AUTOVON 332-1110
7350th Air Base Group, USAFE
1946th Information Systems Squadron, AFCC
6912th Electronic Security Group, ESC
Support base, USAFE

Thule AB, Greenland
APO New York 09023-5000
(Call AUTOVON 834-1211; ask for Thule AB.)
Support base, SPACECMD

Torrejon AB, Spain
APO New York 09283
AUTOVON 723-1110
Hq. 16th Air Force, USAFE
401st Tactical Fighter Wing, USAFE

Yokota AB, Japan
APO San Francisco 96328-5000
AUTOVON 248-1101
Hq. US Forces, Japan
Hq. 5th Air Force, PACAF
475th Air Base Wing, PACAF
316th Tactical Airlift Group, MAC

Zaragoza AB, Spain
APO New York 09286
AUTOVON 724-1110
406th Tactical Fighter Training Wing, USAFE
Tactical fighter training base, USAFE

Zweibrücken AB, Germany
APO New York 09860
AUTOVON 498-1110
26th Tactical Reconnaissance Wing, USAFE
10th Military Airlift Squadron, MAC

Francis E. Warren AFB, Wyo. 82005; adjacent to Cheyenne. Phone (307) 775-1110; AUTOVON 481-1110. SAC base. 4th Air Div.; 90th Strategic Missile Wing. Base activated July 4, 1867; under Army jurisdiction until 1947 when reassigned to USAF. Home of the first Atlas-D ICBM missile wing (1960–65); named for Francis Emory Warren, Wyoming senator and early governor. Base has 5,872 acres, plus 200 Minuteman III missile sites distributed over 12,600 sq. mi. in Wyoming, Colorado, and Nebraska. Selected for the deployment of the Peacekeeper missile system. Altitude 6,142 ft. Military 3,516; civilians 533. Payroll $72.3 million. Housing: 203 officer; 628 NCO; 36 transient. 25-bed hospital.

George AFB, Calif. 92394; 6 mi. NW of Victorville. Phone (619) 269-1110; AUTOVON 353-1110. TAC base. 831st Air Div.; 37th Tactical Fighter Wing, home of TAC's Wild Weasel F-4G squadrons; 35th Tactical Training Wing, F-4 transitional and upgrade training; German Air Force training in F-4; ANG F-4D detachment; 27th Tactical Air Support Sqdn. (OV-10); 2067th Information Systems Sqdn. (AFCC). Base activated in 1941; named for Brig. Gen. Harold H. George, WW I fighter ace killed Apr. 29, 1942, in aircraft accident in Australia. Area 5,347 acres. Altitude 2,875 ft. Military 5,998; civilians 463. Payroll $124.5 million. Housing: 229 officer; 1,214 NCO; 198 senior NCO; 45 transient TLQ. 35-bed hospital.

Goodfellow AFB, Tex. 76908-5000; within city limits of San Angelo. Phone (915) 657-3231; AUTOVON 477-3231. ATC base. Base activated Jan. 1941; named for Lt. John J. Goodfellow, Jr., WW I fighter pilot killed in combat Sept. 14, 1918. Area 1,137 acres. Altitude 1,877 ft. Military 2,389; civilians 582. Payroll $45.64 million. Housing: 3 officer; 96 NCO; 105 transient (69 VAQ, 36 VOQ). Clinic.

Grand Forks AFB, N. D. 58205; 16 mi. W of Grand Forks. Phone (701) 594-6011; AUTOVON 362-1110. SAC base. 319th Bomb Wing (B-52G and KC-135); 321st Strategic Missile Wing (Minuteman III). Base activated in 1956; named after the city of Grand Forks, whose citizens bought the property for the Air Force. Area 6,912 acres. Missile complex covers an additional 7,500 sq. mi. Altitude 911 ft. Military 5,371; civilians 661. Payroll $104.4 million. Housing: 558 officer; 1,719 NCO; 243 transient. 40-bed hospital.

Griffiss AFB, N. Y. 13441; 1 mi. NE 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 headquarters of AFCC's Continental Communications Division; 485th Engineering Installations Gp. (AFCC); 49th Fighter Interceptor Sqdn. (TAC); Hq. 24th Air Div. and the Northeast Region Operations Control Center (NORAD/ADTAC). Base activated Feb. 1, 1942; named for Lt. Col. Townsend E. Griffiss, killed in aircraft accident Feb. 15, 1942 (the first US airman to lose his life in Europe while in the line of duty during WW II). Area 3,896 acres. Altitude 504 ft. Military 4,803; civilians 3,204. Payroll $192 million. Housing: 175 officer; 558 NCO; 140 transient. 70-bed hospital.

Grissom AFB, Ind. 46971; 7 mi. S of Peru. Phone (317) 689-5211; AUTOVON 928-1110. SAC base. 305th Air Refueling Wing; 434th Tactical Fighter Wing (AFRES); 931st Air Refueling Gp. (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 at Cape Kennedy, Fla. Area 2,810 acres. Altitude 800 ft. Military 2,445; civilians 1,080. Payroll $51.2 million (SAC only). Housing: 276 officer; 1,852 NCO; 138 transient. 10-bed hospital.

Gunter AFS, Ala. 36114; 4 mi. NE of Montgomery. Phone (205) 279-1110; AUTOVON 446-1110. AU station. Air Force Teleprocessing Center; Air Force Logistics Management Center; USAF Extension Course Institute; USAF Senior NCO Academy. Base activated Aug. 27, 1940; named for William A. Gunter, longtime mayor of Montgomery and airpower exponent, died 1940. Area 366 acres. Altitude 220 ft. Military 1,304; civilians 876. Payroll included in Maxwell entry. Housing: 118 officer; 206 NCO; 302 transient (108 VOQ and 194 VAQ).

Hanscom AFB, Mass. 01731; 17 mi. NW of Boston. Phone (617) 861-4441; AUTOVON 478-5980. AFSC base. Hq. Electronic Systems Div. (AFSC), manages development and acquisition of command control communications and intelligence (C³I) systems. Also site of Air Force Geophysics Lab, center for research and exploratory development in the terrestrial, atmospheric, and space environments. Base has no flying mission; transient USAF aircraft use runways of Laurence G. Hanscom Field, state-operated airfield adjoining the base. Named for a pre-WW II advocate of private aviation, killed in a lightplane accident in 1941. Area 846 acres. Altitude 133 ft. Military 2,100; civilians 3,100. Payroll $152 million. Housing: 276 officer; 420 NCO; 30-unit transient lodging facility; 754 BOQ/VOQ. Clinic.

Hickam AFB, Hawaii 96853-5000; 10 mi. W of Honolulu. Phone (808) 422-0531 (Oahu military operator); AUTOVON 430-0111. PACAF base. Host unit 15th Air Base Wing, supporting Air Force units and installations in Hawaii and throughout the Pacific; subordinate unit 9th Airborne Command and Control Sqdn. Major associate units: Hq. Pacific Air Forces; 834th Airlift Div. (MAC); Hq. Pacific Information Systems Div. (AFCC); 1st Weather Wing (MAC); 6594th Test Gp. (AFSC); 154th Composite Gp. (ANG); 619th Military Airlift Support Sqdn. (MAC); Det. 1, 89th Military Airlift Wing (MAC). Base activated Sept. 1937; named for Lt. Col. Horace M. Hickam, air pioneer killed in crash Nov. 5, 1934, at Fort Crockett, Tex. Area 2,694 acres. Altitude sea level. Military 5,204; civilians 1,971. Payroll $219 million (includes Hickam and Wheeler AFBs and Bellows AFS). Housing: 535 officer; 1,924 NCO. Clinic.

Hill AFB, Utah 84056; 5 mi. SW of Ogden. Phone (801) 777-7221; AUTOVON 458-1110. AFLC base. Hq. Ogden Air Logistics Center. Furnishing logistics support for Peacekeeper, Minuteman, and Titan II missiles; Bomarc drone and Maverick air-to-ground missiles; laser and electro-optical guided bombs; F-4 and F-16 systems manager; air munitions; aircraft landing gears; wheels, brakes and struts, tires, and tubes; photographic and aerospace training equipment. Also home of the 388th Tactical Fighter Wing; 419th Tactical Fighter Wing (AFRES); 40th Aerospace Rescue and Recovery Sqdn.; 6545th Test Gp. (AFSC), which includes management of Utah Test and Training Range and RPV test programs. Base activated Nov. 1940; named for Maj. Ployer P. Hill, killed Oct. 30, 1935, test-flying the first B-17. Area 6,666 acres; manages 961,012 acres. Altitude 4,788 ft. Military 5,500; civilians 15,200. Payroll $495 million. Housing: 263 officer; 882 NCO; 8 transient. 35-bed hospital.

Holloman AFB, N. M. 88330; 8 mi. SW of Alamogordo. Phone (505) 479-6511; AUTOVON 867-1110. TAC base. 833d Air Div.; 49th Tactical Fighter Wing (F-15 operations); 479th Tactical Training Wing (AT-38 fighter lead-in training); 4449th Mobility Support Sqdn. (Harvest Bare); 82d and 83d Tactical Control Flts.; 6585th Test Group (AFSC) conducts test and evaluation of aircraft and missile systems. Twenty-one other tenant units located at Holloman, including 1877th Information Systems Sqdn., 1025th Satellite Communications Sqdn. (SPACECMD), 1984th Communications Sqdn., 40th Aerospace Rescue and Recovery Sqdn., Air Force Geophysical Laboratory detachment, and a US Army unit. Base activated in 1942; named for Col. George V. Holloman, guided-missile pioneer, killed in B-17 crash in Formosa, Mar. 19, 1946. Area 50,697 acres. Altitude 4,093 ft. Military 6,581; civilians 1,157. Payroll $187 million. Housing: 191 officer; 1,360 NCO; 255 transient. 35-bed hospital.

Homestead AFB, Fla. 33039; 5 mi. NNE of Homestead. Phone (305) 257-8011; AUTOVON 791-0111. TAC base. 31st Tactical Training Wing, F-4D fighter operations and training; site of ATC sea-survival school; 726th Tactical Control Sqdn. (TAC); Naval Security Group Activity; 482d Tactical Fighter Wing (AFRES); 301st Aerospace Rescue and Recovery Sqdn. (AFRES). Base activated Apr. 1955. Area 3,491 acres. Altitude 7 ft. Military 4,954; civilians 7,736. Payroll $120.8 million. Housing: 321 officer; 1,294 NCO; 359 transient. 80-bed hospital.

Hurlburt Field, Fla. 32544-5000; 5 mi. W of Fort Walton Beach. Phone (904) 881-6668; AUTOVON 872-1110. MAC base, though located on the Eglin AFB (AFSC) reservation. Home of 2d Air Div., which is the focal point for all special operations matters for USAF. Under 2d AD's responsibility are the 1st Special Operations Wing, Hurlburt Field, equipped with the MC-130E (Combat Talon), AC-130H (Spectre Gunship), HH-53 (Pave Low III), and UH-1N (Twin Huey); the USAF Special Operations School; 1723d Special Operations Combat Control Sqdn.; Special Operations Weather Team. Also under 2d AD's responsibility are 1st Special Operations Sqdn., Clark AB, the Philippines; 7th Special Operations Sqdn., Rhein-Main AB, Germany; and helicopters at Howard AFB, Panama. Tenant units assigned to Hurlburt Field include the Special Missions Operational Test and Evaluation Center; 4442d Tactical Control Gp., which includes the US Air Force Air-Ground Operations School and the 727th Tactical Control Sqdn.; 823d Civil Engineering Sqdn. (Red Horse). Base activated in 1943; named for Lt. Donald W. Hurlburt, WW II pilot killed Oct. 2, 1943, in a crash on Eglin reservation. Altitude 35 ft. Military 3,723; civilians 320. Payroll $93 million. Housing: 74 officer; 306 NCO; 341 transient. Medical clinic only at Hurlburt; 160-bed hospital at Eglin Regional Hospital.

Indian Springs Air Force Auxiliary Field, Nev. 89018; 45 mi. NW of Las Vegas. Phone (702) 897-6201; AUTOVON 682-6201. TAC base. 554th Combat Support Sqdn.; 4460th Helicopter Sqdn. Provides bombing and gunnery range support for tactical operations from Nellis AFB; manages construction of realistic target complexes; supports US Department of Energy research activities. Base activated in 1942. Area 1,652 acres. Altitude 3,124 ft. Military 325; civilians 30. (Payroll included in Nellis AFB entry.) Housing: 78 officer and NCO quarters; 40 trailer spaces. Dispensary.

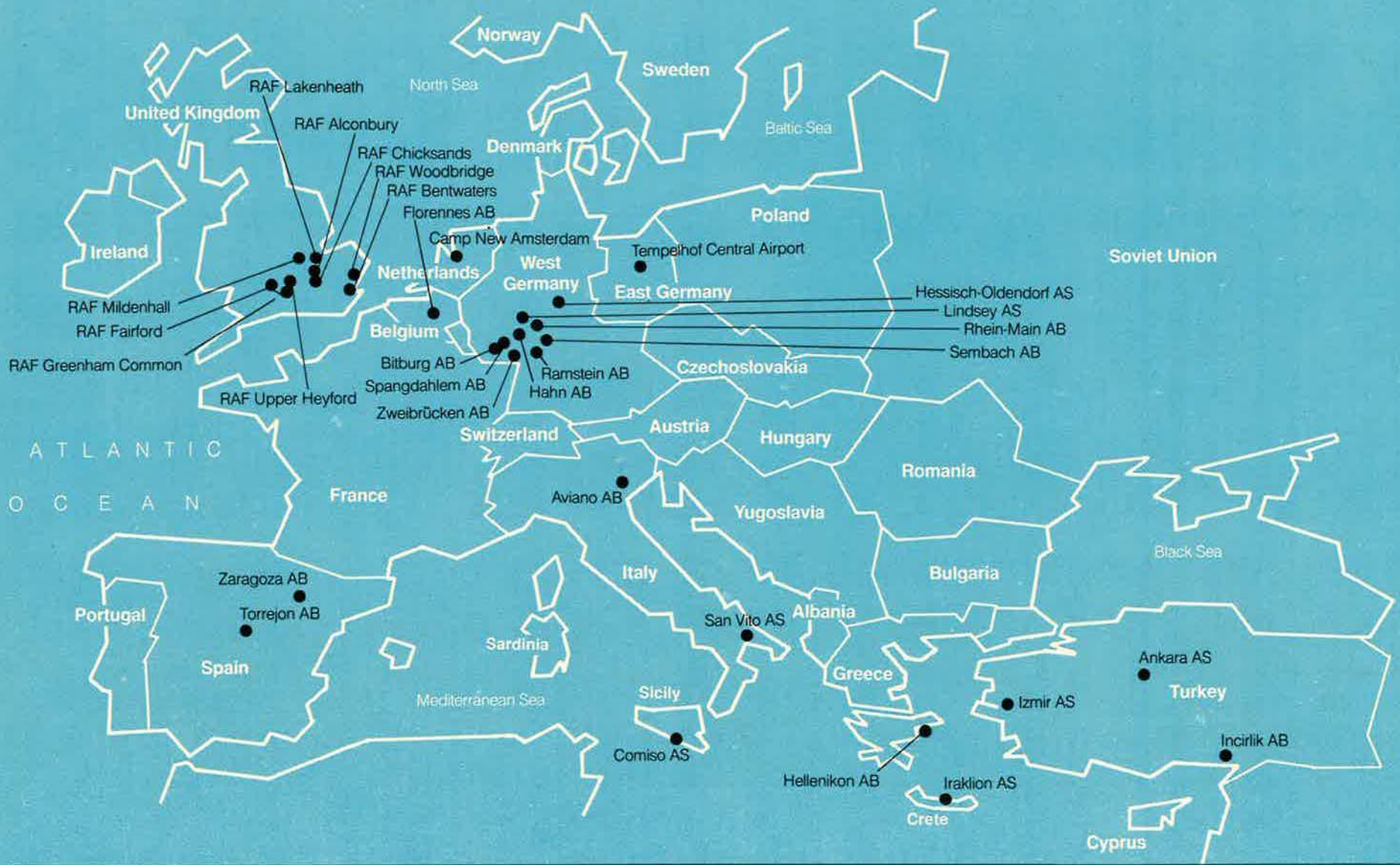
Keesler AFB, Miss. 39534-5000; located in Biloxi. Phone (601) 377-1110; AUTOVON 868-1110. ATC base. Hq. Keesler Technical Training Center (communications, electronics, avionics, radar systems, computer and command and control systems, personnel, and administrative courses); Keesler USAF Medical Center. Hosts MAC and AFRES weather reconnaissance units, TAC airborne command and control sqdn., AFCC installation gp.,

Guide to Air Force Stations

In addition to the major facilities in this Guide to Bases, USAF has a number of Air Force stations (AFS) throughout the US and overseas. These stations perform varied missions, including air defense and missile warning. Here is a listing of stations with state, ZIP code, and major command. Where a station can be reached by a general-purpose AUTOVON number, such a number (AV) is listed. If it can be reached by NORAD Tactical AUTOVON System (NTAS), the number (NTAS) is listed. Commercial telephone numbers (AC) are given for stations not having access to AUTOVON.

Albrook AFS, APO Miami 34002 (TAC) — AV 222-4012
Bellows AFS, Hawaii 96795-5000 (PACAF) — AC (808) 259-5941
Calumet AFS, Michigan 49913 (TAC) — NTAS 640-1301
Cape Canaveral AFS, Florida 32925-5000 (AFSC) — AV 467-1110
Cape Cod AFS, Massachusetts 02532-1419 (SPACECMD) — AV 557-2277
Cavalier AFS, North Dakota 28220-5000 (SPACECMD) — AV 330-3298
Clear AFS, APO Seattle 98704 (SPACECMD) — AV 317-585-6409
Cudjoe Key AFS, Florida 33039 (TAC) — AV 483-8452
Falcon AFS, Colorado 80912 (SPACECMD) — AV 692-7011
Fort Fisher AFS, North Carolina 28449 (TAC) — NTAS 652-2265
Galena Airport, APO Seattle 98723 (AAC) — AV 317-446-3311
Gentile AFS, Ohio 45401 (AFLC) — AV 850-5111
John Hay AS, APO San Francisco 96298-5000 (PACAF) — AV 822-1201
King Salmon Airport, APO Seattle 98713 (AAC) — AV 317-721-3550
Makah AFS, Washington 98357 (TAC) — NTAS 490-6343
Newark AFS, Ohio 43057-5000 (AFLC) — AV 580-1110
Oklahoma City AFS, Oklahoma 73145-5000 (AFLC) — AV 735-9011
Point Arena AFS, California 95468 (TAC) — NTAS 644-4316
Port Austin AFS, Michigan 48467 (TAC) — NTAS 779-3345
Sunnyvale AFS, California 94088-3430 (AFSC) — AV 359-3611
Wallace AS, APO San Francisco 96277-5000 (PACAF) — AV 822-1201

USAF's Principal Bases Overseas — Europe



AFCC NCO Academy/Leadership School. Base activated June 12, 1941; named for 2d Lt. Samuel R. Keesler, Jr., WW I aerial observer, killed in action Oct. 9, 1918, near Verdun, France. Area 3,600 acres. Altitude 26 ft. Military 11,690; civilians 3,096. Payroll $280 million. Housing: 363 officer; 1,594 NCO; 90 transient (399 VOQ and 658 VAQ units on space availability, tech training students occupy many units). 325-bed medical center.

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. Electronic Security Command; Air Force Electronic Warfare Center; Air Force Cryptologic Support Center; Joint Electronic Warfare Center; USAF Service Information and News Center; Air Force Commissary Service; 433d Tactical Airlift Wing (AFRES); 149th Tactical Fighter Gp. (ANG). Base activated May 7, 1917; named for Lt. George E. M. Kelly, first Army pilot to lose his life in a military aircraft, killed May 10, 1911. Area 3,992 acres. Altitude 689 ft. Military 4,358; civilians 18,938. Payroll $546 million. Housing: 46 officer; 368 NCO. Clinic.

Kirtland AFB, N. M. 87117; S of Albuquerque. Phone (505) 844-0011; AUTOVON 244-0011. MAC base. 1606th Air Base Wing. Major agencies and units include Air Force Contract Management Div. (AFSC); Air Force Operational Test and Evaluation Center; Air Force Weapons Laboratory (AFSC); Office of the Chief of Security Police; New Mexico ANG; 1550th Combat Crew Training Wing (MAC); Defense Nuclear Agency Field Command; Naval Weapons Evaluation Facility, Sandia Laboratories; Lovelace Biomedical and Environmental Research Institute; Department of Energy's Albuquerque Operations Office; AFSC NCO Academy; Air Force Directorate of Nuclear Surety; 150th Tactical Fighter Gp. (ANG); 1960th Information Systems Sqdn. (AFCC); 3098th Aviation Depot Sqdn.; Det. 1, 1369th Audiovisual Sqdn. These agencies furnish contract management; nuclear and laser research, development, and testing; operational test and evaluation services; advanced helicopter training; and HC-130 search and rescue training. Other major units are the Air Force Space Technology Center; AFLC Nuclear Support Office; Albuquerque Seismological Laboratory; Command Control Communications Countermeasures Joint Test Force; Univ. of New Mexico Civil Engineering Research Facility; Interservice Nuclear Weapons School. Base activated Jan. 1941; named for Col. Roy S. Kirtland, air pioneer and commandant of Langley Field in the 1930s, died May 2, 1941. Area 51,330 acres. Altitude 5,352 ft. Military 5,226; civilians 14,134. Payroll $730 million. Housing: 124 officer; 2,010 NCO; 380 transient (211 VOQ, 169 VAQ). Dispensary and 40-bed hospital.

K. I. Sawyer AFB, Mich. 49843; 20 mi. S of Marquette. Phone (906) 346-6511; AUTOVON 472-1110. SAC base. 410th Bomb Wing; 87th Fighter Interceptor Sqdn. (ADTAC); 2001st Information Systems Sqdn. (AFCC). Base activated in 1959; named for Kenneth I. Sawyer, who proposed site for county airport, died 1944. Area 5,278 acres. Altitude 1,220 ft. Military 4,169; civilians 452. Payroll $95.9 million. Housing: 263 officer; 1,430 NCO; 40 BOQ units; 244 transient (incl. 20 fully furnished efficiency apartments and 199 trailer spaces in housing area). 25-bed hospital.

Lackland AFB, Tex. 78236-5000; 8 mi. WSW of San Antonio. Phone (512) 671-1110; AUTOVON 473-1110. ATC base. Provides basic military training for active-duty, Air Guard, and Air Reserve airmen; technical training of basic and advanced security police/law enforcement personnel; patrol dog-handler courses; training of instructors, recruiters, and social actions/drug abuse counselors; USAF marksmanship training; Officer Training School; Defense Language Institute English Language Center; Wilford Hall USAF Medical Center (Air Force's largest medical center; also conducts education and clinical research); ATC NCO Academy; military training instructor reserve sqdn.; 539th Air Force Band; 3504th Recruiting Gp.; Det. 40, Air Logistics Center. Base activated in 1941; named for Brig. Gen. Frank D. Lackland, early commandant of Kelly Field flying school, died 1943. Area 6,783 acres, incl. 3,972 acres at Lackland Training Annex. Altitude 787 ft. Military 18,813; civilians 4,971. Payroll $395.5 million. Housing: 106 officer; 619 NCO; 946 transient. 1,000-bed medical center.

Langley AFB, Va. 23665; 3 mi. N of Hampton. Phone (804) 764-9990; AUTOVON 432-1110. TAC base. 1st Tactical Fighter Wing, F-15 fighter operations; Hq. Tactical Air Command; 5th Weather Wing (MAC); 2d Aircraft Delivery Gp. (TAC); 480th Reconnaissance Technical Gp. (TAC); US Army TRADOC Flight Det.; 48th Fighter Interceptor Sqdn. (TAC). Base activated Dec. 30, 1916; is the oldest continuously active AFB in the US; named for aviation pioneer and scientist Samuel Pierpont Langley, died 1906. NASA Langley Research Center is located across base. Area 3,500 acres. Altitude 10 ft. Military 9,188; civilians 2,616. Payroll $235.1 million. Housing: 384 officer; 1,259 NCO; 262 transient. USAF regional 80-bed hospital.

Laughlin AFB, Tex. 78843-5000; 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, B-17 pilot killed over Java, Jan. 29, 1942. Area 4,008 acres. Altitude 1,080 ft. Military 3,009; civilians 901. Payroll $78.2 million. Housing: 255 officer; 348 NCO; 37 transient, 22 temporary family lodging facilities. 15-bed hospital.

Laurence G. Hanscom AFB *(see Hanscom AFB).*

Little Rock AFB, Ark. 72099; 12 mi. NE of Little Rock. Phone (501) 988-3131; AUTOVON 731-1110. MAC base. 314th Tactical Airlift Wing, only C-130 training base in DoD, training crew members from all branches of service and some foreign countries; tenants include 308th Strategic Missile Wing—one of two Titan II missile wings in USAF; air refueling gp. (ANG); 2151st Information Systems Sqdn. (AFCC); 22d Air Force Leadership School. Base activated in 1955. Area 6,898 acres. Altitude 310 ft. Military 7,300; civilians 1,000. Payroll $159 million. Housing: 313 officer; 1,222 NCO; 387 transient (162 VAQ, 225 VOQ). 30-bed hospital.

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, as Limestone AFB; renamed for Maj. Charles J. Loring, Jr., F-80 pilot killed Nov. 22, 1952, in North Korea; posthumously awarded Medal of Honor. Area more than 9,000 acres. Altitude 746 ft. Military 3,612; civilians 867. Payroll $81.5 million. Housing: 288 officer; 1,560 NCO; 135 transient; 4 VIP. 20-bed hospital.

Los Angeles AFS, Calif. 90009; in metropolitan Los Angeles area, city of El Segundo, 3 mi. S of Los Angeles IAP. Phone (213) 643-1000; AUTOVON 833-1110. Headquarters of AFSC's Space Division, which manages the design, development, acquisition, and launch of DoD's space program. Support unit is 6592d Air Base Gp. Station activated Dec. 14, 1960. 24 tenant units on station; also provides support to 41 off-station units/activities. Military 1,502; civilians 1,205. Payroll $90.3 million. Area 96 acres at Los Angeles AFS and 96 acres at Fort MacArthur Annex. Altitude 95 ft. Housing at Fort MacArthur Annex in San Pedro: 200 townhomes for company-grade officers and NCOs, with 170 townhomes under construction for completion in September 1985; 33 senior and general officer houses; unaccompanied dormitories for 58 officers and 54 enlisted personnel. 18 TLF units. Clinic, commissary, and Air Force Family Support Center.

Lowry AFB, Colo. 80230-5000; on border between Denver and Aurora. Phone (303) 370-1110; AUTOVON 926-1110. ATC base. Technical Training Center; Air Force Accounting and Finance Center; Air Reserve Personnel Center; 3320th Correction and Rehabilitation Sqdn. Lowry Technical Training Center conducts training in avionics, space operations, munitions, air intelligence, logistics, and audiovisual fields. Base activated Oct. 1, 1937; named for 1st Lt. Francis B. Lowry, killed in action Sept. 26, 1918, near Crepion, France, while on a photo mission. Area 1,863 acres on base and 3,833-acre training annex 25 mi. E of Lowry. Altitude 5,400 ft. Military 8,942; civilians 5,452. Payroll $222.8 million. Housing: 95 officer; 772 enlisted; 40 transient. Clinic.

Luke AFB, Ariz. 85309; 20 mi. WNW of Phoenix. Phone (602) 856-7411; AUTOVON 853-1110. TAC base. 832d Air Div.; 405th Tactical Training Wing, F-15 operations; 58th Tactical Training Wing, F-16 operations; 302d Special Operations Sqdn. (AFRES). Luke, the largest fighter training base in the free world, conducts training of USAF aircrews in the F-15 and F-16 and foreign training in the F-5 (at nearby Williams AFB). Base activated in 1941; named for 2d Lt. Frank Luke, Jr., observation balloon-busting ace of WW I and first flyer to receive the Medal of Honor, killed in action Sept. 29, 1918, near Murvaux, France. Area 4,197 acres plus 2,700,000-acre range. Altitude 1,101 ft. Military 5,876; civilians 1,544. Payroll $144 million. Housing: 95 officer; 779 NCO; 40 transient. 105-bed hospital.

MacDill AFB, Fla. 33608; adjacent to Tampa city limits. Phone (813) 630-1110; AUTOVON 968-1110. TAC base. 56th Tactical Training Wing, F-16 operations; Hq. US Readiness Command; Hq. US Central Command, Joint Communications Support Element. 56th Tactical Training Wing conducts replacement training in the F-16. Base activated Apr. 15, 1941; named for Col. Leslie MacDill, killed in an aircraft accident Nov. 8, 1938, near Washington, D. C. Area 5,631 acres. Altitude 6 ft. Military 6,877; civilians 1,915. Payroll $183 million. Housing: 58 officer; 746 enlisted; 350 transient. 75-bed USAF regional hospital.

Malmstrom AFB, Mont. 59402; 1.5 mi. E of Great Falls. Phone (406) 731-9990; AUTOVON 632-1110. SAC base. 341st Strategic Missile Wing. Base activated Dec. 15, 1942; named for Col. Einar A. Malmstrom, WW II fighter commander killed in air accident Aug. 24, 1954. Site of SAC's first Minuteman wing. Area 3,573 acres plus about 23,000 sq. mi. of missile complex. Altitude 3,525 ft. Military 3,994; civilians 429. Payroll $87 million. Housing: 294 officer; 1,112 NCO; 107 transient. 29-bed hospital.

March AFB, Calif. 92518; 9 mi. SE of Riverside. Phone (714) 655-1110; AUTOVON 947-1110. SAC base. Hq. 15th Air Force, 22d Air Refueling Wing; 26th NORAD Region/Air Div. (TAC); 452d Air Refueling Wing (AFRES); 943d Tactical Airlift Gp.; 163d Tactical Fighter Gp. (ANG). Base activated Mar. 1, 1918; named for 2d Lt. Peyton C. March, Jr., who died in Texas, Feb. 18, 1918, of crash injuries. Area 7,117 acres. Altitude 1,530 ft. Military 4,037; civilians 1,196. Payroll $119 million. Housing: 103 officer; 608 NCO; 146 transient. 110-bed hospital.

Mather AFB, Calif. 95655-5000; 12 mi. ESE of Sacramento. Phone (916) 364-1110; AUTOVON 826-1110. ATC base. DoD executive manager for navigator training (USAF, Navy, Marine Corps basic navigation training). Only navigator training base; also trains USAF electronic warfare officers. 320th Bomb Wing (SAC); 940th Air Refueling Gp. (AFRES); 3506th Recruiting Gp. Base activated in 1918; named for 2d Lt. Carl S. Mather, killed in midair collision Jan. 30, 1918, in Texas. Area 5,800 acres. Altitude 96 ft. Military 5,130; civilians 1,220. Payroll $194.4 million. Housing: 451 officer; 820 NCO; 208 transient. 80-bed hospital.

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; Center for Aerospace Doctrine, Research, and Education; Leadership and Management Development Center; Squadron Officer School; Educational Development Center; Air Force Historical Research Center; Hq. Air Force ROTC; Hq. Civil Air Patrol-USAF; Community College of the Air Force; 908th Tactical Airlift Gp. (AFRES). (The Senior NCO Academy and Extension Course Institute are at Gunter AFS.) Base activated in 1918; named for 2d Lt. William C. Maxwell, killed in air accident Aug. 12, 1920, in the Philippines. Area 2,535 acres. Altitude 168 ft. Military 3,245; civilians 1,633. Payroll $193.5 million. Housing: 277 officer; 420 NCO; 1,106 transient (1,052 VOQ and 54 VAQ). 90-bed hospital.

McChord AFB, Wash. 98438-5000; 8 mi. S of Tacoma. Phone (206) 984-1910; AUTOVON 976-1110. MAC base. 62d Military Airlift Wing; 25th Air Div. (TAC); 318th Fighter Interceptor Sqdn. (TAC); Region Operations Control Center (NORAD); 446th Military Airlift Wing (AFRES Assoc.). Base activated May 5, 1938; named for Col. William C. McChord, killed Aug. 18, 1937, while attempting a forced landing at Maidens, Va. Area 4,609 acres. Altitude 322 ft. Military 5,784; civilians 2,029. Payroll $152 million. Housing: 111 officer; 882 NCO; 284 transient. Dispensary.

McClellan AFB, Calif. 95652; 9 mi. NE of Sacramento. Phone (916) 643-2111; AUTOVON 633-1110. AFLC base. Hq. Sacramento Air Logistics Center provides logistics management, procurement, maintenance, and distribution support for such USAF weapon systems as F-111, FB-111, A-10, EF-111; surveillance and warning systems, Space Transportation System, communication-electronics equipment, radar sites, and generators; maintenance support for F-4 and F-106 aircraft. Associate units include 41st Rescue and Weather Reconnaissance Wing (MAC); 2049th Communications Gp. and 1849th Electronics Installations Sqdn. (AFCC); 1155th Technical Operations Sqdn. (AFSC); 431st Fighter Weapons Sqdn. (TAC); Hq. 4th Air Force (AFRES); Defense Logistics Agency; US Coast Guard Air Station, Sacramento (DOT). Named for Maj. Hezekiah McClellan, pioneer in Arctic aeronautical experiments, killed in crash May 25, 1936. Area 2,625 acres. Altitude 76 ft. Military 3,932; civilians 14,296. Payroll $481.4 million. Housing: 132 officer; 343 NCO; 21 transient. Clinic.

McConnell AFB, Kan. 67221; 5 mi. SE of Wichita. Phone (316) 681-6100; AUTOVON 743-1110. SAC base. 381st Strategic Missile Wing; 384th Air Refueling Wing; 184th Tactical Fighter Gp. (ANG). Base activated June 5, 1951; named for Capt. Fred J. McConnell, WW II B-24 pilot who died in crash of a private plane Oct. 25, 1945; and for his brother, 2d Lt. Thomas L. McConnell, also a WW II B-24 pilot, killed July 10, 1943, during attack on Bougainville in the Pacific. Area 3,066 acres. Altitude 1,371 ft. Military 3,722; civilians 1,293. Payroll $87.5 million. Housing: 149 officer; 440 NCO; 141 transient. 15-bed hospital.

McGuire AFB, N. J. 08641-5000; 18 mi. SE of Trenton. Phone (609) 724-1110; AUTOVON 440-0111. MAC base. 438th Military Airlift Wing; Hq. 21st Air Force; NJANG; N. J. Civil Air Patrol; 170th Air Refueling Gp. (ANG); 108th Tactical Fighter Wing (ANG); 514th Military Airlift Wing (AFRES Assoc.); the MAC NCO Academy East; Air Force Band of the East. Base adjoins Army's Fort Dix; formerly Fort Dix Army Air Base. Activated as AFB in 1949; named for Maj. Thomas B. McGuire, Jr., P-38 pilot, second leading US ace of WW II, recipient of Medal of Honor, killed in action Jan. 7, 1945, in the Philippines. Area 3,552 acres. Altitude 133 ft. Military 4,767; civilians 2,020. Payroll


Atlantic
Thule AB
Greenland
Sondrestrom AB
Iceland
Keflavik NS
ATLANTIC
OCEAN
Newfoundland
Lajes Field
Azores
Pacific
China
North Korea
Sea of Japan
Misawa AB
Yellow Sea
Osan AB
Suwon AB
South Korea
Kunsan AB
Taegu AB
Yokota AB
Kwangju AB
Japan
East China Sea
Okinawa
Kadena AB
Bonin Islands
Formosa Strait
Taiwan
PACIFIC
OCEAN
Mariana Islands
Clark AB
Philippines
Guam
Andersen AFB
Central America
Atlantic Ocean
Cuba
Mexico
Caribbean Sea
Pacific Ocean
Howard AFB
Panama

$99.7 million. Housing: 194 officer; 1,560 NCO; 620 transient (186 VOQ, 244 VAQ, 160 transient family units, 30 transient). Dispensary and 150-bed hospital at Fort Dix.

Minot AFB, N. D. 58705; 13 mi. N of Minot. Phone (701) 727-4761; AUTOVON 344-1110. SAC base. 57th Air Div.; 91st Strategic Missile Wing; 5th Bomb Wing; 5th Fighter Interceptor Sqdn. (TAC). Base activated Feb. 1957. Area 5,050 acres plus additional 19,324 acres for missile sites. Altitude 1,650 ft. Military 6,100; civilians 529. Payroll $135.5 million. Housing: 543 officer; 1,927 NCO; 104 transient. Dispensary; also 40-bed military hospital in city of Minot.

Moody AFB, Ga. 31699; 10 mi. NNE of Valdosta. Phone (912) 333-4211; AUTOVON 460-1110. TAC base. 347th Tactical Fighter Wing, F-4E fighter operations. Base activated June 1941; named for Maj. George P. Moody, killed May 5, 1941, while test-flying Beech AT-10. Area 6,050 acres. Altitude 233 ft. Military 3,350; civilians 484. Payroll $64.9 million. Housing: 38 officer; 220 NCO; 54 transient. 25-bed hospital.

Mountain Home AFB, Idaho 83648; 56 mi. SE of Boise. Phone (208) 828-2111; AUTOVON 657-1110. TAC base. 366th Tactical Fighter Wing, F-111A fighter and EF-111A electronic countermeasures operations. 2036th Information Systems Sqdn. (AFCC); 513th Field Training Det. (ATC); Det. 22, 40th Aerospace Rescue and Recovery Sqdn. (MAC); OL/AF 4444th Operations Sqdn.; Det. 2, USAF Fighter Weapons School; Det. 3, Tactical Air Warfare Center; AFOSI Det. 2007; Det. 454, Air Force Audit Agency; Det. 11, 4400th Management Engineering Sqdn.; Det. 18, 25th Weather Sqdn. Base activated Apr. 1942. Area 6,639 acres. Altitude 3,000 ft. Military 3,906; civilians 506. Payroll $78 million. Housing: 152 officer; 1,370 NCO; 121 transient. 20-bed hospital.

Myrtle Beach AFB, S. C. 29579; in south Myrtle Beach. Phone (803) 238-7211; AUTOVON 748-1110. TAC base; shares runway with Myrtle Beach Jetport. 354th Tactical Fighter Wing, A-10 fighter operations. Served as Army air base, 1941–47; USAF base since 1956. Area 3,793 acres. Altitude 25 ft. Military 3,450; civilians 455. Payroll $80.7 million. Housing: 116 officer; 682 NCO; 65 trailer lots; 116 transient. 20-bed hospital.

Nellis AFB, Nev. 89191; 8 mi. NE of Las Vegas. Phone (702) 643-1800; AUTOVON 682-1800. TAC base. Tactical Fighter Weapons Center, F-4E, F-5E, F-15, F-16, F-111, A-10, T-38, and UH-1N operations; 57th Fighter Weapons Wing, F-5E Aggressor operations; Thunderbirds Air Demonstration Sqdn.; 4440th Tactical Fighter Training Gp. (Red Flag); 554th Operations Support Wing; 554th Range Gp.; 474th Tactical Fighter Wing, F-16 operations; 4450th Tactical Training Gp.; 820th Civil Engineering Sqdn. (Red Horse); 3096th Aviation Depot Sqdn.; 2069th Information Systems Sqdn. Base activated July 1941; named for 1st Lt. William H. Nellis, WW II P-47 fighter pilot, killed Dec. 27, 1944, in Europe. Area 11,274 acres with ranges totaling 3,012,770 acres. Altitude 2,171 ft. Military 10,770; civilians 1,057. Payroll $239 million. Housing: 125 officer; 1,236 NCO; 100 trailer spaces; 495 transient. 40-bed hospital.

Norton AFB, Calif. 92409; 59 mi. E of Los Angeles, within San Bernardino corporate limits. Phone (714) 382-1110; AUTOVON 876-1110. MAC base. 63d Military Airlift Wing; Hq. Air Force Inspection and Safety Center; Hq. Defense Audiovisual Agency; Hq. Air Force Audit Agency; Hq. Aerospace Audiovisual Service (MAC). Also Ballistic Missile Office (AFSC); 445th Military Airlift Wing (AFRES Assoc.); MAC NCO Academy West and 22d Air Force NCO Leadership School. Base activated Mar. 2, 1942; named for Capt. Leland F. Norton, native of San Bernardino, WW II A-20 attack bomber pilot, killed in action May 27, 1944, near Amiens, France. Area 2,430 acres. Altitude 1,156 ft. Military 5,406; civilians 2,898. Payroll $208 million. Housing: 56 officer; 208 NCO; 339 transient. Clinic.

Offutt AFB, Neb. 68113; 8 mi. S of Omaha. Phone (402) 294-1110; AUTOVON 271-1110. SAC base. Hq. Strategic Air Command; 55th Strategic Reconnaissance Wing; 544th Strategic Intelligence Wing; Air Force Global Weather Central (MAC); 3d Weather Wing (MAC); 3902d Air Base Wing; Hq. Strategic Information Systems Div. (AFCC); 1st Aerospace Information Systems Wing (AFCC); 1000th Satellite Operations Gp. (SPACECMD); 6949th Electronic Security Sqdn. (ESC); 702d Air Force Band. Base activated in 1896 as Army's Fort Crook; landing field named in 1924 for 1st Lt. Jarvis J. Offutt, WW I pilot, died Aug. 13, 1918, from injuries received at Valheureux, France. Area 1,914 acres. Altitude 1,048 ft. Military 12,204; civilians 3,072 (incl. 462 contractor personnel). Payroll $319 million. Housing: 511 officer; 2,169 NCO; 60 transient. 90-bed hospital.

Patrick AFB, Fla. 32925; 2 mi. S of Cocoa Beach. Phone (305) 494-1110; AUTOVON 854-1110. AFSC base. Operated by the Eastern Space and Missile Center in support of DoD, NASA, and other agency missile and space programs. Major tenants are Equal Opportunity Management Institute; Air Force Technical Applications Center; 549th Tactical Air Support Gp.; 2d Combat Information Systems Gp. (AFCC). Activated in 1940, base is airhead for Cape Canaveral AFS. CCAFS has supported more than 2,300 launches since 1950. Named for Maj. Gen. Mason M. Patrick, chief of AEF's Air Service in WW I and chief of the Air Service/Air Corps, 1921–27. Area 2,341 acres. Altitude 9 ft. Military 3,491; civilians 1,667. Payroll $133.5 million. Housing: 168 officer; 1,408 NCO. 20-bed hospital.

Pease AFB, N. H. 03803; 3 mi. W of Portsmouth. Phone (603) 430-0100; AUTOVON 852-1110. SAC base. 45th Air Div.; 509th Bomb Wing (FB-111 medium bomber and KC-135 tanker operations); 541st Air Force Band; 1916th Information Systems Sqdn. (AFCC); 3519th USAF Recruiting Sqdn. (ATC); 157th Air Refueling Gp. (ANG). Base activated in 1956; named for Capt. Harl Pease, Jr., WW II B-17 pilot and Medal of Honor recipient, killed Aug. 7, 1942, during attack on Rabaul, New Britain Island. Area 4,254 acres. Altitude 101 ft. Military 3,641; civilians 464. Payroll $87.7 million. Housing: 129 officer; 1,082 NCO (incl. 50 trailer spaces); 126 transient (incl. 43 VOQ, 55 VAQ, 28 TLF). 70-bed hospital.

Peterson AFB, Colo. 80914-5001; 7 mi. E of Colorado Springs. Phone (303) 554-7321; AUTOVON 692-7011. SPACECMD base. Host unit is 1st Space Wing (SPACECMD). Hq. Space Command; Hq. North American Aerospace Defense Command; NORAD Cheyenne Mountain Complex in Cheyenne Mountain; Hq. Aerospace Defense Command; 302d Tactical Airlift Wing (AFRES). Base activated in 1942; named for 1st Lt. Edward J. Peterson, killed Aug. 8, 1942, in aircraft crash at the base. Area 1,176 acres. Altitude 6,200 ft. Military 3,917; civilians 1,389. Payroll $123 million. Housing: 106 officer; 384 NCO; 40 transient. Clinic.

Plattsburgh AFB, N. Y. 12903; adjacent to Plattsburgh, N. Y. Phone (518) 565-5000; AUTOVON 689-5000. SAC base. 380th Bomb Wing, medium bomber and tanker operations with FB-111 and KC-135. 4007th Combat Crew Training Sqdn. trains all FB-111 combat crews for SAC. Det. 18, 40th Aerospace Rescue and Recovery Sqdn. (MAC); 71st Flying Training Wing (ATC); 2042d Information Systems Sqdn. (AFCC); 210th Field Training Detachment. Second oldest active military installation in the US, established 1814; AFB since 1955. Area 3,388 acres. Altitude 235 ft. Military 4,029; civilians 671. Payroll $77 million. Housing: 230 officer; 1,412 NCO. 20-bed hospital.

Pope AFB, N. C. 28308-5000; 12 mi. NNW of Fayetteville. Phone (919) 394-0001; AUTOVON 486-1110. MAC base. USAF Airlift Center; 317th Tactical Airlift Wing; 1st Aeromedical Evacuation Sqdn.; 1721st Combat Control Sqdn.; 1943d Information Services Sqdn. (AFCC); 53d Mobile Aerial Port Sqdn. (AFRES). Base adjoins Army's Fort Bragg and provides intratheater airlift support for airborne forces and other personnel, equipment, and supplies. Base activated in 1919; named for 1st Lt. Harley H. Pope, WW I flyer, killed Jan. 6, 1919, when his JN-4 "Jenny" ran out of fuel and crashed near Fayetteville. Area 1,750 acres. Altitude 218 ft. Military 3,672; civilians 666. Payroll $97.8 million. Housing: 89 officer; 370 NCO; 216 transient. Clinic.

Randolph AFB, Tex. 78150-5001; 20 mi. ENE of San Antonio. Phone (512) 652-1110; AUTOVON 487-1110. ATC base. 12th Flying Training Wing, T-37 and T-38 pilot instructor training. Major tenants are Hq. Air Training Command; Air Force Manpower and Personnel Center; Occupational Measurement Center; Office of Civilian Personnel Operations; Hq. USAF Recruiting Service. Base activated June 1930; named for Capt. William M. Randolph, killed Feb. 17, 1928, when his AT-4 crashed on takeoff at Gorman, Tex. Area 2,901 acres. Altitude 761 ft. Military 5,635; civilians 2,509. Payroll $228 million. Housing: 186 officer; 833 NCO; 150 transient. Clinic.

Reese AFB, Tex. 79489-5000; 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., P-38 fighter pilot killed in Sardinia, May 14, 1943. Area 2,467 acres. Altitude 3,336 ft. Military 2,650; civilians 580. Payroll $73.3 million. Housing: 112 officer; 296 NCO; 63 transient. 15-bed hospital.

Robins AFB, Ga. 31098; at Warner Robins; 18 mi. SSE of Macon. Phone (912) 926-1110; AUTOVON 468-1110. AFLC base. Hq. Warner Robins Air Logistics Center; Hq. Air Force Reserve (AFRES); 2853d Air Base Gp.; 19th Air Refueling Wing (SAC); 5th Combat Information Systems Gp. (AFCC); 3503d Recruiting Gp.; 1926th Communications Sqdn. (AFCC). Base activated Mar. 1942; named for Brig. Gen. Augustine Warner Robins, an early Chief of the Materiel Division of the Air Corps, died June 16, 1940. Area 8,863 acres. Altitude 294 ft. Military 3,873; civilians 16,170. Payroll $524 million. Housing: 225 officer; 1,171 NCO; 40 TLF, 150 VOQ, 120 VAQ; 100 trailer spaces. 30-bed hospital.

Sawyer AFB *(see K. I. Sawyer AFB).*

Scott AFB, Ill. 62225-5000; 6 mi. ENE of Belleville. Phone (618) 256-1110; AUTOVON 638-1110. MAC base. 375th Aeromedical Airlift Wing; Hq. Military Airlift Command; Hq. Air Force Communications Command; Hq. 23d Air Force; Hq. Aerospace Rescue and Recovery Service; Hq. Air Weather Service. Also, Defense Commercial Communications Office; Environmental Technical Applications Center; USAF Medical Center, Scott; 7th Weather Wing; 932d Aeromedical Airlift Gp. (AFRES Assoc.); Airlift Information Systems Div.; 375th Air Base Gp. Base activated June 14, 1917; named for Cpl. Frank S. Scott, first enlisted man to die in an air accident, killed Sept. 28, 1912, at College Park, Md. Area 3,000 acres. Altitude 453 ft. Military 6,823; civilians 4,089. Payroll $310.1 million. Housing: 393 officer; 1,386 NCO, 17 government trailers for airman housing, plus 105 spaces for privately owned trailers; 300 transient. 170-bed hospital; 98-bed aeromedical staging facility.

Seymour Johnson AFB, N. C. 27531; adjacent to Goldsboro. Phone (919) 736-0000; AUTOVON 488-1110. TAC base. 4th Tactical Fighter Wing, F-4E fighter operations; 68th Air Refueling Gp. (SAC); 2012th Information Systems Sqdn. (AFCC). Base activated June 12, 1942; named for Navy Lt. Seymour A. Johnson, Goldsboro native, killed Mar. 5, 1941, in an aircraft accident in Maryland. Area 4,122 acres. Altitude 109 ft. Military 5,485; civilians 773. Payroll $118 million. Housing: 217 officer; 1,483 enlisted; 149 transient. 30-bed hospital.

Shaw AFB, S. C. 29152; 10 mi. WNW of Sumter. Phone (803) 668-8110; AUTOVON 965-1110. TAC base. 363d Tactical Fighter Wing, F-16 fighter and RF-4C reconnaissance operations; Hq. 9th Air Force (TAC); 507th Tactical Air Control Wing, manages 407L/485L tactical air control systems. Base activated Aug. 30, 1941; named for 2d Lt. Ervin D. Shaw, one of the first Americans to see air action in WW I, killed in action in France on July 9, 1918, when his Bristol fighter was shot down during a reconnaissance mission. Area 3,567 acres; supports another 8,078 acres. Altitude 244 ft. Military 6,125; civilians 1,666. Payroll $88 million. Housing: 389 officer; 1,315 NCO; 189 transient. 40-bed hospital.

Shemya AFB, Alaska (APO Seattle 98736); located at western tip of the Aleutian Islands chain, midway between Anchorage, Alaska, and Tokyo, Japan. Phone (907) 392-3000; AUTOVON (317) 392-3000. 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 the local date is the same as elsewhere in the US. Island area about 11.25 sq. mi. Altitude 270 ft. Military 581; civilian contract employees 399. Payroll $7.5 million. Housing: 70 transient. Dispensary.

Sheppard AFB, Tex. 76311-5000; 4 mi. N of Wichita Falls. Phone (817) 851-2511; AUTOVON 736-1001. ATC base. Sheppard Technical Training Center provides resident courses in aircraft maintenance, civil engineering, communications, comptroller, transportation, and instructor training. The 3785th Field Training Wing provides specialized and advanced training at 76 field training detachments and 20 operating locations worldwide. The School of Health Care Sciences provides training in medicine, dentistry, nursing, biomedical sciences, medical readiness, and health services administration. The 80th Flying Training Wing conducts undergraduate pilot training and instructor training for the Euro-NATO Joint Jet Pilot Training Program. The wing trains allied fighter pilots for 12 NATO countries. Base activated June 14, 1941; named for Morris E. Sheppard, US Senator from Texas, died 1941. Area 5,000 acres. Altitude 1,015 ft. Military 7,954; civilians 1,477. Payroll $195 million. Housing: 200 officer; 1,087 NCO. 150-bed regional hospital.

Tinker AFB, Okla. 73145; 8 mi. SE of Oklahoma City. Phone (405) 734-7321; AUTOVON 735-1110. AFLC base. Hq. Oklahoma City Air Logistics Center, furnishes logistic support for bombers, jet engines, instruments, and electronics. Electronics Installation Center; 3d Combat Communications Gp.; 552d Airborne Warning and Control Wing (TAC); 507th Tactical Fighter Gp. (AFRES). Base activated Mar. 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 retreating enemy ships. Area 4,277 acres. Altitude 1,291 ft. Military 7,227; civilians 17,954. Payroll $579 million. Housing: 108 officer; 395 NCO with 108 under construction. 30-bed hospital.

Travis AFB, Calif. 94535-5000; at Fairfield, 50 mi. NE of San Francisco. Phone (707) 438-4011; AUTOVON 837-1110. MAC base. Hq. 22d Air Force; 60th Military Airlift Wing; 349th Military Airlift Wing (AFRES Assoc.); 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 7,580 acres. Altitude 62 ft. Military 12,318; civilians 3,389. Payroll $336.5 million. Housing: 241 officer; 1,926 NCO; 584 transient (incl. 40 TLQ, 204 VOQ, 188 VAQ, 83 Aerial Port quarters with cooking facilities, 69 Aerial Port quarters without). 290-bed hospital.

Tyndall AFB, Fla. 32403; 13 mi. E of Panama City. Phone (904) 283-1113; AUTOVON 970-1110. TAC base. USAF Air Defense Weapons Center; primary units are the 325th

Tactical Training Wing, 475th Weapons Evaluation Gp., and 325th Combat Support Gp. Provides DoD a centralized location for operational and technical advice on air defense concepts and tactics and combat readiness training for tactical and strategic air defense aircrews and weapons controllers. Single-point management for all continental USAF subscale and full-scale drone aerial target operations. TAC units include 23d North American Aerospace Defense Command Region/23d Air Div., home of Southeast Region Operations Control Center. Tenants include Air Force Engineering and Services Center; 3625th Technical Training Sqdn. (ATC); 2021st Information Systems Sqdn. (AFCC); TAC NCO Academy East. Base activated Dec. 7, 1941; named for 1st Lt. Frank B. Tyndall, WW I fighter pilot, killed July 15, 1930, in crash of P-1 near Mooresville, N. C. Area 28,000 acres. Altitude 18 ft. Military 4,450; civilians 1,900. Payroll $123 million. Housing: 139 officer; 814 NCO. 50-bed hospital.

US Air Force Academy, Colo. 80840; 10 mi. N of Colorado Springs. Phone (303) 472-3110; AUTOVON 259-3110. Direct reporting unit, activated Apr. 1, 1954, at Lowry AFB, Colo. Moved to permanent location Aug. 1958. Tenant units include 1876th Communications Sqdn.; Frank J. Seiler Research Lab (AFSC); DoD Medical Exam Review Board; Det. 470, Air Force Audit Agency; 557th Flying Training Sqdn.; 94th Air Training Sqdn. Area 18,000 acres. Altitude 7,280 ft. Military 2,472; civilians 1,803. Payroll $166.5 million. Housing: 452 officer; 779 NCO; 80 transient; 28 temporary family quarters. 85-bed hospital.

Vance AFB, Okla. 73705-5000; 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., native of Enid, 1939 West Point graduate, Medal of Honor recipient, killed July 26, 1944, when the air-evac plane returning him to the US went down in the Atlantic near Iceland. Area 1,811 acres. Altitude 1,307 ft. Military 1,300; civilians 1,300. Payroll $68 million. Housing: 139 officer; 134 NCO; 39 transient, 10 TLF. Clinic.

Vandenberg AFB, Calif. 93437; 8 mi. NNW of Lompoc. Phone (805) 866-1611; AUTOVON 276-1110. SAC base. Site of 1st Strategic Aerospace Div. (SAC); Space and Missile Test Organization (AFSC); Western Space and Missile Center (AFSC); Shuttle Activation Task Force (AFSC). Host command conducts missile crew training and provides facilities and support for operational ICBM tests. Vandenberg is the only base that launches operational ballistic missiles in the SAC deterrent force. WSMC is responsible for conducting R&D testing of USAF space and ballistic missile programs and unmanned polar-orbiting space operations of DoD, USAF, and NASA. This includes development, testing, and evaluation of the Peacekeeper and the Space Transportation System. Peacekeeper testing began in June 1983, and a total of 20 test launches is scheduled through 1986. Shuttle Activation Task Force (SATAF) is responsible for facility construction, equipment installation, and validation for future Vandenberg Space Shuttle launches beginning in early 1986. More than 1,560 launches have taken place from Vandenberg since Dec. 1958. Originally Army's Camp Cooke. Activated Oct. 1941. Base taken over by USAF June 7, 1957; renamed for Gen. Hoyt S. Vandenberg, USAF's second Chief of Staff. Area 98,400 acres. Altitude 400 ft. Military 4,129; civilians 2,441; civilian contractors 8,037. Payroll $376.8 million. Housing: 511 officer; 1,567 NCO; 172 mobile trailer spaces; 500 transient. 45-bed hospital.

Warren AFB *(see Francis E. Warren AFB).*

Wheeler AFB, Hawaii 96854-5000; near center of the island of Oahu, adjacent to the Army's Schofield Barracks. Phone (808) 422-0531; AUTOVON 430-0111. PACAF base. Host unit 15th Air Base Sqdn. 326th Air Div. (Air Defense Control Center); 22d Tactical Airlift Support Sqdn., a subordinate unit, and 169th Aircraft Warning and Control Sqdn. (Hawaii Air National Guard—Air Defense Direction Center); US Army aviation units from Schofield Barracks; 6924th Electronic Security Sqdn.; several other associate units. Base activated Feb. 1922; named for Maj. Sheldon H. Wheeler, CO of Luke Field, Hawaii, in 1919; killed there July 13, 1921, when his biplane crashed during an aerial exhibition. Area 1,369 acres. Altitude 845 ft. Military 1,337; civilians 114. Payroll included in entry for Hickam AFB. Housing: 102 officer; 390 NCO. Dispensary.

Whiteman AFB, Mo. 65305; 1.5 mi. S of Knob Noster. Phone (816) 687-1110; AUTOVON 975-1110. SAC base. 351st Strategic Missile Wing. Base activated in 1942; named for 2d Lt. George A. Whiteman, shot down while taking off in a fighter from Wheeler Field, Hawaii, on Dec. 7, 1941—the first Army Air Forces airman to be shot down in WW II. Area 3,384 acres plus missile complex of about 10,000 sq. mi. Altitude 869 ft. Military 2,976; civilians 407. Payroll $67 million. Housing: 200 officer; 792 NCO; 59 transient (incl. 4 guest houses and 55 VAQ). 25-bed hospital.

Williams AFB, Ariz. 85240-5000; 14 mi. SE of Mesa. Phone (602) 988-2611; AUTOVON 474-1001. ATC base. 82d Flying Training Wing, largest undergraduate pilot training base; also provides F-5 combat crew training for foreign students via the 425th Tactical Fighter Training Sqdn. Home of AFSC Human Resources Lab/Flying Training Div., doing extensive research on flight simulators. Base activated July 1941; named for 1st Lt. Charles D. Williams, killed in bomber crash near Fort De Russy, Hawaii, July 6, 1927. Area 4,762 acres. Altitude 1,385 ft. Military 3,450; civilians 1,050. Payroll $90 million. Housing: 300 officer; 410 NCO; 40 transient. 30-bed hospital.

Wright-Patterson AFB, Ohio 45433; 10 mi. ENE of Dayton. Phone (513) 257-1110; AUTOVON 787-1110. AFLC base. Hq. Air Force Logistics Command; Hq. Aeronautical Systems Div. (AFSC); 4950th Test Wing (AFSC); Foreign Technology Div. (AFSC); Air Force Institute of Technology; USAF Medical Center, Wright-Patterson; US Air Force Museum; Air Force Acquisition Logistics Center; Logistics Operations Center; Logistics Management Systems Center; AFLC International Logistics Center; 2750th Air Base Wing (AFLC); 906th Tactical Fighter Gp. (AFRES); more than 78 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 in Area C of present base. Area 8,174 acres. Altitude 824 ft. Military 9,000; civilians 17,000; contracted service and contractor employees 6,000. Payroll $755 million. Housing: 1,090 officer; 1,260 NCO; 40 transient. 285-bed hospital.

Wurtsmith AFB, Mich. 48753; 3 mi. NW of Oscoda. Phone (517) 739-2011; AUTOVON 623-1110. SAC base. 40th Air Div.; 379th Bomb Wing. Base activated in 1924 as Camp Skeel, gunnery camp for Selfridge Field; became Oscoda Army Air Field during WW II; renamed in 1953 for Maj. Gen. Paul B. Wurtsmith, killed Sept. 13, 1946, in a B-25 crash near Asheville, N. C. Base assigned to SAC Apr. 1, 1960. Area 5,213 acres. Altitude 634 ft. Military 3,308; civilians 697. Payroll $85.2 million. Housing: 197 officer; 1,144 NCO; 30 transient. 20-bed hospital. ■

Guide to ANG and AFRES Bases

NOTE: This section of the Guide consolidates major Air National Guard (ANG) and Air Force Reserve (AFRES) bases into a single listing. Most ANG locations are listed alphabetically, according to the city where they are located. AFRES units are listed by the names of their bases and are designated as AFRES facilities. There are, in addition, some ANG and AFRES units that are located on active-duty bases. These may be found in the main "Guide to Bases" section, elsewhere in this issue.

Anchorage, Alaska (Kulis ANG Base at Anchorage IAP) 99502. Phone (907) 243-1145; AUTOVON (317) 626-1444. 176th Tactical Airlift Gp. (ANG). 144th Tactical Airlift Sqdn. (ANG). Named for Lt. Albert Kulis, killed in training flight in 1954. Area 101 acres. Altitude 124 ft. Military 839, technicians 239. Payroll $11.2 million. 6-bed hospital.

Atlanta, Ga. (McCollum Airport, Kennesaw, Ga.) 30144; 27 mi. N of Atlanta, 10 mi. from Dobbins AFB. Phone (404) 422-2500; AUTOVON 925-2474. 129th Tactical Control Sqdn. Area 13 acres. Altitude 1,060 ft. Military 328, technicians 45. Payroll through Dobbins AFB.

Atlantic City Airport, N. J. (Federal Aviation Administration Technical Center) 08405-5000; 10 mi. W of Atlantic City. Phone (609) 645-6000; AUTOVON 445-6000. 177th Fighter Interceptor Gp. (ANG). Area 123 acres. Altitude 76 ft. Military 986, technicians 328. Payroll $11.8 million.

Baltimore, Md. (Glenn L. Martin State Airport) 21220-2899; 8 mi. E of Baltimore. Phone (301) 687-6270; AUTOVON 235-9210. 175th Tactical Fighter Gp. (ANG); 135th Tactical Airlift Gp. (ANG). Area 75 acres. Altitude 89 ft. Military 1,764, technicians 455. Payroll $17.0 million. Clinic.

Bangor ANG Base, Me. 04401-4393; 4 mi. NW of Bangor. Phone (207) 947-0571; AUTOVON 476-6210. 101st Air Refueling Wg. (ANG). Area 314 acres. Altitude 192 ft. Military 970, technicians 297. Payroll $13.8 million. Small BX-Foodland.

Battle Creek ANG Base, Mich. 49015-1291; located adjacent to W. K. Kellogg Airport. Phone (616) 963-1596; AUTOVON 580-3210. 110th Tactical Air Support Gp. (ANG). Area 241 acres. Altitude 941 ft. Military 934, technicians 229. Payroll $10.5 million.

Birmingham Municipal Airport, Ala. (Smith ANG Base) 35217. Phone (205) 599-9200; AUTOVON 694-2260. 117th Tactical Recon Wg. (ANG). ANG base named for Col. Sumpter Smith, who played an important part in promoting the development of Birmingham's airport. Area 86 acres. Altitude 650 ft. Military 1,305, technicians 362. Payroll $15.5 million.

Boise Air Terminal, Idaho (Gowen Field) 83707; 6 mi. S of Boise. Phone (208) 385-5011; AUTOVON 941-5011. 124th Tactical Recon Gp. (ANG). Also host to ARNG (Army field training site) and Marine Corps Reserve. Airport named for Lt. Paul R. Gowen, killed in B-10 crash in Panama, July 11, 1938. Area 2,600 acres (467 acres military). Altitude 2,858 ft. Military 1,384, technicians 477. Payroll $16.2 million. Limited transient facilities available during Army Guard camps.

Buckley ANG Base, Colo. 80011; 8 mi. E of Denver. Phone (303) 366-5363; AUTOVON 877-9011. 140th Tactical Fighter Wg. (ANG), 154th Tactical Control Gp., and Hq. Colorado ANG. Also host to Navy Reserve, Marine Corps Reserve, ARNG, and Air Force units. Base activated Apr. 1, 1942, and used as a gunnery training facility. ANG assumed control from US Navy in 1959. Named for Lt. John H. Buckley, National Guardsman, killed in the Argonne, France, Sept. 27, 1918. Area 3,262 acres. Altitude 5,663 ft. Military 1,224, technicians 351. Payroll $20.3 million. Dispensary.

Burlington, Vt. (Burlington International Airport) 05401; 3 mi. E of Burlington. Phone (802) 658-0770; AUTOVON 689-4310. 158th Tactical Fighter Gp. (ANG). Area 326 acres. Altitude 371 ft. Military 975, technicians 308. Payroll $10.9 million.

Charleston, W. Va. (Kanawha Airport) 25311-5000; 4 mi. NE of Charleston. Phone (304) 357-5100; AUTOVON 366-9210. 130th Tactical Airlift Gp. (ANG). Area 56 acres. Altitude 981 ft. Military 973, technicians 241. Payroll $9.8 million. Dispensary, clinic.

Charlotte, N. C. (Charlotte/Douglas Municipal Airport) 28208. Phone (704) 399-6363; AUTOVON 583-9210. 145th Tactical Airlift Gp. (ANG). Area 69 acres. Altitude 749 ft. Military 1,102, technicians 255. Payroll $11.8 million. Clinic.

Cheyenne, Wyo. (Cheyenne Municipal Airport) 82001. Phone (307) 772-6201; AUTOVON 943-6201. 153d Tactical Airlift Gp. (ANG). Area 46 acres. Altitude 6,156 ft. Military 921, technicians 240. Payroll $9.5 million.

Dallas Naval Air Station, Tex. (Hensley Field) 75211. Phone (214) 266-6111; AUTOVON 874-6111. 136th Tactical Airlift Wg. (ANG). Area 49 acres. Altitude 495 ft. Military 1,021, technicians 253. Payroll $11.0 million.

Des Moines Municipal Airport, Iowa 50321; in city of Des Moines. Phone (515) 285-7182; AUTOVON 939-8210. 132d Tactical Fighter Wg. (ANG). Area 112 acres. Altitude 957 ft. Military 1,027, technicians 315. Payroll $12.8 million.

Dobbins AFB, Ga. 30069-5000; 2 mi. S of Marietta; 16 mi. NW of Atlanta. Phone (404) 429-5055; AUTOVON 925-1110. AFRES base. Hq. 14th Air Force (AFRES); 94th Tactical Airlift Wg. (AFRES); 116th Tactical Fighter Wg. (ANG). Base activated in 1943, named for Capt. Charles Dobbins, WW II pilot killed in action near Sicily. Area 1,729 acres. Altitude 1,068 ft. AFRES: military 268, technicians 214, civilians 432, Reservists 2,493. Payroll $34.7 million. ANG: military 1,168; technicians 355. Payroll $16.6 million. Housing: 3 officer, 5 NCO. Dispensary.

Duluth International Airport, Minn. 55811-5000; 5 mi. NW of Duluth. Phone (218) 727-6886; AUTOVON 825-7210. 148th Fighter Interceptor Gp. (ANG). USAF base also located at airport. Area 152 acres. Altitude 1,429 ft. Military 1,028, technicians 372 (+ 22 civilians). Payroll $14.6 million.

Ellington ANG Base, Tex. 77034-5586; adjacent to

Ellington Field, 17 mi. SE of Houston. Phone (713) 481-1400; AUTOVON 954-2110. 147th Fighter Interceptor Gp. (ANG). Other tenants: NASA Operations, US Coast Guard, Army National Guard, FAA. Named for Lt. Eric L. Ellington, a pilot killed Nov. 1913. Area 209 acres. Altitude 40 ft. Military 973, technicians 309. Payroll $17.0 million.

Fargo, N. D. (Hector Field) 58105-5536. Phone (701) 237-6030; AUTOVON 362-8110. 119th Fighter Interceptor Gp. (ANG). Area 133 acres. Altitude 900 ft. Military 1,065, technicians 359. Payroll $13.5 million.

Forbes Field, Kan. 66619-5000; 2 mi. S of Topeka. Phone (913) 862-1234; AUTOVON 720-4210. 190th Air Refueling Gp. (ANG). Area 170 acres. Altitude 1,079 ft. Military 885, technicians 282 (+ 43 civilians). Payroll $11.7 million.

Fort Smith Municipal Airport, Ark. (Ebing ANG Base) 72906. Phone (501) 646-1601; AUTOVON 962-8210. 188th Tactical Fighter Gp. (ANG). Area 95 acres. Altitude 468 ft. Military 967, technicians 301. Payroll $10.5 million.

Fort Wayne, Ind. (Fort Wayne Municipal Airport) 46809; 5 mi. SSW of Fort Wayne. Phone (219) 747-4141; AUTOVON 899-1550. 122d Tactical Fighter Wg. (ANG). Area 87 acres. Altitude 800 ft. Military 1,117, technicians 321. Payroll $12.0 million.

Fresno Air Terminal, Calif. 93727-2199; 5 mi. NE of Fresno. Phone (209) 454-5100; AUTOVON 949-8210. 26th NORAD Region and 26th Air Div. (TAC); 194th Fighter Interceptor Sqdn. (ANG); 144th Fighter Interceptor Wg. (ANG). Area 139 acres. Altitude 332 ft. Military 1,008, technicians 373. Payroll $14.7 million.

Gen. Billy Mitchell Field, Wis. 53207; SE of Milwaukee. AFRES base. Altitude 722 ft. ANG and AFRES have separate phones and facilities. ANG phone (414) 747-4410; AUTOVON 580-8410. 128th Air Refueling Gp. (ANG). ANG area 65 acres. Military 1,015, technicians 293. Payroll $11.4 million. AFRES phone (414) 481-6400; AUTOVON 786-9110. 440th Tactical Airlift Wg. (AFRES). AFRES area 100 acres. Military 11, technicians 199. Reservists 918. Payroll $11.88 million.

Greater Peoria Airport, Ill. 61607; 7 mi. SW of Peoria. Phone (309) 697-6400; AUTOVON 724-9210. 182d Tactical Air Support Gp. (ANG). Area 137 acres. Altitude 640 ft. Military 943, technicians 235. Payroll $9.0 million. Dispensary.

Greater Pittsburgh International Airport, Pa. 15231; 15 mi. NW of Pittsburgh. Altitude 1,203 ft. AFRES base. ANG and AFRES have separate phones and facilities. ANG phone (412) 269-8350; AUTOVON 277-8350. 171st Air Refueling Wg. and 112th Tactical Fighter Gp. (ANG). ANG area 90 acres. Military 1,641, technicians 490. Payroll $18.2 million. AFRES phone (412) 269-8000; AUTOVON 277-8000. 911th Tactical Airlift Gp. (host unit). AFRES area 165 acres. Military 21, technicians 133, civilians 209, Reservists 1,050. Payroll $11.5 million. Other units include 1998th Communications Installation Gp. (AFCC). Base activated 1943. 50 VOQ; 230 enlisted qtrs.

Great Falls International Airport, Mont. 59404; 5 mi. SW of Great Falls. Phone (406) 727-4650; AUTOVON 279-2301. 24th NORAD Region and 24th Air Div. (TAC); SAGE Control Center (NORAD); 120th Fighter Interceptor Gp. (ANG). Area 139 acres. Altitude 3,674 ft. Military 1,016, technicians 356. Payroll $13.9 million. Dispensary.

Gulfport-Biloxi Regional Airport, Miss. 39501; within city limits of Gulfport. Phone (601) 868-6200; AUTOVON 363-6200. Training site; also host to 255th Combat Communications Sqdn., the Army National Guard Transportation Repair Shop, and 173d Civil Engineering Flt. An air-to-ground gunnery range is located 70 mi. due north of site. Area 211 acres. Altitude 28 ft. ANG military 372, technicians 78. Payroll through Keesler AFB. 2-bed dispensary.

Harrisburg International Airport, Middletown, Pa. 17057; 10 mi. E of Harrisburg. Phone (717) 948-2201; AUTOVON 454-9201. 193d Special Operations Gp. (ANG). ANG area 70 acres. Altitude 310 ft. Military 1,105, technicians 287. Payroll $17.3 million.

Jackson Municipal Airport, Miss. (Allen C. Thompson Field) 39208-0810; 7 mi. E of Jackson. Phone (601) 968-8321; AUTOVON 731-9310. 172d Tactical Airlift Gp. (ANG). ANG area 84 acres. Altitude 346 ft. Military 926, technicians 233. Payroll $12.6 million. 6-bed dispensary.

Jacksonville International Airport, Fla. 32229; 15 mi. NW of Jacksonville. Phone (904) 757-1360; AUTOVON 460-7210. 125th Fighter Interceptor Gp. (ANG). Area 158 acres. Altitude 30 ft. Military 1,025, technicians 358. Payroll $14.1 million. 5-bed dispensary.

Knoxville, Tenn. (McGhee Tyson Airport) 37901; 10 mi. SW of Knoxville. Phone (615) 970-3077; AUTOVON 588-8210. Host unit is 134th Air Refueling Gp. (ANG). Tenants: 228th Combat Communications Sqdn. and ANG's I. G. Brown Professional Military Education Ctr. Area 287 acres. Altitude 980 ft. Military 1,143, technicians 329 (+ 2 civilians). Payroll $14.2 million. Dispensary.

Lincoln Municipal Airport, Neb. 68524-1897; 1 mi. NW of Lincoln. Phone (402) 473-1326; AUTOVON 720-1210. 155th Tactical Recon Gp. (ANG). Also hosts Army National Guard unit. Area 163 acres. Altitude 1,198 ft. Military 1,194, technicians 334. Payroll $11.1 million. Tactical clinic.

Louisville, Ky. (Standiford Field) 40213. Phone (502) 566-9400; AUTOVON 989-4400. 123d Tactical Recon Wg. (ANG). Area 65 acres. Altitude 497 ft. Military 1,221, technicians 345. Payroll $12.4 million.

Mansfield Lahm Airport, Ohio 44901-5000; 3 mi. N of Mansfield. Phone (419) 522-9355; AUTOVON 696-6210. 179th Tactical Airlift Gp. (ANG). Named for nearby city and aviation pioneer Brig. Gen. Frank P. Lahm. Area 45 acres. Altitude 1,296 ft. Military 939, technicians 237. Payroll $8.3 million. Dispensary.

Martinsburg, W. Va. (Eastern West Virginia Regional Airport) 25401; 4 mi. S of Martinsburg. Phone (304) 263-0801; AUTOVON 242-9210. 167th Tactical Airlift Gp. (ANG). Area 279 acres. Altitude 556 ft. Military 958, technicians 235. Payroll $9.2 million. Dispensary.

McEntire ANG Base, S. C. 29044; 12 mi. E of Columbia. Phone (803) 776-5121; AUTOVON 583-8201. 169th Tactical Fighter Gp. (ANG). Also host to 240th Combat Communications Sqdn. (ANG) and Army Guard aviation unit. Base named for Brig. Gen. B. B. McEntire, Jr. (ANG), killed in an F-104 in 1961. Area 2,394 acres. Altitude 250 ft. Military 1,303, technicians 327. Payroll $12.8 million. Dispensary.

Memphis International Airport, Tenn. 38118; within Memphis city limits. Phone (901) 369-4111; AUTOVON 966-8210. 164th Tactical Airlift Gp. (ANG). ANG occupies 82 acres. Altitude 332 ft. Military 939, technicians 246. Payroll $9.5 million. Clinic.

Meridian, Miss. (Key Field) 39302-1825; located at municipal airport, near Highways 20 and 59. Phone (601) 693-5031; AUTOVON 694-9210. 186th Tactical Recon Gp. (ANG); host to 238th Combat Communications Sqdn. (ANG). Area 74 acres. Altitude 297 ft. Military 1,270, technicians 339. Payroll $13.0 million. 2-bed dispensary.

Minneapolis-St. Paul International Airport, Minn. 55450; in Minneapolis, near junction of Mississippi and Minnesota Rivers. AFRES base. Altitude 840 ft. ANG and AFRES have separate phones and facilities. ANG phone (612) 725-5011; AUTOVON 825-5681. 133d Tactical Airlift Wg. (ANG). ANG area 126 acres. Military 1,319, technicians 297. Payroll $12.7 million. AFRES phone (612) 725-5011; AUTOVON 825-5100. 934th Tactical Airlift Gp. (AFRES). AFRES area 300 acres. Reservists 999, technicians 135, civilians 225. Payroll $13.5 million for AFRES. Other units include 210th Engineering and Installation Sqdn. (ANG); 237th Air Traffic Control Flt. (ANG); 133d Field Training Flt. (ANG); Navy Readiness Comd. Region 16; Naval Air Reserve Center; Marine Wg. Support Gp., Det. 47; Defense Investigative Service; USAF-CAP/NCLR and CAP MN/LO; and Det. 3, 1974th Teleprocessing Gp. (USAF).

Moffett Naval Air Station, Calif. 94035; 2 mi. N of Mountain View. ANG phone (415) 966-4700; AUTOVON 462-4700. 129th Aerospace Rescue and Recovery Gp. (ANG). Area 12 acres. Altitude 34 ft. Military 686, technicians 238. Payroll $13.7 million.

Montgomery, Ala. (Dannelly Field) 36196; 7 mi. SW of Montgomery. Phone (205) 284-7210; AUTOVON 742-9210. 187th Tactical Fighter Gp. (ANG). Hosts 232d Combat Communications Sqdn. Named for Ens. Clarence Dannelly, Navy pilot killed at Pensacola, Fla., during WW II. Area 42 acres. Altitude 221 ft. Military 1,171, technicians 341. Payroll $15.4 million. Dispensary.

Muniz ANG Base, Puerto Rico 00914; E of San Juan. Phone (809) 728-5450; AUTOVON 860-9210. 156th Tactical Fighter Gp. (ANG). Base named for Lt. Col. José A. Muniz, who was killed in an aircraft accident July 4, 1960. Area 25 acres. Military 902, technicians 262. Payroll $13.1 million.

Nashville Metropolitan Airport, Tenn. 37217-0267; 6 mi. SE of Nashville. Phone (615) 361-4600; AUTOVON 446-6210. 118th Tactical Airlift Wg. (ANG). Area 75 acres. Altitude 597 ft. Military 1,362, technicians 356. Payroll $15.2 million.

New Orleans Naval Air Station, La. (Alvin Callender Field) 70143; 15 mi. S of New Orleans. ANG and AFRES have separate phones and facilities. ANG phone (504) 394-2818; AUTOVON 363-3399. 159th Tactical Fighter Gp. (ANG). ANG military 1,017, technicians 354. Payroll $14.7 million. AFRES phone (504) 393-3293; AUTOVON 363-3293. 926th Tactical Fighter Gp. (AFRES). Military 720, technicians 260. Payroll $8.5 million. NAS New Orleans was the first joint Air Reserve Training Facility. Named for Alvin A. Callender, who served with the British Royal Flying Corps during WW I and who was shot down over France in 1918. Area 3,245 acres. Altitude 3 ft. Dispensary.

Niagara Falls International Airport, N. Y. 14304-5000; 6 mi. E of Niagara Falls. Phone (716) 297-4100; AUTOVON 489-3011. AFRES base. 914th Tactical Airlift Gp. (AFRES). 107th Fighter Interceptor Gp. (ANG). Base activated in Jan. 1952. Area 979 acres. Altitude 590 ft. AFRES: 60 active duty; 129 technicians; 242 civilians; 949 Reservists. Payroll $12.5 million. ANG: 989 military; 350 technicians. Payroll $12.5 million.

O'Hare Air Reserve Forces Facility, Ill. 60666; 22 mi. NW of Chicago's Loop. Phone (312) 694-6000; AUTOVON 930-1110. AFRES base. 928th Tactical Airlift Gp. (AFRES), 126th Air Refueling Wg. (ANG). Defense Contract Administration Services Region. Base activated in Apr. 1946, named for Lt. Cmdr. Edward H. "Butch" O'Hare, USN Medal of Honor recipient, killed Nov. 26, 1943, during battle for the Gilbert Islands. Area 391 acres. Altitude 643 ft. ANG military 1,305, technicians 1,330, Reservists 1,500. Payroll $13.2 million.

Ontario International Airport, Ontario, Calif. 91761. Phone (714) 984-2705; AUTOVON 896-1895. 146th Combat Communications Gp. (ANG). Area 39 acres. Altitude 900 ft. Military 199, technicians 24. Payroll $10.6 million.

Otis ANG Base, Mass. 02542; 7 mi. NNE of Falmouth. Phone (617) 968-4667; AUTOVON 557-4667. 102d Fighter Interceptor Wg. (ANG) and 6th Missile Warning Sqdn. (Pave Paws). Other tenants include Coast Guard Air Station Cape Cod; Army National Guard Aviation; Camp Edwards ARNG Training Installation; VA National Cemetery. Named for 1st Lt. Frank J. Otis, ANG flight surgeon and pilot killed in 1937 crash. Area 22,000 acres, incl. ANG 4,000 acres. Altitude 132 ft. ANG military 1,145, technicians 349 (+ 278 civilians). Payroll $21.1 million. 1,193 housing units on base. USCG administers 601 (10 command, 45 officer, 546 other ranks).

Phelps Collins ANG Base, Mich. 49707; 7 mi. W of Alpena. Phone (517) 354-4141; AUTOVON 722-3760. Training site detachment. Facilities used by ANG and AFRES units for annual field training, also ARNG and Marine Reserve for special training. Named for Capt. W. H. Phelps Collins, American Flying Corps, killed in France, Mar. 1918. Area 2,711 acres. Altitude 689 ft. Military 54. Payroll paid through Wurtsmith AFB. Housing: 1,500 personnel. 14-bed hospital. Dispensary.

Phoenix, Ariz. (Sky Harbor International Airport) 85034. Phone (602) 244-9841; AUTOVON 853-9211. 161st Air Refueling Gp. (ANG). Area 51 acres. Altitude 1,230 ft. Military 933, technicians 283. Payroll $12.8 million.

Portland International Airport, Portland, Ore. 97218-2797. Phone (503) 288-5611; AUTOVON 891-1701. 142d Fighter Interceptor Gp. (ANG); 244th Combat Communications Sqdn. (ANG); 244th Combat Communications Flt. (ANG); 116th Tactical Control Sqdn. (ANG); Det. 5, 2036th Communications Sqdn. (AFCC); 12th Special Forces Gp. (USAR); and Oregon Wg., CAP. Also host to 939th Aerospace Rescue and Recovery Sqdn. (AFRES). 83d Aerial Port Sqdn. (AFRES). Area 273 acres. Altitude 26 ft. Military 1,700, technicians 452 (+ 46 civilians). Payroll $26.0 million.

Providence, R. I. (Quonset Point State Airport) 02852; 20 mi. S of Providence. Phone (401) 885-3960; AUTOVON 476-3210. 143d Tactical Airlift Gp. (ANG). Area 79 acres. Altitude 9 ft. Military 1,005, technicians 252. Payroll $12.1 million.

Reno, Nev. 89502 (Cannon International Airport—May ANG Base), 1776 ANG Way; 5 mi. SE of Reno. Phone (702) 788-4500; AUTOVON 830-4500. 152d Tactical Recon Gp. (ANG). Named for Maj. Gen. James A. May, state Adjutant General. Area 123 acres. Altitude 4,411 ft. Military 1,033, technicians 302. Payroll $11.1 million. Dispensary.

Richards-Gebaur AFB, Mo. 64030-5000; 17 mi. S of Kansas City, Mo. Phone (816) 348-2000; AUTOVON 463-1110. 442d Tactical Fighter Wg. (AFRES); 1879th Communications Sqdn. (AFCC); Navy and Army Reserve units. 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, an F-84 pilot, was killed Aug. 29, 1952, over North Korea during his 99th mission. Area 2,418 acres. Approx. 1,900 acres declared excess and turned over to General Services Administration for final conveyance as determined by reuse studies. Some 120 acres occupied by non-Air Force military units and federal agencies. Joint-use airport facility with Kansas City, Mo. Altitude 1,090 ft. AFRES and active-duty USAF military 1,500, technicians/civilians 317. Payroll $13.7 million. On-base, Marine Corps-operated, all-service housing: 27 officer, 214 enlisted. Consolidated open mess and 300 transient quarters available.

Richmond, Va. (Byrd International Airport) 23150; 4 mi. SE of downtown Richmond. Phone (804) 222-8884; AUTOVON 274-8210. 192d Tactical Fighter Gp. (ANG). Airfield named for Adm. Richard E. Byrd, famous Arctic and Antarctic explorer. Area 143 acres. Altitude 167 ft. Military 1,186, technicians 315. Payroll $11.2 million.

Rickenbacker ANG Base, Ohio 43217; 13 mi. SSW of Columbus. Phone (614) 492-8211; AUTOVON 950-1110.

Base transferred from SAC to ANG Apr. 1, 1980. 121st Tactical Fighter Wg. (ANG); 907th Tactical Airlift Gp. (AFRES); 160th Air Refueling Gp. (ANG); 2032d Communications Sqdn. (AFCC); Naval Air Reserve and Naval Construction (USNR). Base activated 1942. Formerly Lockbourne AFB; renamed May 7, 1974, in honor of Capt. Edward V. Rickenbacker, top US WW I ace and Medal of Honor recipient who died July 23, 1973. Area 4,100 acres. Approx. 1,800 acres declared excess and turned over to General Services Administration. Altitude 744 ft. Reserve and ANG military 3,600, active-duty USAF 67, technicians 380. Payroll $32 million. On-base Capehart housing. VOQ and VAQ available, limited on weekends. Consolidated open mess available.

Roslyn ANG Station, Roslyn, N. Y. 11576; 27 mi. E of New York City. Phone (516) 299-5201; AUTOVON 456-5201. 152d Tactical Control Gp., 213th Engineering Installation Sqdn. Also hosts two Army National Guard units. Area 50.3 acres. Altitude 320 ft. Military 455, technicians 19. Payroll through Stewart IAP, N. Y.

Salt Lake City International Airport, Utah 84116; 3 mi. W of Salt Lake City. Phone (801) 521-7070; AUTOVON 790-9210. 151st Air Refueling Gp. (ANG). Also hosts ANG's 130th Engineering Installation Sqdn. and 106th and 109th Tactical Control Flts. Area 75 acres. Altitude 4,220 ft. Military 1,377, technicians 334 (+ 33 civilians). Payroll $14.6 million. Dispensary.

Savannah International Airport, Ga. 31402; 4 mi. NW of Savannah. Phone (912) 964-1941; AUTOVON 860-8210. 165th Tactical Airlift Gp. (ANG). Also field training site. Area 232 acres. Altitude 50 ft. Military 1,004, technicians 294. Payroll $15.0 million. Housing: 156 officer; 736 enlisted. 3-bed dispensary.

Schenectady County Airport, Scotia, N. Y. 12302-9752; 2 mi. N of Schenectady. Phone (518) 381-7300; AUTOVON 974-9221. 109th Tactical Airlift Gp. (ANG). Area 106 acres. Altitude 378 ft. Military 936, technicians 238. Payroll $8.9 million. Dispensary.

Selfridge ANG Base, Mich. 48045; 3 mi. NE of Mount Clemens. Phone (313) 466-4011; AUTOVON 273-0111. 127th Tactical Fighter Wg. (ANG); 191st Fighter Interceptor Gp. (ANG); 927th Tactical Airlift Gp. (AFRES); also hosts Air Force, Navy Reserve, Marine Air Reserve, Army Reserve, Army units, and US Coast Guard Air Station for Detroit. Base activated July 1917, transferred to Michigan ANG July 1971. Named for 1st Lt. Thomas E. Selfridge, first Army officer to fly an airplane and first fatality of powered flight, killed Sept. 17, 1908, at Fort Myer, Va., when plane piloted by Orville Wright crashed. Area 3,727 acres. Altitude 583 ft. ANG military 1,995, ANG technicians 560 (+ 572 civilians). Payroll $36.3 million. Dispensary.

Sioux City Municipal Airport, Iowa 51110; 7 mi. S of Sioux City. Phone (712) 255-3511; AUTOVON 939-6210. 185th Tactical Fighter Gp. (ANG). Area 114 acres. Altitude 1,098 ft. Military 885, technicians 263. Payroll $10.2 million. Dispensary.

Sioux Falls, S. D. (Joe Foss Field) 57104; N side of Sioux Falls. Phone (605) 336-0670; AUTOVON 939-7210. 114th Tactical Fighter Gp. (ANG). Named for Brig. Gen. Joseph J. Foss, WW II ace, former governor of South Dakota, former National President of AFA, and founder of the South Dakota ANG. Area 145 acres. Altitude 1,428 ft. Military 916, technicians 270. Payroll $10 million.

Springfield, Ill. (Capitol Airport) 62707; NW of Springfield. Phone (217) 753-8850; AUTOVON 631-8210. 183d Tactical Fighter Gp. (ANG). Area 70 acres. Altitude 592 ft. Military 1,090, technicians 348. Payroll $12.6 million. Dispensary.

Springfield-Beckley Airport, Ohio 45501-1780; 5 mi. S of Springfield. Phone (513) 323-8J53; AUTOVON 346-2311. 178th Tactical Fighter Gp. (ANG). Area 113 acres. Altitude 1,052 ft. Military 1,185, technicians 299. Payroll $13.1 million. 6-bed dispensary.

St. Joseph, Mo. (Rosecrans Memorial Airport) 64503; 4 mi. W of St. Joseph. Phone (816) 271-1300; AUTOVON 720-9210. 139th Tactical Airlift Gp. (ANG). Area 298 acres. Altitude 724 ft. Military 842, technicians 260. Payroll $9.5 million.

St. Louis International Airport, Mo. (Lambert Field) 63145. Phone (314) 263-6356; AUTOVON 693-6356. 131st Tactical Fighter Wg. (ANG). Area 50 acres. Altitude 589 ft. Military 1,351, technicians 360. Payroll $18.0 million.

Stewart International Airport, Newburgh, N. Y. 12550; 4 mi. W of Newburgh; 15 mi. N of USMA (West Point). Phone (914) 564-7000, ext. 3376; AUTOVON 247-3376. Hq. NYANG and 105th Military Airlift Gp. (ANG); USMA subpost airport. Formerly Stewart AFB; acquired by state of New York in 1970. ANG area 260 acres. Altitude 491 ft. ANG military 1,921, technicians 224. Payroll $8.1 million. Dispensary.

Suffolk County Airport, Westhampton Beach, N. Y. 11978-1294; within corporate limits of Westhampton Beach. Phone (516) 288-4200; AUTOVON 456-7210. 106th Aerospace Rescue and Recovery Gp. (ANG). Area 70 acres. Altitude 67 ft. Military 725, technicians 237. Payroll $11.5 million.

Syracuse, N. Y. (Hancock Field) 13211-7099; 5 mi. NE of Syracuse. Phone (315) 458-5500; AUTOVON 587-9110. 174th Tactical Fighter Wg. (ANG). Base operations for Hancock ANG Base. 152d Tactical Control Gp., 108th and 113th Tactical Control Flts. Area 443 acres. Altitude 421 ft. Military 1,348, technicians 391. Payroll $12.9 million. Dispensary.

Terre Haute, Ind. (Hulman Regional Airport) 47803; 5 mi. E of Terre Haute. Phone (812) 877-5210; AUTOVON 724-1210. 181st Tactical Fighter Gp. (ANG). Area 279 acres. Altitude 585 ft. Military 988, technicians 304. Payroll $11.9 million. 5-bed dispensary.

Toledo Express Airport, Swanton, Ohio 43558; 14 mi. W of Toledo. Phone (419) 866-2078; AUTOVON 580-2078. 180th Tactical Fighter Gp. (ANG). Area 79 acres. Altitude 684 ft. Military 916, technicians 260. Payroll $11.5 million. 4-bed clinic.

Truax Field (Dane County Regional Airport), Madison, Wis. 53704-2591; 2 mi. N of Madison. Phone (608) 241-6200; AUTOVON 273-8210. 128th Tactical Fighter Wg. (ANG). Activated June 1942 as AAF base; taken over by Wisconsin ANG in Apr. 1968. Named for Lt. T. L. Truax, who was killed in a P-40 training accident in 1941. Area 153 acres. Altitude 862 ft. Military 880, technicians 291. Payroll $12.0 million. Housing: 7 transient. Dispensary.

Tucson International Airport, Ariz. 85734; within Tucson city limits. Phone (602) 748-1110; AUTOVON 361-1110. 162d Tactical Fighter Gp. (ANG). Area 49 acres. Altitude 2,650 ft. Military 1,157, technicians 532. Payroll $18.7 million.

Tulsa International Airport, Okla. 74115. Phone (918) 832-5208; AUTOVON 956-5297. 138th Tactical Fighter Gp. (ANG) and 219th Electronic Installation Sqdn. Area 78 acres. Altitude 676 ft. Military 1,049, technicians 280. Payroll $10.5 million.

Utah ANG Base, Utah 84116; 3 mi. W of Salt Lake City. Phone (801) 521-7070; AUTOVON 790-9210. 151st Air Refueling Gp. (ANG). Also hosts ANG's 130th Engineering Installation Sqdn. and 106th and 109th Tactical Control Flts. Area 75 acres. Altitude 4,220 ft. Military 1,428, technicians 304. Payroll $13.7 million. Dispensary.

Van Nuys ANG Base, Calif. (Van Nuys Airport) 91409. Phone (213) 781-5980; AUTOVON 873-6310. 146th Tactical Airlift Wg. (ANG), 147th Combat Communications Sqdn. (Contingency). Area 62 acres. Altitude 799 ft. Military 1,630, technicians 401. Payroll $17.6 million.

Volk Field ANG Base, Wis. 54618-5001; 90 mi. NW of Madison. Phone (608) 427-1210; AUTOVON 798-3210. ANG field training site, including air-to-air and air-to-ground gunnery ranges, providing training for ANG flying units. Named for Lt. Jerome A. Volk, first Wisconsin ANG pilot killed in the Korean War. Area 10,265 acres. Altitude 910 ft. Military 57, technicians 56. Payroll $2.4 million. 6-bed dispensary.

Westfield, Mass. (Barnes Municipal Airport) 01085; 3 mi. N of Westfield. Phone (413) 568-9151; AUTOVON 636-1210/11. 104th Tactical Fighter Gp. (ANG). Area 133 acres. Altitude 270 ft. Military 952, technicians 284. Payroll $12.2 million.

Westover AFB, Mass. 01022-5000; 5 mi. NE of Chicopee Falls. Phone (413) 557-1110; AUTOVON 589-1110. AFRES base. 439th Tactical Airlift Wg. (AFRES). Also home of Army, Navy, and Marine Corps Reserve and Massachusetts Army National Guard. Base dedicated Apr. 6, 1940; named for Maj. Gen. Oscar Westover, Chief of the Air Corps, killed Sept. 21, 1938, in crash near Burbank, Calif. Area 2,500 acres. Altitude 244 ft. Reservists 2,130, technicians (AFRES and tenant units) 211, civilians 469. Payroll $17.5 million. Housing: 313 family quarters; 432 dormitory rooms; 25 VOQ; 174 BOQ.

Willow Grove Air Reserve Facility, Pa. 19090; 14 mi. N of Philadelphia. ANG and AFRES have separate phones and facilities. Altitude 356 ft. ANG phone (215) 443-1500; AUTOVON 991-1500. 111th Tactical Air Support Gp. (ANG). ANG area 40.83 acres. Military 907, technicians 229. Payroll $9.1 million. AFRES phone (215) 443-1062; AUTOVON 991-1062. 913th Tactical Airlift Gp. (AFRES). AFRES area 162 acres. Reservists 856, technicians 147, civilians 122. Payroll $9.3 million. Other units include Army, Navy, and Marine Corps Reserve. Defense Contract Administration Services Region, Philadelphia; 92d Aerial Port Sqdn. (MAC) as off-base tenant. Base activated Aug. 1958. Navy transient quarters available, but limited.

Will Rogers World Airport, Okla. 73169-5000; 7 mi. SW of Oklahoma City. Phone (405) 686-5210; AUTOVON 956-8210. 137th Tactical Airlift Wg. (ANG). Area 71 acres. Altitude 1,290 ft. Military 1,085, technicians 254. Payroll $10.6 million.

Wilmington, Del. (Greater Wilmington Airport) 19720; 5 mi. S of Wilmington. Phone (302) 322-3361; AUTOVON 455-3000. 166th Tactical Airlift Gp. (ANG); Army National Guard aviation company. Area 57 acres. Altitude 80 ft. Military 986, technicians 239. Payroll $9.2 million. 2-bed dispensary.

Windsor Locks, Conn. (Bradley International Airport) 06096; 15 mi. N of Hartford. Phone (203) 623-8291; AUTOVON 636-8310. 103d Tactical Fighter Gp. (ANG) and Army National Guard aviation battalion. Named for Lt. Eugene M. Bradley, killed in P-40 crash in Aug. 1941. Area 158 acres. Altitude 173 ft. Military 912, technicians 290. Payroll $11.6 million.

Youngstown Municipal Airport, Ohio 44473-5000; 16 mi. N of Youngstown. Phone (216) 392-1645; AUTOVON 346-9211. AFRES base. 910th Tactical Airlift Gp. (AFRES), 757th Tactical Airlift Sqdn. (AFRES). Base activated 1952. Area 226 acres. Altitude 1,196 ft. Reservists 901, technicians 230. Payroll $13 million. ■

A Guide to USAF's R&D Facilities

Principal AFSC R&D Facilities

From AFSC headquarters at Andrews AFB, Md., Gen. Lawrence A. Skantze, AFSC Commander, directs the operations of the command's divisions, development and test centers, ranges, and laboratories. These organizations are described below.

Product Organizations

Aeronautical Systems Division (ASD), Wright-Patterson AFB, Ohio—ASD directs the design, development, and acquisition of aeronautical systems, such as fighters, tactical reconnaissance aircraft, bombers, transports, aerial tankers, rescue helicopters, manned vehicles, long- and short-range air-to-surface missiles, simulators, reconnaissance and electronic warfare systems, aircraft engines, and other aeronautical equipment. ASD comprises more than 11,000 military and civilians working in research, development, and acquisition programs. Scientists, engineers, logisticians, business and program managers, technicians, and support people make up the work force.

Current aircraft programs include the priority effort to further develop, acquire, and test the new B-1B strategic bomber (the first of 100 scheduled for production was rolled out in September 1984, five months ahead of schedule and on cost, and the first flight took place in October 1984); development of an advanced tactical fighter for the mid-1990s and beyond; full-scale development of the T-46A Next-Generation Pilot Trainer (rollout took place in February 1985); full-scale development of the HH-60A Night Hawk combat rescue helicopter; full-scale development of the C-17 airlift aircraft; reengining and other enhancements to the KC-135 tanker; continued production of and improvements to the TR-1 tactical reconnaissance aircraft and the F-15 Eagle and F-16 Fighting Falcon fighters; procurement of C-23A European distribution system aircraft; production of C-12F and C-21A aircraft to replace CT-39s; lease/buy of C-20A special mission aircraft to replace the aging C-140s; the study and design of a transatmospheric vehicle concept; improvements to the B-52 force defensive systems; and the alternate fighter engine for F-15 and F-16 aircraft.

Missile systems include development of the advanced

cruise missile, continued production and deployment of the air-launched cruise missile, and production of the tactical infrared Maverick missile, which is capable of air strikes at night and in adverse weather.

Technology modernization—an ASD strategy to help aerospace manufacturers modernize their facilities to improve productivity—is a demonstrated success and has been expanded to include most major weapon system programs at ASD and at other AFSC product organizations as well.

ASD's 4950th Test Wing operates and maintains most of AFSC's inventory of specially modified aircraft for conducting test flights and gathering and analyzing test results. These include the Advanced Range Instrumentation Aircraft (ARIA), which deploy worldwide to receive, record, and retransmit telemetry data from missiles, satellites, and launch vehicles. The ARIA aircraft are maintained at Wright-Patterson AFB along with a fleet of testbed aircraft, including C-130, C-141, C-18, C-135, T-39, and T-37 aircraft, to provide customers a low-cost testbed option.

Also a part of ASD are the Air Force Wright Aeronautical Laboratories (AFWAL).

Air Force Wright Aeronautical Laboratories (AFWAL), Wright-Patterson AFB, Ohio—AFWAL includes four major organizations at Wright-Patterson AFB—the Flight Dynamics, Materials, Avionics, and Aero Propulsion Laboratories—and is organizationally located under ASD. AFWAL was established to combine common laboratory overhead, management, and support functions.

Avionics Laboratory conducts research and development programs for reconnaissance, weapons delivery, electronic warfare, electronic technology, and avionics systems.

Aero Propulsion Laboratory conducts Air Force exploratory and advanced development programs in turbine engines, ramjets, fuels, turbine engine lubricants, aircraft fire protection, synthetic fuels, and flight vehicle power.

Flight Dynamics Laboratory is concerned with the development of flight-vehicle technology. Specific technical areas include structural design and durability, vehicle dynamics, vehicle equipment, environmental control, crew escape and recovery, survivability and vulnerability, flight control, crew station design, flight simulation, performance analysis, aerodynamics, configuration synthesis, and technology integration. Test-beds for flight-control technologies include AFTI/F-16 and DIGITAC and the X-29A forward-sweptwing (jointly with DARPA) and AFTI/F-111 mission-adaptive wing. The latter two are technology demonstrators for new wing designs. Additionally, design studies are under way for a short takeoff and landing and maneuver technology demonstrator.

Materials Laboratory conducts the complete USAF program in materials exploratory development and manufacturing technology. Areas of current emphasis include thermal protection materials; metallic and nonmetallic structural materials; aerospace propulsion materials; fluids, lubricants, and fluid-containment materials; protective coatings; electronic and electromagnetic materials; laser-hardened materials; integrated computer-aided manufacturing, robotics, smart processing, and flexible automated batch manufacturing; and nondestructive evaluation.

Armament Division (AD), Eglin AFB, Fla.—The Division is charged with the planning, research, development, and acquisition of conventional air armaments and the test and evaluation of armament and electronic warfare systems and related equipments.

The four major mission areas assigned to AD are research and technology, systems development and acquisition, test and evaluation, and host and base support. This full spectrum assigns cradle-to-grave responsibility for air armaments to one organization. This synergism is further enhanced by the using command tenant organizations assigned to Eglin AFB, Fla.

The research and technology and systems development and acquisition mission areas are organized under a single manager, the Deputy Commander for Development and Acquisition, to control centrally the efforts of AD's Air Force Armament Test Laboratory and the development plans, systems acquisition, and acquisition logistics organizations. This one focal point ties together the basic research, exploratory development, advanced development, master planning, and conceptual, validation, and full-scale engineering development, production, and deployment phases of acquisition. The elements of integrated logistics support are provided by a joint AFSC and AFLC office.

AD's 3246th Test Wing, equipped with a fleet of approximately forty aircraft and highly instrumented ground facilities, manages the Division's overall test and evaluation program. To accomplish its mission, the wing utilizes several large land test ranges scattered throughout the 724-square-mile Eglin complex as well as 86,000 square miles of water ranges located in the adjacent Gulf of Mexico. Major tests on or above AD's ranges cover all kinds of equipment, including aircraft systems, subsystems, missiles, guns, bombs, rockets, targets and drones, high-powered radars, and airborne electronic countermeasures equipment. Equipment is tested in a variety of environments, and combat conditions are realistically simulated. One of the Test Wing's unique assets is the McKinley Climatic Laboratory, capable of testing military hardware as large as a bomber in environments ranging from minus 65 to plus 165 degrees Fahrenheit with 100 mph winds, icing, clouds, rain, and snow.

One AD organization, the 6585th Test Group, is located at Holloman AFB, N. M. Among its unique facilities are a 50,000-foot high-speed test track, a radar target scatter facility (RATSCAT), and the Central Inertial Guidance Test Facility (CIGTF).

Air Force Armament Test Laboratory (AFATL), Eglin AFB, Fla.—AFATL is the principal Air Force laboratory doing research on free-fall and guided nonnuclear munitions and airborne targets and scorers to provide the future technological base for aircraft armaments. These include missile subsystems, bombs, dispensers, fuzes, guns, and ammunition. AFATL also provides consulting services in aircraft munition compatibility and analysis and prediction of munition subsystem performance and weapon effects. AFATL is organizationally assigned to the Armament Division at Eglin AFB, Fla.

Electronic Systems Division (ESD), Hanscom AFB, Mass.—ESD is responsible for development, acquisition, and delivery of electronic systems and equipment for the command control communications and intelligence functions of aerospace forces. More than 100 projects are currently under way, including modernization of the World-Wide Military Command and Control System, which is used by DoD to control its military forces; replacement of the Distant Early Warning (DEW) Line radars with new technology sensors that require little on-site manning and in some cases will operate unattended; radars in the four corners of the nation to detect attack by sea-launched ballistic missiles and to track satellites; upgrading of the Ballistic Missile Early Warning System in England, Greenland, and Alaska to meet the modern missile threat; an Air Force/Army radar to detect, track, and direct weapons against stationary or slow-moving ground and airborne targets; a triservice secure and survivable tactical communications network for air, ground, and sea forces; improvements to NORAD's Space Operations Center and Cheyenne Mountain Complex for directing the defense of North America; an unmanned low-frequency radio network throughout the US to pass emergency messages should the electromagnetic pulse from nuclear detonations disrupt normal communications; a worldwide chain of optical satellite-tracking stations; the E-3 Sentry airborne radar/direction center for the Air Force, North Atlantic Treaty Organization, and Saudi Arabia; and an over-the-horizon backscatter radar for long-range (out to 1,800 miles) warning of aircraft approaching North America.

ESD manages the Department of Defense Electromagnetic Compatibility Analysis Center at Annapolis, Md., and maintains an office at Kapaun AS, Germany, for the coordination and management of many European-wide C³I programs.

Rome Air Development Center at Griffiss AFB, N. Y., supports ESD by developing a technology base for C³I projects. ESD also works directly with the major commands to plan for evolutionary C³I improvements.

Rome Air Development Center (RADC), Griffiss AFB, N. Y.—RADC is the principal organization charged with Air Force research and development programs related to C³I (command control communications and intelligence). RADC mission areas include communications, electromagnetic guidance and control, surveillance of ground and aerospace objects, intelligence data handling, information systems technology, artificial intelligence and battle management, ionospheric propagation, solid state sciences, microwave physics, and electronic reliability, maintainability, and compatibility. Reporting to the Commander, ESD, Hanscom AFB, Mass., RADC is also responsible for assisting in the demonstration and acquisition of selected systems and subsystems within its areas of expertise.

Space Division (SD), Los Angeles AFS, Calif.—SD provides and manages the majority of the nation's military space systems. SD's responsibilities include providing and maintaining space-based communications, meteorological, navigation, and surveillance systems in support of combat forces on the ground, at sea, and in the atmosphere; developing spacecraft, launch vehicles, and ground-terminal equipment to maintain and improve military space capabilities; launching and controlling on-orbit satellites for DoD and other government agencies; developing space defense and survivability technology to ensure protection of the nation's space assets; managing DoD activities in the National Space Transportation System (Space Shuttle); operating national test ranges and launch facilities to support space and missile programs for the Air Force, DoD, NASA, and other agencies; operating a worldwide network of satellite tracking stations; and operating the Space and Missile Test Organization, the Air Force Satellite Control Facility, the Air Force Space Technology Center, and the Manned Space Flight Support Group, major field elements of SD, described below.

To meet these global responsibilities, SD utilizes 2,967 officers, 2,609 enlisted, and 4,551 civilian personnel. Aerospace Corporation, based adjacent to SD headquarters, also devotes the principal efforts of its highly qualified 1,669-member technical staff to SD programs.

Air Force Space Technology Center (AFSTC), Kirtland AFB, N. M.—AFSTC is under the command of Space Division, AFSC. The Space Technology Center directs three Air Force Systems Command laboratories: Air Force Weapons Laboratory at Kirtland AFB, Air Force Rocket Propulsion Laboratory, Edwards AFB, Calif., and Air Force Geophysics Laboratory, Hanscom AFB, Mass.

AFSTC integrates technology efforts to enhance military space capabilities and the needs of future space systems.

Collectively, the expertise of these laboratories under AFSTC provides a focus for information about space-related developments in such diverse areas as electronics hardening, laser research, rocket propulsion, and the earth and space environment.

The Center will work through Air Force Systems Command and Space Command to provide research results for future systems needs and to identify key technology areas for long-range plans.

AFSTC works closely with NASA and other military agencies on joint development programs.

Air Force Weapons Laboratory (AFWL), Kirtland AFB, N. M.—AFWL conducts Air Force Systems Command nonconventional weapons research and development in high-energy laser technology, advanced weapon concepts, and nuclear weapon technology, including nuclear survivability/vulnerability. AFWL also acts as the AFSC focal point for the technical aspects of nuclear safety and the development of nuclear hardness criteria for Air Force systems.

Air Force Rocket Propulsion Laboratory (AFRPL), Edwards AFB, Calif.—AFRPL conducts exploratory and advanced development programs for liquid, solid, and hybrid rockets; advanced rocket propellants; and associated ground-support equipment. AFRPL also conducts system support programs for other units and divisions of AFSC, other branches of the armed services, and NASA.

Air Force Geophysics Laboratory (AFGL), Hanscom AFB, Mass.—AFGL is the center for research, exploratory, and advanced development involving the terrestrial, atmospheric, and space environments. AFGL scientists study the effects of the space environment on Air Force satellites; the interactions of the ionosphere and upper atmosphere with Air Force systems; the optical properties of the atmosphere, both as a transmission medium and as an emitter of radiation; the measurement of the earth's gravity field and its crustal motions to determine their effects on ballistic missiles; and new and better ways to predict the weather and measure weather elements.

Ballistic Missile Office (BMO), Norton AFB, Calif.—BMO is responsible for the planning, implementation, and management of Air Force programs to acquire ballistic missile systems and subsystems.

A major BMO development program is the Advanced Strategic Missile Systems (ASMS). ASMS is responsible for providing advanced technology to ensure the effectiveness, survivability, and penetration of strategic missile systems in response to evolving missions, threats, and technologies. ASMS provides support for operational systems, alternatives for future systems, and arms-control support.

BMO is managing the development of the Peacekeeper system, a new, survivable ICBM. Peacekeeper is currently undergoing a flight-test program at Vandenberg AFB, Calif. The scheduled date for the initial operational capability of the Peacekeeper is set for late 1986.

BMO is also managing the development of the Small Intercontinental Ballistic Missile program (SICBM). This new program office opened at BMO in May 1983. The development of the new small missile is in response to the President's ICBM Modernization Program.

Test Organizations

Space and Missile Test Organization (SAMTO), Vandenberg AFB, Calif.—SAMTO has two specific functions. First is the management of field test and launch operations for all DoD-directed space programs and long-range ballistic research and development programs. The other is development, management, and operation, through the Eastern and Western Space and Missile Centers, of the national test ranges.

Western Space and Missile Center (WSMC), Vandenberg AFB, Calif.—WSMC is responsible for conducting launch and launch support of research and development ballistic missile testing and polar-orbiting space launches for DoD, USAF, and other agencies. Stretching halfway around the world from the California coast to the Indian Ocean, the Western Test Range is operated in

support of ballistic and space test operations. The Range also supports Space Shuttle operational flight tests and other aeronautical tests employing the same sensors and data-gathering equipment used for ballistic and space booster flights. WSMC is responsible for planning and subsequent execution of the Peacekeeper research and development flight tests and for west coast Space Shuttle launch operations, scheduled to begin in early 1986.

Eastern Space and Missile Center (ESMC), Patrick AFB, Fla.—ESMC is responsible for conducting launch and launch support activities of manned and unmanned space launches and ballistic missiles for the Air Force, DoD, foreign governments, and other government agencies. Support includes the development and processing of the Inertial Upper Stage for the Space Shuttle, all space launches requiring geosynchronous orbits, and the Trident and Pershing II missile programs. In addition, it operates Patrick AFB. The Eastern Test Range extends more than 10,000 miles down the Atlantic into the Indian Ocean where it joins the Western Test Range to form a worldwide network. Tracking and data-gathering stations are located at Grand Bahama, Antigua, and Ascension Islands.

Air Force Satellite Control Facility (AFSCF), Sunnyvale AFS, Calif.—AFSCF develops, maintains, and operates for the Space Division a worldwide network of tracking stations to perform on-orbit tracking, data acquisition, and command and control of DoD space vehicles.

Manned Space Flight Support Group (MSFSG), Johnson Space Center, Houston, Tex.—The MSFSG is developing the capability to plan for and control DoD Space Transportation System missions and to ensure that those missions are secure. In addition, MSFSG will manage the acquisition phase of the Shuttle Operations and Planning Center portion of the Consolidated Space Operations Center. The MSFSG will also train personnel to support the command and control of DoD Space Shuttle missions directly and to transition those personnel to the Space Operations Center.

Air Force Flight Test Center (AFFTC), Edwards AFB, Calif.—AFFTC conducts and supports flight testing and evaluation of manned aircraft, research vehicles, and related propulsion, weapons, avionics, and flight-control systems within or entering the Air Force inventory. Similar tests and evaluations can also be carried out by AFFTC on aircraft belonging to other US military services and government agencies.

AFFTC is also the Air Force organization responsible for testing and evaluating remotely piloted vehicles, Air Force versions of air- and ground-launched cruise missiles, plus crew, cargo, and special mission parachutes.

Among the aerospace test programs currently under way at AFFTC are those related to the B-1B bomber, the F-15 Eagle, the F-16 Fighting Falcon, the T-46A trainer, and follow-on testing and evaluation of the B-52 avionics and cruise-missile systems.

AFFTC operates the Air Force Test Pilot School at Edwards AFB, where experienced pilots and engineers are trained for flight test and aerospace research work.

AFFTC has management responsibility for the Utah Test and Training Range (UTTR), a 2,700-square-mile facility in northwest Utah where many test and development flights of remotely piloted vehicles and cruise missiles are carried out. Units administering the UTTR are located at Hill AFB, Utah.

AFFTC is involved in the nation's Space Shuttle program by providing the landing site for certain missions and carrying out the comprehensive evaluation of the Shuttle's descent characteristics for the Department of Defense. Edwards AFB also remains a contingency landing site for the Space Shuttle.

Arnold Engineering Development Center (AEDC), Arnold AFS, Tenn.—AEDC operates the world's most advanced and largest complex of aerospace flight simulation test facilities—some forty aerodynamic and propulsion wind tunnels, high-altitude rocket and jet engine test cells, space environmental chambers, and ballistic ranges. Twenty-seven of the Center's test units have capabilities unmatched elsewhere. The Center's new Aeropropulsion Systems Test Facility, which will be used to test advanced propulsion systems for future aircraft, will begin testing operations in late 1985.

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. Full-size hardware and scale models are tested at the Center under conditions simulating altitudes of up to 1,000 miles and velocities up to twenty-three times the speed of sound.

The greatest advantage of simulated flight testing is the precise control that can be exercised in repeatedly simulating the variables of the flight envelope. In addition, models can be used rather than flight-weight hardware. Cause of a structural failure can be more easily pinpointed with recoverable hardware. Development of a system can be accelerated by simultaneous development of components and subsystems, making it unnecessary to wait for a suitable booster or test-bed for development testing.

Arnold Center has contributed to practically every top-priority aerospace program of the nation. Customers include the National Aeronautics and Space Administration; the Federal Aviation Administration; the Air Force, Army, and Navy; private industry; and government and educational institutions.

AEDC appropriately carries the name of the man directly responsible for its conception—Gen. Henry H. (Hap) Arnold. The original concept of the Center evolved from a study commissioned shortly before the end of World War II by General Arnold, then commander of the Army Air Forces. He had determined that the lack of aeronautical test facilities in the US prior to the war had resulted in technically inferior aeronautical weapon systems compared to those developed in Germany. The study was conducted under the leadership of Dr. Theodore von Kármán, one of the world's leading aeronautical scientists, and began with a detailed survey of German wind tunnels and ground test facilities.

Laboratories

DCS/Science and Technology (DL), Andrews AFB, Md.—The DCS/Science and Technology provides policy, planning, and technical direction to programs of the command's research and development laboratories.

Laboratories directly under DL are:

Air Force Office of Scientific Research (AFOSR), Bolling AFB, D. C.—AFOSR is the single manager of Air Force basic research. It awards grants and contracts for basic research directly related to Air Force needs. Research is selected to support the search for new knowledge and the expansion of scientific principles. AFOSR is also responsible for the activities of the Frank J. Seiler Research Laboratory, the European Office of Aerospace Research and Development, and the AFOSR Liaison Office, Far East.

The Frank J. Seiler Research Laboratory (FJSRL), USAF Academy, Colo.—This laboratory is engaged in basic research in physical and engineering sciences, usually centering around chemistry, applied mathematics, and aerospace mechanics. The laboratory sponsors related research conducted by the faculty and cadets of the USAF Academy.

European Office of Aerospace Research and Development (EOARD), London, England—This unit links the Air Force and the scientific communities in Europe, Africa, and the Near East. It identifies foreign technology, engineering, and manufacturing advances that can be applied to USAF requirements.

The AFOSR Liaison Office, Far East (AFOSR/FE), Tokyo, Japan—This office is the Far East counterpart to the EOARD and provides liaison with the scientific and engineering communities of the Far East.

Special Organizational Considerations

Air Force Engineering and Services Center, Research and Development Division (AFESC/RD), Tyndall AFB, Fla.—AFESC/RD is organizationally assigned to Headquarters Air Force Engineering and Services Center. It acts as the Systems Command agent in executing civil engineering, environmental quality, and facilities energy RDT&E. AFESC/RD evaluates methods and techniques to detect, assess, control, and abate Air Force environmental problems. The Division also conducts civil engineering R&D to improve air base survivability, aircraft contingency launch and recovery surfaces, aircraft and tactical shelters, and air base equipment/facilities.

Special AFSC Organizations

Foreign Technology Division (FTD), Wright-Patterson AFB, Ohio—FTD acquires, evaluates, analyzes, and disseminates information on foreign aerospace technology in concert with other divisions, laboratories, and centers. Information collected from a wide variety of sources is processed by unique electronic data-handling and laboratory-processing equipment and analyzed by scientific and technical specialists.

Air Force Contract Management Division (AFCMD), Kirtland AFB, N. M.—AFCMD is responsible for DoD contract management activities in twenty major contractor plants assigned to the Air Force under the DoD National Plant Cognizance Program. AFCMD evaluates contractor performance and manages the administration of contracts executed by Air Force, Army, Navy, Defense Logistics Agency, NASA, and other government purchasing agencies. The division also operates one detachment, the Contract Administration Services/European System Office (CASE/UR) in Brussels, Belgium, in support of the F-16 multinational coproduction program.

Aerospace Medical Division (AMD), Brooks AFB, Tex.—AMD is charged with the management and the conducting of research and development in aerospace biotechnology that supports the Air Force mission. AMD is responsible for the activities of the Air Force Human Resources Laboratory, the Wilford Hall Medical Center, the USAF School of Aerospace Medicine, and the USAF Occupational and Environmental Health Laboratory. Specialized and postgraduate professional education is also conducted in medicine, dentistry, and aerospace medical subjects at the USAF School of Aerospace Medicine. AMD scientists at the USAFSAM and the Harry G. Armstrong Aerospace Medical Research Laboratory seek to counter potential hazards and ensure maximum crew performance in all aerospace environments.

Air Force Human Resources Laboratory (AFHRL), Brooks AFB, Tex.—AFHRL manages and conducts research and exploratory and advanced development programs for manpower and personnel, operational and technical training, simulation, and logistics systems. The Manpower and Personnel Division is located at Brooks AFB. The other AFHRL divisions are the Logistics and Human Factors Division at Wright-Patterson AFB, Ohio, the Operations Training Division at Williams AFB, Ariz., and the Training Systems Division at Lowry AFB, Colo.

Wilford Hall USAF Medical Center (WHMC), Lackland AFB, Tex.—Established in 1942 as a 100-bed contingency hospital, Wilford Hall USAF Medical Center has grown to accommodate 1,000 beds and more than 1,000,000 outpatient visits annually.

Wilford Hall has completed an addition and alteration project that began in November 1976 and consumed $95 million and seven years of construction time.

A new wing was completed and opened in July 1979; a nine-story bed tower is now in use, as is the three-story clinic area. A new cancer therapy unit was recently opened.

A new $6 million clinical investigation facility opened in 1984 to enhance clinical research. Investigations have resulted in unprecedented advances in surgical and treatment procedures in such areas as dental work, drug therapy, internal medicine, psychiatric treatment, cancer treatment, experimental surgery, and organ transplants.

Services at the Center include the Air Force's only eye bank, a neonatal intensive care unit, complete dental care, open-heart surgery, kidney, bone marrow, and corneal transplants, and a cancer therapy unit.

In addition, Wilford Hall is a training center that offers residencies and fellowships in most major medical specialties, providing eighty-five percent of all postgraduate medical training courses in the Air Force.

Air Force Harry G. Armstrong Aerospace Medical Research Laboratory (AAMRL), Wright-Patterson AFB, Ohio—The Harry G. Armstrong Aerospace Medical Research Laboratory is part of the Aerospace Medical Division. It conducts behavioral and biomedical research to enhance human performance under conditions of environmental stress. AAMRL also establishes design criteria and new biotechnology techniques to protect and sustain personnel in future aerospace systems. The four areas of laboratory research are: occupational and environmental toxic hazards in Air Force operations, safety and aircrew effectiveness in mechanical force environments, man-machine integration technology, and manned weapon-system effectiveness.

USAF School of Aerospace Medicine (USAFSAM), Brooks AFB, Tex.—The school is part of the Aerospace Medical Division. Its research mission includes both in-house and contractual work dealing with applied aspects of aeromedical research. Investigations in the Divisions of Data Sciences, Clinical Sciences, Environmental Sciences, and Radiobiology encompass laboratory and clinical studies in biological, environmental, and dynamic conditions that may affect the health and efficiency of aircrews. The Epidemiology Division serves as a consultant and reference laboratory to Air Force medical facilities throughout the world. One of its principal responsibilities is to give advice and assistance in the investigation of disease outbreaks at Air Force installations. USAFSAM operates the USAF Hyperbaric Treatment Center and twenty-four-hour worldwide consultation service.

USAF Occupational and Environmental Health Laboratory (OEHL), Brooks AFB, Tex.—OEHL provides consultation and specialized laboratory services to support requirements of occupational, radiological, environmental health, and environmental quality programs.

AFSC NCO Academy/Leadership School, Kirtland AFB, N. M.—The Air Force Systems Command (AFSC) Noncommissioned Officer Academy and Leadership Schools are located at Kirtland AFB, N. M. The AFSC NCO Academy has been in continuous operation for more than thirty years—longer than any other Air Force NCO Academy. Both the Academy and Leadership School are important phases of the Air Force's four levels of professional military education offered to USAF's NCO corps. ■

Guide to NASA's Research Centers

The National Aeronautics and Space Administration (NASA) operates a number of research, development, test, and evaluation (RDT&E) field centers 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.—Programs at Ames involve research and development in aeronautics, life sciences, space sciences and applications, space technology, and new science and technology growing from aerospace programs. The Center's major program responsibilities are concentrated in: theoretical and experimental fluid mechanics and aerodynamics, rotorcraft technology, high-performance aircraft technology, flight simulation, flight testing, computational fluid dynamics, fluid and thermal physics, space sciences, airborne sciences and applications, human factors and space biology, and ground and flight projects in support of aeronautics and space technology. 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 Facility, Edwards AFB, Calif.—Dryden Flight Research Facility is concerned with manned flight within and outside the atmosphere, including low-speed, supersonic, hypersonic, and reentry flight and aircraft operations. Flight testing includes HiMAT (Highly Maneuverable Aircraft Technology), RPRVs (Remotely Piloted Research Vehicles), pivot-wing subsonic aircraft, digital fly-by-wire flight control systems, and wake vortex alleviation methods. Dryden served as a Shuttle landing site for the first four orbital flights and thereafter as a contingency landing site. 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.—The Goddard Space Flight Center conducts a wide-ranging program in space science and applications. The GSFC manages the development of wholly integrated spacecraft, ranging from systems engineering to development, integration, and testing; the development and operation of both the ground network of tracking and data acquisition facilities and the Tracking and Data Relay Satellite System; scientific research including both theoretical studies and development of significant scientific experiments flown on satellites; and the operation of a research airport located at Wallops Island, Va. Goddard is also the manager of the Delta launch vehicle. Named for Dr. Robert H. Goddard (1882–1945), the "father" of rocketry and the space age.

Jet Propulsion Laboratory, Pasadena, Calif.—Jet Propulsion Laboratory is operated for NASA under contract by the California Institute of Technology. The Jet Propulsion Laboratory is primarily responsible for the conduct of NASA automated missions concerned with deep space scientific exploration; tracking, data acquisition, reduction, and analysis required by deep space flight; and development of advanced spacecraft propulsion, guidance, and control systems. The Laboratory is also responsible for selected automated earth-orbital projects. Activities include a broad range of engineering, scientific, and management functions devoted to planetary exploration, physics and astronomy, space applications, spacecraft operations, operation of the Deep Space Network, and research and analysis.

John F. Kennedy Space Center, Fla.—The principal role of the Center includes Space Shuttle launch preparation, launch, landing, and refurbishment, Spacelab and Spacelab payloads ground processing, cargo/experiment integration and processing, upper stages ground processing, and operation and maintenance of ground-support equipment. The Center is also responsible for launch preparation, checkout, and launch for the current inventory of expendable launch vehicles. Launches from the Pacific Coast are conducted by the KSC Western Operations Support Office at Lompoc, Calif. The two principal Shuttle launching and landing sites are at Kennedy and at Vandenberg AFB, Calif.

Langley Research Center, Hampton, Va.—Langley's primary mission is research and development of advanced concepts and technology for future aircraft and spacecraft systems, with particular emphasis on environmental effects, performance, range, safety, and economy. The aeronautical research program is directed at pursuing basic and applied research opportunities leading to increases in performance, efficiency, and capability. Major research disciplines include aerodynamics; operations and airworthiness; acoustics and noise reduction; structures and materials; flutter, aeroelasticity, dynamic loads, and structural response; fatigue and fracture; electronic and mechanical instrumentation; and flight dynamics and control. Named for Samuel P. Langley (1834–1906), astronomer and aerodynamicist who pioneered in the theory and construction of heavier-than-air craft.

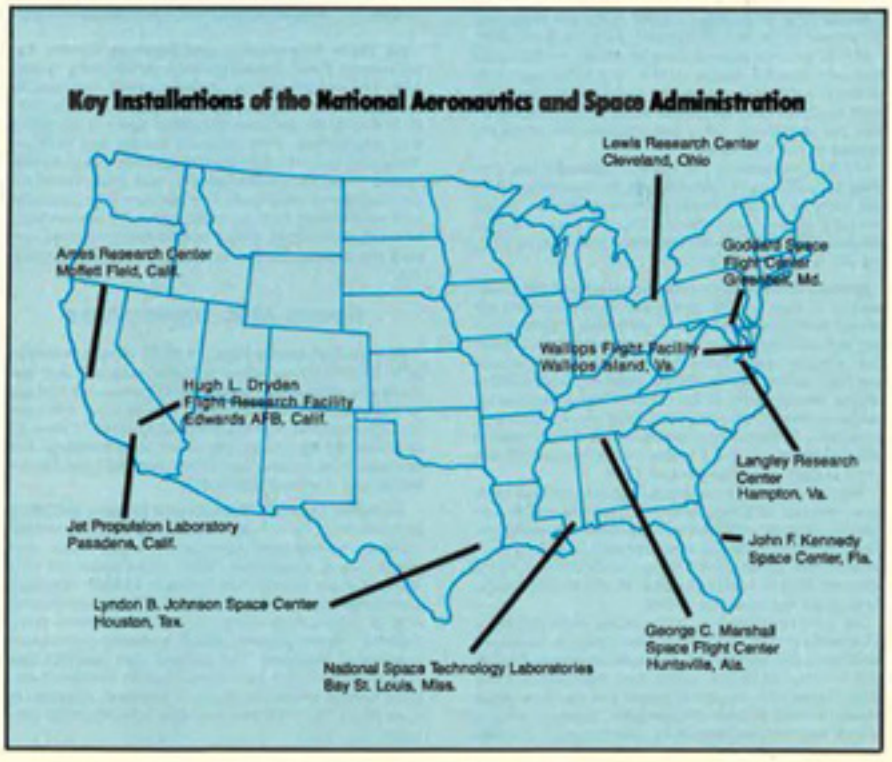
George C. Marshall Space Flight Center, Huntsville, Ala.—Marshall serves as one of NASA's primary centers for the design and development of space transportation systems, orbital systems, scientific payloads, and other means for space exploration. The Marshall Center has major responsibilities for Space Shuttle development, testing, and fabrication, including the main engine and solid rocket boosters and external tanks. Other major projects are Spacelab, Space Telescope, High-Energy Astronomy Observations, solar electric propulsion, and materials processing in space. It manages the Michoud Assembly Facility in New Orleans. Named for the late Gen. George C. Marshall, recipient of the Nobel Peace Prize.

Wallops Flight Facility, Wallops Island, Va.—Wallops is responsible for managing NASA's Suborbital Sounding Rocket Projects from mission and flight planning to landing and recovery, including payload and payload carrier design, development, fabrication, and testing; experiment management support; launch operations; and tracking and data acquisition. Launch vehicles used by Wallops include the four-stage Scout rocket with orbital capability. Wallops also manages the NASA balloon program and is responsible for operating the National Scientific Balloon Facility at Palestine, Tex.

Lewis Research Center, Cleveland, Ohio—LeRC was established as an aircraft engine research laboratory for aircraft propulsion systems. Since then, LeRC has developed many unique facilities for testing full-scale aircraft engines and engine components, chemical rocket engines, electric propulsion systems, space and terrestrial power generation systems, and space communication systems. Lewis is the lead center for aeronautical propulsion and power-transfer technologies, including engine materials and structures, tribology, bearings, seals, inlets, nozzles, propulsion system integration, compressors, turbines, transmissions, propellers, instrumentation, and controls. Lewis also manages the Atlas and Centaur launch vehicle systems and development of the Shuttle Centaur Cryogenic Upper Stage for the Space Transportation System. 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, and responsibilities include operational planning, crew selection and training, flight control, and experiment/payload flight control for the Space Transportation System. Definition and development of in-flight biomedical experiments are included in the life sciences research responsibilities of the Center. The Center is named for the late President Johnson.

National Space Technology Laboratories, Bay St. Louis, Miss.—NSTL is NASA's prime static test facility for large liquid-propellant rocket engines and propulsion systems. NSTL plays a key role in the development and acceptance testing of the Space Shuttle main engines and main propulsion system development testing and also conducts applied research and development in the fields of remote sensing, environmental sciences, and other selected applications program. NSTL manages the installation and provides support and facilities to collocated elements of other agencies including the Department of Defense, Department of Interior, Department of Commerce, the Environmental Protection Agency, and the Department of Transportation. ■



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AN AIR FORCE ALMANAC

On the following pages appears a variety of information and statistical material about the US Air Force—its people, organization, equipment, funding, activities, bases, and heroes. This "Almanac" section was compiled by the staff of Air Force Magazine. We especially acknowledge the help of the Secretary of the Air Force Office of Public Affairs in its role as liaison with Air Staff agencies in bringing up to date the comparable data from last year's "Almanac." A word of caution: Personnel figures that appear in this section in different forms will not agree (nor will they always agree with figures in command and separate operating agency reports or in the "Guide to Bases") because of different cutoff dates, rounding off, differing methods of reporting, or categories of personnel that are excluded in some cases. These figures do illustrate trends, however, and may be helpful in placing force fluctuations in perspective.

—THE EDITORS

USAF—EVOLUTION OF THE NAME AND THE SERVICE'S LEADERS THROUGH THE YEARS*

DESIGNATION	FROM	TO	COMMANDER (at highest rank)	TITLE	FROM	TO
Aeronautical Div., US Signal Corps	Aug. 1, 1907	July 18, 1914	Brig. Gen. James Allen	Chief Signal Officer	Aug. 1, 1907	Feb. 13, 1913
			Brig. Gen. George P. Scriven	Chief Signal Officer	Feb. 13, 1913	July 18, 1914
Aviation Section, US Signal Corps	July 18, 1914	May 24, 1918	Brig. Gen. George P. Scriven	Chief Signal Officer	July 18, 1914	Feb. 13, 1917
			Maj. Gen. George O. Squier	Chief Signal Officer	Feb. 14, 1917	May 20, 1918
Army Air Service (AAS)	May 24, 1918	July 2, 1926	Maj. Gen. William L. Kenly	Chief, Div. of Military Aeronautics	May 20, 1918	Dec. 22, 1918
			Maj. Gen. Charles T. Menoher	Chief of the Air Service	Dec. 23, 1918	Oct. 4, 1921
			Maj. Gen. Mason M. Patrick	Chief of the Air Service	Oct. 5, 1921	July 1, 1926
Army Air Corps (AAC)	July 2, 1926	June 20, 1941	Maj. Gen. Mason M. Patrick	Chief of the Air Corps	July 2, 1926	Dec. 12, 1927
			Maj. Gen. James E. Fechet	Chief of the Air Corps	Dec. 13, 1927	Dec. 18, 1931
			Maj. Gen. Benjamin D. Foulois	Chief of the Air Corps	Dec. 19, 1931	Dec. 21, 1935
			Maj. Gen. Oscar Westover	Chief of the Air Corps	Dec. 22, 1935	Sept. 21, 1938
			Gen. H. H. Arnold	Chief of the Air Corps	Sept. 29, 1938	June 30, 1941
Army Air Forces (AAF)	June 20, 1941	Sept. 18, 1947	Gen. H. H. Arnold	Chief of the AAF	June 30, 1941	Mar. 8, 1942
			Gen. of the Army H. H. Arnold	Commanding General, AAF	Mar. 9, 1942	Feb. 9, 1946
			Gen. Carl A. Spaatz	Commanding General, AAF	Feb. 10, 1946	Sept. 25, 1947
United States Air Force (USAF)*	Sept. 18, 1947		Gen. Carl A. Spaatz	Chief of Staff, USAF	Sept. 26, 1947	Apr. 29, 1948

*For USAF leaders since 1948, see p. 200.

UNITED STATES AIR FORCE PERSONNEL STRENGTH—1907 THROUGH 1986

YEAR	STRENGTH	YEAR	STRENGTH
1907	3	1947	305,827
1908	13	1948	387,730
1909	27	1949	419,347
1910	11	1950	411,277
1911	23	1951	788,381
1912	51	1952	973,474
1913	114	1953	977,593
1914	122	1954	947,918
1915	208	1955	959,946
1916	311	1956	909,958
1917	1,218	1957	919,835
1918	195,023	1958	871,156
1919	25,603	1959	840,028
1920	9,050	1960	814,213
1921	11,649	1961	820,490
1922	9,642	1962	883,330
1923	9,441	1963	868,644
1924	10,547	1964	855,802
1925	9,670	1965	823,633
1926	9,674	1966	886,350
1927	10,078	1967	897,426
1928	10,549	1968	904,759
1929	12,131	1969	862,062
1930	13,531	1970	791,078
1931	14,760	1971	755,107
1932	15,028	1972	725,635
1933	15,099	1973	690,999
1934	15,861	1974	643,795
1935	16,247	1975	612,551
1936	17,233	1976	585,207
1937	19,147	1977	570,479
1938	21,089	1978	569,491
1939	23,455	1979	559,450
1940	51,165	1980	557,969
1941	152,125	1981	570,302
1942	764,415	1982	582,845
1943	2,197,114	1983	592,044
1944	2,372,292	1984	597,125*
1945	2,282,259	1985	602,070*
1946	455,515	1986	611,500*

*Programmed

USAF TOTAL ACTIVE-DUTY STRENGTH BY GRADE

(As of September 30, 1984)

OFFICERS

GRADE	NUMBER
GENERAL	13
LIEUTENANT GENERAL	38
MAJOR GENERAL	117
BRIGADIER GENERAL	170
COLONEL	5,506
LIEUTENANT COLONEL	12,550
MAJOR	19,520
CAPTAIN	39,610
FIRST LIEUTENANT	14,400
SECOND LIEUTENANT	14,315
TOTAL	**106,239**

AIRMEN

GRADE	NUMBER
CHIEF MASTER SERGEANT	4,842
SENIOR MASTER SERGEANT	9,663
MASTER SERGEANT	36,519
TECHNICAL SERGEANT	56,261
STAFF SERGEANT	108,859
SERGEANT/SENIOR AIRMAN	102,758
AIRMAN FIRST CLASS	124,652
AIRMAN	22,021
AIRMAN BASIC	20,835
TOTAL	**486,410**

OFFICERS	106,239
CADETS	4,476
AIRMEN	486,410
TOTAL STRENGTH	**597,125**

USAF AND AIR RESERVE FORCES PERSONNEL BY CATEGORIES

CATEGORY	FY '81	FY '82	FY '83	FY '84	FY '85	FY '86[1]
AIR FORCE MILITARY						
Officers	99,000	102,000	104,600	106,200	108,200	109,600
Airmen	467,000	476,000	483,000	486,400	489,500	497,400
Cadets	4,000	4,000	4,500	4,500	4,400	4,400
TOTAL, AIR FORCE MILITARY	**570,000**	**582,000**	**592,100**	**597,100**	**602,100**	**611,500**
Career Reenlistments	43,000	44,400	43,500	38,000	44,600	50,700
Rate	86%	90%	92%	90%	90%	90%
First-Term Reenlistments	19,900	27,100	31,100	24,700	23,900	21,200
Rate	43%	57%	66%	62%	59%	54%
CIVILIAN PERSONNEL						
Direct Hire (Including Technicians)	233,000	235,500	230,000	239,800	242,800	252,495
Indirect Hire—Foreign Nationals	13,000	13,000	13,000	13,000	13,600	14,319
TOTAL, CIVILIAN PERSONNEL	**246,000**	**248,500**	**243,000**	**252,800**	**256,400**	**266,814**
TOTAL, MILITARY AND CIVILIAN[2]	**816,000**	**830,500**	**835,100**	**849,900**	**858,500**	**878,314**
Technicians (included above as Direct Hire Civilians)						
AFRES Technicians	7,600	7,748	7,984	7,634	8,305	9,042
ANG Technicians	21,829	21,834	21,949	22,160	22,401	22,792
AIR RESERVE FORCES						
Air National Guard, Selected Reserve	98,000	100,700	102,200	104,104	105,690	110,859
Air Force Reserve, Paid	62,000	64,500	67,227	70,318	74,829	77,400
Air Force Reserve, Nonpaid	44,000	43,000	42,864	40,000	40,000	40,000
TOTAL, READY RESERVE	**202,000**	**208,200**	**212,291**	**214,422**	**220,519**	**228,259**
Standby	37,000	33,000	28,939	29,121	28,600	29,000
TOTAL, AIR RESERVE FORCES[3]	**239,000**	**241,200**	**241,230**	**243,543**	**249,119**	**257,259**

[1]President's Budget Request.
[2]FY '81–84 are actual figures; FY '85–86 are estimates; excludes nonchargeable personnel.
[3]Excludes Retired Air Force Reserve.

NOTE: Totals may not add due to rounding.

USAF PERSONNEL STRENGTH BY COMMANDS, SOAs, AND DRUs

(Assigned Strengths as of September 30, 1984)

MAJOR COMMANDS	MILITARY	CIVILIAN	TOTAL
Air Force Communications Command (AFCC)	47,805	7,533	55,338
Air Force Logistics Command (AFLC)	11,248	85,244	96,492
Air Force Systems Command (AFSC)	28,654	27,600	56,254
Air Training Command (ATC)	70,738	14,043	84,781
Air University (AU)	7,544	1,727	9,271
Alaskan Air Command (AAC)	7,580	1,178	8,758
Electronic Security Command (ESC)	12,723	1,009	13,732
Military Airlift Command (MAC)	78,250	16,047	94,297
Pacific Air Forces (PACAF)	27,441	9,171	36,612
Space Command (SPACECMD)	5,116	1,259	6,375
Strategic Air Command (SAC)	105,979	12,085	118,064
Tactical Air Command (TAC)	102,912	11,490	114,402
United States Air Forces in Europe (USAFE)	61,500	9,977	71,477
TOTALS	**567,490**	**198,363**	**765,853**

SEPARATE OPERATING AGENCIES (SOAs)	MILITARY	CIVILIAN	TOTAL
Air Force Accounting and Finance Center (AFAFC)	226	2,171	2,397
Air Force Audit Agency (AFAA)	237	750	987
Air Force Commissary Service (AFCOMS)	859	9,264	10,123
Air Force Engineering and Services Center (AFESC)	390	466	856
Air Force Inspection and Safety Center (AFISC)	371	135	506
Air Force Intelligence Service (AFIS)	580	178	758
Air Force Legal Services Center (AFLSC)	417	148	565
Air Force Manpower and Personnel Center (AFMPC)	1,731	889	2,620
Air Force Medical Service Center (AFMSC)	104	59	163
Air Force Office of Security Police (AFOSP)	73	61	134
Air Force Office of Special Investigations (AFOSI)	1,822	424	2,246
Air Force Operational Test and Evaluation Center (AFOTEC)	513	133	646
Air Force Service Information and News Center (AFSINC)	660	176	836
Air Reserve Personnel Center (ARPC)	516	12,297	12,523
DIRECT REPORTING UNITS (DRUs)			
Air Force Technical Applications Center (AFTAC)	1,269	84	1,353
Combat Operations Staff (COS)	226	20	246
USAF Historical Research Center (USAFHRC)	22	70	92
National Guard Bureau (NGB)	1,916	1,611	3,527
United States Air Force Academy (USAFA)*	2,591	1,676	4,267
Other	10,636	33,149	43,785
TOTALS, SOAs and DRUs	**25,159**	**54,399**	**79,558**
TOTALS, COMMANDS, SOAs, and DRUs	**592,649**	**252,762**	**845,411**

*4,476 cadets not included.

AIR FORCE MILITARY PERSONNEL DISTRIBUTION BY GEOGRAPHIC AREA

(As of September 30, 1984)

TOTAL MILITARY PERSONNEL	**597,125**
US TERRITORY AND SPECIAL LOCATIONS	**469,287**
TOTAL IN FOREIGN COUNTRIES	**127,838**
Western and Southern Europe (Major concentrations in Germany—40,012, UK—25,971, Spain—5,190, Italy—5,403, Turkey—4,052)	89,178
East Asia and Pacific (Major concentrations in Japan/Okinawa—14,968, Philippines—9,277, South Korea—11,058)	35,659
Africa, Near East, S. Asia (Major concentrations in Egypt—64, Saudi Arabia—205)	412
Western Hemisphere (Major concentrations in Canada—121, Panama [Republic]—2,187)	2,406
Eastern Europe	19
Undistributed	164

NUMBER OF OFFICERS IN EACH MAJOR CAREER FIELD*

CODE	UTILIZATION FIELD TITLE	ASSIGNED
00**	Commanders and Directors	3,550
02	International Politico-Military Affairs	264
05	Disaster Preparedness	36
09	Special Duty	1,821
10–14	Pilot	20,781
15 & 22	Navigator	8,922
16	Air Traffic Control	453
17	Air Weapons Director	2,085
18	Missile Operations	3,180
20	Space Systems	1,171
23	Audiovisual	108
25	Weather	1,375
26	Scientific	1,582
27	Acquisition Program Management	2,378
28	Development Engineer	6,162
29	Program Management	229
30	Communications-Electronics	3,637
31	Missile Maintenance	506
40	Aircraft Maintenance & Munitions	3,818
51	Computer Technology	3,362
55	Civil Engineering	2,446
57	Cartography/Geodesy	101
60	Transportation	1,006
62	Supply Service	417
64	Supply Management	1,307
65	Procurement/Manufacturing Management	1,575
66	Logistics Plans & Programs	1,116
67	Financial	1,186
69	Management Analysis	222
70	Administration	2,396
73	Personnel	1,889
74	Manpower Management	582
75	Education & Training	693
79	Public Affairs	561
80	Intelligence	3,047
81	Security Police	1,078
82	Special Investigations & Counterintelligence	532
87	Band	34
88	Legal	1,293
89	Chaplain	829
90	Health Services Management	1,179
91 & 92	Biomedical Sciences	2,183
93–95	Physician	3,735
97	Nurse	4,684
98	Dental	1,608
99	Veterinary	46

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

**Commanders and director specialties in various career fields, e.g., operations, logistics, programming, etc.

NUMBER OF ENLISTED IN EACH MAJOR CAREER FIELD

CODE	CAREER FIELD TITLE	ASSIGNED
10	First Sergeant	1,695
11	Aircrew Operations	8,627
12	Aircrew Protection	3,029
20	Intelligence	13,172
22	Photomapping	119
23	Audiovisual	3,041
24	Safety	1,328
25	Weather	3,123
27	Command Control Systems Operations	16,542
29	Communications Operations	2,455
30	Communications-Electronics Systems	28,299
31	Missile Electronic Maintenance	3,349
32	Avionics Systems	30,244
34	Training Devices	2,583
36	Wire Communications Systems Maintenance	4,376
39	Maintenance Management Systems	3,136
40	Intricate Equipment Maintenance	865
41	Missile Systems Maintenance	5,160
42	Aircraft Systems Maintenance	44,218
43	Aircraft Maintenance	42,653
44	Missile Maintenance	3,177
46	Munitions & Weapons Maintenance	23,829
47	Vehicle Maintenance	5,613
49	Systems Information	15,283
54	Mechanical/Electrical	10,822
55	Structural/Pavements	13,215
56	Sanitation	1,807
57	Fire Protection	6,047
59	Marine	123
60	Transportation	14,911
61	Supply Services	2,915
62	Food Services	4,668
63	Fuels	7,162
64	Supply	25,838
65	Procurement	1,570
66	Logistics Plans	977
67	Accounting & Finance, and Auditing	5,450
69	Management Analysis	452
70	Administration	29,173
73	Personnel	11,582
74	Morale, Welfare & Recreation	1,835
75	Education & Training	3,661
79	Public Affairs	1,264
81	Security Police	39,355
82	Special Investigations & Counterintelligence	863
87	Band	1,079
90–92	Medical	24,826
98	Dental	3,493
99	Miscellaneous (Special Duty, Patients, Unclassified, etc.)	15,483

USAF PERSONNEL BY GRADE, RACE, AND SEX

(As of December 30, 1984)

OFFICERS

GRADE	FORCE	BLACK*	OTHER**	WOMEN***
GENERAL	342	8	2	3
COLONEL	5,592	109	68	86
LIEUTENANT COLONEL	12,736	266	193	357
MAJOR	19,671	523	271	1,066
CAPTAIN	40,293	2,895	589	5,486
FIRST LIEUTENANT	13,596	1,046	236	1,952
SECOND LIEUTENANT	14,403	840	273	2,324
TOTALS	**106,633**	**5,687**	**1,632**	**11,274**

AIRMEN

GRADE	FORCE	BLACK*	OTHER**	WOMEN***
CHIEF MASTER SERGEANT	4,847	526	66	15
SENIOR MASTER SERGEANT	9,872	1,447	140	45
MASTER SERGEANT	37,793	5,822	692	481
TECHNICAL SERGEANT	57,612	10,475	1,468	2,905
STAFF SERGEANT	110,969	20,628	3,698	14,303
SERGEANT	58,760	12,709	2,349	10,353
SENIOR AIRMAN	50,608	8,105	1,832	6,346
AIRMAN FIRST CLASS	111,050	17,272	4,205	14,941
AIRMAN	25,261	3,519	1,023	3,365
AIRMAN BASIC	21,579	3,004	860	3,006
TOTALS	**488,351**	**83,507**	**16,333**	**55,760**
TOTALS, INCLUDING OFFICERS	**594,984**	**89,194**	**17,965**	**67,034**

*Includes 13,290 women.
**Includes 2,127 women.
***Includes women from black and other categories.

AVERAGE AGES OF MILITARY PERSONNEL

(As of September 30, 1984)

Officers	Average 34 years of age
Airmen	Average 26 years of age

MONTHLY MILITARY BASIC RATES OF PAY

(Effective January 1, 1985)

PAY GRADE	YEARS OF SERVICE: UNDER 2	2	3	4	6	8	10	12	14	16	18	20	22	26
COMMISSIONED OFFICERS														
O-10	$5,069	$5,247	$5,247	$5,247	$5,247	$5,449	$5,449	$5,866*	$5,866*	$6,285*	$6,285*	$6,706*	$6,706*	$7,124*
O-9	4,493	4,610	4,708	4,708	4,708	4,828	4,828	5,029	5,029	5,449	5,449	5,866*	5,866*	6,285*
O-8	4,069	4,191	4,290	4,290	4,290	4,610	4,610	4,828	4,828	5,029	5,247	5,449	5,667	5,667
O-7	3,381	3,611	3,611	3,611	3,773	3,773	3,992	3,992	4,191	4,610	4,927	4,927	4,927	4,927
O-6	2,506	2,753	2,934	2,934	2,934	2,934	2,934	2,934	3,033	3,513	3,693	3,773	3,992	4,329
O-5	2,004	2,354	2,516	2,516	2,516	2,516	2,592	2,732	2,915	3,133	3,313	3,413	3,532	3,532
O-4	1,689	2,057	2,194	2,194	2,235	2,334	2,493	2,633	2,753	2,874	2,954	2,954	2,954	2,954
O-3	1,570	1,755	1,876	2,076	2,175	2,254	2,375	2,493	2,554	2,554	2,554	2,554	2,554	2,554
O-2	1,369	1,495	1,796	1,856	1,895	1,895	1,895	1,895	1,895	1,895	1,895	1,895	1,895	1,895
O-1	1,188	1,237	1,495	1,495	1,495	1,495	1,495	1,495	1,495	1,495	1,495	1,495	1,495	1,495
COMMISSIONED OFFICERS WITH MORE THAN 4 YEARS OF ACTIVE ENLISTED OR WARRANT OFFICER SERVICE														
O-3E	—	—	—	2,076	2,175	2,254	2,375	2,493	2,592	2,592	2,592	2,592	2,592	2,592
O-2E	—	—	—	1,856	1,895	1,955	2,057	2,136	2,194	2,194	2,194	2,194	2,194	2,194
O-1E	—	—	—	1,495	1,597	1,656	1,716	1,775	1,856	1,856	1,856	1,856	1,856	1,856
ENLISTED MEMBERS														
E-9	—	—	—	—	—	—	1,860	1,902	1,945	1,990	2,034	2,074	2,183	2,395
E-8	—	—	—	—	—	1,560	1,605	1,647	1,690	1,734	1,774	1,818	1,925	2,139
E-7	1,089	1,176	1,219	1,262	1,305	1,347	1,390	1,433	1,498	1,540	1,584	1,604	1,712	1,925
E-6	937	1,021	1,064	1,109	1,150	1,192	1,236	1,300	1,341	1,384	1,405	1,405	1,405	1,405
E-5	822	895	938	979	1,044	1,086	1,129	1,171	1,192	1,192	1,192	1,192	1,192	1,192
E-4	767	810	857	924	960	960	960	960	960	960	960	960	960	960
E-3	723	762	793	824	824	824	824	824	824	824	824	824	824	824
E-2	695	695	695	695	695	695	695	695	695	695	695	695	695	695
E-1**	620	620	620	620	620	620	620	620	620	620	620	620	620	620

NOTE: Amounts less than $1 have been omitted.
*Basic pay is limited to $5,724.90, or Level V of the Executive Schedule.
**Basic pay for E-1s with less than four months of service is $573.60.
Basic pay while serving as Chairman of the Joint Chiefs of Staff or as Chief of Staff of the Air Force is $7,861.20, regardless of cumulative years of service.
Basic pay while serving as Chief Master Sergeant of the Air Force is $2,912.10, regardless of cumulative years of service.

MONTHLY BASIC ALLOWANCE FOR QUARTERS (BAQ)

(Effective January 1, 1985)

Pay Grade	Without Dependents		With Dependents [3]
	Full [1,3]	Partial [2]	
O-10	$537.30	$50.70	$660.90 (661.80)
O-9	537.30	50.70	660.90 (661.80)
O-8	537.30	50.70	660.90 (661.80)
O-7	537.30	50.70	660.90 (661.80)
O-6	493.20	39.60	599.40
O-5	465.30	33.00	552.30
O-4	426.60	26.70	504.90
O-3	345.30	22.20	420.90 (422.70)
O-2	278.10 (297.60)	17.70	360.90 (376.20)
O-1	238.50	13.20	323.70
E-9	315.30	18.60	429.90
E-8	292.20	15.30	400.50
E-7	249.30	12.00	372.60
E-6	221.40	9.90	337.80
E-5	204.90	8.70	300.30
E-4	177.60	8.10	259.50
E-3	172.50	7.80	238.50
E-2	146.40	7.20	238.50
E-1	133.50	6.90	238.50

[1]Payment of the full rate of basic allowance for quarters at these rates to members of the uniformed services without dependents is authorized by 37 U.S.C. 403 and Part IV of Executive Order 11157, as amended.

[2]Payment of the partial rate of basic allowance for quarters at these rates to members of the uniformed services without dependents who, under 37 U.S.C. 403(b) or 403(c), are not entitled to the full rate of basic allowance for quarters is authorized by 37 U.S.C. 1009(c) and Part IV of Executive Order 11157, as amended.

[3]During the period beginning on January 1, 1985, and ending on the date on which any change is made by law in any of the rates of BAQ, the rate of BAQ payable to a member who is entitled to BAQ on or after January 1, 1985, and before the date of any such change and who was entitled to BAQ on December 31, 1984, shall not be less than the rate of BAQ that was in effect for that member on December 31, 1984, unless the member holds a lower grade than he held on that date or has had a change from "with dependent" status to "without dependent" status. Saved pay rates are shown in parentheses for the affected BAQ rates.

MONTHLY INCENTIVE PAY RATES*

(Effective January 1, 1985)

PHASE I

Monthly Rate	Years of Aviation Service as an Officer *(including flight training)*
$125	2 or less
$156	more than 2
$188	more than 3
$206	more than 4
$400	more than 6

PHASE II

Monthly Rate	Years of Service as an Officer as Computed under 37 U.S.C. 205
$370	more than 18
$340	more than 20
$310	more than 22
$280	more than 24
$250	more than 25 (O-6 and below)

Non-Crew Member Flying Pay

	Monthly Rate
Officer	$110
Enlisted Non-Crew Member	$ 83

*For rated officers, flight surgeons, and other designated medical officers.

NOTE: An officer in pay grade O-7 may not be paid at a rate greater than $200 a month. An officer in pay grade O-8 or above may not be paid at a rate greater than $206 a month. Officers with more than 18 years of commissioned service and less than 6 years of aviation service are entitled to Phase I rates.

BASIC ALLOWANCE FOR SUBSISTENCE (BAS)

Officers (Monthly)	Enlisted (Daily)*		
	Separate Rations	Rations in Kind Not Available	Emergency Rations
$106.18	$5.06 $4.68*	$5.72 $5.29*	$7.57 $7.00*

*Applies to E-1s with less than four months of active-duty service.

EDUCATIONAL LEVELS—USAF LINE OFFICERS

Level	End of September 1984 Number	Percent
Below baccalaureate/unknown	243	0.26
Baccalaureate, no master's degree	53,916	59.66
Master's degree, no doctorate	34,872	38.59
Doctoral and professional degrees	1,344	1.49
TOTALS	**90,375**	**100.00**

EDUCATIONAL LEVELS—USAF ENLISTED FORCE

Level	End of September 1984 Number	Percent
Below high school	2,062	0.43
High school	307,053	63.96
Some college (less than two years)	112,096	23.35
AA/AS degree	17,103	3.56
Two to three years of college	28,562	5.95
Baccalaureate, no master's	12,109	2.52
Master's or higher	1,120	0.23
TOTALS	**480,105**	**100.00**

FEDERAL CIVILIAN PAY SCALE

General Schedule

(Effective January 1, 1985)

GRADE	1	2	3	4	5	6	7	8	9	10
GS-1	$9,339	$9,650	$9,961	$10,271	$10,582	$10,764	$11,071	$11,380	$11,393	$11,686
GS-2	10,501	10,750	11,097	11,393	11,521	11,860	12,199	12,538	12,877	13,216
GS-3	11,458	11,840	12,222	12,604	12,986	13,368	13,750	14,132	14,514	14,896
GS-4	12,862	13,291	13,720	14,149	14,578	15,007	15,436	15,865	16,294	16,723
GS-5	14,390	14,870	15,350	15,830	16,310	16,790	17,270	17,750	18,230	18,710
GS-6	16,040	16,575	17,110	17,645	18,180	18,715	19,250	19,785	20,320	20,855
GS-7	17,824	18,418	19,012	19,606	20,200	20,794	21,388	21,982	22,576	23,170
GS-8	19,740	20,398	21,056	21,714	22,372	23,030	23,688	24,346	25,004	25,662
GS-9	21,804	22,531	23,258	23,985	24,712	25,439	26,166	26,893	27,620	28,347
GS-10	24,011	24,811	25,611	26,411	27,211	28,011	28,811	29,611	30,411	31,211
GS-11	26,381	27,260	28,139	29,018	29,897	30,776	31,655	32,534	33,413	34,292
GS-12	31,619	32,673	33,727	34,781	35,835	36,889	37,943	38,997	40,051	41,105
GS-13	37,599	38,852	40,105	41,358	42,611	43,864	45,117	46,370	47,623	48,876
GS-14	44,430	45,911	47,392	48,873	50,354	51,835	53,316	54,797	56,278	57,759
GS-15	52,262	54,004	55,746	57,488	59,230	60,972	62,714	64,456	66,198	67,940
GS-16	61,296	63,339	65,382	67,425	69,468*	71,511*	73,554*	75,597*	77,640*	
GS-17	71,840*	74,197*	76,590*	78,983*	81,376*					
GS-18	84,157*									

Senior Executive Service**

LEVEL	1	2	3	4	5	6
	$61,296	$63,764	$66,232	$68,700	$70,500	$72,300

*Pay limited to Level V of the Executive Schedule, $68,700.
**Basic pay for employees at these rates is limited to $72,300, in accordance with Public Law 97-377.

AIR FORCE FULL-TIME CIVILIAN EMPLOYMENT BY GRADE

(As of September 30, 1984)

GS/OTHER		WG		WL		WS	
GR	POP	GR	POP	GR	POP	GR	POP
1	127	1	253	1	0	1	38
2	640	2	1,089	2	27	2	44
3	6,366	3	786	3	2	3	139
4	16,280	4	1,537	4	49	4	224
5	22,612	5	4,030	5	54	5	388
6	8,516	6	4,288	6	47	6	518
7	12,679	7	5,687	7	55	7	989
8	1,970	8	7,313	8	157	8	919
9	17,107	9	6,902	9	256	9	1,392
10	860	10	19,808	10	943	10	1,741
11	17,258	11	5,648	11	144	11	680
12	17,221	12	1,912	12	21	12	383
13	8,381	13	330	13	0	13	332
14	3,214	14	114	14	0	14	224
15	1,050	15	4	15	0	15	139
16	0					16	49
17	2					17	11
18	1					18	1
ST	6					19	0
SES	229						
TOTALS	**134,519**		**59,701**		**1,755**		**8,211**

GR = Grade
GS = General Schedule
ST = Scientific and Professional
SES = Senior Executive Service

POP = Population
WG = Wage Grade Positions
WL = Wage Grade Leader Positions
WS = Wage Grade Supervisory Positions

NOTE: Table does not include ANG Technicians.

AIR FORCE CIVILIAN PERSONNEL AVERAGE AGE AND LENGTH OF SERVICE

(As of December 31, 1984)

Average age	43 years
Average length of service	15 years

DoD FINANCIAL SUMMARY BY COMPONENT FOR FY 1984–86

(TOA in Billions of Dollars)

Component	FY '84	FY '85	FY '86
Army	$ 62.28	$ 74.71	$ 82.01
Navy	81.71	96.49	104.88
Air Force	86.29	100.05	110.29
Defense Agencies/OSD	10.65	13.04	16.54
Defense-wide Contingencies	—	—	0.19
Defense-wide	17.30	1.05	0.48
TOTALS	**$258.22**	**$285.33**	**$314.38**

NOTE: Totals may not add due to rounding.

DoD BUDGET BY MISSION CATEGORIES FOR FY 1984–88

(Billions of Dollars)

	Total Budget Authority in Current Dollars (1984 figures actual; 1985–88 estimates)					
Military Program	**1984**	**1985**	**1986**	**1987**	**1988**	**Change FY 1985–86**
Strategic Forces[1]	$ 26.1	$ 27.8	$ 29.9	$ 30.5	$ 32.1	+ 2.1
General-Purpose Forces	100.7	120.6	132.1	152.5	177.4	+11.5
Intelligence and Communications	20.0	25.1	27.9	31.2	33.9	+ 2.8
Airlift and Sealift	5.5	7.0	8.0	8.5	8.0	+ 1.0
Guard and Reserve Forces	12.2	15.7	16.9	19.9	22.0	+ 1.2
Research and Development[2]	21.5	24.6	30.4	33.6	40.6	+ 5.8
Central Supply and Maintenance	23.4	24.4	26.5	30.6	35.5	+ 2.1
Training, Medical, and Other General Personnel Activities[3]	43.3	33.1	35.6	39.7	44.0	+ 2.5
Administrative and Associated Activities	4.8	5.9	5.9	6.6	7.2	0.0
Support of Other Nations	0.7	0.5	0.5	0.9	0.9	0.0
TOTAL BUDGET AUTHORITY	**$258.2**	**$284.7**	**$313.7**	**$354.0**	**$401.6**	**+29.0**

NOTE: Totals may not add due to rounding.

[1]Excludes strategic systems development included in the research and development category.
[2]Excludes research and development in other program areas on systems approved for production.
[3]Military retired pay is included in training, medical, and other general personnel activities through 1984. In 1985 and later years, military retired pay is funded on an accrual basis with costs distributed to all mission categories.

INSTALLATIONS OF THE US AIR FORCE

MAJOR INSTALLATIONS	**FY '77**	**FY '78**	**FY '79**	**FY '80**	**FY '81**	**FY '82**	**FY '83**	**FY '84**	**FY '85**
US and Possessions*	107	107	107	107	107	106	105	104	104
Foreign	27	27	27	27	27	28	30	32	32
Worldwide	**134**	**134**	**134**	**134**	**134**	**134**	**135**	**136**	**136**
MINOR INSTALLATIONS									
US and Possessions	2,305	2,205	2,169	2,098	2,074	2,086	2,039	2,028	2,028
Foreign	664	661	645	642	619	641	643	671	671
Worldwide	**2,969**	**2,866**	**2,814**	**2,740**	**2,693**	**2,727**	**2,682**	**2,699**	**2,699**
"Minor Installations" includes:									
Missile Sites	1,157	1,157	1,157	1,157	1,157	1,158	1,158	1,158	1,158
Air National Guard	128	127	128	131	133	136	136	137	137
Electronics Station or Site	569	545	530	485	467	484	461	461	461
General Support Annex	1,095	1,019	981	950	919	933	911	927	927
Auxiliary Airfield	20	18	18	17	17	16	16	16	16

*Includes Air Reserve Forces (AFRES and ANG).

AIR FORCE BUDGET AND FINANCE—FISCAL YEARS 1981–86

(Figures in millions of dollars)

	FY '81	FY '82	FY '83	FY '84	FY '85	FY '86
Gross National Product	$2,884,800	$3,048,800	$3,224,300	$3,581,100	$3,868,500	$4,198,500
Federal Budget, Outlays (Current $)	678,200	745,700	808,300	851,800	959,100	973,700
DoD Budget, Outlays (Current $)	156,096	182,850	205,012	220,806	246,300	277,500
DoD Percent of: GNP	5.4%	6.0%	6.4%	6.2%	6.4%	6.6%
Federal Budget	23.0%	24.5%	25.4%	25.9%	25.7%	28.5%
Air Force Budget Outlays						
Current Dollars	46,748	55,104	62,894	68,620	83,435	94,011
Constant FY '86 Dollars	59,041	64,126	70,178	74,089	86,868	94,011
AF Percent of: GNP	1.6%	1.8%	2.0%	1.9%	2.2%	2.2%
Federal Budget	6.9%	7.4%	7.8%	8.0%	8.7%	9.7%
DoD Budget	29.9%	30.1%	30.7%	31.1%	33.9%	33.9%
Total Obligational Authority						
DoD—Current Dollars	175,387	210,419	238,553	258,224	285,333	314,381
Constant FY '86 Dollars	218,102	245,024	266,727	279,560	296,717	314,381
AF—Current Dollars	52,335	64,920	73,806	86,285	101,548**	110,293
Constant FY '86 Dollars	64,880	75,397	82,286	98,648	104,895	110,293
(With anticipated supplementals)						
Current Dollars						
Aircraft Procurement (3010)	10,212	13,640	17,296	21,318	26,078	26,165
Missile Procurement (3020)	3,329	4,478	4,814	7,799	8,388**	10,863
Other Procurement (3080)	3,148	5,408	5,525	6,958	8,848	9,538
Procurement Subtotal	16,689	23,526	27,637	36,075	43,314	46,566
Military Construction—AF (3300)	937	1,558	1,460	1,551	1,573	2,082
Military Construction—AFRES (3730)	22	37	36	41	68	67
Military Construction—ANG (3830)	90	105	128	109	111	137
Military Construction Subtotal	1,049	1,700	1,624	1,701	1,752	2,286
RDT&E (3600)	7,133	8,866	10,621	12,275	13,506	15,579
Stock Fund (4921)	28	79	162	1,289	549	465
TOTAL, INVESTMENT	**24,899**	**34,171**	**40,044**	**51,340**	**59,121**	**64,896**
Military Personnel—AF (3500)	9,913	11,467	12,216	12,825	18,143	19,188
Reserve Personnel—AF (3700)	277	327	361	388	583	623
National Guard Personnel—AF (3850)	386	478	534	578	892	995
Military Personnel Subtotal	10,576	12,272	13,111	13,791	19,618	20,806
Operation & Maintenance—AF (3400)	14,742	16,133	17,179	17,773	19,213	20,924
Operation and Maintenance—AFRES (3740)	599	676	762	783	881	908
Operation & Maintenance—ANG (3840)	1,519	1,669	1,815	1,801	1,829	1,830
Family Housing* (0704)	—	—	896	798	885	929
TOTAL, OPERATING	**27,436**	**30,750**	**33,763**	**34,946**	**42,426**	**45,397**
Programs, TOA (Current $)						
I Strategic Forces	7,918	11,532	14,208	19,929	23,221**	23,179
II General-Purpose Forces	15,192	19,310	19,316	21,443	25,788	29,332
III Intelligence & Communications	5,932	7,138	9,150	10,741	14,067	15,885
IV Airlift & Sealift Forces	3,004	4,027	4,231	5,191	6,239	7,202
V Reserve & Guard Forces	3,525	3,621	4,337	4,453	5,346	5,298
VI Research & Development	5,729	7,074	8,400	9,296	9,888	10,501
VII Central Supply & Maintenance	5,202	5,564	6,266	7,267	7,373	8,406
VIII Training, Medical, & Other General Activities	4,611	5,487	6,747	6,718	8,145	8,998
IX Administration & Associated Activities	792	764	903	1,070	1,390	1,401
X Support of Other Nations	430	403	247	177	91	91

NOTE: Totals may not add due to rounding. FY '85 column is a revised estimate. FY '86 is President's budget request.
*OSD appropriation prior to FY '83.
**Includes $1.5 billion for Peacekeeper, pending March 1985 vote.

USAF AIRCRAFT PROCUREMENT—FY '78–86

CATEGORY	FY '78	FY '79	FY '80	FY '81	FY '82	FY '83	FY '84	FY '85	FY '86
Fixed-Wing Aircraft									
Total Units Budgeted	357	392	408	313	200	199	242	286	354
Accepted/Scheduled Acceptances	190	288	354	396	370	302	218	204	247
Helicopters									
Total Units Budgeted	0	0	0	5	6	0	0	0	0
Accepted/Scheduled Acceptances	0	0	0	0	0	11	0	0	0

NOTE: FY '78–84 columns are actual. FY '85–86 data are planned.

USAF'S AIRCRAFT—HOW MANY OF EACH TYPE AND HOW OLD?

(Current as of September 30, 1984)

	0–3 yrs.	3–6 yrs.	6–9 yrs.	9–12 yrs.	12–15 yrs.	15–18 yrs.	18–21 yrs.	21–24 yrs.	24+ yrs.	TOTAL NUMBER	AVERAGE AGE
A-7	—	1	—	—	19	3	—	—	—	23	13.5 years
A-10	170	193	97	4	—	—	—	—	—	464	3.9 years
A-37	—	—	7	17	19	1	—	—	—	44	11.6 years
B-1	—	1	1	—	—	—	—	—	—	2	6.6 years
B-52	—	—	—	—	—	—	—	113	151	264	24.0 years
FB-111	—	—	—	—	59	3	—	—	—	62	13.9 years
C-5	—	—	1	15	59	2	—	—	—	77	13.0 years
C-6	—	—	—	—	—	—	1	—	—	1	18.8 years
C-9	—	—	—	3	12	8	—	—	—	23	13.5 years
C-10	20	5	—	—	—	—	—	—	—	25	1.7 years
C-12	30	1	24	4	—	—	—	—	—	59	4.2 years
C-18	8	—	—	—	—	—	—	—	—	8	2.4 years
C-130	—	2	33	40	39	27	176	33	10	360	17.0 years
C-131	—	—	—	—	—	—	—	—	1	1	29.5 years
C-135	—	—	—	—	—	—	118	250	251	619	23.2 years
C-137	—	—	—	1	—	—	—	1	3	5	21.9 years
C-140	—	—	—	—	—	—	—	12	—	12	21.9 years
C-141	—	—	—	—	—	133	137	1	—	271	18.1 years
E-3	9	11	14	—	—	—	—	—	—	34	4.9 years
E-4	—	—	—	4	—	—	—	—	—	4	10.3 years
F-4	—	—	92	71	214	410	54	1	—	842	14.5 years
F-5	5	—	66	25	2	—	1	—	—	101	8.8 years
F-15	130	267	271	29	—	—	—	—	—	697	5.3 years
F-16	441	224	6	—	—	—	—	—	—	671	2.3 years
F-100	—	—	—	—	—	—	—	—	79	79	27.1 years**
F-102	—	—	—	—	—	—	—	—	4	4	26.9 years***
F-106	—	—	—	—	—	—	—	4	60	64	24.7 years
F-111	2	—	9	59	179	90	—	—	—	339	13.4 years
H-1	—	—	—	22	69	26	7	—	—	124	14.3 years
H-3	—	—	—	—	8	23	24	1	—	56	17.6 years
H-53	—	—	—	6	25	15	—	—	—	46	14.1 years
H-60	11	—	—	—	—	—	—	—	—	11	1.5 years
O-2	—	—	—	—	58	9	—	—	—	67	14.6 years
OV-10	—	—	—	—	—	77	—	—	—	77	15.9 years
TR-1	9	—	—	—	—	—	—	—	—	9	1.6 years
T-33	—	—	—	—	—	—	—	—	114	114	26.6 years
T-37	—	—	—	—	10	147	43	90	325	615	22.2 years
T-38	—	—	—	—	76	222	345	177	—	820	18.5 years
T-39	—	—	—	—	—	—	3	91	—	94	22.1 years
T-41	—	—	—	—	6	44	—	—	—	50	16.4 years
T-43	—	—	—	15	—	—	—	—	—	15	10.6 years
U-6	—	1	—	—	—	—	—	—	—	1	4.0 years
UV-18	—	—	2	—	—	—	—	—	—	2	7.0 years
U-26	1	—	—	—	—	—	—	—	—	1	1.0 year
X-29	2	—	—	—	—	—	—	—	—	2	2.3 years
OTHER	38	—	—	—	—	—	—	—	—	38	1.5 years
TOTALS	**875**	**706**	**625**	**315**	**854**	**1,240**	**909**	**774**	**998**	**7,299***	**12.0 years**
PERCENT	**12%**	**10%**	**9%**	**4%**	**12%**	**17%**	**12%**	**11%**	**14%**		

Less than 9 years old: 2,209 aircraft (30%).
More than 9 years old: 5,096 aircraft (70%).
*Includes adjustment of + 3 fighters not included in September 1984 calendar age report.
**Includes 67 drones.
***All are QF-102 drones.

NOTE: ARF not included in calendar age.

AIR NATIONAL GUARD AIRCRAFT—HOW MANY OF EACH TYPE AND HOW OLD?

(Current as of September 30, 1984)

	0–3 yrs.	3–6 yrs.	6–9 yrs.	9–12 yrs.	12–15 yrs.	15–18 yrs.	18–21 yrs.	21–24 yrs.	24+ yrs.	TOTAL NUMBER	AVERAGE AGE
A-7	18	11	28	126	176	—	—	—	—	359	11.1 years
A-10	—	101	5	—	—	—	—	—	—	106	5.0 years
OA-37	—	—	11	20	19	7	—	—	—	57	11.8 years
C-7	—	—	—	—	—	—	—	1	—	1	22.0 years
C-130	15	19	—	—	—	3	12	50	90	189	20.4 years
C-131	—	—	—	—	—	—	—	—	32	32	29.1 years
KC-135	—	—	—	—	—	—	—	—	104	104	25.6 years
F-4	—	—	—	—	12	218	437	—	—	667	18.6 years
F-16	—	26	—	—	—	—	—	—	—	26	4.2 years
F-106	—	—	—	—	—	—	—	3	76	79	24.9 years
H-3	—	—	—	—	3	2	6	—	—	11	17.1 years
O-2	—	—	—	—	5	8	—	—	—	13	15.7 years
T-33	—	—	—	—	—	—	—	—	40	40	28.8 years
T-39	—	—	—	—	—	—	—	6	—	6	22.0 years
T-43	—	—	—	4	—	—	—	—	—	4	10.5 years
TOTALS	**33**	**157**	**44**	**150**	**215**	**238**	**461**	**59**	**342**	**1,699**	**17.0 years**
PERCENT	**2%**	**9%**	**3%**	**9%**	**13%**	**14%**	**27%**	**3%**	**20%**		

Less than 9 years old: 284 aircraft (14%).
More than 9 years old: 1,465 aircraft (86%).

AIR FORCE RESERVE AIRCRAFT—HOW MANY, HOW OLD?

(Current as of November 30, 1984)

	0–3 yrs.	4–6 yrs.	7–9 yrs.	10–12 yrs.	13–15 yrs.	16–18 yrs.	19–21 yrs.	22–24 yrs.	24+ yrs.	TOTAL NUMBER	AVERAGE AGE
A-10	—	50	50	—	—	—	—	—	—	100	7.0 years
C-123	—	—	—	—	—	—	—	—	4	4	28.1 years
C-130A	—	—	—	—	—	—	—	—	61	61	26.9 years
AC-130A	—	—	—	—	—	—	—	—	10	10	28.0 years
C-130B	—	—	—	—	—	—	—	34	—	34	23.8 years
C-130E	—	—	—	—	—	—	17	24	—	41	21.5 years
C-130H	6	—	—	—	—	—	—	—	—	6	2.2 years
HC-130H	—	—	—	—	—	—	11	—	—	11	19.9 years
WC-130H	—	—	—	—	—	—	7	—	—	7	19.2 years
HC-130N	—	—	—	—	4	—	—	—	—	4	15.0 years
KC-135	—	—	—	—	—	—	—	—	24	24	26.5 years
F-4	—	—	—	—	—	110	2	—	—	112	18.0 years
F-16	—	26	—	—	—	—	—	—	—	26	5.5 years
H-1	—	—	—	—	10	—	—	—	—	10	14.5 years
H-3	—	—	—	—	2	8	4			14	18.3 years
TOTALS	**6**	**76**	**50**	**—**	**16**	**118**	**41**	**58**	**99**	**464**	**18.3 years**
PERCENT	**1%**	**16%**	**11%**	**0%**	**3%**	**25%**	**9%**	**13%**	**21%**		

Less than 9 years old: 132 aircraft (28%).
More than 9 years old: 332 aircraft (72%).

ACTIVE-DUTY MILITARY PERSONNEL, RESERVE COMPONENT MILITARY PERSONNEL, AND CIVILIAN PERSONNEL STRENGTH

(Figures in thousands)

	FY '80	FY '81	FY '82	FY '83	FY '84	FY '85	FY '86
Active-Duty Military							
Army	777	781	784	780	780	781	781
Navy	527	540	553	558	565	571	586
Marine Corps	188	191	192	194	197	198	200
Air Force	558	570	581	592	597	602	612
Total	**2,050**	**2,082**	**2,110**	**2,123**	**2,136**	**2,152**	**2,179**
Reserve Components (Selected Reserve)							
Army National Guard	367	389	408	417	433	447	450
Army Reserve	207	225	257	266	278	298	301
Naval Reserve	87	88	94	109	122	129	142
Marine Corps Reserve	35	37	40	43	44	46	43
Air National Guard	96	98	101	102	104	105	111
Air Force Reserve	59	62	64	67	70	75	77
Total	**851**	**899**	**964**	**1,005**	**1,051**	**1,100**	**1,124**
Direct Hire Civilian							
Army*	312	318	322	334	342	342	346
Navy	298	310	309	329	329	328	330
Air Force*	231	233	235	239	241	243	253
Defense Agencies	75	79	81	82	87	89	91
Total*	**916**	**940**	**947**	**984**	**999**	**1,002**	**1,020**

NOTE: Totals may not add due to rounding.

*These totals include Army and Air National Guard Technicians, who were converted from State to Federal employees in FY '69.

USAF FLYING SQUADRONS BY MISSION TYPE[1]

ACTIVE FORCES	FY '74	FY '82	FY '83	FY '84	FY '85*	FY '86*
Strategic Bomber	28	23	21	21	21	21
Air Refueling	38	33	34	32	33	33
Strategic Command and Control	8	7	6	6	6	6
Intelligence	—	—	3	3	3	3
Strategic Reconnaissance	—	—	1	1	1	1
Strategic Interceptor	7	5	5	5	5	5
Fighter	74	79	78	77	78	78
Tactical Reconnaissance	13	6	8	8	8	8
Tactical Electronic Warfare	—	2	2	3	3	2
Special Operations Forces	5	5	5	5	5	5
Tactical Air Command Control Systems[2]	2	3	3	3	3	3
Tactical Air Control Systems[2]	9	9	9	9	9	9
Weather	3	3	3	3	3	3
Rescue	12	8	8	8	8	8
Tactical Airlift	17	14	14	14	14	14
Strategic Airlift	17	17	17	17	17	17
Special Mission	2	1	1	1	1	1
Aeromedical Airlift	3	3	3	3	3	3
ICBM	26	26	25	24	23	23
TOTAL	**264**	**244**	**246**	**243**	**244**	**244**
RESERVE FORCES						
ANG Selected Reserve	91	91	91	91	91	91
Air Force Reserve[3]	53	54[4]	56[4]	56[4]	56[4]	56[4]
TOTAL	**144**	**145**	**147**	**147**	**147**	**147**
GRAND TOTAL	**409**	**389**	**393**	**391**	**391**	**391**

*Estimate.
[1]Includes training, support, and OT&E units.
[2]Includes consolidation of certain functional groups.
[3]Includes Associate squadrons.
[4]Includes twenty mobilized units.

NUMBER OF AIRCRAFT PER ACTIVE-DUTY USAF SQUADRON

Aircraft Type	Number*
A-7	18 or 24
A-10	18 or 24
B-52	14, 16, or 19
C-5	15 or 16**
C-9	3 or 11
C-130	16
AC-130	10
KC-135	9 to 25
C-141	17 or 18**
E-3A	2, 4, or 16
F-4	18 or 25
RF-4	18
F-5	11, 18, or 21
F-15	18 or 24
F-16	18 or 24
F-106	18
F-111	18 or 24
FB-111	12

*For some types of aircraft, squadrons vary in size as shown here. HC-130, WC-130, T-39, and T-38 aircraft are counted as total Unit Equipment, not by squadrons.
**Reflects ongoing transfer of assets to Air Reserve Forces. (Temporary situation in C-5 squadrons.)

THE NUMBER OF ACTIVE AIRCRAFT AND FLYING HOURS

TYPE OF AIRCRAFT	FY '80	FY '81	FY '82	FY '83	FY '84	FY '85	FY '86
Bomber, Strategic	414	412	391	338	328	328	340
Tanker	529	534	542	546	556	561	573
Fighter/Interceptor/Attack	2,769	2,850	2,900	2,997	3,019	3,048	3,037
Reconnaissance/Electronic Warfare	354	344	363	385	404	424	425
Cargo/Transport	836	835	825	827	863	863	869
Search & Rescue (Fixed Wing)	35	36	36	35	35	37	32
Helicopter (includes Rescue)	230	230	227	236	237	239	233
Trainer	1,678	1,644	1,642	1,624	1,622	1,657	1,650
Utility/Observation/Other	189	207	193	206	191	176	182
TOTAL, USAF	**7,034**	**7,092**	**7,119**	**7,194**	**7,255**	**7,333**	**7,341**
Air National Guard total	1,560	1,636	1,647	1,703	1,688	1,682	1,712
Air Force Reserve total	474	452	447	458	458	470	480
TOTAL, ACTIVE AIRCRAFT, USAF, ANG, AFRES	**9,069**	**9,180**	**9,213**	**9,355**	**9,401**	**9,485**	**9,533**
Active aircraft including foreign government owned	(9,209)	(9,321)	(9,346)	(9,445)	(9,489)	(9,573)	(9,621)
FLYING HOURS (000)							
USAF	2,596	2,619	2,800	2,843	2,870	2,881	2,950
Air National Guard	393	406	411	411	416	423	434
Air Force Reserve	136	134	130	132	136	140	149
TOTAL FLYING HOURS	**3,125**	**3,159**	**3,341**	**3,386**	**3,422**	**3,444**	**3,533**

NOTE: Data in FY '80–84 columns are actual; FY '85 and FY '86 data are estimated.

USAF Leaders Through The Years

SECRETARIES OF THE AIR FORCE

Stuart Symington	Sept. 18, 1947	Apr. 24, 1950
Thomas K. Finletter	Apr. 24, 1950	Jan. 20, 1953
Harold E. Talbott	Feb. 4, 1953	Aug. 13, 1955
Donald A. Quarles	Aug. 15, 1955	Apr. 30, 1957
James H. Douglas, Jr.	May 1, 1957	Dec. 10, 1959
Dudley C. Sharp	Dec. 11, 1959	Jan. 20, 1961
Eugene M. Zuckert	Jan. 24, 1961	Sept. 30, 1965
Harold Brown	Oct. 1, 1965	Feb. 15, 1969
Robert C. Seamans, Jr.	Feb. 15, 1969	May 14, 1973
John L. McLucas	July 18, 1973	Nov. 23, 1975
James W. Plummer (acting)	Nov. 24, 1975	Jan. 1, 1976
Thomas C. Reed	Jan. 2, 1976	Apr. 6, 1977
John C. Stetson	Apr. 6, 1977	May 18, 1979
Hans Mark	July 26, 1979	Feb. 9, 1981
Verne Orr	Feb. 9, 1981	

USAF CHIEFS OF STAFF

Gen. Carl A. Spaatz	Sept. 26, 1947	Apr. 29, 1948
Gen. Hoyt S. Vandenberg	Apr. 30, 1948	June 29, 1953
Gen. Nathan F. Twining	June 30, 1953	June 30, 1957
Gen. Thomas D. White	July 1, 1957	June 30, 1961
Gen. Curtis E. LeMay	June 30, 1961	Jan. 31, 1965
Gen. John P. McConnell	Feb. 1, 1965	July 31, 1969
Gen. John D. Ryan	Aug. 1, 1969	July 31, 1973
Gen. George S. Brown	Aug. 1, 1973	June 30, 1974
Gen. David C. Jones	July 1, 1974	June 20, 1978
Gen. Lew Allen, Jr.	July 1, 1978	June 30, 1982
Gen. Charles A. Gabriel	July 1, 1982	

CHIEF MASTER SERGEANTS OF THE AIR FORCE

CMSAF Paul W. Airey	Apr. 3, 1967	Aug. 1, 1969
CMSAF Donald L. Harlow	Aug. 1, 1969	Oct. 1, 1971
CMSAF Richard D. Kisling	Oct. 1, 1971	Oct. 1, 1973
CMSAF Thomas N. Barnes	Oct. 1, 1973	Aug. 1, 1977
CMSAF Robert D. Gaylor	Aug. 1, 1977	Aug. 1, 1979
CMSAF James M. McCoy	Aug. 1, 1979	July 1, 1981
CMSAF Arthur L. Andrews	Aug. 1, 1981	Aug. 1, 1983
CMSAF Sam E. Parish	Aug. 1, 1983	

AIR FORCE COMMUNICATIONS COMMAND

Maj. Gen. Harold W. Grant	July 1, 1961	Feb. 15, 1962
Maj. Gen. Kenneth P. Bergquist	Feb. 16, 1962	June 30, 1965
Maj. Gen. J. Francis Taylor, Jr.	July 1, 1965	Oct. 31, 1965
Maj. Gen. Richard P. Klocko	Nov. 1, 1965	July 2, 1967
Maj. Gen. Robert W. Paulson	July 15, 1967	Aug. 1, 1969
Maj. Gen. Paul R. Stoney	Aug. 1, 1969	Oct. 31, 1973
Maj. Gen. Donald L. Werbeck	Nov. 1, 1973	Aug. 24, 1975
Maj. Gen. Rupert H. Burris	Aug. 25, 1975	Oct. 31, 1977
Maj. Gen. Robert E. Sadler	Nov. 1, 1977	July 1, 1979
Maj. Gen. Robert T. Herres	July 1, 1979	July 27, 1981
Maj. Gen. Robert F. McCarthy	July 27, 1981	June 1, 1984
Maj. Gen. Gerald L. Prather	June 1, 1984	

Formerly Air Force Communications Service.
Redesignated Air Force Communications Command Nov. 15, 1979.

AIR FORCE LOGISTICS COMMAND

Gen. Joseph T. McNarney	Oct. 14, 1947	Aug. 31, 1949
Lt. Gen. Benjamin W. Chidlaw	Sept. 1, 1949	Aug. 20, 1951
Gen. Edwin W. Rawlings	Aug. 21, 1951	Feb. 28, 1959
Lt. Gen. William F. McKee	Mar. 1, 1959	Mar. 14, 1959
Gen. Samuel E. Anderson	Mar. 15, 1959	July 31, 1961
Gen. William F. McKee	Aug. 1, 1961	June 30, 1962
Gen. Mark E. Bradley, Jr.	July 1, 1962	July 31, 1965
Gen. Kenneth B. Hobson	Aug. 1, 1965	July 31, 1967
Gen. Thomas P. Gerrity	Aug. 1, 1967	Feb. 24, 1968
Lt. Gen. Lewis L. Mundell (acting)	Feb. 24, 1968	Mar. 28, 1968
Gen. Jack G. Merrell	Mar. 29, 1968	Sept. 11, 1972
Gen. Jack J. Catton	Sept. 12, 1972	Aug. 31, 1974
Gen. William V. McBride	Sept. 1, 1974	Aug. 31, 1975
Gen. F. Michael Rogers	Sept. 1, 1975	Jan. 27, 1978
Gen. Bryce Poe II	Jan. 28, 1978	July 31, 1981
Gen. James P. Mullins	Aug. 1, 1981	Nov. 1, 1984
Gen. Earl T. O'Loughlin	Nov. 1, 1984	

Formerly Air Material 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	July 31, 1977
Gen. Lew Allen, Jr.	Aug. 1, 1977	Mar. 13, 1978
Gen. Alton D. Slay	Mar. 14, 1978	Feb. 1, 1981
Gen. Robert T. Marsh	Feb. 1, 1981	Aug. 1, 1984
Gen. Lawrence A. Skantze	Aug. 1, 1984	

Formerly Air Research and Development Command.
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	Apr. 1, 1979
Gen. B. L. Davis	Apr. 1, 1979	July 29, 1981
Gen. Thomas M. Ryan, Jr.	July 29, 1981	June 30, 1983
Gen. Andrew P. Iosue	July 1, 1983	

AIR UNIVERSITY

Maj. Gen. Muir S. Fairchild	Mar. 15, 1946	May 17, 1948
Maj. Gen. Robert W. Harper	May 17, 1948	Oct. 15, 1948
Gen. George C. Kenney	Oct. 16, 1948	July 27, 1951
Lt. Gen. Idwal H. Edwards	July 28, 1951	Feb. 28, 1953
Lt. Gen. Laurence S. Kuter	Apr. 15, 1953	May 31, 1955
Lt. Gen. Dean C. Strother	June 1, 1955	June 30, 1958
Lt. Gen. Walter E. Todd	July 15, 1958	July 31, 1961
Lt. Gen. Troup Miller, Jr.	Aug. 1, 1961	Dec. 31, 1963
Lt. Gen. Ralph P. Swofford, Jr.	Jan. 1, 1964	July 31, 1965
Lt. Gen. John W. Carpenter III	Aug. 1, 1965	July 31, 1968
Lt. Gen. Albert P. Clark	Aug. 1, 1968	July 31, 1970
Lt. Gen. Alvan C. Gillem II	Aug. 1, 1970	Oct. 31, 1973
Lt. Gen. F. Michael Rogers	Nov. 1, 1973	Aug. 31, 1975
Lt. Gen. Raymond B. Furlong	Sept. 1, 1975	July 1, 1979
Lt. Gen. Stanley M. Umstead	July 1, 1979	July 24, 1981
Lt. Gen. Charles G. Cleveland	July 24, 1981	Aug. 1, 1984
Lt. Gen. Thomas C. Richards	Aug. 1, 1984	

Air University, now again a major command, was part of Training Command between May 1978 and July 1983.

ALASKAN AIR COMMAND

Brig. Gen. Joseph H. Atkinson	Oct. 1, 1946	Feb. 25, 1949
Brig. Gen. Frank A. Armstrong, Jr.	Feb. 26, 1949	Dec. 27, 1950
Maj. Gen. William D. Old	Dec. 27, 1950	Oct. 14, 1952
Brig. Gen. W. R. Agee	Oct. 27, 1952	Feb. 26, 1953
Maj. Gen. George R. Acheson	Feb. 26, 1953	Feb. 1, 1956
Lt. Gen. Joseph H. Atkinson	Feb. 24, 1956	July 16, 1956
Maj. Gen. Frank A. Armstrong, Jr.	July 17, 1956	Oct. 23, 1956
Maj. Gen. James H. Davies	Oct. 24, 1956	June 27, 1957
Lt. Gen. Frank A. Armstrong, Jr.	June 28, 1957	Aug. 18, 1957
Brig. Gen. Kenneth H. Gibson	Aug. 19, 1957	Aug. 13, 1958
Maj. Gen. C. F. Necrason	Aug. 14, 1958	July 19, 1961
Maj. Gen. Wendell W. Bowman	July 26, 1961	Aug. 8, 1963
Maj. Gen. James C. Jensen	Aug. 15, 1963	Nov. 14, 1966
Maj. Gen. Thomas E. Moore	Nov. 15, 1966	July 24, 1969
Maj. Gen. Joseph A. Cunningham	July 25, 1969	July 31, 1972
Maj. Gen. Donavon F. Smith	Aug. 1, 1972	June 5, 1973
Maj. Gen. Charles W. Carson, Jr.	June 18, 1973	Mar. 2, 1974
Maj. Gen. Jack K. Gamble	Mar. 19, 1974	June 30, 1975
Lt. Gen. James E. Hill	July 1, 1975	Oct. 14, 1976
Lt. Gen. M. L. Boswell	Oct. 15, 1976	June 30, 1978
Lt. Gen. Winfield W. Scott, Jr.	July 1, 1978	Apr. 1, 1981
Lt. Gen. Lynwood E. Clark	Apr. 1, 1981	Aug. 31, 1983
Lt. Gen. Bruce K. Brown	Sept. 1, 1983	

ELECTRONIC SECURITY COMMAND

Col. Roy H. Lynn	Oct. 26, 1948	July 5, 1949
Col. Travis M. Hetherington	July 6, 1949	Feb. 21, 1951

Maj. Gen. Roy H. Lynn	Feb. 22, 1951	Feb. 13, 1953
Maj. Gen. Harold H. Bassett	Feb. 14, 1953	Jan. 3, 1957
Maj. Gen. Gordon L. Blake	Jan. 4, 1957	Aug. 5, 1959
Maj. Gen. John B. Ackerman	Aug. 6, 1959	Sept. 20, 1959
Maj. Gen. Millard Lewis	Sept. 21, 1959	Aug. 31, 1962
Maj. Gen. Richard P. Klocko	Sept. 1, 1962	Oct. 15, 1965
Maj. Gen. Louis E. Coira	Oct. 16, 1965	July 18, 1969
Maj. Gen. Carl W. Stapleton	July 19, 1969	Feb. 23, 1973
Maj. Gen. Walter T. Galligan	Feb. 24, 1973	May 16, 1974
Maj. Gen. Howard P. Smith	May 17, 1974	July 31, 1975
Maj. Gen. K. D. Burns	Aug. 1, 1975	Jan. 18, 1979
Maj. Gen. Doyle E. Larson	Jan. 19, 1979	July 31, 1983
Maj. Gen. John B. Marks	Aug. 1, 1983	

Formerly USAF Security Service.
Redesignated Electronic Security Command Aug. 1, 1979.

MILITARY AIRLIFT COMMAND

Lt. Gen. Laurence S. Kuter	June 1, 1948	Oct. 28, 1951
Lt. Gen. Joseph Smith	Nov. 15, 1951	June 30, 1958
Lt. Gen. William H. Tunner	July 1, 1958	May 31, 1960
Gen. Joe W. Kelly, Jr.	June 1, 1960	July 18, 1964
Gen. Howell M. Estes, Jr.	July 19, 1964	July 31, 1969
Gen. Jack J. Catton	Aug. 1, 1969	Sept. 12, 1972
Gen. Paul K. Carlton	Sept. 20, 1972	Mar. 31, 1977
Gen. William G. Moore, Jr.	Apr. 1, 1977	June 30, 1979
Gen. Robert E. Huyser	July 1, 1979	June 26, 1981
Gen. James R. Allen	June 26, 1981	June 30, 1983
Gen. Thomas M. Ryan, Jr.	July 1, 1983	

Formerly Military Air Transport Service.
Redesignated as Military Airlift Command Jan. 1, 1966.

PACIFIC AIR FORCES

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

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

SPACE COMMAND

Gen. James V. Hartinger	Sept. 1, 1982	Aug. 1, 1984
Gen. Robert T. Herres	Aug. 1, 1984	

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	July 31, 1977
Gen. Richard H. Ellis	Aug. 1, 1977	Aug. 1, 1981
Gen. B. L. Davis	Aug. 1, 1981	

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	Apr. 30, 1978
Gen. W. L. Creech	May 1, 1978	Nov. 1, 1984
Gen. Jerome F. O'Malley	Nov. 1, 1984	

US AIR FORCES IN EUROPE

Brig. Gen. John F. McBain	Aug. 15, 1947	Oct. 20, 1947
Lt. Gen. Curtis E. LeMay	Oct. 20, 1947	Oct. 15, 1948
Lt. Gen. John K. Cannon	Oct. 16, 1948	Jan. 20, 1951
Gen. Lauris Norstad	Jan. 21, 1951	July 26, 1953
Lt. Gen. William H. Tunner	July 27, 1953	June 30, 1957
Gen. Frank F. Everest	July 1, 1957	July 31, 1959
Gen. Frederic H. Smith, Jr.	Aug. 1, 1959	June 30, 1961
Gen. Truman H. Landon	July 1, 1961	July 31, 1963
Gen. Gabriel P. Disosway	Aug. 1, 1963	July 31, 1965
Gen. Bruce K. Holloway	Aug. 1, 1965	July 31, 1966
Gen. Maurice A. Preston	Aug. 1, 1966	July 31, 1968
Gen. Horace M. Wade	Aug. 1, 1968	Jan. 31, 1969
Gen. Joseph R. Holzapple	Feb. 1, 1969	Aug. 31, 1971
Gen. David C. Jones	Sept. 1, 1971	June 30, 1974
Gen. John W. Vogt	July 1, 1974	Aug. 31, 1975
Gen. Richard H. Ellis	Sept. 1, 1975	July 31, 1977
Gen. William J. Evans	Aug. 1, 1977	Aug. 1, 1978
Gen. John W. Pauly	Aug. 1, 1978	Aug. 1, 1980
Gen. Charles A. Gabriel	Aug. 1, 1980	June 30, 1982
Gen. Billy M. Minter	July 1, 1982	Nov. 1, 1984
Gen. Charles L. Donnelly, Jr.	Nov. 1, 1984	

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	July 31, 1977
Lt. Gen. Kenneth L. Tallman	Aug. 1, 1977	June 16, 1981
Maj. Gen. Robert E. Kelley	June 16, 1981	July 4, 1983
Lt. Gen. Winfield W. Scott, Jr.	July 5, 1983	

AIR (AEROSPACE) DEFENSE COMMAND

Lt. Gen. George E. Stratemeyer	Mar. 27, 1946	Nov. 30, 1948
Maj. Gen. Gordon P. Saville	Dec. 1, 1948	Sept. 1, 1949*
Lt. Gen. Ennis C. Whitehead	Jan. 8, 1951	Aug. 24, 1951
Gen. Benjamin W. Chidlaw	Aug. 25, 1951	May 31, 1955
Maj. Gen. Frederic H. Smith, Jr. (acting)	June 1, 1955	July 19, 1955
Gen. Earle E. Partridge	July 20, 1955	Sept. 16, 1956
Lt. Gen. Joseph H. Atkinson	Sept. 17, 1956	Feb. 28, 1961
Lt. Gen. Robert M. Lee	Mar. 1, 1961	July 5, 1963
Maj. Gen. Robert H. Terrill (acting)	July 6, 1963	July 31, 1963
Lt. Gen. Herbert B. Thatcher	Aug. 1, 1963	July 31, 1967
Lt. Gen. Arthur C. Agan, Jr.	Aug. 1, 1967	Feb. 28, 1970
Lt. Gen. Thomas K. McGehee	Mar. 1, 1970	June 30, 1973
Gen. Seth J. McKee	July 1, 1973	Sept. 30, 1973
Gen. Lucius D. Clay, Jr.	Oct. 1, 1973	Aug. 31, 1975
Gen. Daniel James, Jr.	Sept. 1, 1975	Dec. 6, 1977
Gen. James E. Hill	Dec. 6, 1977	Dec. 31, 1979
Gen. James V. Hartinger	Jan. 1, 1980**	Mar. 31, 1980

*After September 1, 1949, ADC was reduced to paper status and finally inactivated on July 1, 1950. It was reestablished on January 1, 1951.
**With the activation of the Aerospace Defense Center on December 1, 1979, General Hartinger became commander of both ADCOM and the Center. When the major command inactivated in March 1980, he continued as commander of the Center.

AIR FORCE RESERVE

Maj. Gen. Rollin B. Moore, Jr.	Aug. 1, 1968	Jan. 26, 1972
Brig. Gen. Alfred Verhulst (acting)	Jan. 27, 1972	Mar. 15, 1972
Maj. Gen. Homer I. Lewis	Mar. 16, 1972	Apr. 8, 1975
Maj. Gen. William Lyon	Apr. 16, 1975	Apr. 16, 1979
Maj. Gen. Richard Bodycombe	Apr. 17, 1979	Oct. 31, 1982
Maj. Gen. Sloan R. Gill	Nov. 1, 1982	

Since Mar. 16, 1972, the Chief of Air Force Reserve has been dual-hatted as Commander, Hq. Air Force Reserve (AFRES). The earlier chief of Air Force Reserve was Maj. Gen. Tom E. Marchbanks, Jr., from Jan. 18, 1968, to Feb. 1, 1971.

AIR NATIONAL GUARD

Col. William A. R. Robertson	Nov. 28, 1945	Oct. 1948
Maj. Gen. George G. Finch	Oct. 1948	Sept. 25, 1950
Maj. Gen. Earl T. Ricks	Oct. 13, 1950	Jan. 4, 1954
Maj. Gen. Winston P. Wilson	Jan. 26, 1954	Aug. 5, 1962
Maj. Gen. I. G. Brown	Aug. 6, 1962	Apr. 19, 1974
Maj. Gen. John J. Pesch	Apr. 20, 1974	Jan. 31, 1977
Maj. Gen. John T. Guice	Feb. 1, 1977	Apr. 1, 1981
Maj. Gen. John B. Conaway	Apr. 1, 1981	

The ANG head was Chief, Aviation Group, National Guard Bureau until 1948, when the title changed to Chief, Air Force Division, NGB. In Dec. 1969 the title was changed to the present Director, Air National Guard.

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 USAF Historical Research Center, Maxwell AFB, Ala., has completed a detailed accounting of the Air Service victory credits in World War I, AAF victory credits in World War II, and USAF victory credits in Korea and Southeast Asia. The World War II list took much time as a result of the great number of victories (16,591 full and partial credits) and the many different procedures used to record them. The final documented list of all World War II combat scores is now available in printed form. It is USAF Historical Study No. 85, titled "USAF Credits for the Destruction of Enemy Aircraft, World War II." Copies at $8.85 each may be ordered from the USAF Historical Research Center, Maxwell AFB, Ala. 36112.

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 LE—Lafayette Escadrille RFC—Royal Flying Corps (British)
FFC—French Flying Corps RN—Royal Navy (British)

LEADING ARMY AIR FORCES ACES OF WORLD WAR II

(Fourteen and a half or more victories)

Bong, Maj. Richard I.	40	Duncan, Col. Glenn E.	19.50	Anderson, Capt. Clarence E., Jr.	16.25
McGuire, Maj. Thomas B., Jr.	38	Carson, Capt. Leonard K.	18.50	Dunham, Lt. Col. William D.	16
Gabreski, Lt. Col. Francis S.	28*	Eagleston, Maj. Glenn T.	18.50*	Harris, Lt. Col. Bill	16
Johnson, Capt. Robert S.	27	Hill, Col. David L. (AVG/USAF) (12.25)	18.25**	Welch, Capt. George S.	16
MacDonald, Col. Charles H.	27	Older, Lt. Col. Charles H. (AVG/USAF) (11.25)	18.25**	Beerbower, Capt. Donald M.	15.50
Preddy, Maj. George E.	26.83	Beckham, Maj. Walter C.	18	Brown, Maj. Samuel J.	15.50
Meyer, Lt. Col. John C.	24*	Green, Maj. Herschel H.	18	Peterson, Capt. Richard A.	15.50
Schilling, Col. David C.	22.50	Herbst, Lt. Col. John C.	18	Whisner, Capt. William T., Jr.	15.50*
Johnson, Lt. Col. Gerald R.	22	Zemke, Lt. Col. Hubert	17.75	Blakeslee, Col. Donald J. M. (ES/USAF) (3.5)	15**
Kearby, Col. Neel E.	22	England, Maj. John B.	17.50	Bradley, Lt. Col. Jack T.	15
Robbins, Maj. Jay T.	22	Beeson, Capt. Duane W.	17.33	Cragg, Maj. Edward	15
Christensen, Capt. Fred J.	21.50	Thornell, 1st Lt. John F., Jr.	17.25	Foy, Maj. Robert W.	15
Wetmore, Capt. Ray S.	21.25	Reed, Lt. Col. William N. (AVG/USAF) (11)	17**	Hofer, 2d Lt. Ralph K.	15
Voll, Capt. John J.	21	Varnell, Capt. James S., Jr.	17	Homer, Capt. Cyril F.	15
Mahurin, Maj. Walker M.	20.75*	Johnson, Maj. Gerald W.	16.50	Bochkay, Capt. Donald H.	14.84
Lynch, Lt. Col. Thomas J.	20	Godfrey, Capt. John T.	16.33	Landers, Lt. Col. John D.	14.50
Westbrook, Lt. Col. Robert B.	20			Powers, Capt. Joe H., Jr.	14.50
Gentile, Capt. Donald S.	19.83				

* Aces who added to these scores by victories in the Korean War. Ranks are as of last victory in World War II.

AVG—American Volunteer Group
ES—Eagle Squadron

** The Historical Research Center has no way of verifying kills claimed (in parentheses) while flying with AVG or ES.

USAF ACES OF THE KOREAN WAR

McConnell, Capt. Joseph, Jr.	16	Hagerstrom, Maj. James P.	8.50*	Whisner, Maj. William T., Jr.	5.50*
Jabara, Maj. James	15*	Risner, Capt. Robinson	8	Baldwin, Col. Robert P.	5
Fernandez, Capt. Manuel J.	14.50	Ruddell, Lt. Col. George I.	8*	Becker, Capt. Richard S.	5
Davis, Maj. George A., Jr.	14*	Buttlemann, 1st Lt. Henry	7	Bettinger, Maj. Stephen L.	5
Baker, Col. Royal N.	13*	Jolley, Capt. Clifford D.	7	Creighton, Maj. Richard D.	5*
Blesse, Maj. Frederick C.	10	Lilley, Capt. Leonard W.	7	Curtin, Capt. Clyde A.	5
Fischer, 1st Lt. Harold E.	10	Adams, Maj. Donald E.	6.50	Gibson, Capt. Ralph D.	5
Garrison, Lt. Col. Vermont	10*	Gabreski, Col. Francis S.	6.50*	Kincheloe, Capt. Iven C., Jr.	5
Johnson, Col. James K.	10*	Jones, Lt. Col. George L.	6.50	Latshaw, Capt. Robert T., Jr.	5
Moore, Capt. Lonnie R.	10	Marshall, Maj. Winton W.	6.50	Moore, Capt. Robert H.	5
Parr, Capt. Ralph S., Jr.	10	Kasler, 1st Lt. James H.	6	Overton, Capt. Dolphin D., III	5
Foster, Capt. Cecil G.	9	Love, Capt. Robert J.	6	Thyng, Col. Harrison R.	5*
Low, 1st Lt. James F.	9			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		WW II	KOREA	TOTAL
Gabreski, Col. Francis S.	28	6.50	34.50	Johnson, Col. James K.	1	10	11
Meyer, Col. John C.	24	2	26	Ruddell, Lt. Col. George I.	2.50	8	10.50
Mahurin, Col. Walker M.	20.75	3.50	24.25	Thyng, Col. Harrison R.	5	5	10
Davis, Maj. George A., Jr.	7	14	21	Colman, Capt. Philip E.	5	4	9
Whisner, Maj. William T., Jr.	15.50	5.50	21	Heller, Lt. Col. Edwin L.	5.50	3.50	9
Eagleston, Col. Glenn T.	18.50	2	20.50	Chandler, Maj. Van E.	5	3	8
Garrison, Lt. Col. Vermont	7.33	10	17.33	Hockery, Maj. John J.	7	1	8
Baker, Col. Royal N.	3.50	13	16.50	Creighton, Maj. Richard D.	2	5	7
Jabara, Maj. James	1.50	15	16.50	Emmert, Lt. Col. Benjamin H., Jr.	6	1	7
Olds, Col. Robin	12	4*	16	Bettinger, Maj. Stephen L.	1	5	6
Mitchell, Col. John W.	11	4	15	Visscher, Maj. Herman W.	5	1	6
Brueland, Maj. Lowell K.	12.50	2	14.50	Liles, Capt. Brooks J.	1	4	5
Hagerstrom, Maj. James P.	6	8.50	14.50	Mattson, Capt. Conrad E.	1	4	5
Hovde, Lt. Col. William J.	10.50	1	11.50	Shaeffer, Maj. William F.	2	3	5

* Colonel Olds's 4 additional victories came during the Vietnam War.

AMERICAN ACES OF THE VIETNAM WAR

DeBellevue, Capt. Charles B. (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	Kearby, Col. Neel E.	22	WW II
McGuire, Maj. Thomas B., Jr.	38	WW II	Robbins, Maj. Jay T.	22	WW II
Gabreski, Col. Francis S.	34.50	WW II, Korea	Christensen, Capt. Fred J.	21.50	WW II
Johnson, Lt. Col. Robert S.	27	WW II	Wetmore, Capt. Ray S.	21.25	WW II
MacDonald, Col. Charles H.	27	WW II	Davis, Maj. George A., Jr.	21	WW II, Korea
Preddy, Maj. George E.	26.83	WW II	Voll, Capt. John J.	21	WW II
Meyer, Col. John C.	26	WW II, Korea	Whisner, Maj. William T., Jr.	21	WW II, Korea
Rickenbacker, Capt. Edward V.	26	WW I	Eagleston, Col. Glenn T.	20.50	WW II, Korea
Mahurin, Col. Walker M.	24.25	WW II, Korea	Lynch, Lt. Col. Thomas J.	20	WW II
Schilling, Col. David C.	22.50	WW II	Westbrook, Lt. Col. Robert B.	20	WW II
Johnson, Lt. Col. Gerald R.	22	WW II	Gentile, Capt. Donald S.	19.83	WW II

SOME FAMOUS FIGHTER FIRSTS

First American to down 5 enemy aircraft in WW I	Capt. Frederick Libby (serving with the RFC)
First American ace of WW 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 WW I	Capt. Douglas Campbell
First American ace of WW II	Pilot Officer William R. Dunn (RAF)
First American USAAF ace of WW II	Lt. Boyd D. "Buzz" Wagner
First American to score an aerial victory in Korea	1st Lt. William G. Hudson (June 27, 1950)
First jet-to-jet kill of the Korean War	1st Lt. Russell J. Brown (Nov. 8, 1950)
First American ace of the Korean War	Capt. James Jabara (May 20, 1951)
First American ace of two wars	Maj. A. J. "Ajax" Baumler (8 in Spain; 5 in WW II)
First USAF ace of two wars	Maj. William T. Whisner, Jr. (15.5 in WW II; 5.5 in Korea)
First USAF ace with victories in WW II and Vietnam	Col. Robin Olds (12 in WW II; 4 in Vietnam)

Source: *Fighter Aces*, by Col. Raymond F. Toliver and Trevor J. Constable. Macmillan Co., N. Y., 1965.

UNITED STATES AIR FORCE MEDAL OF HONOR RECIPIENTS—1918–1985

NAMES, ALPHABETICALLY BY WARS AND RANK AT TIME OF ACTION	HOME TOWN	DATE AND PLACE OF ACTION	PRESENT ADDRESS OR DATE OF DEATH
WORLD WAR I			
Bleckley, 2d Lt. Erwin R.	Wichita, Kan.	Oct. 6, 1918, Binarville, France	KIA, Oct. 6, 1918
Goettler, 2d Lt. Harold E.	Chicago, Ill.	Oct. 6, 1918, Binarville, France	KIA, Oct. 6, 1918
Luke, 2d Lt. Frank, Jr.	Phoenix, Ariz.	Sept. 29, 1918, Murvaux, France	KIA, Sept. 29, 1918
Rickenbacker, Capt. Edward V.	Columbus, Ohio	Sept. 25, 1918, Billy, France	Died, July 23, 1973
WORLD WAR II			
Baker, Lt. Col. Addison E.	Chicago, Ill.	Aug. 1, 1943, Ploesti, Romania	KIA, Aug. 1, 1943
Bong, Maj. Richard I.	Poplar, Wis.	Oct. 10–Nov. 15, 1944, Southwest Pacific	Killed, Aug. 6, 1945, Burbank, Calif.
Carswell, Maj. Horace S., Jr.	Fort Worth, Tex.	Oct. 26, 1944, South China Sea	KIA, Oct. 26, 1944
Castle, Brig. Gen. Frederick W.	Manila, P.I.	Dec. 24, 1944, Liege, 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	Monterey, Calif. (Ret. Lt. Gen.)
Erwin, SSgt. Henry E.	Adamsville, Ala.	Apr. 12, 1945, Koriyama, Japan	Leeds, Ala.
Femoyer, 2d Lt. Robert E.	Huntington, W. Va.	Nov. 2, 1944, Merseburg, Germany	KIA, Nov. 2, 1944
Gott, 1st Lt. Donald J.	Arnett, Okla.	Nov. 9, 1944, Saarbrücken, Germany	KIA, Nov. 9, 1944
Hamilton, Maj. Pierpont M.	Tuxedo Park, N. Y.	Nov. 8, 1942, Port Lyautey, French Morocco	Died, Mar. 4, 1982
Howard, Lt. Col. James H.	Canton, China	Jan. 11, 1944, Oschersleben, Germany	Belleair Bluffs, Fla. (Ret. Brig. Gen.)
Hughes, 2d Lt. Lloyd H.	Alexandria, La.	Aug. 1, 1943, Ploesti, Romania	KIA, Aug. 1, 1943
Jerstad, Maj. John L.	Racine, Wis.	Aug. 1, 1943, Ploesti, Romania	KIA, Aug. 1, 1943
Johnson, Col. Leon W.	Columbia, Mo.	Aug. 1, 1943, Ploesti, Romania	McLean, Va. (Ret. Gen.)
Kane, Col. John R.	McGregor, Tex.	Aug. 1, 1943, Ploesti, Romania	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. Lt. Col.)
Morgan, 2d Lt. John C.	Vernon, Tex.	July 28, 1943, Kiel, Germany	Marina del Rey, Calif. (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	Died, May 11, 1984
Truemper, 2d Lt. Walter E.	Aurora, Ill.	Feb. 20, 1944, Leipzig, Germany	KIA, Feb. 20, 1944
Vance, Lt. Col. Leon R., Jr.	Enid, Okla.	June 5, 1944, Wimereaux, France	Killed, July 26, 1944, near Iceland
Vosler, TSgt. Forrest L.	Lyndonville, N.Y.	Dec. 20, 1943, Bremen, Germany	Baldwinsville, 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.	Boothbay Harbor, Me. (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	Shalimar, Fla. (Ret. Col.)
Dethlefsen, Maj. Merlyn H.	Greenville, Iowa	Mar. 10, 1967, Thai Nguyen, No. Vietnam	Fort Worth, Tex. (Ret. Col.)
Fisher, Maj. Bernard F.	San Bernardino, 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, Col., Lackland AFB, Tex.
Jackson, Lt. Col. Joe M.	Newnan, Ga.	May 12, 1968, Kham Duc, So. Vietnam	Kent, Wash. (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	Vienna, Va.
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	Santa Monica, Calif. (Ret. 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	Anacortes, Wash. (Ret. Lt. Col.)

SOME FAMOUS FIRSTS AMONG US BOMBARDMENT UNITS

June 12, 1918 First bombs dropped by an AEF bomb unit: 8 Breguet 14s of the 96th Aero Sqdn., led by Maj. Harry M. Brown, on Dommary-Baroncourt railyards in France.

Dec. 10, 1941 First heavy bomb mission of WW II: 5 B-17s of the 93d Bomb Sqdn., 19th Bomb Gp., led by Maj. Cecil Combs, attacked Japanese convoy near Vigan, P.I., also sank the first enemy vessel by US aerial combat bombing.

Apr. 18, 1942 First mission against Japan: 16 B-25s of the 17th Bomb Gp. and 89th Recce Sqdn., led by Lt. Col. James H. Doolittle, launched from the carrier *Hornet*.

June 12, 1942 First mission against a European target: 13 B-24s of HALPRO Detachment, led by Col. H. A. Halverson, flying from Egypt against Ploesti oil fields.

Jan. 27, 1943 First mission against the German homeland: 53 B-17s and B-24s of the 1st and 2d Bomb Wgs., flying from the UK, attacked the Wilhelmshaven naval base.

Aug. 6, 1945 First atomic bomb mission: The *Enola Gay*, a 509th Composite Gp. B-29, piloted by Col. Paul W. Tibbets, Jr., flying from Tinian, attacked Hiroshima, Japan.

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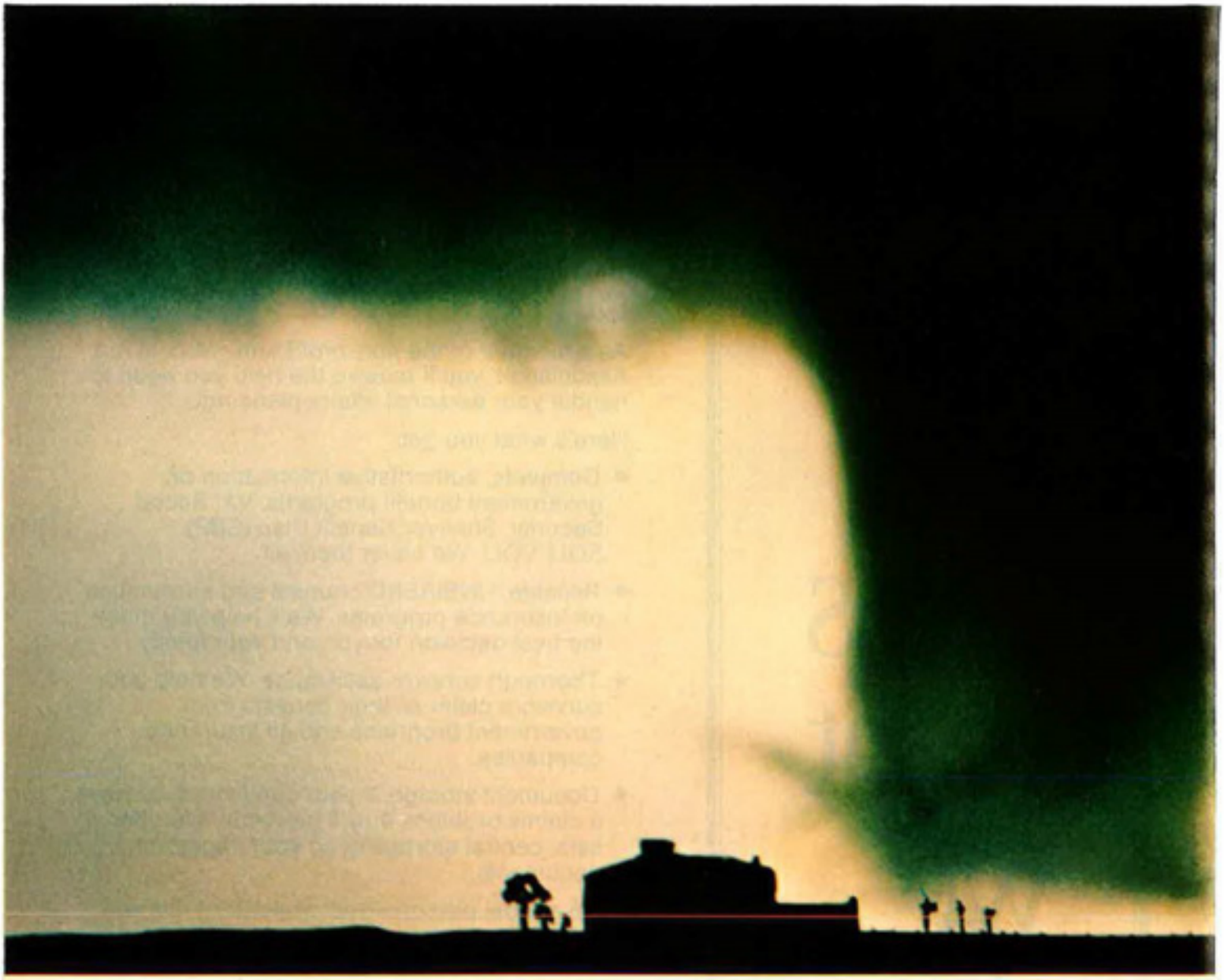

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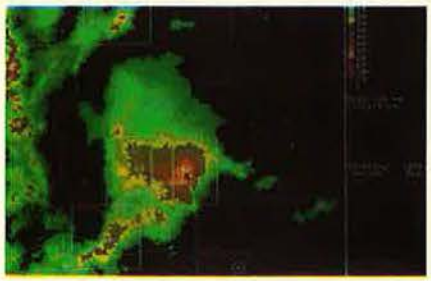
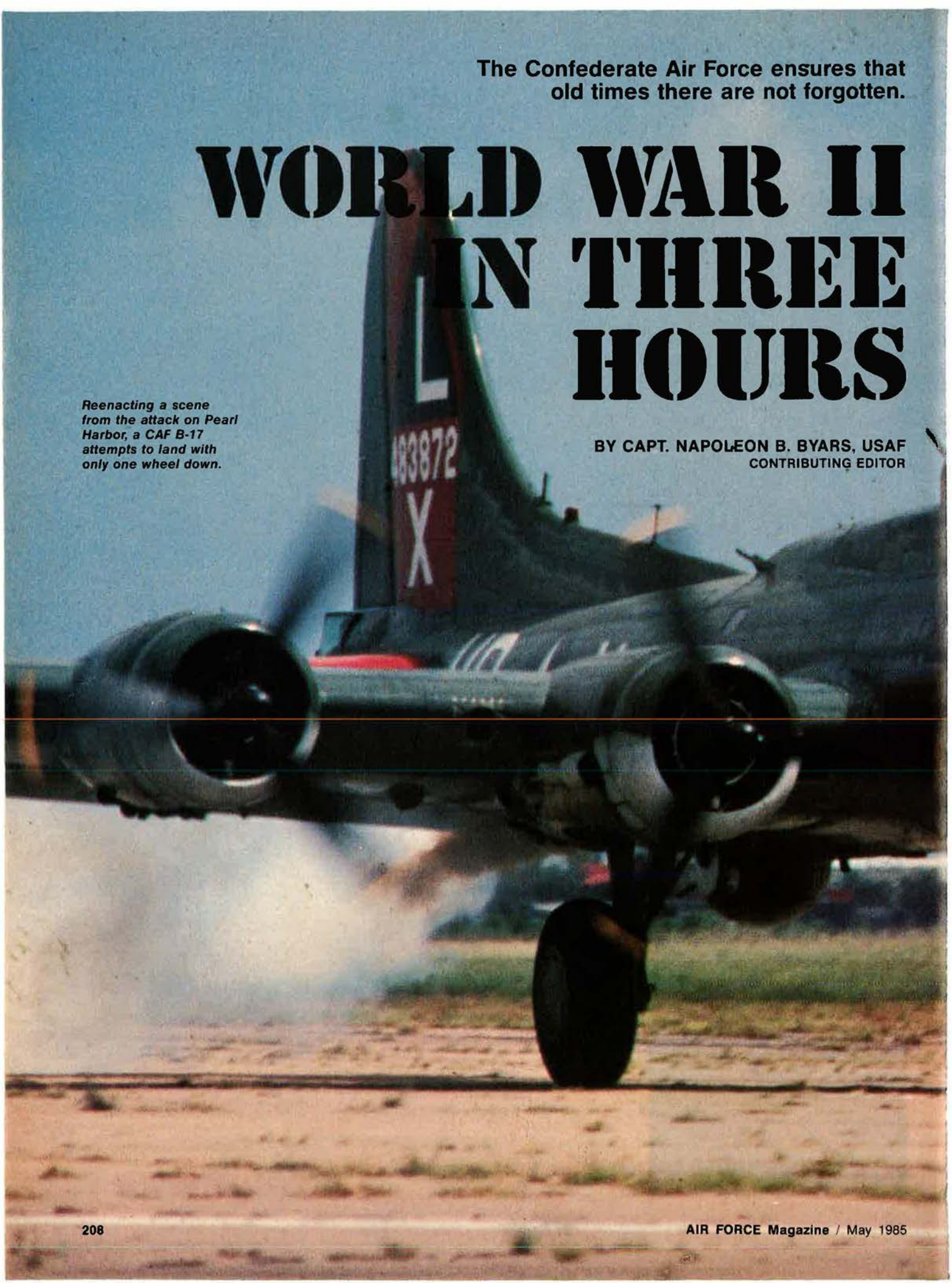
NEXRAD display graphics will be color-coded according to wind speed and storm severity.



Raytheon

The Confederate Air Force ensures that old times there are not forgotten.

WORLD WAR II IN THREE HOURS



Reenacting a scene from the attack on Pearl Harbor, a CAF B-17 attempts to land with only one wheel down.

BY CAPT. NAPOLEON B. BYARS, USAF
CONTRIBUTING EDITOR

Way down South in the land of cotton, a most unusual band of characters is keeping the heritage of airpower alive, refighting the great air battles of World War II. For them, World War II lasts just a little over three hours.

Each year, more than a million people come to airfields across the US to catch a glimpse of living history. The men and women who put on these airshows are the heart and soul of the world's largest private air force—the Confederate Air Force.

The CAF began in 1957 when five Army Air Forces veterans started tinkering around with a P-51 Mustang. Piloting the vintage Mustang stirred their passion for the high-performance propeller fighters of World War II and drove them to acquire more airplanes. Soon the south Texas "cow-pasture" days of the CAF were in full bloom.

Early airshows featured aerobatics, dogfights, and races between a P-51, an F8F Bearcat, a Corsair, and a P-38. At today's airshows, audiences watch a flying museum of approximately 132 warplanes do "battle" in the skies.

Before the audiences' eyes, Spitfires take on Me-109s and a He-111 as the Battle of Britain is refought. Moments later, a flight of CAF AT-6s painted to look like Japanese Zeros swoops over the airfield, setting off a series of explosions. The scream of diving planes sounds from above, a battle-damaged B-17 Flying Fortress attempts a landing with only one wheel down—it's De-

CAF Col. Carter McGregor, B-29 veteran, flew on the first and last B-29 missions of WW II. Many CAF officers are combat veterans.

cember 7, 1941, all over again, and Pearl Harbor is under attack.

But don't be misled. The CAF is about more than just airshows. For the men and women who are veterans of or who lost loved ones in the monumental struggle against the Axis powers, it's about preserving American airpower history of the time period from 1939 to 1945.

"The CAF's stock-in-trade is nostalgia, patriotism, and living American history that you can see, hear, touch, feel, and smell," says CAF

CAF airplanes painted to look like Japanese Zeros fly in close formation during an airshow performance. Each year, more than 1,000,000 people watch CAF airshows and exhibits.

The B-29A Superfortress* Fifi *is the pride of the CAF fleet. Restoration of* Fifi *took more than three years.

Executive Director Mack Sterling.

The CAF also strives to offer jet-age generations a look back at the critical role of aviation in World War II. And, too, with an international membership approaching 7,000, the CAF is about a lot of hard work mixed in with the satisfaction of preserving the aircraft and collecting the memorabilia of World War II.

The work is not without its rewards. As one CAF member put it: "To see a man walk up to one of our aircraft—see his lip quiver, and a tear come to his eye—that is all the payment we need for the labor of love that we do."

The pride of the CAF fleet is *Fifi*, the world's only remaining flyable B-29A Superfortress. *Fifi*'s internal systems were restored to operational condition by a CAF maintenance team in 1971, after the aircraft had sat for seventeen years in the arid climate of the Mojave Desert at China Lake, Calif. They flew the B-29 to their headquarters at Rebel Field in Harlingen, Tex. Restoration of *Fifi* took more than three years.

The appearance of *Fifi* at airshows is a reminder that, nearly forty years ago, another B-29, the *Enola Gay*, dropped history's first atomic bomb on Hiroshima—an event that helped convince the Japanese to surrender, preventing an estimated one million Allied casualties that might otherwise have been incurred if the invasion of mainland Japan had been necessary.

The CAF fleet of bombers also

A B-17 on static display during a CAF airshow stirs emotions while attracting admirers from earlier and later generations.

B-24 at sunset. The beauty of Ghost Squadron airplanes is a tribute to the preservation work of the CAF.

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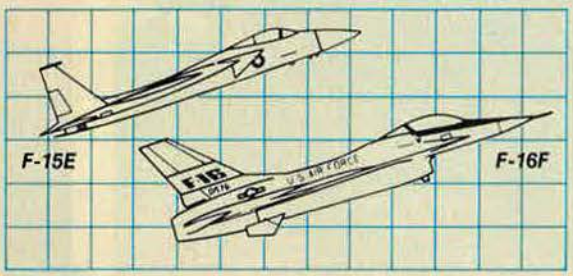

CANDIDATE APPLICATIONS

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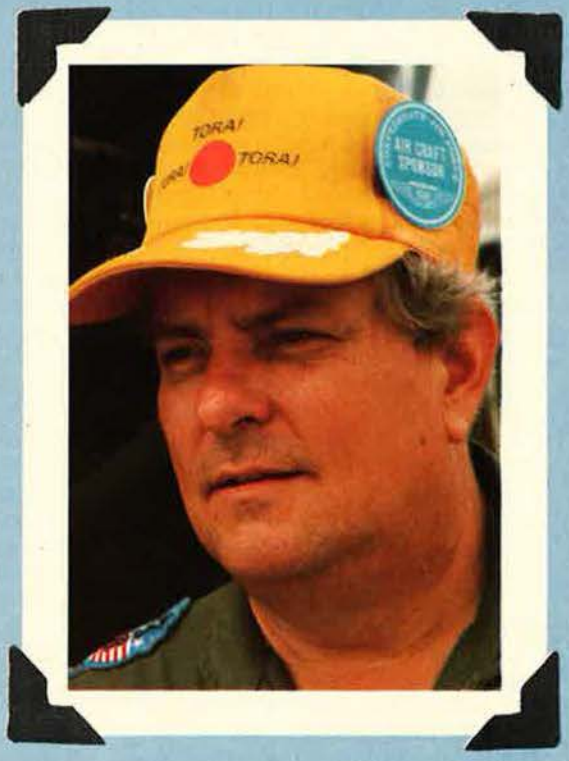
includes the B-17, B-24, and B-25, among other aircraft. In fact, with its extraordinary collection of flyable World War II bombers and fighters, the CAF is much sought after by Hollywood filmmakers in search of authenticity. CAF airplanes have filled the frames of such box-office attractions as *Tora! Tora! Tora!*, *Patton*, *Final Countdown*, *Close Encounters of the Third Kind*, and *The Right Stuff*.

From offices at Rebel Field, the CAF coordinates participation in approximately 100 airshows each year. The priceless collection of planes belonging to the CAF make up the "Ghost Squadron," which has been participating in airshows since 1963. The world-famous World War II Airpower Demonstration, in which CAF airplanes reenact the great air battles of the Second World War, is held in Harlingen each October. The program includes reenactments commemorating Wake Island, Midway, the bombing of Tokyo, D-Day, and V-J Day. Many of the crews who fly in the airshow are combat veterans from the battles they help to recreate.

Next year, the Confederate Air Force will be at "AFA's Gathering of Eagles—1986" in Las Vegas, Nev., from April 27 to May 1. This event will mark the fortieth anniversary of AFA as well as of such USAF major commands as the Strategic Air Command, the Tactical Air Command, and the Aerospace Defense Command. ■

From front to back: a CAF Me-109, Mustang, and Spitfire in flight. Airplanes from both Allied and Axis powers make up the CAF's priceless collection of warplanes.

CAF Executive Director Mack Sterling. In twenty-eight years, the CAF has established a reputation for professionalism and dedication to preserving history.



AIRMAN'S BOOKSHELF

Tracing DoD's Roots

The Formative Years, 1947–1950, by Steven L. Rearden. Historical Office, Office of the Secretary of Defense, Washington, D. C., 1984. 667 pages with charts, tables, photos, bibliography, notes, and index. $25.

Tipping the scales at three and one-third pounds, this heavyweight is the first volume in a new series that will provide a comprehensive history of the Office of the Secretary of Defense (OSD).

The Formative Years traces the evolution of OSD from its establishment in September 1947 to the beginning of the Korean War in June 1950. According to Alfred Goldberg, OSD Historian and General Editor for the new series, the Department of Defense (DoD)—and especially OSD—played "a central role in the making and execution of national security policy" in the years following World War II. This volume illuminates the main events, policies, and people during these early years and points up the tensions and tribulations, the successes and failures that attended the reordering of the nation's defense structure.

Built around a narrative framework, the book examines how OSD came into being, how it operated, and how it dealt with the multifaceted problem of national security. The author of this volume, Steven L. Rearden, served as a consultant to OSD before undertaking work on *The Formative Years*. He holds a doctorate in history from Harvard University.

Rearden's major themes include the origins and organization of the National Military Establishment (NME); the progress of unification; the availability, competition for, and use of resources; and the role of OSD and the military services in meeting US international responsibilities and commitments during the early stages of the Cold War.

Between 1947 and 1950, two men served as Defense Secretary—James Forrestal and Louis Johnson. Though vastly different in style and personality, both were motivated by a strong desire to serve their country and by a belief that the job they were doing ranked as one of the most important in public service.

The volume opens with the swearing-in of James Forrestal, who faced the dual challenge of effecting unification of the armed services and of reconstituting US defense policy to meet an increasing array of problems and threats abroad. By the time Forrestal had taken office, the mighty World War II military machine—12,000,000 troops—had been largely dismantled.

With an operating budget of $10 billion and responsibilities to support and defend US interests worldwide, Forrestal confronted management difficulties of the first magnitude. The newly created NME was a colossus, the largest and most costly agency in the federal government. The unified NME that came into being consisted basically of OSD, the three military departments, and several statutory staff agencies under the Secretary. "This office," Forrestal observed to a friend shortly before taking office, "will probably be the greatest cemetery for dead cats in history."

During his eighteen months as Secretary of Defense, Forrestal worked unceasingly to promote service unification. "The basic problem," as one of his aides aptly described it at the time, "was that of effecting, simultaneously, a marriage between the Departments of Army and Navy and a divorce between the Departments of Army and Air Force."

Since the Army Air Forces was already nearly independent of the Army when the National Security Act was passed, it was relatively easy to separate them without undue disruption of their established routines. The process began on September 26, 1947, when Forrestal issued the first in a series of "transfer orders" that legally transferred the property, functions, and personnel assigned to the Army Air Forces to the new Department of the Air Force. With the signing of the final transfer order on July 22, 1949, the "divorce" became total and final.

To make unification work, Forrestal discovered that he needed more authority and assistance than the 1947 National Security Act gave him. His successor in 1949, Johnson, had the benefit of amendments that enhanced the Secretary's power. Even so, when Johnson became Secretary of Defense, he inherited an organization still in transition. And, like Forrestal, Johnson confronted fierce interservice quarrels over roles and missions. A section on the making of the defense budget for the period strikingly illuminates the intricate relationships among strategic policies, military programs, roles and missions, and money.

Throughout the three years that Forrestal and Johnson served, a series of international crises emphasized OSD's mission to oversee the readiness of the nation's military defenses and to assist the President in developing effective measures to safeguard US interests. Students of foreign affairs will be interested in the chapters on assistance to Greece and Turkey under the Truman Doctrine, the first Arab-Israeli war, arms shipments to the Middle East, the civil war in China and its repercussions throughout the Far East (including the early stages of US involvement in Vietnam), and the Berlin crisis. Subsequent chapters examine the movement toward a North Atlantic alliance and the creation of the Foreign Military Assistance Program.

A central issue in the postwar debate over service roles and missions was the question of how future wars would be fought. What was the role of atomic weapons in military strategy?

This book is richly documented. The author makes extensive use of OSD primary source materials, including OSD internal files and other documentary collections. Interviews are especially valuable, contributing much to the originality and flavor of the book.

The early achievements of OSD should not be underestimated. The reader learns that the vast new defense organization charted by For-

restal and Johnson, with radically altered relationships and procedures among key governmental and civilian players, was made to work. Both men laid the vital foundation on which others could build in the years ahead.

This book will be of interest to anyone who is seeking insight into the beginnings of the Department of Defense.

—Reviewed by Maj. Michael B. Perini, USAF. Major Perini is Deputy Chief, Operational Forces Branch, Media Relations Division, Secretary of the Air Force Office of Public Affairs.

A Profound Legacy

Bomber Harris and the Strategic Bombing Offensive, 1939–1945, by Charles Messenger. St. Martin's Press, New York, N. Y., 1984. 244 pages with photos, bibliography and sources, appendices, and index. $27.50.

The mammoth, incisive biographies of the great commanders of World War II have been written. So have the epic histories of their great triumphs and tragedies. And while such detailed histories and biographies are needed, there is also a proper place for works that can integrate personality, deeds, and context into a brief, readable account.

Bomber Harris is such a book. Combining history and biography with skill, scholarship, and sensitivity, Charles Messenger presents a dispassionate montage of Sir Arthur Harris and his controversial leadership of the Royal Air Force's Bomber Command and the strategic bombing campaign against Germany in the Second World War. The author's thesis is loud and clear: For whatever he was as both individual and commander, Harris was quick, decisive—and his legacy profound.

The roots of Bomber Command's doctrine can be traced directly to the interwar period and the infancy of British airpower. Investigating the efforts of the Royal Flying Corps in World War I, the nascent Air Ministry found that, despite insignificant material damage, British bombers had wreaked terrible psychological havoc on the German civilian population. Air Ministry researchers also concluded that area bombing tied up an inordinate amount of scarce enemy resources, such as airplanes, guns, and associated defensive material.

This great lesson was not lost on the Rhodesian-born Arthur Harris. A major with the Royal Flying Corps at war's end, Harris rose steadily into the ranks of command and planning during the 1920s and 1930s. As Nazi-led Germany rearmed, Harris's personal experiences in the Great War and his judgment of evolving bombing technology coalesced in the belief that heavy area strategic bombing would be most effective and ultimately decisive in any future war with Hitler.

Despite Harris's protestations, however, the RAF adopted a strategy in the late 1930s that was predicated on the primacy of a powerful Fighter Command that would be capable of destroying the Luftwaffe in the skies over the English Channel, the North Sea, and England herself. Accordingly, Bomber Command's needs were largely ignored, thus leaving the force equipped with obsolescent planes flown by ill-trained crews.

The first ineffective bomber strikes after the outbreak of hostilities in September 1939 proved dramatically the essential wrong-headedness of such a doctrine. After viewing the savage pounding of London by the Luftwaffe during the Battle of Britain, Harris remarked, "I was convinced that a bomber offensive of adequate weight and the right kind of bombs would, if continued for long enough, be something that no country in the world could endure."

When he assumed command of Bomber Command in 1942, Harris single-mindedly determined to destroy German heavy industry completely, regardless of the heavy civilian casualties or the inevitable high rate of aircrew attrition. This course, he steadfastly maintained, was the sole means of breaking the German military/industrial behemoth.

With the unfailing support of Winston Churchill, Harris directed his heavy bombers to such targets as Cologne, Dresden, Hamburg, and Schweinfurt. His fundamental intent was crystallized by his grim comment that "these attacks are to go on until the heart of Nazi Germany ceases to beat."

During the war and in numerous postmortems since, Harris has been severely criticized for his strategy of area bombing. Nicknamed "The Butcher" by the Germans—and by some RAF airmen as well—he was nonetheless convinced that his strategy, as ghastly as it might be, would in the long run win the war more quickly and cheaply than any alternative. As Harris coldly noted, "You can't make an omelette without breaking eggs."

What is history's verdict on Harris's great strategy? Most post-1945 evaluations conclude that massive area bombing probably did shorten the war. However, the cost in British planes and men proved the steep price of such a strategy. But as Messenger points out, the stakes were high in the dark early days of the war. Harris and Bomber Command did what they sincerely believed was required. They bravely persevered and ultimately contributed significantly to the final Allied victory in Europe.

An excellent study of a most controversial warrior and his star-crossed career, *Bomber Harris* recapitulates the great debate surrounding Sir Arthur Harris, the doggedly heroic Bomber Command, and their undeniable role in the winning of World War II. Thorough and comprehensive in both presentation and analysis, the book is strengthened by the rich appendices and the many maps, charts, and photographs.

Because Messenger is judicious and fair in his account, the final verdict on Harris will rest ultimately with the reader.

—Reviewed by Dr. William J. Teague. Dr. Teague teaches American government at the University of Texas at Dallas.

Action Over China

A Flying Tiger's Diary, by Maj. Gen. Charles R. Bond, Jr., USAF (Ret.), and Terry H. Anderson. Texas A&M University Press, College Station, Tex., 1984. 264 pages. $15.95.

As the title implies, Charlie Bond is one of those unusual warriors who kept a diary. This is no recollection forty years after, but rather the uninhibited notes of a young man who joined the American Volunteer Group—Claire Chennault's famed Flying Tigers.

When the AVG recruiters came around Army Air Corps and Navy bases in those months before Pearl Harbor, they had an interesting proposition: $650 a month. This sum compared quite favorably to the niggardly $187 paid a second lieutenant on flying status. More important, the AVG promised action—a real bonus to pilots in an Air Corps where flying time, let alone action, was hard to come by.

Charlie Bond, despite the fact that he had been flying bombers, signed on as a fighter pilot and went off to China as one of the first Flying Tigers. These mercenaries, flying P-40s, were a mixed bag of Navy, Marine, and Army fellows who had left their service to become Chiang Kai-shek's foreign air legion.

Bond's diaries make those days come alive, for they are written in the

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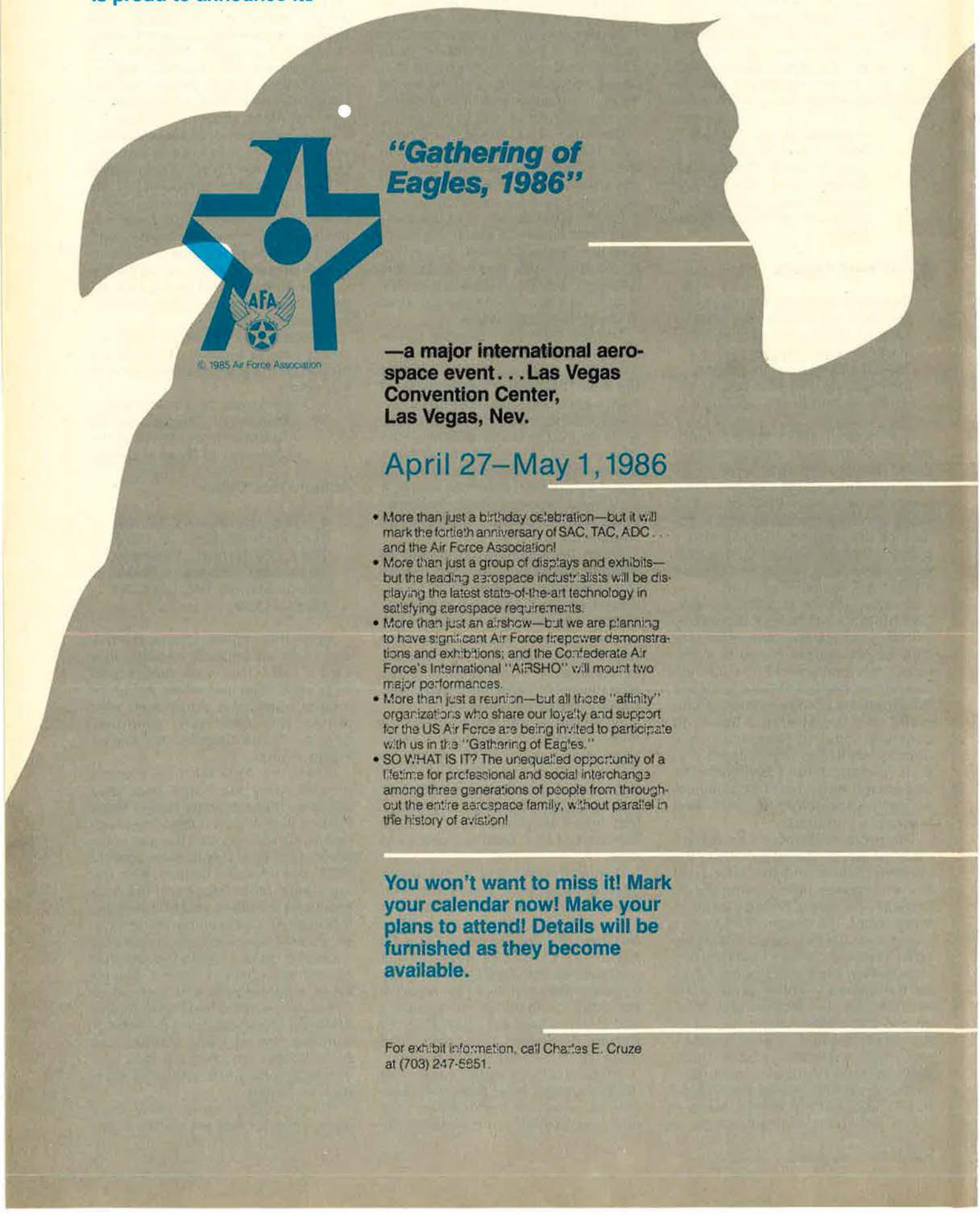

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- More than just an airshow—but we are planning to have significant Air Force firepower demonstrations and exhibitions; and the Confederate Air Force's International "AIRSHO" will mount two major performances.
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For exhibit information, call Charles E. Cruze at (703) 247-5851.

AIRMAN'S BOOKSHELF

uncontrived style of a young man writing to himself about the day's events. There are wonderful accounts of air combat, told with the immediacy of an after-action report. And there are tales, too, of the undisciplined and seamy side of the AVG's life in China.

Claire Chennault made a deep and favorable impression on Bond. Others, like the later-to-be-famous Gregory "Pappy" Boyington, were not so admired. All in all, the Flying Tigers were a mixture of adventurers, idealists, and men who simply needed more money. But whatever their reasons for joining the AVG, they did a great job when it was needed. Bond became an ace and went on to a long and distinguished Air Force career.

The book should prove fascinating reading for old-timers who remember those days and wonder what it would have been like had they dropped everything and gone along with Charlie Bond. For young pilots—or any other young person—it is a chance to read a young man's private thoughts during a lonely and dangerous time.

—Reviewed by Gen. T. R. Milton, USAF (Ret.), Contributing Editor.

New Books in Brief

Military Doctrine and the American Character: Reflections on AirLand Battle, by Herbert I. London. This short monograph examines Army Field Manual 100-5, *Operations,* which is perhaps known better as AirLand Battle—the Army's statement of doctrine. Positing that "military policy and its doctrine must be related to national defense in a fundamental sense that suggests defense concerns are integrated into perceptions of national welfare and our relationships with other states," the author argues that AirLand Battle is "a significant landmark. . . . [It] takes from our tradition and history those unique national elements that cohere into a theory on how Americans should fight their wars." Perhaps the most important of these national elements is initiative: "Army doctrine has moved from a football to a soccer mode in theory, training, and application." Military professionals will find much to ponder in these few pages. With a preface by John Tower. Distributed by Transaction Books, published by the National Strategy Information Center, New York, N. Y., 1984. 67 pages. $4.50.

The Space Station: An Idea Whose Time Has Come, edited by Theodore R. Simpson. On January 25, 1984, during his State of the Union address, President Ronald Reagan called for the development and launch of a permanently manned space station within a decade. This collection of essays by space experts and governmental decision-makers limns the historical background of manned space programs, examines the rationale to build a space station, analyzes what the station might look like and what it would do, and looks forward to the long-term possibilities of such a momentous undertaking. Written for the general public but valuable nonetheless to the technical expert for its insight into the governmental engines driving space exploration, this publication by the Institute of Electrical and Electronics Engineers is worthwhile reading for space enthusiasts everywhere. With a foreword by Harrison H. Schmitt. IEEE Press, New York, N. Y., 1985. 295 pages. $19.95.

—Reviewed by Hugh Winkler, Assistant Managing Editor.

THE BULLETIN BOARD

By James A. McDonnell, Jr., MILITARY RELATIONS EDITOR

VA Budget Scrutinized

The proposed VA budget for Fiscal Year 1986 is pegged by the Administration at $27.1 billion to fund medical, compensation, and other programs for the nation's 28,000,000 veterans, eligible family members, and survivors. This is essentially the same level of funding as this year, which was an all-time high. Critics, however, maintain that it fails to address programs that are growing and emphasizes some wrong priorities.

Congressional reaction to the proposal was immediate—and vocal. Rep. G. V. (Sonny) Montgomery (D-Miss.), Chairman of the House Committee on Veterans' Affairs, believes that many items recommended for axing should be retained. According to the Congressman, "The President has proposed reductions, reorganizations, user fees (which are, in my view, a hidden tax increase), and initiatives which are unrealistic."

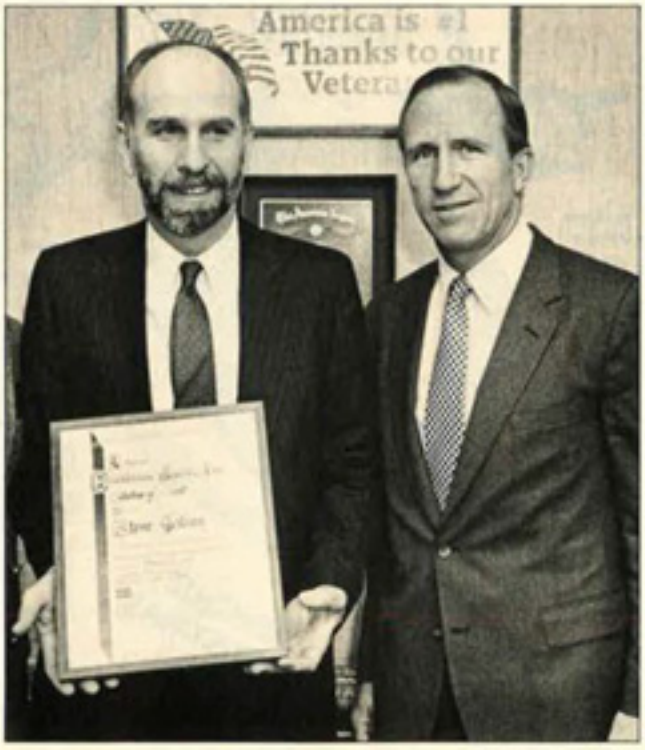
Specifically, his committee recommended that the current one percent user fee for GI home loans be maintained rather than raised to five percent as recommended by the Administration. Also, it opposed the President's plan to consolidate VA regional office functions from fifty-eight to three centralized locations. The committee also recommended that the cut of 624 employees freed up by the consolidation be scrubbed.

Further, the congressional watchdogs want the VA to hire 4,000 more medical-care staffers to take care of the some 20,000 veterans the committee says are turned away from VA facilities each month.

On the Senate side, Sen. Alan Cranston (D-Calif.), former Chairman of the Senate Veterans' Affairs Committee and current ranking minority member, charged that the budget proposals would undermine veteran health-care programs and "threaten to bleed the overall system."

One proposal drawing sharp attacks in both houses is the President's idea to apply a means test for VA facility treatment of nonservice-connected disabled veterans and veterans over age sixty-five. Senator Cranston said that this could become a "bureaucratic nightmare" and result in "turning away many sick veterans who are actually unable to afford the care they need."

Administrator Harry N. Walters, in a briefing to veterans groups, including AFA, defended the budget as "fair" and said that it aimed at equalizing treatment for both young and old vets. To date, he has not convinced many congressmen, and they are dropping bills in the legislative mill to head off the expected results of the budget proposal.



Vietnam-era veteran Steve Wilson, left, Nashville, Tenn., is the winner of the First Annual Hospitalized Veterans Song-Writing Award. His plaque was recently presented by VA Administrator Harry Walters in a Washington, D. C., ceremony. The competition is cosponsored by the VA and the Paralyzed Veterans of America. Wilson's winning composition, "Scooter," was inspired by the experiences of a double amputee in his hometown.

Bob Hope Village Opens

The Bob Hope Village of the Air Force Enlisted Widows Home at Fort Walton Beach, Fla., has opened for business. Sixty-four applicants on the waiting list have seen their dreams come true.

The sixty-four units now open represent one-fourth of the total 256 units planned for the new facility. Another sixty-four garden-type apartments are scheduled to open this month. The Widows group wants prospective applicants to know that information requests are being answered as quickly as possible, but some delays are occurring because of the large volume of inquiries.

Basically, priority for space in the home goes to widows of Air Force enlisted persons, including regular, Guard, and Reserve. Within this category, those deemed to have "a dire need" receive first consideration. The apartments are designed especially for the senior citizen and include an emergency call system, bathroom safety rails, covered patios and walkways, and complete sprinkler systems.

Chief Executive Officer D. M. Masone, responding to an inquiry as to how fast the remaining units will open, said, "The answer is easy. Construction will proceed when the necessary funds are available." Citing his estimate of 20,000 widows who could benefit from the Home environment, Mr. Masone urged prospective donors to take inspiration from the com-

Loading blankets on a C-130 at Memphis are members of the 164th Tactical Airlift Group, Tennessee Air National Guard. Six ANG units flew blankets and medical supplies to McGuire AFB, N. J., for shipment to Africa. The ANG worked with the State Department, the Agency for International Development, and DoD on the relief mission. (Tennessee ANG photo by Col. James M. Shearin)

pleted units and to make 1985 their "challenge year" for giving a donation to make the remaining units a reality.

Military Housing Plan Tested

Hanscom AFB, Mass., has been chosen as the mainland US base to test a congressionally directed pilot housing program that will evaluate another way to finance military family housing. Eielson AFB, Alaska, will test a similar program.

In the test now under way at Hanscom AFB, the Air Force contracted with a developer to lease 163 new housing units to be built on base. The developer, rather than the government, will finance construction of the homes and then lease them to the Air Force for twenty years. At the end of that time, the Air Force will have the right of "first refusal" to buy the units.

A base spokesman said, "Congress chose this new leasing-type concept as a possible alternative to solve the problem of financing military housing. Here at Hanscom we have a double problem—high rents and very few available units. The leased units will be primarily used to house junior-grade military personnel."

It's anticipated that the first houses constructed under this plan will be completed in 1986.

Agent Orange Study Encouraging

A continuing twenty-year study of Air Force people who took part in herbicide spraying operations in Vietnam (Ranch Hand) has issued its second report. The newest Ranch Hand evaluation says that airmen "show no sign of unusual health problems."

Col. (Dr.) William H. Wolfe said the study, so far, has shown no "significant differences in the deaths recorded in the Ranch Hand group and a comparison population." That report echoes findings of the first report, issued two years ago.

A total of 1,256 Ranch Hand people are being evaluated in the extensive survey. Comparison figures and groups include the 1978 death rate for white American males, the DoD nondisability retired life table for the same year, the West Point class of 1956, all active-duty Air Force people, and the entire Civil Service population.

Hart Offers National Service Study

Sen. Gary Hart (D-Colo.) has introduced legislation that would create a Select Commission on National Service Opportunities. He said that he hoped the action would "generate a debate that will culminate in the adoption by Congress of a system of national youth service."

Essentially, the Commission would hold hearings across the country and investigate costs, uses, administration, etc., of a required national service for youth. Envisioned as part of this service would be duties in healthcare facilities, urban and rural environmental projects, and the military. Careful attention would be given to how such a plan would affect the All-Volunteer Force.

If the Senator's proposal were adopted, the Commission would consist of twenty-one members, with eleven appointed by the President, five appointed by the Senate, and five by the House. He anticipates, he says, that membership would be drawn from such sources as schools and colleges, business, labor, and the military. He would also include on the Commission representation from the seventeen- to twenty-five-year-old group that would be affected by any final proposals.

The Senator estimates that his Commission would cost about $3 million and would take about fifteen months to complete its work. A spokeswoman for the Senator told AIR FORCE Magazine that he believes his proposal will attract bipartisan endorsement. However, knowledgeable congressional observers are doubtful that the Commission proposal will be accepted by the full Congress.

Guard/Reserve Readiness Initiatives

Rep. G. V. (Sonny) Montgomery (D-Miss.) has suggested legislation to improve the country's National Guard and Reserve components. It's a comprehensive package of seven initiatives and is designed to improve readiness capability.

The plan includes recommended action in the areas of selected reserve

Nathaniel Smith retired from USAF in 1978 as a master sergeant and formed his own company, Ver-Val Enterprises, Inc., of Fort Walton Beach, Fla. His firm now handles $10 million worth of government contracts and employs 116 people. Here he inspects a pallet coupler latch for a KC-10.

manpower, individual ready reserve manpower, training, family support, employer support, equipment, and facilities. The Congressman pointed out that this effort marks the first time that a member of Congress has coordinated with the nation's military and civilian Guard and Reserve leadership to take an in-depth look at "where the Guard and Reserve are today and where we need to be in the years ahead."

Representative Montgomery is a ranking member of the House Armed Services Committee and a leader in promoting a more active role for the reserve components of the Total Force.

Some of the key points of his package include:

- Allowing reservists full GI Bill benefits;
- Strengthening the attractiveness of the Guard and Reserve to health-care professionals;
- Increasing the use of simulator training by reserve units;
- Increasing the availability of "family amenities," such as commissary and exchange privileges for reservists; and
- Tax incentives for employers who hire reservists.

In calling for passage of his plan, Congressman Montgomery noted that defense dollar savings would be possible if more military missions were assigned to Guard and Reserve forces.

THE BULLETIN BOARD

USAF Flight Technology Spotlighted

The Air Force's Orientation Group, headquartered at Gentile AFS, Ohio, has unveiled a new display at the Chicago Museum of Science and Technology that highlights Air Force technology.

A dramatic ten-foot-wide photo of the SR-71 Blackbird reconnaissance aircraft draws the eye to a series of display panels. Visitors can easily see where Air Force advances are taking the US in terms of aeronautics. Featured are four technological challenges: how to link man and machine, how to gather and present battle information for decision-making, how to hide a 238-ton aircraft in flight, and how to build planes to outperform today's aircraft.

The new exhibit includes four precisely modeled aircraft, each an example of how the Air Force is using advanced technologies to meet the stated challenges. The aircraft include the F-16 fighter, the E-3 Airborne Warning and Control System aircraft, the B-1B long-range bomber, and the X-29 technology development aircraft.

Short Bursts

The Senate has passed legislation that would advance **retired Lt. Gens. Ira C. Eaker and James H. Doolittle** (AFA's first president) to the grade of **General** on the retired list. No pay, benefits, or survivor benefits would be affected. The House is to take it up next.

Sanford N. McDonnell, chairman and chief executive officer of McDonnell Douglas Corp. in St. Louis, Mo., serves as a volunteer national president of the **Boy Scouts of America.** Recently, commemorating Scouting's seventy-fifth anniversary, he presented the "Distinguished Scout Citizen of the Year" award to President Ronald Reagan.

SENIOR STAFF CHANGES

PROMOTIONS: To be **Brigadier General:** John F. **McMerty.**

RETIREMENTS: M/G Joseph H. **Connolly;** M/G Harry **Falls,** Jr.; M/G John B. **Marks,** Jr.; M/G Earl G. **Peck;** B/G Jimmy C. **Pettyjohn;** M/G James C. **Pfautz;** B/G Jerry W. **Tietge.**

CHANGES: M/G Thomas A. Baker, from Dir., Int'l Prgms., DCS/P&R, Hq. USAF, Washington, D. C., to Dir. of Personnel Plans, DCS/M&P, Hq. USAF, Washington, D. C., replacing M/G Robert C. Oaks . . . **B/G James S. Cassity, Jr.,** from Cmdr., European Info. Sys. Div., AFCC, Ramstein AB, Germany, to Cmdr., Space Comm. Div., AFCC, & DCS for Comm., Electronics, & Computer Resources, Hq. NORAD, Peterson AFB, Colo., replacing M/G John P. Hyde . . . **B/G John A. Corder,** from Cmdr., Def. General Supply Ctr., DLA, Richmond, Va., to Dir., Electronic Combat, DCS/P&O, Hq. USAF, Washington, D. C., replacing retiring B/G Jerry W. Tietge . . . **Col. (B/G selectee) Robert S. Delligatti,** from Dep. Dir., Int'l Prgms., DCS/P&R, Hq. USAF, Washington, D. C., to Dir., Int'l Prgms., DCS/P&R, Hq. USAF, Washington, D. C., replacing M/G Thomas A. Baker . . . **B/G Frank S. Goodell,** from Dep. Dir., Log. Plans & Prgms., DCS/L&E, Hq. USAF, Washington, D. C., to Spec. Ass't to DCS/L&E & DCS/RD&A for Reliability & Maintainability, Hq. USAF, Washington, D. C.

B/G Samuel J. Greene, from Dir., C³ & Computer Sys. Directorate, Hq. USCENTCOM, MacDill AFB, Fla., to Cmdr., European Info. Sys. Div., AFCC, Ramstein AB, Germany, replacing B/G James S. Cassity, Jr. . . . **M/G John P. Hyde,** from Cmdr., Space Comm. Div., AFCC, & DCS for Comm., Electronics, & Computer Resources, Hq. NORAD, Peterson AFB, Colo., to Dep. Dir., Defense-wide C³ Support, OJCS, Washington, D. C. . . . **B/G Kenneth R. Johnson,** from DCS for Acquisition Log., Hq. AFSC, Andrews AFB, Md., to DCS for Product Assurance & Acquisition Log., Hq. AFSC, Andrews AFB, Md. . . . **B/G Paul H. Martin,** from Dep. Ass't C/S for Intel., Hq. USAF, Washington, D. C., to Cmdr., Hq. ESC, & Dir., JEWC, San Antonio, Tex., replacing retiring M/G John B. Marks, Jr. . . . **Col. (B/G selectee) John F. McMerty,** from Cmdr., 184th TFG (ANG), McConnell AFB, Kan., to Dep. Dir., ANG, Hq. USAF, Washington, D. C., replacing B/G Wess P. Chambers.

M/G Robert C. Oaks, from Dir. of Personnel Plans, DCS/M&P, Hq. USAF, Washington, D. C., to Ass't DCS/M&P, Hq. USAF, Washington, D. C., replacing retired M/G Keith D. McCartney . . . **Col. (B/G selectee) Gary W. O'Shaughnessy,** from Cmdr., Electronic Security Europe, ESC, Ramstein AB, Germany, to DCS for Intel., Hq. USAFE, Ramstein AB, Germany, replacing M/G Leonard H. Perroots . . . **M/G Leonard H. Perroots,** from DCS for Intel., Hq. USAFE, Ramstein AB, Germany, to Ass't C/S for Intel., Hq. USAF, Washington, D. C., replacing retiring M/G James C. Pfautz . . . **Col. (B/G selectee) James M. Rhodes, Jr.,** from DCS for Operational Support, 4ATAF, AFCENT, Heidelberg, Germany, to Command Dir., NORAD Combat Ops., J-31, NORAD, Cheyenne Mountain Complex, Colo., replacing B/G Billy J. Rhoten . . . **B/G Billy J. Rhoten,** from Command Dir., NORAD Combat Ops., J-31, NORAD, Cheyenne Mountain Complex, Colo., to DCS for Intel., Hq. NORAD/SPACECMD, Peterson AFB, Colo., replacing B/G Earl S. Van Inwegen.

Col. (B/G selectee) Wayne E. Schramm, from Cmdr., Pacific Info. Sys. Div., AFCC, & DCS for Info. Sys., Hq. PACAF, Hickam AFB, Hawaii, to Dir., C³ & Computer Sys. Directorate, Hq. USCENTCOM, MacDill AFB, Fla., replacing B/G Samuel J. Greene . . . **B/G Earl S. Van Inwegen,** from DCS for Intel., Hq. NORAD/SPACECMD, Peterson AFB, Colo., to JCS Representative for Space Negotiations, OJCS, Washington, D. C. . . . **B/G David S. Watrous,** from Chief, Office of Support to Mil. Ops., NSA, Fort Meade, Md., to Dir. for Intel., Hq. PACOM, Camp Smith, Hawaii, replacing retired B/G Jimmy C. Pettyjohn. ■

Surviving spouses of veterans are **eligible for VA home loans,** according to the VA. For full eligibility, they must be unmarried, and the veteran's death must have been service-connected.

The Air Force told Congress recently that it estimates the average **unreimbursed cost** for blue-suiters making **PCS moves** at about $1,500 for mid-level enlisted members and **just under $2,000** for junior officers.

The **Navy** is really getting **tough with bad check writers.** The Navy Exchange will now notify the IRS of those people who write more than $600 of bad paper. The angle is to report the amount of goods, services, or money those individuals received but never paid for as "income earned" for tax purposes.

Cents-off **coupons** are big business! Air Force Commissary shoppers turned in more than **$21 million worth** in 1984. The Commissary Service earned $5 million in handling charges from the companies offering the discounts.

Want to locate a blue-suiter? AFMPC will send you the military address of any active-duty person if you write to Hq. AFMPC/MPCD003, Northeast Office Place, 9504 IH-35 North, San Antonio, Tex. 78233-6636. Tell them all the pertinent facts you know about the person.

MSgt. Linda Kachmar, NCOIC of Mobilization Systems and Procedures at the Air Reserve Personnel Center, Denver, Colo., looks at a six-gallon jug, representing the amount of blood she's donated.

Latest honoree to receive the **Hall of Heroes Gold Medallion** is Pacific Air Forces **Chaplain Lt. Col. Lemuel M. Boyles.** The annual award, given by the Chapel of the Four Chaplains in Philadelphia, recognizes a person who has "given of himself in an exemplary and sacrificial manner." Chaplain Boyles won for his ministerial efforts in the combat zone during the Grenada conflict.

The latest issue of VA's popular handbook, "**Federal Benefits for Veterans and Dependents,**" is off the presses. The eighty-nine-page pamphlet **lists all available benefits,** including those provided by the Departments of Labor and Defense. It also lists locations and contacts of all VA offices, cemeteries, counseling services, and other VA facilities. Send $2.50 to the Superintendent of Documents, Washington, D. C. 20402, for your copy. Ask for it by name and stock number—051-000-00170-2.

The Air Force is looking for astronauts. Most officer selectees will perform duties as mission specialists, but some will be assigned to Space Shuttle pilot duty. About thirty will be nominated. NASA will make the final selections, and successful applicants will serve at least four years with the space agency. They're looking only for those with degrees in engineering, mathematics, or biological or physical sciences. Flyers must have at least 1,000 hours in high-performance jet aircraft. Check with local personnel officials for details. ■

'I Am the Captain of My Soul'

A dying navigator clung to the last slender thread of life until his job was done.

BY JOHN L. FRISBEE

ARMY Air Forces planners who selected oil refineries and synthetic fuel plants as one of three major target systems in Germany underestimated that country's military reliance on synthetic fuel—particularly aviation fuel. Eighty-five percent of the Luftwaffe's aviation-grade gasoline came from one type of synthetic process—the hydrogenation plants that produced fuel from coal.

While Allied invasion forces were building up in the United Kingdom, both ground and air leaders agreed that an invasion of the Continent would not be feasible until the Allies had won air superiority. Despite that consensus, only two percent of Allied bombing had been against oil targets prior to the spring of 1944. Disagreement over target priorities was part of the reason. Another important factor was the lack of long-range fighter escort to accompany the bombers deep into Germany, where most of the oil targets lay. By early 1944, rapidly increasing numbers of P-51s and range extension of other fighters solved that element of the problem.

In the spring of 1944, Lt. Gen. Carl "Tooey" Spaatz, Commander of US Strategic Air Forces in Europe, convinced Supreme Commander Gen. Dwight Eisenhower and the British that oil should be given a higher priority. Knocking out the refineries and synthetic plants would limit the German army's mobility. It also would help in gaining air superiority by depriving the Luftwaffe of aviation fuel and, equally important, by bringing the enemy air force up to defend those vital targets so that Air Marshal Goering's fighters might be shot down by the increasingly dominant Allied fighter force.

The oil campaign got under way in May 1944. In spite of diversions to support Allied landings in June and the breakout from Normandy the following month, oil production had been cut by nearly eighty percent at the end of September. But oil facilities could be put back in operation in from four to six weeks by the 350,000 workers assigned to that task. The bombing attacks had to be repeated frequently.

One of the largest hydrogenation plants was at Merseburg, near Leipzig, some 500 miles from Eighth Air Force bases in England. On November 2, 1944, the Eighth launched more than 500 heavies against Merseburg-Leuna. Lt. Gen. Jimmy Doolittle's crews had been there before. They knew it was a tough, massively defended target.

One of the units assigned to this mission was the 447th Bomb Group, based at Rattlesden. The navigator of B-17 L-Love in the 711th Squadron was 2d Lt. Robert Femoyer. That morning, as he sat in the crew briefing taking notes on flak concentrations along the attack and withdrawal routes, he was just another of the nearly 10,000 navigators trained by the AAF. Before the day ended, Lieutenant Femoyer was to earn a place in the pantheon of Air Force heroes.

Though mortally wounded by flak over Germany, 2d Lt. Robert Femoyer refused sedation until his badly damaged B-17 was clear of enemy fire.

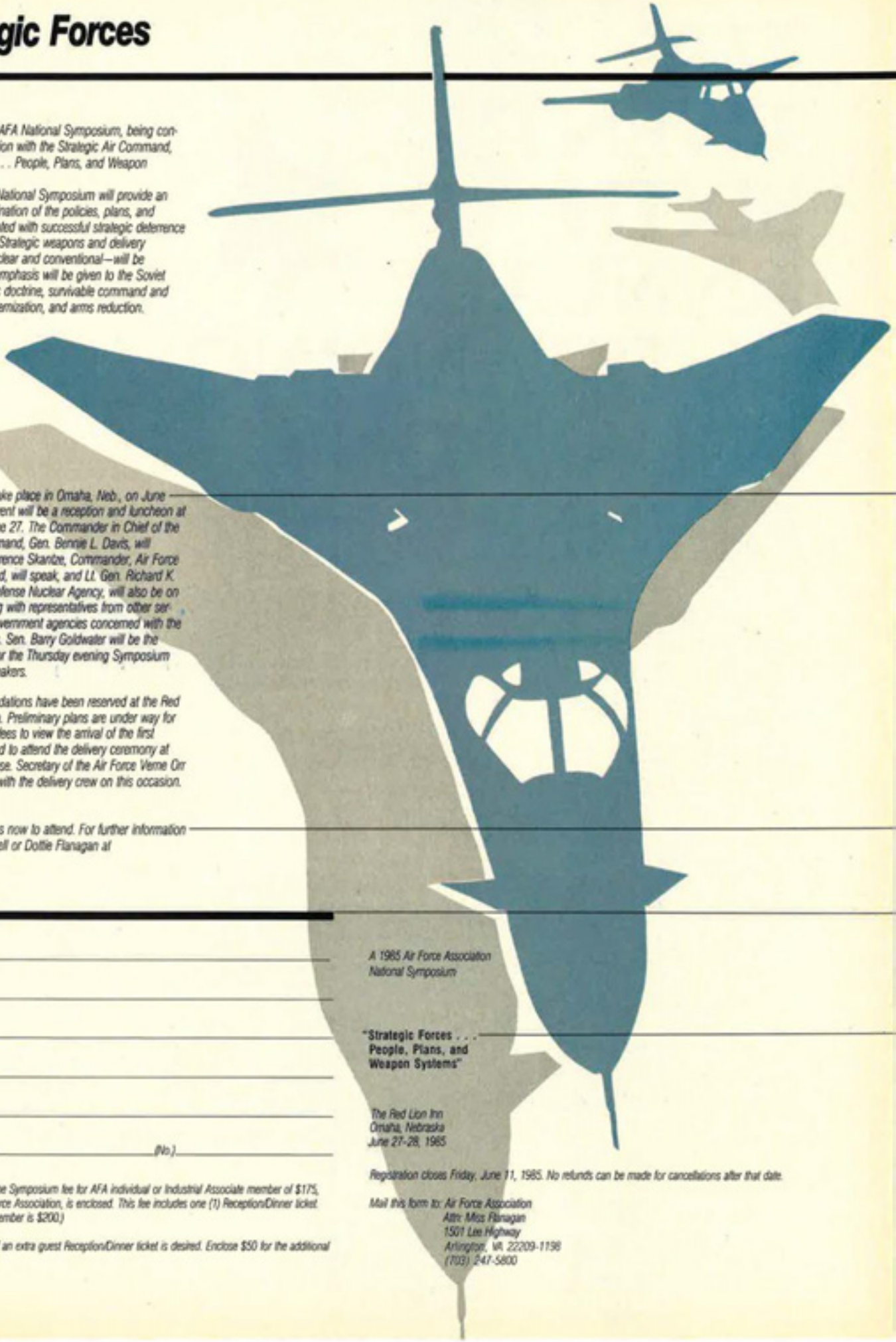
Near Merseburg, L-Love was hit by three bursts of heavy flak. Femoyer was critically wounded by shell fragments that penetrated his back and side, and the badly damaged B-17 was forced to drop out of formation.

The young navigator, who had been thrown to the floor when he was hit, refused a sedative that would dull the excruciating pain of his wounds. He insisted that it was his responsibility to keep the lone bomber clear of the hundreds of flak guns that lay between Merseburg and the English Channel, and he was determined that his mind remain clear.

Unable to sit at his table, he asked to be propped up on the floor so he could see his charts and instruments. For two and a half hours, as he lay in a pool of blood, Femoyer resisted the pain and nausea that threatened to dominate his mind. Again and again as he grew weaker from loss of blood, he fought back a gray curtain of unconsciousness. Not until they were safely through the maze of flak sites and over the Channel did he give up directing the plane and permit crew members to administer a sedative.

Lt. Robert Femoyer died shortly after his B-17 landed in England. In May 1945, he was awarded the Medal of Honor posthumously, one of only two navigators to earn the nation's highest decoration for valor. Through his last agonizing hours, he had remained true to his mission, true to his comrades, and true to his own standard of honor. ■

Strategic Forces



Announcing an AFA National Symposium, being conducted in conjunction with the Strategic Air Command, "Strategic Forces . . . People, Plans, and Weapon Systems."

This upcoming National Symposium will provide an authoritative examination of the policies, plans, and capabilities associated with successful strategic deterrence on a global scale. Strategic weapons and delivery systems—both nuclear and conventional—will be discussed. Major emphasis will be given to the Soviet threat, US strategic doctrine, survivable command and control, force modernization, and arms reduction.

This event will take place in Omaha, Neb., on June 27-28. The first event will be a reception and luncheon at 11:30 a.m. on June 27. The Commander in Chief of the Strategic Air Command, Gen. Bennie L. Davis, will keynote; Gen. Lawrence Skantze, Commander, Air Force Systems Command, will speak, and Lt. Gen. Richard K. Saxer, Director, Defense Nuclear Agency, will also be on the program, along with representatives from other services and other government agencies concerned with the Symposium topics. Sen. Barry Goldwater will be the featured speaker for the Thursday evening Symposium saluting all the speakers.

Hotel accommodations have been reserved at the Red Lion Inn in Omaha. Preliminary plans are under way for Symposium attendees to view the arrival of the first operational B-1 and to attend the delivery ceremony at Offutt Air Force Base. Secretary of the Air Force Verne Orr is expected to be with the delivery crew on this occasion.

Make your plans now to attend. For further information call: Jim McDonnell or Dottie Flanagan at (703) 247-5800.

Registration Form

NAME (Print) _____

TITLE _____

AFFILIATION _____

ADDRESS _____

CITY, STATE, ZIP _____

TELEPHONE: (Code) _____ *(No.)* _____

My check covering the Symposium fee for AFA individual or Industrial Associate member of $175, payable to the Air Force Association, is enclosed. This fee includes one (1) Reception/Dinner ticket. (Note: Fee for non-member is $200.)

_____ *Mark here if an extra guest Reception/Dinner ticket is desired. Enclose $50 for the additional ticket.*

A 1985 Air Force Association National Symposium

"Strategic Forces . . . People, Plans, and Weapon Systems"

The Red Lion Inn
Omaha, Nebraska
June 27-28, 1985

Registration closes Friday, June 11, 1985. No refunds can be made for cancellations after that date.

Mail this form to: Air Force Association
Attn: Miss Flanagan
1501 Lee Highway
Arlington, VA 22209-1198
(703) 247-5800

May 25 at The Broadmoor, Colorado Springs, Colo.

THE TWENTY-SIXTH ANNUAL OUTSTANDING SQUADRON DINNER

Saluting the 1985 Outstanding Squadron at the United States Air Force Academy. Cosponsored by the Air Force Association and its Colorado Springs/Lance Sijan Chapter.

More than 700 guests—including parents and friends of the cadets, together with aerospace, AFA, and government leaders from throughout the country—will pay tribute to the top Academy Squadron, selected for excellence in all elements of cadet life, from academic standings and military leadership to drilling and intramural athletics. This is the Academy's most outstanding award of the year.

Reception 6:00 p.m., Dinner 6:45 p.m., Dancing 10:00 p.m.; The International Center of The Broadmoor.

Dress: Black-tie for civilians
Summer Mess Dress for military
Cost: $65 single, $120 per couple

Hotel reservations may be made direct with: The Broadmoor, Colorado Springs, Colo. 80901, telephone (303) 634-7711. Singles $105 - $145, Doubles $115 - $155; or The Clarion Hotel (formerly Four Seasons Motor Inn), 2886 S. Circle Drive, Colorado Springs, Colo. 80906, telephone (303) 576-9000. Singles $50, Doubles $60; or the Antlers Plaza (under The Broadmoor management and providing regular shuttle service to and from The Broadmoor), Chase Stone Center, Colorado Springs, Colo. 80903, telephone (303) 473-5600. Singles $63, Doubles $69. Be sure to mention AFA when writing or calling for reservations.

A golf tournament will be conducted at The Broadmoor on Friday, May 24. Please write AFA for details.

Dinner Reservation Form

Return to Air Force Association, 1501 Lee Highway, Arlington, VA 22209-1198

Attn: D. Flanagan

Please make the following reservations for me at AFA's 1985 Outstanding Squadron Dinner:

____ Singles @ $65 $ _____

____ Couples @ $120 $ _____

Enclosed is my check for $ _____

Please send information on the golf tournament.

Name _____

Address _____

City _____ State _____ ZIP _____

Telephone ( ) _____

AFA INTERCOM

By Robin L. Whittle, AFA DIRECTOR OF COMMUNICATIONS

During the 1984 National Convention, twelve of the thirty-three recipients of AFA's "Man of the Year" Award met. Pictured, from left, are Joe Higgins, William W. Spruance, Martin H. Harris, Thomas W. "Tony" Anthony, Jack B. Gross, Richard H. Becker, Earl D. Clark, Jr., Daniel F. Callahan, Victor R. Kregel, David C. Noerr, Edward A. Stearn, and Carl J. Long.

AFA's Energetic "Men Of the Year" Are Honored for Action

For thirty-one years, a "few good men and one woman" have risen above other active AFA leaders to claim the distinctive title of "AFA Man of the Year." The first recipient was then-AFA National Secretary Julian B. Rosenthal, who was recognized in 1953 for "selfless devotion of his talents and efforts to the cause of American airpower and the development of AFA."

Essentially the same has been said of all the recipients, six of whom have served AFA as National President and Board Chairman: Thos. F. Stack, George D. Hardy (who also served as National Secretary), Joe L. Shosid, Howard T. Markey, Martin M. Ostrow, and Victor R. Kregel. Three have served as Board Chairman—Jack B. Gross (who also served as National Treasurer), Daniel F. Callahan, and Julian B. Rosenthal; one as National President and National Secretary—Martin H. Harris; and three as the AFA National Secretary—Julian B. Rosenthal, George D. Hardy, and Earl D. Clark, Jr.

All have headed AFA state organizations and/or chapters and include famed cartoonist Milton Caniff, who served as President of AFA's Iron Gate Chapter in New York City and who was honored as AFA Man of the Year for 1965 in recognition of his efforts in planning and staging the Iron Gate Chapter's second annual Air Force Salute in February 1965. A share of the proceeds from that event went to AFA's Aerospace Education Foundation.

Many of these AFA "activists" met as a group for the first time during AFA's 1984 National Convention to discuss the issues and reminisce about days gone by.

On the Scene in AFA's Busy and Active Grass Roots

AFA's **Charles A. Lindbergh Chapter** in Westport, Conn., has the year plotted out with a number of significant events through December 1985. A schedule was enclosed with the Chapter newsletter from Chapter President **John Henry Griffin.** Small wonder the Lindbergh Chapter was the Outstanding Chapter (151–400 members) for 1984 and the recipient of the 1983 Donald W. Steele, Sr., Memorial Award as AFA Unit of the Year—they plan for it.

National Director **Ed Stearn** formed "Volunteers for Peacekeeper" in March to convince wavering editorial writers and newspaper editors of the need for the MX missile. Quick to respond was **H. A. Strack,** President of AFA's General Doolittle/Los Angeles Area Chapter, who wrote a letter to the Los Angeles *Times* regarding its February 28 editorial "Bury the MX." Mr. Strack said he "wondered [how the paper could] be arbiter and judge in the face of the unanimous recommendations of those who have been in positions of ultimate responsibility? The past four Presidents, all of their Secretaries of State and Defense, and their National Security Advisors, irrespective of political party, have unanimously supported the need for the MX as a timely, effective, and relatively less costly response to the Soviet [military] buildup."

Mr. Stearn also wrote the Los Angeles *Times,* pointing out a number of inaccurate and misleading statements, and noted, "You do not mention the effects that aging, relatively small payloads, accuracy, 'clear' oceans, look-down radar, costs, or development, test, and deployment times could have on existing and proposed systems and on the usefulness [of such systems] as deterrent weapons or arms-control bargaining

INTERCOM

chips." Other members of "Volunteers for Peacekeeper" are **Dick Doom,** National Vice President for the Far West Region; **Bob Gore,** National Director and AFA Communications Committee member; and **Liston T. "Zack" Taylor.**

In response to an editorial in the Tallahassee *Democrat* entitled "Missiles—Additional Money Is Useless," National Director **Bud West** wrote to the two members of Congress whom the editorial had cited as keys in the MX vote; the editorial had also asked readers to "let them know you want them to vote against MX." Mr. West wrote in support of MX, stating in part, "We suspect that you and your staff have more than enough good, hard, factual information to stand strongly in support of our nation's fundamental need for MX." National Director **Tom Hanlon** wrote to his congressional delegation urging support for MX, as did Tennessee State President **Jack K. Westbrook. Phil Saxton,** National Vice President/Northwest Region, urged state and chapter leaders to write letters to the editor in support of MX.

Longtime AFA leader **Art Littman** wrote a letter to **Rep. Vic Fazio** (D-Calif.) thanking him for participating in a defense roundtable discussion with General Robert F. Travis Chapter members and community leaders on February 16. Mr. Littman also noted that as a result of the meeting he was unsure of how the Congressman would vote on the MX. "I know that you are a believer in the concept of deterrence," he wrote. "What worries me is that once we send the signal to the Soviets by not going ahead with MX, we stand the chance of weakening the cohesion of our friends and allies because of the perception of the weakening of our own deterrence." South Carolina AFA President **James "Doug" Catington,** Eugene Chapter President **Harry Hance,** and Executive Committee member **Howard Strand** also made their views known on the MX missile in letters to the media and to Capitol Hill.

New York AFA Vice President **Maxine Donnelly** responded to OMB Director **David Stockman's** criticism of the military by writing a letter to President Reagan. She wrote, "As a taxpayer, I am embarrassed over not doing more for the military. Retirement benefits simply do not compare with the price the military may have to pay at any given moment" . . . Newport Beach, Calif., resident **Dr. Ernst H. Krause** has been named a Jimmy Doolittle Fellow of AFA's Aerospace Education Foundation. He is a senior vice president of The Aerospace Corp. in El Segundo and, prior to his retirement, was responsible for all planning and technical development at Aerospace.

Lions, Rotary, Kiwanis, Optimists Clubs, grade schools, retirement centers, Jaycees, and church groups are among the key organizations receiving briefings by the Fort Worth Chapter's Speakers' Bureau. The Bureau coordinates speaking engagements featuring Air Force officers and enlisted people from nearby Carswell AFB on topics ranging from the Soviet threat and updates on SAC to the military retirement system. Chapter President **Dan Heth** says the logistical work is being expertly handled by Chapter Aerospace Education Chairman **Gerrett A. Guly, Jr.**

"What is most important is that none of us ever lose sight of the role the military plays in the defense of this country and that one of the basic rights it defends is freedom of speech," **Kevin Barry,** publisher of the San Angelo *Standard-Times,* told members and guests of AFA's Concho Chapter recently. His speech focused on relations between the military and the media.

AFA's first elected National President, **Thomas G. Lanphier, Jr.,** was among the distinguished guests at the "Salute to Jimmy Doolittle" on February 23. The Salute included the dedication of the Doolittle Library at the University of Texas at Dallas. **Sen. Barry Goldwater** (R-Ariz.) officiated at the dedication. The event also featured a flyby of three privately owned B-25s, *The General, Silver Lady,* and *Big Ole Brew 'n Little Ole You.* A reception and banquet, keynoted by Senator Goldwater and held at the Loew's Anatole Hotel, drew some 1,000 civic and military leaders. Active AFA leader and former Dallas Chapter President **Bill Solemene** helped plan the activities for the February event.

Participants in the "Salute to Jimmy Doolittle" included, from left, Harris Brin, who, clad in his World War II uniform, drove a 1942 Ford Army staff car (in background) as part of the ceremonies; Bill Solemene, former Dallas Chapter President who helped organize the Salute; AFA National President Martin H. Harris; AFA Assistant Executive Director/Field Organizations Dave Noerr; and AFA Board Chairman David L. Blankenship.

AN AFA ALMANAC

H. H. Arnold Award Recipients

AFA's highest Aerospace Award is the H. H. Arnold Award. Named for the World War II leader of the Army Air Forces, it is presented annually in recognition of the most outstanding contributions in the field of aerospace activity.

YEAR	RECIPIENT(S)
1948	Hon. W. Stuart Symington, Secretary of the Air Force
1949	Maj. Gen. William H. Tunner and the men of the Berlin Airlift
1950	Airmen of the United Nations in the Far East
1951	Gen. Curtis E. LeMay and the personnel of Strategic Air Command
1952	Senators Lyndon B. Johnson and Joseph C. O'Mahoney
1953	Gen. Hoyt S. Vandenberg, former Chief of Staff, USAF
1954	Hon. John Foster Dulles, Secretary of State
1955	Gen. Nathan F. Twining, Chief of Staff, USAF
1956	Senator W. Stuart Symington
1957	Edward P. Curtis, Special Assistant to the President
1958	Maj. Gen. Bernard A. Schriever, Commander, Ballistic Missile Division, ARDC
1959	Gen. Thomas S. Power, Commander in Chief, Strategic Air Command
1960	Gen. Thomas D. White, Chief of Staff, USAF
1961	Hon. Lyle S. Garlock, Assistant Secretary of the Air Force
1962	Dr. A. C. Dickieson and John R. Pierce, Bell Telephone Laboratories
1963	The 363d Tactical Reconnaissance Wing, TAC, and the 4080th Strategic Wing, SAC
1964	Gen. Curtis E. LeMay, Chief of Staff, USAF
1965	The 2d Air Division, PACAF
1966	The 8th, 12th, 355th, 366th, and 388th Tactical Fighter Wings, and the 432d and 460th Tactical Reconnaissance Wings
1967	Gen. William W. Momyer, Commander, Seventh Air Force, PACAF
1968	Col. Frank Borman, USAF; Capt. James Lovell, USN; and Lt. Col. William Anders, USAF—Apollo-8 Crew
1969	(No Presentation)
1970	Apollo-11 Team (J. L. Atwood, Lt. Gen. Samuel C. Phillips, USAF, and Astronauts Neil Armstrong, Col. Edwin E. Aldrin, Jr., USAF, and Col. Michael Collins, USAF)
1971	Dr. John S. Foster, Jr., Director of Defense Research and Engineering
1972	Air Units of the Allied Forces in SEA (Air Force, Navy, Army, Marine Corps, and the Vietnamese Air Force)
1973	Gen. John D. Ryan, USAF (Ret.), former Chief of Staff, USAF
1974	Gen. George S. Brown, Chairman, Joint Chiefs of Staff
1975	James R. Schlesinger, Secretary of Defense
1976	Senator Barry M. Goldwater
1977	Senator Howard W. Cannon
1978	Gen. Alexander M. Haig, Jr., USA, Supreme Allied Commander, Europe
1979	Senator John C. Stennis
1980	Gen. Richard H. Ellis, Commander in Chief, Strategic Air Command
1981	Gen. David C. Jones, Chairman, Joint Chiefs of Staff
1982	Gen. Lew Allen, Jr., USAF (Ret.), former Chief of Staff, USAF
1983	Ronald Reagan, President of the United States
1984	The President's Commission on Strategic Forces (the Scowcroft Commission)

AFA's "Man of the Year" Award Recipients

(State names refer to winner's home state at time of award.)

YEAR	RECIPIENT(S)
1953	Julian B. Rosenthal (New York)
1954	George A. Anderl (Illinois)
1955	Arthur C. Storz (Nebraska)
1956	Thos. F. Stack (California)
1957	George D. Hardy (Maryland)
1958	Jack B. Gross (Pennsylvania)
1959	Carl J. Long (Pennsylvania)
1960	O. Donald Olson (Colorado)
1961	Robert P. Stewart (Utah)
1962	(No Presentation)
1963	N. W. DeBernardinis (Louisiana) and Joe L. Shosid (Texas)
1964	Maxwell A. Kriendler (New York)
1965	Milton Caniff (New York)
1966	William W. Spruance (Delaware)
1967	Sam E. Keith, Jr. (Texas)
1968	Marjorie O. Hunt (Michigan)
1969	(No Presentation)
1970	Lester C. Curl (Florida)
1971	Paul W. Gaillard (Nebraska)
1972	J. Raymond Bell (New York) and Martin H. Harris (Florida)
1973	Joe Higgins (California)
1974	Howard T. Markey (Washington, D. C.)
1975	Martin M. Ostrow (California)
1976	Victor R. Kregel (Texas)
1977	Edward A. Steam (California)
1978	William J. Demas (New Jersey)
1979	Alexander C. Field, Jr. (Illinois)
1980	David C. Noerr (California)
1981	Daniel F. Callahan (Florida)
1982	Thomas W. Anthony (Maryland)
1983	Richard H. Becker (Illinois)
1984	Earl D. Clark, Jr. (Kansas)

AFA's First National Officers and Board of Directors

(This panel of officers and directors acted temporarily until a representative group was democratically elected by the membership at the first National Convention.)

OFFICERS

President: James H. Doolittle
First Vice President: Edward P. Curtis
Second Vice President: Meryll Frost
Third Vice President: Thomas G. Lanphier, Jr.
Secretary: Sol A. Rosenblatt
Assistant Secretary: Julian B. Rosenthal
Treasurer: W. Deering Howe
Executive Director: Willis S. Fitch

BOARD OF DIRECTORS

John S. Allard
H. M. Baldridge
William H. Carter
Everett Cook
Burton E. Donaghy
James H. Douglas, Jr.
G. Stuart Kenney
Reiland Quinn
Rufus Rand
Earl Sneed
James M. Stewart
Forrest Vosler
Benjamin F. Warmer
Lowell P. Weicker
C. V. Whitney
J. H. Whitney

AFA's Units of the Year

YEAR	RECIPIENT(S)
1953	San Francisco Chapter (Calif.)
1954	Santa Monica Area Chapter (Calif.)
1955	San Fernando Valley Chapter (Calif.)
1956	Utah State AFA
1957	H. H. Arnold Chapter (N. Y.)
1958	San Diego Chapter (Calif.)
1959	Cleveland Chapter (Ohio)
1960	San Diego Chapter (Calif.)
1961	Chico Chapter (Calif.)
1962	Fort Worth Chapter (Tex.)
1963	Colin P. Kelly Chapter (N. Y.)
1964	Utah State AFA
1965	Idaho State AFA
1966	New York State AFA
1967	Utah State AFA
1968	Utah State AFA
1969	(No Presentation)
1970	Georgia State AFA
1971	Middle Georgia Chapter (Ga.)
1972	Utah State AFA
1973	Langley Chapter (Va.)
1974	Texas State AFA
1975	Alamo Chapter (Tex.) & San Bernardino Area Chapter (Calif.)
1976	Scott Memorial Chapter (Ill.)
1977	Thomas B. McGuire, Jr., Chapter (N. J.)
1978	Thomas B. McGuire, Jr., Chapter (N. J.)
1979	Robert F. Travis Chapter (Calif.)
1980	Central Oklahoma (Gerrity) Chapter (Okla.)
1981	Alamo Chapter (Tex.)
1982	Chicagoland-O'Hare Chapter (Ill.)
1983	Charles A. Lindbergh Chapter (Conn.)
1984	Scott Memorial Chapter (Ill.) & Colorado Springs/Lance Sijan Chapter (Colo.)

AFA's National Presidents


James H. Doolittle (1946)


Thomas G. Lanphier, Jr. (1947)


C. R. Smith (1948)


Robert S. Johnson (1949–50)


Harold C. Stuart (1951)


Arthur F. Kelly (1952)


Peter J. Schenk (1957–58)


Howard T. Markey (1959)


Thos. F. Stack (1960)


Joe Foss (1961)


John B. Montgomery (1962)


George D. Hardy (1969–70)


Martin M. Ostrow (1971–72)


Joe L. Shosid (1973–74)


George M. Douglas (1975–76)


Gerald V. Hasley (1977–78)

AFA's Regions, States, and Chapters

The figures on the right indicate the number of affiliated members as of December 31, 1984. Listed below each Region is the name of the National Vice President for that Region.

CENTRAL EAST REGION	**9,880**
William L. Ryon, Jr.	
Delaware	1,200
Delaware Galaxy	1,023
Diamond State	177
District of Columbia	1,512
Nation's Capital	1,512
Kentucky	479
General Russell E. Dougherty	420
Lexington	59
Maryland	1,797
*Baltimore	348
Central Maryland	74
Thomas W. Anthony	1,375
Virginia	4,755
Danville	30
Donald W. Steele, Sr., Memorial	1,899
Jack Manch	124
Langley	1,958
Leigh Wade	97
Lynchburg	51
Richmond	285
Roanoke	139
Tidewater	172
West Virginia	137
Chuck Yeager	137
FAR WEST REGION	**29,773**
Richard C. Doom	
Arizona	3,771
Frank Luke	853
Phoenix Sky Harbor	1,254
Sedona	84
Tucson	1,580
California	22,866
Antelope Valley	496
David J. Price/Beale	767
*Fresno	434
General Curtis E. LeMay	1,157
*General Doolittle/Los Angeles Area	2,216
General Robert F. Travis	2,955
*Golden Gate	675
Greater Los Angeles Airpower	1,300
High Desert	807
Merced County	866
Monterey Bay Area	252
Pasadena Area	197
Redwood Empire	426
Riverside County	1,163
Robert H. Goddard	1,440
Sacramento	3,377
San Bernardino Area	2,227
San Diego	1,099
Tennessee Ernie Ford	1,012
Guam	547
Guam-Arc Light	547
Hawaii	1,097
*Hawaii	1,097
Nevada	1,492
Reno	315
Thunderbird	1,177
GREAT LAKES REGION	**15,603**
Hugh L. Enyart	
Illinois	4,707
Chicagoland-O'Hare	1,461
Greater Peoria	67
Illini	637
Land of Lincoln	95
Scott Memorial	2,309
West Suburban	138
Indiana	1,582
Central Indiana	239
Fort Wayne-Baer Field Area	166
Grissom Memorial	891
Gus Grissom	160
Lawrence D. Bell Museum	17
Lester W. Johnston	27
South Bend	172
Southern Indiana	110
Michigan	2,765
Battle Creek	252
General Claire Chennault	207
Hoyt S. Vandenberg	298
Huron	453
James H. Straubel	391
Kalamazoo	53
Lake Superior Northland	699
Lloyd R. Leavitt, Jr.	81
Mount Clemens	310
PE-TO-SE-GA	21
Ohio	5,883
Akron	52
*Capt. Eddie Rickenbacker Memorial	591
Cincinnati	153
Cleveland	498
Mid-Ohio	379
Steel Valley	196
*Wright Memorial	4,014
Wisconsin	666
Badger State	63
Billy Mitchell	523
Madison	80
MIDWEST REGION	**8,552**
Charles H. Church, Jr.	
Iowa	262
All-Iowa	154
Richard D. Kisling	108
Kansas	888
Air Capital	712
Topeka	176
Missouri	1,822
Central Missouri	451
Harry S. Truman	466
Spirit of St. Louis	905
Nebraska	5,580
Ak-Sar-Ben	5,391
Lincoln	189
NEW ENGLAND REGION	**4,625**
Arley McQueen, Jr.	
Connecticut	1,095
Central Connecticut	57
Charles A. Lindbergh	167
First Connecticut	275
Flying Yankees	84
General George C. Kenney	53
Igor Sikorsky	150
Northern Connecticut	310
Maine	555
Eastern Maine	84
Southern Maine	72
Spudland	399
Massachusetts	1,582
Boston	295
*Chicopee	355
Laurence G. Hanscom	608
Minuteman	82
Otis	69
Taunton	72
*Worcester	101
New Hampshire	1,170
Amoskeag	155
Pease	1,015
Rhode Island	114
Metro Rhode Island	114
Vermont	108
Burlington	108
NORTH CENTRAL REGION	**3,176**
Jim Laitos	
Minnesota	489
General E. W. Rawlings	422
Head of the Lakes	67
North Dakota	1,547
Concrete Mixers	19
General David C. Jones	597
Happy Hooligan	90
Red River Valley	841
South Dakota	1,140
Dacotah	147
Rushmore	993
NORTHEAST REGION	**11,172**
John P. E. Kruse	
New Jersey	4,246
Admiral Charles E. Rosendahl	150
Atlantic City Area	217
Garden State	34
Greater Camden Area	137
Hangar One	148
High Point	65
*Hudson	89
Mercer County	106
Middlesex	75
New Jersey Public Affairs	56
New Jersey Wing CAP/AFA	32
*Passaic-Bergen	339

AFA's Board Chairmen

(Pictured are Chairmen who never served as National President)


George C. Kenney (1953)


John R. Alison (1954)


Gill Robb Wilson (1955)


John P. Hinebry (1956)


Edward P. Curtis (1946)


Carl A. Spaatz (1950)


W. R. Lovelace II (1963)


Jess Larson (1964–66)


Robert W. Smart (1967–68)


James M. Trail (1958)


Julian B. Rosenthal (1959)


Victor R. Kregel (1979–80)


John G. Brosky (1981–82)


David L. Blankenship (1983–84)


Martin H. Harris (1985)


Jack B. Gross (1963)


Daniel F. Callahan (1979–80)

Sal Capriglione	133
Teterboro-Bendix	102
Thomas B. McGuire, Jr	2,093
Tri-County	53
Union Morris	392
Wings	25
New York	**4,255**
*Albany	135
Brooklyn "Key"	558
Chautauqua	99
Colin P. Kelly	643
Forrest L. Vosler	196
General Daniel "Chappie" James, Jr., Memorial	81
Genesee Valley	165
H. H. Arnold	205
Hudson Valley	79
Iron Gate	354
Lawrence D. Bell	341
Lloyd Schloem-Empire	55
Nassau-Mitchell	279
New York Air Reserve & CAP	64
Niagara Frontier	198
Plattsburgh	313
Queens	135
Suffolk County	188
Thomas Watson, Sr.	58
Westchester Falcon	109
Pennsylvania	**2,671**
Air Force Mothers	22
Airport Number One	205
Altoona	49
Beaver Valley	68
Brandywine	60
Col. Stuart E. Kane, Jr.	122
Erie	88
*Greater Pittsburgh	526
Joe Walker	56
Laurel Highlands	54
Lehigh Valley	154
*Metropolitan Philadelphia	378
*Mifflin County	119
Montgomery-Delaware Valley	203
Olmsted	330
Pocono Northeast	43
Steel Valley	96
York-Lancaster	98
NORTHWEST REGION Philip G. Saxton	**6,940**
Alaska	**1,463**
Anchorage	1,090
Fairbanks Midnight Sun	373
Idaho	**790**
Boise Valley	418
Magic Valley	40
Snake River Valley	332
Montana	**668**
Big Sky	668
Oregon	**726**
Eugene	170
*Portland	556
Washington	**3,293**
Central Washington	43
Greater Bellingham	22
Greater Seattle	863
Spokane	824
Tacoma	1,541
ROCKY MOUNTAIN REGION Karen M. Kyritz	**7,919**
Colorado	**4,722**
Blue Barons	88
Colorado Springs/Lance Sijan	2,640
Flatirons	103
Front Range	1,190
General Joe C. Moffitt	69
General Robert E. Huyser	66
Long's Peak	84
Pueblo	66
Silver & Gold	374
Weld County	42
Utah	**2,599**
Gold Card	216
Ogden	668
Rocky Mountain	229
Salt Lake	531
Ute	720
Wasatch	235
Wyoming	**598**
Cheyenne	598
SOUTH CENTRAL REGION C. Cliff Ball	**9,198**
Alabama	**1,820**
Birmingham	251
Mobile	188
Montgomery	1,066
Selma	92
Tennessee Valley	181
War Eagle	42
Arkansas	**1,660**
Blytheville	364
David D. Terry, Jr.	1,122
Fort Smith	71
Razorback	103
Louisiana	**1,689**
Alexandria	180
Ark-La-Tex	1,116
Baton Rouge	149
Greater New Orleans	244
Mississippi	**2,358**
Golden Triangle	856
Jackson	99
John C. Stennis	1,403
Tennessee	**1,671**
Chattanooga	118
Everett R. Cook	266
General Bruce K. Holloway	376
H. H. Arnold Memorial	502
Lt. Gen. Frank M. Andrews	409
SOUTHEAST REGION Morgan S. Tyler, Jr.	**18,359**
Florida	**8,920**
Air Commando	225
Brandon	52
Cape Canaveral	1,148
Central Florida	1,128
Citrus Belt	115
Eglin	1,640
Florida Gulf Coast	144
Florida Highlands	78
Florida Sun Coast	125
Gainesville	59
General James R. McCarthy	147
Gold Coast	328
Homestead	308
Jax	90
Jerry Waterman	1,301
John C. Meyer	202
Morgan S. Tyler	226
Naples-Marco	41
Panama City	856
Southwest Florida	155
Tallahassee	221
West Palm Beach	331
Georgia	**4,228**
Athens	45
Atlanta	165
Carl Vinson Memorial	2,704
Chattahoochee Valley	34
Coosa Valley	39
Dobbins	671
Savannah	261
South Georgia	280
Southeast Georgia	29
North Carolina	**2,563**
Blue Ridge	59
Kitty Hawk	70
Piedmont	208
Pope	1,052
Scott Berkeley	838
Tar Heel	216
Triad	120
Puerto Rico	**154**
San Juan	154
South Carolina	**2,494**
Charleston	869
Clemson	89
Columbia	313
Grand Strand	415
Swamp Fox	808
SOUTHWEST REGION T. A. Glasgow	**27,883**
New Mexico	**2,839**
Albuquerque	1,446
Fran Parker	820
Llano Estacado	573
Oklahoma	**5,401**
Altus	685
Central Oklahoma	3,367
Enid	1,037
Tulsa	312
Texas	**19,563**
Abilene	1,125
Aggieland	100
Alamo	6,866
Austin	1,435
Concho	457
Corpus Christi	120
Dallas	1,041
Del Rio	547
Denton	35
Fort Worth	3,811
Greater Amarillo	97
Heart of the Hills	161
Houston	956
Lee Glasgow-Waco	86
Lubbock	922
Northeast Texas	159
Paso Del Norte	152
Permian Basin	155
Rio Grande Valley	30
Wichita Falls	1,308

*These Chapters were chartered prior to December 31, 1948, and are considered original charter chapters.

INTERCOM

The Aerospace Education Foundation: Past, Present, and Future

AFA's educational affiliate was created on May 1, 1956, as the Air Force Association Foundation, Inc., essentially to provide an agency to which donations would be deductible for income-tax purposes. The first recorded activity was the presentation of awards to two civilians at the Science Symposium in Cambridge, Mass., in October 1956.

After a series of name changes, it officially became the Aerospace Education Foundation on July 27, 1961, and, by that time, had become active in sponsoring conferences and world forums on aerospace education for educators and business leaders preparing for the dawn of the space age.

In the last year, the Foundation reorganized its priorities and established the following goals:

- Serve as a generator, interpreter, educator, and clearinghouse of information to help the public better understand the valuable contributions of aerospace technology to America's welfare and security;
- Encourage interest in aerospace developments and education throughout America's educational system;
- Stimulate and support appropriate research, study, and development programs relating to aerospace activities and aerospace education;
- Assist and encourage literary works to advance the knowledge of the aerospace world and aerospace education and to preserve and perpetuate vital information on the rich aerospace heritage—both military and civilian—of our nation; and
- Apply aerospace technology to the advancement of education.

General Jimmy Doolittle Educational Fellowship Program

Named in honor of famed aviation pioneer and World War II Medal of Honor recipient Gen. James H. Doolittle, USAF (Ret.), this Fellowship program generates funds to support the Foundation's active and varied educational efforts. The program was established in 1974.

General Ira C. Eaker Historical Fellowship Program

The General Ira C. Eaker Historical Fellowship program was established in recognition of General Eaker's visionary contributions to America's aerospace prowess. It generates funds to support and perpetuate understanding and knowledge of America's rich military and civilian aerospace history through relevant research and publication efforts.

Aerospace Education Center

The Foundation's Aerospace Education Center conducts in-depth roundtable discussions of important aerospace, defense, and national security topics featuring key military, congressional, and network news officials as well as educators and business leaders. As a major contribution to aerospace education, roundtable proceedings are widely distributed on audio- and videotape and in written form.

Dissemination of USAF Courses

This program began in 1972 with seven vocational/technical courses and ended in June 1984 with fifty-eight course packages, eleven special publications, and eighteen home-study courses. Through this program, the Foundation disseminated more than 7,000 course packages to more than 1,000 schools in all fifty states and in fourteen foreign countries.

During the 1970s and early 1980s, this program served a valid and urgent need by providing complete course packages of proven worth to the nation's schools, training centers, and the growing number of community colleges. By 1984, however, AEF officials felt that the need for such programs had been met and that technological change in course content and methods of instruction necessitated termination of the program. This program received nationwide recognition by various organizations for its contributions to aerospace education.

AFA's Expanding Network of Active Units Overseas

AFA UNIT	LOCATION
United States Air Forces in Europe (USAFE)	
Ankara AS	Ankara AS, Turkey
Bitburg AB	Bitburg AB, Germany
Camp New Amsterdam	Camp New Amsterdam, The Netherlands
Dolomiti	Aviano AB, Italy
Eagle	Soesterberg AB, The Netherlands
Fens	RAF Alconbury, UK
Gateway to Freedom	Tempelhof Central Airport, West Berlin, Germany
Hahn AB	Hahn AB, Germany
Hellenikon AB	Hellenikon, AB, Greece
Incirlik AB	Incirlik AB, Turkey
Izmir AS	Izmir AS, Turkey
RAF Bentwaters	RAF Bentwaters, UK
RAF Chicksands	RAF Chicksands, UK
RAF Fairford	RAF Fairford, UK
RAF Mildenhall	RAF Mildenhall, UK
Red Raider	Torrejon AB, Spain
Rheinpfalz	Ramstein AB, Germany
Sembach AB	Sembach AB, Germany
Spangdahlem AB	Spangdahlem AB, Germany
Wiesbaden	Lindsey AS, Germany
Zweibrücken AB	Zweibrücken AB, Germany
Pacific Air Forces (PACAF)	
Captain Joseph McConnell, Jr.	Osan AB, Korea
Clark AB	Clark AB, Philippines
Keystone	Kadena AB, Japan
Manila	Manila, Philippines
Misawa	Misawa AB, Japan
Tokyo	Tokyo, Japan
Wolf Pack	Kunsan AB, Korea
Supreme Headquarters Allied Powers Europe (SHAPE)	
General Lauris Norstad	Mons, Belgium

Honor Roll of 1984–85 Aerospace Education Foundation Individual Fellows

Individual Jimmy Doolittle Fellows

(in order of affiliation)

NAME	SPONSOR
(1984)	
The Hon. Verne Orr	George D. Hardy
Brig. Gen. Martin M. Ostrow, USAFR (Ret.) *(in memoriam)*	California State AFA
Lt. Gen. Duane H. Cassidy, USAF	Thomas B. McGuire, Jr., Chapter
Col. Gordon W. Lake, USAF (Ret.)	Thomas B. McGuire, Jr., Chapter
Capt. H. Bruce Gilkes, USAF	Thomas B. McGuire, Jr., Chapter
Herbert R. Dimmick	Iron Gate Chapter
Harold W. Miller	Iron Gate Chapter
Gen. Andrew P. Iosue, USAF, Commander, ATC	Iron Gate Chapter
Herbert F. Rogers	The Fort Worth Civic Leaders Ass'n
Earl E. Hatchett	The Fort Worth Civic Leaders Ass'n
Dr. Gene Wood	The Fort Worth Civic Leaders Ass'n
Sen. Strom Thurmond (R-S. C.)	South Carolina AFA Chapters
Col. Guion S. Bluford, Jr., USAF, NASA Astronaut	Tuskegee Airmen, Inc.
Maj. Gen. Richard A. Burpee, USAF	Iron Gate Chapter
Nation's Capital Chapter	Rockwell International Corp.—DEO
Eglin Chapter	Rockwell International Corp.—DEO
Wright Memorial Chapter	Rockwell International Corp.—DEO
Col. Gerald J. Smith, USAF (Ret.)	Sen. Barry Goldwater (R-Ariz.)
Lt. Gen. Duane H. Cassidy, USAF	Iron Gate Chapter
The Hon. Stuart Symington	Jack Gross
Dr. Robert J. Sanator	Fairchild Republic Company
Supreme Court Chief Justice Warren Earl Burger	General E. W. Rawlings Chapter
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The Air Force Association is an independent, nonprofit, aerospace organization serving no personal, political, or commercial interests; 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 for all mankind.

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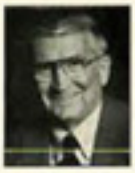

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Awards Received by AEF

YEAR	ORGANIZATION	RECOGNITION
1974	National Society for Performance and Instruction	Outstanding Organization Award
1976	American Society for Training & Development	Human Resources Development Award
1980	National Congress on Aerospace Education	Crown Circle Award for leadership in aerospace education

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1984–85	George D. Hardy	Sen. Barry M. Goldwater

AEF Symposia and National Laboratories for the Advancement of Education (NLAE)

YEAR	TITLE
1968	First NLAE: Individualized Learning for the Inner City
1970	Second NLAE: Educating for the World of Work
1981	Symposium: Engineers: A National Resource—Scarcity, Challenge, & Future Implications
1983	Third NLAE: Improving the Scientific & Technological Literacy of America's Youth

Aerospace Education Center Roundtables

October 26, 1984	Focus on the MX Peacekeeper—Key to Strategic Force Modernization
December 4, 1984	Focus on SDI—Opening a New Era of Deterrence?
January 14, 1985	Focus on Spare Parts—A Balanced Perspective
February 7, 1985	Military Retirement and Its Impact on the Vitality of the Armed Forces
March 6, 1985	Teachers of the Future—Where Are They and Their Students Going?
March 18, 1985	Focus on: The Chiefs
March 28, 1985	Focus on Advanced Tactical Fighter Technologies
April 16, 1985	1985—NATO's First Thirty-Six Years *(Scheduled)*
May 6, 1985	Deterrence—What Is It? What Does It Mean to Me and My Generation?
May 20, 1985	Focus on the B-1B—Its Testing, Its Production—Its Future
June 12, 1985	Remembering the Past—We've Come a Long Way
June 24, 1985	Focus on: Terrorism
July 16, 1985	Educating for Leadership in Space
August 20, 1985	Focus on Reliability and Maintainability (R&M)
October 8, 1985	The Military and the Media
November 19, 1985	Understanding "Gray Area" Conflict

AEF's Air Force Junior ROTC Contest

YEAR	CONTEST THEME
1973	The Role and Significance of the B-1 Strategic Bomber
1974	The Air Force as a Unique National Resource
1975	How Best to Keep the Peace
1976	The Role of Aerospace in American History
1977	The Imperatives of National Readiness
1978	Theater Defense for the 1980s
1979	How Best to Meet the Military Threat
1980	Air Force Junior ROTC—For the Cadet, the School, and the Community
1981	Freedom Is Not Free
1982	Aerospace History
1983	How We Prepare Ourselves for Leadership in America's Future
1984	Military Space Ventures
1985	History of Aerospace in Our Area

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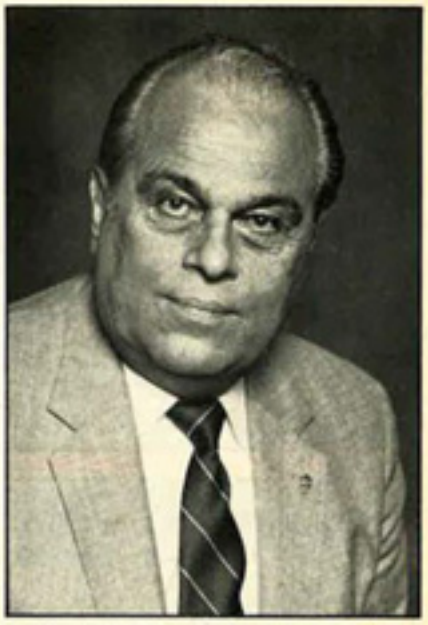

Michael J. Nisos, who has been Managing Director of the Aerospace Education Foundation for the past eighteen years, will retire on May 31, 1985. Mr. Nisos served twenty-four years in the Air Force before retiring as a colonel in 1967. He will be replaced by Kenneth A. Goss.

UNIT REUNIONS

Air Forces Escape & Evasion Society
A European trip is planned for June 4–18, 1985, to honor the Air Forces Escape and Evasion Society (AFEES) Helpers. **Contact:** Heyward C. Spinks, P. O. Box 844, Beaufort, S. C. 29902.

Air Transport Command
Members of the Air Transport Command who served in the Pacific area during World War II will hold a reunion on May 18–19, 1985, in St. Louis, Mo. **Contact:** Ken Bayer, 4853 Milentz, St. Louis, Mo. 63116. Phone: (1-314) 481-8927. Bob Maginnis, 3151 S. E. Gran Via, Stuart, Fla. 33494. Phone: (1-305) 286-2235.

Canberra Association
The Canberra Association, which comprises B-57 crew members, will host a reunion on August 30–September 1, 1985, in Colorado Springs, Colo. **Contact:** George Gohlike, 1419 Kern St., Colorado Springs, Colo. 80915. Phone: (303) 597-4048.

Military Dependents
A reunion for former military dependents who attended Spangdahlem-Bitburg High School (1963–66) will be held in July 1985 in Arlington, Tex. **Contact:** Terry Hill Rogers, 1003 Darlene Lane, Arlington, Tex. 76010. Phone: (817) 860-7525.

Strategic Recon Center
Members of the Strategic Reconnaissance Center (SRC) will hold their twentieth anniversary reunion on August 9–10, 1985, at Offutt AFB, Neb. **Contact:** Dick Lees, 1608 Brenda Dr., Bellevue, Neb. 68005. Phone: (402) 291-1943.

2d Bomb Squadron Ass'n
The 2d Bomb Squadron, 22d Bomb Group, will hold its reunion on June 20–23, 1985, at the Sheraton Patriot Inn in Williamsburg, Va. **Contact:** Jim Bradley, 5803 N. W. 70th Ave., Fort Lauderdale, Fla. 33319. Phone: (305) 721-9262.

4th Fighter Squadron
A reunion for the 4th Fighter Squadron will be held on August 1–3, 1985, at Hill AFB, Utah. **Contact:** Frank W. Dorfmeyer, 211 Carol Park Way, Kettering, Ohio 45440. Phone: (513) 434-5738.

5th Fighter-Interceptor Squadron
The 5th Fighter-Interceptor Squadron "Spitten Kittens" will hold a reunion on July 26–28, 1985, at the Holiday Inn in Fairborn, Ohio. **Contact:** Joe E. Myers, R. R. 1, Box 303, Ramsey, Ill. 62080. Phone: (618) 423-2597.

20th Bomb Squadron
The 20th Bomb Squadron will hold its reunion on August 2–4, 1985, at Barksdale AFB, La. **Contact:** William F. Cocke, 403 Pine Cone Circle, Haughton, La. 71037.

25th Fighter Squadron
Former members of the 25th Fighter Squadron "Assam Draggin's" who served in the CBI (1942–45) are invited to attend a reunion on August 29, 1985, in Tucson, Ariz. **Contact:** Stanley A. Strout, 4717 Montgomery Dr., Santa Rosa, Calif. 95405. Phone: (707) 539-0357.

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5-85

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26th Photo Recon Squadron
The 26th Photo Reconnaissance Squadron will hold a reunion on August 30–31, 1985, in Colorado Springs, Colo. **Contact:** Hartwell C. McCullough, P. O. Box 2141, Lafayette, La. 70502.

Class 40-A Ass'n
Former members of Flying Class 40-A will hold a forty-fifth anniversary reunion on August 29–31, 1985, in Colorado Springs, Colo. **Contact:** Col. Robert F. Schirmer, USAF (Ret.), 8978 E. Anna Pl., Tucson, Ariz. 85710. Phone: (602) 886-0730.

65th Fighter Squadron
The 65th Fighter Squadron, 57th Fighter Group, will hold a reunion on May 31–June 2, 1985, at the Ramada Inn in Windsor Locks, Conn. **Contact:** John N. Morrison, CR 68, Box 74, Thomaston, Me. 04861. Phone: (207) 354-2490.

65th Troop Carrier Squadron
The 65th Troop Carrier Squadron will hold a reunion on July 31–August 4, 1985, in Davis, Calif. **Contact:** Bud Hawkey, 106 Union Dr., New Madison, Ohio 45346.

74th Troop Carrier Squadron Ass'n
A reunion for the 74th Troop Carrier Squadron will be held on July 10–13, 1985, at the Williamsburg Hospitality House in Williamsburg, Va. **Contact:** V. M. Draper, Rte. 4, Box 379, Bluff City, Tenn. 37618. Phone: (615) 764-4362.

86th Fighter-Bomber Group
Members of the 86th Fighter-Bomber Group, including the 525th, 526th, and 527th Squadrons, will hold a reunion on May 30–June 2, 1985, in Chattanooga, Tenn. **Contact:** Gilbert Hurt, 4920 Montcrest Dr., Chattanooga, Tenn. 37416. Phone: (615) 344-6077.

305th Bomb Group Ass'n
Members of the 305th Bomb Group will hold their reunion on August 22–24, 1985, in Philadelphia, Pa. **Contact:** Abe Millar, P. O. Box 757, Sanger, Tex. 76266.

325th Photo Recon Wing
Members of the 325th Photo Reconnaissance Wing and the 7th Photo Group will rendezvous in England on May 23–30, 1985, to dedicate a memorial for members of the 7th Photo Group. **Contact:** W. Hugh Scott, 3342 S. Sandhill Rd., Suite #9-100, Las Vegas, Nev. 89121. Claude Murray, 1933 E. Marshall, Phoenix, Ariz. 85016.

356th Fighter Group
The 356th Fighter Group will celebrate its fortieth anniversary reunion on July 25–28, 1985, at the Buccaneer Motor Lodge on Jekyll Island, Ga. **Contact:** Ken Male, 2988 Hillcrest Rd., Schenectady, N. Y. 12309. Phone: (518) 783-0207.

398th Bomb Group Memorial Ass'n
A reunion for the 398th Bomb Group will be held on July 25–27, 1985, in conjunction with the fiftieth anniversary celebration of the B-17 in Seattle, Wash. **Contact:** George R. Hilliard, 7841 Quartermaine Ave., Cincinnati, Ohio 45236.

420th Air Refueling Squadron
The 420th Air Refueling Squadron will hold its reunion on June 13–16, 1985, at the Sacramento Inn in Sacramento, Calif. **Contact:** Lt. Col. Gordon C. Haworth, USAF (Ret.), 5056 Tacomic Dr., Sacramento, Calif. 95842.

433d Tactical Fighter Squadron
A reunion for members of the 433d Tactical Fighter Squadron will be held on May 24–26, 1985, at Holloman AFB, N. M. **Contact:** Maj. Mark Devlin, USAF, 3029 El Dorado, Alamogordo, N. M. 88310. Phone: (505) 437-4829; AUTOVON 867-7025/6.

448th Bomb Group Ass'n
The 448th Bomb Group will hold a reunion on June 13–15, 1985, in Shreveport, La. **Contact:** Lt. Col. Leroy J. Engdahl, USAFR (Ret.), 1785 Wexford Dr., Vidor, Tex. 77662.

452d/17th Bomb Wings
Members of the 452d/17th Bomb Wings who were stationed at Pusan, Korea, during 1950–53 will hold a reunion at Wright-Patterson AFB, Ohio, on June 5–7, 1985. **Contact:** Walter H. Myers, 53 Howard Ave., Columbus, Ohio 43085.

456th Bomb Group
The 456th Bomb Group will hold a reunion on June 20–23, 1985, in San Antonio, Tex. **Contact:** James F. Watkins, 11415 Minor Dr., Kansas City, Mo. 64114.

510th Fighter Squadron
Members of the 510th Fighter Squadron, 405th Fighter Group, will hold their reunion on May 16–18, 1985, at the Red Lion Inn in Omaha, Neb. **Contact:** William A. Simpkins, 2318 Mount Royal Terrace, Baltimore, Md. 21217. Phone: (301) 669-3892.

6147th Tactical Control Group
Members of the 6147th Tactical Control Group "Mosquitos" who served with Fifth Air Force in the Korean War (1950–53) will hold a reunion on July 18–20, 1985, in Reno, Nev. **Contact:** Sidney F. Johnston, 6147th TCG "Mosquito" Historical Foundation, 6909 Rosewood Rd., N. E., Albuquerque, N. M. 87111.

Flight Checkers Ass'n
Members of the Flight Checkers Association, which includes AACS, AFCS, and AFCC personnel, will hold their reunion during the fall of 1985.

Please contact the address below.

H. G. Lewis
108 Tiller Dr.
Midwest City, Okla. 73110

Lowry Field Bombardiers
Former members of Cadet Classes I, II, and III (Lowry Field, Colo.) will hold a reunion during the fall of 1985 in Denver, Colo.

Please contact me at the address below.
John L. Sutton
4917 Ravenswood Dr., #1744
San Antonio, Tex. 78227
Phone: (512) 675-1441

Shemya Veterans Ass'n

I would like to hear from anyone who served in the armed forces on Shemya Island during World War II and who would be interested in joining the Shemya Veterans Association and planning a reunion.

E. B. Bonnet
P. O. Box 26093
New Orleans, La. 70186
Phone: (504) 288-5180

Class 43-K

I would like to hear from any former members of Class 43-K (Stuttgart, Ark.) who would be interested in holding a reunion.

Maj. Peter A. Ravella,
USAF (Ret.)
2307 Bullington
Wichita Falls, Tex. 76301

Class 55-J

I would like to hear from members of Flying Class 55-J for the purpose of planning a thirtieth anniversary reunion.

Dr. Gerry Morton
TRW Electronics & Defense
One Space Park, E2/9042
Redondo Beach, Calif. 90278
Phone: (213) 536-1401

Coming Events

May 4, **Louisiana State Convention,** Barksdale . . . May 17–18, **Mississippi State Convention,** Biloxi . . . May 17–18, **Oklahoma State Convention,** Altus . . . May 17–18, **Oregon State Convention,** Portland . . . May 17–18, **Tennessee State Convention,** Chattanooga . . . June 14–16, **Georgia State Convention,** Savannah . . . June 15, **Illinois State Convention,** Chanute AFB . . . June 21–22, **Ohio State Convention,** Cleveland . . . June 28–29, **New Jersey State Convention,** Cape May . . . July 12–13, **Colorado State Convention,** Air Force Academy . . . July 12–13, **Pennsylvania State Convention,** Pittsburgh . . . July 19–21, **Texas State Convention,** Austin . . . July 26–28, **Florida State Convention,** Orlando . . . August 2–4, **New York State Convention,** Niagara Falls . . . August 2–3, **Utah State Convention,** Park City . . . August 2–4, **Washington State Convention,** Bellevue . . . August 9–10, **Arkansas State Convention,** Blytheville AFB . . . August 22–24, **California State Convention,** San Diego . . . August 23–24, **North Dakota State Convention,** Minot . . . September 15–19, **AFA National Convention and Aerospace Development Briefings and Displays,** Washington D. C.

AFA CHAMPLUS® . . . . Strong Protection

When a Single Accident or Illness Could Cost *You* Thousands of Dollars, You Need AFA CHAMPLUS®. . . for *Strong* Protection against Costs CHAMPUS Doesn't Cover!

For military retirees and their dependents . . . and dependents of active-duty personnel . . . more and more medical care is being provided through the government CHAMPUS program.

And, of course CHAMPUS pays 75% of allowable charges.

But today's soaring hospital costs—*up to $500 a day* in some major metropolitan medical centers—can run up a $20,000 bill for even a moderately serious accident or illness.

Your 25% of $20,000 is no joke!

AFA CHAMPLUS® protects you against that kind of financial catastrophe *and* covers most of your share of routine medical expenses as well.

HOW AFA CHAMPLUS® WORKS FOR YOU!

WHO IS ELIGIBLE?

1) All AFA members under 65 years of age who are currently receiving military retired pay and are eligible for benefits under Public Law 89-614 (CHAMPUS), their spouses under age 65 and their unmarried dependent children under age 21 (or age 23 if in college).
2) All eligible dependents of AFA members on active duty. Eligible dependents are spouses under age 65 and unmarried dependent children under age 21 (or age 23 if in college).

EXCEPTIONAL BENEFIT PLAN

(See chart at right)

FOUR YEAR BASIC BENEFIT. Benefits for most injuries or illnesses may be paid for up to a four-year period.

PLUS THESE SPECIAL BENEFITS . . .

1) Up to 45 consecutive days of in-hospital care for mental, nervous, or emotional disorders. Outpatient care may include up to 20 visits of a physician or $500 per insured person each year.
2) Up to 30 days care per insured per year in a Skilled Nursing Facility.
3) Up to 30 days care per insured per year and up to 60 days lifetime in a CHAMPUS-approved Residential Treatment Center.
4) Up to 30 days care per insured per year and up to 60 days lifetime in a CHAMPUS-approved Special Treatment Facility.
5) Up to 5 visits per insured per year to Marriage and Family Counselors under conditions defined by CHAMPUS.

YOUR INSURANCE IS NON-CANCELLABLE

As long as you are a member of the Air Force Association, pay your premiums on time, and the master contract remains in force, your insurance cannot be cancelled.

ADMINISTERED BY YOUR ASSOCIATION . . . UNDERWRITTEN BY MUTUAL OF OMAHA

AFA CHAMPLUS® insurance is administered by trained insurance professionals on your Association staff. You get prompt, reliable, courteous service from people who know your needs and know every detail of your coverage. Your insurance is underwritten by Mutual of Omaha, the largest individual and family health insurance company in the world.

AFA OFFERS YOU HOSPITAL BENEFITS AFTER AGE 65

Once you reach Age 65 and are covered under Medicare, AFA offers you protection against hospital expenses not covered by Medicare through the *Senior Age Benefit Plan* of AFA Hospital Indemnity Insurance. Members enrolled in AFA CHAMPLUS® will automatically receive full information about AFA's Medicare supplement program upon attainment of Age 65 so there will be no lapse in coverage.

AFA CHAMPLUS® BENEFIT SCHEDULE

Care	*CHAMPUS Pays*	*AFA CHAMPLUS® Pays*
	For Military Retirees Under Age 65 and Their Dependents	
Inpatient civilian hospital care	CHAMPUS pays 75% of allowable charges.	CHAMPLUS® pays the 25% of allowable charges not covered by CHAMPUS.
Inpatient military hospital care	The only charge normally made is a $6.55 per day subsistence fee, not covered by CHAMPUS.	CHAMPLUS® pays the $6.55 per day subsistence fee.
Outpatient care	CHAMPUS COVERS 75% of outpatient care fees after an annual deductible of $50 per person ($100 maximum per family) is satisfied.	CHAMPLUS® pays the 25% of allowable charges not covered by CHAMPUS after the deductible has been satisfied.
	For Dependents of Active-Duty Military Personnel	
Inpatient civilian hospital care	CHAMPUS pays all covered services and supplies furnished by a hospital less $25 or $6.55 per day, whichever is greater.	CHAMPLUS® pays the greater of $6.55 per day or $25 of the reasonable hospital charges not covered by CHAMPUS.
Inpatient military hospital care	The only charge normally made is a $6.55 per day fee, not covered by CHAMPUS.	CHAMPLUS® pays the $6.55 per day subsistence fee.
Outpatient care	CHAMPUS covers 80% of outpatient care fees after an annual deductible of $50 per person ($100 maximum per family) is satisfied.	CHAMPLUS® pays the 20% of allowable charges not covered by CHAMPUS after the deductible has been satisfied.

NOTE: Outpatient benefits cover emergency room treatment, doctor bills, pharmaceuticals, and other professional services.

There are some reasonable limitations and exclusions for both inpatient and outpatient coverage. Please note these elsewhere in the plan description.

Against Costs CHAMPUS Doesn't Cover

APPLY TODAY!
JUST FOLLOW THESE STEPS

Choose either AFA CHAMPLUS® Inpatient coverage or combined Inpatient and Outpatient coverage for yourself. Determine the coverage you want for dependent members of your family. Complete the enclosed application form in full. Total the premium for the coverage you select from the premium tables on this page. Mail the application with your check or money order for your initial premium payment, payable to AFA.

AFA's CHAMPLUS®

LIMITATIONS

Coverage will not be provided for conditions for which treatment has been received during the 12-month period prior to the effective date of insurance until the expiration of 12 consecutive months of insurance coverage without further treatment. *After coverage has been in force for 24 consecutive months, pre-existing* conditions will be covered regardless of prior treatment.

EXCLUSIONS

This plan does not cover and no payment shall be made for:

a) routine physical examinations or immunizations

b) domiciliary or custodial care

c) dental care (except as required as a necessary adjunct to medical or surgical treatment)

d) routine care of the newborn or well-baby care

e) injuries or sickness resulting from declared or undeclared war or any act thereof

f) injuries or sickness due to acts of intentional self-destruction or attempted suicide, while sane or insane

g) treatment for prevention or cure of alcoholism or drug addiction

h) eye refraction examinations

i) Prosthetic devices (other than artificial limbs and artificial eyes), hearing aids, orthopedic footwear, eyeglasses and contact lenses

j) expenses for which benefits are or may be payable under Public Law 89-614 (CHAMPUS)

PREMIUM SCHEDULE

Plan 1—For military retirees and dependents (Quarterly Premiums)

Inpatient Benefits

Member's Attained Age	Member	Spouse	Each Child
Under 50	$19.03	$23.30	$14.85
50–54	$26.16	$32.01	$14.85
55–59	$36.16	$44.28	$14.85
60–64	$43.62	$53.41	$14.85

Inpatient and Outpatient Benefits

Under 50	$26.80	$31.05	$37.13
50–54	$36.83	$42.68	$37.13
55–59	$50.92	$59.02	$37.13
60–64	$61.41	$71.20	$37.13

Plan 2—For dependents of active-duty personnel (Annual Premiums)

Inpatient Only	None	$ 9.68	$ 5.94
Inpatient and Outpatient	None	$38.72	$29.70

APPLICATION FOR AFA CHAMPLUS®

Group Policy GMG-FC70
Mutual of Omaha 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 _____ (Month/Day/Year) Current Age _____ Height _____ Weight _____ Soc. Sec. No. _____

This insurance coverage may only be issued to AFA members. Please check the appropriate box below:

☐ I am currently an AFA Member. ☐ I enclose $15 for annual AFA membership dues (includes subscription ($14) to AIR FORCE Magazine).

PLAN & TYPE OF COVERAGE REQUESTED

Plan Requested (Check One)
☐ AFA CHAMPLUS® PLAN I (for military retirees & dependents)
☐ AFA CHAMPLUS® PLAN II (for dependents of active-duty personnel)

Coverage Requested (Check One)
☐ Inpatient Benefits Only
☐ Inpatient and Outpatient Benefits

Person(s) to be Insured (Check One)
☐ Member Only ☐ Member & Children
☐ Spouse Only ☐ Spouse & Children
☐ Member & Spouse ☐ Member, Spouse & Children

PREMIUM CALCULATION

All premiums are based on the attained age of the AFA member applying for this coverage. Plan I premium payments are normally paid on a quarterly basis but, if desired, they may be made on either a semi-annual (multiply by 2), or annual (multiply by 4) basis.

Quarterly (annual) premium for member (age ____) $_____

Quarterly (annual) premium for spouse (based on member's age) $_____

Quarterly (annual) premium for ____ children @ $ $_____

Total premium enclosed $_____

If this application requests coverage for your spouse and/or eligible children, please complete the following information for each person for whom you are requesting coverage.

Names of Dependents to be Insured	Relationship to Member	Date of Birth (Month/Day/Year)

(To list additional dependents, please use a separate sheet.)

In applying for this coverage, I understand and agree that (a) coverage shall become effective on the last day of the calendar month during which my application together with the proper amount is mailed to AFA, (b) only hospital confinements (both inpatient and outpatient) or other CHAMPUS-approved services commencing after the effective date of insurance are covered and (c) any conditions for which I or my eligible dependents received medical treatment or advice or have taken prescribed drugs or medicine within 12 months prior to the effective date of this insurance coverage will not be covered until the expiration of 12 consecutive months of insurance coverage without medical treatment or advice or having taken prescribed drugs or medicine for such conditions. I also understand and agree that all such pre-existing conditions will be covered after this insurance has been in effect for 24 consecutive months.

Date _____, 19____ _____ Member's Signature

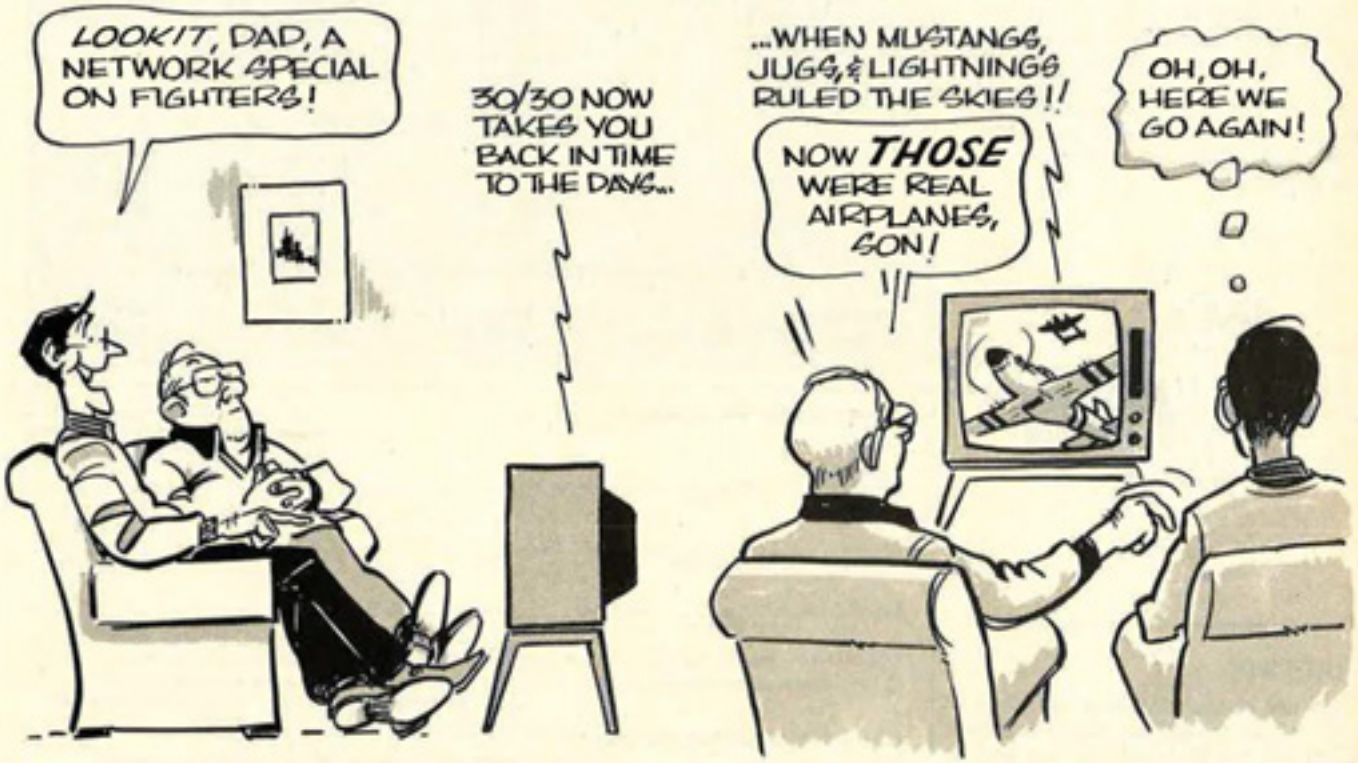
Form 6173GH App. 5-85

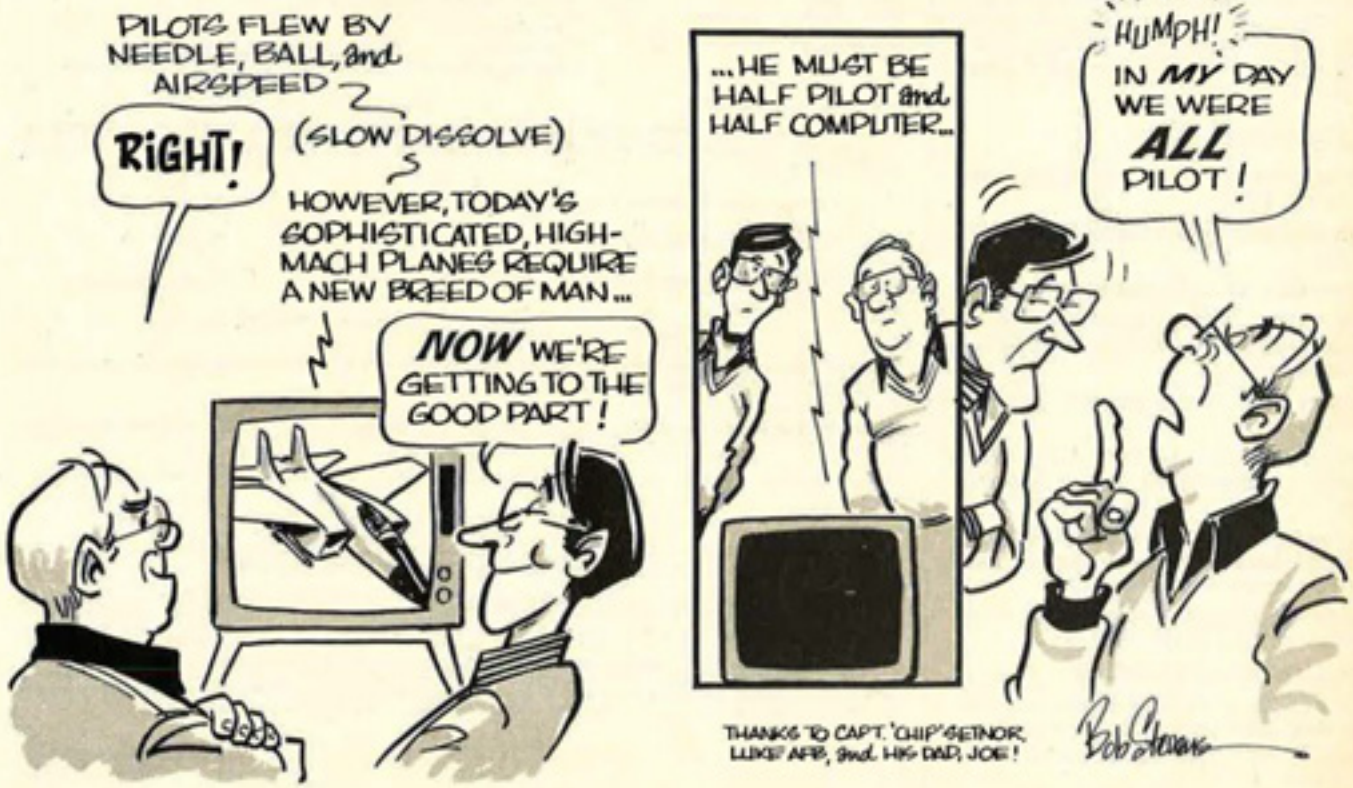
Application must be accompanied by a check or money order. Send remittance to: Insurance Division, AFA, 1501 Lee Highway, Arlington, VA 22209-1198

Bob Stevens'

"There I was..."

"OLD FIGHTER PILOTS NEVER DIE..." and THEY DON'T **FADE** AWAY, EITHER! THIS TRUE HAPPENING BETWEEN A GRAYING WWII FIGHTER PILOT and HIS F-15 PILOT SON PROVES THE POINT—





Where in the world do you need communications?

Wherever you go in the world, from the Ryukyus eastward through Alaska, Greenland, Europe, Africa, the Middle East to India, Indonesia, and the Philippines, and from Pole to Pole, you will find that REL tropo has been there before you.

Starting in the very early 1950's, when REL implemented the first troposcatter communication system, "Polevault," to today's "ULTRALITE" transportable tropo for rapid deployment requirements, we have continued to lead the world in troposcatter technology, communication satellite ground equipment, and electronic warfare.

Need Communications? Anywhere in the World! CALL ON REL!

REL offers challenging positions in Engineering, Marketing, and Program Management. Contact the Director of Personnel, or send your resume to REL, INC.

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THE F-15: KEY PLAYER ON THE USAF TEAM.

THE MISSION: FLY FAR BEHIND THE BATTLE AREA TO DENY AN ENEMY THE MEANS AND WILL TO CONTINUE AN ATTACK.

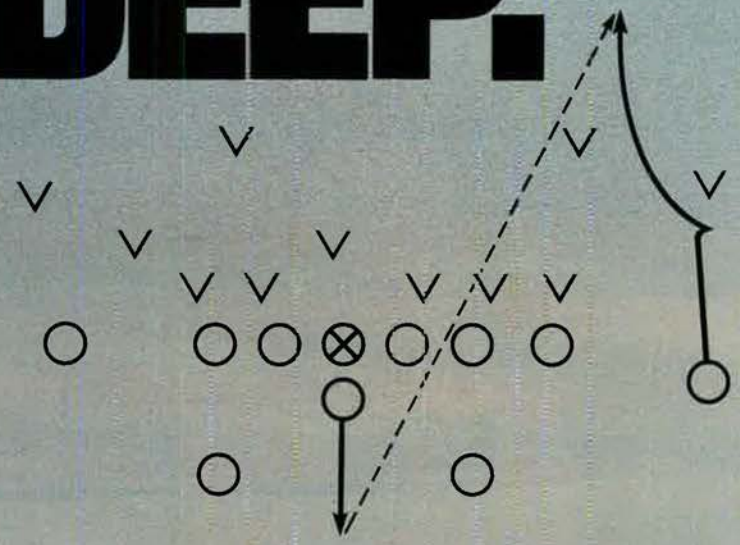
Deep interdiction is a crucial U.S. Air Force mission. Why? Because hostile forces are brought closer to defeat when denied the resources to continue.

A strong defense for America means that the Air Force must be able to go deep when necessary. The mission requires a plane that can fight its way to and from the target through hostile skies, in any weather, day or night, then deliver its payload with precision on high-value, rear-echelon targets.

The Air Force chose the F-15E for this deep interdiction mission. The Eagle's range gets it deep. Its sensors guide it over enemy terrain in any weather, day or night, with a payload large enough to do the job. Its speed, maneuverability, countermeasures and air-to-air weapons get it back safely.

For a strong defense, America counts on the Air Force. And the Air Force counts on the F-15 Eagle.

GOING DEEP.



MCDONNELL DOUGLAS