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AIR FORCE MAGAZINE

PUBLISHED BY THE AIR FORCE ASSOCIATION

AIR FORCE ALMANAC

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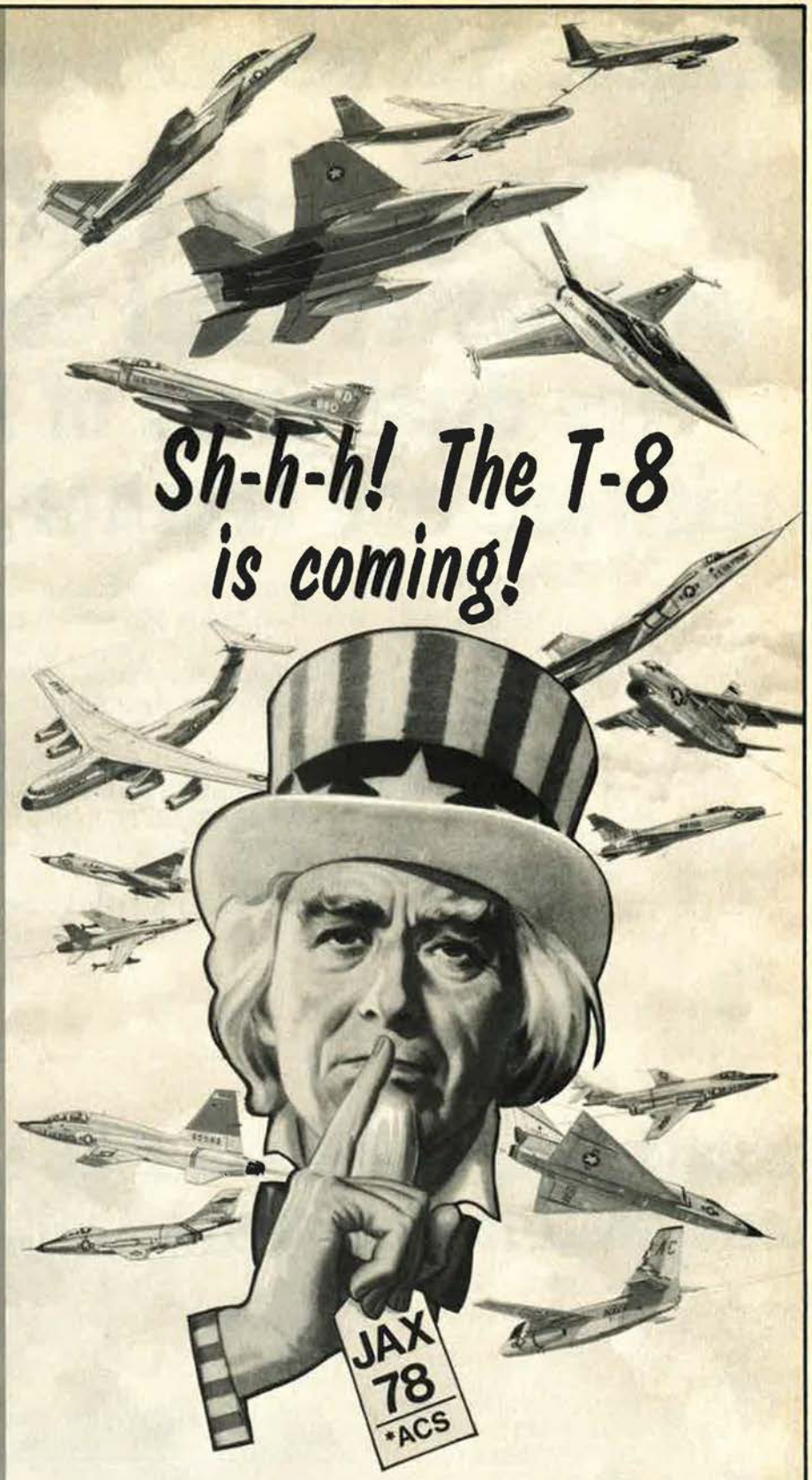

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Long term cost reduction and better skill development are dual goals of Honeywell maintenance trainer programs

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Technicians will soon be able to learn F-16 systems maintenance on a Honeywell computer based maintenance trainer.

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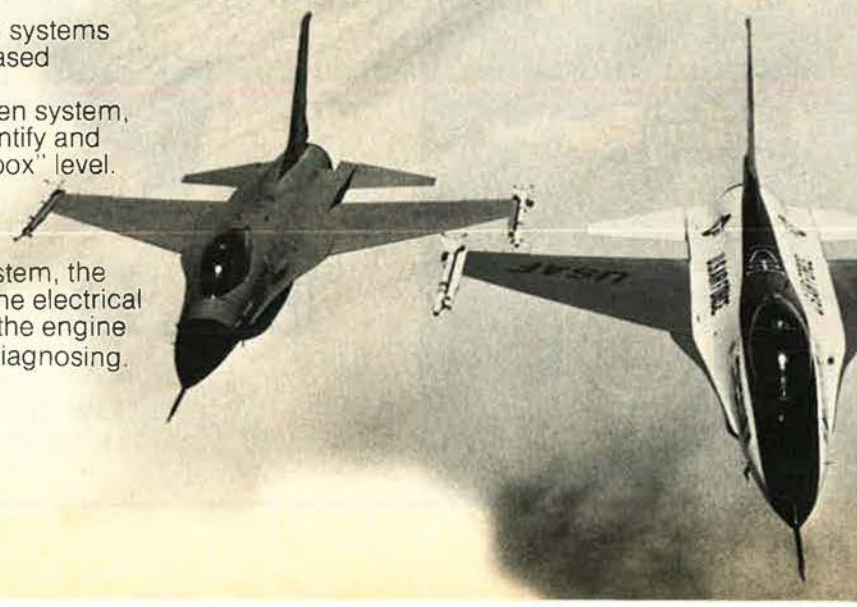
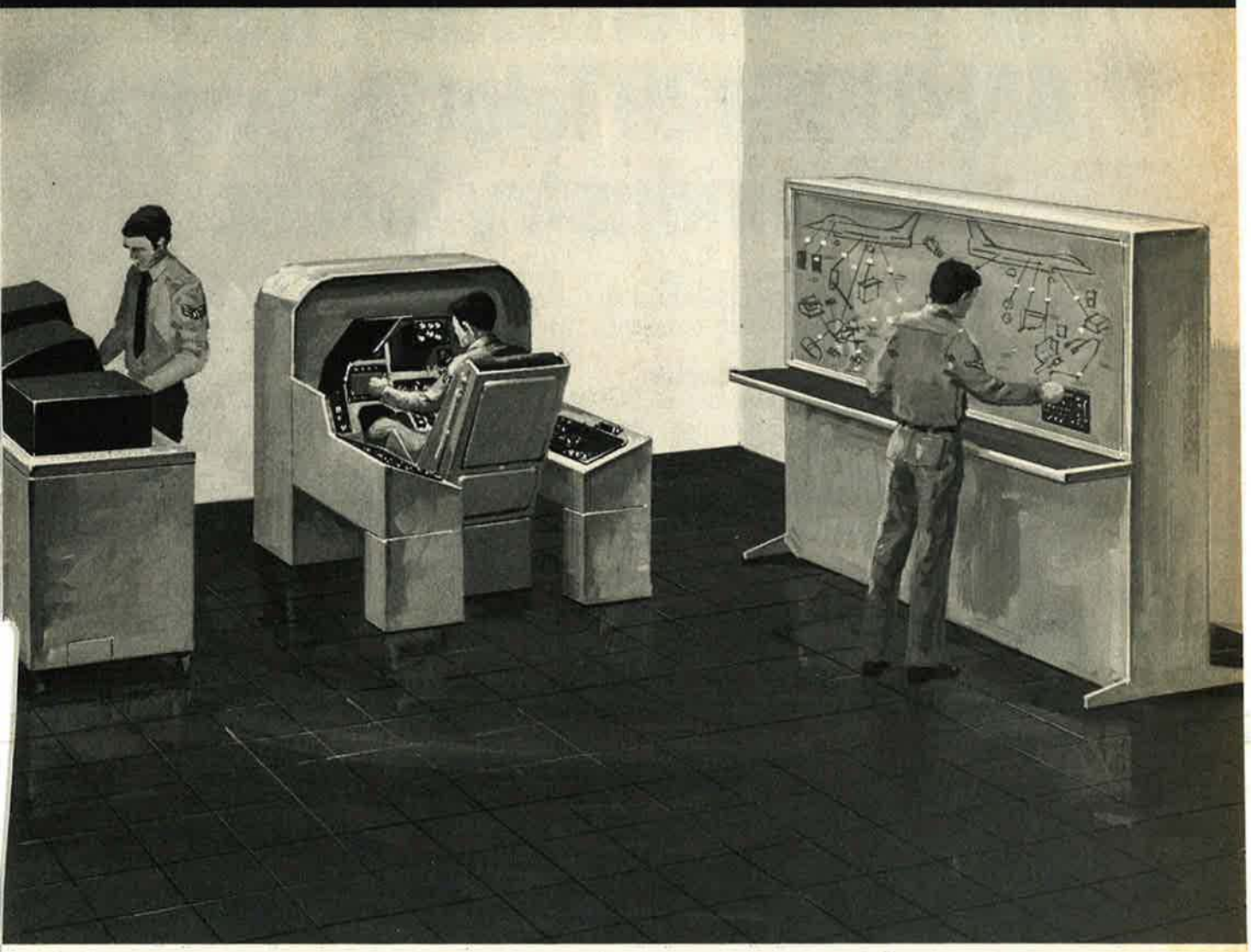
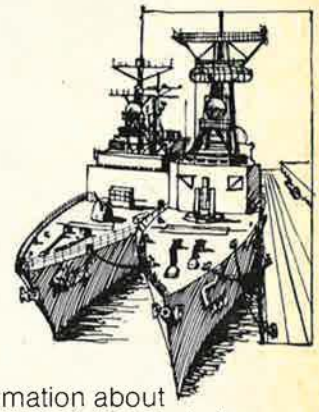


Photo courtesy of General Dynamics

ainers of tomorrow are at Honeywell today.



Honeywell advances maintenance training with new computer and instructional techniques.



Future combat needs will require quick response with highly sophisticated, fully operational equipment. To achieve these vital goals, maintenance technicians will have to have a better understanding of the equipment they're responsible for.

Computer simulated maintenance training frees operational equipment for the field and enables instructors to teach significant equipment malfunctions and how to correct them.

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If you'd like more information about Honeywell Training Systems, contact the Marketing Dept., Honeywell Defense Electronics Division, 1200 East San Bernardino Road, West Covina, California 91790. Phone 213/331-0011. Telex 670-452. Branch offices in Australia, England, France, Germany, Italy, Japan and Sweden.

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For your information, Tracor's AN/UGC-129 Teletypewriter is the industry leader.

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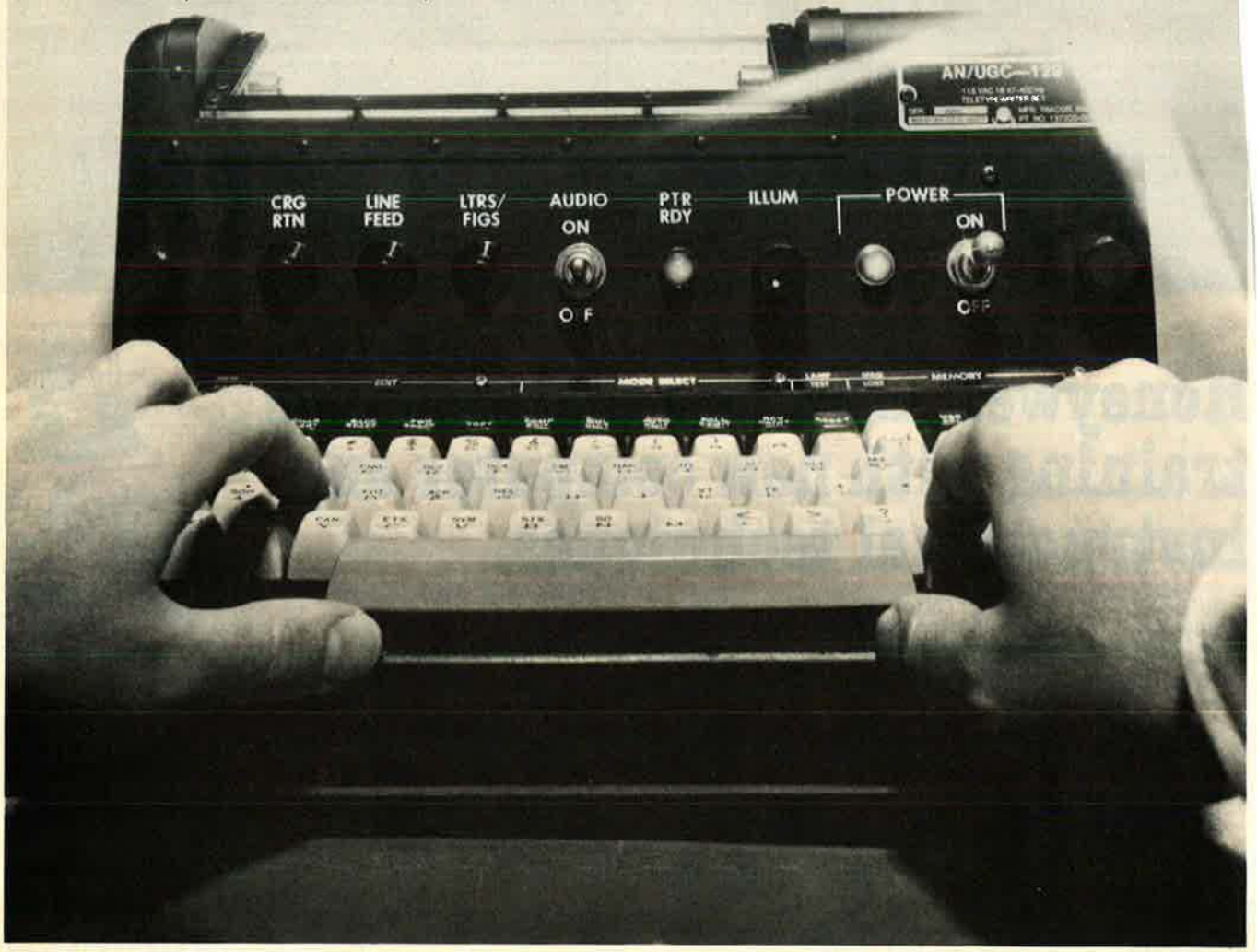

AIR FORCE MAGAZINE
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AN EDITORIAL

Ask Not Too Much Of Quality

THIS Almanac issue is published, as always, with a feeling of pride in the men and women of the United States Air Force. But this year our pride is tempered with genuine concern. We'll come to the reasons for that concern in a moment.

Anyone who reads the reports from the Secretary, the Chief of Staff, the Chief Master Sergeant of the Air Force, and the commands and separate operating agencies must be impressed by the spirit and substance of today's Air Force. Here is a record of enlightened leadership, innovative management, progressive modernization of both regular and Reserve forces, increasingly realistic training, and constantly improving readiness. In quality, it is second to none.

The Almanac is, by design, descriptive rather than analytical. You will not find the reasons for our concern spelled out here in any detail. They lie deeper and relate to our fear that the Air Force—and the other services, too—are fast approaching a point where superior quality will not offset inferior quantity vis-à-vis the USSR and its Warsaw Pact vassals.

Let's take a couple of examples. Based on the Defense Budget request for FY '79, the Air Force will get, in constant FY '79 dollars, only $500 million more total obligational authority (TOA) than it did last year, and exactly the same as it got in FY '77. The new Air Force budget will buy 385 tactical fighters and attack aircraft, while the USSR is reported to be producing more than twice that many every year. That alone is enough reason for concern, but there's more.

In his Report to the Congress for FY '79, Secretary of Defense Harold Brown acknowledged that Soviet defense spending is estimated to have increased, in real terms, by from three to four percent a year for the past fifteen years. During most of those years our defense budget has declined, if retired pay and the incremental costs of Vietnam are set aside. Estimates that the Soviet defense effort exceeds ours by twenty to forty percent "appear reasonable," Dr. Brown said.

The Secretary also reported that "the Long-Range Projection for [US] defense contains a real increase in TOA of about 2.7 percent a year." That doesn't impress us as a winning brand of catch-up ball.

Judgments vary as to whether the free-spending Soviets have already achieved military superiority over the US. It is clear, however, that the altered balance of military power has created greater international instability than at any time since World War II.

Can we count on SALT and the Mutual Balanced Force Reduction negotiations to restore and maintain stability, as some arms controllers claim? We doubt it. The USSR negotiates, and the US should negotiate, within the context of their respective national interests. Russia, under Tsar and commissar, has always been an expansionist power, for the past sixty years further buttressed by an expansionist political/economic philosophy. The US, on the other hand, has been the chief opponent of Soviet expansionism. It's hard to see how an agreement that advances the interests of one side can be compatible with the interests of the other.

Our allies can, of course, contribute to creating stability. But make no mistake about it. In the NATO area, the bottom line in the USSR's calculations will always be US capability. In some areas where US and Soviet interests may clash, we have no strong allies.

Despite this gloomy picture, there is no cause for despair. The United States is still the richest and most technically advanced of nations. For an additional fraction of one percent of our Gross National Product, the decline of US military power in relation to that of the USSR could be checked and probably reversed. The US does not seek military superiority, but neither should we accept military inferiority with all its frightening implications, and that is the direction in which we are being led today.

We call to your attention two quotations that seem appropriate to the times. The first is from Gen. George C. Marshall: "We have tried since the birth of our nation to promote our love of peace by a display of weakness. That course has failed us utterly."

The second comes from George F. Kennan's *Memoirs: 1925–1950.* In the closing days of World War II, a Soviet official said to Mr. Kennan: "This is something you should bear in mind about the Russian. The better things go for him, the more arrogant he is. It is only when we are having hard sledding that we are meek and mild and conciliatory. When we are successful, keep out of our way."

All of us, from the White House down, would do well to keep those thoughts in mind. The Soviets have been successful in building their power base and influence, while our love of peace leads again to vacillation, compromise, and an array of priorities that, in Soviet eyes, spell the kind of weakness that tempts an arrogance backed by growing strength.

—JOHN L. FRISBEE, EDITOR

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Rundown of Errors

One would be hard pressed to recall when as many glaring inaccuracies and misconceptions were contained in an article of a length comparable to "Dr. Sweeney's Secret Formula," by Russell Warren Howe, which appeared in your February 1978 issue.

The salient errors, as they occur in the article, are as follows:

1. Turning radii are given as 880 feet, 750 feet, and 800 feet for the Spitfire, Me-109, and Hurricane, respectively, at 300 mph and a 90-degree angle of bank.

No airplane can perform a level turn at a 90-degree bank angle, as there is no vertical component of lift at this angle. In addition, the numbers indicate that the Spitfire was outturned by the Messerschmitt and Hurricane. To my knowledge, no one, including the Germans, has previously claimed that the Spitfire could be outturned by any other fighter used in the Battle of Britain. Gen. Adolf Galland, himself a participant in the fighter battles, writes on page 17 of his book *The First and the Last*, "The modern Vickers Supermarine Spitfires were slower than our planes by about 10 to 15 mph, but could perform steeper and tighter turns."

Later, in the same paragraph, Howe states, "What the Hurricane lacked . . . slightly in maneuverability, it made up in armament." As a matter of fact, the Spitfire and Hurricane both had the same armament of eight .303 Browning machine guns during the Battle of Britain.

2. "A diving Spit was the first aircraft to go through the sound barrier. . . ."

This is absolutely absurd! Some pilots believed they had exceeded the sound barrier based on faulty IAS readings and improper calculations of TAS, which did not take compressibility into account, but the alleged barrier penetration has never been shown to have occurred.

3. ". . . the engine produced 1,300 horsepower instead of the roughly 1,000 horsepower achieved with earlier fuels (which explains why 100-octane became known as 100/130)."

The fuel designation 100/130 refers to the antiknock properties of the fuel at lean and rich mixture settings, being equivalent to 100-octane with a lean mixture and 130-octane with a rich mixture.

4. "Only at lean-mixture levels could the pilot begin to force the throttle level past the gate."

The purpose of the gate was to prevent the pilot from inadvertently operating the engine at war emergency power, and to indicate to the crew chief when WEP had been used in order that proper maintenance procedures could be followed. Also, a *rich* mixture was automatically supplied to the engine at WEP and other high-power settings.

5. "The British won by a hair, and they would not have mauled the Luftwaffe sufficiently to persuade Hitler to drop his invasion plans, and fatally revise his whole war strategy, without BAM-100."

This statement ignores the realities of September 1940. Fighter Command was being mauled by the Luftwaffe, and only the German decision to switch attacks from Fighter Command airfields to greater London allowed the dangerous attrition rate of RAF fighter pilots to be alleviated, and saved Fighter Command from destruction. A magazine with an interest in aviation history should not support a myth that sprang from wartime propaganda.

Arthur C. Peterson
Downey, Calif.

High Octane

A friend recently loaned me a copy of your February '78 issue. In it I found two items of extreme interest. The first, on the "Short, Unhappy Life of the Barling Bomber," by Capt. Earl H. Tilford, Jr., helped fill in a few details for me on that "New Jersey Monster." I knew the Witteman brothers who built it.

The second article, "Dr. Sweeney's Secret Formula," brought things even closer to home. [I am] a retired employee of Exxon Research and Engineering Co. Dr. Sweeney was once my boss. However, I would like to make a few comments and additions to Mr. Howe's article.

It is true that Esso (then) supplied most of the 100-octane fuel used by both the American and Allied air forces during WW II. But we were not the *first* producers. This honor can be attributed to Socony-Vacuum (now Mobil) Oil Co., whose Paulsboro Refinery in south Jersey was producing it during 1939.

The first production of isooctane, *not* 100-octane fuel, cost $25 a gallon. Isooctane was just a component and not the complete fuel. Actually isooctane was used as a reference fuel of 100-octane on laboratory "knock" engines of that period. When mixed in known proportions with normal heptane, a 0-octane reference fuel, new test blends of 100-octane could be evaluated under standardized test conditions. . . .

While it is true that 100-octane was very much responsible for winning the Battle of Britain in 1940 the German Luftwaffe later reduced that octane gap considerably. As all of their combat avgas-fueled and diesel-engine bombers and recon aircraft were fuel-injected, they really did not need 100-octane. During the later war years, Luftwaffe fighters and bombers used an interesting method for increasing horsepower and speed for short periods by injecting nitrous oxide gas into the supercharger. Earlier they had used MW-1, a 50/50 mixture of methanol and water.

The Imperial Japanese Navy was responsible for all Japanese avgas and lube oil research during WW II. Some of their experiments for developing new fuels border upon the unbelievable. During mid-1945, for example, they were getting ready to produce a 92-octane avgas from pine-tree roots. These roots, having a higher concentration of turpenes, were dry-distilled in small "moonshine stills" all over Japanese farms. The distillate was collected by tank truck and delivered to refineries, where it was converted into avgas base stock. By adding TEL (Tera-Ethyl-Lead), or other equivalent antiknock agents, a fair grade of avgas was obtained.

It is interesting to note that our oil companies today are attempting to do what the Germans did forty years ago—convert coal to oil. It

was estimated that the Germans made eighty-five percent of their various grades of avgas from two major coal-conversion processes. The joker was, however, that it cost them four times as much than if they had used crude oil. Our goal today is to reduce costs by using new techniques and improved equipment. . . .

One could compare the aviation industry to a triangle—with airframe and engine design forming two sides, the real base is fuels. For what good is a hot aircraft if powerful fuels are not available?

David R. Winans
Colonia, N. J.

AEF's New Courses

The Personnel community is appreciative of the Aerospace Education Foundation's sponsorship of the eight additional Air Force vocational-technical course systems now being offered to the civilian educational community—courses which provide an expanded opportunity to upgrade occupational education in civilian training institutions. Moreover, your support of the Community College of the Air Force in its quest to gain appropriate accreditation as a degree-granting institution is gratefully acknowledged.

Rest assured, the Foundation will have our continued support.

Maj. Gen. C. G. Cleveland
Dir., Personnel Programs
Hq. USAF
Washington, D. C.

Thanks for the great news concerning the latest group of eight more courses that are now available to civilian schools as a result of the Aerospace Foundation's unique work.

The Foundation is really doing a great job for the country. All of us in the Air Force are indebted to you and the Foundation's officers for their key role in making these courses available to the civilian educational community.

Keep up the good work.

Brig. Gen. H. J. Dalton, Jr.
Dir., USAF/OI
Washington, D. C.

A Word About the "Common Folk"

I am writing in regard to Mr. Crawford G. Adams's comment about the utility of AIR FORCE Magazine [March '78].

I wonder what Mr. Adams wants in a magazine that specializes in aviation and world affairs. The "Military Balance" and "Soviet Almanac" issues are themselves worth the cost of membership. In fact, Dr. Alfred Monks, the University of Wyoming specialist on Soviet Russia, considers this magazine a superb publication. Dr. Monks is not a general, flyer, or one who cares about his picture, but a university professor who is teaching students about international affairs. I structured a speech for high schools and civic groups concerning Soviet armed forces officer education, and found AIR FORCE Magazine to be an invaluable source for that project.

I think of past issues with superior articles on subjects like Claire Chennault, the Space Shuttle, or the "Jane's All the World's Aircraft" sections. And, certainly, the "last laugh" with Bob Stevens balances this excellent publication.

I always thought that common folk were interested in world affairs, Russia, history, technological advancements, etc. Maybe I'm wrong, in which case [they] should subscribe to more entertaining and secular magazines and consequently bury their heads in the sand as so many other Americans seem to be doing.

Capt. Arthur H. Lucas, Jr.
Laramie, Wyo.

This is in reference to a letter from Mr. Crawford Adams, entitled "THAT Bad?" Although probably ninety-nine percent of your very satisfied readers (myself included) brush off Mr. Adams's complaints with the attitude, "You can't please 'em all," there is, nevertheless, something disconcerting about his words. I'm afraid they reflect the attitude of too many average, apathetic Americans who feel that information such as presented in your "Soviet Aerospace Almanac" edition just "ain't" interesting.

For there to be strong public opinion, there must first be a fair degree of public knowledge. Without that knowledge, the result is the apathy we see today about such things as the unprecedented and massive Soviet arms buildup, the rapidly declining military balance, etc. Unfortunately, many of our apathetic politicians probably, just as Mr. Adams's "common folk," would find your magazine uninteresting. Only strong public opinion will move those politicians. It's a shame more publications such as yours aren't giving the common folk the facts they need upon which they can build politician-moving public opinion.

Most of your readers fully recognize that you are directly addressing the most critical issues America has ever faced. Maybe some of your words will filter to the common folk—and even to some of the politicians—before it's too late.

B. P. Gregg
Seguin, Tex.

Breaching the Dikes

As a person of Netherlands ancestry, I was most interested in the article "Wings Over Windmills," by Ed Mack Miller, in the January issue. However, I believe there was one misstatement. The Germans did not breach the dikes, not that they wouldn't have done so had it been to their advantage to do so. The Dutch themselves flooded selected border areas as a defensive measure—effective against the movement of both infantry and armor.

Late in the war, the British breached some dikes in the south in hopes of flooding out the Germans and thus gaining access to Antwerp. This move, unfortunately, did not dislodge the Germans, who had foreseen this possibility.

I am delighted by the success of the 140th Tactical Fighter Wing's operation. And I am convinced that nowhere will Americans, both military and civilian, receive a warmer welcome than in Holland.

C. A. Philippe von Hemert
Philadelphia, Pa.

Just Another Catch-22

Your comment in the February issue concerning the up-or-out concept—like that on the OER system (October 1977)—missed the mark. Considering the interdependence of one upon the other, I am sorry you did not deal with both in a single article.

Up-or-out is predicated upon the principle that the cream will rise to the top and that the deadwood will be eliminated. Identification of either category requires an objec-

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

Airmail

tive evaluation system. Unfortunately it was the up-or-out concept that led to the perversion of the pre-1974 OER system; OERs became increasingly inflated as supervisors attempted to keep their subordinates competitive for promotion. Finally, supervisors realized that if their people did not walk on water, they soon would have their walking papers. Inflation became so bad that hard-pressed promotion boards had to find minuscule tie-breakers: A name tag slightly crooked in the official photograph, a minor mistake in personnel records, etc.

Corruption of the old OER system led to the present abomination, which, because of a quota, fosters cutthroat competition and is dependent on such subjective factors as job held, time-in-grade, and that damnable buzzword "visibility." Officers who inadvertently found themselves holding a job that guaranteed them an O-3 found that, because of that rating, they could not advance to a position that might offer them a chance for a 1 or a 2. The present system is Catch-22 at its best, and the 1977 changes are a belated recognition of that problem.

I agree with your opposition to Senator Nunn's proposal to let twice-deferred captains remain on active duty with no consideration for further advancement. No one enjoys being a loser, but to be publicly labeled as such would degrade morale and encourage retirement while on active duty.

Would elimination of up-or-out be a panacea? Probably not, since no system is guaranteed perfect and some inequities undoubtedly would occur. However, ask around various offices and see how many captains would be content to remain at the O-3 level until retirement, the only prerequisite being that they remain productive until that time. Many senior captains enjoy their job, want to stay in the Air Force, and would prefer to worry about getting the mission accomplished instead of protecting their promotion.

The up-or-out concept, coupled with the lack of an objective OER system, has created a great deal of anxiety and distrust in the officer ranks, not to mention the official term of "personnel turbulence." One's career depends upon odd quirks of fate with the prospect of devoting the best years of your life to a system that may give you very little in return. Elimination of up-or-out may induce some problems, but it would eliminate many others by enabling the adaptation of an objective OER system.

Stephen H. Miller
Falls Church, Va.

ICBM Unit Patches

I am currently collecting ICBM unit patches from wing and squadron units. Of particular interest are Titan I and Atlas units that are no longer in existence. Would appreciate receiving these patches from anyone who no longer has a need for them.

Maj. Mike A. Spehar, USAF
College of Naval Command and Staff
Naval War College
Newport, R. I. 02840

The 479th Connection

I am a member of the 8th Air Force Historical Society and the unit contact for the 479th Fighter Group, which flew out of Wattisham, England, during WW II.

We are trying to form a veterans association within the Society, to hold reunions and other functions and, with a little luck, to write a unit history.

We would appreciate it if any former members of the 479th or support units at Wattisham would please contact me.

P. Cockton
9248 75th St.
Edmonton,
Alberta, T6C 2H4, Canada

Where Are the Forty-Niners?

I would like to find out the whereabouts of a club called the "Forty-Niners," of the 49th Fighter Bomber Wing, commanded by Joe L. Mason. I joined in Korea in 1950, but have lost track of it.

McDonald Thorton
3446 Glasson St.
Durham, N. C. 27705

75th TC Squadron

We're trying to locate members of the 75th Troop Carrier Squadron during its European tour of duty. We hold reunions every two years, and our next will be in Dayton, Ohio, in the summer of 1979. Our present file includes only those who have kept in touch over the years.

If you served with the 75th during its European tour, please contact

Robert Richards
139 Kiser Dr.
Tipp City, Ohio 45371

Flying Tigers Book

At the present time I am writing a book on the American Volunteer Group (Flying Tigers) in Burma and China during WW II. I would like to contact anyone who was in or connected with the AVG. Of especial interest are documents, letters, diaries, and photographs. I have collected more than 2,000 documents and some 500 photos so far. Any help would be appreciated.

John J. West III
Commander, VFW Post 3773
1004 S. Madison St.
Covington, La. 70433

A History of the 5th BG

I am finishing researching and writing a history of the 5th Bomb Group, Thirteenth Air Force. The 5th Group flew B-17s, and later B-24s, in the Pacific.

I have had some difficulty securing photos and personal anecdotes from the early war period of the 5th—from Pearl Harbor to late 1943. I'd be grateful if any readers could share photos and memories from their service with the group during this time period. Photos relating to the group's B-17s and early B-24Ds would be especially appreciated. I'd take care to copy the photos and return them.

My manuscript is nearing completion, but I still have need for more photos. Any assistance will be greatly appreciated.

Frederick A. Johnsen
P. O. Box 98231
Tacoma, Wash. 98499

305th Bomb Group

I am trying to contact any surviving crew members of a World War II B-17 nicknamed "A Bit of Lace." It served with the 305th Bomb Group, based in England.

Leon Croulebois
41, Rue Brancion
75015 Paris, France

RN Officer's Appeal

I am a serving Royal Naval Officer and am researching the history of military air traffic control. I would, therefore, be most grateful for any help readers could supply.

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SCIENCE/SCOPE

The concept for an air-to-air missile half the size with twice the performance of the AIM-7F Sparrow has been proved feasible in a recent program conducted by Hughes under contract to an Air Force/Navy joint system program office. Using new technology and improved state-of-the-art, AMRAAM (Advanced Medium Range Air-to-Air Missile) will provide a "launch and leave" capability plus the option of launching several missiles at multiple targets. The Hughes design features a patented solid state power combiner, which is the key to the active radar seeker, and takes full advantage of the latest digital technology and micro-miniaturization of electronics. It will be compatible with the F-14, F-15, F-16 and F-18. AMRAAM also features a low-smoke, high-impulse rocket motor which reduces the chances of an enemy pilot sighting either the launch or the oncoming missile and taking evasive action.

In its first flight test, a GBU-15 Planar Wing Weapon scored a "Lethal" hit on a simulated power plant target at White Sands Missile Range, N.M. after launch from an Air Force B-52. A major member of the AF's modular GBU-15 air-to-surface glide bomb family, the 12-foot-long weapon features an 11-foot-wide planar wing, akin to a small glider. The wing is extended after launch, increasing the glide weapon's range and enabling the launching aircraft to "stand-off" at safe distance while accurately guiding it to target. System integration for the Planar Wing Weapon is being conducted by Hughes under contract to the Air Force Armament Development and Test Center, as well as development of the digital autopilot, planar wing module and weapon data link.

West Germany's new Leopard II tank will incorporate a U.S.-developed laser fire control system. Included are a laser rangefinder, stabilized sight, periscope/telescope, computer, meteorological and attitude sensors, controls and displays, and provision for thermal night vision. A tank's fire control system controls the angular differences between the gun line and sight line by processing such information as range, meteorological conditions and tracking rate. Adding a laser rangefinder and stabilized sight equips the tank gunner to direct main gun firing more accurately and more rapidly than before.

The system will be produced entirely in Germany by Krupp Atlas-Elektronik under license from Hughes, developer of the rangefinder. Hughes will furnish manufacturing drawings and technical support to assure a smooth transition to production. Initial order is for 1800 systems.

The highest TOW missile first-fire hit ratio yet recorded by a U.S. unit has been earned by the Marine Corps at Camp Pendleton, CA. where Marines scored a 96.6% hit rate -- 143 out of 148 tries -- on stationary targets. Developed by Hughes for the U.S. Army, TOW (Tube-launched, Optically-tracked, Wire-guided) today is deployed in the air and ground forces of more than 20 nations worldwide. The airborne version of TOW also is used as an anti-tank missile system by U.S. Army and Marine Corps helicopter units. The missile in flight is 117 cm long, 15 cm in diameter and weighs 19 kg. Its maximum range in the air is 3,750 meters.

Airmail

The types of thing I require are old books, papers, photographs, and amusing anecdotes, etc. Any items lent would be returned as soon as possible, plus any postage.

Trevor N. Sturgess
Sub Lieutenant, RN
44 Esmonde Road, Helston
Cornwall TR13, 8BX, UK

UNIT REUNIONS

CBI Hump Pilots
The 33d annual China-Burma-India Hump Pilots Association reunion will be held August 27–September 3, at The Lodge, Vail, Colo. Contact

Mrs. Jan Thies
Executive Secretary
808 Lester St.
Poplar Bluff, Mo. 63901
Phone: (314) 785-2420

CBI Veterans Association
The China-Burma-India Veterans Association will hold their 31st annual reunion at Hershey, Pa., August 2–5. Further information from

Walt Carre
P. O. Box 5
Sewell, N. J. 08080

Daedalians
The Order of Daedalians, the National Fraternity of Military Pilots, is holding its annual convention June 1–3, in San Antonio, Tex., at the El Tropicano Motel Hotel. Contact

Col. Robert E. Morris, USAF (Ret.)
Editor, Daedalus Flyer
Bldg. 1635
Kelly AFB, Tex. 78241
Phone: (512) 924-9485 or -9486

Flying Tigers
The annual reunion of the Flying Tigers of the 14th AF Association will meet in Duluth, Minn., July 26–29. You must be a member to attend! If you served in China during WW II you are eligible to join. Contact

Wayne G. Johnson
Norshor Building
Silver Bay, Minn. 55614
Phone: (218) 226-4404 or -3790

Night Fighters
A contact, in addition to the one announced in our February issue, has been received for the Night Fighters reunion, June 30–July 2, at Stouffer's Dayton Plaza Hotel, Dayton, Ohio. Write

Dick Ehlert
286 Briarwood Circle
Fort Walton Beach, Fla. 32548

SAC NCO Academy
1978 marks the 10th anniversary of the reopening of the SAC NCO Academy as a single Major Command Academy at Barksdale AFB, La. The Academy staff is planning a reunion June 22–23 in conjunction with the Class 78-D graduation activities. Due to limited space available, seats for the actual graduation banquet must be limited to only personnel who were staff members from time of reopening in '68 until the present. All past Academy staff (2d AF, 8th AF, 15th AF) and guests are cordially invited to Friday, June 23, activities. Further information from

CMSgt. C. A. Cockrell
or
Mrs. Stickell
SAC NCO Academy
Barksdale AFB, La. 71110
Phone: (318) 456-4300
AUTOVON 781-4300

19th Bombardment Association
The biennial reunion of the 19th Bombardment Group Association will be held the first week in August. All vets of the 19th are eligible for membership and are urged to attend. Contact

Herb Frank
9013 201st St.
St. Hollis, N. Y. 11423
or
Arthur Norgaard
Rt. 2, Birch Creek Rd.
De Pere, Wis. 54115
Phone: (1-414) 336-5747

82d Fighter Group
The 82d Fighter Group, WW II, 95th, 96th, and 97th Fighter Squadrons, will hold their reunion June 22-25. Contact

Col. Harley C. Vaughn, USAF (Ret.)
1600 ITM
New Orleans, La. 70130

307th Bomb Group (H)
Former members of the 307th Bomb Group (H) are holding a reunion May 27–29 in Fort Worth, Tex. Contact

Carl Whitesell
1594 West 400-South #62
Salt Lake City, Utah 84104

315th Troop Carrier Group
The 2d reunion of the 315th TC Group will be held September 15–17, in Dallas, Tex. In order to establish a master locator file please send current address and names and addresses of those you can contact to

Duncan McKae
254 Lake Point Dr.
Shreveport, La. 71109

341st Fighter Sqdn.
Seeking former members of WW II 341st Fighter Squadron, 348th Fighter Group, 5th AF, for purpose of a reunion. Please contact

Albert V. Arnold
109 Ferris St., Apt. 3
Ypsilanti, Mich. 48197

376th ARS
A reunion of the 376th Air Refueling Squadron will be held at the Barksdale AFB Officer's Club, July 1. Details from

376th Reunion Committee
P. O. Box 376
Barksdale AFB, La. 71110

381st Bomb Group (H)
The 381st Bomb Group (H), 8th AF, based at Ridgewell, England, during WW II, has formed a Memorial Association. Its 3d reunion will be held at Hershey, Pa., September 29–October 1. Whether planning to attend or just desiring to join the association, all former members please contact

T. Paxton (Pax) Sherwood
515 Woodland View Dr.
York, Pa. 17402

402d Fighter Sqdn.
The 1978 reunion of the 402d Fighter Squadron, 370th Fighter Group, 9th AF, will be held at the downtown Rodeway Inn, Jefferson and Market Sts., St. Louis, Mo. 63103, Sept. 7–10. Former members, from 1942 through 1945, are invited. Further details from

Ed J. Meyer, Jr.
4829 Dreux Ave.
New Orleans, La 70126

443d Troop Carrier Group
In conjunction with the Hump Pilots Association meeting, the 443d Troop Carrier Group (1st, 2d, and 315th TC Squadrons) will hold a reunion in Vail, Colo., August 31–September 3. Contact

Hump Pilots Association
808 Lester St.
Poplar Bluff, Mo. 63901
or
Loren Cornell
521 Ferndale Rd.
Birmingham, Ala. 35235

452d Bomb Group
Atlanta, Ga., will be the scene of the September 14–17 reunion of the 452d Bomb Group, 8th AF, England. Former members of the 452d should send a stamped, self-addressed envelope to

Rom Blaylock
P. O. Box 2536
New Bern, N. C. 28560

509th Bomb Wing
The 5th reunion of the 509th Bomb Wing will be held September 29–30 at Wright-Patterson AFB, Ohio. Contact

Lt. Col. D. L. Langhorne, USAF (Ret.)
4111 Rosedale Rd.
Middletown, Ohio 45042

7330th Flying Training Wing
The 25th anniversary reunion of the 7330th Flying Training Wing will be held at Furstenfeldbruck Air Base, Germany, September 26–30. Please write to

Fr. William L. Travers
490 Edgewood Dr., #19
Vacaville, Calif. 95688

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Focus On...

FUFO at a Standstill

BY EDGAR ULSAMER, SENIOR EDITOR

Washington, D. C., April 5

The program went by the unlikely acronym FUFO, for the Full Fuzing Option B77 nuclear bomb. Among its advocates was Secretary of Defense Harold Brown. Work on the B77 had begun in 1974, based on a joint Air Force/US Navy requirement. But the Office of Management and Budget struck it from the FY '79 budget request of the Department of Energy's (DoE) nuclear weapons division. So the world's most sophisticated air-droppable nuclear bomb didn't get off the ground—in spite of firm Pentagon support—because of what in retrospect turns out to be a strange case of presumed association with the B-1 bomber. Even though intergovernmental memoranda issued by Secretary Brown last year—the most recent on December 15, 1977—documented the operational and cost-effective advantages of the B77 for use by a range of USAF and Navy aircraft, OMB, with some backing by the National Security Council, persuaded the White House to defer the program on grounds that it was mainly meant to complement the B-1, whose production had been halted. Further, OMB reasoned, modifying an existing older nuclear weapon, the B43, would provide most of the performance features of the B77, and at lower cost.

The B77 bomb was designed for the Department of Energy's weapons branch by the Lawrence Livermore and Sandia Corp. Laboratories, both of Livermore, Calif. It would have been the most tamper-proof, safest, and from the user's point of view, the most flexible strategic nuclear weapon in the world. As Sen. S. I. Hayakawa (R-Calif.) pointed out in a letter to President Carter, the B77 would increase the survivability of an aircraft carrying it "by allowing very low altitude subsonic or supersonic delivery, with high reliability against hard, irregular targets. The potential carriers include our bombers as well as many Air Force and Navy tactical aircraft. This lay-down bomb can make a major contribution to modernizing and simplifying the [US nuclear weapons] stockpile. It provides many new features for improved safety, security, command and control, and operational flexibility. For example, it will be the only megaton-class weapon with insensitive high explosives, essentially invulnerable to accidental or unauthorized detonation."

If anything, Senator Hayakawa understated the case. At the time of its deferment, the B77 had been well along in its development and test: Its yield ranges from tens of kilotons to about one megaton and various yields can be selected by the crew in flight. As presently proposed, the modified B43 will lack the quality of selectable yield and, therefore, will have to be produced in a number of configurations to cover different requirements. The B61 tactical bomb permits selectable yield, but its maximum yield is less than one-third of that of the B77.

The B77 employs an ingenious mechanism to stabilize, delay, and control its approach to the target—including a "lifting parachute" that raises the weapon above the altitude from which it was dropped. As a result, it can be deployed from as low as 100 feet without endangering the carrying aircraft and descends at an angle and speed optimized for killing hard, irregular targets such as command bunkers and other hardened structures with uneven surfaces.

The B61 and B43 can't be released below 200 feet, a limitation that increases the vulnerability of aircraft operating "on the deck." Another advanced feature is the B77's frugal use of a national resource that is both in critically short supply and extremely expensive, the Special Nuclear Material (SNM) needed to start a nuclear detonation. By contrast, the modified B43, unless completely redesigned or reduced in yield, will use great quantities of SNM and, therefore, will approach or perhaps exceed the cost of the B77.

Also, the broad range of yields that the B77 can be set for would permit a high degree of standardization of the nation's nuclear arsenal, simplified aircrew training and certification of carrying aircraft, and unprecedented operational flexibility. Candidate aircraft for its use are the B-52, F-111, FB-111, F-16, F-4, A-6, and A-7.

Possibly the most significant feature—and one that, along with the SNM cost factor, had been largely ignored by OMB—is the B77's unmatched safety and security. Two key factors are involved here: The use of new insensitive high explosives—needed to "squeeze" the nuclear material to cause chain reaction—that are impervious to impact or fire and, therefore, prevent the scatter of fissile material in a crash; and a quantum jump in the so-called permissive action link (PAL) technology that prevents unauthorized or accidental detonation of the weapon through the use of a multilink command mechanism known as the Unique Signal Generator.

The B43 weapon—a product of the 1960s—that the White House wants to substitute in modified form for the B77, this column learned, can be retrofitted with most of the safety and security features of the B77. The retrofitting will involve a costly and extensive redesign. Most nuclear weapon experts agree that the result will be an essentially new weapon that must go through a complete testing cycle. But no such testing is possible. The Limited Test Ban Treaty already in effect precludes testing of nuclear devices with a yield above 150 kilotons, which is only about one-eighth of the yield sought for the modified B43. If, as is possible, a Comprehensive Test Ban Treaty—currently under negotiation in Geneva—is consummated, no testing of any stage of the B43 would be possible. The B77, on the other hand, has undergone thorough testing and, in the view of the experts, meets the wide range of yields its specifications call for.

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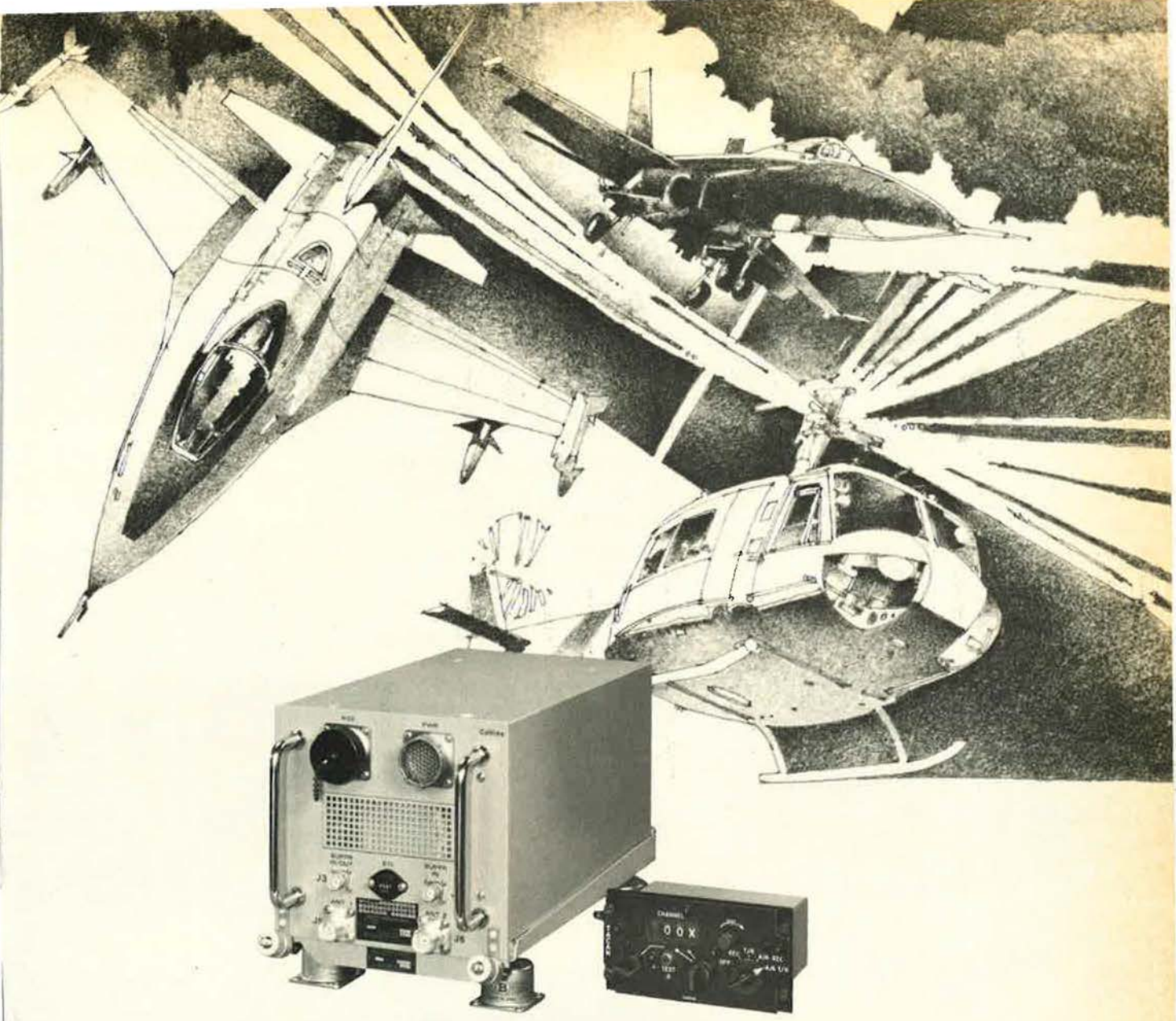

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Focus On...

value of the B77 did not set in until after the program was scrapped on December 19, 1977, and caused belated backpedaling. As a result, DoE's national security division was requested to continue research and development on the B77.

In February, Congress reacted to the Administration's zigzagging by blocking modifications of the B43 on the logical grounds that its performance would lag far behind the B77 and that its ultimate costs could exceed the procurement cost of the B77. The impasse persists at this writing and should serve as an object lesson that vital decisions concerning complex weapons issues should not be made in haste, on the strength of incomplete cost accounting, and by ignoring the advice of experts.

As one ranking expert put it, "OMB's meddling has created a situation where the country may well wind up without a badly needed new strategic bomb and waste untold millions of dollars in the process."

The Administration, in response to congressional pressures, now seems willing to reexamine the entire issue.

Joint Chiefs Expose Warnke Misstatement on SALT

Rep. Robin Beard (R-Tenn.), a member of the House Armed Services Committee, wrote a stinging letter to the White House on March 8, charging "apparent deliberate misrepresentation" of the position of the Joint Chiefs of Staff concerning verifications of SALT II provisions. At this writing, the letter has failed to elicit a reply.

The controversy involves a February 23, 1978, letter by Paul Warnke, Director of the Arms Control and Disarmament Agency, to the Senate Foreign Relations Committee accompanying a study of classified verification issues involved in the pending SALT II agreement. Mr. Warnke wrote that the review and study of the verifiability of the SALT provisions had been conducted "by all involved agencies." Two days later, the Washington *Post* reported, under the headline "US Discloses SALT Details, Says Soviet Compliance Can Be Verified," that "government sources" had said that the ACDA statement "was approved by the relevant government offices, including the Joint Chiefs of Staff."

Not so, Deputy Assistant Secretary Walter Slocombe, the Defense Department's ranking official on SALT, told this column. Mr. Slocombe said there had been DoD participation—below the senior level—in the research connected with the ACDA report, but the Defense Department had not approved it.

Vice Adm. Patrick J. Hannifin, Director of the Joint Staff, in a stern memorandum to ACDA with copies to all pertinent government departments, disowned the claim "that the Joint Chiefs of Staff have concurred in the content of the Interagency Paper, 'Verification of the Prooosed SALT II Agreement,' which ACDA forwarded to the Senate Foreign Relations Committee." Admiral Hannifin also pointed out that the subsequent Washington *Post* story fortified ACDA's misstatement by quoting government sources as asserting specifically that the JCS supported ACDA's claims.

Said the Admiral: "Although members of the Organization of the Joint Chiefs of Staff and the individual services participated with analysts from the other agencies in the preparation of the statement on verifiability, the Joint Chiefs of Staff have not agreed to the statement." Even more peculiar—and as yet also not explained by ACDA—was the JCS disclosure that the National Security Council (NSC), an element of the White House, "was informed on February 22 that the Joint Chiefs of Staff had not cleared the verification paper and that it should be identified as an ACDA paper if there was an immediate need to send the paper." Admiral Hannifin's memorandum to ACDA added kindly: "However, we understand that ACDA was not aware of this information prior to sending the letter . . . to Congress on February 23." New York *Times* columnist William Safire was more skeptical. "Evidently," wrote Safire, "the National Security Council let Mr. Warnke send his happy reassurance on to the Congress without including the specific demurrer by the nation's military."

Recognizing the gravity of the charges leveled against the Executive Branch, Air Force Chief of Staff Gen. David C. Jones, in his capacity as Acting Chairman of the Joint Chiefs of Staff, issued a clarifying memorandum to the Secretary of Defense on March 9. After restating the key points disclosed by Mr. Beard and Admiral Hannifin, General Jones stressed that "the judgment in the forwarding memorandum should not be taken as implying the Joint Chiefs of Staff have taken a position on the report. They believe it prudent to withhold final judgment on the overall verifiability of any SALT II agreement until all the provisions of the treaty are known. The Joint Chiefs of Staff, however, are continuing to assess the verifiability of the elements of various SALT alternatives."

General Jones concluded by stating the JCS "request you clarify their position with the Assistant to the President for National Security Affairs, the heads of the appropriate government agencies, and the chairmen of the congressional committees in receipt of ACDA's letter of 23 February 1978 forwarding the subject report."

Congressman Beard's letter to President Carter summed up the fears of many: "This most recent incident follows the Administration's rejection of recommendations made by the Joint Chiefs of Staff on the Korean troop withdrawal, SALT II proposals, and the development and deployment of US weapons programs, including the B-1, the MX, and the AMST. . . . The suppression of independent and dissenting viewpoints, and the apparent deliberate misrepresentation of the facts, can only be interpreted as a lack of confidence on the part of the Administration in the adequacy of its SALT negotiating posture to meet our military requirements."

It is to be hoped that this strange imbroglio was no more than what Dr. Slocombe theorized to this column that it might be—a colossal bureaucratic blunder. Perhaps the last word about the affair should be Mr. Safire's comment in the New York *Times*: "Although Paul Warnke denied having purged all hawks from the Arms Control and Disarmament Agency, the sound of cooing is deafening from those halls when it comes to the crucial issue of verification—making certain the Soviets keep their agreement."

(More "Focus" on p. 20)

Focus On...

SALT II in Sight?

SALT II progress by the negotiators in Geneva has been slower than the White House first anticipated. Paul H. Nitze, Chairman for Policy Studies of the authoritative, nonpartisan Committee on the Present Danger and a former Deputy Secretary of Defense under President Johnson, recently disclosed a number of crucial sticking points:

The total number of strategic nuclear launch vehicles (SNLVs, a catchall phrase covering large bombers, ICBMs, and SLBMs) is still under dispute. The US is holding out for a reduction to about 2,160 by mid-1980 (down from the original ceiling of 2,400). The Soviet Union insists on a more limited reduction, *i.e.,* 2,250 systems, by mid-1982.

Also unresolved is the question of when a submarine-launched missile falls into the strategic class (and thus is countable under SALT) and when it is to be treated as a purely tactical weapon.

The Geneva negotiators are still deadlocked on the number of MIRVed ICBM launchers. The US wants a limit of 1,200. The Soviets insist on 1,250.

A significant tradeoff, congressional SALT watchers told this column, was offered by the US. The issue involves this nation's right to proceed—during the first three years of the proposed treaty (known as the protocol period)—with development of the improved, long-range Trident II SLBM (about 6,000 miles' range, compared with about 4,000 miles for the Trident I missile) in exchange for the Soviet Union's development and test of a new, large SLBM designed for its new Typhoon-class submarine. (Trident II, also called D-5, might be developed jointly with USAF's MX.)

A recent, tentative agreement of pervasive importance, according to Mr. Nitze, accepts the rule that any ICBM launcher or booster used by a MIRVed missile will be counted categorically as if it were MIRVed. It must be assumed, then, that the Soviets will now MIRV all SS-18 ICBMs—the world's largest—instead of keeping some of the early missiles in their inventory in single-warhead configuration. Noteworthy in this context is that the Soviets now seek permission, under the Protocol section of SALT II, to develop and test a new type of single warhead ICBM. There is some evidence to suggest that the new missile type will be in the 8,000-pound throw-weight class (four times greater than Minuteman III) and deploy a twenty-megaton warhead. Why the Soviets want such a large yield missile is not clear to US analysts.

Meanwhile, highly placed sources report that a new sophisticated guidance system has been flown aboard the newest large Soviet ICBM, the SS-18 (Mod 4), and the modern, medium-size SS-19. This new Inertial Measurement Unit (IMU) features accuracies comparable to the best US systems and may eliminate the need for the Soviet Union's so-called fifth ICBM generation that, according to the Defense Department, is now in early development. Accuracy improvements beyond a certain level become meaningless because any target, hard or soft, within the crater made by a nuclear warhead will be "killed." It really doesn't matter whether the target is in the middle or near the edge of the crater. The accuracy gains scored by the Soviets with this new guidance system, combined with the yields of the warheads carried by their fourth generation of ICBMs—now entering their inventory en masse—will assure a high Single Shot Kill Probability.

As a result, US analysts believe that the Soviet commitment to halt work on the fifth ICBM generation in exchange for US SALT concessions would be a bad trade for the US.

Differences between the two sides concerning the difficult cruise missile issue are narrowing, Mr. Nitze reported. Agreement seems close on an "ambiguous noncircumvention clause" that prohibits the transfer of technology as well as know-how on cruise missiles with a range greater than permitted by SALT. Enforcing such a clause would be difficult, if not impossible. In addition, the Soviets now indicate that they are willing to define cruise missile range limitations in operational, rather than in straight-line, terms. Cruise missiles stand a far better chance of penetrating to targets if they can zigzag to avoid concentrated air defenses. Also, they are affected by wind. The US, therefore, has sought to define range in these operational terms. The Soviets now agree to this principle, but the specifics have not yet been settled.

Lastly, and most significant, the Soviet Union is now willing to disclose pertinent information about weapon systems involved in SALT. But the extent of such information has not been agreed on. In the past, the Soviets accepted US intelligence assessments of Russian weapons as the basis for negotiations without either confirming or denying that information.

The new Soviet Backfire bomber remains a bone of contention and outside of SALT's direct purview. The Soviet Union has indicated willingness to provide informal assurances that Backfire, capable of attacking the US, will not be deployed in a way that would threaten such an attack, and that its production rate will not be increased, even though Soviet negotiators refuse to disclose the rate. The US position on Backfire, according to Mr. Nitze, now is "that restrictions on the Backfire should be included in a document signed by both sides, subject to congressional approval, and thus of the same legal standing as the Protocol."

Because of these Soviet "concessions," congressional experts see a possibility that the Administration will seek a Carter/Brezhnev "Summit" meeting as early as this summer to resolve the remaining points of disagreement. The Administration's ability to win the required two-thirds vote for Senate approval remains doubtful, however.

Washington Observations

• The tendency of CIA boss Adm. Stansfield Turner to present net assessments of US vs. USSR military capabilities to the White House without fully reflecting dissenting views reportedly is stirring resentment in senior occupants of the Pentagon.

• There's mounting concern that the Soviets may have made significant progress in submarine detection through the energy emissions that surface from the wake of even deeply submerged boats. These irregular emissions, called convective cells, show up as hot spots in the atmosphere and cause moisture. They are detectable by special radar and infrared detection systems on ships or in space. The characteristics of the Soviet SS-N-14 cruise missile/homing torpedo suggest that this submarine killer is using that technology.

WHO'S ON FIRST...IN SPACE?

There are hundreds of military satellites in orbit and more on the way. It's vital to our defense to know which types are where at all times...particularly those that may be maneuverable.

To detect and track satellites beyond radar range, the Air Force is now developing GEODSS, which stands for "Ground based Electro-Optical Deep Space Surveillance System". It uses astronomical telescopes with electronics that enhance the light from objects far below the threshold of unaided vision.

As a leader in systems engineering in general and space technology in particular TRW has formed a team of high-technology companies to develop the overall system. Our computer specialists have worked out an ingenious solution for the most difficult problem of all: that of rapidly sorting out, from all the millions of points of light, those anomalous sources that need to be more carefully analyzed. The work is done by high-speed minicomputers and the crucial technology is in their programming. TRW's Moving Target Indicator (MTI) software, developed under contract to the Air Force Systems Command's Electronic Systems Division, almost immediately recognizes and eliminates the natural light sources and zeroes in on the ones that need analysis.

This is one of many areas of space defense in which TRW is active. We're also building military satellites and global communications systems as well as the complex, realtime software that's needed for defense against intercontinental ballistic missiles. We support the Air Force with systems engineering for the Minuteman and Space Transportation System programs... and our electronics people are developing advanced components and systems for digital communications. If you want to know more about our space defense capabilities, please contact Herb Greenbaum, TRW Defense and Space Systems Group, One Space Park, Redondo Beach, CA 90278.

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It's already in service with the U.S. Army as a primary subsonic training target for missile test and evaluation.

This swept-wing variable speed target can be surface launched from a zero length launcher with rocket booster assistance. It operates by remote ground control at speeds from 250 to 500 knots and at altitudes from sea level to 40,000 feet. Endurance may extend up to 3½ hours. And maneuverability has been demonstrated at 6gs.

Developed specifically as a reusable target vehicle, the MQM-107 can be recovered on command with a two-stage parachute system. The target nose cone is engineered to reduce impact damage on recovery.

And with a total external payload of 500 pounds, the MQM-107 airframe is capable of carrying both radar and IR augmentation systems, scoring systems, countermeasure devices, tow targets and gunnery banners.

Above all, the MQM-107's low initial cost, reusability, minimal maintenance requirements, and total Beech product support combine to make it one of the most cost-effective target systems in any military inventory.

For further information, please call or write E. C. Nikkel, Vice President—Aerospace Programs.

Beechcraft

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Capitol Hill

By the Air Force Association Staff

Defense Increases Sought

By March 15 of each year, congressional committees recommend to House and Senate Budget Committees changes to the President's budget request for the next fiscal year—which begins October 1.

This year, in all but one case, the House and Senate Armed Services, Appropriations, and Veterans' Affairs Committees have asked for increases over what the President proposed. The House and Senate Budget Committees should report out their suggestions for the first Concurrent Budget Resolution by April 15, with each body set to act on the resolution by May 15. On September 15, the Congress is to complete action on the second and final resolution.

In his report to the House Budget Committee, Armed Services Committee Chairman Melvin Price (D-Ill.) announced that his committee was recommending an increase of approximately $2.6 billion over the President's $126 billion defense budget request. Price emphasized that "the recommended addition is designed to provide sufficient leeway in the budget for additional initiatives that the Congress might take in the authorization and appropriation process."

The Chairman also advised the Budget Committee that "the recommendation reflects anticipated increases in authorization and legislation for aircraft and ship procurement. This includes an anticipated addition of a nuclear aircraft carrier to the budget, the funding of which is $2.1 billion."

The House Armed Services Committee's report also stated: "There continues to be included in the National Defense Function category the account for military retired pay, which in fiscal year 1979 is estimated to require $10.1 billion in budget authority. The committee recommends that this item be transferred to the more appropriate functional category of Income Security."

The House Appropriations Committee has reported that it views the current defense budget request as "being within a reasonable range of what is required, and therefore the committee recommended no increases, although the committee may differ with the Administration as to some of the individual programs and projects to be funded."

House Veterans' Affairs Committee Chairman Ray Roberts (D-Tex.) has advised the Budget Committee that his committee is recommending an increase of $400 million to the medical portion of the $19.2 billion VA budget request, and recommending that the VA budget be increased by approximately $2 billion.

In the Senate, John C. Stennis (D-Miss.), who heads both the Defense Subcommittee of the Senate's Appropriations Committee and its Armed Services Committee, announced that both full committees were recommending a $1.7 billion increase to the President's defense budget request.

Alan Cranston (D-Calif.) said his Senate Veterans' Affairs Committee was recommending a $2.1 billion boost to the VA budget request, with most of this increase going for improvement in health care, pensions, and in service-connected disability compensation programs.

New Legislation

- **H.R. 11283,** Price (D-Ill.), to make permanent the special pay provisions for reenlistment and enlistment bonuses;
- **H.R. 11329,** Hammerschmidt (R-Ark.), to give veterans suffering discrimination in employment because of status the same procedural rights as persons covered under the Civil Rights Act;
- **H.R. 11687,** Price (D-Ill.), to provide more efficient dental care for both Army and Air Force personnel;
- **S. 2680,** Mathias (R-Md.), to eliminate the reduction in Social Security benefits for spouses and surviving spouses receiving federal Civil Service pension payments;
- **S. 7279,** Bartlett (R-Okla.), to establish ceilings for payments to physicians under CHAMPUS; and
- **S. 2771,** Hathaway (D-Maine), to provide that the proceeds from the operation of certain games of chance by veterans' organizations not be subject to unrelated business income tax.

Among recent legislation having an impact on veterans, as well as on all federal employees, are H.R. 11280, Nix (D-Pa.) and S. 2640, Ribicoff (D-Conn.), which cover the President's proposed Civil Service Reform. The President recommends (1) limiting the five-point veterans preference to the ten-year period following their discharge from the service (beginning two years after such legislation is enacted); (2) expanding the number of applicants who may be considered by a hiring agency from three to seven; and (3) eliminating veterans preference for retired military officers of field-grade rank or above. Amendments to kill this provision in the proposed legislation are now being introduced in the Congress. *(See also "The Bulletin Board," p. 162.)*

What They're Saying

"Women now in the services have been shown to be smarter on the average than men (they are much more likely to have high school diplomas than men, and they score higher on standardized tests); they have a higher retention rate than the men; they lost about fifty percent less time from their jobs than men; and they are capable of meeting much higher physical demands than had been thought possible.

"The Air Force has experimented with small groups of women pilot trainees with unqualified success. One young woman was No. 1 in her training group. (We already knew that women are first-rate pilots, however, given the extraordinary record of Women's Airforce Service Pilots in World War II.)"—William Proxmire (D-Wis.)

"Our Senior Officers have been so emasculated by executive practices, and so intimidated by such obvious lessons as the Gen. John Singlaub affair, that they are no longer captains of their own souls.

"In any event, the overriding lesson for us is that the senior military must be protected in their professional performance and witness, from politically motivated intimidation of their civilian associates and superiors. . . ."—Steven Symms (R-Idaho) ■

Aerospace World News, Views & Comments

By William P. Schlitz, ASSISTANT MANAGING EDITOR

Washington, D. C., April 4

★ The Soviets are literally flying high on the achievements of their manned space program.

Not only did they perform a double-docking aboard orbiting station Salyut-6 in January *(see March issue, p. 20)* but later that month accomplished the resupply of the habitat via an unmanned vehicle, Progress-1, for another space first.

But March proved to be the red-letter month for Soviet manned spaceflight. It was then that Cosmonauts Soviet Air Force Col. Yuri Romanenko and flight engineer Georgi Grechko broke the three-year-old record of eighty-four continuous days in orbit set by an American Skylab crew. The two cosmonauts returned aboard Soyuz-27 to a soft landing on March 16 after a sojourn of ninety-six days in space.

That feat was preceded on March 3 by the rendezvous of Salyut-6 with Soyuz-28, manned by veteran Cosmonaut Soviet Air Force Col. Alexei Gubarev and Czech Air Force Cosmonaut Capt. Vladimir Remek—the first person other than an American or Russian to travel in space.

According to Soviet news agency Tass, Captain Remek was selected for a "full course" of spaceflight training in December 1976 under the Intercosmos program that is preparing Soviet-bloc candidates for work in space.

In 1975, Soyuz-28 mission commander Gubarev spent thirty days in space aboard Soyuz-17 and space station Salyut-4.

★ Early in March, NASA technicians were successful in the first step in their plan to reactivate a number of Skylab's systems with the objective of boosting the space station into a higher, safer orbit *(see April issue, p. 16)*. A NASA tracking station in Bermuda commanded Skylab to begin recharging its batteries via its solar panels, and it obeyed.

If Skylab can be saved from undignified destruction in the atmosphere, "a variety of useful projects" in conjunction with Space Shuttle operations is possible, NASA said.

The space agency has already funded independent studies by two US aerospace companies to determine what further roles Skylab can play in orbital activities.

As NASA points out, Skylab's large living quarters and crew accommodation might prove a welcome adjunct to Space Shuttle/Spacelab missions involving long durations and extensive equipment.

Other potential uses being studied (with formal reports at about year's end) by Martin Marietta and McDonnell Douglas Astronautics:

- The possibility of new experiments, missions, or demonstrations with the Orbiter or Spacelab docked with Skylab, which "might include assembly and support" of large orbital structures.
- The prospect of using equipment already aboard Skylab, and the opportunity to determine the effects on material and equipment residing in space for ten years or more.

★ The first prototype satellite in DoD's planned NAVSTAR Global Positioning System (GPS) was orbited from Vandenberg AFB, Calif., late in February. NAVSTAR-1 joined NTS-2, a Navy Navigation Test Satellite launched last June as a preliminary test vehicle.

The demonstration phase of GPS will be conducted by a total of six satellites: the two already in orbit, two to be launched by summer's end, and two early next year. Three satellites each are to be in two circular 11,000-statute-mile orbits to validate the GPS.

DoD has high hopes for the system, which when operational will contain twenty-four satellites in three orbital planes, eight per orbit, ensuring exceptionally precise pos

At Edwards AFB, Calif., Col. James G. Rider, F-16 joint test force director, receives a hearty welcome from Philip Oestricher, manager of the F-16 flight-test program for General Dynamics, and Lt. Col. Maurice B. Johnston, F-16 operational test and evaluation test director. The occasion: the 1,000th flying hour in the aircraft's full-scale development program. See "Gallery of USAF Weapons," p. 116, for further details on the Mach 2 aircraft, of which the Air Force plans to procure 1,388.

SCAMP Scholarships To Be Awarded

Application deadlines for one-year college or university scholarships of up to $1,000 have been announced by the Board of Trustees of Scholarships for Children of American Military Personnel (SCAMP), a private, nonprofit education organization in Southern California.

Eligible for the scholarships are sons and daughters, no matter where they reside, of American military personnel of any service who were either killed in action, are missing, or were prisoners of war in Southeast Asia. Applicants will be judged on academic qualifications, need, extracurricular activities, and potential.

Letters of request for scholarship application forms should be sent to:

Mr. Martin M. Ostrow
President, SCAMP
212 So. Gale Drive, Suite 200
Beverly Hills, Calif. 90211

Completed applications for the 1978–79 year should be returned to Mr. Ostrow by June 20.

SCAMP scholarships are made possible by revenues derived from the annual Air Force Association-sponsored Air Force Ball held in Los Angeles.

tioning globally in all weather. The satellites will make up the "space segment" of GPS, and provide "three-dimensional" continuous navigation information.

With proper equipment, the "user segment" can process signals from various of the satellites and determine position "within thirty-three feet, velocity within a fraction of a mile per hour, and time within a millionth of a second," officials said. The system will have security features that prevent its use by unauthorized countries or individuals.

The operational system will allow use by unlimited numbers of GPS sets without revealing the position of the user. Planned uses for GPS include precision weapons delivery; en-route navigation for space, air, land, and sea vehicles (some even equipped with hand-held receivers); tactical missile navigation system updating; air traffic control; and common grid targeting.

While the early satellites will be orbited via Atlas booster, the Space Shuttle may deliver later ones.

Key to GPS will be the three atomic clocks aboard each satellite —so accurate they are expected to lose or gain only one second in 30,000 years. GPS should be operational by 1985. The equipment is designed and built by Rockwell International's Space Division, Seal Beach, Calif.

★ In late February, DoD authorized full-scale development of the Navy/USMC CH-53E Super Stallion heavy-lift helicopter and Navy's SH-60B light airborne multipurpose system (LAMPS) Mk III helicopter. Both are built by United Technologies' Sikorsky Aircraft Division, Stratford, Conn.

Under a $88.8 million contract, Sikorsky will deliver six of the heavy-lift craft; the FY '79 budget proposal, now before Congress, requests funds for fourteen more. In all, Navy/USMC would like forty-nine of the triple-turbine aircraft.

The "E" version can lift twice the payload of the twin-turbine "D" version now in service.

USMC will use the "E" for amphibious assault, tactical movement of heavy weapons and other cargo, and the retrieval of downed aircraft. Navy will use the Super Stallion for ship-to-ship and ship-to-shore logistics, support of mobile construction battalions, removal of damaged aircraft from carrier decks, and airborne mine countermeasures. The "E" is equipped for in-flight refueling.

Under the agreement on the LAMPS helicopter, Sikorsky will build and test-fly five prototypes.

According to Sikorsky President Gerald J. Tobias, the "program has a potential for more than 200 helicopters, which would be produced between now and the 1980s. The possible value of the LAMPS program to Sikorsky and our subcontractors in more than thirty states across the nation [totals] more than three quarters of a billion dollars."

When operational, the LAMPS helicopters are to serve aboard frigates, destroyers, and cruisers in antisub and antiship surveillance and targeting. They'll also perform such secondary missions as fleet support, medevac, and search and rescue.

Among LAMPS avionics and weapons will be surface search radar, a magnetic anomaly detector, sonobuoys, acoustic processors and displays, electronic surveillance measures, and torpedoes. It also will carry the latest communication, navigation, and identification equipment for operations in all weather, officials said.

★ Early in March, DoD concluded its investigation of the strange series of "sky quakes" reported along the eastern seaboard and Gulf coasts beginning in December.

Under suspicion as possible causes of the shock waves—which rattled windows and shook walls —were everything from reentering spacecraft to supersize thunderbolts.

All were ruled out except sonic booms, which DoD thinks bounced off warmer high-altitude air with the sound being deflected to areas 100 to 200 miles from aircraft flying supersonically.

Apparently, the unusual winter weather conditions experienced at that time led to the phenomena. DoD said action was being taken "to minimize the further occurrence of these events."

★ Naomi Uemura is one Japanese who plans to avoid traffic congestion—at least for the next several months.

He's traveling alone by dogsled from Canada's Northwest Territories to the North Pole and then the length of Greenland to the southern tip, a six-month trek of 3,728 miles (6,000 km).

The venture is not as foolhardy as it sounds. Uemura has already driven a dogsled solo from Greenland to Alaska; lived a year with Eskimos; scaled the highest peaks on five continents alone (except Everest, which he climbed with a team); and floated, also solo, down the Amazon on a raft (3,728 miles; 6,000 km).

But giving Uemura that extra edge on his current journey is the satellite beacon he's carrying among

Aerospace World

his equipment. The battery-powered unit transmits a signal automatically once a minute. (Included are local temperature and atmospheric pressure.) The signal is relayed by orbiting Nimbus-6, a NASA meteorological research satellite, to a tracking station in Fairbanks, Alaska, and thence to Goddard Space Flight Center in Maryland. There, the explorer's position is computed automatically, thus providing a check on his dead-reckoning and celestial navigation.

Uemura is systematically acquiring snow, ice, and air samples as he goes, so his whereabouts at any particular point is important to, say, the Smithsonian Institution and several Japanese research groups, all of which have scientific stakes in the trip.

The explorer has a voice radio along and a special backup signal to indicate emergency. He's being supplied by paradrop and landing rendezvous.

★ In early March, John F. Loosbrock, Publisher and Editor in Chief of AIR FORCE Magazine, was the recipient of the National Space Club's Press Award. Mr. Loosbrock was cited "for his continuing and persistent journalistic efforts with AIR FORCE Magazine in support of both civilian and military aerospace programs." Previous winners of the award include the New York *Times,* the editors and staff of *Fortune,* Roy Neal of NBC, and Jerry Hannifin of *Time* Magazine.

For his continuing and persistent journalistic support of civilian and military aerospace programs, AIR FORCE Magazine Publisher and Editor in Chief John F. Loosbrock in March received a National Space Club award. See below.

The Press Award was one of several presented at the National Space Club's annual Goddard Memorial Dinner, held March 10 in Washington, D. C.

The National Space Club, founded as the National Rocket Club in 1957, is composed of representatives of industry, government, educational institutions, and news media. Its ob-

Intelligence Briefing...A Roundup

According to *Foreign Report,* published by London's *Economist:*

Soviet front organizations have embarked on an ambitious propaganda campaign this year, in which the World Peace Council is intended to play a leading role. Despite its tarnished reputation as a Soviet mouthpiece, the WPC is congratulating itself on regaining a modicum of respectability as a result of the unprecedented meeting it was allowed to hold in Washington in January, which was attended by American congressmen. The WPC's primary campaigns in 1978 will focus on:

1. Western disarmament, with the neutron bomb and the cruise missile as major targets;
2. "Workers' solidarity" against multinational corporations, which will involve further support for efforts to "expose" their inner workings;
3. Cooperation between the Soviet bloc and the developing countries, and the promotion of a "new international economic order" (despite the miserly scale of Soviet bloc aid to the third world);
4. Alleged human rights violations in non-Communist countries, with particular emphasis on Northern Ireland, southern Africa, Chile, and Iran.

The WPC is currently preparing for the UN General Assembly's special session on disarmament that is due to open in New York in May. The WPC is hoping to use this occasion to present the results of its "new Stockholm appeal" and its campaign against the neutron bomb. The appeal, launched in mid-1975, was supposed to close in August 1976, but it has been kept alive because of the initial lack of support. The appeal publication, *Peace Courier,* claimed in its issue [in January] that 450,000,000 signatures had been collected, but there are doubts about the authenticity of many of these. Half of the signatures appear to have been collected within the Soviet bloc.

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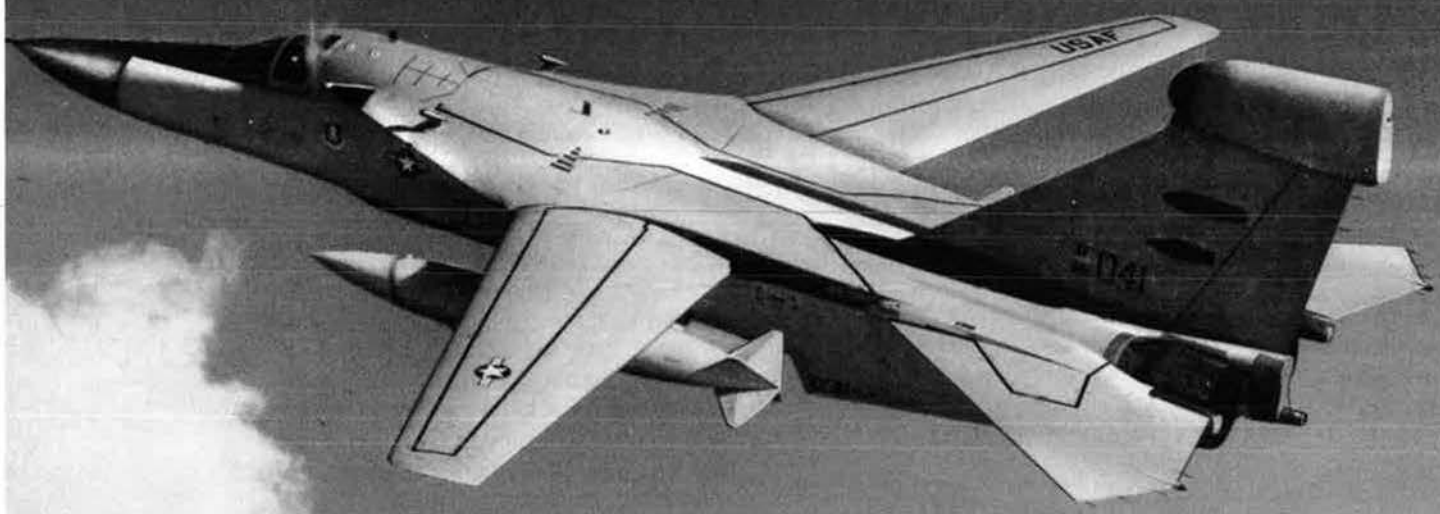

To defeat an enemy, first you have to reach him—undetected. The EF-111, the world's most powerful airborne ECM system, overwhelms and blinds ground radars to incoming aircraft.

And even if multiple, hostile radars switch to a variety of frequencies, the EF-111's broad range of jamming capabilities can handle them immediately.

Adaptable—the EF-111's system is designed to convert quickly and economically to new electronic threats. Compatible—its speed and maneuverability complement any strike aircraft. And versatile—it's ready for standoff, close air support or escort missions. The EF-111 will be the most advanced electronic warfare aircraft to join the U.S. Air Force Tactical Air Command.

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Aerospace World

jective is to promote US leadership in astronautics.

★ USAF plans to install new, "minimally attended" long-range radars along the Alaskan frontier and in the process maintain its surveillance capability while cutting costs more than $30 million annually.

The manned bomber watch along Alaska's western coast consists of seven radar sites, with other network radars located further inland. The system has been in operation more than twenty years and is manned by about 850 Air Force and contractor personnel.

Under the renovation program—dubbed Seek Igloo—manning will be sliced to eighty-seven people, thereby severely reducing the logistics dollar outlays in maintaining and resupplying the manned sites, officials declared.

The revitalized network will tie into the Joint Surveillance System currently being implemented to guard CONUS, Alaska, and Canada. Acting as a focal point for this link-up will be a Region Operations Control Center located at Elmendorf AFB, Alaska. The Elmendorf center will conduct surveillance and identification, and order intercept actions when required.

Seek Igloo radar signals will reach outward 200 nautical miles (321 km) and upward 100,000 feet (30,480 m), providing an around-the-clock vigil.

Installation and checkout of Seek Igloo is expected by 1984, with initial contracts for developmental work to be awarded in mid-1978.

★ Rep. Don H. Clausen (R-Calif.) has been awarded the Frank G. Brewer Trophy in recognition of his efforts in furthering aviation and space education in his home state and throughout the nation.

The trophy, administered by the National Aeronautic Association, is awarded annually for the most outstanding contribution to the development of youth in the field of education and training. It is sponsored by the American Society for Aerospace Education.

Representative Clausen is the first elected public official to receive the trophy. A Navy pilot during World War II, he is an instrument-rated commercial pilot, holds a flight instructor's rating, and has been a CAA examiner.

★ **NEWS NOTES**—For the second year in a row, the **23d Tactical Fighter Wing,** England AFB, La., will represent TAC in July's **RAF Tac Bombing Competition** in Scotland. In 1977, the "Flying Tigers" were awarded the Sir John Mogg Team

Combined Air Warfare Course Begins

Maxwell AFB, Ala.—To improve the war readiness of Air Force units overseas, a new program has been started here for training officers who have been assigned abroad to staff positions above the wing level. The students, primarily operations officers, are being diverted here first for five weeks of training.

The step-up in staff training reflects recent efforts at focusing the Air Force more on immediate combat readiness and less on training for future emergencies.

In the past, officers were assigned to staffs in Europe with little or no training on fighting in cooperation with allied air and ground forces. Air Force staff officers would gain experience in managing US and allied air resources during their overseas assignments, through exercises with allied forces.

The new program aims to have staff officers fully prepared for coalition war the day they arrive abroad.

The first class of this Combined Air Warfare Course at the Air University began in March. The new course is for majors and lieutenant colonels primarily, but captains and colonels will be assigned when their duties require it.

Six classes are scheduled in 1978 and seven in 1979. The course is limited to forty students per class. Ten instructors, plus British and West German officers, conduct the classes.

The course is an attempt to address problems associated with fighting a war in cooperation with allies, such as different doctrines and weapons, and the coordination of different air and ground units.

The first part of the course is a detailed study of the forces and military objectives of the Soviet Union, the Warsaw Pact, and North Korea.

Students then learn about allied forces and the doctrine, strategies, and tactics for combined air warfare. The emphasis is on NATO, but Pacific allies are also studied.

The third block of instruction is focused on NATO, providing students with a detailed study of the strength and limitations of military forces committed to the Western Alliance, and how these forces are employed in combined operations.

Students complete the course with instruction in planning combined air operations, followed by a theater war exercise conducted by computer. The exercise trains students in both defensive and offensive operations with allies.

The Combined Air Warfare Course was created by order of Air Force Chief of Staff Gen. David C. Jones, who has been concerned with increasing the readiness of US and allied forces overseas. General Jones, a former Commander in Chief of USAFE, initiated the study that led to the course, and helped to form the curriculum.

Air War College instructors began developing the course in April 1977, assisted by a team of air warfare experts from General Jones's staff in Washington and the Air Force's European, Pacific, Tactical, and Strategic commands.

Course director Col. Robert W. Davis and four instructors toured major military headquarters in Europe to prepare some of the instruction material. Says Colonel Davis:

"We have designed the course so that it is an important step in the professional career of every operations officer."

—BONNER DAY

Aerospace World

Trophy and came out tops in gunnery, bombing, and leadership.

Airman Magazine's **TSgt. Herman J. Kokojan** has been named 1977 Military Photographer of the Year for **an unprecedented third consecutive time.** In the annual competition, sponsored by the National Press Photographers Association and the University of Missouri, Sergeant Kokojan placed first in the portfolio picture story competition, first in the sports, portrait/personality, and picture story military categories, third in feature nonmilitary, and earned three honorable mentions. **Eight awards in all.** Runner-up in the MPOY competition was newcomer USAF **SSgt. William Hogan,** Det. 3, 1361st Audio-Visual Sqdn., Rhein-Main AB, Germany.

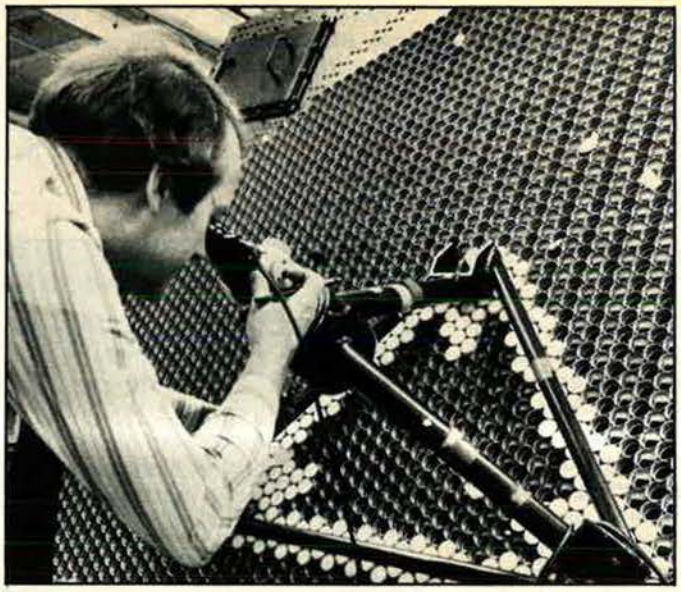
Among recent successful space launches: **NASA's Landsat-C,** into a near-polar orbit to map earth resources; Navy's first Fleet **Satellite Communications Spacecraft** (FLTSATCOM), currently being checked out before going operational.

May 15 marks the **sixtieth anniversary** of the **inauguration of air mail service.** The first mail planes on scheduled service—Curtiss JN-6Hs hastily purchased and modified in reponse to a War Department order—flew between Washington and New York with a stop in Philadelphia. The open-cockpit planes were initially flown by Army pilots operating with only the crudest navigation aids and other equipment.

Historical footnote: On March 13 **George Washington** was posthumously promoted to **General of the Armies of the United States** as per 1976's Joint Congressional Resolution.

Died: Robert W. Prescott, former member of World War II's American Volunteer Group in China and founder of air-cargo Flying Tiger Line, of cancer, in Palm Springs, Calif., in March. He was sixty-four.

Died: Brig. Gen. Marion C. "Gig" Smith, USAF (Ret.), of cancer, in Long Beach, Calif., on March 10. He was sixty-eight. ■



Hundreds of "eyes"—individually controlled cylindrical electronic elements—are being aligned in their sockets during assembly of a fourth US Army Patriot air-defense radar system at the Raytheon Facility at Andover, Mass.

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Sperry Update 4

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

Sperry scores another autopilot first.

McDonnell Douglas has authorized Sperry to proceed with development of what will be the first digital flight guidance system certified for commercial airline use. The system is to be installed in the new DC-9 Super 80.

With the Sperry system, airlines will enjoy significant performance improvements, including autoland, and automated maintenance management.

The Super 80 DFGS will consolidate into one box functions normally requiring six to 10 boxes in analog autopilots. An automated test system will cut airline cost of ownership through reduced maintenance requirements

Further savings will be realized through a higher flight completion percentage made possible by the autoland capability with a built-in autothrottle. The system will integrate aircraft stability and control, flight path steering and thrust management for more accurate approach guidance and simplified flight management, while reducing overall pilot workload.

Sperry ATE users now total 20.

The number of Sperry automatic test equipment (ATE) users worldwide has risen to 20 with orders from Iraqi Airways, British Airways, Air Algerie and China Airlines.

While British Airways is among five Sperry ATE users with more than one system, the other three airlines are new users.

Space experimenters to use Sperry Flexible MDMs.

Flexible multiplexer-demultiplexer units for control of experiment payloads aboard the space shuttle will be supplied to NASA by Sperry.

The units are similar in function to those being supplied by Sperry for data handling and interface between the orbiter's main general purpose computers, spacecraft subsystems and solid rocket boosters. Unlike the orbiter and SRB MDMs, the Flexible MDM offers the option of passive cooling through the use of a silverized Teflon radiator, which is effective even when directed towards the sun.

The Flexible MDM is so designated because it is field programmable for a wide variety of payloads. When placed in NASA inventory, the units will be leased by firms conducting experiments in the shuttle bay.

Sperry leads way in helicopter avionics.

Considerable attention is being focused on Sperry's role in helicopter avionics and for good reason. Sperry, working with a number of helicopter air frames and installers, has secured single pilot IFR certifications on five helicopters, including the Aerospatiale Gazelle and Dauphin, Bell 212, Boeing/MBB BO-105 and Agusta 109A.

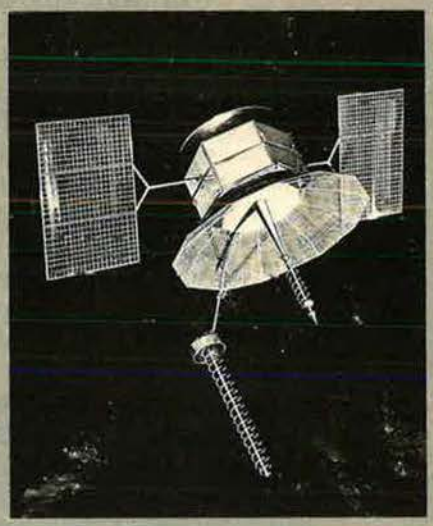
In addition, Bell selected Sperry to provide the standard IFR package for the 222 and Sikorsky will use Sperry flight director systems and gyros in its S-76.

Sperry momentum wheel stabilizes FLTSATCOM.

The first spacecraft in the Fleet Satellite Communications program is gyroscopically stabilized in space by a Sperry Flight Systems momentum wheel assembly.

Sperry's wheel provides three axis stabilization of the satellite to keep its 16-foot diameter dish antenna pointed properly.

Attitude of the 1950 lb. satellite will be controlled by varying the speed of the spinning gyroscopic wheel in response to commands from the on-board computer.



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The ending, and the aftermath, of our Vietnam venture were in part a result of the way we got into the war. The author, a member of Gen. Maxwell Taylor's group that surveyed the deteriorating Vietnam situation in 1961, tells . . .

How We Backed Into Vietnam

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

ALTHOUGH it seems hard to believe, at least for me, it is now almost seventeen years since Gen. Maxwell Taylor led a small group of assorted military and civilian types, of which I was one, out to Saigon. His purpose, as laid out to him in a letter from President Kennedy, was to assess the deteriorating situation in South Vietnam and recommend a course of action. That trip marked the beginning of our Vietnam adventure. It also marked a turning point in our nation's history, or so it would appear. Judging from the never-ending *mea culpas* which accompany almost anything referring to Vietnam these days, the future use of military force in pursuit of our national objectives is at least a questionable option. Because the way we got into Vietnam has a great deal to do with how we ended up, it is worth going back over the ground.

We were not threatened in 1961, either militarily or economically, by the impending collapse of South Vietnam. President Kennedy sent Gen. Maxwell Taylor on his fateful mission for other motives. One of these, based on the United States position as the free world's leader, was to see what we could do to prevent a Communist takeover of South Vietnam. That was a high motive, and Kennedy had in mind political and social help as well as military assistance. He made this much clear in the directive he gave to Taylor. It was, however, in retrospect a hopelessly woolly, however idealistic, charter.

Another motive behind our mission to Vietnam was a desire to use the new counterinsurgency capability of the Army. The Green Berets were the New Frontier's answer to massive retaliation and its response to Khrushchev's threatened "wars of national liberation." Vietnam seemed a good place to test the theory. There were no clear-cut objectives—just go over there and straighten things out.

The Taylor mission went at its job diligently. Each of us focused on things he knew best, and each of us also, it must be admitted, tried to see to it that his client's interests—whether CIA, the Army, Navy, Marines, Air Force, AID, wherever his allegiance lay—were advanced. If Vietnam was where the action was going to be, then everyone wanted a piece of the action.

The report to the President recommended a variety of measures. Predictably enough, they included: a new US military command, a tactical air control system for the Vietnamese Air Force, increased economic aid, logistic troops, more advisors. No one, to my recollection, raised any question about something that was to become painfully obvious later on. That was the difficulty, if not the impossibility, of dealing with an enemy who moved freely in Laos and Cambodia while our efforts would stay strictly inside the borders of South Vietnam. A perceptive British police official in Malaya made a very wise observation to me in those early days. He said that the United States was making a grave mistake to put its reputation on the line while so limiting its freedom of action.

At any rate, during that winter of 1961–62 the Taylor group's recommendations began to take effect. We were engaged in Vietnam, and everyone with any pretensions to governmental importance wanted it understood that he had a key role in this exciting experiment in counterinsurgency. Spring came and with it a Chiefs-of-Mission conference at Baguio in the Philippines, the place where we had put together the Taylor report. The conference was attended by all of our Southeast Asia ambassadors. As the Thirteenth Air Force Commander, I was also invited, more as part of the scenery than as a participant. The conference was chaired jointly by Averell Harriman and Chester Bowles, at least in theory. Mr. Harriman clearly felt he was somewhat more equal than Mr. Bowles and asserted himself accordingly.

The conference gave a fascinating view of the liberal community at work in the political/military arena. The thing I remember most was the subjectivity of the discussions. Laos, for instance, was off limits when discussing the problems of Vietnam. Never mind the fact that the North Vietnamese were using Laos and that we even had some recce photos showing a Soviet supply airdrop at Tchepone in Laos. It was off limits. Diem was an unpopular leader and should be replaced. The fact that there was no visible qualified replacement did not enter into the argument. Some of those who were there that day, Averell Harriman and Roger Hilsman in particular, would speed Diem's downfall later.

The main impression, however, that stays with me all these years is the way we backed into Vietnam. It was all a big and exciting game. It was a game where the in-crowd had the most fun of all, with instant communications back and forth from Saigon and an occasional fast jet trip across the Pacific just to lend a little authenticity to the conversation. But all the while, no real objectives. It was just a game. And, as it turned out, one that was lost, along with a lot of blood, treasure, and national spirit. ■

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DEFENSE SYSTEMS DIVISION

AIR FORCE MAGAZINE • MAY 1978

The outgoing head of the Air Force Systems Command—now USAF's new Vice Chief of Staff—described for AIR FORCE Magazine the wide range of the Air Force's hardware requirements and plans.

THE STATE OF USAF'S WEAPON TECHNOLOGY

BY EDGAR ULSAMER
SENIOR EDITOR

"BEFORE antisatellite attacks were viewed as a real threat, the relatively small number of satellites deployed by the US entailed no penalty in terms of survivability. However, the recent Soviet achievement of an antisatellite capability now threatens our important satellite capabilities in the mission areas of C^3 [command control and communications], surveillance and warning, and navigation." This statement to the Congress by William J. Perry, the Defense Department's Under Secretary for Research and Engineering, gets to the core of a major imbalance that handicaps the Air Force in the "high ground" of space.

Warfare in space, Gen. Lew Allen, Jr., speaking as the Commander of the Air Force Systems Command who is now USAF's Vice Chief of Staff, told AIR FORCE Magazine, "would force us into an arena where the Soviets have substantial advantage. Our efforts, for some years now, have centered on building very sophisticated and extraordinarily cost-effective spacecraft. Because they are long-lived and broadly capable, we keep costs down by producing few of them and at a rate no higher than needed under normal conditions."

The Soviets have gone the opposite way and launch far more, although presumably less expensive and less capable, military spacecraft. As a result, the Soviets keep both launch and production rates high and "thus would be much less vulnerable to an opponent's action than we are," according to General Allen. The problem, however, is solvable. As long as the design characteristics of the Soviet space interceptor are known, we should be able to counter them, General Allen suggested.

Shifting to the Soviet approach of proliferation offers another way out of the present predicament but would be costly and difficult. Nevertheless, some consideration is being given to changing the basic US space posture. Lastly, the relative US disadvantage in spacecraft vulnerability also could be corrected by the US seeking out those methods and techniques in which we have an advantage. Thus, a Soviet attack on our satellites might well prompt a response that is not in space.

Gen. Lew Allen, Jr., former head of AFSC and now USAF's Vice Chief of Staff, has been nominated to be Chief of Staff.

An important, although often misunderstood, factor is that there are gradations in the vulnerability of US military spacecraft. The Soviets have not demonstrated a means for physical attack on spacecraft at geosynchronous—about 22,300 miles—altitude. Even though "we are dealing here with an anticipated rather than an observed threat, we are paying more attention to this possibility and are examining hardening and other protective measures." Intensive precautions are being taken to safeguard the crucial IR (infrared) early warning satellites, including redundancy through "on-orbit spares and other techniques to ensure their ability to resist various forms of threats that might arise in the future," he said. Current Air Force programs also seek to reduce the major vulnerabilities of this warning system at its "nodal" ground terminals, General Allen said.

While a Soviet nuclear space attack would represent the most difficult scenario from a technological standpoint, according to General Allen, its likelihood is low since such an action presumably would cause prompt and forceful US retribution. The real concern, therefore, is more with Soviet actions that may

be deliberately provocative and damaging, "but short of the point where we would be willing to apply severe retaliation. Harassment of US military space systems or limited nonnuclear attacks against some of them could create a situation where it's difficult to structure our response in advance, since we can't be quite sure about the options that are available to us."

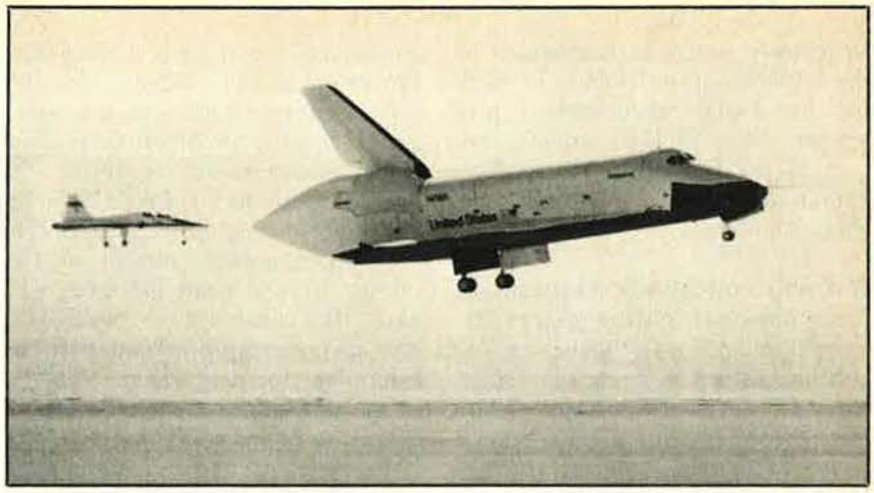
The US is accelerating research and development on an antisatellite (ASAT) interceptor as a potential counter to the operational Soviet ASAT weapons. This and other related programs, Dr. Perry told Congress, "will permit us to increase our ability to observe and monitor space objects, to improve the survival of our satellites, and to have the capability to, if necessary, destroy Soviet satellites."

In addition, the Defense Advanced Research Projects Agency (DARPA), in concert with USAF, continues to investigate space applications of high-energy laser weapons. The high-energy laser program, Dr. Perry said, "is concentrating on the development of efficient infrared chemical and visible electrical laser technologies. Major feasibility demonstrations are being initiated to establish the practicality of laser systems to achieve the performance levels required for space applications."

General Allen pointed out, however, that at the present time, the feasibility of leapfrogging the Soviet ASATs by means of space laser weapons is uncertain. But in a general sense, "the prospect of laser weapons is sufficiently exciting to pursue this technology as rapidly as we know how."

USAF and the Space Shuttle

The US Space Shuttle program, so far as the Air Force is concerned, is now a solid reality, due to the President's recent decision to request funds for activating the Vandenberg AFB, Calif., launch complex and for building enough Orbiters (four with an option for one or more additional vehicles later on) to meet both civilian and defense requirements, General Allen told AIR FORCE Magazine. "We now see the Shuttle as being just around the corner and are beginning to prepare for the complex transition from expendable boosters to the reusable system," he added. The FY '79 Defense budget request includes about $170 million in RDT&E and about $109 million in procurement funds for the Shuttle program.



The Space Shuttle Orbiter, shown here in one of its first landings, will operate from Vandenberg AFB, Calif., when the facility becomes operational in mid-1983.

The Air Force, as the Defense Department's executive agency for this program, is developing an Inertial Upper Stage (IUS) to transport payloads to medium and high orbits from the Shuttle's low orbit. The IUS is expected to become operational by mid-1980. USAF is also developing the Shuttle's launch and landing facility at Vandenberg AFB, slated to begin operations in June 1983. The Air Force will provide a backup launch capability for critical payloads by procuring some Titan III boosters in the event that the Shuttle encounters delays during development or early operational use. Construction of Vandenberg AFB Shuttle facilities is expected to begin in April 1979 and will include a Shuttle landing field, a mate/demate facility, launch pad area, and the launch control center.

Extensive studies by NASA and the Air Force led to the Administration's decision to authorize initially a four-Orbiter fleet, but, as Dr. Perry reported to Congress, "additional Orbiters can be considered for funding in future years in the event that projected flight rates or loss of an Orbiter warrant augmentation of the operational fleet." The Air Force forecasts a total of 109 Shuttle launches for military purposes between FY '82 and FY '91.

Certain modifications of NASA's Johnson Mission Control Center (JMCC) at Houston, Tex., are planned to protect classified payload launches. By the mid-1980s—assuming that the Shuttle program encounters no major difficulties—all Defense Department payloads will be shifted from expendable launch vehicles to the Shuttle. The Vandenberg Shuttle launch and landing facility will be used for high-priority sun synchronous, polar, and near-polar orbit launches of Defense Department payloads. Military satellite systems under development will be modified to permit their deployment by the Shuttle. The Shuttle will be able to carry twice the weight and three times the volume of payloads launched by Titan IIIC. The system will be capable of being launched on a twenty-four-hour notice and, unlike present boosters, will be manned and can bring back to earth spacecraft operating within the Shuttle's altitude envelope, which in certain cases can extend to almost 600 miles.

General Allen suggested that attacks on the Shuttle might be feasible from a technological point of view but unlikely for political reasons. The Shuttle will be used in an "international role and, therefore, any attack against it would constitute an extremely provocative action," he pointed out.

The increasing importance of space

to military functions is reflected by the relatively steep increase in funding for DoD's space-related programs: The $3,364.9 million requested for FY '79 is about $650 million above the equivalent FY '78 appropriation.

Warning and Attack Assessment

As national policy places increased reliance on a "launch-under-attack" posture to assure continued credibility of the US strategic deterrent, the ability to provide timely, accurate, reliable, detailed, and unambiguous warning to the National Command Authorities becomes paramount. Otherwise the NCA's ability, and perceived willingness, to launch the nation's ballistic missiles and bomber forces against the attacker is impaired, doubtful, and, in a deterrent sense, perhaps even ineffective.

The Air Force, General Allen said, is examining potential "radar and spaceborne assets to ensure that we will have the needed capabilities of attack assessment—notwithstanding the question of whether or not the NCA actually would use them [for launch under attack]. A large number of new initiatives has been identified that, in our view, should be taken. Most critical here, we think, is to be able to provide the NCA with real-time information."

To strengthen the credibility of a launch-under-attack posture, better attack assessment must be backed up by a command control and communications system that is less vulnerable, according to General Allen. For the moment, he said, "our spaceborne C^3 elements are not particularly vulnerable, but all ground-based components and sensor elements that we have examined are."

But progress is being made. According to Dr. Perry, the three geostationary satellites that provide early warning of SLBM or ICBM launches against the US are being upgraded through "improved sensor and on-board processing systems." With greater accuracy and longer operational life, "the system will provide the data needed to support National Command Authorities' decisions well into the 1980s." Also, an operational prototype of a Simplified Processing Station (SPS) serving the early warning satellites as a mobile, and eventually proliferated, ground terminal is to go on line during FY '79, according to Dr. Perry. SPS, he reported to Congress, "is a transportable, more austere version of the full-up ground stations, and will have the capability to provide a backup for existing ground stations, a terminal for deployment of additional satellites, if required, and a direct readout to additional users. In addition, we gain an increase in data survivability through proliferation."

In the meantime, DARPA and the Air Force are at work on the next generation of warning satellites that will provide advanced strategic surveillance from space. A prominent step here is the pending first space test of the DARPA/USAF TEAL RUBY experiment. *(See October '77 issue, p. 30.)* TEAL RUBY's advanced infrared technology will provide target and background information from space in a number of spectral bands and include on-board signal processing for real-time detection and tracking, according to Dr. Perry. Related efforts include a joint space launch of DARPA's mini-HALO (for high altitude, large optics) prototype and USAF's Mosaic Sensor system that combined permit "expansion of the current missile attack warning mission of spaceborne sensors," Dr. Perry said. Presumably included here is protection against conventional and laser jamming.

The MX ICBM Program

It can be assumed that by 1986 the Soviet Union's modernized and enlarged ICBM force will threaten the survivability of a major portion of the US ICBM force. The result would be an added burden on the bomber/cruise missile and fleet ballistic missile components of triad, and a severe degradation in the US ability to neutralize time-urgent hardened targets—in the main, Soviet ICBMs held in reserve. USAF's answer is MX, an advanced ICBM technology program now in its validation phase. Its key characteristic is survivability attained through a combination of mobility and concealment.

General Allen said, "We know we can build a missile that is better than the Minuteman ICBM by a substantial degree. We can build MX in several configurations, depending on what is needed. The basing question is more difficult. We are examining the problem from philosophical, strategic, and technical perspectives in order to find the most cost-effective way of redressing the expected vulnerability of our fixed-silo ICBMs in the mid- and late-1980s." The pending SALT II accord, he said, can be presumed to have some effect on the design of the new missile system because SALT terms "might determine how many Soviet reentry systems [warheads] we will have to plan against in designing MX." Fundamental to the design of MX is assurance that an aggressor would need to attack it with many more missiles than he could hope to destroy—an effective deterrent to a Soviet first strike.

Defense Secretary Harold Brown, General Allen pointed out, is willing to consider full-scale engineering development of the new ICBM—even though the Defense Department's FY '79 budget request deferred such a step—"anytime we can bring our thoughts on the weapon's basing mode in order." The Air Force is confident, General Allen added, that "our studies will be completed late this coming summer and will bring into focus many of the pending questions. We don't know how many new questions our studies will generate and how much time it will take to answer them."

The FY '79 budget request includes $158.2 million for continuing MX research and development, with exploratory work on basing mode and the equipment and facilities needed for weapon concealment and mobility comprising half of the total system cost. During FY '79, design and development will get under way for the vehicle, facilities, ground power, command control and communications, and physical security system appropriate for the basing mode selected. Also, during the coming fiscal year, competitive contracts

will be awarded in guidance and control systems; post-boost control systems; and first-, second-, and third-stage boosters.

In the guidance area, the Inertial Measurement Unit design will be started, based on the preprototype Advanced Inertial Reference Sphere (AIRS). Technology demonstrated in the Advanced Ballistic Reentry Vehicle (ABRV) design developed under DoD's USAF-managed ABRES (Advanced Ballistic Reentry Vehicles System) program will be considered for the MX. The booster design will incorporate technology advances in propellants, lightweight cases, and advanced rocket exhaust nozzles developed earlier. The post-boost vehicle will rely on technology advances in axial engines, attitude-control system engines, and propellant expulsion systems developed by the Air Force Rocket Propulsion Laboratory. Test planning as well as all associated computer software formulation also will begin in the coming fiscal year.

Needed: A Manned Penetrating Bomber

"I feel strongly," General Allen told AIR FORCE Magazine, "that we need—and will continue to need—a manned strategic penetrator." Generating this requirement are "our concerns about the efficacy of a pure cruise missile force as the only air-breathing leg of the strategic triad. We also worry about the limitations an all-cruise missile force would impose on our ability to deal with certain kinds of targets and deployments. These limitations, we believe, introduce an unacceptable degree of risk. As a result, our present plans—and our guidance [from DoD]—are to keep the B-52Gs and Hs in the penetrator role. We certainly would not want any significant reduction of that capability. Also we believe there is a need for an additional arrow in our quiver, that is, an option to go into production with an improved bomber sometime in the future. The B-52 won't be able to perform indefinitely as a penetrator. The FB-111H is the Air Force's candidate for keeping this option open."

The outgoing AFSC Commander acknowledged that there is legitimate concern about future "home-on-jam" interceptor systems impairing the continued viability of manned penetrating bombers, but pointed out that the "Soviets do not have—and do not seem to be within reach of—that capability. If they ever develop it, there is good scientific evidence to suggest that we undoubtedly can come up with effective countermeasures."

General Allen is confident that the Air Force can cope with the widely touted SA-10, the new Soviet surface-to-air missile, alleged to have a high kill probability against low-flying bombers and cruise missiles. "As yet we don't have the data to fully understand the nature of the SA-10. This will come with time. But we do know that we are dealing with a new weapon designed to deny low-altitude penetration of Soviet territory and that we will have to pay a great deal of attention to its long-term effects. Our initial response is to stay as low as possible to minimize exposure time. If we do this—both with our bombers and cruise missiles—the burden on the Soviet defenses will be awesome, if not insoluble. Further, the SA-10 makes the case for defense suppression with ICBMs and SRAMs all the more compelling. It also focuses even more attention on reducing the radar cross section of our cruise missiles," he pointed out.

General Allen expressed two general concerns about the potential vulnerability of air-launched cruise missiles that are being designed by the Navy and the Air Force. "Over water our concern centers on the cruise missile carrier. Here the key is to give the cruise missile enough range so the carrier can stay outside the ever-expanding perimeter of Soviet air defenses. If we can't come up with enough standoff range for ALCM, then we will have to think about using ECM [electronic countermeasures] or some other technique for going after the Soviet airborne warning and control systems [SU-AWACS]. Once our ALCMs are over land, the problem of detecting and tracking them against ground clutter mounts for the Soviets, especially since they must defend vast areas. The Soviets must assume that they will have to cope with 3,000 cruise missiles coming in at the same time, which makes their problem horrific. They might be able to use OTH-B [Over the Horizon Backscatter radar] for warning of the pending arrival of US cruise missiles, but the information probably would not be precise enough to direct interceptors against them."

In the FY '79 budget request is $237.8 million in RDT&E and $174.9 million in procurement for USAF's ALCM. To advance cruise missile technologies over a broad front, the AGM-86B (Boeing's ALCM design) and AGM-109 (General Dynamics' modified Tomahawk) are in competition. Each company will build fourteen missiles in FY '78 and FY '79, with ten competitive flights for each missile type scheduled between May and October 1979. Both competitors will begin limited production this year. Source selection is to be completed by January 1980. The Air Force also is examining the option of developing a standoff cruise missile carrier in the event that the B-52 force could not carry enough cruise missiles to meet future targeting and penetration requirements.

One of the potential contestants in an eventual cruise missile carrier competition, according to General Allen, could be the Air Force's proposed, but for the moment moribund, Advanced Medium Short Takeoff and Landing Transport (AMST). Funding for this program—involving development and source selection of an advanced wide-body intratheater transport—was denied in the FY '79 budget. General Allen pointed out, however, that "the door is not completely closed on AMST. The program is being reexamined critically in relation to the C-130." The fundamental question, he added, is the need for outsized cargo lift capabilities within the European and other theaters. AMST, with prototypes developed by Boeing and McDonnell Douglas, is designed to carry army tanks and other outsize cargo.

According to General Allen, AMST might also become a candidate for launching GLCM, USAF's

ground-launched cruise missile. Even though originally a purely ground-launched system, GLCM is now being looked at as also an air-launched weapon. "As we consider the cost picture, the air-launched approach has considerable appeal. But it does pose a difficult problem in connection with SALT," General Allen said.

Studies of the most cost-effective basing mode of GLCM are in progress. A team of USAF technical experts has reviewed the US Army's schemes for deploying and employing its mobile nuclear-tipped Pershing ballistic missile force in Europe. "The Air Force clearly would have to modify the Army's basing and deployment if we were to apply it to GLCM. One of the key problems with this form of mobile ground-basing is that it is manpower intensive. The main reason is the security requirement that arises when the launchers and warheads are mated. We are considering methods for easing the security problem, for instance the separation of the warhead from the rest of the missile until late in the deployment cycle."

The FY '79 budget request allocates $33 million in RDT&E and about $40 million in procurement for GLCM. Key purpose of the new weapon, a variant of the US Navy's Tomahawk Sea-Launched Cruise Missile, is to release USAF's dual-capable aircraft from nuclear alert and make them available for conventional warfare missions in Europe. GLCM also would go a long way toward offsetting the Warsaw Pact's advantage derived from the new Soviet MIRVed intermediate-range ballistic missile, the SS-20. The only long-range, land-based weapon systems now available to NATO are the F-111s and the aging British Vulcan bombers. GLCM's funding is in addition to some $152 million in RDT&E that the Navy, the joint manager of all cruise missile programs, is spending on its sea-launched cruise missile, from which GLCM is derived.

The Air Force continues to explore the potential of the ASALM (Advanced Strategic Air-Launched Missile—a hybrid system using both rocket propulsion and ramjet technology) as a follow-on to the cruise missile and as an air-to-air weapon for use by cruise-missile carriers against SU-AWACS, according to General Allen. The ASALM's high supersonic speed is an obvious advantage over ALCM, but would curtail range significantly unless it flew at high altitude most of the way, he added. USAF, therefore, is considering ways of extending the range of its Boeing-developed SRAM (Short-Range Attack Missile). "When we first examined the possibility of increasing SRAM's range, we held ourselves to sizes compatible with the B-52's internal rotary launcher. Since ASALM would be too big, we now feel that a larger, extended-range model of SRAM might offer certain advantages," the outgoing AFSC

HiMAT Rollout

The joint USAF-NASA Highly Maneuverable Aircraft Technology (HiMAT) aeronautical research vehicle was rolled out early in March at the Rockwell International facility in El Segundo, Calif. About one third the size of an average fighter aircraft, HiMAT—a remotely piloted vehicle (RPV)—will serve as a flying test-bed for advanced aerodynamic design concepts. USAF's manager of the program is the Air Force Flight Dynamics Laboratory (AFFDL) at Wright-Patterson AFB, Ohio.

Primary purpose of the HiMAT program is to enhance the maneuverability of future US fighter aircraft at transonic speeds—700 to 780 mph—and during air-to-air combat. The vehicle's flight-test program will evaluate HiMAT's high-speed turns at 30,000 feet and diving and pullup maneuvers that simulate ground strafing runs.

Such maneuvers become possible largely because of aeroelastic tailoring (AT), a structural design concept conceived by AFFDL in the early 1970s. This feature capitalizes on the unique directional properties of composite materials to control bending and twisting under aerodynamic loading. When HiMAT begins pulling Gs, the composite structure will deform enough to give the vehicle about ten percent additional maneuvering capability. About twenty-five percent of the total weight of HiMAT is graphite epoxy composite materials.

During maneuvers HiMAT is expected to attain sustained eight-G turns at Mach 0.9 at 25,000 feet, and sustained six-G turns at Mach 1.2 at 30,000 feet.

Scheduled for flight testing late in 1978, HiMAT's missions will begin with air-launch at about 45,000 feet from a B-52 aircraft over NASA's Dryden Flight Research Center (DFRC) at Edwards AFB, Calif. The unmanned vehicle is scheduled to fly between twenty and thirty missions at the DFRC facility.

HiMAT, a remotely piloted vehicle about one-third the size of a fighter, will be a flying test-bed for new, sophisticated aerodynamic designs.

Commander told AIR FORCE Magazine.

New Tactical Weapons

In case of a NATO/Warsaw Pact war, USAF's task of blunting the Soviet armored blitzkrieg would be "unlike anything we have ever had to face before. The defenses are heavier and the target area is 'richer' compared to what we encountered in the past. Consequently, we will need weapons that enable our aircraft to kill as many targets on each pass as technology permits," according to General Allen. Hence, a new USAF development program, WAAM, for Wide Area Anti-Armor Munitions. Beyond permitting multiple kills of such targets as tanks, armored personnel carriers, and artillery, WAAM must be deliverable from low altitude as well as standoff, in order to increase the survivability of USAF and NATO aircraft. While the program is still in an exploratory and fluid state, it seems certain that WAAM will turn out to be a family of precision munitions and guided submunitions "some of whose members could be smarter in terms of target detection and guidance than others," according to General Allen.

Among the principal approaches is the so-called combined effects bomblet cluster munition, which uses a shaped charge against armor. The Air Force is examining another submunition, the extended-range antitank mine or ERAM, which, once in place, will recognize its target and fire a directed high-velocity slug against it. Also being considered is the Cyclops concept of a warhead with a sensor that scans the ground while rotating during its fall. If a target is picked up, the warhead explodes and directs a high-energy fragment against it.

Submunitions are adaptable to either missiles or unpowered bombs. They are, as Air Force's Assistant Secretary for Research, Development and Logistics John J. Martin observed, "conventional or nonnuclear munitions equivalent to MIRVing nuclear strategic missiles." Guidance techniques being examined for guided submunitions include radar, IR, and millimeter wave technologies. Some of the new submunition technology is being developed jointly with other NATO members. Included here is the Low-Altitude Airfield Attack System (LAAAS), an extension of the British JP-233 program. The system, a key part of an eventual common NATO air-to-ground package of programs, would dispense submunitions from aircraft flying at low altitude to reduce combat losses.

The Air-to-Air Missile Challenge

"As usual with new aircraft, we are behind in the number of missiles the F-15 requires, in this case, the radar-guided AIM-7F and the IR-guided AIM-9L. Reducing the War Reserve Material shortfall in both missiles is one of our highest priorities," General Allen said. The problem intensifies with the F-16 beginning to enter the operational inventory this year. It will carry AIM-9Ls but not the AIM-7F. "But we will eventually need an improved all-weather medium-range missile for the F-16, just as we need an improved missile of this type for the F-15," according to General Allen.

The solution is a joint Air Force/Navy project to develop an Advanced Medium-Range Air-to-Air Missile (AMRAAM) capable of high average velocity, launch-and-leave, and multiple target attack. About $37 million for this joint-service program is in the FY '79 budget request. These funds cover start-up of a competitive prototype phase, including building the missile, testing the target seeker, and verifying the weapon's compatibility with aircraft that would carry it.

A similar project, the Advanced Short-Range Air-to-Air Missile (ASRAAM), will lead to a follow-on weapon to AIM-9L, but is still in design definition.

STOL, Not V/STOL?

Even though USAF is bringing into the inventory such advanced combat aircraft as the F-15 and F-16, "we certainly have not reached a technological plateau in aircraft design. There are many important technological opportunities that we are looking at very hard. Two key aspects are high maneuverability, typified by the HiMAT [NASA-USAF research RPV developed by Rockwell International], and STOL. We need the latter to operate from damaged runways. The direction these two requirements take remains to be seen, but they may be compatible. Witness the Harrier that in spite of some undesirable characteristics certainly exhibits maneuverability and STOL capabilities," General Allen said.

The Air Force, he stressed, needs STOL but not V/STOL in its future combat aircraft, with "perhaps the option to use some form of takeoff assist under certain conditions. The technical community feels that we are on the verge of some promising technical advances in STOL, mainly in the area of propulsive lift technology. Our AMST program and work by the Navy toward an advanced V/STOL aircraft point the way toward truly remarkable advances in STOL technology."

Three major, fundamental problems concerned General Allen as he relinquished command of AFSC to assume the post of Air Force Vice Chief of Staff:

- Over the long run, USAF may find itself short of technical talent—civilian as well as military. Promotion freezes affecting civilian scientists and engineers are one problem; the difficulty of recruiting enough young officers with science and engineering degrees is another, and could worsen as general enrollment in these disciplines falls behind the nation's needs.
- USAF's research budget, which just now is returning to the FY '70 level in real terms, can't make up for the ground lost in the intervening years. This is especially critical because lead times of new weapon systems now run between thirteen and seventeen years.
- The strategic forces of the United States are in a "state of substantial reexamination. The country needs a deeper and more thorough understanding of these crucial issues to participate more effectively in their resolution. In light of determined and steady Soviet expansion, we can't afford any big mistakes."

These perceptive admonitions by USAF's new Vice Chief of Staff need be heeded by the men and women of the Air Force, and by the nation as a whole. ■

Hit by a series of cutbacks and shakeups, the nation's intelligence agencies are locked in a struggle for money and power. Meanwhile, efforts to keep watch on the Soviet Union have been hurt.

THE BATTLE OVER US INTELLIGENCE

BY BONNER DAY, SENIOR EDITOR

THE US intelligence community is in a battle for money and power at a time when its product, vital information about the aims and activities of foreign countries, has never been more in demand.

The struggle is the result of public criticism of intelligence abuses, combined with repeated actions to cut spending and manpower in this critical area.

For the past five years, US intelligence organizations have been buffeted by congressional investigations, damaging publicity, and a series of personnel purges.

All parts of the intelligence community have been affected, including the Defense Intelligence Agency, the Defense Department's National Security Agency, and the other military intelligence services. The Central Intelligence Agency, in its role of coordinator for all national intelligence, has been a principal target.

The latest in a series of shakeups of the intelligence community was ordered by President Carter in January. Next to come is a new intelligence charter, now being studied by the Senate and House, that would set the President's executive order on intelligence into law, after adding a number of congressional twists.

The aim is to mend a badly damaged intelligence network, but the effect has been to set the chiefs of the various intelligence organizations against each other in a heated battle for what remains of intelligence money and authority.

The effect of the criticism and the budget cuts already has been devastating: US agents and analysts have been reduced to a fraction of what they were a decade ago. Numerous intelligence collection operations have been stopped for lack of men and money. Relations with foreign informants and friendly intelligence services have been damaged severely.

Veteran intelligence officers agree that disclosures and investigations, combined with the money pinch, have hurt the intelligence efforts of the US. Further, a significant number are convinced that intelligence reports have declined in quantity, timeliness, and accuracy over a period of several years.

Military intelligence officers are particularly disturbed that the frequent reorganizations of the intelligence community have put more authority each time into the hands of a single person—the Director of Central Intelligence—and diminished the military voice in the critical decisions over budgets and intelligence assignments.

For military intelligence organizations, this trend means fewer dollars in the annual budget scramble. More importantly, military intelligence chiefs fear they will have less say over what the agencies under them can collect.

Still, military intelligence officers interviewed by AIR FORCE Magazine are optimistic about the nation's intelligence. They say the increasing use of modern technology for collecting intelligence—particularly satellite photography and electronic listening devices—could make intelligence more accurate than ever before. If the current turbulence within the US intelligence community can be resolved satisfactorily, they predict, the intelligence available to the nation's policymakers will be improving sharply in the years ahead.

The guidelines Congress and the Carter Administration have prepared are designed to provide additional checks on potential abuses by intelligence agencies.

Some military intelligence officers note that while it has been the civilian CIA that has been most criticized for abuses, each new reform has given the Director of Central Intelligence more authority, at the expense of the military intelligence services.

The New Rules

The guidelines Congress and the Carter Administration have prepared are designed to provide additional checks on the activities of intelligence agencies.

President Carter announced his reform in January. In 1971 and 1975, major guidelines were issued during the Nixon and Ford Administrations. Says one military intelligence expert: "Each President seems bent on putting his individual stamp on the intelligence community."

Under President Carter's Executive Order 12036, two committees of the National Security Council—The Special Coordination Committee and the Policy Review Committee—have direct supervision of all US intelligence.

The Coordination Committee, chaired by National

Regular meetings with President Carter, once or twice a week, make the power of the Central Intelligence Director, Adm. Stansfield Turner, clear in Washington. Here, Admiral Turner, center, confers with President Carter at the White House while aides listen.

Security Affairs Assistant Zbigniew Brzezinski, reviews sensitive intelligence operations, and, for the first time, coordinates all counterintelligence activities.

For the military organizations, this means Defense Secretary Harold Brown will be sharing with the National Security Council authority that he once could delegate to the heads of the military intelligence organizations.

The Coordination Committee includes Vice President Walter F. Mondale, Secretary of State Cyrus R. Vance, Defense Secretary Brown, Attorney General Griffin Bell, Budget Director James McIntyre, Joint Chiefs of Staff Chairman Gen. George S. Brown, CIA Director Adm. Stansfield Turner, and FBI Director William H. Webster.

The National Security Council's other intelligence body, the Review Committee, examines intelligence operations and approves policies and budgets for the intelligence community. This committee has as chairman Admiral Turner, and as members NSA Assistant Brzezinski, the Vice President, and members of the National Security Council.

Secretary Brown thus will be only one voice on the review committee, when it passes on policies and budgets that have been prepared by Admiral Turner.

The President's order increased the authority of Admiral Turner, as Director of Central Intelligence, over military intelligence organizations, making him responsible for budgeting the entire intelligence community, for assigning intelligence tasks, and for preparing national intelligence reports for the President and the National Security Council.

In recognition of Turner's strengthened hold over military intelligence, Carter's order provides that the authority to assign intelligence tasks can be transferred to the Defense Secretary. Carter has directed Turner and Brown to practice such transfers regularly.

Still, military officers are concerned that units around the world must funnel intelligence requests up to Turner, a time-consuming process that would undercut the traditional authority of military commanders in the field.

Beyond the civilian-military dispute, Carter's order reaffirms the historic ban against assassination that President Ford introduced in Executive Order 11905. The 1947 intelligence charter that organized the US intelligence community after World War II handled this touchy issue differently, by authorizing "any such acts" as might be necessary. Assassination attempts were deemed necessary by administrations during the cold war, the Korean War, and the war in Southeast Asia.

About the ban on assassination, one veteran intelligence officer says: "If Congress had been asked to vote on the assassination of Fidel Castro in the early 1960s, the measure would have passed by at least a two-to-one majority, and the person who introduced the bill would have been given a medal. Now Congress is indignant that such a plan was even being considered."

Under the President's order, Attorney General Bell is responsible for ensuring that intelligence operations comply with the law and for protecting constitutional rights and privacy of US citizens who may be intelligence targets.

As an added precaution, intelligence agencies must answer queries of the Intelligence Oversight Board, which reports directly to the President. Unlike the disbanded Foreign Intelligence Advisory Board, which monitored the quality of intelligence for the President, the new oversight board is charged instead with investigating questions of legality or impropriety in intelligence matters.

The three members are former CIA officer Thomas L. Farmer, former Tennessee Sen. Albert A. Gore, and former Pennsylvania Gov. William M. Scranton.

As a third safeguard, and at the request of Congress, the President has directed that senior officers of the intelligence community report fully and promptly to the Senate and House intelligence committees.

Congressional Reforms

The intelligence charter proposed in Congress goes further, with the intent of making into law many of the rules the President has established by executive order. Congress is scheduled to hold hearings this spring on the legislation, which would replace the 1947 and 1949 laws that organized the present intelligence community.

One of the more damaging congressional innovations, in the opinion of veteran intelligence officers, is a ban against payments for intelligence purposes to clergymen, journalists, members of the Peace Corps, and persons in US government-sponsored art, culture, and education programs. Intelligence veterans fear that some persons in every category of foreign traveler will seek to have their categories included in the ban. Even as proposed, they say, the job of the Soviet Union's counterintelligence teams is made much easier.

No such ban exists for Soviet travelers coming to the US. The large number of such travelers has caused FBI and other counterintelligence experts to concede that they no longer have enough agents to watch all those who are suspected of being Soviet agents.

The proposed law also gives the Senate a bigger hand in staffing the CIA and the National Security Agency. The Director, the Deputy Director, and the top assistants in the CIA would have to be confirmed by the Senate. For the first time, the Director and the Deputy of the

NSA also would have to be confirmed, and at least one would have to be a civilian.

The Director of Central Intelligence, now Admiral Turner, would be renamed the Director of National Intelligence (DNI) under the proposed changes. He would serve as the chief intelligence officer of the US and as Director of the CIA, as he does now. But, in addition, the President would be given authority to separate the position of DNI and CIA director and appoint two people for the two responsibilities now held by Admiral Turner.

The effect of the proposed legislation would be to give Congress a bigger voice in intelligence activities, and to give the DNI a bigger voice over the defense intelligence organizations.

Military intelligence officers are busy studying the proposed charter in preparation for making final arguments to preserve some of the military's present authority.

As in the Carter order, Turner would prepare a budget for the entire intelligence community and have the authority to add to or subtract from the budget of the individual organizations. This authority would be at the expense of Secretary Brown and his intelligence officers.

The congressional bill makes some detailed restrictions, specifically prohibiting assassination, terrorism, torture, the mass destruction of property, creation of food or water shortages or epidemics, the overthrow of democratic governments, and the support of human-rights violations.

Covert activity, in which US agents try to influence events rather than just collect information, requires certification by the President under the proposed charter, and congressional intelligence committees must be notified beforehand. The Director of National Intelligence also must report to the committee regularly on all such activity.

Veteran intelligence agents say the new and proposed rules make their work much more difficult. In the future, they say, US intelligence will be much more public and will resort to covert actions very sparingly, if at all.

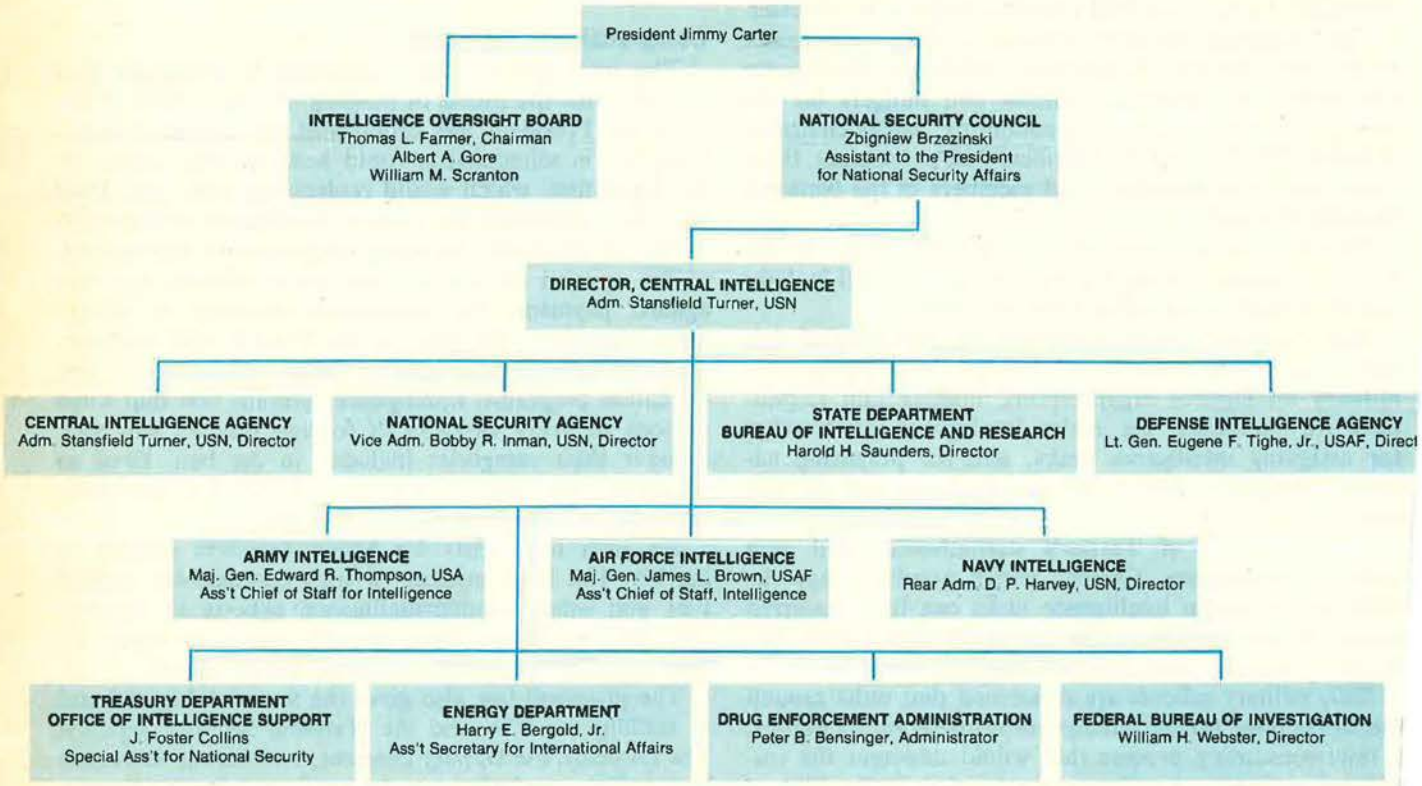
The principal subjects of both the President's order and the congressional charter are the operations of the Central Intelligence Agency and its Director. But the rest of the intelligence community also is included. Specifically named are the State Department, the Treasury Department, the Defense Department's Defense Intelligence Agency and National Security Agency, the Department of Energy, the FBI, and the Drug Enforcement Administration.

Military officers repeatedly make the point that the reforms are designed to correct CIA abuses, principally, but that the practical effect is to give the Director of the CIA even more authority. The additional authority comes, they say, at the expense of military intelligence organizations that have been relatively free of scandal.

Damaging Publicity

Veteran officers say they are concerned about the effect of public disclosures on future operations, rather than who is to blame for the past.

THE US INTELLIGENCE COMMUNITY



In his book *Secret Missions,* retired Army Lt. Gen. Vernon A. Walters, a former CIA deputy director, writes: "During the great investigations into the United States intelligence community, I had occasion to talk to many chiefs of foreign intelligence services, friendly and otherwise. Damage was done to us not by the enemy, but by a distorted sense of national guilt cleverly exploited by those hostile to us. Many of these chiefs of foreign services were appalled at the spectacle of the United States dragging into public view not just dubious actions, but many of the sources and methods by which we worked."

Veteran intelligence officers say the recent congressional investigations, the open statements of former and current CIA Directors William Colby and Admiral Turner, and the release of intelligence documents through the use of the Freedom of Information law have seriously damaged operations abroad.

Intelligence veterans report that sources are refusing to meet with CIA agents abroad, for fear their names later will appear in public. In some cities, military agents have picked up the slack.

Further, the threat of lawsuits for excessive government censorship has caused the release of sensitive information through the Freedom of Information law. One intelligence agent complained to superiors that his identity and activities, as well as the identity of a close relative living abroad, had been released to foreigners without his knowledge or consent.

Says one veteran agent: "The direct effect of the publication of names is small compared with how it affects the willingness of ordinary Americans and foreigners to walk into an American embassy voluntarily with useful information."

The result has been that many intelligence offices abroad, assigned to gather intelligence, have been closed and the agents sent home for lack of business.

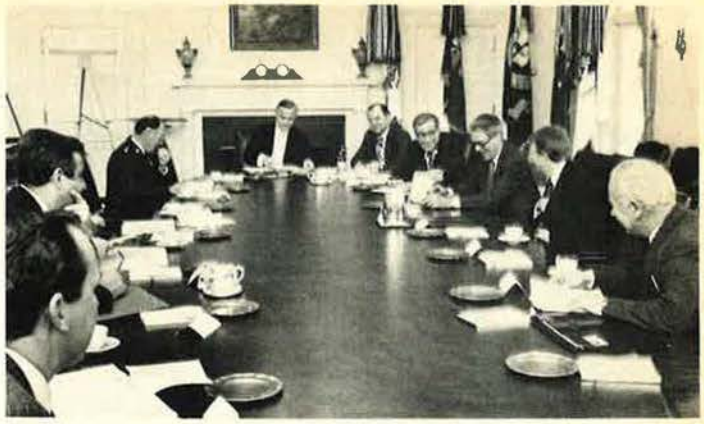
Intelligence reports have suffered. US government sources say when the Cubans went into Angola and later into Ethiopia, many of the details were poorly reported or relayed too late to help American policymakers. Other lapses have been reported in Asia and South America.

Political Pressures

US intelligence experts also are critical of the growing pressure from the White House to slant intelligence for political purposes. An increasing amount of information, other intelligence officers say, is held secret to prevent blunders of government officials from being made public.

In one of the more notorious cases, according to General Walters, he was asked as CIA deputy director to impede the Watergate investigation and to pay salaries to the Watergate burglars while they were in jail. Commenting on later being awarded the Distinguished Intelligence Medal, General Walters writes: "The citation recognized that I had resisted great pressures on me and by so doing had avoided even more serious consequences for the Agency."

Traditionally, the Defense intelligence voice has been ndependent and made policymakers at least hesitate ɔefore bending intelligence reports to fit policy objectives. This independence has been trimmed, however, by repeated reorganizations. Now military officers are concerned that the latest changes will silence the military voice entirely.



The National Security Council, headed by the President, plays a day-to-day role in intelligence activities under new White House and congressional guidelines.

The restraints are already tight. Dr. James Schlesinger, while Defense Secretary, was unable to get the CIA to clear space satellite photos for a congressional committee. He had to order U-2 spy plane flights so Congress could get photos of Soviet missiles in Somalia.

Military officers are studying whether, under the latest guidelines, a Defense Secretary would have the same authority.

Says one source: "In most cases, it is politics rather than national security that causes an intelligence report to be kept secret."

Saving Federal Dollars

The manpower cuts in the intelligence community have been explained as a normal process following a buildup for the war in Southeast Asia. But CIA veterans say privately that that explanation is misleading, that the agency shifted personnel without raising total levels significantly, that there really was no buildup for the war, and that the cutbacks are at the sacrifice of essential and sometimes critical intelligence activities.

In the military services, the situation is different. During the war, there was a heavy demand for tactical intelligence that stripped other intelligence functions of trained operatives.

Military men saw their jobs eliminated after the crisis, and were transferred to other duties. Defense civilians were retired or dismissed in annual budget cuts to levels far below those before the war began.

The real push behind the manpower cuts is the ever-growing cost of satellites, photography, and electronic sensors, combined with the demand of budget officers from the White House to cut spending.

Most intelligence organizations, as a result, have cut manpower ceilings fifty percent or more from pre-Vietnam War years.

Top intelligence officials, with some exceptions, say the constant trimming has caused the quality of intelligence to deteriorate. Says one veteran intelligence official: "There is a growing notion that you can get along

The SR-71 reconnaissance plane remains a key collector of intelligence for Air Force and other agencies.

without spies and that space satellites can take care of all intelligence collection."

The growth of intelligence from machines has caused more than budget problems, however. Because the cost of collecting photos is so enormous, the results cannot be neglected. So as intelligence agencies pour more people into processing them, they have fewer agents for other intelligence gathering. According to one source: "Much of the critical intelligence from other sources has been neglected in recent years. US intelligence has come to rely on what it can count, and has disregarded much of the intelligence that cannot be measured."

Most of the extensive gadgetry is in the Defense budget, which has resulted in a deceiving increase in military spending for intelligence. The increase, say military officers, has gone directly to buy and operate machinery, while manpower cuts have continued.

Within the Defense Department is the National Reconnaissance Office (NRO), which has the mission of coordinating reconnaissance conducted by spy satellites and the SR-71 reconnaissance plane, the successor to the U-2.

The Air Force runs the NRO, spending almost a quarter of the nation's entire intelligence budget. Another big bite of the intelligence budget goes to the National Security Agency for electronic intelligence, including foreign military radio, microwave, telex, and telephone traffic. NSA is responsible for listening posts around the world, and also uses ships and aircraft for its collection of electronic intelligence.

The focus on machines has raised criticism. Retired Army Lt. Gen. Daniel Graham, former DIA chief and a one-time top assistant in the CIA, says: "In staring at the results of technical intelligence, we lost sight of the total picture, which includes military doctrine and strategy; I include myself in this criticism."

General Graham, while retired, was a member of "Team B," part of an intelligence exercise in which a team of nongovernment foreign affairs experts examined available intelligence and came up with a different, more pessimistic conclusion about the Soviet Union's military trends from that of the government's "Team A."

Graham says there might be enough agents to go around if the CIA stopped duplicating the efforts of the Defense Department and concentrated its activities on the analysis of nonmilitary intelligence.

The CIA's expansion into military intelligence, brought about partly by satellite photography, has been a source of embarrassment. In one CIA paper on a country's aircraft strength, it was noted that forty planes were in Iran and speculated that they must be there either for maneuvers or on some form of loan to the Iranian government. This caused some concern in government circles until an investigation revealed that the CIA paper itself was based on a military paper that used a standard military abbreviation, IRAN, for Inspection and Repair As Necessary. When the error was discovered, the CIA ordered all copies of the report destroyed.

Though money and missions long have been a problem to the intelligence community, morale is the principal concern today. The public abuse, combined with a steady stream of dismissals, has brought the intelligence community, particularly the CIA, to a new low. This has led a surprising number of veteran intelligence officers to conclude that some members of the US intelligence community may become susceptible to recruitment by the Soviet Union.

One former top official says: "I once never thought about the danger of a CIA agent becoming a double agent. Now, because of the treatment they have received, I wouldn't be surprised."

Jack Maury, a former top CIA official, is more optimistic: "It is remarkable that over the past quarter century there have been well over 50,000 employees of the CIA and of that number only three or four . . . for reasons of pride, profit, or treachery have seen fit to reveal information, with the result and apparent purpose of seriously endangering the effectiveness of the CIA."

Power Struggles

The civilian and military intelligence services have long battled. But in the past the struggle was focused on intelligence estimates. Now, the frequent changes of intelligence chiefs and the manpower cuts in the intelligence community have caused the battle for money, missions, and influence to escalate to the point where morale and the quality of intelligence has been affected.

Admiral Turner is the subject of most of the complaints, both from civilian and military intelligence officers. Says one CIA veteran: "Turner's firings have caused us to lose continuity, one of the most important factors in dealing with agents."

One top military officer says: "The manner of the firings was absolutely inexcusable and could not have been done more badly. He is letting good men go that other agencies would be glad to have, if they had the money to hire them."

In the face of these criticisms, Admiral Turner still seems a victor in the bureaucracy battle. He is conceded to be the most influential director in the history of the CIA. Says one official: "He meets with the President one and two times a week, more than any previous director."

Tomorrow's Intelligence

Despite the current turbulence, there are some trends that point to improved intelligence.

Intelligence, at an increasing rate, is being declassified and converted into everyday language so that more people, particularly in military units, can understand and use it. More overseas military commands, for example, now are given daily reports on the movement of antiaircraft launchers and other selected weapons in the Soviet Union.

Improvements are being made in satellites, photography, and electronic sensors. Computers, already used extensively in Stateside headquarters, are now being used more and more at overseas bases.

But there are also many signs that disturb intelligence experts. The move to centralize intelligence under the direction of one man, Admiral Turner, upsets many who fear one intelligence voice increases the chances for error and miscalculation.

The danger of intelligence being used for political purposes is greater with the rise of the CIA over the military intelligence organizations.

The intelligence community has been losing senior, experienced analysts at an alarming rate, before replacements can be trained.

Overall, there have been continued manpower cuts since the Vietnam War, while the volume of intelligence requests has increased dramatically.

For veteran intelligence officers, there is no question that US intelligence has been hurt, or that it must be strengthened. General Walters speaks for many in his memoirs:

"Our position of strength in the world is changing, not necessarily for the better. This calls for more vigilance on our part than ever before." ■

Air Force Intelligence—Shrinking in Size

The Air Force Intelligence Service, like the rest of the nation's intelligence organizations, has seen its strength cut sharply in recent years.

Maj. Gen. James L. Brown, USAF Assistant Chief of Staff/Intelligence and Commander of the Air Force Intelligence Service (AFIS), today heads a force of 13,500. This total is forty-one percent smaller than the 23,000 officers, enlisted personnel, and civilians who were in AFIS as recently as 1970.

AFIS experienced a ten percent cut in manpower in 1972. This year it will complete a further reduction of twenty-five percent spread over four years.

Even with the cuts, however, the Air Force remains at the forefront of the nation's intelligence-gathering activities. Air Force personnel direct satellites, reconnaissance planes, and listening posts around the world.

Approximately sixty percent of AFIS personnel are overseas. A major concentration of intelligence people is at USAFE Headquarters at Ramstein AB, Germany. From this headquarters, Air Force intelligence operatives are sent throughout Europe. In the Pacific, significant numbers of intelligence personnel are controlled from PACAF Headquarters at Hickam AFB, Hawaii, and subordinate commands in Korea and Japan.

About ten percent of the total Air Force Intelligence Service is located in Washington, D. C., assigned to the Defense Intelligence Agency, the National Security Agency, or the US Air Force Intelligence Headquarters. The remainder are assigned to air bases across the US or on special assignment in the US or abroad.

Despite a cutback in manpower, Air Force officials say the opportunities for men and women are excellent in the Intelligence Service. Much of what AFIS employees do involves top-secret sensors that can measure nuclear explosions, detect missile launches, and even count troops on the march at night. Employed are the latest techniques in satellites, aircraft, pilotless aircraft, photography, and electronic monitoring. Human agents, less conspicuous, are also used.

Air Force intelligence specialists assigned to air units brief and debrief aircrews. Experts in Russian and other languages translate and analyze foreign publications, documents, and intercepted foreign communications. Teams of specialists translate and interpret photos, radar prints, and other technical data into reports that can be read and understood by policymakers. Engineers and other technical experts search foreign defenses and weapons for weaknesses and vulnerabilities. Analysts compile intelligence from the Air Force and the nation's other intelligence organizations for special studies and comprehensive assessments on aviation, space, and foreign targets.

Though seldom brought to public notice, the Air Force Intelligence Service has produced some of the nation's most respected intelligence officers. Veterans of the Intelligence Service include Air Force Lt. Gen. Eugene F. Tighe, Jr., a career intelligence officer who was USAF's Intelligence Chief from January to September 1977 and is presently Director of the Defense Intelligence Agency.

Another veteran, Maj. Gen. George J. Keegan, Air Force Assistant Chief of Staff for Intelligence from 1972 to 1976, is credited with a number of intelligence achievements. Studies under his direction proved conclusively the intercontinental range of the Soviet Backfire bomber, in the face of now-discredited arguments from other intelligence organizations. General Keegan, now retired, also sponsored a massive study of the Soviet Union's civil defenses. In 1973, he initiated a series of translations of significant Soviet military writings under the title, *Soviet Military Thought,* that are widely used by colleges and universities throughout the US as well as in foreign countries.

The present director of the Intelligence Service, General Brown, is a twenty-year veteran of intelligence assignments. He was appointed in September 1977.

A description of the Intelligence Service's responsibilities is provided on p. 96.

Planning in a World of Change

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

WHEN the Air Force was made a separate service in 1947, the event was hailed as the beginning of an era. Gone were the barnstormers, the "seat-of-the-pants" daredevils, who made the leather helmet and silk scarf their trademark. Also gone were their rickety aircraft—the chewing gum and baling wire variety—that seemed to defy every physical law in getting off the ground.

World War II had ushered in an avalanche of "change." The year 1947 was merely the official concession to a process that later brought faster-than-sound jet aircraft, intercontinental missiles, huge transports, and the varied use of computers. The transition has not been altogether easy. But the Air Force is strong today because "change" has been anticipated and dealt with.

Today, in 1978, we still face the swirling—and, in some cases, unsettling—impact of change. We in the Air Force are not unique, of course. Change is epidemic throughout our nation and the world. But we do have one exacting difference. Our reaction to change will help determine the vitality and strength of our nation's security.

In shouldering our share of that security mission, we must, of course, focus attention on Air Force issues. But we do not operate in a vacuum. To understand the changes taking place within, we must consider the forces operating in the world at large.

Clearly the most dynamic force in world politics since 1973 has been the competition for resources—especially for Middle East oil. Already the Middle East exports vast quantities of oil to Europe, Japan, and the United States. Obviously, any extended interruption of Persian Gulf oil would be catastrophic for the free world.

Secretary Stetson: ". . . an emphasis on technology . . . and a premium on capable, dedicated people."

In other closely aligned areas requiring our attention, the Soviet Union has risen to a military posture equal to our own and has become more bold in the use of its increased power and influence. Since achieving parity, the Soviets have given no sign of relaxing their efforts and seem to be striving for military superiority.

The number of independent states has risen 300 percent since 1947 and the clamor for attention, identity, and a greater share of the world's resources has intensified.

Political terrorism has become a potent and elusive force.

Here at home, inflation continues to be a formidable problem. Unemployment is easing but by no means eliminated from the scene. We have transitioned from an unpopular war to a somewhat uncertain peace.

It is against that backdrop of international and domestic "change" that we grapple with other alterations that directly affect the Air Force. Largely because of tight financial resources, we have reduced our force in recent years in terms of people and equipment. We have opted for quality instead of quantity. Today we have the smallest Air Force in many years, but rising costs continue to be of great concern. For example, operations and maintenance expenses have increased since 1968 even though we have reduced the number of aircraft in the force and cut our flying hour program. Even the drop in manpower since 1964 has been more than balanced by increases in the "cost-per-person."

We have taken a number of positive steps to combat these trends. We have reduced our headquarters and support staffs, made organizational realignments, and transferred the savings to our combat units. We are well on our way toward reaching the goal of twenty-six fully manned and equipped tactical fighter wings. We have given greater responsibilities and more modern equipment to our Reserve components. In short, we have sought and found ways to preserve combat capabilities despite the reductions of previous years.

Today, after that period of reduction and adjustment, there is reason for a somewhat more optimistic outlook. President Carter has publicly supported a three percent real growth in annual defense spending and demonstrated that support with his Fiscal Year 1979 budget request. There is concern in the Congress and with the general public over the growing Soviet threat and our vulnerabilities in a number of areas, particularly raw materials.

However, to gain the fullest effect of what appears to be growing support for a stronger defense posture, the Air Force has a continuing obligation to conserve, manage wisely,

innovate, and increase its adaptability. The changes that await are not totally unpredictable. There will be some familiar, fundamental requirements: the need for readiness, an emphasis on technology and modernization, and a premium on capable, dedicated people. If we deal wisely with the "known," we will be much better prepared for the "unknown."

Formula for Readiness

Readiness will continue to underpin our efforts because, in its broadest sense, readiness includes elements of all that we do. In an age when reaction time can be measured in minutes and seconds, readiness is —and will be—the determining factor.

Part of the readiness formula involves the application of resources. With a restrained budget and fewer people and weapon systems, we cannot afford waste or misuse. For this reason, realistic training methods have become even more essential. Red Flag, a continuing program conducted at Nellis AFB, Nev., provides training for our aircrews in an intensive combat environment against simulated enemy forces. A similar activity, Blue Flag, conducted at Eglin AFB, Fla., trains battlestaff decision-makers in realistic, tactical warfare situations. Project Checkmate, at the Pentagon, permits assessment of our capabilities and strategies from the simulated viewpoint of Soviet commanders.

Of course, we must do far more than train—and we are doing so. We are placing special emphasis on command and control, including the Airborne Warning and Control System that will greatly multiply the effectiveness of our tactical resources. We are hardening a number of our key European facilities—particularly command centers and munitions storage areas. Most importantly, and probably most elusive, we are striving to close the gap on standardization and interoperability with our NATO allies. The more duplication we can eliminate, the more effective our combined forces will be. Our goals involve the common capability of refueling and rearming any aircraft in the alliance; expanded cooperation in research, development, and acquisition; a common family of munitions; and compatible training, doctrine, tactics, and communications.

Of course, training and force posture are only part of the equation. Readiness is a process, a progression. And it is here that the reality of change takes its biggest toll. What is sufficient at one point in time may be disastrously inadequate in the future. Therefore, we must balance the present and the future. That means planning for tomorrow's Air Force while being ready to fight with what we have today. Our responsibilities are really twofold. On the one hand, we must wisely manage the development and use of today's systems in meeting the current threat. At the same time, we must devote a portion of today's attention and resources in preparation for tomorrow's dangers. For this reason, modernization and technology are necessary allies for preserving readiness in a world of flux and change.

Secretary of the Air Force John C. Stetson served as a Navy communications officer during World War II. A graduate of MIT, with a bachelor's degree in aeronautical engineering, Mr. Stetson worked with the management consulting firm of Booz, Allen, and Hamilton from 1951 to 1965. Later named a partner of the firm, Mr. Stetson was responsible for a number of assignments with aircraft companies. He then became president of the Houston Post Co., and, in 1970, president of A. B. Dick Co., a manufacturer and international distributor of business machines. In 1977, he was appointed USAF's twelfth Secretary.

The Modernization Continuum

Particularly during the last two years, we have made progress in arresting the aging trend caused by diminished procurement in previous years. The F-15 and A-10 have begun to enter the active-duty inventory and will provide vastly improved air-superiority and close air support. The F-16, when operational, will complement the F-15 and together they will equal anything the Soviets can muster in the foreseeable future.

In the strategic area, the air-launched cruise missile (ALCM) and the MX advanced intercontinental ballistic missile are prime concerns. Since the B-1 program has been discontinued, the ALCM program is even more significant. The MX, now in advanced development, combines an improved missile with a number of possible basing modes as an option for maintaining a balanced, survivable strategic triad in the mid-1980s.

Other strategic programs involve the study of several manned penetrating bomber alternatives, including an improved FB-111 that would incorporate several technology items from the B-1. Together with improvements to our existing B-52 manned bomber force as well as our Minuteman missiles, these initiatives can balance to a great extent the Soviet advances.

Even in the area of fuel consumption, we are doing our share to minimize the nation's dependency on imported oil. In addition to a very significant conservation program, we have successfully extracted and test-flown jet fuel made from shale oil. The Air Force will continue to encourage and take part in the development of this new technology.

However, current systems and technology offer only temporary assurances. Technology feeds on technology. The history of airpower clearly demonstrates that point. We have come a long way from wood

and fabric wings to super plastic forming and diffusion bonding of titanium. The hand-dropped, line-of-sight munitions of World War I are a far cry from today's laser and electro-optically guided standoff weapons.

Yet the most profound changes in weaponry remain in the future. We are on the verge of developing aircraft and missiles capable of altering their shapes under flight loads through the use of new composite materials. We may soon have powerplants that can literally reconfigure themselves as speeds and loads change. Future aircraft may be able to change their flight paths without banked turns or sideslip—shifting up or down, side-to-side using "thrust vectoring in forward flight." The NAVSTAR Global Positioning System, already in the validation phase, will determine the position of land, sea, and air objects in three dimensions, within five to ten meters, anywhere in the world.

The Key Element—People

Still, hardware presents only one side of the picture. There is a "people" side, and the changes have been no less dramatic. Today's young airmen are much different than their 1947 counterparts. They are far more sophisticated and better educated—thinkers, planners, and improvisers. They are more inquisitive, more capable of independent thought and action, and more likely to be team players when the objective is clear and the methods sound. In our demanding, technically oriented Air Force, an "airman" is quite often a woman, a minority member, or both.

In the "people" realm, as in other areas, we must anticipate and keep pace with change. Recruiting has become a much more difficult task and likely to be more demanding in the future. According to one projection, the number of eighteen-year-old men in our society will drop some fifteen percent by 1985 and twenty-five percent by 1992. At the same time, our economy is becoming more technically oriented and the demand for technically competent people is increasing. Obviously, the complex systems of today and tomorrow are of little value if we cannot attract qualified people.

Part of the answer is to emphasize the recruiting of women. Another approach is to continue attracting minority members. We are doing both. Since 1972, the percentage of women has tripled, the ratio of black officers has doubled, and the percentage of enlisted minorities is representative of our society.

Another answer is to further emphasize positions of substance and merit that enable people to grow, progress, and realize their potential. We are doing this in many ways: opening new career fields to women, emphasizing equal opportunity and treatment, offering technical training and professional education.

At the same time, we cannot forget more basic issues—such as a compensation package sufficient to retain and attract the people we need. The military profession requires, and hopefully inspires, a unique level of dedication, sacrifice, and selflessness. In the final analysis, a man or woman cannot be properly compensated—at least in monetary terms—for defending his or her country. National service must come from a sense of patriotism. Yet Air Force people deserve to be properly compensated—to be free from financial worry and the continued erosion of benefits.

Changes in military compensation have been widely discussed in Congress, by the President's Commission on Military Compensation, and by the media that serve military audiences. The proposals and counterproposals are in many cases taken out of context. And the result has often led to confusion and unnecessary anxiety. One point is obvious: We need stability in this important area so that our people do not have to live with uncertainty and apprehension.

Although the Commission on Military Compensation has submitted its recommendations to the President, the compensation issue remains open. A great deal of thought and deliberation—by the President and Congress—will take place before final decisions are reached. In my discussions with Congress and with the President's Commission, I have stressed a number of factors that must be considered along with any change in military compensation. In my opinion, any new system should be consistent with our current personnel management program and enable us to attract and retain a sufficient number of qualified and motivated people. It must also keep faith with those who have already committed themselves to military careers. In short, any change must be fair, just, and responsive to the needs of both military people and the nation.

After my first year as Secretary, it is apparent that past Air Force planners have dealt successfully with the problem of change. They have provided the wherewithal—the systems, the training, the people—to meet today's requirements.

Yet "change"—unless we are strong, flexible, and resolute—can be the mortal enemy of readiness. Strength that is adequate today may quickly become inadequate as international and domestic forces shape and alter world events. One aspect of national security is abundantly clear: We either grow, innovate, modernize . . . or we diminish. We have a demanding job ahead of us—managing today's resources and fashioning and providing the force of the future. It must be powerful but realistic, comprehensive but flexible, sophisticated but affordable.

I believe we have people who are equal to that task. Together, we can successfully grow to meet a changing world. ■

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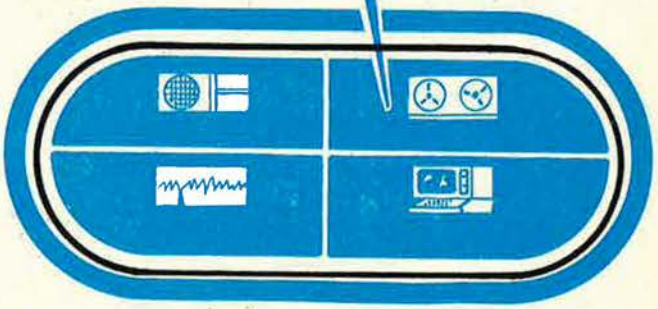

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USAF Character Is Unchanged

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

IN THE past four years, AIR FORCE Magazine has given me many opportunities to speak out from this forum. I'm grateful to the AFA, the editors, and the readers for the coverage and the reception my views have received. AIR FORCE Magazine has been an important link between senior leadership and the rest of the Air Force family, as well as a window between the Air Force and the public. Straight talk is the heart of good communication, and this journal is one of the best in the business.

The majority of my previous articles have emphasized our challenges, our structure, and our goals. Among the dominant themes in recent years have been modernization, readiness, trends in the military balance, and public understanding of the threat. In essence, the focus has been on the Air Force's "body" (the bone, sinew, and muscle of our combat capability) and its environment (the international arena in which that capability serves our nation's interests).

To be sure, emphasis on these subjects is appropriate, for those are the lines where we lay our yardsticks to measure progress and risk.

In last year's Almanac Issue, however, I departed somewhat from this trend and devoted my remarks to a broad survey of our most important asset: our people. In this, my last message as Chief of Staff to the readers of AIR FORCE Magazine, I'd like to carry the theme one step further to indulge in a little institutional introspection. I want to shift the focus still further from the Air Force's *outer* strength and probe more deeply its *inner* vitality: the values, attributes, and standards that guide and stabilize our profession.

If, as is said, the past is a prologue to the future, then there ought to be some lessons in our background which we can apply to guide us in the uncertain days ahead.

General Jones: ". . . Air Force interests [must] remain . . . in harmony with national interests. . . ."

As I reflect on a career spanning more than thirty-five years, I am struck, on the one hand, by the panorama of soaring technology, roller-coaster shifts in military prestige, and galloping social change in every corner of our society. We have moved from the prop and piston era to the space age, from the euphoric military dismantling after World War II to the massive and delicate superpower balance of today.

If there's a lesson here, it is that the rate of change is accelerating and we can expect even more dramatic changes in our future world.

On the other hand, I look back upon the body of professional values which, running like a rugged main spar through wings flexing in heavy turbulence, have cushioned the buffeting and helped us hold a steady course. Not that these values have been static or rigid, for they have evolved as our society has matured. But they have been refined in such a way as to preserve intact the basic character of the Air Force as an elite professional service.

In my view, the "real" Air Force is not the aircraft, missiles, and other hardware that most people think of when our service is mentioned. These are important but inanimate tools, the instruments with which our country entrusts us. The real Air Force is our people—men and women, active and Reserve, uniformed and civilian—living by an extraordinary set of standards and sacrifices, breathing life into the cold metal of our nation's arsenal.

These standards are the head and the heart of our business, its consciousness and it conscience. If the rapids of our future have as much white water as I foresee, the Air Force will need, more than ever, to preserve and protect the standards that have seen us so admirably through our surging "prologue." I'll offer a few thoughts on the ones I think are the keystones.

The "Prime Directive"

First and foremost, we must never lose sight of the fact that the Air Force—like all the branches of the armed forces—is a service organization. We believe in our nation's ideals, its system, its future. We belong to it and exist solely to participate in its defense. We guard the frontiers of opportunity and our values have to be rooted in that broader field.

In practical terms, this means that the question of what's good for the Air Force must always be answered in the context of what's best for the country.

In a hierarchical organization such as ours, this perspective is not always easy to maintain. For all the right reasons, the organizational pressures and incentives are geared to producing "support for Air Force interests"—usually expressed in terms of budget, doctrine, or weapon systems. But I believe the Air Force has done a remarkably good job of harmonizing institutional interests to the broader needs of national security.

Balance is the key. On the one hand, we can never afford to become uncritically and unalterably wedded to customary ways of doing business. We need to keep alive within the Air Force the broad vision and the pioneering spirit that first propelled man aloft and that have been our hallmark since before we became a separate service.

On the other hand, as professional airmen we have a unique perspective on the capabilities, employment, and interaction of aerospace forces. Our voice in these matters has to be clear and resolute. We can't afford to be too quick to abandon proven concepts, systems, and techniques or to embrace indiscriminately all the "revolutionary" solutions offered us in the marketplace; the stakes are too high and not every "new" idea is a good idea.

Ensuring that Air Force interests remain perpetually in harmony with national interests will continue to be an individual and collective trust through the years ahead.

Integrity

It is not enough for the military professional to know the threat and to announce it; our message must be heard, believed, and acted upon or we will have failed in our most important role. We must never lose the confidence, respect, and credibility that give our voice its ring of truth. It is this aspect of professional integrity that transcends all others.

Integrity is certainly not a uniquely military attribute, but the stakes are higher in our business than in almost any other. We must be right, we must be competent, we must admit our mistakes and correct them when they do occur, and, above all, we must never permit either the fact or the image of duplicity to taint our honor. The watchword must be, as always, "the truth, the whole truth, and nothing but the truth."

Leaders at all levels must also be sensitive to unnecessary assaults on the integrity of people working for them if they send the wrong "signals." We must set challenging goals, but not unrealistic or unattainable ones. If we ever try to make perfection the standard, we run the risk of creating artificial pressures for people to concentrate more on image than substance. The "look good syndrome" is the enemy of personal integrity and professional reliability.

Leadership

The need for decisive, compassionate leadership in the days ahead is too self-evident to require much elaboration. However, I would cite a couple of special demands on future leadership that might not appear so obvious. First, looking at the population and force structure trends, we can expect that about one out of seven American adult males will spend some time in uniform during his lifetime. An increasing number of women will be welcomed into our ranks in the years ahead as well. The Air Force leadership has an obligation to make sure that each man and woman who serves with us, no matter for how long, becomes a better person in the process.

Through our policies and management, our people should be motivated to develop an aggressive spirit for right, to form better personal habits, to improve self-discipline, to build a stronger sense of responsibility and a greater love of service for country—whether they remain in uniform or whether they return to civilian life.

It is not only in the *organization's* interest for leadership to promote these values among the people serving under them, but in the broader interest of *society* to return to the civilian world more mature, better educated, more responsible citizens than those who joined us.

The second great challenge for leadership—of all services—will be to preserve the essential institutional character of the military profession. Traditionally, military service in our society has combined many of the characteristics of both a profession and a vocation. However, the philosophical basis for many of the recommendations associated with the all-volunteer force threatens to displace the institutional values and substitute the values of the marketplace.

It will be up to senior leadership to seek for the services the most equitable possible compensation and social supports which, in combination, signal the institution's intent to "take care of its own." But commanders and supervisors at *every* level can help to reverse the trend toward the marketplace by the quality of leadership: set high standards and then set the example; make sure your people understand the importance of their work and how they contribute to the broader mission; and, above all, treat your people as professionals, not "employees."

Military leadership has always included, but always transcended, "management." This extra dimension, in which Air Force leaders have traditionally excelled, will become even more important in the days ahead.

Discipline

"The more things change, the more they stay the same." Some people claim to see a profound erosion in *standards* of discipline over the past few years. From my vantage point, I see only a change in the way discipline is *developed*. The bottom line hasn't changed: confidence that orders will be carried out faithfully and promptly.

When you stop to think about it, fear is probably the *least* effective tool for fostering the sort of discipline needed among a modern force of educated, technically oriented and trained people from a democratic society. It's one thing if a commander's only concern is narrow, unthinking compliance with narrow, uncomplicated instructions. But modern warfare has grown too complex for sole reliance on this essentially medieval foundation for military discipline.

The shift I see is an evolution from a norm of arbitrarily imposed authoritarianism to greater reliance on *self*-discipline. We have worked hard to substitute mutual respect and understanding of the mission for the old-style "do-it-because-I-say-so" philosophy.

Overall, we've made good progress both in the transition and in raising the standards of discipline in the Air Force, but we still have a way to go on both counts.

The sanctions are still there if needed, but our low rates of disciplinary action persuade me that they are being effectively employed by leadership as a backstop rather than as a club.

In view of the increasing complexity and technical sophistication of the modern battlefield, I'm convinced we've chosen the right path in en-

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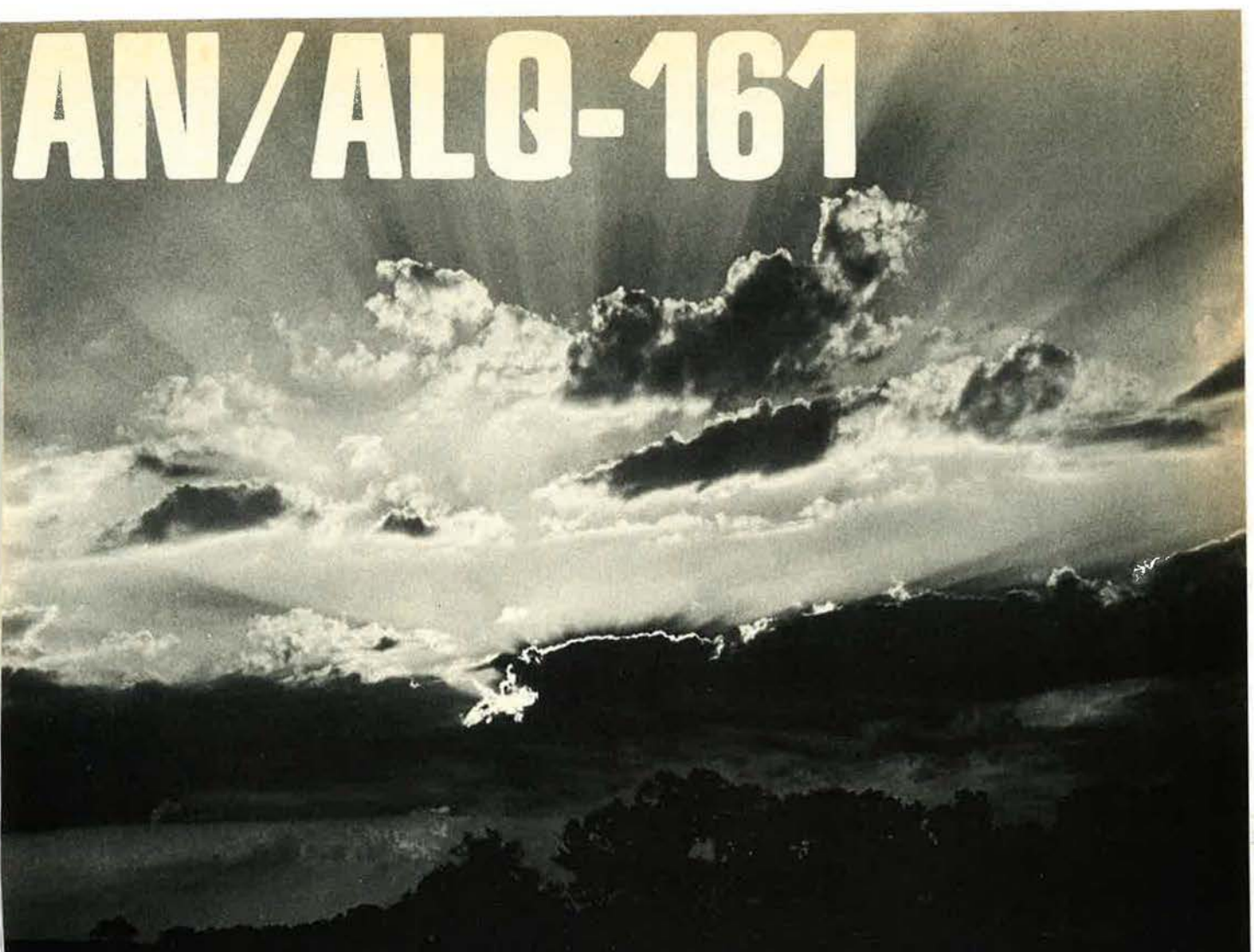
Gen. David C. Jones, a combat pilot during the Korean War, has held command positions in SAC, TAC, and ARRS. He served as DCS/Operations and Vice Commander of the Seventh Air Force in Vietnam during the war. After serving in a number of positions in Europe, including Commander in Chief of US Air Forces in Europe, General Jones became USAF's ninth Chief of Staff on July 1, 1974. In April this year, President Carter nominated him for appointment as Chairman of the Joint Chiefs of Staff.



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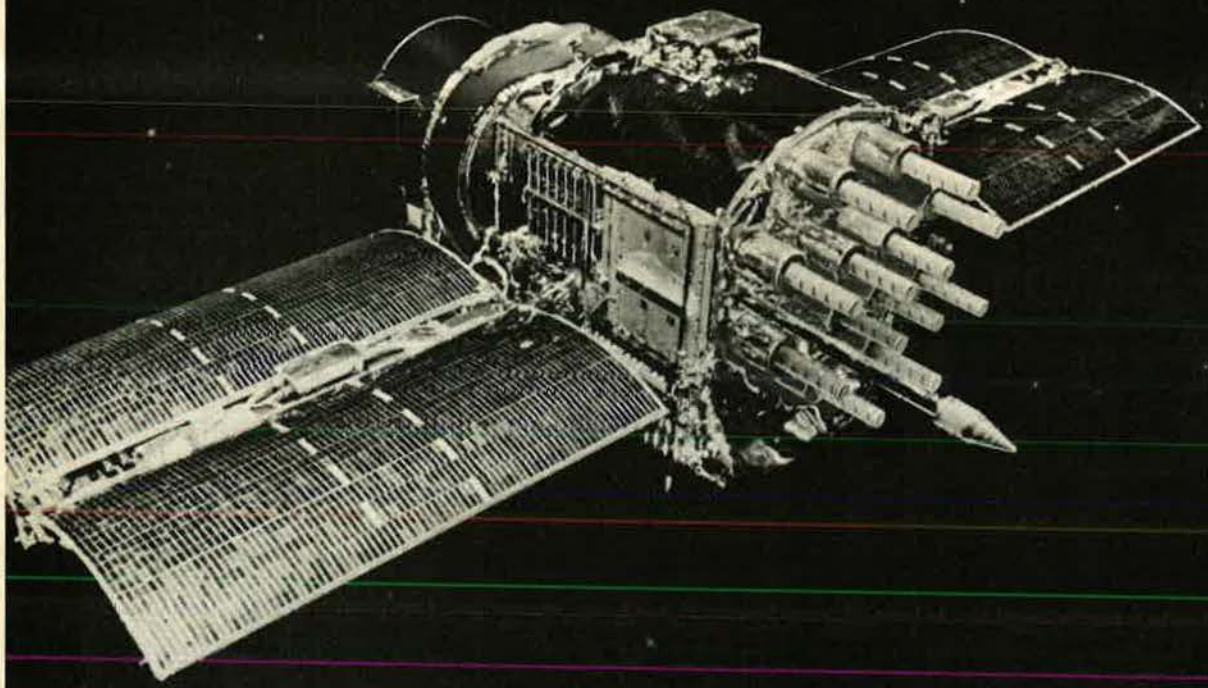

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gaging people's minds, not just their bodies, in our concept of discipline. Our peacetime management and our combat capability will be strong, more flexible, and more imaginative because of it.

Professionalism

This term, perhaps, best summarizes the essence of the other values I've mentioned . . . and some I haven't. Professionalism is a tough term to define precisely and I've always admired the analogy used by my good friend, Gen. Russ Dougherty, the retired former Commander in Chief of SAC.

As he used to characterize it, you're the shortstop on a team in the final game of the World Series; you're in the last of the ninth, one run ahead, and the other team is at bat. There are two outs, the bases are loaded, the pitcher has three and two on the opponent's best slugger, and as the pitcher begins his crucial windup, you breathe a prayer: "Lord, I know old Joe would love to strike him out. But if the batter hits that ball, Lord, please let him hit it to me." Now *that's* professionalism!

I'm proud that the Air Force is full of "shortstops" like that. Our men and women welcome and seek out the tough challenges. In my book, they're the most dedicated, honorable, well-disciplined—in short, the most professional—team in the history of this or any other Air Force.

Past as Prologue

When I took over as Chief of Staff nearly four years ago, I inherited responsibility for the best Air Force in the world, the legacy of strong leadership and loyal, committed service by a whole generation of America's sons and daughters. Soon I will pass to my successor that same legacy, enriched in substantial measure by your support and hard work during my stewardship.

As I was reflecting on our Air Force's capacity to face the many tough challenges ahead, I was reminded of an anecdote that many of you might have heard me tell before. But it is so apropos that I'd like to use it again to conclude my brief valedictory.

The story goes that General Eisenhower was being driven to a meeting in Washington shortly after World War II and, passing the National Archives Building downtown, he noticed the inscription carved over the stately entrance: "What Is Past Is Prologue."

He was struck by the profound significance of these few words and, turning to his driver, a young Army corporal, asked what meaning those words conveyed to him. The young corporal meditated solemnly for a moment, then brightened, turned to General Eisenhower and said, "General, I guess that means, 'You ain't seen nothing yet.' "

That spirit captures exactly my pride and optimism for the future of the US Air Force. The values we have nurtured and nourished have served the Air Force and the nation proudly in the past, in peace and war. We stand second to none in strength, dedication, and professionalism.

Despite the many security threats clouding our nation's horizon, so long as we keep alive and well the professional values that are our heritage and our hallmark, then "You ain't seen nothing yet."

I bid you a grateful farewell and Godspeed on that fateful and exciting mission into the future. Your country is as proud of you as I am. ■

Air Force Morale Resists Pressures

BY ROBERT D. GAYLOR, CHIEF MASTER SERGEANT OF THE AIR FORCE

IN THE eight months I have served as Chief Master Sergeant of the Air Force, I've visited more than fifty Air Force installations and talked with thousands of enlisted people of all ranks. One of the questions I'm asked most frequently by congressmen, generals, staff people, and concerned citizens is: "What is the state of morale and training in the Air Force?"

As we all know, the Air Force has fewer people today than it has had at any time since 1950 and a lot fewer combat aircraft than we had ten years ago. At the same time, the Air Force faces the greatest potential threat in the peacetime history of this country. That isn't good. But so far as morale and training are concerned, I can report that the Air Force is in good shape, manned by more than 560,000 talented, motivated, active-duty people. Add in another 150,000 Air National Guard and Air Force Reserve personnel and you have a total force capability that, in quality, is second to none. Our state of readiness and preparation is high and our weapon systems more sophisticated than ever before, if not more numerous. We did not "back in" to these successes; every move forward has been skillfully planned and programmed through strong leadership.

Chief Gaylor: ". . . so far as morale and training are concerned . . . the Air Force is in good shape. . . ."

Our recruiting standards ensure that we induct only those who can pass rigid mental, physical, and moral requirements. We want people who are dedicated to developing a skill that will contribute toward mission capability and fulfill their personal needs. It is obvious that our recruiters are doing a bang-up job of recruiting some of the finest young women and men available.

At Lackland AFB, Tex.—the Air Force Military Training Center—our new airmen receive their initial introduction to the Air Force way of life. If you were to visit the center, as I did recently, and observe the training and classification that goes on there, I think you'd agree that when our new airmen complete this initial six-week phase, they're ready for the next step.

The majority of these airmen receive technical training before their first permanent assignment; however, some proceed to their base on a direct duty assignment, ready to learn while they work.

Technical schools range in length from a few weeks to several months, depending on the skill to be learned. I have watched security policemen train at Camp Bullis, Tex.; visited a munitions loading training session at Lowry AFB, Colo.; toured aircraft maintenance schools at Chanute AFB, Ill.; and sat in an electronics session at Keesler AFB, Miss. You have to marvel at the ability of the instructors and the eagerness of our new airmen to participate and learn. Then the full-time training process ends. Now the final step: Put the skill to work.

Chief Master Sergeant of the Air Force Robert D. Gaylor this year completes thirty years of service, largely in the security police or as an AF instructor, with tours in Korea, Japan, Thailand, and numerous Stateside assignments. Chief Gaylor, an honor graduate of the SAC NCO Academy at Barksdale AFB, La., in 1972 established the USAF Command Management/Leadership Center in Europe. He was named the fifth Chief Master Sergeant of the Air Force in August 1977.

Are our airmen ready to go to work, capable of producing? The supervisors say "Yes." Of course, training must continue and close supervision is initially required, but the enlisted leaders tell me that, with few exceptions, positive attitude and desire to produce are evident. We're getting the job done with fewer people. The name of the game is quality —quality of people and quality of effort.

Our professional education programs are producing results that have exceeded our expectations. We have a five-phase program, each phase designed for a specific group, and each designed to pick up where the previous one left off. The program begins with leadership and management indoctrination for the newly promoted noncommissioned officer and progresses through the final phase for our more senior, experienced NCOs. The result: effective leaders, efficient managers.

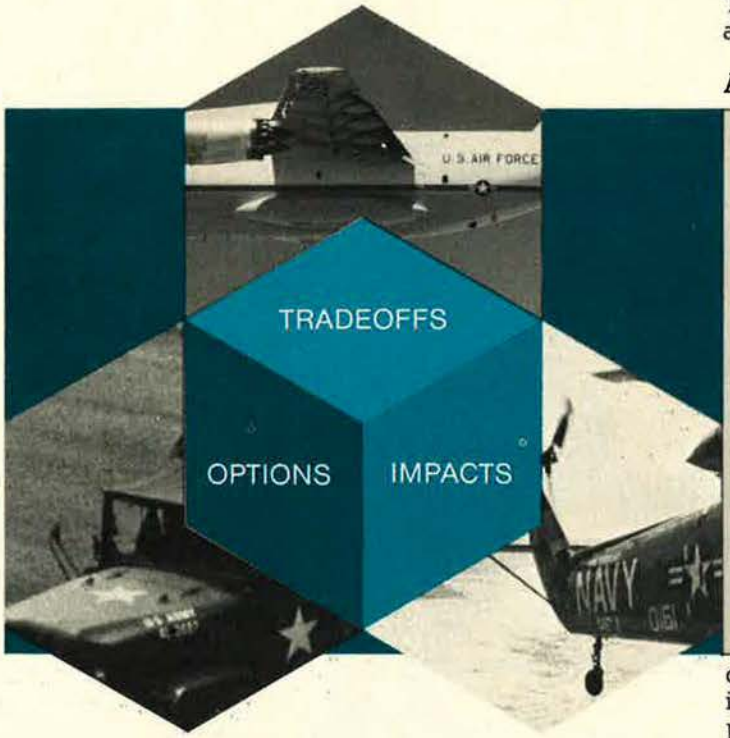
There will always be a need to reevaluate procedures and policies, but we have proved our ability to progress and improve. Our promotion systems and assignment programs are better now and we have made great strides in equal opportunity and eliminating barriers of prejudice. Now we must press on.

Now for the other side of the coin. In the general area of entitlements and benefits, there is a valid perception of loss. We have seen an erosion of some of the traditional opportunities provided a military person and the threat of additional loss is creating turbulence in the ranks. Many of our people are taking a "wait-and-see" attitude with regard to the recommendations of the President's Commission on Military Compensation. "What does the future look like?" is the number-one question asked by all enlisted ranks, disturbed by the proposed changes in retirement and other benefits.

Meanwhile, we are managing the Air Force budget in a very frugal and efficient manner in order to maintain a balance between necessary aerospace weapons and those expenditures associated with people. Our present philosophy is to spend our money where we get the most return in both areas. So far as the people-associated programs are concerned, improved and new dormitories and family quarters, hospitals, commissaries, child-care centers, and recreational facilities are just a few of the investments that will improve the quality of life for our people. These things are truly investments in the future, just as are the funds that go into the new and better weapons that we need.

After traveling around the Air Force for eight months, it's my judgment that morale and training are excellent and that our weapons for preserving the peace are being modernized as rapidly as appropriations will permit. Overall, the Air Force is in good shape, and that's mostly because of the trained, motivated people who have chosen to make the Air Force their way of life. ■

MANAGING THE COURSE OF CHANGE



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Additionally, ADCOM maintains a network of radars and a force of interceptors to protect US air sovereignty in peacetime and to provide a defense against enemy bomber attack. All of these forces are under the operational control of the North American Air Defense Command (NORAD). Air Force Gen. James E. Hill commands both NORAD and ADCOM.

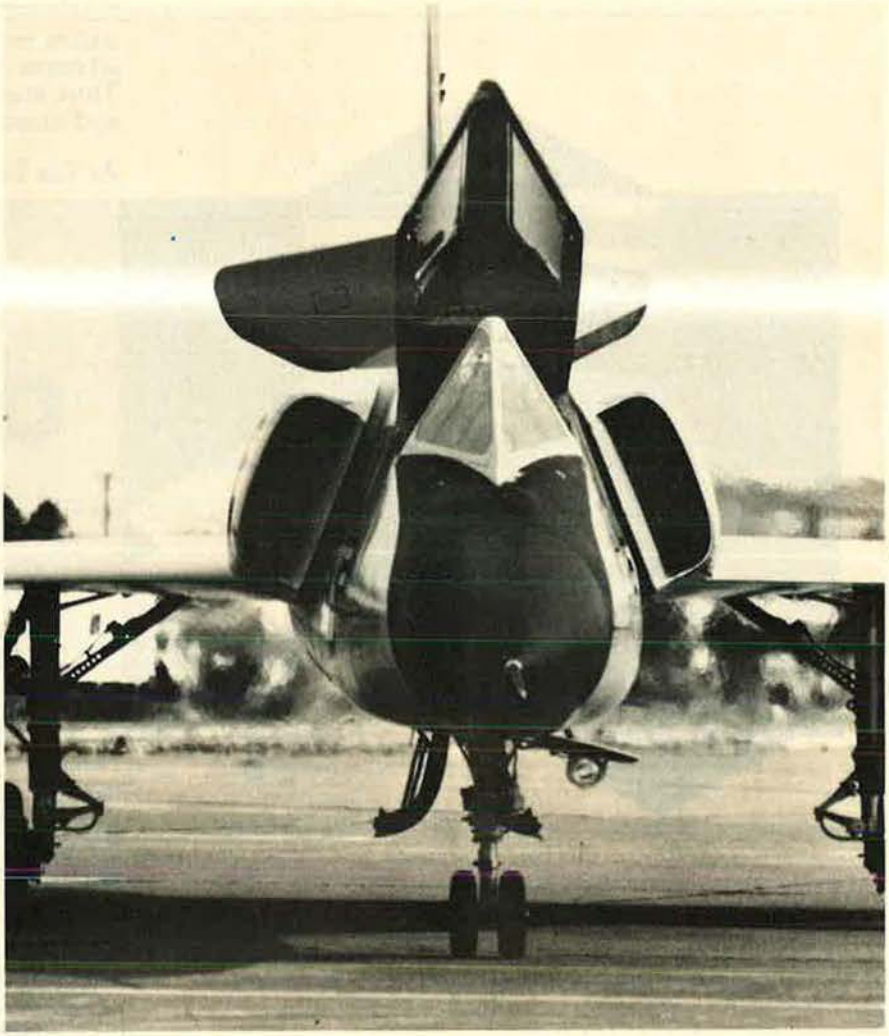
ADCOM has approximately 23,000 military and 4,200 civilians located around the world. Many are at remote stations, monitoring radars that guard against hostile ballistic missile launches and bomber penetrations, and track orbiting space objects.

ADCOM relies on a number of complementary systems to fulfill its space role.

The Spacetrack system currently consists of optical and radar sensors spread from Florida to Alaska in the United States, and from the Pacific to Europe overseas. The sensors include three-ton, ten-foot-high Baker-Nunn cameras equipped with telescopes that can photograph light reflected from a satellite the size of a basketball up to 20,000 miles in space.

ADCOM's newest space radar, Cobra Dane, became operational in July 1977. Perched at the southwestern tip of the Aleutians on Shemya Island, this large phased-array radar contains more than 15,000 active antenna elements and is capable of detecting and tracking objects 2,000 miles in space. The radar's primary role is to monitor Soviet missile tests launched into the Kamchatka Peninsula and North Pacific Ocean.

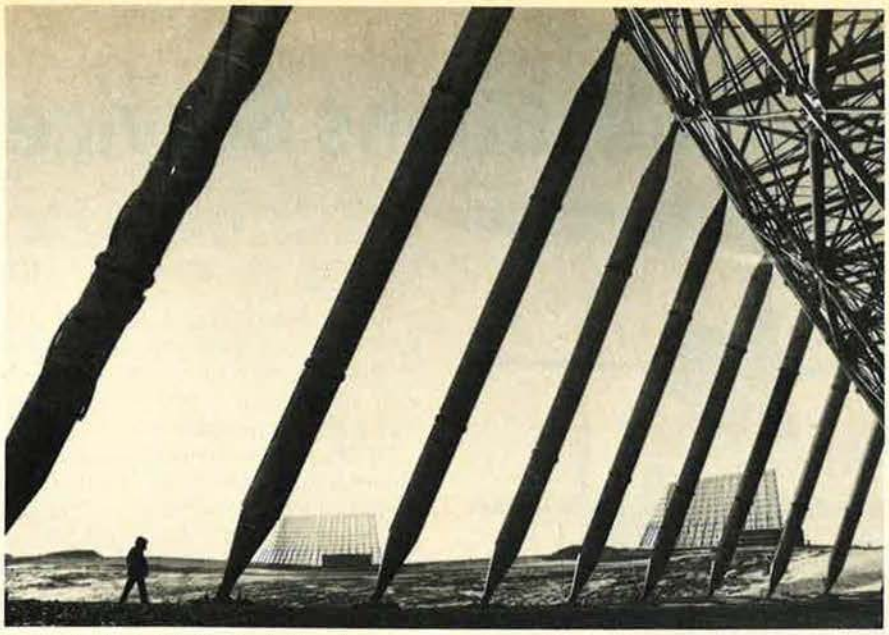
Other radars, although not part of Spacetrack, contribute data to the system. They include the huge radars of the Ballistic Missile Early Warning System (BMEWS) that cover the polar approaches, a phased-array radar located at Eglin AFB, Fla., and the long-range Perimeter Acquisition Radar, Attack Characterization System (PARCS), at Concrete, N. D. Added to ADCOM's inventory in 1977, the PARCS originally was one of the major components of the Army's



Developed in the 1950s, the Mach 2.3 F-106 is still an effective interceptor.

Gen. James E. Hill, CINC, Aerospace Defense Command.

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



These Ballistic Missile Early Warning System radars at Thule, Greenland, report data to ADCOM's Combat Operations Center at Colorado Springs.

Safeguard Ballistic Missile Defense System. The giant phased-array radar, with a range of 1,800 nautical miles, obtains information on reentry vehicles.

All objects tracked by Spacetrack and other sensors are fed into the Space Defense Center (SDC) located in ADCOM's Combat Operations Center deep inside Cheyenne Mountain near Colorado Springs, Colo. Some 20,000 observations of the tracked space objects are received and computer-processed daily by the SDC.

The Center maintains a computerized catalog of orbiting space objects, charts their present positions, plots future orbital paths, and forecasts when and where they will reenter the earth's atmosphere. In May 1977, the SDC tallied the 10,000th piece of man-made hardware in space.

A new Ground-Based Electro-Optical Deep Space Surveillance system is being tested as the forerunner of a proposed five-station worldwide network for nighttime surveillance of deep space. The system is designed to provide rapid and complete coverage up to a synchronous orbit of 20,000 nautical miles and beyond. Full operational capability is expected in the mid-1980s.

Also planned for the 1980s are two Pave Paws phased-array radars—one at Otis AFB, Mass., and the other at Beale AFB, Calif. Pave Paws will guard against a submarine-launched ballistic missile attack on the continental United States and will also support ADCOM's Spacetrack system by feeding into the SDC positional and velocity data of all earth satellites within the radars' range.

ADCOM also provides forces to defend the US against attack and to maintain sovereignty of US airspace. The command has six squadrons of F-106 Delta Dart fighter interceptors, augmented by six squadrons of F-106s, three F-101 Voodoo squadrons, and one F-4 squadron flown by the Air National Guard. One Air National Guard F-106 squadron will convert to F-4s during 1978. The Tactical Air Command contributes eight F-4 aircraft to the peacetime air-sovereignty mission and makes available additional aircraft during time of crisis.

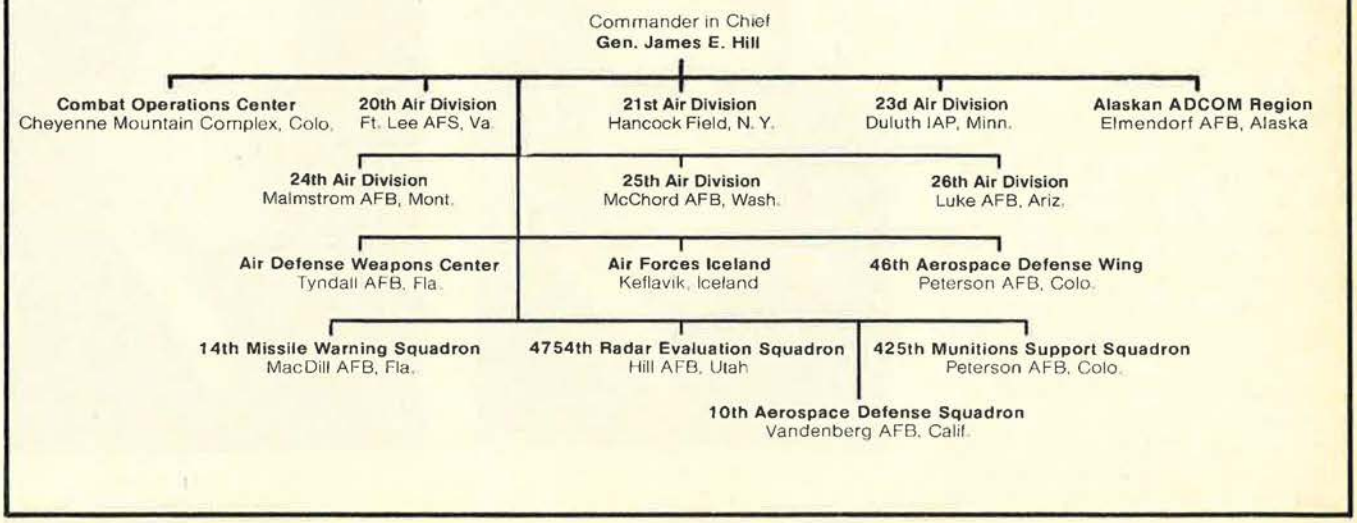
ADCOM supports one F-4 squadron for the Iceland Defense Force at Keflavik. It also provides aircrews to help man EC-121 early-warning aircraft for use in Iceland. Other aircraft operated by ADCOM include one regular Air Force and two Air National Guard squadrons of EB-57s.

Improvement in ADCOM's capability for early warning and assessment of hostile bomber attack will come when radars of the 3,000-mile-long Distant Early Warning (DEW) Line near the Arctic Circle are automated and deficiencies in low-altitude detection are corrected.

ADCOM and the Federal Aviation Administration continue to work on a joint network of radars around the nation's borders. ■

AEROSPACE DEFENSE COMMAND

Headquarters, Peterson AFB, Colo.



Air Force Communications Service

AFCS Navigational Aids Communications Office controllers keep the commander informed of significant developments and outages twenty-four hours a day.

On October 31, 1977, Maj. Gen. Robert E. Sadler became the ninth Commander of Air Force Communications Service (AFCS). The following day, the headquarters of the command was transferred from Richards-Gebaur AFB, Mo., to Scott AFB, Ill.

AFCS is responsible for engineering, installing, operating, and maintaining a worldwide system of base and long-haul communications, and air traffic control and navigational aid facilities and services for the Air Force and other governmental and civilian agencies. AFCS is the major contributor of all the military services in the Defense Communications System (DCS).

By the end of FY '78, AFCS will have about 45,000 people working at more than 400 locations in forty-nine of the fifty states and twenty-two foreign countries and island possessions. AFCS is the eighth largest organization in the Air Force.

The command operates through six major subordinate commands called communications areas and a number of smaller independent groups and squadrons as shown in the accompanying organization chart. Engineering and installation support is provided to Europe by Northern Communications Area and to Alaska by Southern Communications Area. The command operates entirely from the bases of other commands.

Below the headquarters level, most AFCS commanders wear two hats: they command AFCS organizations and also serve as communications-electronics staff officers in commands they serve. Northern Communications Area, Southern Communications Area, and the 1842d Electronics Engineering Group are exceptions to the "Dual Hat" rule.

AFCS organizations vary in size from small detachments, some with as few as one man, to large groups with more than 1,000 members at major Air Force bases.

AFCS units assumed ground maintenance responsibilities for the Air Weather Service in October. This action was a result of recommendations made by the USAF base management action group to integrate AWS ground maintenance functions within AFCS. Three basic actions were involved. AWS ground maintenance management was consolidated within AFCS maintenance management functions, intermediate maintenance shops were integrated with existing AFCS units wherever possible, and AWS organizational maintenance was consolidated with local AFCS maintenance functions. At those installations where no AFCS units existed, the organizational maintenance functions were established as an operating location of an AFCS unit.

Ground terminal maintenance of the Defense Meteorological Satellite Program was transferred to AFCS and is managed as a special project, as is the maintenance of the Space Environmental Support System.

Implementation of the Improved Emergency Message Automatic Transmission System was also com-

Maj. Gen. Robert E. Sadler, Commander, AFCS.

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

pleted during the year. The system, operated by the Joint Chiefs of Staff, supports the National Military Command System by providing a means for rapid composition, review, and release of emergency action messages by the JCS to the Single Integrated Operations Plan commanders.

An AFCS nominee, TSgt. Howard W. Bunton, was selected as one of the twelve Outstanding Airmen of the Air Force for 1977. The AFCS sergeant was honored at the Air Force Association Convention in September and also was commissioned an Air Force second lieutenant by Gen. David C. Jones during the convention.

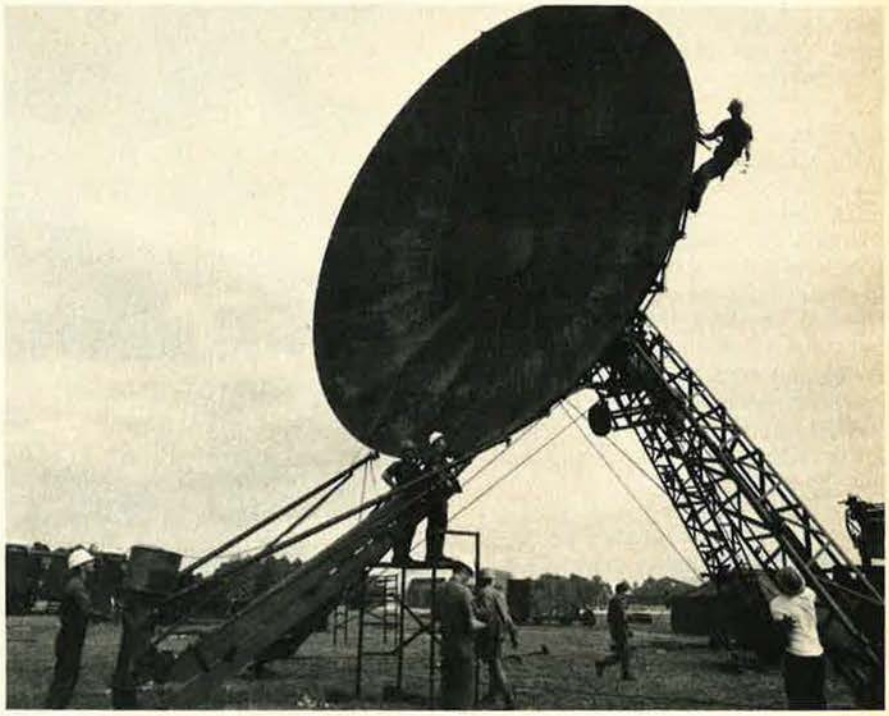
Eighty-two AFCS air traffic controllers were credited with saving fifty-nine aircraft and 397 crew members and passengers during 1977. Involved in the 1977 "saves" were twenty-four military and thirty-five civilian aircraft having a monetary value of more than $60.4 million. Since AFCS was activated in July 1961, air traffic controllers—operating at bases around the world—have been credited with saving 1,520 aircraft, worth more than $1.6 billion and carrying 5,789 military and civilian passengers.

AFCS is designated as Air Force lead command for the Defense Satellite Communications System (DSCS) ground terminals, and the single Air Force point of contact to plan, program, direct, and/or coordinate those activities associated with the installation of worldwide Air Force satellite terminals, associated communications subsystems, and their interfaces. In addition to managing the DSCS program, AFCS exercises tri-service management and control of the Tactical Satellite Communication System for the Joint Chiefs of Staff.

The USAF Military Affiliate Radio System (MARS), which is operated primarily by volunteer military and civilian radio operators and serves as an emergency backup communications system, is another AFCS responsibility.

AFCS is also responsible for training Air National Guard and Air Force Reserve personnel assigned to communications units. These units would, on mobilization, augment the active-duty communications units.

AFCS plays a major role in helping shape the Air Force's course of action, and continues to "Provide the Reins of Command." ■



AFCS combat communications units support war and contingency plans and provide temporary facilities for exercises, maneuvers, and special events.

AIR FORCE COMMUNICATIONS SERVICE

Headquarters, Scott AFB, Ill.

Commander
Maj. Gen. Robert E. Sadler

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

Air Force Logistics Command

The Air Force Logistics Command in 1977 looked to the future challenge of supporting new and complex weapon systems such as the F-15 and F-16, and maintaining more mature systems such as the B-52 and the F-106, both of which are into their third decade.

During 1977, AFLC's Acquisition Logistics Division (AFALD) continued its aggressive efforts to drive down the cost of owning and operating Air Force weapon systems. Increased attention to Life-Cycle Costing received major emphasis. AFALD participated in source selections for new systems, stressing the importance of long-term operating and support costs, and had prime responsibility for the Advanced Tanker Cargo Aircraft program, ensuring that support considerations will receive early high-level attention.

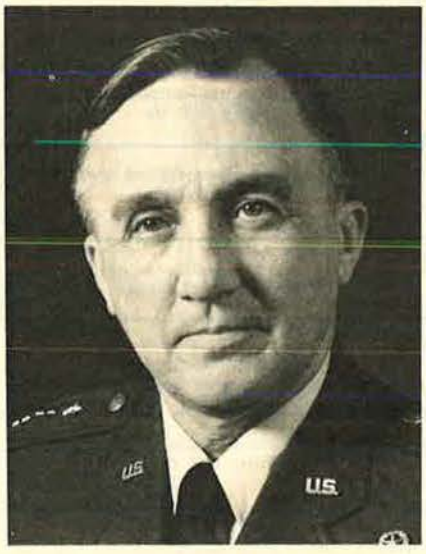
The command's prototype program to "stretch" the C-141 has met all of its objectives, ahead of schedule and under original cost estimates. A full production program for the stretch C-141 would give the Air Force the equivalent of ninety new aircraft, at one-fourth of today's cost.

AFLC also made progress in improving its physical facilities. Military Construction Program projects totaling more than $63 million were completed during the year. The command did design work on and awarded $36.9 million in Operations and Maintenance contracts, including family housing, and nonappropriated funds and industrial fund projects.

From 1972 through 1977, AFLC has invested $189 million in modernizing maintenance facilities and $160 million in replacing obsolete maintenance equipment. The total benefits of the maintenance modernization program are expected to reach $1.2 billion over the economic life of the investments. Maintenance activity during the year included programmed depot maintenance and significant modification of 1,602 aircraft. More than 4,100 engines were overhauled.

AFLC has begun to upgrade maintenance skills in its industrial-type activities through a program of maintenance certification. A pilot program was started at two Air Logistics Centers (ALC) in January for jet engine mechanics, testers, and inspectors; in March the command began to

An F-15 Eagle (top) in depot maintenance at Warner Robins Air Logistics Center, the system manager for this and several other USAF aircraft. In lower photo, AFLC employees at Sacramento Air Logistics Center do modification work on the A-10 close support aircraft, for which that Center is responsible.



Gen. Bryce Poe II, Commander, AFLC.

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

The San Antonio Air Logistics Center at Kelly AFB performs depot maintenance on bombers, fighters, and transports in this hangar—one of the largest in the Air Force. Some 3,000 civilian employees work here.

expand the program to many skill areas at all five ALCs.

The command's financial program in 1977 reached nearly $12 billion. The command's $6.1 billion appropriated budget was about twenty percent of the total Air Force budget. Stock and industrial fund money amounted to $5.2 billion, while AFLC also managed nearly $700 million of foreign countries' money to support their international logistics programs.

More than half a million procurement actions initiated by AFLC obligated some $4.6 billion. Small businesses received more than $600 million in contracts.

Continuing a high level of activity in international logistics, AFLC provided support to sixty-three foreign countries. The command had some $5 billion in active Foreign Military Sales cases, representing new and prior-year sales of goods and services to be delivered.

AFLC rid the Air Force of a lingering problem in 1977 when it successfully managed the disposal of 2,300,000 gallons of Herbicide Orange, a defoliant left over from the Vietnam War. The material was incinerated by a Dutch-owned ship off the coast of Johnston Island in the mid-Pacific, culminating a seven-year disposal effort.

In 1977, AFLC's work force included some 82,000 civilians and 9,000 military personnel carrying out its industrial-type operations through the seven centers shown in the accompanying organization chart and its activities at Wright-Patterson AFB, Ohio, where the command has its headquarters.

Each ALC is responsible for logistics support of specific weapon systems and equipment, the Military Aircraft Storage and Disposition Center stores surplus aircraft and returns them to the inventory if needed, and the Aerospace Guidance and Metrology Center repairs and calibrates inertial guidance and navigation systems and manages the Air Force's worldwide measurement and calibration program.

Gen. Bryce Poe II assumed command at AFLC on January 30, 1978, succeeding Gen. F. Michael Rogers, who retired after heading the organization since August 1975. ■

AIR FORCE LOGISTICS COMMAND

Headquarters, Wright-Patterson AFB, Ohio

Air Force Systems Command

The mission of Air Force Systems Command (AFSC) is to advance aerospace technology and to adapt it into logistically supportable, cost-effective aerospace systems. It is responsible for the design, construction, and purchase of weapons and military equipment for Air Force operational and support commands.

AFSC's budget for FY '78 was $10.1 billion, or approximately thirty-one percent of the total Air Force budget. Systems Command manages resources at nearly 200 installations throughout the United States and overseas that are valued at more than $2 billion.

The projected command manpower level for FY '78 is approximately 52,300, including 10,100 officers, 15,600 airmen, and 26,600 civilians.

Management initiatives, prompted by the fact that more than half the AFSC budget goes to acquiring weapon systems that are in the manufacturing stage, included: Quality 77, a study to identify problems and to propose improvements in quality assurance. Low-rate initial production was adopted, and a method designed to cut eighteen months from the acquisition cycle while reducing costs and increasing quality. A combined AFSC and Air Force Logistics Command Propulsion Systems Program Office was created to serve as a focal point to manage aircraft engines from "cradle to grave." A Product Engineering Services Office (PESO) was established to permit a cadre of skilled engineering and manufacturing personnel to assist in improving engineering, design, and procurement methods. A Systems Acquisition Manpower (SAM) model was developed to help Systems Program Office (SPO) managers describe their programs in such a way that manpower requirements for new programs can be identified more accurately.

The budget for manufacturing technology has been increasing yearly, with $50 million programmed by FY '82. The Air Force Materials Laboratory (AFML) at Wright-Patterson AFB, Ohio, manages this program. It is responsible for the development and application of new manufacturing technologies to solve weapons production problems.

Technological advances in 1977 included experimentally validated analytical models designed to predict the performance of swirl augmentators in jet engines. A major breakthrough in infrared spectroscopy permits measuring the intensity, wavelength, and time of occurrence of radiation produced by missile exhausts or high-altitude nuclear explosions, and identifying the source of that radiation. A triaxial accelerometer that provides accurate position information was launched on an Air Force satellite. An advanced environmental control system was developed to improve the reliability of aircraft and avionics equipment. A new fuze was developed to make 20-mm and 30-mm aircraft guns more effective against enemy aircraft and vehicles. Experimental glass composites were prepared that are compatible with polymeric laminates (plastic) and have the unique combination of high expansion, strength, hardness, and chemical durability.

The command is involved in more than 200 weapon systems programs that include such areas as avionics, space satellites, strategic and tactical aircraft, and intercontinental ballistic missiles.

The following were among AFSC's most significant program achievements in 1977:

- Research and development of the B-1 advanced strategic bomber program continued, using the four experimental models already built or being built. Tests during the year included the first live Short-Range Attack Missile (SRAM) launch at high altitude, in June, and a low-altitude, live SRAM launch in November. Fatigue testing of the tail section assembly was completed. Since the beginning of the flight-test program through the end of 1977, the three B-1s have flown more than 150 missions totaling 870 flight-test hours.
- In conjunction with cancellation of B-1 production, greater emphasis was placed on air-launched cruise missiles. AFSC requested $550 million through 1981 to expedite the program, and reorganized its management structure to mesh with the Joint Cruise Missile Program Office (JCMPO), under the lead of the Naval Air Systems Command in Washington, D. C.
- The ground-launched cruise missile (GLCM) program entered full-scale engineering development.
- The Secretary of Defense approved full production of the F-16 air combat fighter. Four more test aircraft were delivered to Edwards AFB, Calif., bringing the total to five.
- In July, the first operational squadron of A-10 close air support aircraft was activated. In August, six were deployed to Europe for exercises.
- Production of the F-15 Eagle air-superiority fighter continued on schedule. By the end of 1977, more than 250 had been delivered to four Tactical Air Command (TAC) wings

Gen. Alton D. Slay, Commander, AFSC.

CMSgt. Robert D. Harrison, Senior Enlisted Advisor, AFSC.

nd one USAFE wing. The first twenty-three Eagles for Europe were deployed nonstop from Langley AFB, Va., to Bitburg AB, Germany, in April.

• In late December, a $28 million contract was let to McDonnell Douglas Corp. for an expected buy of twenty wide-body transports as part of the Advanced Tanker Cargo Aircraft (ATCA) program.

• DoD's most important source of weather data is the Defense Meteorological Satellite Program (DMSP). A second Block 5D satellite was orbited in June, thus restoring coverage of the entire surface of the earth four times daily. The first was launched in 1976.

• The first satellite in the NavStar Global Positioning System, Navigation Technology Satellite II, was launched in June and successfully inserted into orbit.

• Approval was given in June to integrate the Space Shuttle Inertial Upper Stage (IUS) on the Titan III booster. The IUS is being developed as an upper stage for the Space Transportation System (Space Shuttle).

• Research continued on advanced ICBM technology (MX). Two basing concepts, buried trenches and hardened shelters, are being considered for more detailed study of costs and technical feasibility.

• Culminating nearly seven years of successful development work, the first operational E-3A Airborne Warning and Control aircraft was turned over to TAC in March 1977. AFSC has since delivered five more AWACS aircraft.

• In June, Offutt AFB, Neb., became the main base of operations for the first three E-4 Advanced Airborne Command Post aircraft, to be operated by SAC.

• Site preparation for the Pave Paws phased-array radar was completed at Otis AFB, Mass., and Beale AFB, Calif., and the construction of technical facilities was begun.

• Full-scale development of the Precision Location Strike System (PLSS) was approved in September.

• The cruciform version of the GBU-15 modular glide bomb completed a forty-three-launch test program in December. Testing the planar wing version began in July 1977.

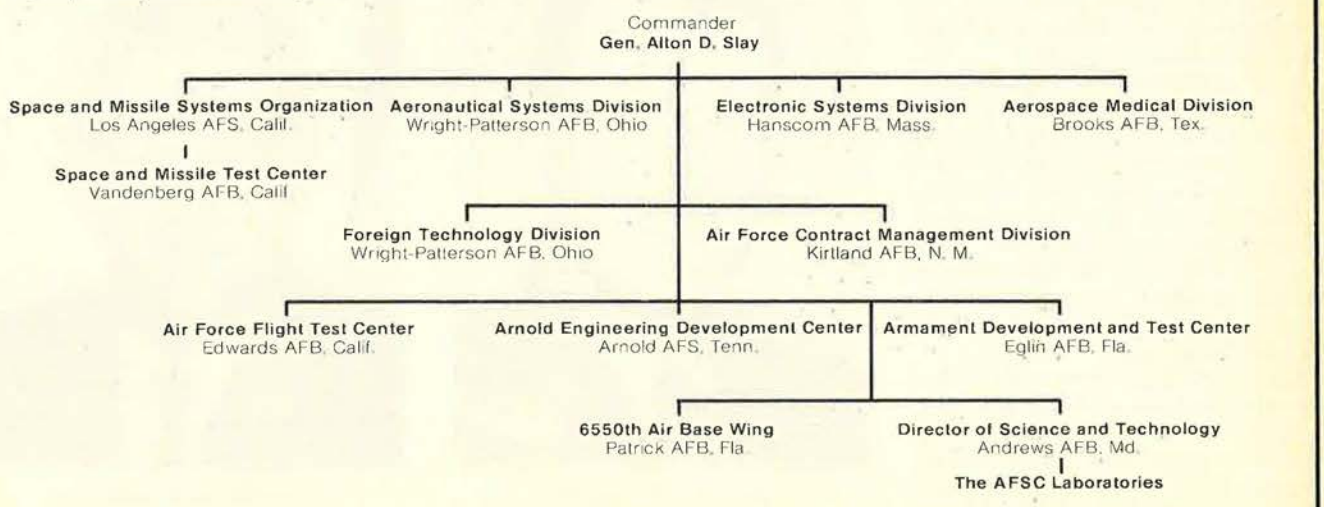
Foreign Military Sales (FMS) during 1977 (755 cases valued at $11.6 billion) made defenses of free world nations more reliable and credible. FMS benefits the American production base by generating jobs in the aerospace industry and offsetting development and import costs.

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

A B-52 undergoing cold-weather tests at AFSC's McKinley Climatic Laboratory, Eglin AFB, Fla., the world's largest environmental test chamber.

AIR FORCE SYSTEMS COMMAND

Headquarters, Andrews AFB, Md.



A MAJOR COMMAND

Air Training Command

The Air Training Command (ATC) recruits young Americans and teaches them the skills needed to assure the constant state of Air Force readiness so vital to national security.

At press time, the transfer of Air University (AU), Maxwell AFB, Ala., to ATC was scheduled to become effective on May 15, 1978. This consolidation in one command of AU's vast academic and training resources with those of ATC will ensure a continuing flow of men and women eminently qualifled for productive Air Force careers.

With a $1.6 billion operating budget, assets of more than $2.1 billion, 1,500-plus aircraft, and a work force in excess of 121,000, ATC is the free world's largest training-educational system.

From its headquarters at Randolph AFB, Tex., ATC manages fourteen bases in eight states, and eighty-five field training detachments (FTDs) and operating locations (OLs) worldwide. ATC instructors conducted approximately 2,600 resident and nonresident courses for some 152,000 personnel in 1977. The FTDs and OLs administered another 700 courses to around 126,000 students. Approximately 78,000 young men and women received basic training at Lackland AFB, Tex., and nearly 9,000 Air Force flying personnel were given land and water survival training.

Requirements for pilots and navigators were cut back in 1977, and DoD closed two of ATC's undergraduate pilot training bases.

Last spring, women were admitted to pilot and navigator training, and the first ten women pilots and five navigators in the history of the Air Force graduated in the fall.

T-37 simulators at Reese AFB, Tex., and Williams AFB, Ariz., improved the efficiency of pilot training while cutting costs. Training in the T-38 simulator began early this year.

Although ATC flew approximately nineteen percent of total USAF flying hours, it accounted for less than six percent of USAF aircraft accidents, for a flying safety record of 3.2 per 100,000 flying hours.

More than 4,000 airmen from fifty-five allied nations received ATC professional and technical training valued at more than $135 million. Close to 4,900 foreign students graduated from the Defense Language Institute-English Language Center at Lackland, and ninety-seven Saudi Arabian airmen completed the first phase of training under the Peace Start program.

Navigator student learning T-37 ropes at Mather AFB, Calif.

More than 1,000 NCOs graduated from the command's NCO Academy, and 9,000-plus junior NCOs completed Phase I–III of Professional Military Education.

In the technical training area, there was a move toward task-oriented training. Teaching students to do a specific job, getting them to "hands-on" training sooner, and to their first assignments quicker, increased efficiency while saving money. And pursuing an aggressive energy-conservation program, ATC opened the first solar-heated and -cooled exchange in the military at Randolph AFB last September.

Community College of the Air Force registrations mushroomed to nearly 70,000. In January 1977, CCAF was authorized by the Commissioner of Education, Department of Health, Education and Welfare, to award the associate in applied science degree to enlisted members of the Air Force, Air Force Reserve, and Air National Guard. By year's end, CCAF had awarded 1,367 degrees.

Air University provides professional military education (PME), graduate studies, and continuing career education for officers, NCOs, and civilians.

Professional military education is provided by the Air War College, Air Command and Staff College, and Squadron Officer School at Maxwell AFB, Ala., and the USAF Senior Non-

Gen. John W. Roberts, Commander, ATC.

CMSgt. Brian Bullen, Senior Enlisted Advisor, ATC.

commissioned Officer Academy at nearby Gunter AFS.

AU's Air Force Institute of Technology at Wright-Patterson AFB, Ohio, meets USAF graduate-level requirements in scientific, technological, managerial, and other designated professional areas.

The Air Force ROTC program, the largest single source of officers for the USAF, provides precommissioning education at the collegiate level and a Junior ROTC program at the high school level.

AU's Leadership and Management Development Center is the focal point for leadership and management education in the Air Force and offers both in-residence specialized continuing education programs and on-base consultation services.

Other important functions assigned to AU include: the Civil Air Patrol, the Academic Instructor and Foreign Officer School, the Extension Course Institute, the Logistics Management Center, the AU Library, and the Albert F. Simpson Historical Research Center. ■

MEETING THE RECRUITING CHALLENGE

Air Force Recruiting Service, headquartered at Randolph AFB, Tex., continued in 1977 to recruit the quality men and women needed to sustain the All-Volunteer Force. Brig. Gen. William P. Acker is Commander of Recruiting Service, and CMSgt. Joseph J. Kozusko is the senior enlisted advisor.

Air Force recruiters overcame a tough recruiting climate to sign up more than 75,000 people last year, including some 72,000 without prior military service, about 10,000 of them women. More than 1,500 health professionals were recruited, along with 1,100 former service members and 800 applicants for Officer Training School. All Air Force recruiting goals were met from October 1976 to September 1977 except for some of the health professions.

More than half of the enlistees without prior military service scored in the "above average" Department of Defense mental categories and 95.4 percent were high school graduates or had a General Education Development certificate.

More than 46,000 age-qualified leads were provided to recruiters in 1977 through the Air Force Recruiter Assistance Program (AFRAP), implemented Air Force-wide early last year. Under this program, Air Force members are urged to refer quality individuals to USAF recruiters for both enlisted and commissioning programs. Especially needed are leads on college graduates with scientific and engineering degrees, and physicians. One of the most important initiatives in the four-year history of All-Volunteer Force recruiting, AFRAP is expanding this year.

Since implementing the Recruiter Helper Program, a major part of AFRAP, some 5,000 first-term airmen have returned to their home towns to aid recruiters in telling other youths about the Air Force. Recruiter helpers were credited with 5,148 enlistments from 384,800 contacts. They also provided some 6,500 age-qualified prospects to Air Force recruiters.

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

AIR TRAINING COMMAND

Headquarters, Randolph AFB, Tex.

Commander
Gen. John W. Roberts

Technical Training Center
Lowry AFB, Colo.

3320th Correction and Rehabilitation Squadron

Technical Training Center
Chanute AFB, Ill.

Technical Training Center
Keesler AFB, Miss.

Undergraduate Pilot Training

Columbus AFB, Miss.
(14th Flying Training Wing)
Laughlin AFB, Tex.
(47th FTW)
Reese AFB, Tex.
(64th FTW)
Vance AFB, Okla.
(71st FTW)
Williams AFB, Ariz.
(82d FTW)
Sheppard AFB, Tex.*
(80th FTW)

Foreign Military Affairs Training Group

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

Technical Training Center
Sheppard AFB, Tex.

USAF School of Health Care Sciences

Air Force Military Training Center
Lackland AFB, Tex.

Basic Military Training School, USAF
USAF School of Applied Aerospace Sciences
USAF Occupational Measurement Center
Defense Language Institute—English Language Center**

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

San Antonio Procurement Center

557th Flying Training Squadron*
US Air Force Academy, Colo.

Community College of the Air Force
Lackland Training Annex
Lackland AFB, Tex.

Officer Training School, USAF
Lackland AFB, Tex.

Air University
Maxwell AFB, Ala.

Air War College
Air Command and Staff College
Squadron Officer School
Headquarters Civil Air Patrol—USAF
Senior NCO Academy
Air Force Institute of Technology
Air Force Reserve Officer Training Corps

3636th Combat Crew Training Wing*
(Survival)

Fairchild AFB, Wash.*
(Eielson AFB, Alaska)*
(Homestead AFB, Fla.)*
(Nellis AFB, Nev.)*

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.

*Tenant Unit

**DoD Executive Agent

A MAJOR COMMAND

Alaskan Air Command

One of AAC's principal missions is air defense. Here an AAC F-4E prepares to take off at Elmendorf AFB, Alaska.

The Alaskan Air Command provides early warning of an air attack on the US and Canada, guards the sovereignty of US airspace, and supports US ground forces in Alaska.

AAC mans three main bases, thirteen aircraft control and warning squadrons (AC&W), and two forward operating bases.

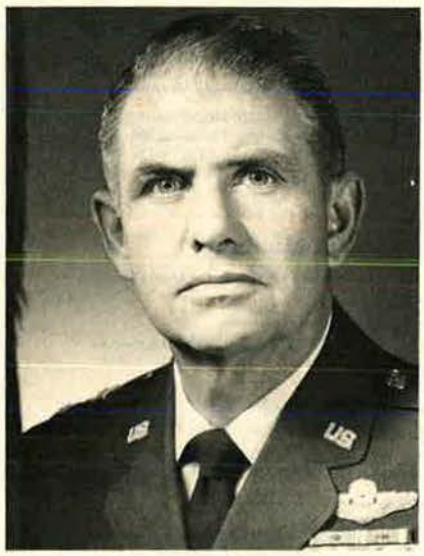
The command has a total of 8,800 personnel, including 800 officers, 6,600 airmen, and 1,400 civilian employees.

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

AAC's three main bases are Elmendorf AFB, bordering Anchorage; Eielson AFB, near Fairbanks; and Shemya AFB, near the tip of the Aleutian Islands chain. The AC&W squadrons are along the western coast or in the interior. Galena and King Salmon Airports are forward operating bases for fighter aircraft from Elmendorf. In addition, AAC provides administrative and logistic support for ADCOM units at Shemya AFB and at Clear AFS.

In November 1977, the 21st Composite Wing (21 COMPW) at Elmendorf was reorganized. The wing now has assigned to it all of the AC&W squadrons and the forward operating bases. In addition, an AC&W group, a tactical fighter group, and an additional tactical fighter squadron were formed and placed under the wing.

Both the 21 COMPW maintenance units at Elmendorf and the mainte-



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

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

Among AAC's many tenant units is Military Airlift Command's 17th Tactical Airlift Squadron, equipped with C-130Es.

nance units of the 5010th Combat Support Group at Eielson AFB have converted to the new Production Oriented Maintenance Organization (POMO) program. Eielson maintenance changed to POMO in January 1978. The Elmendorf units completed the reorganization in April 1978.

Elmendorf's 21 COMPW is the main flying arm of AAC. The wing's 43d Tactical Fighter Squadron was named the winner of the 1977 Hughes Trophy for Excellence in Air Defense. The wing's other squadron, the 18th Tactical Fighter Squadron, was activated in 1977. Both squadrons fly the F-4E Phantom. The wing also has a number of T-33 Shooting Star jets assigned to the 343d Tactical Fighter Group at Elmendorf.

Major tenants at Elmendorf include the 616th Military Airlift Group and its 17th Tactical Airlift Squadron, equipped with C-130Es; and the 71st Aerospace Rescue and Recovery Squadron, equipped with HC-130s and HH-3 helicopters.

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

A Joint Task Force (JTF), established by the Joint Chiefs of Staff for contingency/emergency operations, is formed each year for joint Arctic training exercises involving up to 25,000 active-duty, National Guard, and Reserve personnel from all the military services and the Coast Guard. It normally is headed by the AAC commander.

AAC also operates a Rescue Coordination Center (RCC) that uses aircraft and personnel of all the military services in the state, plus the Civil Air Patrol, the FAA, and civilian volunteers. During 1977, the RCC coordinated emergency assistance for 288 military and civilian persons in distress and saved 143 lives.

Members of the Alaskan Air Command not only serve on "America's last frontier," but on the "first frontier" for the defense of the North American continent. AAC personnel share in one common goal—providing "Top Cover for America." ■

Sgt. Kurt Hartman (left) and SSgt. Paul Arthur attach an identification tag to a moose at Elmendorf AFB.

ALASKAN AIR COMMAND

Headquarters, Elmendorf AFB, Alaska

A MAJOR COMMAND

Military Airlift Command

Flying these HH-53s and other fixed- and rotary-wing aircraft, MAC's Aerospace Rescue and Recovery Service has saved 18,000 people in the past thirty-one years.

In June of this year, the Military Airlift Command (MAC) celebrates thirty years of service to the nation. Originally called Military Air Transport Service (MATS), the command was reorganized and renamed in 1966, and in 1977 became the Air Force's third Specified Command, along with the Strategic Air Command and Aerospace Defense Command.

Shortly after the command was first organized, its people were deeply involved in the Berlin Airlift. From June 1948 to September 1949, aircrews flew 189,963 missions—most of them in C-47s and C-54s—airlifting supplies into the German city that had been blockaded by the USSR. Since that time, MAC has grown to a command with more than 88,000 active-duty people, and its principal aircraft are the more sophisticated C-130 Hercules, C-141 StarLifter, and C-5 Galaxy transports.

MAC now participates each year in approximately fifty joint training exercises, flies routine missions daily throughout the free world, and meets all special airlift requirements that arise. Among special airlift missions, MAC helped return survivors of the Tenerife air disaster from the Canary Islands in March 1977. The same month, and again in October, the remains of thirty-one US servicemen and one civilian killed in Southeast Asia were brought home aboard MAC aircraft. In June 1977, the first C-5 to land in the Soviet Union flew nonstop from Chicago to Moscow, carrying a forty-ton superconducting magnet for a joint US-Soviet magnetohydrodynamic electrical project.

A unique MAC unit, the 89th Military Airlift Group at Andrews AFB, Md., has the continuing special airlift mission of flying top government officials anywhere in the world.

As 1978 unfolded, MAC found itself hauling more than 1,000,000 pounds of snow-removal equipment and 500 troops to Toledo, Ohio. Two weeks later, MAC aircrews moved some 4,000,000 pounds of equipment and 1,000 troops into Boston, Mass., Providence, R. I., and Hartford, Conn., to help dig the Northeast out of its worst blizzard in years.

During all this, the C-141 passed the 5,000,000 flying-hour mark. The transport—delivered to MAC in 1965—is the first completely jet aircraft built to meet military troop and cargo standards.

Airlift is only part of the MAC story. The command also has three technical services that support USAF and the Department of Defense:

- The Aerospace Audio-Visual Service (AAVS) manages USAF's photographic and video products and services. Besides its primary mission of combat and other photo documentation, AAVS produces training and orientation films, and runs a large film library and photo depository.
- Air Weather Service supports the Air Force, Army, and various joint commands with global weather information. AWS personnel, flying aboard Aerospace Rescue and Recovery Service aircraft, provide tropical storm and special weather reconnaissance for satellite and missile launches. Over the years, AWS has also furnished Army forces with detailed combat weather information.
- Aerospace Rescue and Recovery Service, MAC's third technical service, has the principal mission of combat search and rescue. But search and rescue in peacetime—involving both military and civilian mishaps—is also an important role.

Gen. William C. Moore, Jr., CINC, Military Airlift Command.

CMSgt. Edward A. Henges, Senior Enlisted Advisor, MAC.

OPERATIONAL AIRCRAFT ASSIGNED TO MAC

TYPE	NUMBER
T/UH-1F	39
UH-1N	51
HH-1	11
C/HH-3	44
C/HH-53	32
C-5	77
C-9	23
T-39	108
C-12	2
C-130	276
HC-130	30
WC-130	14
C-135	11
C-137	5
C-140	11
C-141	271
TOTAL	1,005

ARRS operates the Air Force Rescue Coordination Center, the single federal agency coordinating search and rescue activities in the forty-eight contiguous states. In 1977, both active-duty and Reserve/Guard ARRS forces added 618 names to their save list, raising their thirty-one-year total to more than 18,000. ARRS personnel fly C-130 and C-135 aircraft and three types of helicopters—HH-1s, HH-3s, and HH-53s.

Medical airlift is another key ele-

Right, loading snow-removal equipment aboard a MAC C-141 for airlift to Boston during 1978 blizzard. Below, a forty-ton superconducting magnet is unloaded from a C-5 at Moscow's Sheremetyevo Airport for a joint US-Soviet project.

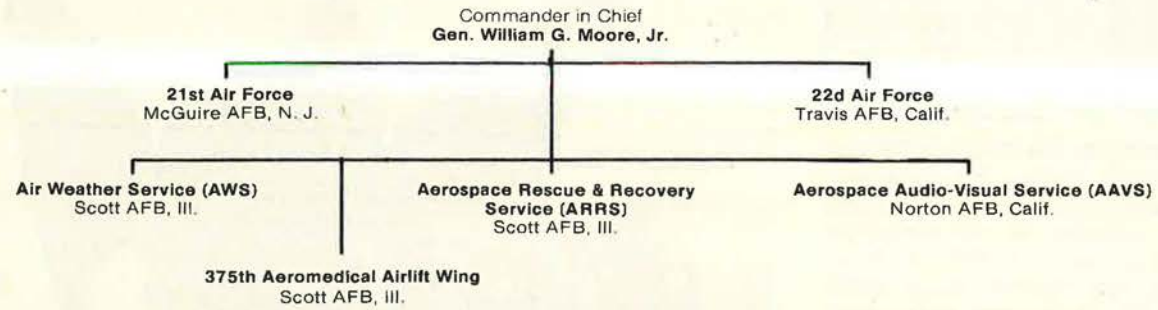
ment in MAC's worldwide mission. Crews from the 375th Aeromedical Airlift Wing attended more than 57,000 patients aboard C-9 Nightingale, C-141 StarLifter, and C-130 Hercules aircraft. Besides US areas, these aircraft fly "air-evac" missions in the European and Pacific theaters as well.

MAC relies primarily on the commercial airlines for passenger airlift. Civil carriers also provide some cargo airlift and those that participate in daily peacetime business with the Department of Defense are members of the Civil Reserve Air Fleet (CRAF). This is a twenty-six-year partnership between the military and the civil air industry which provides a greater capability to our airlift force when augmentation is needed.

The Army Air Line of Communications (ALOC) to Europe, supported by MAC long-range aircraft, was established after a recent successful test program. The ALOC enables the Army to reduce overseas inventories of critical repair parts and improves supply management and equipment availability. ■

MILITARY AIRLIFT COMMAND

Headquarters, Scott AFB, Ill.



TWENTY-FIRST AIR FORCE (MAC)

Headquarters, McGuire AFB, N. J.

TWENTY-SECOND AIR FORCE (MAC)

Headquarters, Travis AFB, Calif.

We'll keep the AV-8B one jump ahead.

The AV-8B Advanced Harrier now being developed by McDonnell Douglas is designed to fulfil the U.S. Marine Corps' requirement through the 1990's for a high performance, light attack V/STOL aircraft.

The Advanced Harrier will be capable of twice the range/payload of today's AV-8A.

Again, Rolls-Royce has been chosen to supply the power – the vectored thrust Pegasus turbofan.

After 15 years' V/STOL experience, this engine has proved an outstanding success as a highly dependable power unit, offering optimum take-off performance and cruising efficiency.

Like every Rolls-Royce engine, the Pegasus is backed by a tradition of proved gas turbine technology, unbeaten reliability and a worldwide product support reputation.

That's why Rolls-Royce power:

- drives Concorde at twice the speed of sound and takes more than 10,000 of the world's civil and military aircraft into the air.
- propels gas turbine warships in 24 of the world's navies.
- provides the power for oil and gas industries in 14 major countries from drilling in the North Sea to pumping across Alaskan wastes.
- generates over 5,000 megawatts of electricity worldwide supplying anything from the small industrial installation to entire cities.

Unrivalled experience in gas turbine design and development has made Rolls-Royce one of the world's principal suppliers of power with the resources to meet the demands of both today's world and tomorrow's.

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Rolls-Royce Inc., 375 Park Avenue, New York, N.Y. 10022

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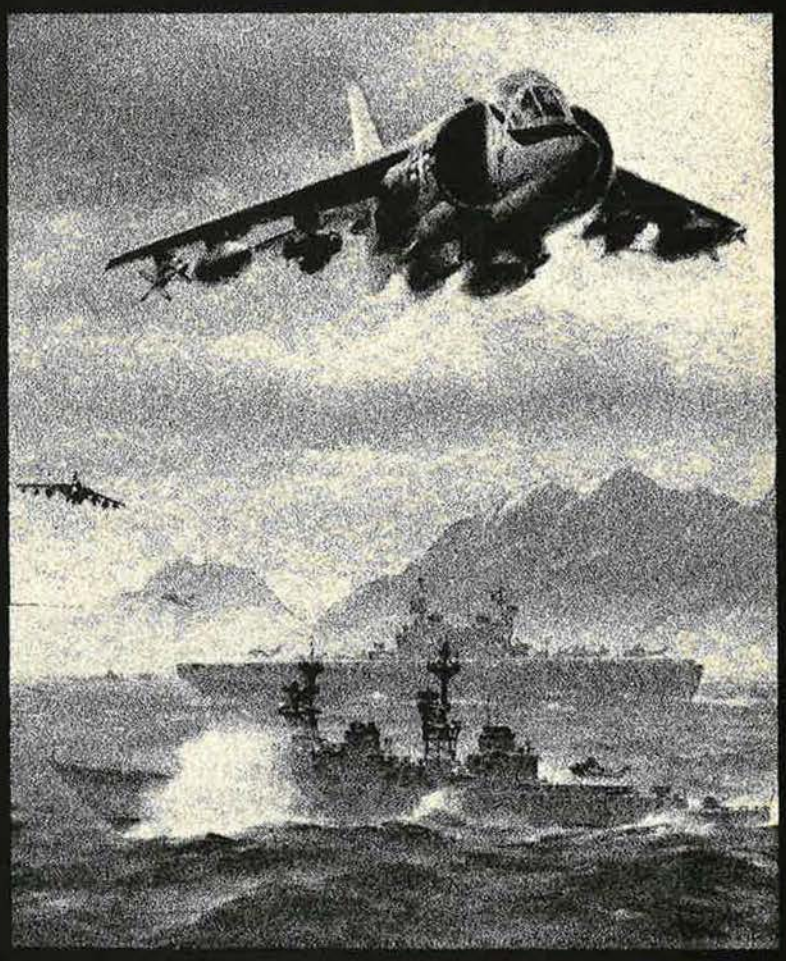
ROLLS



ROYCE

A MAJOR COMMAND

Pacific Air Forces

Pacific Air Forces (PACAF), headquartered at Hickam Air Force Base, Hawaii, is the USAF component of the unified Pacific Command (PACOM). PACAF's area of responsibility encompasses more than 102,000,000 square miles (nearly fifty-three percent of the earth's surface) and includes some 2,000,000,000 people, who live under more than thirty-five flags.

Lt. Gen. James A. Hill, the Commander in Chief (CINCPACAF), has responsibilities to both the Commander in Chief, Pacific Command (CINCPAC), and to the USAF Chief of Staff. As CINCPAC's principal air advisor, General Hill is responsible for air defense of the PACOM from land areas. His assigned and supporting units can provide the entire spectrum of tactical and special air operations. Other PACAF responsibilities include military assistance to air forces of friendly nations and support for other USAF commands operating in the PACOM.

As a USAF major air commander, CINCPACAF commands more than 33,000 operational and support personnel stationed at bases and facilities principally located in Japan/Okinawa, Korea, Philippines, Taiwan, and Hawaii.

The keys to combat readiness are quality personnel who are well-trained and combat-ready, and good equipment. PACAF has been reequipping with later versions of the F-4 Phantom II and has a wide variety of reconnaissance, Wild Weasel, air superiority, and close air support versions of that aircraft.

A variety of forward air control (FAC), tactical airlift, and other aircraft are assigned throughout the Pacific and provide support for PACAF's many peacetime and wartime roles. In addition, PACAF's 326th Air Division at Wheeler AFB, Hawaii, exercises operational control of F-4C interceptor alert forces belonging to the Hawaii ANG.

Recently, the 26th Tactical Fighter Training Squadron, located at Clark AB, Philippines, received new F-5E fighters. The squadron, using the tactics of a potential enemy force, trains PACAF aircrews in Dissimilar Air Combat Tactics.

In mid-1976, PACAF initiated a combat-readiness program tailored to the unique characteristics of an Asian scenario. Using air-to-air and air-to-ground ranges near Clark AB, the training program is called Cope Thunder. It involves all of PACAF's forces and has integrated US Navy, Marine, Army, and Philippine Air Force units into a large-scale tactical air combat exercise. At times Tactical Air Command (TAC) aircrews and aircraft also participate. With sophisticated threat simulators, Cope Thunder provides an extraordinary opportunity for combat crews to obtain "realistic" combat experience.

An F-5 for PACAF's Aggressor Training Squadron arrives at Clark AB.

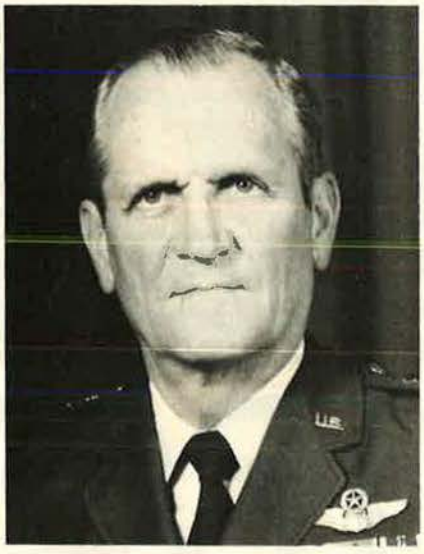
Last year, PACAF units participated in more than 100 uniservice, joint service, and combined exercises with the military forces of a number of our Pacific allies. The largest of these, Team Spirit, involved some 6,000 air sorties during the two-week exercise in Korea.

Other initiatives to improve PACAF's readiness include Quick Turn and POMO.

Quick Turn, used in training missions, is designed to refuel, rearm, and relaunch aircraft within thirty minutes or less. It also permits better scheduling and maintenance in peacetime air operations.

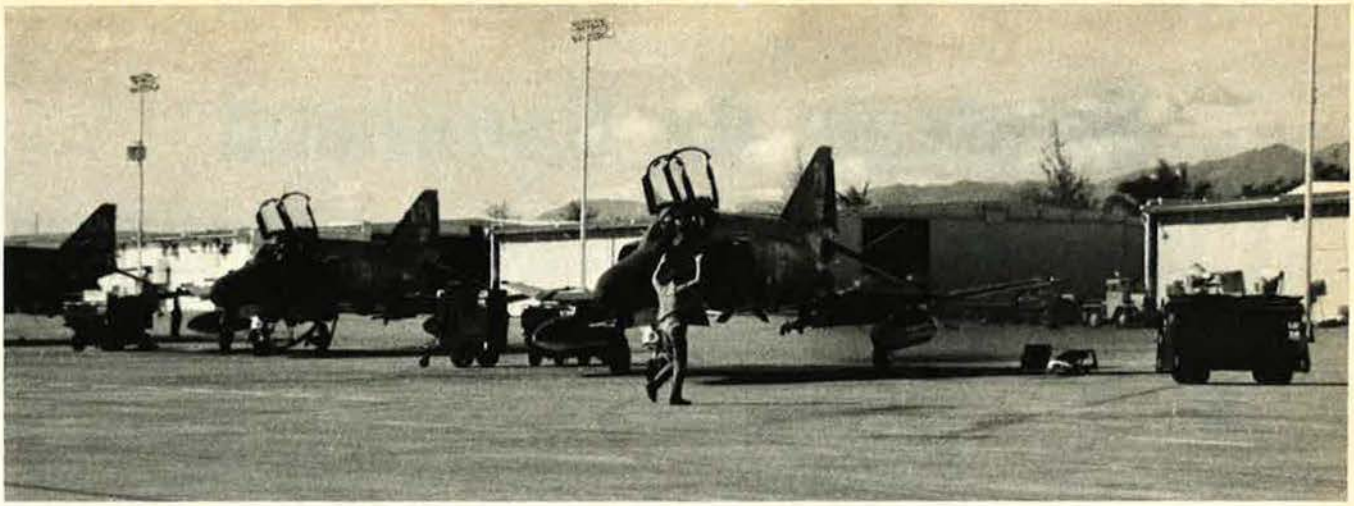
POMO—Production Oriented Maintenance Organization—reorganizes the maintenance work force into on-aircraft and off-aircraft production groups. On-aircraft work is performed by Aircraft Generation Squadron (AGS) personnel while off-aircraft work (component repair) is done by Equipment Maintenance Squadron (EMS), Component Repair Squadron (CRS), or Centralized Intermediate Repair Facility (CIRF) personnel.

Another program, called Centralized Intermediate Logistics Concept (CILC) was instituted at Kadena Air Base at Okinawa, with the creation of a Consolidated Intermediate Repair Facility (CIRF). Under the CILC program,



Lt. Gen. James A. Hill, CINC, Pacific Air Forces.

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



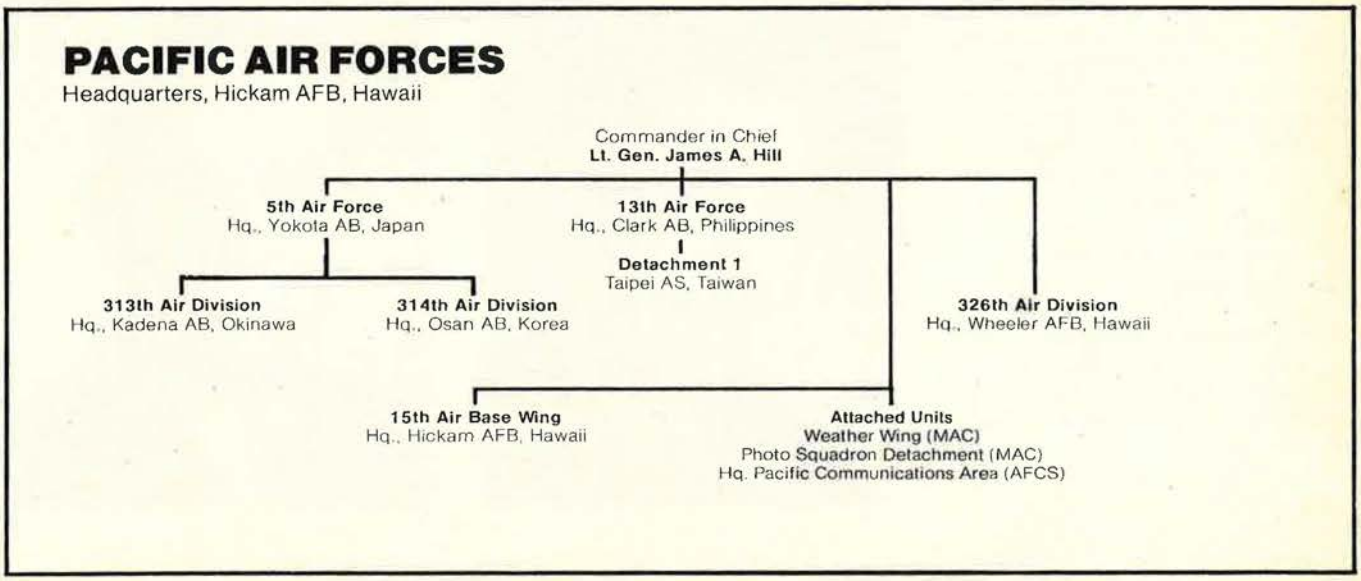
F-4Es of the 3d Tactical Fighter Wing at Clark AB, P. I., prepare for a training mission in the Western Pacific.

most off-aircraft intermediate-level maintenance for PACAF's fleet of F-4s is performed at the CIRF. In addition, all jet engine intermediate maintenance for J79 engines is performed at the CIRF. This allows a centralization of scarce specialists and technicians at a behind-the-lines facility which enhances cost-effectiveness and combat survivability.

Many other initiatives have been and will be instituted within this dynamic command as PACAF's dedicated personnel improve and maintain the mobility, flexibility, and capability to respond to a wide spectrum of contingencies in this vast and crucial geographic area. ■

THE MAJOR OPERATIONAL UNITS OF PACIFIC AIR FORCES (PACAF)

UNIT	LOCATION	AIRCRAFT
15th Air Base Wing	Hickam AFB, Hawaii	EC-135, T-33, F-4 (ANG)
326th Air Base Division	Wheeler AFB, Hawaii	O-2
FIFTH AIR FORCE HQ., YOKOTA AB, JAPAN		
8th Tactical Fighter Wing	Kunsan AB, Korea	F-4
18th Tactical Fighter Wing	Kadena AB, Okinawa	F-4, RF-4, MC-130, T-39
51st Composite Wing (Tactical)	Osan AB, Korea	F-4, OV-10
313th Air Division	Kadena AB, Okinawa	
314th Air Division	Osan AB, Korea	
475th Air Base Wing	Yokota AB, Japan	T-39, UH-1
THIRTEENTH AIR FORCE HQ., CLARK AB, PHILIPPINES		
3d Tactical Fighter Wing	Clark AB, Philippines	F-4, F-5, T-38, T-39, T-33



A MAJOR COMMAND

Strategic Air Command

One of SAC's fleet of KC-135 tankers prepares to refuel an FB-111 medium-range bomber. This photograph was taken from the cockpit of another FB-111, awaiting its turn to take on a load of fuel.

Strategic Air Command was brought into being in 1946 for one primary purpose—to be so ready and able to fight that war, particularly nuclear war, would not be forced upon the United States.

Today, beyond its central mission, SAC is charged with several other key military tasks. These include selective nuclear options short of total war; supporting theater commanders in repelling conventional attacks; supporting naval commanders in protecting vital sea lanes; providing aerial refueling for bombardment, reconnaissance, tactical, and airlift forces; and gathering and processing strategic reconnaissance information.

SAC's 117,000 combat crew, maintenance, and support men and women and their equipment are ready to perform these missions.

On alert around the clock, 450 Minuteman IIs, 550 Minuteman IIIs with multiple independently targetable reentry vehicles, and fifty-four heavyweight Titan IIs constitute the larger part of the strategic triad's missile force.

SAC's bombers are the second leg of the triad. Long-range B-52 bombers can deliver a wide range of weapons—up to 60,000 pounds of conventional iron bombs, gravity-fall nuclear weapons, and nuclear-tipped air-to-ground short-range attack missiles. In addition to the primary strategic mission, B-52s are suitable for four conventional roles: show of force, area denial, precision strikes, and defense suppression. FB-111 swing-wing bombers are capable of low-level, supersonic delivery of nuclear weapons.

KC-135 Stratotankers refuel SAC's strategic bombardment and reconnaissance aircraft, and the cargo and tactical aircraft of other Air Force commands, the Navy and Marines, and other nations.

Global reconnaissance tasks are planned, executed, and controlled from SAC headquarters, using three specialized reconnaissance vehicles: the long-range RC-135, the high alti-

Gen. Richard H. Ellis, CINC, Strategic Air Command.

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

tude U-2, and the multisensored supersonic SR-71.

Specially equipped EC-135 aircraft with battle staffs aboard are constantly in the air, as backup to ground command posts. The EC-135s are also key elements in SAC's post-attack command control system of auxiliary airborne command posts and radio-relay aircraft.

Looking toward the future, SAC people are modernizing current equipment and planning for replacements that will allow SAC to perform its missions in the next century.

Minuteman missile silos have been hardened to increase the survivability of the force against nuclear effects. A more accurate and slightly higher yield Minuteman reentry vehicle is being tested. A new guidance system has been selected for the Titan II that will reduce the missile's weight, volume, and power requirements.

SAC planners are preparing for the day when the present fixed-location missiles will be more vulnerable to larger, more accurate enemy missiles. Validation of the MX missile continues with analysis of all feasible basing concepts, and initial emphasis on testing potential trench and shelter modes. Under the trench concept, the missiles would be concealed in buried tunnels with the locations changing by moving within tunnels. In the shelter concept, the missiles move under concealment among a number of hardened shelters.

MX would be more difficult to target and thus more survivable than the fixed location Titan II and Minuteman missiles. In addition, new MX technology can provide SAC the flexibility

STRATEGIC AIR COMMAND

Headquarters, Offutt AFB, Neb.

Commander in Chief
Gen. Richard H. Ellis

8th Air Force
Hq. Barksdale AFB, La.

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

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

3d Air Division
Hq. Andersen AFB, Guam

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

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

15th Air Force
Hq. March AFB, Calif.

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

1st Combat Evaluation Group
Barksdale AFB, La.

544th Aerospace Reconnaissance Technical Wing
Offutt AFB, Neb.

306th Strategic Wing*
Ramstein AB, Germany

3902d Air Base Wing
Offutt AFB, Neb.

*Tenant Unit

EIGHTH AIR FORCE (SAC)

Headquarters, Barksdale AFB, La.

Commander
Lt. Gen. Richard L. Lawson

19th Air Division
Carswell AFB, Tex.

340th Air Refueling Group*
Altus AFB, Okla.
(KC-135)

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

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

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

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

45th Air Division
Pease AFB, N. H.

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

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

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

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

40th Air Division
Wurtsmith AFB, Mich.

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

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

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

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

42d Air Division
Blytheville AFB, Ark.

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

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

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

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

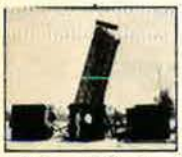
308th Strategic Missile Wing*
Little Rock AFB, Ark.
(Titan II)

* Tenant Unit

If you are up in the air over 3D Air Defense Radar Systems, here are some down-to-earth facts.

Fact ITT Gilfillan has developed and produced Air Surveillance Radars since 1942, and pioneered long range 3D Air Defense Radar Systems since 1959.

Fact During the 1960's, Gilfillan developed and produced the AN/TPS-32, presently the standard long range 3D radar of the U.S. Marine Corps Tactical Air Command Control System.



Fact Since 1960, the U.S. Navy has invested over $250 million with ITT Gilfillan in the development and production of the AN/SPS-48 — the primary fleet defense long range 3D air defense radar. It provides surveillance, interceptor control and weapon designation for over 50 major combatant ships including the newest nuclear aircraft carriers and guided missile cruisers.

Fact In 1974 ITT Gilfillan integrated the AN/TPS-64, an AN/TPS-32 derivative, into the eastern segment of the NADGE system.

Fact In 1974 the AN/SPS-48 was selected as the primary long range 3D radar on the DD 993, the new guided missile frigate now in final development.

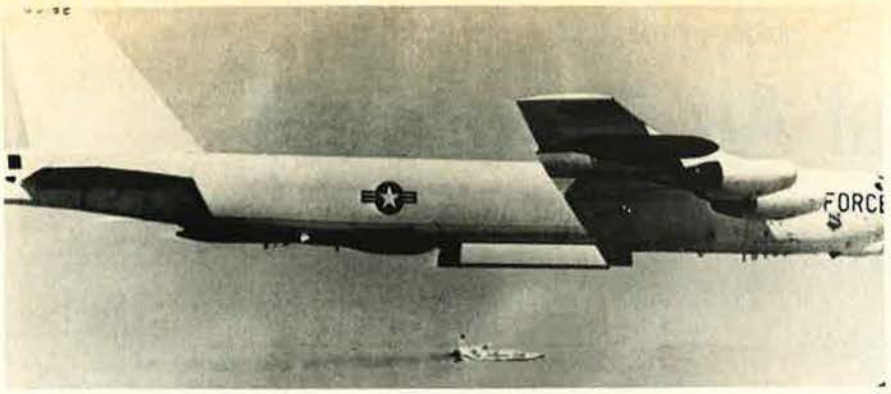
Fact In 1975, after a worldwide competition, ITT Gilfillan was selected by the Swedish Air Force to produce a new, modern 3D radar to function as the primary sensor in its STRIL air defense system. This radar for the 1980's, combines the operational needs of high performance and availability with a contractually guaranteed low life cycle cost.

Fact In 1977 the Federal Republic of Germany selected ITT Gilfillan as one of the two final contractors in the competition for supply of new 3D radars for the German air defense system (GEADGE). Another example of Gilfillan's commitment to provide and supply the world's most advanced radar equipment.

Fact Today, in addition to our international activities, we are continuing to work with all of the U.S. air defense forces in developing 3D air defense radars to cope with the threat environment of the future.

For full details write: ITT Gilfillan, 7821 Orion Ave., Van Nuys, CA 91409, or phone (213) 988-2600.

GILFILLAN ITT



Plans call for equipping SAC's B-52 bombers to carry the air-launched cruise missile (ALCM), shown here in a test flight at the White Sands, N. M., range.

Artist's concept of the McDonnell Douglas DC-10 tanker/cargo aircraft that, in the 1980s, will enhance SAC's ability to support general-purpose forces.

of more warheads per missile, greater range, greater accuracy, and more throw-weight than Minuteman, or with combinations of these variables.

The B-52s are being modernized with new offensive avionics, fire control, and navigation systems. Plans are under way to refit the B-52 to carry a new generation of air-launched cruise missile. The missile will have a small, efficient engine, long range, small radar cross section, a sophisticated warhead, and a highly accurate, inertial guidance and terrain contour comparison navigation system.

The lower wing skin of the KC/RC/EC-135 is being replaced to add 27,000 flying hours life to that old but valuable aircraft. In the 1980s, SAC's ability to support the mobility of US general-purpose forces will be increased by the advanced tanker/cargo aircraft. Small numbers of this aircraft will refuel tactical and strategic airlift aircraft on overseas deployments, as well as carry personnel and support equipment.

Building on yesterday's and today's experience, and using modernized or new equipment, SAC's people will remain dedicated to the concept of deterrence that is summed up by the command motto: "Peace Is Our Profession." ■

FIFTEENTH AIR FORCE (SAC)

Headquarters, March AFB, Calif.

Commander
Lt. Gen. Bryan M. Shotts

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

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

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

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

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

12th Air Division
Dyess AFB, Tex.

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

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

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

47th Air Division
Fairchild AFB, Wash.

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

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

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

57th Air Division
Minot AFB, N. D.

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

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

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

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

14th Air Division
Beale AFB, Calif.

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

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

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

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

307th Air Refueling Group*
Travis AFB, Calif.
(KC-135)

*Tenant Unit

A MAJOR COMMAND

Tactical Air Command

E-3A Airborne Warning and Control Aircraft (AWACS), above, and F-15 Eagle fighters, right, were added to TAC in 1977 as part of the command's modernization program.

Tactical Air Command continues to improve its combat ability and readiness as it modernizes the aircraft inventory and accelerates training for flying and support personnel.

TAC's combat strength is being increased by the conversion of operational units to the latest tactical aircraft. In March 1977, the 354th Tactical Fighter Wing, Myrtle Beach AFB, S. C., received its first A-10 aircraft. By January 1978, the first A-10 squadron successfully completed an operational readiness inspection by deploying to Travis Field, Ga., and operating under simulated combat conditions.

The first operational E-3A Airborne Warning and Control aircraft was turned over in March 1977 to TAC's 552d Airborne Warning and Control Wing (AWACW) at Tinker AFB, Okla. Six E-3A aircraft had been delivered to the 552d AWACW by January 1978. A total of fourteen is expected by year's end. Training of aircrews and support personnel has been accelerated as the wing nears initial operational status.

TAC units provided the aircraft and personnel to reequip and train two front-line USAFE wings. The 366th Tactical Fighter Wing at Mountain Home AFB, Idaho, sent its complement of F-111F aircraft and aircrews to RAF Lakenheath, United Kingdom. The 1st Tactical Fighter Wing, Langley

Gen. Wilbur L. Creech, Commander, TAC

CMSgt. Lewis C. Covington, Coordinator, TAC Senior Enlisted Advisors Council.

TACTICAL AIR COMMAND

Headquarters, Langley AFB, Va.

Commander
Gen. Wilbur L. Creech

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

12th Air Force
Hq., Bergstrom AFB, Tex.

USAF Southern Air Division
Hq., Howard AFB, C. Z.

USAF Tactical Air Warfare Center
Hq., Eglin AFB, Fla.

24th Composite Wing
Howard AFB, C. Z.
(O-2, UH-1)

Inter-American Air Forces Academy
Albrook AFS, C. Z.

4441st Tactical Training Group (Blue Flag)
Eglin AFB, Fla.

USAF Air-Ground Operations School
Hurlburt Field
(Eglin AF Aux. Field No. 9), Fla.

552d Airborne Warning and Control Wing
Tinker AFB, Okla.
(E-3A, EC-130, EC-135)

USAF Tactical Fighter Weapons Center
Hq., Nellis AFB, Nev.

Tactical Fighter Weapons Center Range Group
Nellis AFB, Nev.

4440th Tactical Fighter Training Group (Red Flag)
Nellis AFB, Nev.

57th Tactical Training Wing
Nellis AFB, Nev.
(F-4D/E, F-5E, F-15, F-111E/F, A-10, UH-1)

USAF Air Demonstration Squadron
Nellis AFB, Nev.
(T-38)

NINTH AIR FORCE (TAC)

Headquarters, Shaw AFB, S. C.

Commander
Lt. Gen. James V. Hartinger

1st Tactical Fighter Wing
Langley AFB, Va.
(F-15, EC-135, UH-1)

Headquarters Tactical Training Davis-Monthan
Davis-Monthan AFB, Ariz.

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

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

363d Tactical Reconnaissance Wing
Shaw AFB, S. C.
(RF-4C)

507th Tactical Air Control Wing
Shaw AFB, S. C.
(O-2, OV-10, CH-3)

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

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

56th Tactical Fighter Wing
MacDill AFB, Fla.
(F-4D/E, UH-1)

354th Tactical Fighter Wing
Myrtle Beach AFB, S. C.
(A-7D, A-10)

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

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

1st Special Operations Wing
(CH-3, UH-1, MC/AC-130)

USAF Special Operations School
Hurlburt Field (Eglin AF Aux. Field No. 9), Fla.

TWELFTH AIR FORCE (TAC)

Headquarters, Bergstrom AFB, Tex.

Commander
Lt. Gen. James D. Hughes

Headquarters Tactical Training, George

35th Tactical Fighter Wing
George AFB, Calif.
(F-4C/E/G, F-105G, UH-1)

Headquarters Tactical Training, Luke

58th Tactical Training Wing
Luke AFB, Ariz.
(F-15, F-4, TF-104, UH-1)

Headquarters Tactical Training, Holloman

49th Tactical Fighter Wing
Holloman AFB, N. M.
(F-15)

479th Tactical Training Wing
Holloman AFB, N. M.
(T-38)

67th Tactical Reconnaissance Wing
Bergstrom AFB, Tex.
(RF-4C)

602d Tactical Air Control Wing
Bergstrom AFB, Tex.
(O-2, OV-10, CH-3)

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

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

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

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

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

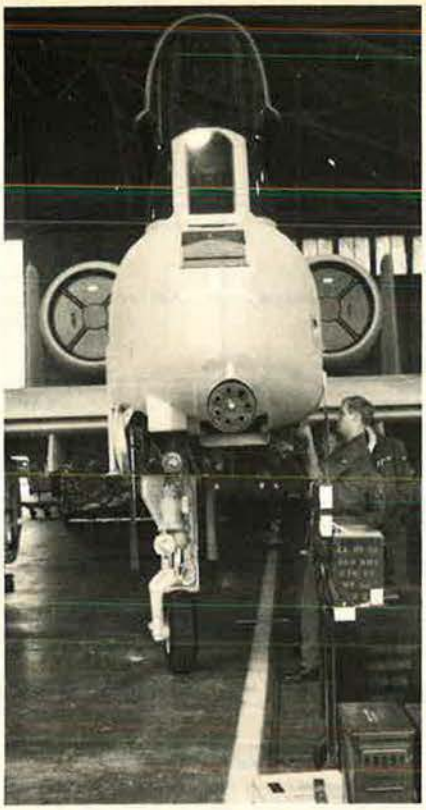
AFB, Va., trained USAFE aircrews in F-15 Eagle aircraft and readied the aircraft before being deployed to the 36th Tactical Fighter Wing at Bitburg AB, Germany. TAC is also training crews for F-15 conversion of the 32d Tactical Fighter Squadron, Camp New Amsterdam, Holland, in the fall of 1978. TAC began to equip its next wing of F-15s at Holloman AFB, N. M., and made plans to transition its fighter wing at Eglin AFB, Fla., to Eagles early next year. The 388th Tactical Fighter Wing, Hill AFB, Utah, will start receiving production models of the F-16 early next year.

While converting to new aircraft systems, TAC units maintain readiness in their old aircraft under the "Ready Team" program. This program reduces unit down time while aircrews and maintenance personnel train in the new aircraft. The concept is also being applied to conversions of Air Reserve Forces units. TAC resources have been increased to more than 96,000 people and approximately 1,700 aircraft on twenty-three bases.

Organizationally, TAC has activated a "tactical training headquarters" at each of its major training bases: Luke, Davis-Monthan, George, and Holloman AFBs, making them responsible for the tactical training wings located at these bases.

Realistic training has become the watchword under the various "flag" programs initiated by Gen. Robert J. Dixon, the recently retired TAC Commander. Red Flag training exercises on the Nellis AFB ranges give fighter pilots simulated combat experience in a high-threat environment with mock enemy ground and air threats. The exercises involve up to 200 aircraft flying a total of 2,400 sorties over a four-week period.

Black Flag is a maintenance concept that schedules sortie surges to more closely resemble combat maintenance operations. The first component, Production Oriented Maintenance Organization (POMO), organizes maintenance personnel into an aircraft generation squadron, an equipment maintenance squadron, and a component repair squadron. More specialists are sent out to the line under a crew-team concept, to promote faster mission turnaround. The other program, Production Oriented Scheduling Techniques (POST), emphasizes specific techniques for quick turnarounds. The POST workweek has a surge schedule with heavy flying on two days and reduced flying the rest of the week. By March, all combat wings had implemented both POMO and POST procedures.



A TAC load crew runs a proficiency check on the armament of an A-10 Thunderbolt at Myrtle Beach AFB, S. C.

A-7D jet pilot begins TAC training flight in joint Air Force-Army maneuvers in the Panama Canal Zone.

Other "flag" readiness programs include Green Flag, which provides realistic training for a European or Korean contingency; Gold Flag, designed to help overcome a projected fighter pilot shortage in the 1980s by increasing the rate of training for new pilots; Gray Flag, which measures readiness of individual pilots, squadrons, and wings, and absorbs pilots into units at a faster pace; and Blue Flag, which provides training in decision-making for battle management and operations.

TAC, in addition to being a major Air Force command, is the USAF component of two unified commands —the US Atlantic Command (LANTCOM), Norfolk, Va., and US Readiness Command (USREDCOM), MacDill AFB, Fla. Upon mobilization, TAC would assume command of more than 50,000 Air National Guard and Air Force Reserve personnel in ninety-eight units across the nation.

Units of the Air Reserve Forces participated along with TAC's active units in a continuing program of short-term tactical deployments. The deployments were designed to exercise TAC's ability to reinforce overseas commands as well as to give the aircrews training in operations outside the United States. In twenty-five separate deployments during FY '77, TAC deployed more than 350 aircraft to Europe, Alaska, and the Pacific for periods of two to four weeks. One-fifth of these aircraft were flown by Reservists and Guardsmen. Such participation will increase to a full one-third of the deployments scheduled for FY '78.

Many of these deployments are to collocated operating bases (COBs)—air bases of allied nations that are designated to receive reinforcement units in periods of increased tension. The deployed units often participate in US or international readiness exercises from their deployed bases. TAC also participates in five annual joint readiness exercises in the United States sponsored by USREDCOM and LANTCOM, including the Brave Shield series and Solid Shield.

TAC has organized a "Quality of Life" group within the headquarters and initiated a program called TOPCARE, designed to take aggressive action to correct inequities in pay and benefits where possible and to communicate these actions to members of the command. TOPCARE demonstrates to TAC members that their leaders care. And they respond with a dedication that has enabled the command to achieve its enduring goal—readiness. ■

Air Force Electronic Systems

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United States Air Forces in Europe

In 1978, United States Air Forces in Europe (USAFE) continues its emphasis on combat readiness through force modernization and interoperability with its North Atlantic Treaty (NATO) allies.

More than 67,000 US Air Force military men and women and some 600 tactical aircraft stand ready at twenty-three air bases from the United Kingdom to Turkey as a major element of NATO's deterrent posture. Operational units of the Air Force Tactical, Strategic, and Military Airlift Commands, the Air National Guard, and the Air Force Reserve are trained and ready to reinforce USAFE rapidly when necessary.

USAFE fighters get a helping hand from the 619th Tactical Control Flight in northern Germany, and from USAFE's OV-10 FAC aircraft (below).

The introduction of the F-15 Eagle at Bitburg AB, Germany, in April 1977, with a second F-15 unit programmed for Camp New Amsterdam, the Netherlands, later this year gives NATO a highly sophisticated air-superiority weapon system second to none.

USAFE's long-range strike capability was further enhanced with the June 1977 activation of the command's second F-111 wing at RAF Lakenheath, UK.

With the recently announced introduction of a wing of A-10 aircraft at RAF Bentwaters/Woodbridge in the UK, USAFE will significantly enhance its close air support capability. The A-10's "tank killer" characteristics

Gen. William J. Evans, Commander in Chief, USAFE.

CMSgt. Sam E. Parish, Senior Enlisted Advisor, USAFE.

will be a major counter to the Warsaw Pact's armored force.

Command and control has been greatly improved with the 600th Tactical Control Group becoming operational at Hessisch-Oldendorf Air Station near Hannover in Northern Germany, and establishment of the 606th Tactical Control Squadron near Bremerhaven. Both are part of the 601st Tactical Control Wing, Sembach AB, Germany, USAFE's primary tactical air control unit. Also operational is the USAFE-manned NATO Operations Support Cell at the German kaserne at Kalkar, some seventy miles northwest of Cologne.

Dissimilar Air Combat Training (DACT) for USAFE's aircrews is a vital part of the command's training to sustain combat readiness. F-5Es of the 527th Tactical Fighter Training Aggressor Squadron at RAF Alconbury, UK, provide realistic aerial combat training for European-based crews. Also, field training exercises in virtually every corner of the European Theater emphasize all-weather capabilities in support of both land and sea forces.

USAFE's training programs that continue throughout the year include Tactical Air Command, Air National Guard, and Air Force Reserve fighter units deployed from the United States. A prime objective is to make tactical air forces of the NATO allies interoperable. Squadron-size tactical units deploy directly from their Stateside bases to air bases of NATO countries, with maximum integration into the operation of allied units. Cross-servicing US and allied aircraft is a vital part of the interoperability goal. Munitions loading, refueling, and maintenance of any allied aircraft at any allied base is the goal.

Since USAFE's major operating bases would be prime targets in a NATO/Warsaw Pact confrontation, USAFE has arranged with its NATO partners to use selected allied airfields as dispersal locations and places to land augmentation aircraft. This Collocated Operating Base (COB) concept provides the command increased flexibility and survivability by providing fuel, munitions, and communications at these locations.

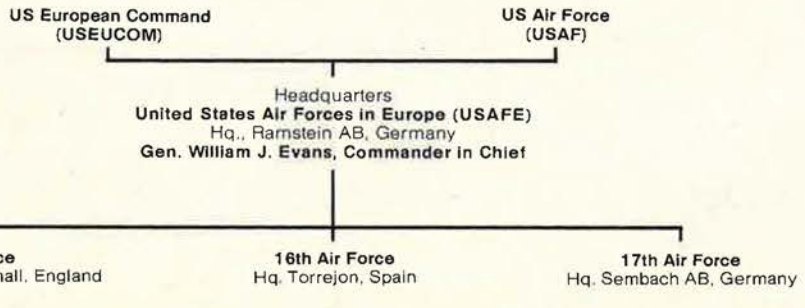
In peace or in time of unilateral military activity, USAFE is a component of the United States European Command (USEUCOM). However, in a NATO/Warsaw Pact confrontation, most USAFE tactical forces would be under NATO command and control. USAFE's Commander in Chief, Gen. William J. Evans, also commands NATO's Allied Air Forces Central Europe (AAFCE), which includes Belgian, Canadian, German, Dutch, British, and US units. AAFCE headquarters is located at Ramstein AB, Germany, and reports directly to NATO's Allied Forces Central Europe (AFCENT) at Brunssum, the Netherlands. ■

THE MAJOR OPERATIONAL UNITS OF USAFE

UNIT	*LOCATION*	*AIRCRAFT/MISSION*
	England	
10th Tac Recon Wing	RAF Alconbury	RF-4, F-5
48th Tac Fighter Wing	RAF Lakenheath	F-111
20th Tac Fighter Wing	RAF Upper Heyford	F-111
81st Tac Fighter Wing	RAF Bentwaters/Woodbridge	F-4, MAC Rescue HC-130, HH-53 (A-10 FY '79)
513th Tac Airlift Wing	RAF Mildenhall	MAC Rotational C-130, SAC Rotational KC-135
	Spain	
401st Tac Fighter Wing	Torrejon AB	F-4
406th Tac Fighter Tng. Wing	Zaragoza AB	Tactical Range Support, Weapons Training School, SAC Rotational KC-135, MAC Rescue UH-1N
	Italy	
40th Tactical Group	Aviano AB	Rotational USAFE Aircraft, Command and Control
	Turkey	
Hq. TUSLOG	Ankara AS	Command and Control
Det. 10, TUSLOG	Incirlik CDI	Rotational USAFE Aircraft
	Greece	
7206th Air Base Gp.	Hellenikon AB	Support and Communications
	The Netherlands	
32d Tac Fighter Sqdn.	Camp New Amsterdam	F-4 (F-15 FY '79)
	Germany	
26th Tac Recon Wing	Zweibrücken AB	RF-4
36th Tac Fighter Wing	Bitburg AB	F-15
50th Tac Fighter Wing	Hahn AB	F-4
52d Tac Fighter Wing	Spangdahlem AB	F-4
86th Tac Fighter Wing	Ramstein AB	F-4, MAC, UH-1, T-39, C-12
601st Tac Control Wing	Sembach AB	Tactical Command and Control, and Forward Air Control, OV-10, CH-53
600th Tac Control Gp.	Hessisch-Oldendorf AS	Tactical Command and Control
7100th Air Base Gp.	Lindsey AS	Communications Command and Control
7350th Air Base Gp.	Berlin	Support and Communications
435th Tac Airlift Wing (MAC)	Rhein-Main AB	C-9, C-130, MAC Strategic C-5, C-141

UNITED STATES AIR FORCES IN EUROPE

Headquarters, Ramstein AB, Germany



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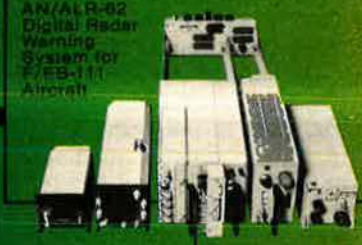
Initial CM-442 Production Award

AN/ALR-62 Digital Radar Warning System for F/FB-111 Aircraft



ALR-46 (CM-442)

ALR-46 processors produced for Royal Norwegian AF

AN/ALR-62 Digital Radar Warning System – for helicopters and LW aircraft

Development and production — DSA-201 processors

Prototypes delivered

AS 1978 BEGINS, OVER 2150 AIRCRAFT ARE EQUIPPED WITH DALMO VICTOR'S COMPUTER-BASED EW SYSTEMS. INHERENT PERFORMANCE ADVANTAGES, PLUS FIELD REPROGRAMMABILITY AND VERSATILE GROWTH CAPACITY FOR FUTURE NEEDS, CONTINUE TO FIND WIDESPREAD APPLICATION AMONG FREE WORLD DEFENSE FORCES.

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975 | 1976 | **NEW IN 1977** | **SYSTEMS/ APPLICATIONS**

Countermeasures Receiving Set for EF-111A Terminal Threat Warning System

Production prototypes delivered

Flight test complete

ALR-62 (V4)

Initial production delivery

ALR-62 (V1, 2, 3)

Initial production award

First production delivery

COMPASS SAIL portion of COMPASS TIE

ALR-64 & ALR-69

Initial production award

1000th CM-442 delivered to USAF

ALR-46 (V1)

DSA-20B Latest, most powerful design for agility

DSA-20B Demonstrated

DEES test

DSA-20B

2000th CM-442/A delivered to USAF

ALR-46A (CM-442A) faster, more powerful processor

ALR-46 (V3)

First production delivery

USN Dev'mt Award

AIDS* — Laser/Radar Warning Integration Development Perkin-Elmer ALIR Laser Sensor

ALR-46AN(NAVY)

AIDS — LASER/RW

JAWS — Integrated Jamming And Warning System

JAWS System performance test

JAWS F33615-77-C-1004

First COMPASS TIE unit delivered

Initial production award

CM-429 COMPASS TIE Digital Signal Processors

ALR-69

ALR-46 (RNAF)

First production delivery

Lot 2 ordered

Lot 2 delivery complete

DSA-201

APR-41

*AIDS: Airborne Integrated Defense Systems

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DALMO VICTOR OPERATIONS

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A MAJOR COMMAND

USAF Security Service

New signals intelligence equipment and an increased demand for its services marked the year for the United States Air Force Security Service (USAFSS).

The mission of the Security Service is signals intelligence (SIGINT), communications security (COMSEC), and electronic warfare (EW) analysis support for all Air Force commands. Educating field commanders to the command's battlefield capabilities has been the goal of the service under Maj. Gen. (selectee) Kenneth D. Burns, USAFSS Commander.

To make its services better known, General Burns has sent a special team to brief potential customers from the Air Staff to pilot and navigator trainees. As a result, field commanders have been making increasing demands on USAFSS operators and analysts for signals intelligence data.

Security Service mobile units and fixed sites also have been given bigger responsibilities in domestic and overseas field exercises.

Security Service developments over the year include:

- Helping other commands in operational readiness inspections.
- Participating in more Red Flag, Blue Flag, and other tactical training programs.
- Strengthening the command's direct support (DSU) and emergency reaction units (ERU).

The headquarters was realigned and Deputy Chiefs of Staff for Plans, and for Programs and Resources, were established. The goal of the reorganization was to increase readiness by integrating the command's SIGINT, COMSEC, and EW resources.

Total Force, the use of Reservists to augment civilian and active-duty members, has been improved in the command. More than 1,100 new positions for Reservists have been identified, and about 750 of these positions already have been approved and funded.

Security Service employs more than 13,000 military and 2,000-plus civilian members in some one hundred locations throughout the US and twelve allied countries. The command, with headquarters at Kelly AFB, Tex., continues to maintain a two-to-one enlisted/officer ratio. Many NCOs hold key managerial and operational positions.

USAF SECURITY SERVICE TO BE DISESTABLISHED

On April 12, 1978, the Air Force announced that USAF Security Service is to be disestablished and its functions transferred to other commands and agencies. For the highlights of this and other organizational changes and realignments, pertaining principally to the separate operating agencies, see the opposite page.

—THE EDITORS

The command's Air Force Electronic Warfare Center focused, during the past year, on applications of EW to counter command and control systems. There were also significant strides in the analysis of defense suppression techniques for the F-4G and EF-111 aircraft.

The Air Force Communications Security Center expanded services to support the Air Force's Operations Security (OPSEC) program.

Advanced mobile vans were rolled out of the Air Force Cryptologic Depot at Kelly AFB for final field shakedown. The depot designed and built the prototype vans. The computerized monitoring and communications equipment is designed to give field commanders better and faster signals intelligence.

Some of the latest equipment was added to the command's airborne program. New computers and cathode ray tube displays are being tested to improve efficiency.

A communications security team monitored a "silent strike" fighter aircraft mass launch at Luke AFB, Ariz. Tactical Air Command has requested additional monitoring teams for future exercises.

In the next several years, overseas sites will be reequipped, with technology leading to remotely controlled systems. At the command's fixed sites, new technology will result in economies of manpower and energy, more comprehensive collection capabilities and more efficient processing, and information tailored to specific needs.

The new systems also use common operations and components to simplify operator and maintenance training.

"Top-priority item for Security Service in 1978 is ensuring that each of us has a readiness role, and that we are finely honed to do the job as efficiently as possible," says General Burns. ■

Maj. Gen. (selectee) Kenneth D. Burns, Commander, USAFSS.

CMSgt. Thomas J. Echols, Senior Enlisted Advisor, USAFSS.

HIGHLIGHTS OF USAF REORGANIZATION, APRIL 12, 1978

As this Almanac issue goes to press, the Air Force announced, on April 12, a reorganization of the Office of the Air Force Secretary and of the Air Staff, with some activities of the latter transferred to major commands and separate operating agencies (SOAs). Also involved are the disestablishment of one major command and a realignment of SOA functions. Most actions are to be initiated in FY '78, with completion by the end of FY '79. No irrevocable actions were to be taken during a thirty-day period, beginning April 12.

Highlights of the reorganization, as it pertains to the commands and SOAs described in this Almanac, are summarized below. Additional details will be reported in the June issue of AIR FORCE Magazine.

To Be Disestablished

Major Command: USAF Security Service. Major functions will be transferred to a new SOA, Air Force Intelligence Center, and training responsibilities (and Goodfellow AFB, Tex.) to Air Training Command.

Separate Operating Agencies

The following SOAs will be redesignated with expanded responsibilities, or disestablished and their functions transferred to new SOAs or to a major command as indicated in parentheses: AF Data Automation Agency (to AF Communications Service); AF Engineering and Services Agency, AF Inspection and Safety Center, AF Intelligence Service, AF Management Engineering Agency, AF Military Personnel Center, AF Office of Special Investigations, Air Reserve Personnel Center.

New Separate Operating Agencies

AF Engineering and Services Center (AFESC), Tyndall AFB, Fla., will take over the functions of the AF Engineering and Services Agency, some Hq. USAF engineering and services functions, and the Civil Engineering research activities of Kirtland AFB, N. M., which will remain at Kirtland. The AF Commissary Service will remain at Kelly AFB, Tex.

AF Inspector General Activities Center (AFIGAC), Kirtland AFB, N. M. The present AF Inspection and Safety Center will be realigned under this new SOA, but will remain at Norton AFB, Calif. Portions of the AF Office of Special Investigations and all of the AF Security Police functions in the Washington area will be transferred to AFIGAC at Kirtland AFB.

AF Intelligence Center (AFIC), Kelly AFB, Tex., will assume some of the functions of the present AF Intelligence Service, some functions previously assigned to USAF Security Service, and organizational responsibility for AF Foreign Technology Division at Wright-Patterson AFB, Ohio, presently part of Air Force Systems Command.

AF Legal Services Center (AFLSC), Wright-Patterson AFB.

AF Manpower and Personnel Center (AFMPC), Randolph AFB, Tex., will continue the functions of the present AF Military Personnel Center and the AF Management Engineering Agency, plus additional non-policy manpower and personnel functions now performed in the Washington area.

AF Medical Center (AFMC), Brooks AFB, Tex., will be responsible for some functions of the Air Force Surgeon General's Office, and the Aerospace Medical Division, now assigned to Air Force Systems Command.

Air Force Service Information and News Center (AFSINC), Kelly AFB, Tex., will be assigned the Internal Information functions now conducted in the Washington area, and the Home Town News Center, which will be transferred from Tinker AFB, Okla., to Kelly AFB.

Three existing SOAs—AF Audit Agency, AF Accounting and Finance Center, and AF Test and Evaluation Center—will continue their present functions with no relocation.

Two existing SOAs—Air Force Academy and Air Force Reserve—will assume a new status as independent units. Air Force Reserve will assume responsibility for the functions of the Air Reserve Personnel Center, but those functions will remain at Lowry AFB, Colo.

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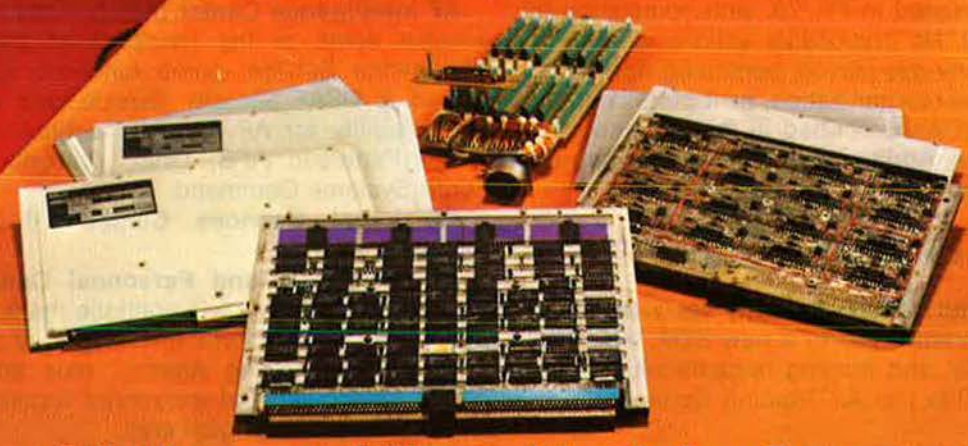

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Air Force Accounting and Finance Center

AFAFC's 2,100 employees provide USAF with quality pay service.

The Air Force Accounting and Finance Center, located at Lowry AFB, Colo., is the focal point for Air Force financial operations. The center's forty officers, 215 enlisted people, and 1,777 civilians pay all active, Reserve, and retired members; account for all appropriated funds; provide technical guidance for the accounting and finance network; and do all accounting and billing for DoD's foreign military sales contracts.

AFAFC pays nearly 1,150,000 men and women each month—571,000 active duty, 147,000 Reservists and Air National Guardsmen, and 431,000 Air Force retirees. The Center also manages and pays more than 1,800,000 allotment accounts for active-duty and retired people.

The Center accounts for all money Congress appropriates for the Air Force. For FY '78 that amounts to more than $33 billion. Using 2,000 financial reports from around the world, AFAFC compiles 132 key reports to Air Force fund managers, other military services, DoD, Treasury Department, Office of Management and Budget, other government agencies, and Congress.

AFAFC also supplies technical guidance for the operation of the Air Force accounting and finance network as well as designing and testing the financial systems used by this network of 9,000 people in 169 locations.

In November 1976, DoD established a centralized foreign military sales accounting and billing organization at AFAFC which became the Security Assistance Accounting Center (SAAC) in 1977. It is responsible for operating a single DoD-wide automated system to keep senior Pentagon officials and Congress advised on the status of all armed forces material being sold to foreign governments. The SAAC has $40 billion in open orders that will be accounted for and billed from Denver.

AFAFC has established a currency clearing house in Brussels, Belgium. The office provides currency exchanges among the NATO nations involved in F-16 coproduction.

Maj. Gen. Lucius Theus, who commands AFAFC, is also Director of Accounting and Finance for the Air Force and Assistant Director for Security Assistance Accounting, Defense Security Assistance Agency.

In 1977, AFAFC made many improvements resulting in even better and faster pay service for Air Force members.

- The direct payroll deposit program, SURE-PAY, incorporates electronic funds transfer (EFT). Air Force payment data for active-duty and retired personnel is sent each month to financial organizations across the country through the Federal Reserve System, using only a computer tape and one Treasury check (normally in the $100 million range). SURE-PAY eliminates individual checks, payroll listings, envelopes, and postage, resulting in better service and savings of nearly $3 million a year.
- Remote inquiry of the AFAFC pay data bank has been possible in seventeen Stateside accounting and finance offices. In 1977, satellite communication data links enabled AFAFC to provide the same information to overseas offices. Three bases—Clark, P. I.; Elmendorf, Alaska; and Ramstein, Germany—received instant individual pay data on computer remote terminals electronically connected to the AFAFC Computer Center. During FY '78, AFAFC will expand this remote terminal operation to twenty-three more CONUS installations and six more overseas bases.
- In 1977, AFAFC began withholding state income taxes. The Center now sends some $2.6 million to twenty-seven states and the District of Columbia.

AFAFC takes pride in providing fast, friendly service to its customers; however, to assure the continuance of that service, the Center has installed new equipment and employs state-of-the-art management and reporting techniques.

The Center became the first DoD organization to use electronically operated mailmobiles for hourly pickup and delivery of mail. Other improvements include word processing, microfilm service center, and a computer laser printer that "types" 20,000 lines per minute and automatically separates and collates copies of reports.

As the Air Force "money manager," AFAFC will continue to provide personalized service to its customers through creative financial management and responsive accounting. ■

Maj. Gen. Lucius Theus, Commander, AFAFC.

CMSgt. Melvin D. Bauer, Senior Enlisted Advisor, AFAFC.

Air Force Audit Agency

The Air Force Audit Agency (AFAA) at Norton AFB, Calif., is USAF's internal audit organization. AFAA has eighty-five offices on Air Force installations in thirty-four states and eight foreign countries. Most of the agency's 1,026 military and civilian personnel have bachelor's degrees, nearly a third have master's degrees, and nine percent are certified public accountants.

Internal auditing of USAF policies, procedures, and controls helps management use resources more efficiently by identifying problems at all management levels, locating causes, and recommending solutions.

Brig. Gen. Joseph B. Dodds, The Auditor General and Commander of AFAA, and his predecessors have reported to the USAF Comptroller. Beginning sometime in 1978, The Auditor General will report directly to the Secretary of the Air Force, receive technical guidance from the Assistant Secretary of the Air Force (Financial Management), and have direct access to the Chief of Staff. The change emphasizes the independent nature of internal audit.

Audits are designed to meet the needs of each management level. Centrally directed audits (CDAs) are performed concurrently at various locations to evaluate significant USAF or major command programs and activities. USAF Headquarters CDAs, which usually address standard Air Force-wide systems, are applied at a sampling of about twenty bases. Audit managers summarize the results and recommend improvements to top Air Force managers.

Major command CDAs focus on the unique aspects of each major command. Typically, the audit is applied at about half the command's bases, and the results are reported to the command headquarters.

The third major type of audit—the local audit—is performed by area audit offices under the guidance of field audit headquarters. Results are reported to the local commander and to the appropriate major command.

The audit force is managed by The Auditor General through two geographic regions and two line directorates. The Western Region at Norton AFB services the Western US, including Alaska and the Pacific, with thirty-five area audit offices. The Eastern Region at Langley AFB, Va., has thirty-four offices and serves the Eastern US, the Canal Zone, Greenland, and Europe. Each regional office audits up to four major and twenty-five minor Air Force installations.

The two line directorates—Acquisition and Logistics Systems at Wright-Patterson AFB, Ohio, and Service-Wide Systems at Andrews AFB, Md.—provide specialized services. The Directorate of Acquisition and Logistics Systems services Air Force Systems Command and Air Force Logistics Command. It supervises audit offices at AFSC's buying divisions and AFLC's Air Logistics Centers. This centralized management permits coordinated auditing of all phases of a weapon system's life cycle from conception to operational and logistic support.

The Service-Wide Systems Directorate manages Air Force-wide audits of support activities and programs. The Directorate has offices at the Air Force Accounting and Finance Center, Air Force Military Personnel Center, and Air Force Data Systems Design Center.

AFAA auditors made more than 3,900 reports of audit in FY '77, resulting in $156 million in savings or cost avoidance. This amounts to a sevenfold return on auditing costs. ■

Brig. Gen. Joseph B. Dodds, Commander, AFAA.

CMSgt. Robert S. Wise, Senior Enlisted Advisor, AFAA.

Air Force Data Automation Agency

The Air Force Data Automation Agency (AFDAA) provides centralized management and organizational structure for automatic data processing (ADP) activities with Air Force-wide application. It also provides ADP systems support from conception through termination to the Air Force and several other federal agencies, and specialized ADP expertise and consultation services in areas such as facilities design, safety, computer security, and computer resources management.

The AFDAA commander is also assigned to the Air Staff, where he serves as Air Force Director of Data Automation.

The agency consists of headquarters elements, the Data Systems Evaluation Office (DSEO), and the Program Management Office (PMO), located at Gunter AFS, Ala., and four subordinate units: the Air Force Data Services Center (AFDSC), the Air Force Data Systems Design Center (AFDSDC), the Federal Computer

Performance Evaluation and Simulation Center (FEDSIM), and the Air Force Computer Acquisition Office (AFCAO). AFDAA has approximately 1,200 military people and 910 civilians assigned.

The DSEO provides independent assistance to the Air Force to ensure the production of ADP systems that meet user needs on schedule at the projected cost.

The PMO directs the Base Level Data Automation Program–Phase IV, which will replace Base Level U-1050-II and B3500 computers at approximately 125 sites.

The AFDSC is located in the Pentagon and provides automatic data processing and management science services to Hq. USAF, Office of the Secretary of Defense, and other agencies. It is responsible for planning, designing, developing, and implementing computer-based management information systems for these agencies. AFDSC operates a regional ADP service center at San Antonio, Tex.—the San Antonio Data Services Center (SADSC)—which has two large computer systems with independent remote terminal networks. SADSC provides support to several Air Force major commands and other departments of the federal government as capacity permits on a fee-for-service basis.

The AFDSDC at Gunter AFS is responsible for designing, developing, and maintaining USAF standard ADP systems; establishing the use of common computer techniques; and recommending areas for additional applications. AFDSDC develops and recommends standards for programming languages, establishes documentation standards, participates in the development of related standards for equipment, and acts as the ADP systems manager for many Air Force-wide systems.

The FEDSIM, located in Washington, D. C., was established in February 1972 by the General Services Administration (GSA) to provide computer performance and evaluation services to all agencies of the federal government. Because of USAF's recognized expertise in this area, it was designated to operate the FEDSIM for GSA. FEDSIM provides advanced techniques of computer performance and evaluation, and simulation services on a fully reimbursable basis.

The AFCAO at Hanscom AFB, Mass., acquires ADP computer systems or ADP computer elements for the Air Force. This includes developing specifications and solicitation documents necessary for the selection and acquisition of ADP computer elements. The Office provides assistance to Air Force ADP users and other federal agencies in preparing specifications, developing and releasing the solicitation documents, receiving and evaluating proposals and bids, performing live test demonstrations, and determining life cycle costs. ■

Col. A. R. Mourges, Commander, AFDAA.

CMSgt. Philip C. Salley, Senior Enlisted Advisor, AFDAA.

AF Engineering and Services Agency

The Air Force Engineering and Services Agency (AFESA), which became operational in April 1977, is a separate operating agency headquartered at Kelly AFB, Tex., that pulls together specialized engineering and services functions. The major components are:

- Air Force Commissary Service, Kelly AFB, Tex.
- Air Force Civil Engineering Center, Tyndall AFB, Fla.
- Air Force Regional Civil Engineers Offices in San Francisco, Calif.; Dallas, Tex.; and Atlanta, Ga.
- Air Force Mortuary Services Offices, Bolling AFB, D. C.
- Air Force Services Office, Philadelphia, Pa.

Maj. Gen. Robert C. Thompson, Air Force Director of Engineering and Services, is also the AFESA Commander, and CMSgt. Fred K. Dickinson, AFESA Chief of Military Personnel, is the agency's Senior Enlisted Advisor.

The Air Force Commissary Service (AFCOMS) is the largest component in AFESA with 698 military and 10,113 civilians providing food and related merchandise to the Air Force family worldwide. The 161-store system is governed by a board of directors through AFCOMS headquarters and four geographically located region headquarters.

The Air Force Civil Engineering Center (AFCEC) has 136 military and 137 civilian personnel. It provides specialized engineering, environmental technical training, and planning to assist Air Force civil engineering organizations worldwide. AFCEC supports combat readiness, environmental programs, energy conservation, base livability, corrosion control, fire protection, and airfield pavement maintenance.

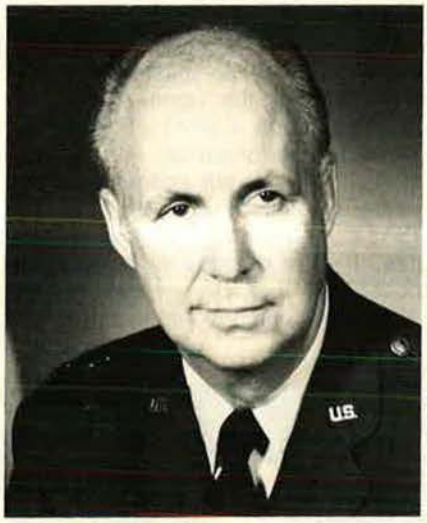
The Center's new Directorate of Readiness brings together the planning and evaluation functions for contingency engineering forces, ensuring base survivability for flying operations under all conditions. The directorate's readiness center is scheduled to be in operation this year. It will have secure communica-

tion lines, worldwide military command and control system computer access, detailed information on airfields, the status of Prime Beef and Red Horse contingency units, and information on equipment and supplies.

The three Air Force Regional Civil Engineers Offices (AFRCE) are designated Western, Central, and Eastern AFRCE. The small military/civilian staff of each AFRCE manages major design and construction projects for Air Force, Air Force Reserve, and Air National Guard units within its area. These AFRCEs also act as a point of contact for federal and state environmental agencies.

The Air Force Mortuary Services Office (AFMSO), with nine civilians, controls a worldwide program to provide assistance in identifying remains of those involved in accidents, disasters, and military operations.

The Air Force Services Office (AFSO) has fifteen military and twenty two civilian members to provide management, operational guidance, and technical assistance to appropriated-fund food service and laundry/dry cleaning activities worldwide. The AFSO aims at increasing the effectiveness of food service training, improving management of food service contracts and the quality of dining hall food, and making food services more efficient and responsive to customer preferences. ■



Maj. Gen. Robert C. Thompson, Commander, AFESA.

CMSgt. Fred K. Dickinson, Senior Enlisted Advisor, AFESA.

Air Force Intelligence Service

The Air Force Intelligence Service (AFIS), established June 27, 1972, as a separate operating agency, provides intelligence services to US Air Force Headquarters and to USAF commanders.

The National Security Act of 1947, as amended, authorizes the Air Force to collect, evaluate, correlate, and disseminate departmental intelligence. Department of Defense (DoD) directives call for the Air Force to provide an organization capable of furnishing adequate, timely, and reliable intelligence for DoD use.

In 1971, the Secretary of the Air Force directed the realignment of Air Staff operating and support functions to other organizations. The following year, the Air Force Intelligence Service was established.

Maj. Gen. James L. Brown, the Assistant Chief of Staff for Intelligence (ACS/I), Hq. USAF, also serves as Commander of AFIS. AFIS Senior Enlisted Advisor is CMSgt. George L. Proud.

AFIS is charged with supporting USAF planning and combat operations, and with responding to the changing intelligence requirements of the Air Force. AFIS engages in the following activities:

• *Substantive intelligence.* AFIS provides the Air Force with all source intelligence affecting Air Force policies, resources, force deployment and employment, indications and warning, intelligence analysis of current operations, and special intelligence research. AFIS provides experts on targeting, weapons, and cartography; serves as Air Force Intelligence contact with the Defense Mapping Agency; and ensures that the Secretary of the Air Force, the Chief of Staff, and key Air Staff officers receive the timely and accurate intelligence necessary to assess critical situations in world crises.

• *Security and communications management.* AFIS oversees the worldwide Air Force Special Security Office and Special Activities Office, and ensures compliance with security

Maj. Gen. James L. Brown, Commander, AFIS.

CMSgt. George L. Proud, Senior Enlisted Advisor, AFIS.

policies covering special intelligence and intelligence telecommunications.

• *Intelligence data management.* AFIS plans, coordinates, and exercises managerial control of worldwide Air Force intelligence data.

• *The Air Force attaché program.* AFIS supports the Defense Attaché System (DAS) and monitors all matters concerning Air Force participation in DAS.

• *The AFIS Reserve program.* AFIS is responsible for recruiting, administering, training, and using intelligence mobilization augmentees. These Reservists provide immediate support under the Total Force Policy to the active force during peacetime, for contingencies, and for mobilization.

• *Soviet Affairs.* AFIS conducts the Air Force's Soviet Awareness Program, does basic research in Communist military doctrine and strategy, and produces expository materials for use in assessing the impact of Communist doctrine and strategy on USAF plans and operations.

• *The 7602d Air Intelligence Group (AINTELG),* headquartered at Fort Belvoir, Va., is the AFIS agency responsible for the management and collection of worldwide human source intelligence as well as evasion and escape and prisoner-of-war intelligence. A typical project is sifting and reviewing data from POW experiences to better prepare the Air Force for prisoner-of-war situations.

The Air Force Intelligence Service participates in a number of joint and Air Force training exercises each year to improve the readiness of active-duty and Reserve Forces intelligence personnel. ■

Air Force Office of Special Investigations

The Air Force Office of Special Investigations (AFOSI), headquartered in Washington, D. C., has more than 1,800 special agents and support people assigned to thirty districts and 125 detachments and operating locations throughout the world. On request, they assist any USAF commander in dealing with fraudulent, counterintelligence, or criminal activities. The commander then takes the action he deems necessary.

AFOSI divides its investigative tasks among three major directorates: Fraud, Counterintelligence, and Criminal Investigations.

The Fraud Directorate supervises investigations of fraudulent activities, major administrative irregularities, and violations of public trust involving Air Force procurement, disposal, pay and allowance matters, and nonappropriated fund activities. The directorate also determines whether the opportunity for fraud or other irregularities exists at a given activity. Another of its responsibilities is to coordinate investigative support to the Army and Air Force Exchange Service, AFOSI having been designated the Executive Agency for such support, and to coordinate AFOSI support to more than 180 Defense Logistics Agency field offices throughout the world under a 1974 agreement.

The Directorate of Counterintelligence employs offensive and defensive measures to detect, neutralize, and destroy the effectiveness of threats to Air Force security posed by hostile intelligence services. A significant and expanding AFOSI responsibility is detecting terrorist threats to Air Force facilities and personnel and warning the affected commanders. The directorate supervises various counterterrorism services for Air Force commanders in areas of heightened terrorist activity and provides protective services for threatened personnel.

The Criminal Directorate is responsible for investigating criminal offenses, ranging from housebreaking to homicide, against persons, their property, or the USAF. Generally, jurisdiction is limited to crimes committed on Air Force installations by persons subject to the UCMJ.

AFOSI directs the USAF polygraph/Identi-kit programs, maintains the USAF terminal to the FBI National Crime Information Center, provides a highly trained forensic science cadre, and performs continuing patterns and trends analysis.

Since many investigative matters extend beyond Air Force personnel or the boundaries of Air Force bases, AFOSI maintains liaison with law enforcement and investigative organizations at the international, federal, state, and local levels. Cooperation with such agencies ensures the preservation of jurisdictional responsibilities and assures the Air Force commander that he is getting the most thorough investigative service possible.

AFOSI selects and trains its own special agents from among the most highly qualified and capable Air Force officers, NCOs, and civilians. Selectees attend a twelve-week investigator's course at the Air Force Special Investigations School in Washington, D. C. The course includes approximately 420 hours of administrative, investigative, and military law work. After gaining field experience, most special agents return to the school for advanced or specialized training. ■

Col. Forest A. Singhoff, Commander, AFOSI.

CMSgt. Lawrence A. Shellhammer, Senior Enlisted Advisor, AFOSI.

Air Force Inspection and Safety Center

The Air Force Inspection and Safety Center (AFISC) at Norton AFB, Calif., monitors the Air Force inspection system and safety programs. Maj. Gen. Richard E. Merkling serves as both the center's Commander and as the Deputy Inspector General for Inspection and Safety, Hq. USAF. (General Merkling is to be replaced on May 18, 1978, by Maj. Gen. [selectee] Robert W. Bazley.)

On January 31, 1978, AFISC's work force totaled 569 (407 military and 162 civilians), including foreign exchange officers, safety engineers from major aerospace companies, staff training officers, Reserve supplement officers, and mobilization augmentees.

AFISC has five directorates—Inspection, Aerospace Safety, Medical Inspection, Nuclear Surety, and Programs. The last supports the others in such areas as analysis, scheduling, operational budgeting, data automation, personnel, and administration. The Center also conducts an Inspection School for all newly assigned USAF, major command, and separate operating agency inspectors.

The Inspector General's Assistant for Inquiries and Complaints, also at Norton AFB, answers complaints referred to The Inspector General of the Air Force.

The Center's Directorate of Inspection evaluates the effectiveness of Air Force management, mission capability, and readiness. The directorate conducts three types of inspections: The Functional Management Inspection (FMI) to evaluate well-defined activities and programs; the System Acquisition Management Inspection (SAMI) to review all aspects of weapon system acquisition; and the Command Inspection System Inspection (CISI) to evaluate major command and separate operating agency inspection team performance. The directorate also conducts studies for the Chief of Staff, USAF, and commanders of major commands concerning Air Force-wide readiness and offers a consultant service, reporting only to the commander requesting the assistance.

The Directorate of Aerospace Safety is the Air Force safety program functional manager for USAF and Air Reserve Forces flight, ground, missile, space, and explosives accident prevention. The directorate has primary responsibility for Air Force safety directives. It develops standards, programs, procedures, and trending techniques to assist in identifying and correcting safety-related problems in all functional areas. The directorate participates in mishap investigations of specific interest to the Chief of Staff, USAF, and serves as the focal point for all matters pertaining to USAF implementation of the Occupational Safety and Health Act (OSHA).

The directorate's Safety Policy and Programs Division develops interservice, interagency, and international agreements related to Air Force Safety matters. The Life Sciences Division assists in the planning, design, development, and operation of Air Force weapon systems and work environments. The System Safety and Engineering Division develops safety techniques and procedures for Air Force managers in weapon system acquisition, maintenance, and operation.

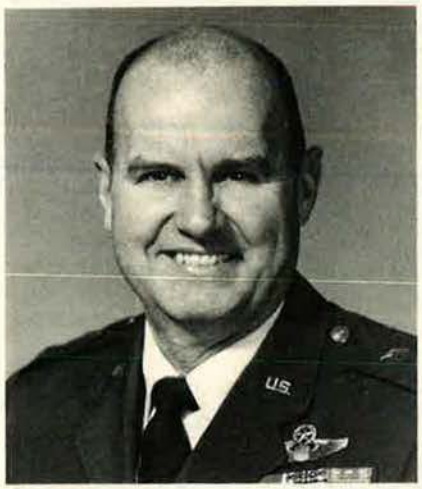
The Safety Education Division designs, plans, and develops resources for safety education programs including university-level safety courses. It also publishes *Aerospace Safety, Driver,* and *Maintenance* magazines, and the Safety Officer's Study Kit. The Reports and Analysis Division is custodian of all Air Force mishap reports, and has primary responsibility for identifying problems in all safety disciplines.

The Weapons Safety Division develops and implements missile, space, and explosives safety programs. Flight safety programs are directed by the Flight Safety Division. OSHA and other ground safety responsibilities are guided by the Ground Safety Division.

The Directorate of Medical Inspection performs Health Services Management Inspections of all active-duty and Air Force Reserve medical units. The directorate also conducts functional management inspections of specific medical activities and programs.

The Directorate of Nuclear Surety at Kirtland AFB, N. M., has safety and inspection responsibilities like those of the Directorates of Inspection and Aerospace Safety, but confined solely to nuclear/laser matters. In addition to directing the accident, incident, deficiency (AID) reporting system and giving technical advice for investigating and preventing nuclear accidents, directorate personnel serve as secretariat and chairman of the Nuclear Weapon System Safety Group (NWSSG). The NWSSG evaluates each nuclear weapon system to ensure it satisfies DoD nuclear safety standards; it also orginates the weapon system safety rules for Secretary of Defense approval.

AFISC's operations affect nearly every facet of Air Force life, from how the Air Force flies and fights to the way its people are treated and cared for. AFISC people are reminded daily of their mission by a large sign over the headquarters entrance: "Strength Through Vigilance." ■

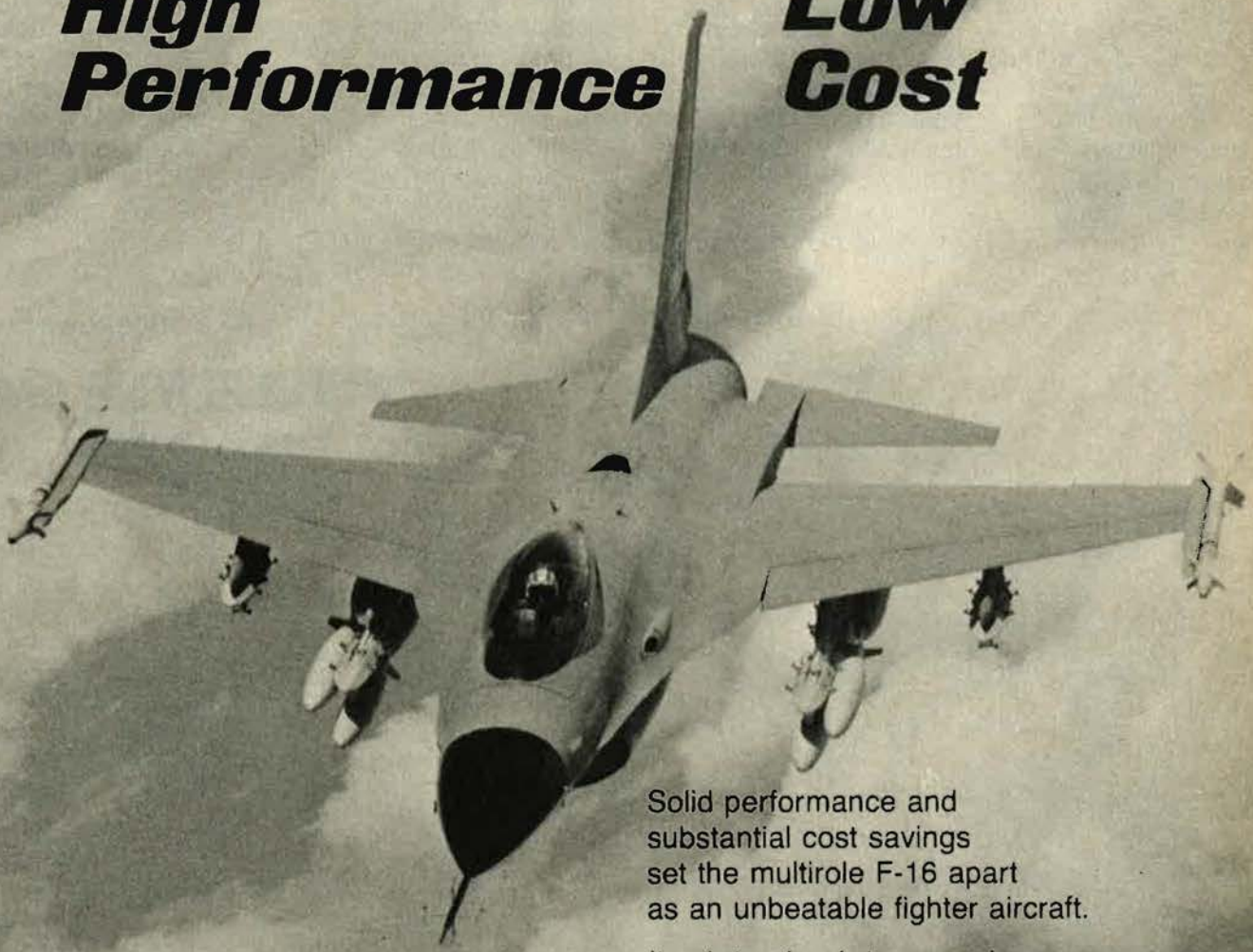


Maj. Gen. Richard E. Merkling, Commander, AFISC.

CMSgt. Philip A. Arvizo, Senior Enlisted Advisor, AFISC.

Multirole F-16

High Performance Low Cost



Solid performance and
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multirole capability, coupled
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and support, have already won its
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Air Force Test and Evaluation Center

SSgt. Robert Kishbaugh, an F-16 egress specialist with the AFTEC F-16 Test Team, here works on the inertial reel of an F-16's ejection system.

The Air Force Test and Evaluation Center (AFTEC) is the Air Force's independent management agency for the operational test and evaluation of emerging weapon systems. "Basically, our charter is to test new systems in the operational environment they were designed for and to see how well they perform," says Maj. Gen. Howard W. Leaf, AFTEC Commander. "AFTEC also is charged with determining how well the system can be maintained and supported by Air Force personnel in the field once it becomes operational. Our final test results are reported directly to the Air Force Chief of Staff."

The results are reviewed and weighed by members of the Defense Systems Acquisition Review Council (DSARC) at various milestone points in the systems acquisition cycle. Results of AFTEC Initial Operational Test and Evaluation (IOT&E), or preproduction testing, are used in the DSARC decision on whether to approve full-scale production. If a production go-ahead is given, AFTEC conducts the first phase of Follow-on Test and Evaluation (FOT&E) testing, the results of which are vital to any further production decisions or system modifications. Additional FOT&E is conducted by appropriate Air Force major commands.

To manage the forty-three major Air Force OT&E programs and monitor more than 230 others, AFTEC has 233 military and sixty-five civilians, the majority of whom are stationed at AFTEC Headquarters, Kirtland AFB, N. M. This staff of operational and technical people prepares pretest documentation (including test plans), designs tests, and assists in analyzing data and preparing formal reports.

AFTEC testing is conducted at a series of test sites, such as Edwards AFB, Calif. More than 650 operational, logistical, maintenance, and training experts from using and supporting commands man AFTEC test teams that collect, analyze, and evaluate data, and have primary responsibility for preparing OT&E test reports. Final test reports, sent to the Air Force Chief of Staff, are the efforts of both the field test teams and the headquarters staff at Kirtland.

Maj. Gen. Howard W. Leaf, Commander, AFTEC.

CMSgt. Martin J. Kuettel, Senior Enlisted Advisor, AFTEC.

A series of major milestones occurred among the AFTEC's OT&E programs during the past year. Among them were:

- Successful completion of the F-16 multinational fighter IOT&E. This led to the DSARC decision to proceed with full-scale production of the aircraft. AFTEC Follow-on Test and Evaluation began after this decision.
- European testing of the F-15, AWACS, and the infrared imaging radar (IIR) tracker, in a series of realistic demonstrations.
- Establishment of three significant AFTEC field units: Det. 1, Kapaun, Germany (near Ramstein), to coordinate all aspects of European operational testing with allied defense agencies; Det. 2, Eglin AFB, Fla., liaison with the Tactical Air Warfare Center (TAWC), the Armament Development and Test Center (ADTC), and other defense organizations impacting on operational test and evaluation; and the MX Test Team at Norton AFB, Calif., for advanced planning of operational test and evaluation of this major Air Force weapon system.
- Approval of the initial test concept for the Base Level Data Automation Systems (Phase IV).
- Completion of the F-4G "Wild Weasel" program IOT&E.
- Initiation of EF-111A Tactical Jamming System IOT&E at Mountain Home AFB, Idaho.
- First phase of the Advanced Aerial Refueling Boom (AARB) IOT&E flight testing.
- Completed IOT&E on the YC-14 and YC-15 Advanced Medium Short Takeoff transport aircraft.
- Completion of preproduction prototype testing on the "stretch" YC-141B cargo aircraft.

AFTEC will continue active testing during the coming year on the principal Air Force weapon systems, with major milestones coming in such programs as the F-16, F-4G "Wild Weasel" FOT&E, Ground-Launched Cruise Missile (GLCM), AIM-9L missile, E-3A, E-4B Advanced Airborne Command Post, F-5E simulator for the Royal Saudi Air Force, EF-111A, IIR tracker, and the laser Maverick missile. ■

AF Management Engineering Agency

The Air Force Management Engineering Agency (AFMEA) was established in November 1975, but the Air Force has been developing manpower standards for almost twenty years through its Management Engineering Program.

In an October 1977 report to the Military Personnel Subcommittee of the House Armed Services Committee, the General Accounting Office stated: "Since 1959, the Air Force has given increasingly greater management emphasis and priority to the program [management engineering]. The program currently is an integral and highly visible part of the Air Force's determination, management, and justification of personnel requirements."

AFMEA is a relatively small agency, with about 300 people serving on eleven functional management engineering teams at Air Force bases in the CONUS, and at agency headquarters, Randolph AFB, Tex. Maj. Gen. Stuart H. Sherman, Jr., Air Force Director of Manpower and Organization, serves in a dual capacity as the AFMEA Commander.

Since becoming operational, AFMEA has set Air Force manpower standards that cover about 280,000 manpower authorizations in the areas of medicine, transportation, munitions, engineering and services, comptroller, security police, data automation, intelligence, aircraft maintenance, personnel, chaplain, safety, base operations, and training functions. AFMEA has also approved manpower standards for about 800 major command work centers that produced a net savings of $35 million over a twenty-two-month period in 1976 and 1977.

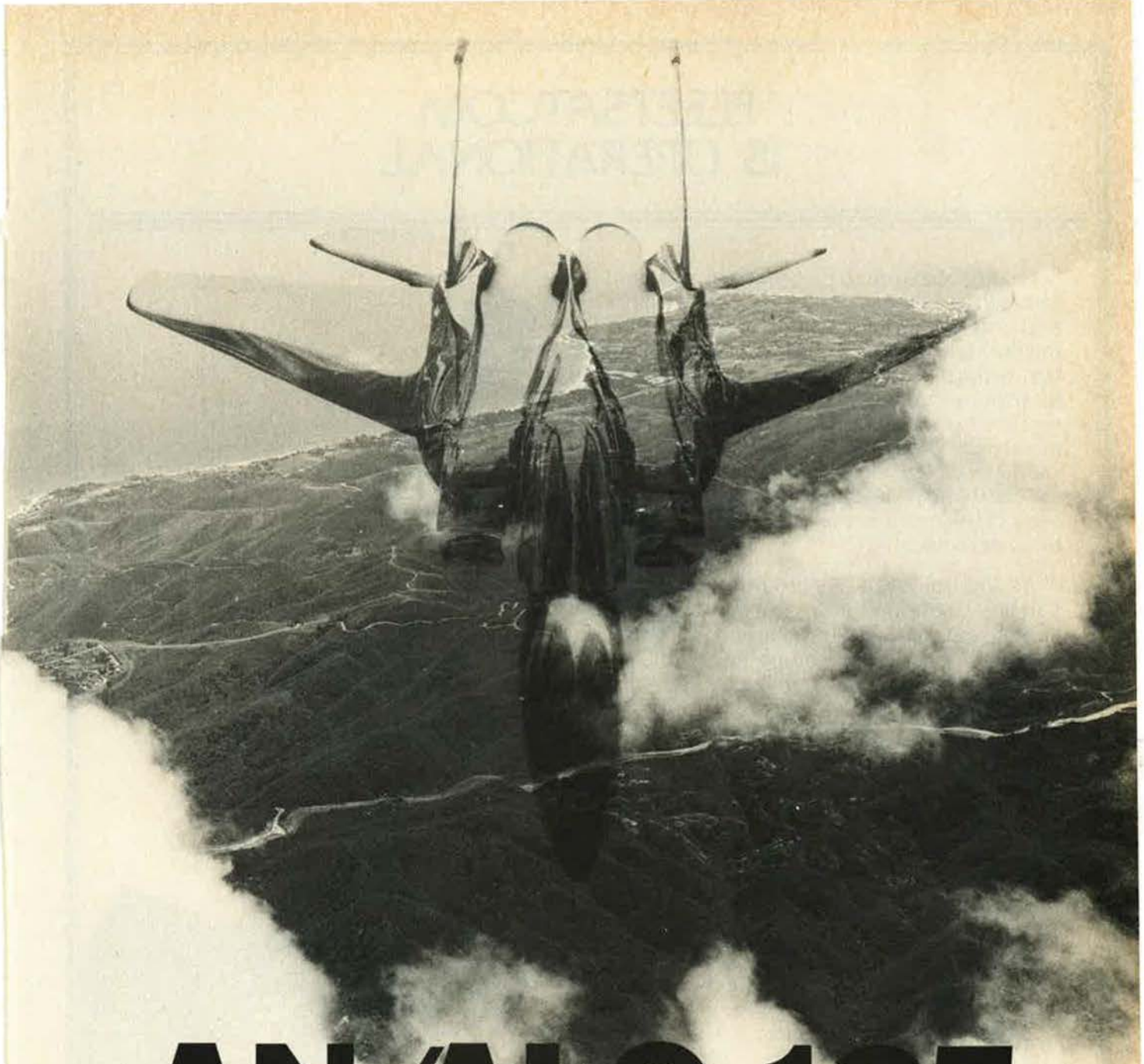
In addition to management engineering, the agency contributes to other aspects of Air Force manpower management, including grade resources, the Productivity Program, and the Air Force Commercial/Industrial Triennial Review. AFMEA works with the Air Force Military Personnel Center (AFMPC) in designing and developing the Contingency Planning and Support Capability System and with AFMPC and the Air Force Office of Civilian Personnel Operations to ensure that manpower programs are complementary.

Long-range objectives of AFMEA are to increase manpower standards coverage, to shorten the required time for developing standards, to develop new procedures for determining grades and skills, and to further incorporate standards into the planning of wartime manpower requirements.

The Committee on Armed Services, House of Representatives Report No. 95-194, of April 1977, stated: ". . . The Air Force has been in the forefront of manpower developments and progress in the Department of Defense in recent years. . . ." The agency's goal is to continue to lead the way in improving manpower management. ■

Maj. Gen. Stuart H. Sherman, Jr., Commander, AFMEA.

CMSgt. Roland W. Douglas, Senior Enlisted Advisor, AFMEA.



AN/ALQ-135

Designation of Internal Countermeasures Set (ICS) designed and built by Northrop for U.S. Air Force F-15 Eagle. Most advanced ECM system yet developed for tactical aircraft. Initial production contract completed with 44 systems delivered. All on time, on cost, performance as promised. Follow-on production continuing.

Northrop ICS makes F-15 virtually invisible to enemy by automatically jamming their radar signals. Dual mode: continuous wave energy and time pulse energy. Internal installation does not compromise F-15 flight performance.

Northrop is proven leader in electronic warfare technology. Developer of ECM jammer for prototype USAF B-1 strategic bomber. Producer of ECM power management system for USAF B-52. More than 14,000 jamming transmitters delivered by Northrop since 1952.

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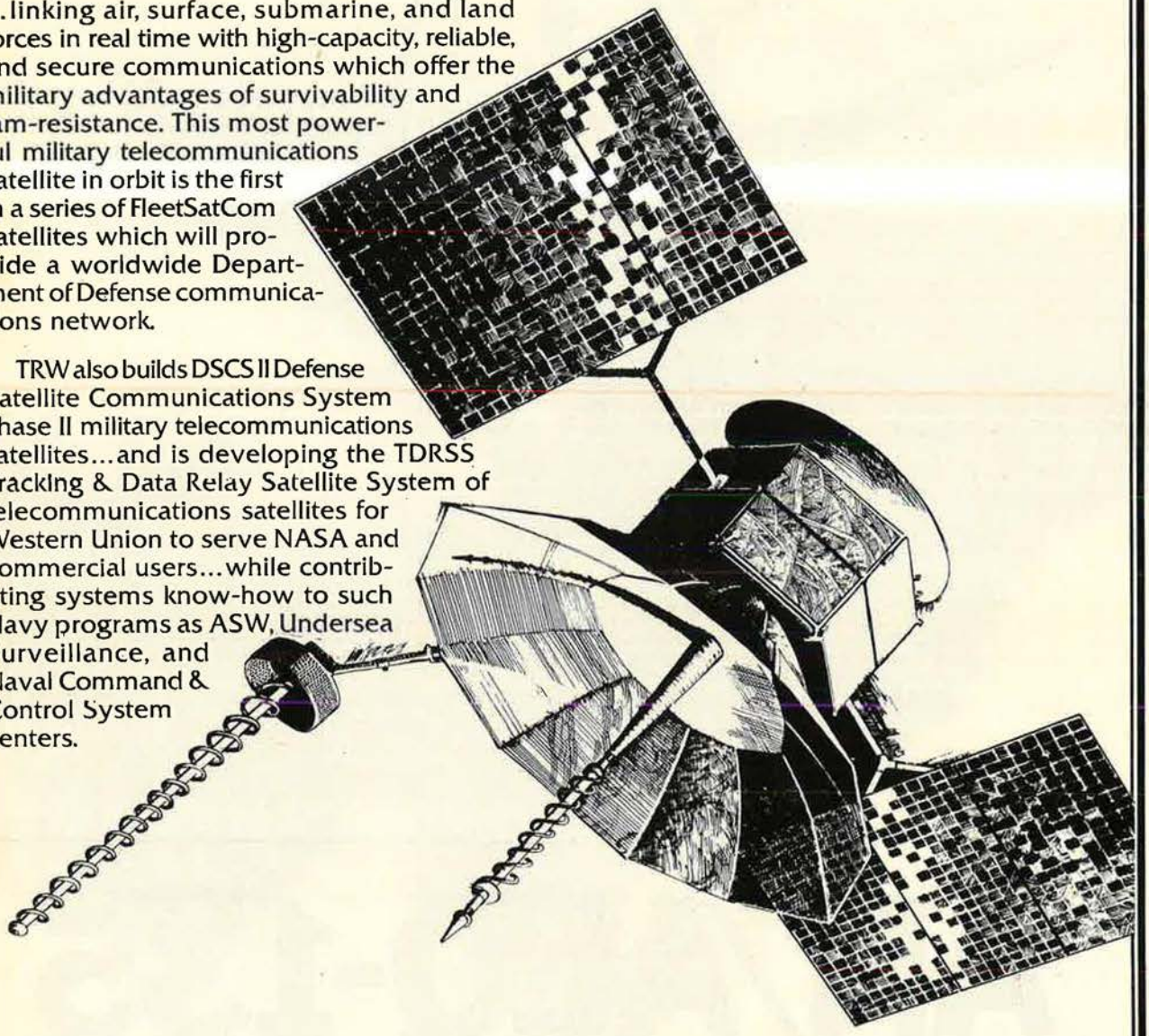

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Air Force Military Personnel Center

The Air Force Military Personnel Center (AFMPC) at Randolph AFB, Tex., provides a ready force of people essential to the Air Force mission. It carries out policies and programs developed by DCS/Personnel in Washington and works in consultation with Air Force major commands and functional managers.

About 500 officers, 800 enlisted persons, and 700 civilians are assigned to the Center to manage personnel programs influencing the lives and careers of military members from service entry into their retirement years.

Much of AFMPC's efforts deal with the assignment of more than half a million USAF men and women Stateside and overseas. A key word in assignment policies is stability—fewer moves and longer stays between assignments.

Assignments in the continental US are normally for a minimum of three years, with first-term airmen and officers who are serving four-year terms receiving no more than two assignments after initial training. Careerists without dependents assigned to certain long-tour oversea areas are now required to serve the thirty-six-month "accompanied" tour length, and home basing or follow-on assignments, wherever practicable, will be provided for personnel assigned to short-tour areas.

Active-duty service commitments (ADSCs) for airmen entering some formal training courses ensure a fair return to the Air Force on training costs. ADSCs for officers entering undergraduate pilot or helicopter training June 15, 1979, or later, will be increased from the present five years to six years.

AFMPC is deeply involved in better utilization of women. The first ten women to graduate from pilot training were assigned to T-37, T-38, T-43, KC-135, C-141, C-9, and WC-130 aircraft. The first five women navigators were assigned to WC-130, KC-135, and C-141 aircraft. In January, fifteen women were selected to enter combat crew training to become Titan II missile launch officers.

Recruiting and retention programs managed by AFMPC help get and keep the right kinds of people. At the opposite end of military careers, the Center develops and manages separation and retirement procedures, and serves as the point of contact between the Air Force and retirees, their dependents, and survivors of active and retired members.

About thirty-five selection boards, like this one, are convened at the Center annually. Some 150 generals and 500 colonels make up the boards.

More than thirty boards met at the center during the past year to select USAF people for promotion to temporary and permanent officer grades and to senior and chief master sergeant. Other AFMPC boards selected officers for Regular appointment, education and training courses, and specialized assignments, and chose some highly qualified chief master sergeants for extension of tenure to thirty-three years.

AFMPC designs, develops, and operates personnel evaluation systems—the officer effectiveness reports (OER), and airman performance reports (APR). The Center also plans

Maj. Gen. Leroy W. Svendsen, Jr., Commander, AFMPC.

CMSgt. Theodore J. Severson, Senior Enlisted Advisor, AFMPC.

and manages evaluation programs, including airman promotion system specialty knowledge tests (SKT) and promotion fitness examinations (PFE).

Even the off-duty activities of USAF members are an AFMPC concern as the Center oversees the Air Force morale, welfare, and recreation program that is operated mainly at base level.

To keep track of all the promotions, recruitments, separations, retirements, and assignment actions, AFMPC operates one of the largest personnel data and records management systems in the world.

Through the programs they manage, the men and women of AFMPC strive for better mission performance and more satisfying careers for Air Force members. ■

Each year, more than 10,000 USAF people visit AFMPC to check their master file (on microfiche cards) in the Center's Records Review room.

Air Reserve Personnel Center

The Air Reserve Personnel Center (ARPC) at Lowry AFB, Colo., provides personnel support to every member of the Air Reserve Forces. Often called "The Manpower Bank of the Air Force," ARPC keeps track of more than a half million Reserve members, and, in terms of numbers, is one of the largest personnel operations in the Air Force.

ARPC is emphasizing better communications with Reservists. A new quarterly newsletter, *UPDATE,* reports additions and changes in personnel policy to the Reservists who receive base-level personnel support from the Center. Briefing teams visit key areas of the United States to inform Reservists on personnel policy and management programs, and explain how Reservists can help the Center be more responsive to their needs.

Initiating flextime, which allows Center employees to choose their own eight duty hours between 0630 and 1700, increased customer service coverage for WATS line queries by two and a half hours a day, Monday through Friday. Special "how to" features in various publications tell Reservists how to use the ARPC system to their advantage.

Using a Mailgram mobilization order has greatly reduced mobilization response time. If the President or Congress orders mobilization, up to 10,000 orders an hour could be transmitted to Reservists through Western Union's Mailgram system. The twenty-four-hour recall notice is now a reality.

Selection for Professional Military Education now coincides with ROPA promotion boards convened at the Center. The top ten percent selected for ROPA promotion to the grades of major, lieutenant colonel, and colonel will be considered by a Central Schools Selection Board (CSSB) along with Reserve volunteers.

ARPC has finished converting Air Force Reserve records to microfilm. During FY '77, approximately 24,000 Air Force Reserve and Air National Guard officer records and 40,000 Air Force Reserve enlisted records were converted. This has allowed ARPC to reduce active file storage space from approximately 14,000 square feet to 1,500 square feet. Converting ANG enlisted records to microfilm is under way.

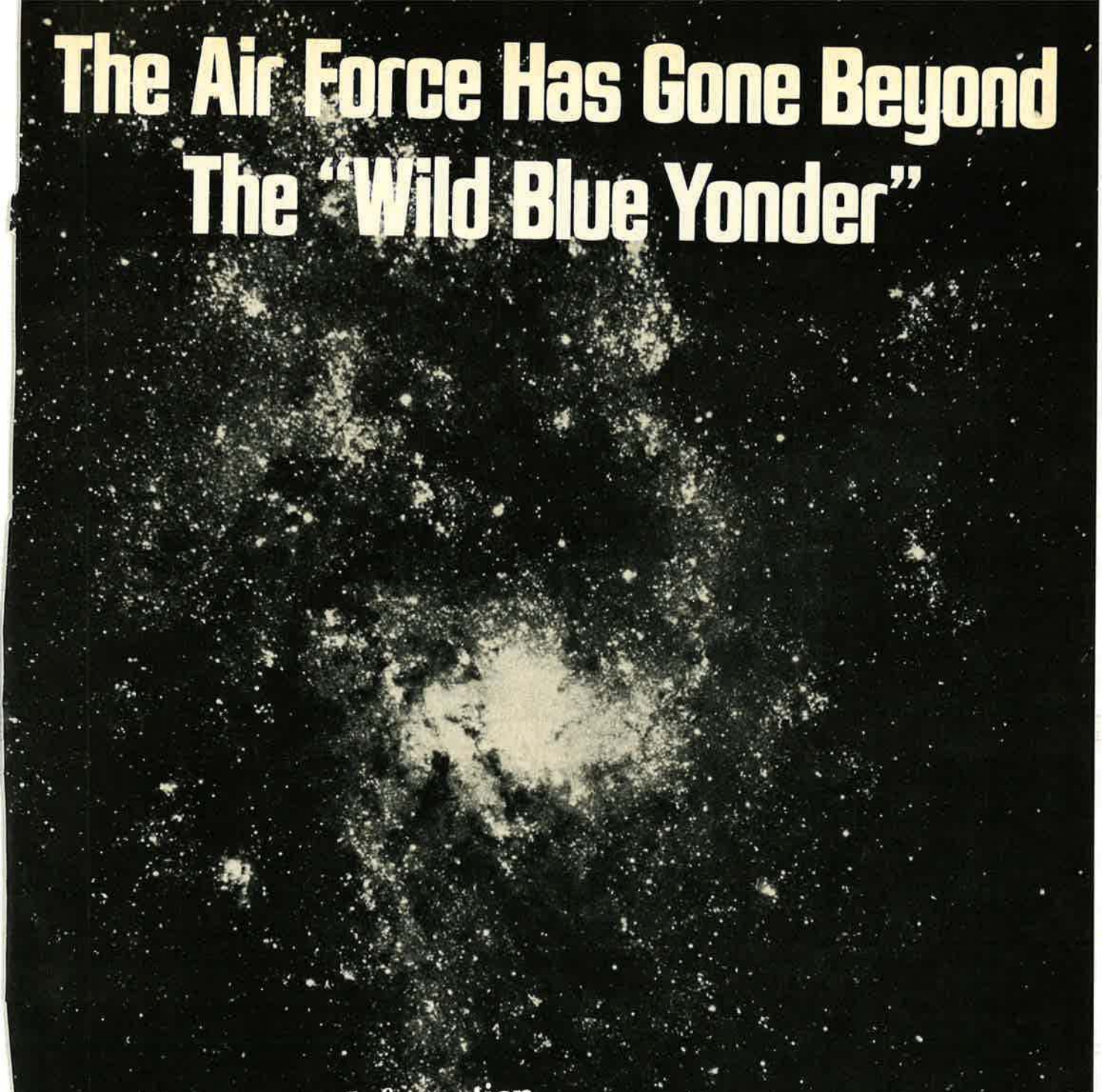
Internal management improvements for ARPC's approximately 700 civilian and 175 military employees included two pilot projects in Job Enrichment, and hiring a full-time education and training officer to develop and implement a centerwide training program.

Throughout last year, better service to men and women of the Reserve Forces was ARPC's primary concern. Continued improvement is the goal for coming months. ■

Col. Frank D. Hardee, Commander, ARPC.

CMSgt. Posie W. Barker, Senior Enlisted Advisor, ARPC.

The Air Force Has Gone Beyond The "Wild Blue Yonder"



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Air Force Reserve

An AFRES KC-135 tanker refuels an F-16 fighter over Edwards AFB, Calif. The Reserve will receive both F-16s and A-10s at some time in the future.

Since 1970, ninety percent of the Air Force Reserve (AFRES) flying force has converted to more modern equipment. In the next scheduled conversion, airborne early warning and control EC-121s will be swapped for F-4 Phantom fighters in October 1978, and longer-range plans call for AFRES units to fly A-10 close air support aircraft and F-16 multipurpose fighters.

This modernization reflects increasing Department of Defense reliance on AFRES in the Total Force Policy. The command closed out 1977 with all flying units that had their assigned aircraft rated as combat ready.

Typical of AFRES response without being mobilized was the swift, round-the-clock participation in Operation Snow Blow II, the airlift of emergency snow-removal equipment and personnel to cities in the northeastern US that were paralyzed by the February blizzard. Reserve C-130 Hercules crews voluntarily pitched in to assist the Military Airlift Command (MAC) in providing aid to these snowbound victims.

In another humanitarian mission, four AFRES aerospace rescue and recovery units equipped with HC-130, HH-1H and HH-3E aircraft flew 673 hours on 396 missions in 1977 and were credited with forty-four lives saved.

An AFRES WC-130 weather reconnaissance group accounted for more than seventy percent of the nation's hurricane surveillance. Other C-130s with airborne firefighting gear helped the US Forest Service contain devastating West Coast blazes that raged over thousands of acres.

In addition to these units, which augment MAC resources, AFRES personnel assigned to C-141 StarLifter and C-5 Galaxy Associate Units comprise almost fifty percent of MAC's strategic aircrews and thirty-five percent of that command's maintenance force. Other AFRES aircraft, including C-7 Caribou and C-123 Provider transports, would provide MAC with more than 240 aircraft if mobilized, and represent thirty-five percent of the Air Force's tactical airlift capability.

The Tactical Air Command's strike force can be beefed up with more than 170 AFRES aircraft and crews. These units fly F-105 Thunderchiefs, A-37 Dragonflys, AC-130 gunships, and CH-3E and Jolly Green Giant helicopters. The AFRES gunships and special operations helicopters make up about half of the Air Force's special operations inventory.

Many AFRES aircraft equipped for aerial refueling are finding Air Force Reservists on the other end of the refueling boom, now that AFRES is assigned KC-135 Stratotankers, which support Strategic Air Command and other Air Force commands. A third KC-135 squadron will be activated in July 1978.

The Air Force Reserve's 143 nonflying units also augment the capabilities of gaining commands. For example, civil engineering units perform many construction projects at bases across the US and overseas, accomplishing training while assisting the regular Air Force. Other Reservists augment base hospitals or fly with aeromedical evacuation units. Aerial port personnel are among those deployed overseas to handle cargo, passengers, and mail. Mobile maintenance and supply units are called upon to assist Air Force Logistics Command in depot work as a part of their training.

AFRES Headquarters is at Robins AFB, Ga., where the command administers units with more than 450 aircraft. The people responsible for the diverse AFRES missions include some 48,000 Air Force Reservists, of whom about 7,000 are Air Reserve Technicians (ARTs), more than 3,000 non-ART civilians, and 400 active-duty military personnel. These dedicated individuals ensure that the Air Force Reserve is trained and ready to respond to any national emergency. ■

Maj. Gen. William Lyon, Commander, AFRES.

CMSgt. Jackie R. Farley, Senior Enlisted Advisor, AFRES.

AIR FORCE RESERVE FLYING WINGS AND ASSIGNED UNITS

AIR FORCE	WING HQ.	GROUP	SQUADRON	TYPE AIRCRAFT	LOCATION	GAINING COMMAND
Fourteenth Air Force (Hq., Dobbins AFB, Ga.)		932d AAG (Assoc)	73d AAS (Assoc)	C-9	Scott AFB, Ill.	MAC
	94th TAW		700th TAS	C-7A	Dobbins AFB, Ga.	MAC
		908th TAG	357th TAS	C-7A	Maxwell AFB, Ala.	MAC
	302d TAW		355th TAS	C-123K	Rickenbacker AFB, Ohio	MAC
			356th TAS	C-123K	Rickenbacker AFB, Ohio	MAC
		911th TAG	758th TAS	C-123K	Greater Pittsburgh AP, Pa.	MAC
	315th MAW (Assoc)		300th MAS (Assoc)	C-141	Charleston AFB, S. C.	MAC
			701st MAS (Assoc)	C-141	Charleston AFB, S. C.	MAC
			707th MAS (Assoc)	C-141	Charleston AFB, S. C.	MAC
	439th TAW		337th TAS	C-130B	Westover AFB, Mass.	MAC
			731st TAS	C-123K	Westover AFB, Mass.	MAC
		914th TAG	328th TAS	C-130A	Niagara Falls IAP, N. Y.	MAC
	459th TAW		756th TAS	C-130E	Andrews AFB, Md.	MAC
		913th TAG	327th TAS	C-130E	Willow Grove NAS, Pa.	MAC
		927th TAG	63d TAS	C-130A	Selfridge ANG Base, Mich.	MAC
	512th MAW (Assoc)		326th MAS (Assoc)	C-5	Dover AFB, Del.	MAC
			709th MAS (Assoc)	C-5	Dover AFB, Del.	MAC
	514th MAW (Assoc)		335th MAS (Assoc)	C-141	McGuire AFB, N. J.	MAC
			702d MAS (Assoc)	C-141	McGuire AFB, N. J.	MAC
			732d MAS (Assoc)	C-141	McGuire AFB, N. J.	MAC
Tenth Air Force (Hq., Bergstrom AFB, Tex.)			302d SOS	CH-3E	Luke AFB, Ariz.	TAC
		915th AEW&CG	79th AEW&CS	EC-121T	Homestead AFB, Fla.	ADCOM
		919th SOG	711th SOS	AC-130A	Eglin AFB, Fla. (Aux. 3)	TAC
	301st TFW		457th TFS	F-105D/F	Carswell AFB, Tex.	TAC
		507th TFG	465th TFS	F-105D/F	Tinker AFB, Okla.	TAC
		508th TFG	466th TFS	F-105B	Hill AFB, Utah	TAC
	434th TFW		45th TFS	A-37B	Grissom AFB, Ind.	TAC
			46th TFS	A-37B	Grissom AFB, Ind.	TAC
		910th TFG	757th TFS	A-37B	Youngstown Municipal AP, Ohio	TAC
		917th TFG	47th TFS	A-37B	Barksdale AFB, La.	TAC
		926th TFG	706th TFS	A-37B	NAS, New Orleans, La.	TAC
	452d ARW		336th ARS (Heavy)	KC-135	March AFB, Calif.	SAC
		940th ARG (Heavy)	314th ARS (Heavy)	KC-135	Mather AFB, Calif.	SAC
Fourth Air Force (Hq., McClellan AFB, Calif.)	349th MAW (Assoc)		301st MAS (Assoc)	C-5A	Travis AFB, Calif.	MAC
			312th MAS (Assoc)	C-5A	Travis AFB, Calif.	MAC
			708th MAS (Assoc)	C-141	Travis AFB, Calif.	MAC
			710th MAS (Assoc)	C-141	Travis AFB, Calif.	MAC
	403d RWRW		305th ARRS	HH-3E, HC-130H/N	Selfridge ANG Base, Mich.	MAC
			301st ARRS	HH-1H, HH-3E	Homestead AFB, Fla.	MAC
			303d ARRS	HC-130H	March AFB, Calif.	MAC
			304th ARRS	HH-1H	Portland IAP, Ore.	MAC
		920th WRG	815th WRS	WC-130H	Keesler AFB, Miss.	MAC
	433d TAW		68th TAS	C-130B	Kelly AFB, Tex.	MAC
		924th TAG	704th TAS	C-130B	Bergstrom AFB, Tex.	MAC
	440th TAW		95th TAS	C-130A	Gen. Billy Mitchell Fld., Wis.	MAC
		928th TAG	64th TAS	C-130A	Chicago-O'Hare IAP, Ill.	MAC
	442d TAW		303d TAS	C-130E	Richards-Gebaur AFB, Mo.	MAC
		934th TAG	96th TAS	C-130A	Minneapolis-St. Paul IAP, Minn	MAC
	445th MAW (Assoc)		728th MAS (Assoc)	C-141	Norton AFB, Calif.	MAC
			729th MAS (Assoc)	C-141	Norton AFB, Calif.	MAC
			730th MAS (Assoc)	C-141	Norton AFB, Calif.	MAC
	446th MAW (Assoc)		97th MAS (Assoc)	C-141	McChord AFB, Wash.	MAC
			313th MAS (Assoc)	C-141	McChord AFB, Wash.	MAC

AAG/S (Assoc)	Aeromedical Airlift Group/Squadron (Assoc)	RWRW	Rescue & Weather Reconnaissance Wing
AEW&CG/S	Airborne Early Warning & Control Group/Squadron	SOG/S	Special Operations Group/Squadron
ARRS	Aerospace Rescue & Recovery Squadron	TAW/G/S	Tactical Airlift Wing/Group/Squadron
ARW/G/S	Air Refueling Wing/Group/Squadron	TFW/G/S	Tactical Fighter Wing/Group/Squadron
MAW/S (Assoc)	Military Airlift Wing/Squadron (Assoc)	WRG/S	Weather Reconnaissance Group/Squadron

Air National Guard

The primary peacetime mission of the Air National Guard (ANG) is to maintain a state of readiness that will ensure successful active force augmentation when mobilized. ANG units are in state status and commanded by their state governors unless called to federal duty. They may be called for federal service by order of the President, upon declaration of war by Congress, or when otherwise authorized by law. While in state status, the ANG provides the states a trained, equipped, and disciplined force to preserve peace and protect life and property during disasters, civil disorders, and other emergencies.

All Air Guard units are assigned for mobilization purposes to active Air Force major commands that establish and advise units on training standards and conduct inspections. Upon mobilization, they take their place in the organizational structure of their gaining commands: TAC, SAC, ADCOM, MAC, AFCS, ATC, and PACAF.

Air Guard members participate in forty-eight unit training assemblies each year plus fifteen days of annual training. Aircrews receive up to thirty-six additional flying-training periods to maintain proficiency and ensure mission readiness.

The Air Guard force structure includes twenty-four wings, ninety-one flying squadrons, and 231 major nonflying units. The flying squadrons operate seventeen different types of mission aircraft. Nearly 92,000 men and women are assigned to units in all fifty states, the District of Columbia, and Puerto Rico.

During 1977, the ANG achieved a 100 percent pass rate on operational readiness inspections (ORIs) while expanding its peacetime support of active forces. ANG KC-135 units are augmenting SAC's permanent Tanker Task Force (ETTF), and seven KC-135 units are standing SIOP alert. Operation Creek Party, ANG KC-97 aerial refueling support of Air Force aircraft in Europe, terminated in May 1977 following ten successful accident-free years of operation.

ANG units have participated extensively in TAC's Red Flag exercises and Short Term Tactical Deployments. TAC-gained ANG units also flew 4,877 close air support sorties in support of US Army training requirements.

ANG F-106, F-101, and F-4 units continue to provide aircraft and crews to CINCNORAD on continuous twenty-four-hour alert. These units provide a significant part of the air defense interceptor force for the continental United States, and the entire air defense capability for Hawaii.

On October 1, 1977, ANG C-130 units, along with AFRES C-130s, took over the rotational (ROTE) commitment to US Southern Command from active-force elements of MAC. The C-130 units provide in-theater airlift support. Two ANG HC-130/HH-3 combat rescue units are an integral part of the National Search & Rescue (SAR) plan.

Twenty-one ANG medical units performed annual training in active Air Force medical facilities providing critical manning assistance in the areas of orthopedic surgery, general surgery, anesthesiology, general dentistry, operating room nurses, and pharmacy technicians.

ANG Electronic Installation (EI) personnel contributed 402,100 man hours of direct labor to the Air Force Communications Service (AFCS). In addition, 45,500 man-hours of proficiency training were obtained under the volunteer augmentation program. The program provided ANG EI volunteers in Europe, the Middle East, Far East, Hawaii, Alaska, and throughout the CONUS to augment AFCS active units.

Force modernization continues with eight aircraft conversions scheduled for FY '78, resulting in the phaseout of two F-100 squadrons and retirement of the last four ANG KC-97 squadrons. Replacement aircraft are KC-135s, A-7Ds, F-4Cs, and C-130Bs. Also, all of the remaining F-100 and RF-101 aircraft in the ANG will be replaced with F-4Cs, A-7Ds, RF-4Cs, and F-105G Wild Weasels (a new ANG mission) in FY '79. Two units of new production A-10s are programmed for FY '79, and the Guard is to receive eight new C-130Hs. Tactical fighter squadrons in Colorado and at Springfield, Ill., will be increased from eighteen to twenty-four A-7D and F-4C aircraft respectively. Nonflying units are also modernizing with ANG Tactical Control units receiving the TPS-43 radars and Combat Communications Groups receiving additional TRAC-97 radios.

The professionally trained citizen-airmen demonstrate daily the value of a strong and ready reserve of the Air Force. Tested and proven, the Air National Guard is recognized as a "ready-now" member of the Total Force. ■

Maj. Gen. John T. Guice, Director, ANG.

CMSgt. Lynn E. Alexander, Senior Enlisted Advisor, ANG.

THE AIR NATIONAL GUARD BY MAJOR COMMAND ASSIGNMENT

(As of April 1, 1978)

AEROSPACE DEFENSE COMMAND

F-101 Voodoo

107th Fighter Interceptor Gp.	Niagara Falls, N. Y.
142d Fighter Interceptor Gp.	Portland, Ore.
147th Fighter Interceptor Gp.	Ellington AFB, Tex.*

F-106 Delta Dart

102d Fighter Interceptor Wg.	Otis AFB, Mass.*
144th Fighter Interceptor Wg.	Fresno, Calif.
120th Fighter Interceptor Gp.	Great Falls, Mont.
125th Fighter Interceptor Gp.	Jacksonville, Fla.
177th Fighter Interceptor Gp.	Atlantic City, N. J.

F-4C/D Phantom

119th Fighter Interceptor Gp.	Fargo, N. D.
191st Fighter Interceptor Gp.	Selfridge ANGB, Mich.

EB-57

158th Defense System Evaluation Gp.	Burlington, Vt.
190th Defense System Evaluation Gp.	Forbes Field, Kan.

STRATEGIC AIR COMMAND

KC-135 Stratotanker

101st Air Refueling Wg.	Bangor, Me.
126th Air Refueling Wg.	Chicago, Ill.
141st Air Refueling Wg.	Fairchild AFB, Wash.
171st Air Refueling Wg.	Pittsburgh, Pa.
128th Air Refueling Gp.	Gen. Billy Mitchell Field, Wis.
134th Air Refueling Gp.	Knoxville, Tenn.
151st Air Refueling Gp.	Salt Lake City, Utah
157th Air Refueling Gp.	Pease AFB, N. H.
160th Air Refueling Gp.	Rickenbacker AFB, Ohio
161st Air Refueling Gp.	Phoenix, Ariz.
170th Air Refueling Gp.	McGuire AFB, N. J.
189th Air Refueling Gp.	Little Rock AFB, Ark.

MILITARY AIRLIFT COMMAND

C-130 Hercules

118th Tactical Airlift Wg.	Nashville, Tenn.
133d Tactical Airlift Wg.	Minneapolis/St. Paul, Minn.
136th Tactical Airlift Wg.	NAS, Dallas, Tex.
137th Tactical Airlift Wg.	Will Rogers World Airport, Okla.
146th Tactical Airlift Wg.	Van Nuys, Calif.
109th Tactical Airlift Gp.	Schenectady, N. Y.
130th Tactical Airlift Gp.	Charleston, W. Va.
139th Tactical Airlift Gp.	St. Joseph, Mo.
143d Tactical Airlift Gp.	Providence, R. I.
145th Tactical Airlift Gp.	Charlotte, N. C.
153d Tactical Airlift Gp.	Cheyenne, Wyo.
164th Tactical Airlift Gp.	Memphis, Tenn.
165th Tactical Airlift Gp.	Savannah, Ga.
166th Tactical Airlift Gp.	Wilmington, Del.
167th Tactical Airlift Gp.	Martinsburg, W. Va.
172d Tactical Airlift Gp.	Jackson, Miss.
176th Tactical Airlift Gp.	Anchorage, Alaska
179th Tactical Airlift Gp.	Mansfield, Ohio

C-7A Caribou

135th Tactical Airlift Gp.	Baltimore, Md.

HC-130 Hercules/HH-3 Jolly Green Giant

106th Aerospace Rescue & Recovery Gp.	Suffolk Co. Airport, N. Y.
129th Aerospace Rescue & Recovery Gp.	Hayward, Calif.

PACIFIC AIR FORCES

F-4 Phantom

154th Tactical Fighter Gp.	Hickam AFB, Hawaii

* No longer a major active Air Force base

TACTICAL AIR COMMAND

A-7D Corsair II

121st Tactical Fighter Wg.	Rickenbacker AFB, Ohio
132d Tactical Fighter Wg.	Des Moines, Iowa
140th Tactical Fighter Wg.	Buckley ANGB, Colo.
112th Tactical Fighter Gp.	Pittsburgh, Pa.
150th Tactical Fighter Gp.	Kirtland AFB, N. M.
156th Tactical Fighter Gp.	San Juan, Puerto Rico
169th Tactical Fighter Gp.	McEntire ANGB, S. C.
185th Tactical Fighter Gp.	Sioux City, Iowa

F-100D Super Sabre

116th Tactical Fighter Wg.	Dobbins AFB, Ga.
122d Tactical Fighter Wg.	Fort Wayne, Ind.
127th Tactical Fighter Wg.	Selfridge ANGB, Mich.
131st Tactical Fighter Wg.	St. Louis, Mo.
103d Tactical Fighter Gp.	Windsor Locks, Conn.
104th Tactical Fighter Gp.	Westfield, Mass.
138th Tactical Fighter Gp.	Tulsa, Okla.
149th Tactical Fighter Gp.	Kelly AFB, Tex.
159th Tactical Fighter Gp.	NAS, New Orleans, La.
180th Tactical Fighter Gp.	Toledo, Ohio
181st Tactical Fighter Gp.	Terre Haute, Ind.
188th Tactical Fighter Gp.	Fort Smith, Ark.

A-7D Corsair II

114th Tactical Fighter Gp.	Sioux Falls, S. D.
162d Tactical Fighter Training Gp.	Tucson, Ariz.
178th Tactical Fighter Gp.	Springfield, Ohio

F-105B Thunderchief

108th Tactical Fighter Wg.	McGuire AFB, N. J.

F-105D Thunderchief

113th Tactical Fighter Wg.	Andrews AFB, Md.
192d Tactical Fighter Gp.	Byrd Field, Sandston, Va.

F-105F Thunderchief

184th Tactical Fighter Training Gp.	McConnell AFB, Kan.

A-37B Dragonfly

174th Tactical Fighter Gp.	Syracuse, N. Y.
175th Tactical Fighter Gp.	Baltimore, Md.

F-4C Phantom

183d Tactical Fighter Gp.	Springfield, Ill.

RF-4C Phantom

117th Tactical Reconnaissance Wg.	Birmingham, Ala.
123d Tactical Reconnaissance Wg.	Louisville, Ky.
124th Tactical Reconnaissance Gp.	Boise, Idaho
148th Tactical Reconnaissance Gp.	Duluth, Minn.
152d Tactical Reconnaissance Gp.	Reno, Nev.
155th Tactical Reconnaissance Gp.	Lincoln, Neb.
187th Tactical Reconnaissance Gp.	Montgomery, Ala.

RF-101C Voodoo

186th Tactical Reconnaissance Gp.	Meridian, Miss.

O-2A Super Skymaster

105th Tactical Air Support Wg.	White Plains, N. Y.
128th Tactical Air Support Wg.	Truax Field, Wis.
110th Tactical Air Support Gp.	Battle Creek, Mich.
111th Tactical Air Support Gp.	Willow Grove NAS, Pa.
163d Tactical Air Support Gp.	Ontario, Calif.
182d Tactical Air Support Gp.	Peoria, Ill.

EC-130E

193d Tactical Electronic Warfare Gp.	Harrisburg, Pa.

Air Force Academy

In the last two years, 310 women cadets have entered the Academy.

A milestone was reached in 1977 when Col. Harold V. Todd, a member of the Academy's first graduating class, became the first Air Force Academy alumnus to be selected for promotion to brigadier general.

Since Harold Todd's graduation in 1959, more than 11,000 graduates have joined the officer corps, including 851 last year. Replacing those 1977 graduates were 1,501 entering members of the Class of 1981, including 153 women. The new cadets brought the Academy Cadet Wing strength to just over 4,400, the maximum authorized by law. Of those, 310 women cadets have entered during the past two years. Performance and attrition statistics are about the same as for men in the same classes.

The Academy mission is to produce career officers for the Air Force. The track record thus far has been outstanding, with more than two of every three graduates remaining on active duty past their initial service obligation.

Overseeing Academy activities are the Superintendent, Lt. Gen. K. L. Tallman, and his staff of more than 1,150 officers, 1,480 enlisted personnel, and 2,350 civilians.

The 550 faculty members offer instruction in twenty-three academic majors with heavy emphasis on science and engineering courses. But all cadets must also take a series of core courses that provide a broad background in the social sciences and humanities as well.

A 461,000-volume reference library supporting these studies will be expanded in the near future to accommodate more than 100,000 additional volumes.

Complementing the academic studies is an air-oriented military education and training program. This starts with an initial six weeks of basic military training as new cadets arrive, but develops into a combination of classroom instruction and practical experience as the years progress. Upperclass cadets command and administer the Cadet Wing through their leadership positions.

Since most cadets follow either pilot or navigator careers, the aviation aspects of training are emphasized. Light aircraft training for qualified senior cadets is complemented by optional parachuting and soaring programs for all cadets. The acquisition of two new UV-18B aircraft in 1977 has tripled the parachuting program, allowing for fifteen jumpers on each flight instead of only five as before.

Not all athletes become Air Force Academy cadets, but all Air Force Academy cadets become athletes. Few schools in the country have as extensive physical education, intramural, or intercollegiate programs. In addition to stressing physical development and skills, the program enhances cadet leadership training as cadets plan, execute, and serve as officials in their own intramural program involving 640 teams in sixteen different sports.

At the intercollegiate level, the Academy fields forty-four different teams in nineteen men's and women's sports. A major change last year saw Bill Parcells, a former assistant at Texas Tech, replace Ben Martin as head coach of the football team. Martin retired after eighteen seasons at the helm.

The Academy is located on the east side of the Rocky Mountains, just north of Colorado Springs. Last year, more than 1,600,000 tourists visited the Academy, most of them during the summer months.

The Academy has traditionally produced top scholars as well as outstanding Air Force officers. Academically, the Academy ranks high among the nation's colleges in winners of Rhodes Scholarships, Guggenheim Fellowships, and NCAA Scholar Athlete Scholarships. Athletically, Academy teams have also performed well over the years, winning more than seventy percent of all games played at the intercollegiate level. Militarily, Academy graduates have won every Air Force decoration, including the Medal of Honor. ■

Lt. Gen. Kenneth L. Tallman, Superintendent, USAFA.

CMSgt. Elmer W. Wienecke, Senior Enlisted Advisor, USAFA.

Both the U.S. Air Force and U.S. Army have now chosen Twin Otters.

For many good reasons.

The United States Air Force Academy has chosen two de Havilland Twin Otters for training cadets in parachute drops in its airmanship program.

Designated UV-18B, these are the first Twin Otters to be used by the U.S.A.F., while the Twin Otter UV-18A's are serving the specific requirements of the U.S. Army.

The performance characteristic of the Twin Otter which most attracted the Academy is the airplane's single-engine capability, which is an absolute must at Colorado Springs, where they operate from small strips located at altitudes above 6,000 ft.

With the aircraft they currently operate, the Academy is able to train about 300 cadets annually, *replacement with these new Twin Otter UV-18B airplanes will accommodate approximately 750 cadets each year.*

Not only will the UV-18B substantially reduce costs, but at the same time it will be much quieter than the aircraft presently in use; an important feature since noise pollution has become a matter of great concern in the vicinity of the Academy's operating area.

It has been almost 30 years since the first de Havilland aircraft, the Beaver, was accepted by the U.S.A.F. The U.S. Army also chose the Beaver, then the Otter, the Caribou and the Twin Otter—a total of more than 1,300 de Havilland aircraft in all.

This confidence in de Havilland performance speaks for itself.

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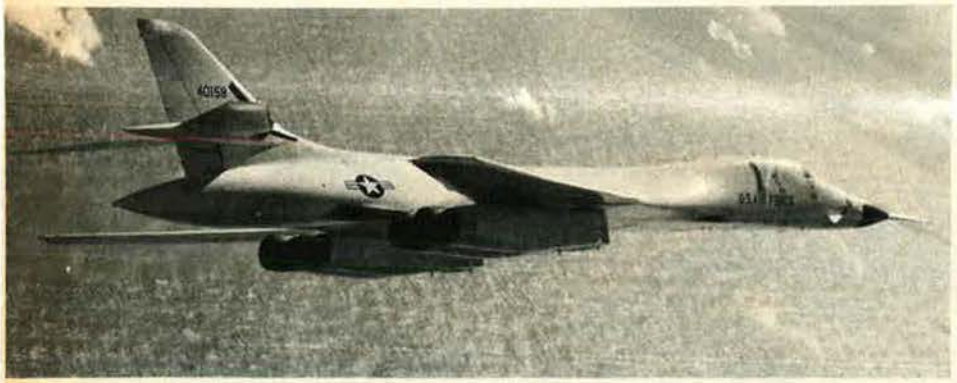
de Havilland

GALLERY OF USAF WEAPONS

BY S. H. H. YOUNG, ASSOCIATE COMPILER, JANE'S ALL THE WORLD'S AIRCRAFT
EDITED BY JOHN W. R. TAYLOR, EDITOR, JANE'S ALL THE WORLD'S AIRCRAFT



B-1

Bombers

B-52 with low-light-level TV sensors

FB-111 with air-to-ground SRAM

B-1

Although the B-1 strategic heavy bomber, which has been in development since 1970, will not be entered into production now or probably in the future, the four pre-production aircraft are to be used in a continuing research and development program. The description and data that follow are included in this Gallery as a convenience to readers, since the B-1's potential contribution to the deterrent triad is likely to remain a topic of discussion and debate.

The B-1 is a variable-geometry aircraft with a blended wing-body configuration, and was intended to maintain the effectiveness of the SAC manned bomber force into the next century. Its nuclear hardening, high alert rate, and fast takeoff would give it excellent launch survivability. It was intended, normally, to cruise to its target at subsonic speed, then attack at high subsonic speed and low altitude. Alternatively, it would be capable of supersonic over-the-target dash at high altitude. Its radar signature is approximately 10% that of the B-52; it carries twice the latter's payload, and can use shorter runways. A unique structural mode control system (SMCS), utilizing small canard foreplanes and the bottom rudder section, minimizes the effect of turbulence on crew and airframe during high-speed, low-level terrain-following. Variable-geometry inlets, which allow speeds of up to Mach 2.1, were eliminated as a cost-reduction measure on the proposed production aircraft, although they could be fitted if required. Operational test flights demonstrated the B-1's ability to fulfill its designed role, in terms of base escape, high-altitude cruise with aerial refueling, low-altitude high-speed terrain-following penetration, simulated weapons release, and recovery. Mach 2.0 was exceeded for the first time in April 1976. Defensive avionics that have been under development for the aircraft include radio frequency surveillance and warning equipment, electronic countermeasures, and other countermeasures such as chaff.

Contractor: Rockwell International Corporation, North American Aircraft Operations, Los Angeles Division.
Power Plant: four General Electric F101-GE-100 afterburning turbofan engines; each approximately 30,000 lb thrust.
Accommodation: four: two pilots and two systems operators, in pairs.
Dimensions: span spread 136 ft 8½ in, fully swept 78 ft 2½ in, length overall 150 ft 2½ in, height 33 ft 7¼ in.
Weight: gross 389,800 lb.
Performance: max speed at 50,000 ft Mach 2.1, max range without refueling 6,100 miles.
Armament: three internal weapon bays, accommodating 24 AGM-69B SRAMs on three rotary dispensers, or 75,000 lb of free-fall bombs. Provision for 8 more SRAMs or 40,000 lb of free-fall weapons externally.

B-52 Stratofortress

About 400 of the 744 production B-52s built between 1954 and 1962 remain, constituting the major piloted element of the current Strategic Air Command inventory. Successive refinements, including the installation of new equipment and more powerful engines in later versions, and the updating of earlier models, ensure the continued effectiveness of the type, of which the "G" and "H" variants are most numerous. Apart from its conventional role, the B-52 has been utilized in recent years in other missions, including sea-surveillance flights in cooperation with the USN. Versions still operational are: **B-52D,** total of 170 built with J57-P-29W turbojet engines, with delivery from December 1956; refurbishment of about 80 "D"s was completed early last year in order to extend their operational life. **B-52F,** with uprated J57-P-43W engines, first flown in May 1958; 89 built; those remaining in inventory now used for training purposes. **B-52G,** introduced important changes including a redesigned wing containing integral fuel tankage, fixed underwing tanks, a new tail fin of reduced height and broader chord; a remotely controlled tail turret which allowed the gunner to be repositioned with the rest of the crew; deliveries began in February 1959, and 193 were built. **B-52H,** the final version, switched to TF33 turbofan engines and had improved defensive armament, including a Vulcan multibarrel tail gun; 102 were built, with deliveries starting in May 1961. Under a major USAF program initiated in 1971, the B-52Gs and "H"s were each modified to carry 20 AGM-69A Short Range Attack Missiles, six under each wing and eight in the bomb-bay. In addition, all B-52Gs and "H"s have been equipped with an AN/ASQ-151 Electro-optical Viewing System (EVS), using forward looking infrared (FLIR) and low-light-level TV sensors to improve low-level flight capability. (Data for B-52G.)

Contractor: The Boeing Aerospace Company.
Power Plant: eight Pratt & Whitney J57-P-43W turbojet engines; each 13,750 lb thrust.
Accommodation: two pilots, side-by-side, plus navigator, radar-navigator, ECM operator, and tail gunner.
Dimensions: span 185 ft 0 in, length 157 ft 7 in, height 40 ft 8 in.
Weight: gross 480,000 lb.
Performance (approx): max speed at 20,000 ft 660 mph, service ceiling 55,000 ft, range 10,000 miles.
Armament: four 0.50 caliber guns in tail turret; bombs and Quail diversionary missiles internally. Alternative provision for 20 SRAM missiles.

FB-111A

A two-seat, medium-range, high-altitude strategic bomber version of the basic swingwing F-111, the **FB-111A** was developed originally to provide SAC with a replacement for some of its B-52C/F versions of the Stratofortress and B-58A Hustlers. It is also capable of supersonic speed at sea level. The first of 76 production aircraft flew in July 1968, and the initial delivery was made in October 1969 to the 340th Bomb Group. Operational units equipped with the FB-111A are the 380th and 509th Bomb Wings.

Contractor: General Dynamics Corporation.
Power Plant: two Pratt & Whitney TF30-P-7 turbofan engines; each 20,350 lb thrust with afterburning.
Accommodation: two, side-by-side.
Dimensions: span spread 70 ft 0 in, fully swept 33 ft 11 in, length 73 ft 6 in, height 17 ft 1.4 in.
Weight (approx): gross 100,000 lb.
Performance: max speed at 36,000 ft Mach 2.5, service ceiling more than 60,000 ft, range 4,100 miles with external fuel.
Armament: up to four AGM-69A SRAM air-to-surface missiles on external pylons, plus two in the weapons bay, or six nuclear bombs, or combinations of these weapons; provision for up to 31,500 lb of conventional bombs.

Fighters

F-4 Phantom II

Continued updating has enabled this mid-1950s all-weather fighter to remain an effective element in USAF's tactical inventory. Well over 600 F-4s equip TAC units; about 450 are based with USAFE in Europe; PACAF units in Hawaii, Korea, Okinawa, and the Philippines, AAC's 43d Tactical Fighter Squadron, and one ADCOM (ANG) squadron are similarly equipped. Latest equipment produced for USAF Phantoms includes the Pave Spike day tracking/laser ordnance designator pod, for use with "smart" weapons, and the advanced ALQ-131 ECM system capable of covering the complete range of threat radars. First Phantom version supplied to USAF was the **F-4C,** a two-seat tactical fighter developed from the basic F-4B naval version, with J79-GE-15 turbojet engines and provision for a large external weapon load. Modifications included dual controls, an inertial navigation system, and boom flight refueling, instead of drogue. The 583 aircraft completed between May 1963 and May 1966 were deployed by TAC, PACAF, and USAFE for close-support, attack, and air-superiority duties, and with ANG from January 1972. Two squadrons are operational in a "Wild Weasel" defense suppression role, carrying ECM warning sensors, jamming pods, chaff dispensers, and antiradiation missiles. The **F-4D** was developed from the F-4C with major systems changes, including new weapon ranging and release computers to increase accuracy in air-to-air and air-to-surface weapon delivery. First F-4D flew in December 1965, with deliveries beginning in March 1966. Total of 843 built, primarily for USAF, but 32 were supplied to Iran and 36 transferred from USAF to the Republic of Korea. The **F-4E** is a multirole fighter capable of performing air-superiority, close-support, and interdiction missions. A 20 mm Vulcan multi-barrel gun is fitted, together with an improved fire-control system, as a result of operational experience with earlier aircraft, some of which had been equipped with pod-mounted guns. An additional fuselage fuel tank extends the F-4E's radius of action. Leading-edge slats, to improve maneuverability, have been retrofitted to all USAF F-4Es. In addition, from early 1973, some models were fitted with Northrop's target-identification system electro-optical (TISEO) as an aid to positive long-range visual identification of airborne or ground targets. Several hundred F-4Es have been built for USAF. Latest 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, and a digital intercept computer that includes launch computations for all USAF AIM-9 and AIM-7 missiles. The **F-4G** (Advanced "Wild Weasel") is a modified F-4E with sophisticated electronic warfare equipment that enables it to detect, identify, and locate enemy radars, and to direct against them weapons for their destruction or suppression. Changing EW threats are covered by use of reprogrammable software. Primary armament includes Shrike (AGM-45), Standard ARM (AGM-78), and HARM (AGM-88), with optional availability of the CBU Rockeye area weapon for suppression purposes, and the Maverick missile. The first operational kit installation was begun in the spring of 1976, followed by a second in the autumn. A further 15 installations were scheduled for completion in 1977, followed by 60 more this year and 39 in 1979, providing a total of 116 aircraft. (Data for F-4E.)

Contractor: McDonnell Aircraft Company, Division of McDonnell Douglas Corporation.
Power Plant: two General Electric J79-GE-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 2.27, range with typical tactical load 1,300 miles.
Armament: one 20 mm M-61A1 multibarrel gun; provision for up to four AIM-7E Sparrow, AIM-4D Falcon, 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 successor to Northrop's F-5A export fighter, the Tiger II was intended primarily to provide America's allies with an uncomplicated air-superiority tactical fighter, capable of relatively inexpensive maintenance and operation. The single-seat **F-5E,** first flown in August 1972, is basically a VFR day/night fighter with limited all-weather capability. Design emphasis is on maneuverability rather than high speed, notably through the use of maneuvering flaps. More than 900 F-5Es and two-seat **F-5Fs** have been ordered by a dozen countries. TAC, assisted by ATC, is training pilots and technicians of user air forces. For this purpose, 20 F-5Es were supplied to USAF, beginning in April 1973 with the 425th TF Squadron, before deliveries to foreign governments began late that year. Deliveries of the F-5F began in the summer of 1976. TAC also operates two "aggressor squadrons" of camouflaged F-5Es, simulating late-model MiG threat aircraft, in "Red Flag" exercises at Nellis AFB, Nev. Similar training is provided by F-5Es of the 527th Tactical Fighter Training Aggressor Squadron, USAFE, at RAF Alconbury, England. PACAF's aggressor squadron, in the Philippines, operates T-38s. (Data for F-5E.)

Contractor: Northrop Corporation, Aircraft Division.
Power Plant: two General Electric J85-GE-21A turbojet engines; each 5,000 lb thrust with afterburning.
Accommodation: pilot only.
Dimensions: span 26 ft 8 in, length 48 ft 2 in, height 13 ft 4 in.
Weights: empty 9,583 lb, gross 24,675 lb.
Performance (at 13,220 lb): max level speed at 36,000 ft Mach 1.63, service ceiling 51,800 ft, range with max fuel, with reserve fuel for 20 min max endurance at S/L (with external tanks retained) 1,595 miles.
Armament: two AIM-9 Sidewinder missiles on wingtip launchers; two M-39A2 20 mm cannon in nose, with 280 rounds per gun; 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 (F-5F only) a laser designator.

F-4E Phantoms

F-5E Tiger II

F-15 Eagle

F-15 Eagle

Designed specifically for an air-superiority role, the F-15 is a single-seat, fixed-wing, all-weather fighter which has an inherent air-to-surface attack capability. The first **F-15A** flew in July 1972, and the type is progressively replacing the F-4 as USAF's primary air-superiority aircraft. Specialized equipment includes a lightweight Hughes radar system for long-range detection and tracking of small high-speed objects operating at all heights down to treetop level, and for ensuring effective weapons delivery, with a headup display for close-in dogfights. The IFF system embodies a Hazeltine interrogator to inform the pilot if an aircraft seen visually or on radar is friendly; an inertial navigation system is fitted. F-15 aircraft starting with FY'78 procurement will have the Production Eagle Package (PEP-2000) improvements, which include 2,000 lb of additional internal fuel, provisions for carriage of pallets, and increased takeoff gross weight capability to 68,000 lb.

To date 404 F-15s have been ordered for operational use by USAF. An additional 96 were approved in the FY '78 budget, and 78 are requested for FY '79. Planned total production is 729 aircraft for USAF by FY '83. F-15 pilot training is accomplished at Luke AFB, Ariz., in both single-seat F-15A and two-seat **F-15B** (formerly TF-15) aircraft. TAC's 1st TFW at Langley AFB, Va., and USAFE's 36th TFW at Bitburg AB, Germany, have fully operational wings; TAC's 49th TFW at Holloman AFB, N. M., should complete its complement of F-15s this year. Eight world time-to-height records were set by the specially-prepared F-15 **Streak Eagle** in early 1975, of which six remain unbeaten, including climb to 20,000 m (65,616 ft) in 2 min 2.94 sec. (Data for F-15A.)

Contractor: McDonnell Aircraft Company, Division of McDonnell Douglas Corporation.
Power Plant: Two Pratt & Whitney F100-PW-100 turbofan engines; each 25,000 lb thrust class.
Accommodation: pilot only.
Dimensions: span 42 ft 9¾ in, length 63 ft 9 in, height 18 ft 5½ in.
Weight: empty 27,300 lb, gross 56,000 lb.
Performance: max speed Mach 2.5, combat ceiling 65,000 ft, ferry range, without external fuel pallets, more than 2,878 miles.
Armament: one internally mounted M-61A1 20 mm multibarrel cannon; four AIM-9L Sidewinder and four AIM-7F Sparrow air-to-air missiles carried externally. Provision for carrying up to 15,000 lb of ordnance on three weapon stations.

F-16

F-16

Following the award of a contract in April 1975, six single-seat **F-16A** and two two-seat **F-16B** full-scale development (FSD) aircraft are under construction by General Dynamics. The first F-16A flew in December 1976, followed by the first F-16B eight months later. The eighth aircraft is due to fly by the middle of this year. These aircraft differ in a number of significant ways from the two YF-16s that were built and tested, together with two Northrop YF-17s, under USAF's Lightweight Fighter Prototype program, begun in April 1972. The prototypes were designed to exploit and flight test emerging advanced technologies such as: decreased structural weight through the use of composites, decreased drag resulting from reduced static stability margins, fly-by-wire flight controls with side stick force controller, high g tolerance/high visibility cockpit with a 30 degree reclined seat and single-piece bubble canopy, blended wing-body aerodynamics with forebody strakes and automatically variable wing leading-edges to enhance the exceptional maneuverability provided by the light weight/low wing loading design and the high thrust provided by the single F100-PW-100 engine. The interchangeability of this engine with that of the F-15 contributed to the lower acquisition and operating costs of the F-16 in the Air Force's evaluation of the two prototype fighter designs. These lower costs, together with the performance advantages demonstrated in test flights, led to the decision to develop and procure the F-16 for USAF. Compared with the prototypes, the production models have a 13.7 in longer fuselage, increased wing area, an added self-contained jet-fuel engine starter, and increased external stores-carrying capability on nine stations. An advanced all-digital stores management system feeds information concerning weapons selection and delivery mode to the fire control computer. Other equipment includes a High Resolution Ground Map (HRGM), an advanced radar warning receiver, a Marconi-Elliott head-up display, and internal chaff or flare dispensers; ECM can be carried. The eight pre-production aircraft will be used to evaluate the potential of the F-16 under operational conditions, prior to full-scale production. The USAF has indicated its intention to procure a total of 1,388 operational F-16s, of which 105 were requested in the FY '78 budget and 145 in the FY '79 budget. In addition, four NATO nations in Europe (Belgium, Denmark, the Netherlands, and Norway) have signed a memorandum of understanding with the US to purchase 348 F-16s under co-production arrangements. (Data for F-16A.)
Contractor: General Dynamics Corporation.
Power Plant: one Pratt & Whitney F100-PW-100 (3) turbofan engine; about 25,000 lb thrust with afterburning.
Accommodation: pilot only.
Dimensions: span 32 ft 10 in, length excl probe 47 ft 7.7 in, height 16 ft 5.2 in.

F-100C Super Sabre

F-101B Voodoo

F-105F two-seat trainer

Weights: empty 14,567 lb, gross, with external load 33,000 lb.
Performance: max speed Mach 2 class, service ceiling more than 50,000 ft, ferry range more than 2,200 miles.
Armament: one M-61A1 20 mm multibarrel cannon with 500 rounds, mounted in fuselage; infrared missile mounted on each wingtip; underwing attachments for other stores including air-to-surface weapons.

F-100 Super Sabre

Twelve ANG units assigned to TAC continue to operate the 400 or so Super Sabres that remain in service. First flown in May 1953, the original prototype was the first operational fighter capable of supersonic speed in level flight. The **F-100A**, with a J57-P-7 or -39 engine, was the basic single-seat interceptor version. Two hundred and three were delivered, of which some were later converted to camera-carrying RF-100As. The **F-100C** introduced a strengthened wing with four attachments for up to 6,000 lb of bombs, other weapons, or drop tanks, and could be flight refueled. Four hundred and seventy-six were built, being superseded in production by the **F-100D**, with bomb-load increased to 7,500 lb, a Minneapolis Honeywell supersonic autopilot, tail-warning radar, and other refinements; 1,274 were built. Final version was the **F-100F**, a two-seat variant for use as a fighter-bomber, air-superiority fighter, or trainer, of which 339 were built in 1957–59, with full operational equipment apart from having two instead of the standard four guns. (Data for F-100D.)
Contractor: North American Aviation, Inc.
Power Plant: one Pratt & Whitney J57-P-21A turbojet engine; 17,000 lb thrust with afterburning.
Accommodation: pilot only.
Dimensions: span 38 ft 9 in, length 47 ft 0 in, height 15 ft 0 in.
Weights: empty 21,000 lb, gross 34,832 lb.
Performance: max speed at 36,000 ft Mach 1.3 range, with two external tanks, 1,500 miles.
Armament: four 20 mm M-39E guns in fuselage; underwing pylons for six 1,000 lb bombs, two Sidewinder missiles, rockets, etc.

F-101B Voodoo

This two-seat long-range all-weather interceptor was first flown in March 1957. The ANG has three groups of F-101Bs assigned to Aerospace Defense Command, and the aircraft also continues to serve with the Canadian Armed Forces under NORAD control. *(For reconnaissance versions see page 119.)*
Contractor: McDonnell Aircraft Corporation.
Power Plant: two Pratt & Whitney J57-P-55 turbojet engines; each 14,990 lb thrust with afterburning.
Accommodation: pilot and radar operator in tandem.
Dimensions: span 39 ft 8 in, length 67 ft 4¾ in, height 18 ft 0 in.
Weight: gross 46,500 lb.
Performance: max speed at 40,000 ft Mach 1.85, service ceiling 51,000 ft, max range 1,550 miles.
Armament: two AIM-4D Falcon air-to-air missiles carried externally, and two AIR-2A Genie nuclear-warhead unguided rockets carried internally.

F-105 Thunderchief

Several squadrons of **F-105D** single-seat all-weather fighter-bombers remain in service with the ANG and AF Reserve, equipped with NASARR monopulse radar system, for use in both high- and low-level missions, and Doppler for night or bad weather operations. More than 600 were built, of which about 30 were modified to carry the T-Stick II system to improve all-weather bombing. Also in the ANG and Reserve are a few **F-105Bs** and the **F-105F** two-seat dual-purpose trainer/tactical fighter version of the F-105D with lengthened fuselage and higher tail fin, of which 143 were built. Two squadrons of the active Air Force fly the **F-105G** all-weather "Wild Weasel" version of the two-seat F-105, intended for the suppression of surface-to-air missile sites, with electronic countermeasures pods mounted on the underfuselage. Typical armament load comprises four Shrike missiles or two Standard ARMs. (Data for F-105D.)
Contractor: Fairchild Republic Division of Fairchild Industries.
Power Plant: one Pratt & Whitney J75-P-19W turbojet engine; 26,500 lb thrust with afterburning and water injection.
Accommodation: pilot only.
Dimensions: span 34 ft 11¼ in, length 67 ft 0¼ in, height 19 ft 8 in.
Weights: empty 27,500 lb, gross 52,546 lb.
Performance: max speed at 38,000 ft Mach 2.1, service ceiling 52,000 ft, max range more than 1,842 miles.
Armament: one General Electric 20 mm Vulcan multibarrel gun and more than 14,000 lb of stores under fuselage and wings.

F-106 Delta Dart

The F-106 all-weather fighter was developed in the mid-1950s from the F-102 to accommodate the larger J75 engine. Constant updating has enabled Aerospace Defense Command to deploy the aircraft throughout the

'60s and '70s, and 231 continued to serve with active USAF squadrons until the last Fiscal Year, by the end of which about half of the F-106s had been transferred to the ANG. The two production versions are: **F-106A,** single-seat interceptor with J75 engine, first flown in January 1957; 277 were built, with deliveries from July 1959. **F-106B,** a tandem two-seat dual-purpose combat trainer, of which 63 were built. The F-106's MA-1 electronic guidance and fire-control system has been updated periodically. Other modifications have included installation of supersonic drop tanks, in-flight refueling, and the approval of a 20 mm cannon, which gives greater effectiveness against low altitude/ECM/maneuvering targets. (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 23,650 lb, gross 35,500 lb.

Performance (approx): max speed at 40,000 ft Mach 2.3, service ceiling 57,000 ft, range 1,200 miles.

Armament: one AIR-2A Genie unguided nuclear-warhead rocket and four AIM-4F/G Falcon air-to-air missiles carried internally; capability to carry a 20 mm cannon is being provided on most F-106As.

F-111

Four versions of this pioneer variable-geometry tactical fighter are currently in service with five USAF units: **F-111A,** the initial aircraft of this type delivered for service with the 4480th TF Wing, a training unit, in July 1967 were development models. First operational wing was the 474th TFW, with deliveries beginning in October 1967. A total of 141 production F-111As was built, and this version served with distinction in SEA in 1972–73. The "A" was superseded in production by the **F-111E,** a version with modified air intakes which improved engine performance above Mach 2.2. Ninety-four were built, and most of these serve with the 20th TFW, based in the UK in support of NATO, with the remainder in the 57th Tactical Training Wing. The **F-111D** has more advanced avionics, offering improvements in navigation and air-to-air weapon delivery. Ninety-six were built and equip the 27th TFW. The **F-111F,** of which 106 were built for the 366th TFW, has uprated turbofans. It is being modified to carry in its weapons bay the Pave Tack system, which provides a day/night all-weather capability to acquire, track, and designate ground targets for laser, infrared, and electro-optically guided weapons. The F-111F-equipped 48th TFW moved to the UK last year.

Production of the F-111 was completed in 1976. Its EW capabilities are being updated, with the ALQ-131 ECM system. In addition, the **EF-111A,** an ECM conversion of the F-111A, is under development by Grumman as a potential replacement for USAF's EB-57s. The first flight of a prototype was made in March 1977, and the complete system was flown for the first time on the second prototype in May of the same year. A further 40 conversions are envisaged, to equip two USAF squadrons in the early 1980s, and the first five have been requested in the FY '79 budget proposals. Basic equipment comprises ALQ-99A jammers. SAC has a strategic bomber version of the F-111, designated **FB-111A** *(see page 114)*. The Royal Australian Air Force acquired 24 **F-111Cs** for strike duties.

Contractor: General Dynamics Corporation.

Power Plant: F-111A/E: two Pratt & Whitney TF30-P-3 turbofan engines; each 18,500 lb thrust with afterburning. F-111D: two TF30-P-9 turbofan engines; each 19,600 lb thrust with afterburning. F-111F: two TF30-P-100 turbofan engines; each approx 25,100 lb thrust with afterburning.

Accommodation: crew of two, side-by-side in escape module.

Dimensions: span spread 63 ft 0 in, fully swept 31 ft 11.4 in, length 73 ft 6 in, height 17 ft 1.4 in.

Weights (F-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 M-61A1 multibarrel cannon and two B43 bombs in internal weapon bay; four swiveling and two fixed jettisonable wing pylons carrying total external load of up to 25,000 lb of bombs, rockets, missiles, or fuel tanks.

F-106 Delta Dart

F-111

Attack and Observation Aircraft

A-7D Corsair II

A total of 459 A-7D single-seat, subsonic tactical fighters was delivered to the USAF between 1968 and 1976. The first of the initial two production aircraft, each powered by a TF30-P-8 engine, flew in April 1968, followed five months later by the first TF41-engined model. The 354th TFW, first operational unit equipped with A-7Ds, demonstrated the outstanding target kill capability of the type in Southeast Asia. Accuracy is achieved with the aid of a continuous-solution navigation and weapon-delivery system, including all-weather radar bomb delivery. Additionally, 383 A-7Ds are to be modified to carry a Pave Penny laser target designation pod, beginning from the middle of this year.

Since 1973, A-7Ds have been delivered also to ANG units in New Mexico, Colorado, Ohio, Pennsylvania, Arizona, Iowa, Puerto Rico, South Dakota, and South Carolina, representing the first new aircraft received by these units in more than 20 years.

Contractor: Vought Corporation, subsidiary of the LTV Corporation.

Power Plant: one Allison TF41-A-1 non-afterburning turbofan engine; 14,250 lb thrust.

Accommodation: pilot only.

Dimensions: span 38 ft 9 in, length 46 ft 1½ in, height 16 ft 0¾ in.

Weights: empty 19,781 lb, gross 42,000 lb.

Performance: max speed at S/L 698 mph, ferry range with external tanks 2,871 miles.

Armament: one M-61A1 20 mm multibarrel gun; up to 15,000 lb of air-to-air or air-to-surface missiles, bombs, rockets, or gun pods on 6 underwing and two fuselage attachments; Pave Penny AN/AAS-35 laser target designation pod to be installed on 383 aircraft.

A-10 Thunderbolt

Designed specifically for the close air support (CAS) mission, the A-10 offers a unique combination of large payload, long loiter, and wide combat radius to ensure operational flexibility. 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. Two prototypes, six pre-production, and 339 production A-10s have been funded to date, with a further 162 requested in the FY '79 budget. The first operational squadron was activated at Myrtle Beach AFB, S. C., in June 1977 and achieved operational capability in October, approximately three months ahead of schedule. Three wings of A-10s are to be deployed to Europe beginning in 1979. Procurement of the currently planned total of 733 aircraft will be completed by 1982, equipping five wings, each with four squadrons of 18 aircraft.

Contractor: Fairchild Republic Company, Division of Fairchild Industries.

Power Plant: two General Electric TF34-GE-100 turbofan engines; each approx 9,065 lb thrust.

Accommodation: pilot only.

Dimensions: span 57 ft 6 in, length 53 ft 4 in, height 14 ft 8 in.

Weight: max gross weight 47,400 lb.

Performance: combat speed at S/L, clean 449 mph,

A-7D Corsair II

A-10 Thunderbolt

A-37B Dragonfly

range with 9,500 lb of weapons and 2.0 hr loiter, 20 min reserve, 288 miles.

Armament: one 30 mm GAU-8/A gun; eight underwing hard points and three under fuselage for up to 16,000 lb of ordnance, including various types of free-fall or guided bombs, gun pods, or 6 AGM-65 Maverick missiles, and jammer pods. Chaff and flares will be carried internally to counter radar or infrared directed threats. The centerline pylon and the two flanking fuselage pylons cannot be occupied simultaneously.

A-37B Dragonfly

Evolved from the T-37 trainer for use in armed counterinsurgency (COIN) missions from short unimproved airstrips, the A-37B is currently in service with the 434th TFW of the Air Force Reserve, and with the 174th and 175th TFG of the ANG. A total of 511 were built, of which many served in Southeast Asia. Others have been delivered to foreign air forces, mainly in Latin America.

Contractor: Cessna Aircraft Company.

Power Plant: two General Electric J85-GE-17A turbojet engines; each 2,850 lb thrust.

Accommodation: two, side-by-side.

Dimensions: span over tip-tanks 35 ft 10½ in, length excluding fuel probe 28 ft 3¼ in, height 8 ft 10½ in.

Weights: empty 6,211 lb, gross 14,000 lb.

Performance: max level speed at 16,000 ft 507 mph, service ceiling 41,765 ft, range with max payload, including 4,100 lb ordnance, 460 miles.

Armament: one GAU-2B/A 7.62 mm Minigun installed in forward fuselage; four pylons under each wing able to carry various combinations of rockets and bombs.

AC-130

AC-130A/H

Most of the AC-130 gunships still in USAF's inventory were transferred to the Air Force Reserve in 1976. Each of the original batch of AC-130As was fitted with four 20 mm Vulcan cannon, four 7.62 mm Miniguns, searchlight, and sensors, including forward-looking infrared target acquisition equipment and low-light-level TV and laser target designators. AC-130As are now equipped with two 40 mm cannon, two 20 mm cannon, and two 7.62 mm guns. In the AC-130H, one of the 40 mm cannon is replaced by a 105 mm howitzer.

Contractor: Greenville (Texas) Division of E-Systems, Inc. Other data basically as for C-130 *(page 121)*.

O-2A

O-2A

A total of 346 specially equipped variants of the "push-and-pull" Cessna 337 Skymaster was ordered by USAF from 1966, originally to replace the Cessna O-1 in the forward air controller role in Vietnam. Six ANG units fly the O-2A. The O-2A's specialized equipment and electronics permit control of air strikes, visual reconnaissance, target identification and marking, ground-air coordination, and damage assessment. The O-2B, equipped for psywar missions, is no longer in operation.

Contractor: Cessna Aircraft Company.

Power Plant: two Continental IO-360-C/D piston engines; each 210 hp.

Accommodation: pilot and observer side-by-side; 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.

OV-10A Bronco

OV-10A Bronco

Acquired by USAF for use in the forward air control role, and for limited quick-response ground support pending the arrival of tactical fighters, the OV-10A is a counterinsurgency combat aircraft, first flown in August 1967. One hundred fifty-seven were delivered to USAF before production of the OV-10A for the US services ended in April 1969. Fifteen aircraft that had been specially modified for the night forward air control and strike designation role reverted to the original OV-10A configuration in 1974. Versions of the OV-10 are also in service with the USN, US Marine Corps, and foreign air forces.

Contractor: Rockwell International Corporation, North American Aircraft Operations.

Power Plant: two Garrett AiResearch T76-G-416/417 turboprop engines; each 715 hp.

Accommodation: two in tandem.

Dimensions: span 40 ft 0 in, length 41 ft 7 in, height 15 ft 2 in.

Weights: empty 6,969 lb, overload gross weight 14,466 lb.

Performance: max speed at S/L, without weapons, 281 mph; service ceiling 28,800 ft; combat radius with max weapon load, no loiter, 228 miles.

Armament: four fixed forward-firing M-60C 7.62 mm machine-guns; four external weapon attachment points under short sponsons, for up to 2,400 lb of rockets, bombs, etc; fifth point, capacity 1,200 lb, under center fuselage. Provision for carrying one Sidewinder missile on each wing and, by use of a wing pylon kit, various stores, including rocket and flare pods, and free-fall ordnance. Max weapon load 3,600 lb.

Reconnaissance and Special-Duty Aircraft

SR-71

SR-71A/C

Developed initially as a successor to the U-2, this strategic reconnaissance aircraft confirmed itself as the fastest, highest-flying production aircraft in history when it established a series of world records in July 1976, flown by three USAF crews. Flying from Beale AFB, Calif., the SR-71A set an absolute speed record of 2,193.167 mph over a 15/25 km straight course; a speed of 2,092.294 mph around a 1,000 km closed circuit; and a sustained altitude of 85,069 ft in horizontal flight. The prototype flew for the first time in December 1964, and delivery of production aircraft began in January 1966, for operation by the 9th Strategic Reconnaissance Wing at Beale. At least 30 SR-71As, known unofficially as "Blackbirds," are thought to have been built, each carrying complex equipment ranging from simple battlefield surveillance systems to multiple-sensor, high-performance systems capable of specialized surveillance of up to 60,000 sq miles of territory in one hour. Mission details are highly classified, but SR-71As and Teledyne Ryan AQM-34L RPVs are known to have been the only USAF reconnaissance aircraft permitted to overfly North Vietnam after the cessation of bombing in January 1973. Other sorties were made in the Middle East during and after the Yom Kippur war in late 1973. In September 1974, an SR-71A flew from New York to London, England, in 1 hr 54 min 56.4 sec, at an average speed of 1,806.987 mph. The **SR-71C** is a two-seat training version, with elevated rear cockpit.

Contractor: Lockheed Aircraft Corporation.

Power Plant: two Pratt & Whitney JT11D-20B (J58) turbojet engines; each 34,000 lb thrust with afterburning.

Accommodation: crew of two in tandem.

Dimensions: span 55 ft 7 in, length 107 ft 5 in, height 18 ft 6 in.

Weights (estimated): empty 60,000 lb, gross 170,000 lb.

Performance (estimated): max speed at 78,750 ft more than Mach 3, operational ceiling above 80,000 ft, range Mach 3.0 (1,980 mph) at 78,750 ft 2,982 miles.

Armament: none.

WU-2

TR-1 and U-2

Surprise item in the FY '79 military budget is a request for $10.2 million for a new single-seat, single-engined tactical reconnaissance aircraft to be designated **TR-1.** It is a variant of the highly reliable and versatile **U-2R** strategic reconnaissance aircraft, of which production began in the late 1950s and which itself remains an important element of the USAF inventory. Equipment to be carried by the TR-1 will enable it to provide high-altitude, standoff surveillance of the battle area, or potential battle area, on a round-the-clock all-weather basis, in direct support of US and allied ground and air forces during peace, crises, and war situations.

The basic U-2 is essentially a powered glider, with high aspect ratio wing and lightweight structure, evolved to carry out clandestine strategic reconnaissance for long periods at very high altitudes over non-allied nations. Fifty-five are believed to have been built, including 2 prototypes, 48 single-seat **U-2A/B** versions, and 5 two-seat **U-2Ds.** The J57-P-37A turbojet of the U-2A was replaced by a more powerful J75-P-13, adapted to run on low-volatility fuel, in the U-2B. Versions such as the U-2D, U-2CT tandem-cockpit trainer, U-2EPX (electronics patrol experimental), **WU-2** weather reconnaissance model, and HASP U-2 (high-altitude sampling program) are conversions of basic models. All have similar dimensions except for the U-2R, which is 63 ft long, with a span of 103 ft and height of 16 ft. (Data for U-2B.)

Contractor: Lockheed Aircraft Corporation.

Power Plant: one Pratt & Whitney J75-P-13 turbojet engine; 17,000 lb thrust, in all current models.

Dimensions: span 80 ft 0 in, length 49 ft 7 in, height 13 ft 0 in.

Weights: gross, with slipper tanks, 17,270 lb; max permissible more than 21,000 lb.

Performance: max speed at 40,000 ft 528 mph, operational ceiling about 80,000 ft, range about 4,000 miles.

RF-101

Only the 186th Tactical Reconnaissance Group of the ANG continues to operate the RF-101C Voodoo. USAF's first supersonic daylight tactical reconnaissance aircraft. The original RF-101As and "C"s, with nose-mounted cameras, were supplemented in 1967–68 by RF-101Gs and "H"s, converted from F-101A/C fighters, for service with the ANG. Data similar to F-101B.

RF-4C

Developed to replace the RF-101 in USAF service, the RF-4C is a multisensor reconnaissance version of the F-4C Phantom II. The first production model flew in May 1964, and 505 were built before manufacture ended in December 1973. They are operated by TAC, PACAF, and USAFE tactical reconnaissance units, and were taken into ANG service in February 1972. Radar and photographic systems are housed in a modified nose, increasing the overall length of the aircraft by 33 in. The three basic reconnaissance systems, operated from the rear seat, comprise conventional cameras, side-looking airborne radar (SLAR) infrared line scanner, and a tactical electronic reconnaissance (TEREC) system. Current modifications include the ARN-101 digital avionics package, the Pave Tack system, the AAD-5 infrared set, and a planned data link. The major improvement will result from integration of these latter systems on an RF-4C to provide a quick strike reconnaissance (QSR) capability. Lear Siegler will be the integrating contractor for QSR, which will provide for the first time a near real time day/night capability to identify targets using data-linked infrared data. In addition, this system will provide a capability to designate ground targets for laser weapons, and to acquire targets for infrared weapons. Full-scale development for 90 QSR aircraft will begin later this year. Data similar to F-4.

EC-121

Derived from the C-121 Super Constellation transport, a few versions of this early-warning, fighter-control, and reconnaissance aircraft continue in service, easily distinguished by the massive radomes above and below the fuselage. The **EC-121D** is a development of the EC-121C, with added wingtip fuel tanks, first delivered in May 1954. Under subsequent modification programs, some "D"s became **EC-121Hs,** with additional electronics to feed data into NORAD's SAGE defense system; others became **EC-121Ts,** ten of which currently perform radar surveillance missions operated by the 79th AEW&C Squadron of the AF Reserve in support of ADCOM. The ANG's 193d Tactical Electronic Group is equipped with **EC-130Es.** (Data for EC-121D.)

Contractor: Lockheed Aircraft Corporation.
Power Plant: four Wright R-3350-91 piston engines; each 3,250 hp.
Dimensions: span 126 ft 2 in, length 116 ft 2 in, height 27 ft 0 in.
Weights: empty 80,611 lb, gross 143,600 lb.
Performance: max speed at 20,000 ft 321 mph, service ceiling 20,600 ft, range 4,600 miles.
Armament: none.

EC-135, etc.

Several aircraft in the KC-135 Stratotanker series were modified for specialized roles, during production or at a later date. The **EC-135C** (originally designated KC-135B) is basically similar to the KC-135A but with 18,000 lb st TF33 turbofans. It is equipped as a Flying Command Post in support of SAC's airborne alert role, and is fitted with extensive communications equipment. EC-135Cs can be refueled by SAC tankers. Fourteen were built and have been adapted to provide control of Minuteman ICBMs. At least one SAC EC-135C is airborne at all times, accommodating a flight crew of 5, a general officer, and a staff of 18. Versions of the C-135 Stratolifter series used for reconnaissance include 12 turbofan **RC-135Vs,** equipped also for electronic reconnaissance with SAC; 2 **RC-135Bs,** and 2 **RC-135Vs;** and 10 **WC-135Bs,** converted C-135Bs, are used by MAC for long-range weather reconnaissance missions. In addition, 8 **EC-135Ns** were equipped as airborne radio and telemetry stations for the Apollo program. Data basically as C-135 *(page 122).*

E-3A AWACS

Deliveries of production E-3As began in March 1977, when the first aircraft was handed over to TAC's 552d Airborne Warning and Control Wing at Tinker AFB, Okla. Of the 34 E-3A AWACS (Airborne Warning and Control System) aircraft required by TAC, 22 have been authorized to date, with three more requested under the FY '79 budget. Purchase of others is under discussion by NATO nations in Europe. AWACS was conceived essentially as a mobile, flexible, survivable, and jamming-resistant surveillance and command control and communications (C^3) system, capable of all-weather, long-range, high- or low-level surveillance of all air vehicles, manned or unmanned, above all kinds of terrain. A modified Boeing 707-320B carries an extensive complement of mission avionics, including computer, radar, IFF, communications, display, and navigation systems. Two test-bed aircraft were built to allow a competitive fly-off between two competing radar systems, followed by three RDT&E aircraft, one of which was the losing test-bed machine. On October 31, 1975, the first E-3A with production electronics began engineering test and evaluation as a preliminary to formal qualification testing, which was completed in January 1977. The unique 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 existing surveillance systems. AWACS can support a variety of tactical and/or air defense missions with no change in configuration. Deliveries are expected to extend into 1984.

Contractor: The Boeing Aerospace Company.
Power Plant: four Pratt & Whitney TF33-P100/100A turbofan engines; each 21,000 lb thrust.
Accommodation: operational crew of 17.
Dimensions: span 130 ft 10 in, height 41 ft 4 in.
Performance: max speed 530 mph, ceiling above 29,000 ft, endurance 6 hr on station 1,000 miles from base.

E-4A/B (AABNCP)

SAC is now sole support manager of the Advanced Airborne Command Post (AABNCP) force, which is equipped with Boeing 747s modified to serve as the National Emergency Airborne Command Post (NEACP) and Hq. Strategic Air Command airborne command post. Three **E-4As** provide an interim NEACP capability, utilizing existing EC-135 command control and communications (C^3) equipment. A fourth aircraft, delivered in August 1975, serves as a test-bed for advanced C^3 equipment and is designated **E-4B.** It began flying in the spring of 1976 with a new 1,200kVA electrical system designed to support advanced electronics to be added later. This will include a wide variety of radio communications equipment, such as a new LF/VLF system employing a trailing-wire antenna that is towed behind the aircraft in flight. Original plans, now held in abeyance pending further study, envisaged procurement of two additional E-4Bs, and retrofit of the E-4As to E-4B configuration.

RF-4C Phantom II

EC-135N

EC-121

E-3A AWACS

E-4A (AABNCP)

EB-57

Contractor: The Boeing Aerospace Company.
Power Plant: four General Electric F103-GE-100 turbofan engines; each 52,500 lb thrust. (Aircraft No. 1 and 2 were retrofitted with these engines in 1976.)
Dimensions: span 195 ft 8 in, length 231 ft 4 in, height 63 ft 5 in.
Weight: (E-4A): gross 778,000 lb.
Performance: unrefueled endurance 12 hours.

EB-57

A two-seat version of the EB-57 continues in service with ANG's 158th and 190th Defense System Evaluation Groups and ADCOM's 17th Defense System Evaluation Squadron at Malmstrom AFB, Mont. Equipped with the latest devices for jamming and penetrating air defenses, the task of the EB-57s is to simulate an enemy bomber force, and attempt to find gaps in air-defense systems by day or night, at variable altitudes and from any point of the compass.
Contractor: The Martin Company.
Power Plant: two Wright J65-W-5F turbojet engines; each 7,200 lb thrust.
Dimensions: span 64 ft 0 in, length 65 ft 5 in, height 15 ft 6 in.
Performance: max speed more than 500 mph, ceiling above 45,000 ft, range more than 1,800 miles.

WC-130B/E/H

Nineteen modified C-130 Hercules transports, designated WC-130B, E, and H, are equipped for weather reconnaissance duties, including penetration of tropical storms to obtain data for forecasting of storm movements. They are assigned to the 41st Rescue and Weather Reconnaissance Wing of MAC's Aerospace Rescue and Recovery Service and the 815th WRS of the Air Force Reserve. Data similar to C-130.

Transports and Tankers

C-5 Galaxy

C-7A Caribou

C-9A Nightingale

C-5 Galaxy

Largest aircraft in service anywhere in the world, the C-5 flew for the first time in June 1968. A total of 81 was delivered to MAC between December 1969 and May 1973, each capable of airlifting loads of up to 214,000 lb, such as two M-60 tanks or three CH-47 Chinook helicopters, over transoceanic ranges. The 70 aircraft in first-line service are capable of inflight refueling. Initial funds have been made available, and a contract has been awarded for engineering design and test of a modification to the wing of the C-5 aimed at extending to 30,000 hours the aircraft's operational life. Investigations have also been undertaken into the possibility of producing a derivative version with modernized, less complex electronics and functional subsystems, and with increased payload to handle USAF's growing outsize airlift requirement.
Contractor: Lockheed-Georgia Company.
Power Plant: four General Electric TF39-GE-1 turbofan engines; each 41,000 lb thrust.
Accommodation: crew of five, rest area for 15 (relief crew, etc.); 75 troops and 36 standard 463L pallets or assorted vehicles, or additional 270 troops.
Dimensions: span 222 ft 8½ in, length 247 ft 10 in, height 65 ft 1½ in.
Weights: empty 323,000 lb, gross (for 2.25 *g*) 769,000 lb.
Performance: max speed at 25,000 ft 571 mph, service ceiling (at 615,000 lb) 34,000 ft, range with 112,600 lb payload 6,529 miles.

C-7A Caribou

Currently in service with AF Reserve's 94th Tactical Airlift Wing and with ANG's 135th Tactical Airlift Group, this Canadian-built twin-engine STOL utility transport flew for the first time in July 1958. The US Army was the principal customer and in January 1967 still had 134 C-7As in service, all of which were transferred to USAF. Their ability to operate from short, unprepared runways in all weather conditions led to the widespread use of the C-7As in Southeast Asia.
Contractor: de Havilland Aircraft of Canada Ltd.
Power Plant: two Pratt & Whitney R-2000-7M2 piston engines; each 1,450 hp.
Accommodation: crew of two or three; 31 troops, 25 paratroops, or 14 litters and 9 other persons.
Dimensions: span 95 ft 7½ in, length 72 ft 7 in, height 31 ft 9 in.
Weights: empty 18,335 lb, gross 28,500 lb.
Performance: max speed at 6,000 ft 216 mph, service ceiling 27,100 ft, range 200 to 1,175 miles.

C-9A and VC-9C

Essentially an off-the-shelf DC-9 Series 30 commercial transport, modified to include a special-care compartment with separate atmospheric and ventilation controls, the **C-9A** is used by USAF on aeromedical evacuation operations. The first of 21 was delivered in August 1968 to MAC's 375th Aeromedical Airlift Wing; orders were completed by February 1973. The Nightingale is also currently performing overseas theater aeromedical evacuation missions in Europe and the Pacific. Also in service are three specially configured **VC-9Cs**, delivered to the Special Air Missions Wing at Andrews AFB, Md., in 1975. (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 two; 30 to 40 litter patients, more than 40 ambulatory patients, or a combination of both, plus five medical staff.
Dimensions: span 93 ft 5 in, length 119 ft 3½ in, height 27 ft 6 in.
Weight: gross 108,000 lb.
Performance: max cruising speed at 25,000 ft 565 mph, ceiling 35,000 ft, range more than 2,000 miles.

C-12A

The C-12A is a military version of the Beechcraft Super King Air 200, of which 34 were due to be delivered to USAF by the end of last year. Its role is to support attaché and military assistance advisory missions throughout the world. MAC uses two C-12As to train aircrews and to supplement support airlift.
Contractor: Beech Aircraft Corporation.
Power Plant: two Pratt & Whitney Aircraft of Canada PT6A-38 turboprop engines; each 750 shp.
Accommodation: crew of two; up to 8 passengers or 4,764 lb of cargo.
Dimensions: span 54 ft 6 in, length 43 ft 9 in, height 15 ft 0 in.
Weight: gross 12,500 lb.
Performance: max speed at 14,000 ft 301 mph, service ceiling 30,900 ft, range at max cruising speed 1,824 miles.

KC-97L

The one remaining Air National Guard unit that flies the KC-97 will convert to KC-135s in June 1978. These KC-97Ls were built between 1953 and 1956 as KC-97G tankers. When replaced with KC-135As, they were modified to KC-97L standard by addition of J47-GE-25A jet pods before being handed over to the ANG for operation as tankers for TAC fighters.
Contractor: The Boeing Airplane Company.
Power Plant: four Pratt & Whitney R-4360-59 piston engines; each 3,500 hp. Two General Electric J47-GE-25A auxiliary turbojets; each 5,200 lb thrust.
Dimensions: span 141 ft 3 in, length 110 ft 4 in, height 38 ft 3 in.
Weights (KC-97G): empty 82,500 lb, gross 175,000 lb.
Performance: (KC-97G): max speed at 25,000 ft 375 mph, service ceiling 35,000 ft, range at 297 mph 4,300 miles.

C-123 Provider

First flown in 1966, the C-123K is the only version of the basic C-123 troop and supply transport still in the USAF inventory. Fitted with two underwing pylon-mounted auxiliary turbojets, improved landing gear, and a new stall warning system, it was widely used during the Vietnam War for transport and special duties. The Air Force Reserve has four C-123K squadrons. (Data for C-123K.)
Contractor: The Fairchild Engine and Airplane Corporation.
Power Plant: two Pratt & Whitney R-2800-99W piston engines; each 2,500 hp; and two General Electric J85-GE-17 turbojet engines; each 2,850 lb thrust.
Accommodation: crew of three; 58 troops, 50 litters, or 21,000 lb of cargo.
Dimensions: span 110 ft 0 in, length 76 ft 4 in, height 34 ft 6 in.
Weights: empty 35,366 lb, gross 60,000 lb.
Performance: max speed at 10,000 ft 228 mph, service ceiling above 25,000 ft, range with 15,000 lb payload 1,035 miles.

C-130 Hercules

Production of the C-130 continues, although the TAC specification under which the Hercules was designed dates back to 1951. The initial production model was the **C-130A,** first flown in April 1955, powered by 3,750 ehp Allison T56-A-11 or -9 turboprops; 219 were ordered, with deliveries beginning in December 1956. Two special variants, **DC-130As** (originally GC-130As), were built as drone launchers/directors for ARDC (now AFSC), carrying up to four drones on underwing pylons. All special equipment was removable, permitting the aircraft to be used as freighters, assault transports, or ambulances, as required. The **C-130B** was a developed version with improved range and higher weights, powered by 4,050 ehp Allison T56-A-7 turboprops; the first of 134 entered USAF service in April 1959. Six C-130Bs were modified in 1961 for air-snatch recovery of classified USAF satellites, to replace C-119s of the 6593d Test Squadron at Hickam AFB. Twelve **C-130Ds** were modified C-130As for use in the Arctic, with wheel-ski landing gear, increased fuel capacity, and provision for JATO. The **C-130E** is an extended-range development of the C-130B, with larger underwing fuel tanks; 389 were ordered for MAC and TAC with deliveries beginning in April 1962. Basically similar to the "E," the **C-130H** has uprated T56-A-15 turboprop engines, a redesigned outer wing, and other minor improvements; delivery began in April 1975. C-130s are currently active in USAF regular, Reserve, and ANG airlift squadrons. Variants include **HC-130H** for the Aerospace Rescue and Recovery Service and for ARRS units of the ANG and Reserve, and the **AC-130A/H** and **WC-130B/E/H** described separately. (Data for C-130H.)
Contractor: Lockheed-Georgia Company.
Power Plant: four Allison T56-A-15 turboprop engines; each 4,508 ehp.
Accommodation: crew of five; up to 92 troops or 6 standard freight pallets, etc.
Dimensions: span 132 ft 7 in, length 97 ft 9 in, height 38 ft 3 in.
Weights: empty 75,331 lb, gross 175,000 lb.
Performance: max speed 386 mph, service ceiling at 130,000 lb 33,000 ft, range with max payload 2,487 miles.

HC-130

Sixty-six extended-range C-130s, designated **HC-130H,** were ordered in 1963 for the Aerospace Rescue and Recovery Service, with uprated T56-A-15 engines and specialized search and rescue equipment for the recovery of aircrews and retrieval of space hardware. This includes advanced direction-finding equipment, and surface-to-air (STAR) and air-to-air (ATAR) recovery systems. Initial flight was made in December 1964. Crew complement is eight to ten. Twenty HC-130Hs have been modified into **HC-130Ps** for the combat rescue mission, and are capable of refueling helicopters in flight. Four were modified into **JHC-130Hs,** with added equipment for aerial recovery of reentering space capsules. Under a USAF contract dated December 1974, another HC-130H was modified by LAS to **DC-130H** standard, with four pylons each capable of carrying a 10,000 lb new-generation RPV. Fifteen **HC-130Ns,** a newer search and rescue version of the HC-130P with advanced direction-finding equipment, were ordered in 1969; these aircraft are capable of refueling helicopters in flight but are not equipped with the surface-to-air recovery system. Other data similar to C-130, except length is 98 ft 9 in with STAR recovery system folded.

C-123K Provider

KC-97L

C-130

HC-130H

KC-135 Stratotanker refueling F-15

KC-135 Stratotanker

As single manager of all USAF KC-135 tankers, SAC supports its own force and those of other commands with aerial refueling for all tactical and cargo aircraft. With high-speed, high-altitude capabilities, the **KC-135A** can also be used as a long-range passenger and/or cargo transport. It was developed from the Boeing Model 367-80 (prototype for the 707 series). A total of 732 was built, of which the first flew in August 1956; about 600 remain operational, including about 100 currently assigned to Air Force Reserve and ANG units. Variants include the **KC-135Q**, adapted to refuel Lockheed SR-71s; and **KC-135R** and **KC-135T** for special reconnaissance. (Data for KC-135A.)

Contractor: The Boeing Company.

Power Plant: four Pratt & Whitney J57-P-59W turbojet engines; each 13,750 lb thrust.

Accommodation: crew of four or five; up to 80 passengers.

Dimensions: span 130 ft 10 in, length 136 ft 3 in, height 38 ft 4 in.

Weights: empty 98,466 lb, gross 297,000 lb.

Performance: max speed at 30,000 ft 585 mph, service ceiling 50,000 ft, range with 120,000 lb of transfer fuel 1,150 miles, ferry mission 9,200 miles.

VC-137B

C-140 JetStar

C-135 Stratolifter

Ordered originally to serve as interim jet passenger/cargo transports, pending delivery of C-141s, only 11 basic C-135 transports remain operational with MAC. The original Stratolifter was a KC-135A with the tanker's refueling equipment deleted, and minor internal changes. Three converted KC-135As, known as C-135A "Falsies," were followed by 15 production **C-135As** with J57-P-59W turbojet engines, and 30 **C-135Bs** with Pratt & Whitney TF33-P-5 turbofans. Eleven "B"s were subsequently converted to **VC-135Bs** with revised interior for VIP transportation; others became **WC-135B** and **RC-135E/M.** Data similar to KC-135, except:

Dimensions: length 134 ft 6 in.

Weights (C-135B): operating weight empty 102,300 lb, gross 275,500 lb.

Accommodation: 126 troops; 44 litters and 54 sitting casualties; or 87,100 lb of cargo.

Performance (C-135B): max speed 600 mph, range with 54,000 lb payload 4,625 miles.

VC-137

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 **VC-137C** for use by the President. It is basically a 707-320B with a special VIP interior for a crew of seven or eight and 49 passengers. A second VC-137C is also operated, together with three smaller 707-120s, originally designated VC-137As but later modified to **VC-137B** standard by the installation of turbofan engines.

Contractor: The Boeing Company.

Power Plant: four Pratt & Whitney JT3D-3 turbofan engines; each 18,000 lb thrust.

Dimensions: VC-137B span 130 ft 10 in, length 144 ft 6 in, height 42 ft 0 in; VC-137C span 145 ft 9 in, length 152 ft 11 in, height 42 ft 5 in.

Weights: VC-137B gross 258,000 lb; VC-137C gross 322,000 lb.

Performance (VC-137C): max speed 627 mph, service ceiling 42,000 ft, range about 7,000 miles.

C-140 JetStar

Deliveries of the C-140 JetStar began in late 1961. Five **C-140As** are used currently by Air Force Communications Service (AFCS) for inspecting worldwide military navigation aids. Six **VC-140B** transport versions are in service with the 89th Military Airlift Wing, Special Missions, of MAC, operating from Andrews AFB, Md.

Contractor: Lockheed-Georgia Company.

Power Plant: four Pratt & Whitney J60-P-5A turbojet engines; each 3,000 lb thrust.

Accommodation: C-140A crew of five; VC-140B crew of three and 8 or 13 passengers.

Dimensions: span 54 ft 5 in, length 60 ft 5 in, height 20 ft 5 in.

Weight: gross 40,920 lb.

Performance: max cruising speed at 20,000 ft 550 mph, ceiling above 45,000 ft, range with reserves 2,280 miles.

C-141 StarLifter

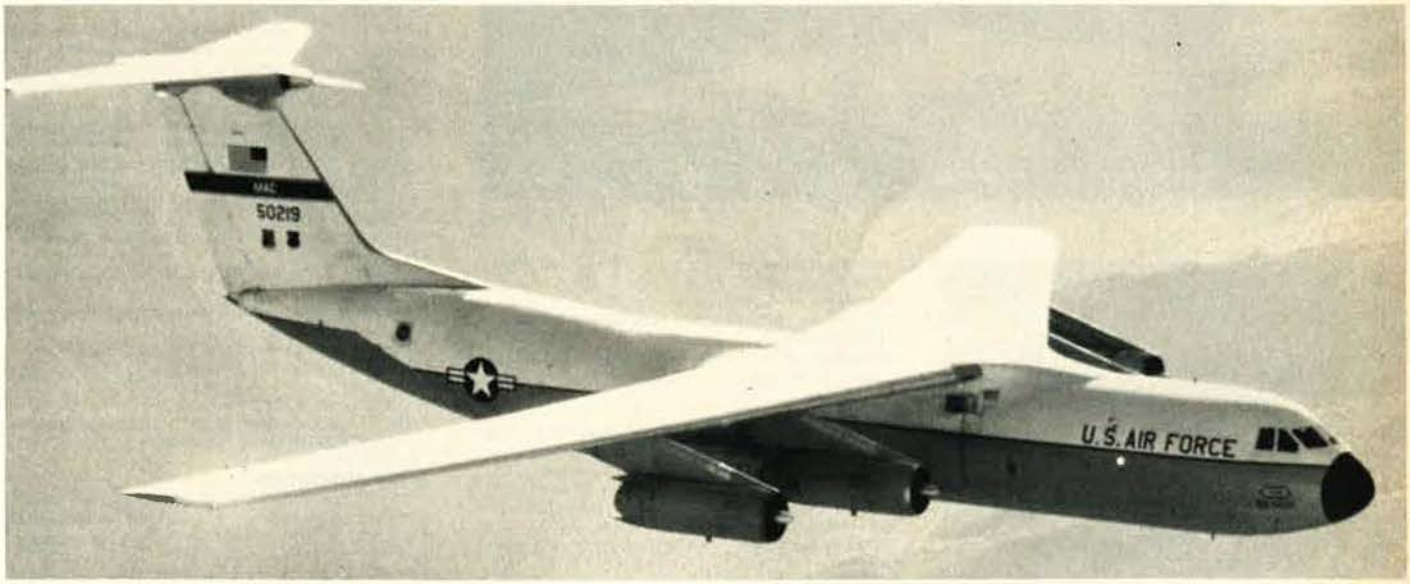
Initiated as the flying element of Logistics Support System 463L, with an all-weather landing system standard, the **C-141** began squadron operations with MAC in April 1965. It was soon making virtually daily flights to Southeast Asia, and played a key role in the civilian evacuation program in both South Vietnam and Cambodia. Lockheed built 284, of which some were modified to carry Minuteman ICBMs, with local structural strengthening to accommodate this 86,207 lb load. In service, loads have often been space-limited; so, to utilize more fully the potential of its C-141s, USAF funded the development of a prototype **YC-141B,** with the fuselage lengthened by 23 ft 4 in. The prototype conversion offers in-flight refueling capability, and has improved wing root fairings to decrease drag, thus providing higher speed and reducing fuel consumption. The YC-141B made its maiden flight in March 1977; a decision on whether or not to seek funds to modify USAF's entire active fleet of 271 C-141s was to be based on the results of the test program, completed in the same year. (Data for C-141.)

Contractor: Lockheed-Georgia Company.
Power Plant: four Pratt & Whitney TF33-P-7 turbofan engines; each 21,000 lb thrust.
Accommodation: crew of four; 154 troops; 122 paratroops; or 64,000 lb of freight.
Dimensions: span 159 ft 11 in, length 145 ft 0 in, height 39 ft 3 in.
Weights: empty 136,000 lb, gross 323,100 lb.
Performance: max speed at 25,000 ft 571 mph, service ceiling 41,600 ft, range with max fuel 4,750 miles.

ATCA

Competition between McDonnell Douglas and Boeing to build the Advanced Tanker/Cargo Aircraft (ATCA) resulted in the award of an initial contract to the former company in December 1977. The McDonnell Douglas design is based on an advanced version of 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 hose and drogue, and military avionics. In its primary role of increasing US air mobility, a single ATCA will be able to combine the tasks of a tanker and a cargo aircraft, by refueling fighters and simultaneously carrying the fighters' support equipment and support personnel on overseas missions. It will 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 will refuel strategic offensive and reconnaissance aircraft during long-range conventional operations; and it will augment cargo-carrying capability on a selected basis. In terms of active deployment, the ATCA'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. Available funding over the next five years will determine the number of aircraft to be ordered by USAF, but a force of about 20 aircraft is anticipated.

Contractor: McDonnell Douglas Corporation.
Power Plant: three General Electric CF6-50C1 turbofan engines; each 52,500 lb st.
Accommodation: max cargo payload 170,000 lb.
Dimensions: span 165 ft 4 in, length 182 ft 0 in, height 58 ft 1 in.
Weight: gross 590,000 lb.
Performance: range with max cargo payload 4,370 miles; or delivery of 200,000 lb of transfer fuel to a receiver 2,200 miles from its home base, and return.



C-141 StarLifter

ATCA

Trainers

T-33A

T-33A

At least 300 T-33As remain in service for use in combat support missions and for proficiency and radar target evaluation training. Evolved from the Shooting Star jet fighter, a lengthened fuselage accommodates a second cockpit in tandem, with the canopy extended to cover both. The armament of the fighter 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.

T-37B

T-38 Talon

T-39 Sabreliner

T-41A Mescalero

Dimensions: span 38 ft 10½ in, length 37 ft 9 in, height 11 ft 4 in.

Weights: empty 8,084 lb, gross 11,965 lb.

Performance: max speed at 25,000 ft 543 mph, service ceiling 47,500 ft.

Armament: two 0.50 caliber machine guns on some early aircraft only.

T-37B

Seven hundred and one of these two-seat primary trainers are currently in service with Air Training Command, which, in cooperation with SAC, has also implemented the Accelerated Copilot Enrichment (ACE) program to provide increased flying experience in T-37s and T-38s for SAC junior pilots. The original T-37A was the first USAF jet trainer designed as such from the start. From November 1959, deliveries switched to the T-37B, and all "A" models were subsequently converted to "B" standard. 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.

T-43A

Weights: empty, 3,870 lb, gross 6,600 lb.

Performance: max speed at 25,000 ft 426 mph, service ceiling 35,100 ft, range at 360 mph, standard tankage 870 miles.

T-38 Talon

This lightweight twin-jet advanced trainer, which was in continuous production from 1956 to 1972, has maintained constantly the best safety record of any USAF supersonic aircraft. Like the F-5 tactical fighter, the Talon was derived from Northrop's private-venture N-156 design and is almost identical in structure to the F-5. The first T-38 flew in April 1959, and production models entered operational service in March 1961. More than 1,100 of the total 1,187 T-38s built were delivered to USAF, and are in service with PACAF and TAC, as well as ATC, which has more than 800.

Contractor: Northrop Corporation.

Power Plant: two General Electric J85-GE-5 turbojet engines; each 2,680 lb thrust dry, 3,850 lb thrust with afterburning.

Accommodation: student and instructor, in tandem.

Dimensions: span 25 ft 3 in, length 46 ft 4½ in, height 12 ft 10½ in.

Weights: empty 7,164 lb, gross 12,093 lb.

Performance: max level speed at 36,000 ft more than Mach 1.23 (812 mph), ceiling above 55,000 ft, range, with reserves, 1,093 miles.

T-39 Sabreliner

To meet USAF requirements for a combat-readiness trainer and utility aircraft, Rockwell built as a private venture the prototype Sabreliner, which made its first flight in September 1958, powered by two General Electric J85 turbojets. Subsequent production models utilized by USAF are T-39B basic utility trainers with J60 turbojet engines, of which 143 were delivered for service throughout the Air Force. Of those still in the inventory, 103 are assigned to MAC for airlift support, and are based at Norton AFB, Calif., Scott AFB, Ill., and Andrews AFB, Md. Sabreliners are also in service with PACAF at Kadena AB, Okinawa; Yokota AB, Japan; and Clark AB, Philippines.

Contractor: Sabreliner Division of Rockwell International Corporation.

Power Plant: two Pratt & Whitney J60-P-3 turbojet engines; each 3,000 lb thrust.

Accommodation: crew of two; 4 to 7 passengers.

Dimensions: span 44 ft 5 in, length 43 ft 9 in, height 16 ft 0 in.

Weights: empty 9,300 lb, gross 17,760 lb.

Performance: max speed at 36,000 ft 595 mph, service ceiling 39,000 ft, range 1,950 miles.

T-41A Mescalero

USAF pilot candidates undergo a flight screening program with about 14 hours in a standard Cessna Model 172 light aircraft, bought by USAF as a trainer under the designation **T-41A.** An initial order for 170 aircraft in 1964 was supplemented by a further 34 in July 1967. Ninety-six remain in the ATC inventory. A more powerful version, the T-41C, was ordered by USAF in October 1967, and 52 of these were delivered for cadet flight training at the USAF Academy. (Data for the T-41A.)

Contractor: Cessna Aircraft Company.

Power Plant: one Continental O-300-C piston engine; 145 hp.

Accommodation: crew of two, side-by-side.

Dimensions: span 35 ft 10 in, length 26 ft 11 in, height 8 ft 9½ in.

Weights: empty 1,285 lb, gross 2,300 lb.

Performance: max speed at S/L 139 mph, service ceiling 13,100 ft, range 720 miles.

T-43A

Selected by USAF to replace the piston-engine T-29, the first of these navigation trainers made its initial flight on April 10, 1973. Basically a military version of the commercial Boeing Model 737-200, the T-43A is equipped with the same on-board avionics as the most advanced USAF operational aircraft, including celestial, radar, and inertial navigation systems, LORAN, and other radio systems. Deliveries of the 19 aircraft ordered for ATC were completed in July 1974.

Contractor: The Boeing Aerospace Company.

Power Plant: two Pratt & Whitney JT8D-9 turbofan engines; each 14,500 lb thrust.

Accommodation: crew of two; 12 students, 4 advanced students, and 3 instructors.

Dimensions: span 93 ft 0 in, length 100 ft 0 in, height 37 ft 0 in.

Weight: gross 115,500 lb.

Performance: econ cruising speed at 35,000 ft Mach 0.7, operational range 2,995 miles.

Helicopters

UH-1F and HH-1H

The **UH-1F** was developed from the basic Bell Model 204 to participate in a design competition for a missile site support helicopter. USAF ordered 146, of which the first flew in February 1964. Deliveries began, to the 4486th Test Squadron, in September of the same year, and were completed in 1967. A few UH-1Fs were modified to **UH-1Ps** for classified psychological warfare missions in Vietnam. **TH-1F** is a version of the UH-1F used for instrument and hoist training. A total of 39 of these three versions are in service with MAC. In November 1970, USAF ordered 30 larger 12/15-seat **HH-1Hs,** based on the Model 205, for local base rescue duties. Deliveries were completed in 1973. (Data for UH-1F.)

Contractor: Bell Helicopter Textron.
Power Plant: one General Electric T58-GE-3 turboshaft engine; 1,272 shp (derated to 1,100 shp).
Accommodation: one pilot and 10 passengers; or two crew and 2,000 lb of cargo.
Dimensions: rotor diameter 48 ft 0 in, length of fuselage 39 ft 7½ in, height 14 ft 8 in.
Weight: gross 9,000 lb.
Performance: max speed 138 mph, service ceiling at mission gross weight 13,450 ft, max range, no allowances, at mission gross weight 347 miles.

UH-1N

The UH-1N is a twin-engined version of the UH-1 utility helicopter, developed originally to meet a Canadian government requirement. It is capable of sustained cruising flight on one engine. Initial orders on behalf of the US services, placed simultaneously with Canadian orders in 1969, included 79 for USAF. Deliveries began in the following year.

Contractor: Bell Helicopter Textron.
Power Plant: Pratt & Whitney (Canada) T400-CP-400 Turbo "Twin-Pac," consisting of two PT6 turboshaft engines coupled to a combining gearbox with a single output shaft; flat-rated to 1,250 shp.
Accommodation: pilot and 14 passengers or cargo; or external load of 3,383 lb.
Dimensions: rotor diameter (with tracking tips) 48 ft 2¼ in, length of fuselage 42 ft 4¾ in, height 14 ft 10¼ in.
Weight: gross 10,500 lb.
Performance: max speed at S/L 126 mph, service ceiling 15,000 ft, max range, no reserves, 248 miles.
Armament (optional): two General Electric 7.62 mm Miniguns or two 40 mm grenade launchers; two seven-tube 2.75 in rocket launchers.

CH-3E

Although based on the US Navy's SH-3A, this twin-engined amphibious transport helicopter 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-3E. Introduction of uprated engines led to the designation CH-3E in February 1966, applicable to both 42 new production aircraft and 41 re-engined CH-3Cs, of which 50 were adapted subsequently as HH-3Es *(see below)*.

Contractor: Sikorsky Aircraft, Division of United Technologies Corporation.
Power Plant: two General Electric T58-GE-5 turboshaft engines: each 1,500 shp.
Accommodation: crew of two or three; 25 or 30 fully equipped troops, 15 litters, or 5,000 lb of cargo.
Dimensions: rotor diameter 62 ft 0 in, length of fuselage 57 ft 3 in, height 18 ft 1 in.
Weights: empty 13,255 lb, gross 22,050 lb.
Performance: max speed at S/L 162 mph, service ceiling 11,100 ft, max range, with 10% reserve, 465 miles.
Armament: General Electric 7.62 mm machine gun.

HH-3E Jolly Green Giant

Modified version of the CH-3E evolved 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 also are assigned to ARRS units of the Reserve and ANG. An unarmed version (HH-3F Pelican) is used by the US Coast Guard. Other 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 Jolly Green Giant, including the in-flight refueling probe and all-weather avionics and armament, but is faster and larger. The first of eight flew in March 1967, and following delivery, which began in June the same year, the type was used extensively for rescue operations in Southeast Asia.

Contractor: Sikorsky Aircraft, Division of United Technologies Corporation.
Power Plant: two General Electric T64-GE-3 turboshaft engines; each 3,080 shp.
Accommodation: crew of three; basic accommodation for 38 combat-equipped troops or 24 litters and 4 attendants.
Dimensions: rotor diameter 72 ft 3 in, length of fuselage (without refueling probe) 67 ft 2 in, height 24 ft 11 in.
Weights: empty 23,125 lb, gross 42,000 lb.
Performance: max speed at S/L 186 mph, service ceiling 18,400 ft, max range, with 10% reserve, 540 miles.

HH-53C and CH-53C

The **HH-53C** is an improved version of the HH-53B, powered by 3,925 shp T64-GE-7 turboshaft engines. It was first delivered to USAF in August 1968. With a maximum speed of 196 mph, the **HH-53C** is faster than the "B" model; it can transport 60 passengers or 18,500 lb of freight and has an external cargo hook of 20,000 lb capacity. Other data basically as for HH-53B above. A total of 72 HH-53B/Cs were built. Four generally similar **CH-53Cs** are used to provide battlefield mobility for the Air Force mobile Tactical Air Control System.

UH-1N

CH-3E

HH-3E Jolly Green Giant

HH-53C

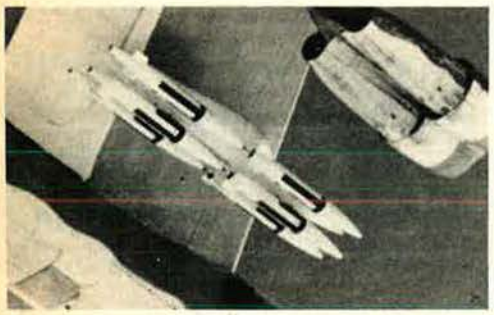
Strategic Missiles

LGM-25C Titan II

In service since 1963, this two-stage ICBM is deployed in six squadrons, each with nine missiles, based at Davis-Monthan AFB, Ariz.; McConnell AFB, Kan.; and Little Rock AFB, Ark. Titan II is fitted with a thermonuclear warhead having the largest yield of any carried by a US missile and has a launch reaction time of one minute from its fully hardened underground silo. During flight, the second stage shuts down once a speed of 17,000 mph is attained; vernier nozzles then adjust the velocity and correct the trajectory for the proper ballistic delivery of the ablative-type reentry vehicle, which finally separates from the burnt-out second stage. Advanced penetration aids are carried to hinder detection and destruction by enemy ABMs. Current updating of Titan II's guidance system aims at increased cost-effectiveness rather than improved accuracy.

Titan II

Minuteman III



AGM-69 SRAM aboard B-52

Contractor: Martin Marietta Corporation.
Power Plant: first stage: Aerojet-General LR87 storable liquid-propellant engine; 430,000 lb thrust; second stage: Aerojet-General LR91 storable liquid-propellant engine; 100,000 lb thrust.
Guidance: AC Electronics inertial guidance system.
Warhead: thermonuclear, in General Electric Mk 6 ablative reentry vehicle.
Dimensions: length 103 ft 0 in, max body diameter 10 ft 0 in.
Weight: launch weight 330,000 lb.
Performance: max speed 17,000 mph (approx), max range 6,300 miles.

LGM-30F/G Minuteman

Of similar range, though smaller and lighter in weight than the liquid-propellant Titan, this three-stage solid-propellant second-generation missile was designed to supersede earlier ICBMs and has a smaller payload. The current operational versions are:

LGM-30F Minuteman II: similar in configuration to the original Minuteman I, Minuteman II has increased range and targeting coverage; also increased accuracy and payload capacity. Operational since 1965, it is currently based at Malmstrom AFB, Mont., Ellsworth AFB, S. D., and Whiteman AFB, Mo.

LGM-30G Minuteman III: MIRV capability enables this version to place warheads on three targets with a high degree of accuracy; Minuteman III also increases the possibility of penetrating enemy defense systems. First highly successful test launch was made in 1968, and Minuteman III is now operational at Minot AFB, N. D., F. E. Warren AFB, Wyo., Grand Forks AFB, N. D., and Malmstrom AFB, Mont. Under a force modernization program, SAC has provided Minuteman III with the Command Data Buffer System that permits rapid missile retargeting.

With the Minuteman force made up of the planned 450 Minuteman IIs and 550 Minuteman IIIs, production ended in December 1977; current funding is primarily for the purchase of components, guidance systems, and spares. Recent R&D has been aimed at development of the Mk 12A reentry vehicle, which increases the yield of the Minuteman III warhead, and refinements to improve accuracy. The Mk 12A is scheduled for deployment on part of the Minuteman III force, with initial operational capability in 1980.

Assembly and Checkout: The Boeing Aerospace Company.
Power Plant: first stage: Thiokol M-55E solid-propellant motor; 210,000 lb thrust; second stage: Aerojet-General SR19-AJ-1 solid-propellant motor; 60,300 lb thrust; third stage: LGM-30F Hercules, Inc., solid-propellant motor; LGM-30G Thiokol solid-propellant motor; 34,400 lb thrust.
Guidance: Autonetics Division of Rockwell International inertial guidance system.
Warhead: LGM-30F single thermonuclear warhead in Avco reentry vehicle; LGM-30G multiple thermonuclear warheads, each in a General Electric Mk 12 reentry vehicle.
Dimensions: length 59 ft 10 in, diameter of first stage 5 ft 6 in.
Weights: launch weight (approx) LGM-30F 73,000 lb; LGM-30G 78,000 lb.
Performance: speed at burnout more than 15,000 mph, highest point of trajectory approx 700 miles, range with max operational load LGM-30F more than 6,000 miles; LGM-30G more than 7,000 miles.

AGM-69 SRAM

USAF contracts covering the production of 1,500 AGM-69As were authorized in 1971 and deployment by SAC began in August 1972, when the B-52Gs of the 42d Heavy Bombardment Wing became operational with SRAM at Loring AFB, Me. Deliveries to equip 17 B-52 wings and two FB-111 wings at 18 SAC bases were completed in July 1975. Current funding is for the development of an improved, longer-life propellant for SRAM's rocket motor. The new propellant will have a minimum service life of 10 years.

The supersonic air-to-surface SRAM, which has a nuclear warhead, was designed fundamentally 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 20 AGM-69A SRAMs, twelve in three-round underwing clusters and eight on a rotary dispenser in the aft bomb-bay, together with up to four Mk 28 thermonuclear weapons. An FB-111A can carry four AGM-69As on swiveling underwing pylons and two internally. When carried externally, a tailcone, 22.2 in long, is added to the missile to reduce drag. Development of the AGM-69B has been abandoned, following the decision not to put the B-1 into production.

Contractor: The Boeing Aerospace Company.
Power Plant: Lockheed Propulsion Company LPC-415 restartable solid-propellant two-pulse rocket engine.
Guidance: General Precision/Kearfott inertial system, permitting attack at high or low altitude, and dog-leg courses.
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.

Boeing ALCM

General Dynamics ALCM

ALCM

In an announcement in June 1977, the President stated that priority was to be given to the development of the cruise missile instead of the B-1 bomber. The ALCM (Air-Launched Cruise Missile) program is now in full-scale development, with a competitive fly-off scheduled between the Boeing **AGM-86B,** a long-range version of the AGM-86A described in last year's Gallery, and the General Dynamics **AGM-109,** an air-launched version of the Tomahawk Submarine-Launched Cruise Missile. The ALCM is a small unmanned winged air vehicle capable of sustained subsonic flight following launch from a carrier aircraft. It has a turbofan engine and a nuclear warhead, and is programmed for precision attack on surface targets. Guidance is by a combination of inertial and terrain comparison techniques. Small radar signature and low-level flight capability enhance its effectiveness. A B-52 could carry 12 ALCMs externally and 8 internally on a rotary dispenser, with the missiles' wings and tail folded, and engine air intake retracted.

Contractors: Boeing Aerospace Company; General Dynamics (Convair).
Power Plant: Williams Research Corporation F107-WR-100 turbofan engine; 600 lb st.
Dimensions: length 18–21 ft, body diameter 20–30 in, wingspan 8–12 ft.
Weights: 2,500–3,500 lb.
Performance: classified.

Airborne Tactical and Defense Missiles

AIR-2A Genie

Although production ended in 1962, thousands of AIR-2A Genies were delivered and continue in first-line service with F-106 squadrons of USAF, as well as with F-101Bs of the Canadian Armed Forces. A 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 precau-

tions, the missile remains inert in a nuclear sense until it is armed in the air, a few moments before firing. A training version, without nuclear warhead, is also in service.
Contractor: McDonnell Douglas Astronautics Company.
Power Plant: Thiokol SR49-TC-1 solid-propellant rocket motor; 36,000 lb thrust.
Guidance: no guidance system.
Warhead: nuclear, with reported yield of 1.5 kilotons.
Dimensions: length 9 ft 7 in, body diameter 1 ft 5.35 in, fin span 3 ft 3½ in.
Weight: launch weight 820 lb.
Performance: max speed Mach 3, max range 6 miles.

AIM-4A/C/D Falcon

Falcon was the first air-to-air guided weapon to come into USAF service. Versions include:

AIM-4A: improved version of the original radar-homing production model; about 12,000 built between 1956 and 1959.

AIM-4C: similar airframe to AIM-4A but with infrared guidance system. About 9,500 were delivered simultaneously with the "A"s.

AIM-4D: "cross-bred" version, combining the improved infrared homing head of the AIM-4G Super Falcon with the basic airframe of the AIM-4C. Used to arm F-101 interceptors. Thousands of older Falcons were converted to AIM-4D standard.

Contractor: Hughes Aircraft Company.
Power Plant: Thiokol M58-E4 solid-propellant rocket motor; 6,000 lb thrust.
Guidance: AIM-4A: Hughes semiactive radar homing system; AIM-4C/D: infrared homing system.
Warhead: high-explosive.
Dimensions: length AIM-4A 6 ft 6 in, AIM-4C/D 6 ft 7½ in, body diameter 6.4 in, wing span 1 ft 8 in.
Weights: launch weight AIM-4A 110 lb; AIM-4C 122 lb; AIM-4D 134 lb.
Performance (AIM-4D): max speed Mach 4, range 6 miles.

AIM-4F/G Super Falcon

A developed version of the AIM-4A/C Falcon, with 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. The two versions were introduced simultaneously in 1960, superseding the interim AIM-4E.
Contractor: Hughes Aircraft Company.
Power Plant: Thiokol M46 two-stage solid-propellant motor; first-stage rating of 6,000 lb thrust.
Guidance: AIM-4F: Hughes semiactive radar homing guidance; AIM-4G: infrared homing system.
Warhead: high-explosive, weighing 40 lb.
Dimensions: length AIM-4F 7 ft 2 in; AIM-4G 6 ft 9 in, body diameter 6.6 in, wing-span 2 ft 0 in.
Weights: launch weight AIM/4F 150 lb; AIM-4G 145 lb.
Performance: max speed Mach 2.5, max range 7 miles.

AIM-7E/F Sparrow

One of the most important guided weapons in service with NATO air forces and their allies, the Sparrow is a radar-homing, air-to-air missile with all-weather, all-altitude capability. Some 34,000 of the AIM-7C, D, and E versions were produced. Current basic operational model, the **AIM-7E,** is standard armament of the F-4 Phantom II and is suited also for use against shipping targets from aircraft or ships. The **AIM-7E-2** is similar but has better maneuverability to improve its "dogfight" capability. In production for both USAF and USN is the advanced solid-state **AIM-7F,** with larger motor, Doppler guidance, and good capability over both dogfight and medium ranges. USAF procurement of the "F" is expected to total more than 5,000, to supersede the AIM-7E and to arm the F-15, with a further increment of 1,300 requested in the FY '78 budget. General Dynamics has been brought in as a second source contractor. Development of a monopulse seeker for the AIM-7F was started in 1975, aimed at reducing cost and improving performance in the ECM and look-down/clutter areas. The "F" was approved for deployment at the beginning of last year, with initial operational capability of the version with monopulse seeker planned for 1981. (Data for AIM-7F.)
Contractor: Raytheon Company.
Power Plant: Hercules MK 58 Mod O solid-propellant rocket motor.
Guidance: Raytheon semiactive Doppler radar homing system.
Warhead: high-explosive.
Dimensions: length 12 ft 0 in, body diameter 8 in, wing span 3 ft 4 in.
Weight: launch weight 500 lb.
Performance (estimated): max speed more than Mach 3.5, range AIM-7E 14 miles; AIM-7F 28 miles.

AIM-9 Sidewinder

The AIM-9 Sidewinder is a close-range air-to-air missile using infrared guidance. Versions currently under development for USAF or in service are:

AIM-9E: with improved guidance and control. Produced by Philco by modifications of original AIM-9Bs. Production completed, with more than 3,000 in service.

AIM-9G: advanced model with airframe changes, new motor and guidance, improved target acquisition and lock-on. Production by Raytheon completed in 1970.

AIM-9H: version with improved close-range capability, produced for USN; one-time procurement of 800 by USAF in FY '76. Solid-state guidance, off-boresight acquisition/launch capability. Lead bias function moves missile impact point forward to more vulnerable area on target aircraft.

AIM-9J: advanced version of AIM-9E with both increased range and improved maneuvering capability for dogfighting. Being produced for 1977–78 delivery to USAF by Ford Aerospace, to equip the F-15 and other Sidewinder-compatible aircraft, by modification of remaining 590 AIM-9Bs in USAF inventory and 1,410 acquired from USN.

AIM-9L: third-generation Sidewinder for USAF and USN. New Mk 36 Mod 6 solid-propellant motor. Double-delta nose fins for improved inner boundary performance and maneuverability. AM-FM conical scan for increased seeker sensitivity and improved tracking stability. Annular blast fragmentation warhead, rate bias, and active optical fuze for increased lethality and low susceptibility to countermeasures. Planned USAF procurement is for more than 5,000 missiles between FY '76 and FY '80 (Data for AIM-9H, L.)
Contractor: Naval Weapons Center.
Power Plant: (AIM-9L): Rocketdyne/Bermite Mk 36 Mod 6 solid-propellant motor.
Guidance: (AIM-9H): solid-state infrared homing guidance.
Warhead: high-explosive.
Dimensions: length 9 ft 5 in, body diameter 5 in, fin span 2 ft 0¾ in.
Weight: launch weight 190 lb.
Performance: max speed Mach 2.5, range 6.2–11 miles.

AGM-45A Shrike

More than 13,000 of these supersonic missiles, which are designed to home automatically on enemy radar installations, will have been procured by USAF by the end of FY '78. The AGM-45A entered operational service in Vietnam during 1965 and subsequently played an important role in the US air offensive. It became a standard penetration aid on US tactical aircraft, and its effectiveness has been increased progressively by many improvements. Twelve versions are known to have been produced for USAF and USN, differing primarily in the frequency coverage of the front and detachable seeker sections. Late models are planned to equip the "Wild Weasel" F-4Gs.
Contractor: Naval Weapons Center.
Power Plant: Rocketdyne Mk 39 Mod 7 or Aerojet Mk 53 solid-propellant rocket motor.
Guidance: passive homing head by Texas Instruments.
Warhead: high-explosive/fragmentation, weighing 145 lb.
Dimensions: length 10 ft 0 in, body diameter 8 in, span 3 ft 0 in.
Weight: launch weight 400 lb.
Performance (estimated): range more than 3 miles.

AGM-65 Maverick

The basic **AGM-65A** is a launch-and-leave TV-guided air-to-surface missile. This enables the pilot of the launch aircraft to seek other targets or leave the target area once Maverick has been launched. Production was initiated in 1971, following successful test launches over distances ranging from a few thousand feet to many miles, and from high altitudes down to treetop level. The AGM-65A is carried by the A-7D, A-10, F-4D, F-4E, and F-16, normally in three-round underwing clusters, and is intended for use against pinpoint targets such as tanks and columns of vehicles. Orders totaled 19,000 before production was terminated in favor of the **AGM-65B,** with a "scene magnification" TV seeker which enables the pilot to identify and lock on to smaller or more distant targets. Manufacture of 6,000 has begun.

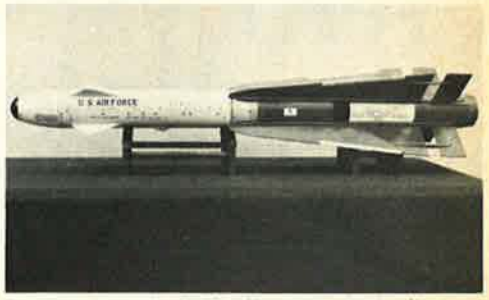
To overcome limitations of the TV Maverick, which can be used only in daylight clear-weather conditions, two new versions have been developed:

AGM-65C: laser-guided version intended for close air support by day or night against targets marked by airborne or ground designator. Initial batch of 100 being produced in FY '78; order for 4,600 more planned.

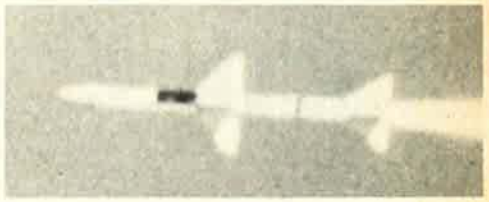
AGM-65D: with imaging infrared seeker (IIR). Funding requested in FY '79 for engineering development.

Later development will include adaptation of Maverick to carry a 250 lb warhead for use against larger hardened targets such as command bunkers. (Data for AGM-65A.)
Contractor: Hughes Aircraft Company.
Power Plant: Thiokol TX-481 solid-propellant rocket motor.
Guidance: self-homing electro-optical guidance system.
Warhead: high-explosive, shaped charge.
Dimensions: length 8 ft 1 in, body diameter 1 ft 0 in, wing span 2 ft 4 in.
Weight: launch weight 462 lb.
Performance: classified.

AIR-2A Genie



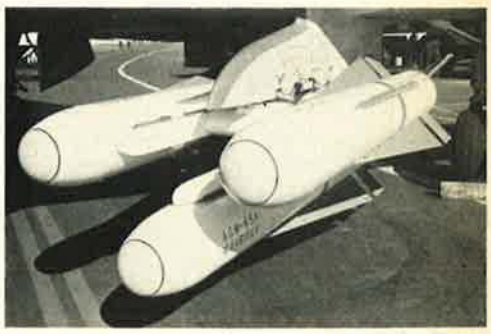
AIM-4D Falcon



AIM-7F Sparrow

AIM-9J Sidewinder

AGM-45A Shrike



AGM-65 Maverick

The Fairchild A-10 revolutionizes close air support tactics.

1977 saw the Fairchild A-10 perform in some of the most important and rigorous battle exercises ever developed.

Red Flag. JAWS. Fort Lewis. Gila Bend. Nightmare Range. Coronet Bantam. Oksboel 77.

The A-10 flew against simulated armor threats and proved it can work with the Army to provide responsive, effective close air support against a variety of targets.

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AGM-78 Standard ARM

Designed to provide a significant increase in capability over earlier weapons in countering the threat of radar-controlled antiaircraft guided missiles and guns, the AGM-78 Standard ARM (Anti-Radiation Missile) entered production in 1968, and several advanced models were developed subsequently, some highly classified. The initial **AGM-78A** version used the passive homing target-seeking head of the Shrike missile; subsequent models have improved seeker heads and avionics for better target selection, increased effectiveness against target countermeasures, and still greater attack range. Standard ARM is deployed on USAF's F-105 and also by USN. Equipment carried by the launch aircraft includes a Target Identification and Acquisition System (TIAS), which is able to determine and pass to the missile specific target parameters. 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 1,356 lb.
Performance: max speed Mach 2, max range 15.5 miles.

Electro-Optical Guided Bomb (EOGB)

USAF's GBU-8, HOBO, is an unpowered 2,000 lb TV-guided air-to-surface weapon, produced in the form of a kit that converts a standard Mk 84 bomb into a highly accurate guided weapon with moderate/long-range capability. The weapon's guidance is automatic once it has been locked on to a target, enabling the pilot to leave the target area after the weapon has been launched. EOGB consists of a forward guidance assembly, the warhead, an interconnect section, and an aft control section, including an autopilot. It was used in Southeast Asia.

Contractor: Rockwell International Corporation.
Guidance: TV, automatic tracking.
Warhead: Mk 84 bomb (2,000 lb, unitary).
Dimensions: length 12 ft 5 in, body diameter 1 ft 6 in, wing span 3 ft 8 in.
Weight: 2,240 lb.

Modular Glide Weapon System (GBU-15)

The GBU-15 is a glide bomb in the 2,000 lb class that can be equipped with alternative aerodynamic components, warheads, and guidance units. Initial versions are TV-guided, with data-link to enable the weapon to be controlled from the cockpit of the launch aircraft. The GBU-15 can be assembled in a cruciform configuration for low-altitude attack, or in a planar (flip-out wing) configuration for high-altitude standoff attack, as alternatives to the basic small wing/strake module. Provisions are made for the addition of advanced seekers to provide night and adverse weather capabilities, including a laser seeker, imaging infrared, and a mid-course system that includes distance measuring equipment (DME) for increased accuracy. The direct attack GBU-15 (V) is expected to precede the planar wing/DME version into service. (Data for Mk 84 version, unless indicated otherwise.)

Contractors: Hughes Aircraft Corporation (planar wing), Rockwell International Corporation (cruciform wing).
Guidance: TV with data-link. DME and LORAN options.
Warhead: Mk 84 bomb (2,000 lb, unitary) or CBU-75 (cluster).
Dimensions: length 12 ft 5 in, body diameter 1 ft 6 in, wing span 3 ft 8 in.
Weight: approximately 2,400 lb.

AGM-78 Standard ARM

Launch Vehicles

Agena

Since 1959, Agenas have served as satellite or booster on more missions than any other spacecraft in the world. A payload section (nosecone) able to accommodate a variety of earth-orbiting and space probes weighing up to several hundred pounds gives the vehicle an inherent versatility. Agena is normally utilized as the upper stage of such launchers as Atlas and Titan III. With its attached payload, it has functioned for longer than six months on some USAF missions. An Agena spacecraft was the first to accomplish a rendezvous and docking by spacecraft in orbit and to provide propulsion power in space for another spacecraft. 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. Agena is used in most USAF reconnaissance satellite launchings, except for Big Bird missions.

Prime Contractor: Lockheed Missiles and Space Company, Inc.
Power Plant: Bell Aerosystems YLR81-BA-11 liquid-propellant rocket engine: 16,000 lb thrust.
Dimensions (Agena D): length (typical) 23 ft 3 in, diameter 5 ft 0 in.
Weights (typical Agena D): launch weight 15,037 lb; weight in orbit, less payload, 1,277 lb.

Atlas Launchers

By the beginning of 1978, Atlas had recorded a total of 431 space and ballistic launches, and 36 Atlas E and F missiles remained available for future launches. The E and F series vehicles are essentially identical, the primary difference being in their method of deployment. They are stored at Norton AFB, Calif., until they enter the refurbishment and launch program. Current launch vehicles are as follows:

Atlas SLV-3A: An upgraded version of the earlier SLV-3, with lengthened propellant tanks, the SLV-3A was evolved primarily for use with the Agena upper stage, but it could serve as a direct-ascent vehicle or in conjunction with other upper stages. Of the fourteen SLV-3As produced under initial contracts, seven were for use by the USAF in classified missions, with the remainder for NASA.

Atlas SLV-3D: Although intended for use primarily with the Centaur D-1A upper stage, the SLV-3D is standardized like the SLV-3A and can be used on other missions. In 1972, Pioneer-10 was launched on its flight path to Jupiter with the highest velocity ever imparted to a spacecraft, the launch vehicle being an Atlas/Centaur with an additional TE-M-364-4 solid-propellant rocket motor.

Prime Contractor: General Dynamics Corporation, Convair Division.
Power Plant: uprated Rocketdyne MA-5 propulsion system, comprising central sustainer motor and two boosters; total S/L thrust approx 431,040 lb (60,000 lb from the central sustainer motor, 370,000 lb total from the boosters, 1,040 lb from two verniers).
Dimensions: length SLV-3A 78 ft 11 in; SLV-3A/Agena 118 ft; SLV-3D/Centaur 131 ft, max body diameter 10 ft 0 in.
Launch Weight (SLV-3A): 314,000 lb.
Performance (SLV-3A-Agena): capable of putting payload of 8,500 lb into a 115-mile circular orbit, or of launching 2,730 lb into synchronous transfer orbit.

Centaur

First US high-energy upper stage and first to utilize liquid hydrogen as a propellant. The latest version, Centaur D-1, retains the same propulsion and structural features as its predecessor, Centaur D, but has several redesigned or repackaged astrionics components. Used in conjunction with the Atlas SLV-3D or the Titan IIIE, it provides widely ranging applications and capabilities: the nose section of the former is modified to a constant 10 ft diameter to accommodate the Centaur D-1A which, in turn, generates most of the electronic command and control systems for the launch vehicle; the Centaur D-1T also provides guidance for its Titan booster. A 10 ft diameter fairing protects payloads for Centaur D-1A; a 14 ft shroud encloses both the payload and the Centaur D-1T on Titan/Centaur. Atlas-Centaur D-1A launch missions have been assigned into 1981. Primary mission of the Titan IIIE/Centaur was the placing of two Viking spacecraft on Mars in 1976. Centaur's multiburn and extended coast capability were tested after the 1976 launch of a Helios solar probe, and were used operationally during the 1977 Mariner Jupiter Saturn missions.

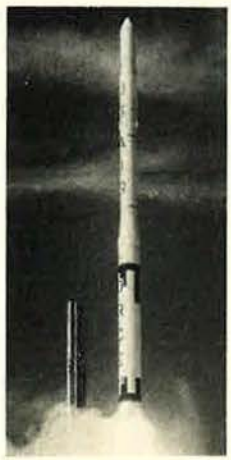
Prime Contractor: General Dynamics Corporation, Convair Division.
Power Plant: two Pratt & Whitney RL10A-3 liquid hydrogen engines; each 15,000 lb thrust.
Guidance: inertial guidance system.
Dimensions: Centaur: length 30 ft 0 in, diameter 10 ft 0 in.
Launch Weight (approx): 37,000 lb.
Performance: Atlas-Centaur: 11,200 lb into 115-mile circular orbit, or 4,100 lb into synchronous transfer orbit, or 1,300 lb to nearest planet; Titan/Centaur: 34,000 lb into 115-mile circular orbit, or 7,300 lb into synchronous equatorial orbit, or 8,200 lb to nearest planet.

Scout

Designed to make possible space, orbital, and reentry research by NASA and the Department of Defense at comparatively low cost, using "off-the-shelf" major components where available, Scout is a four/five-stage launch vehicle, first ordered in 1959, which can be launched at any angle from vertical to 20° from vertical. A subsequent version with an improved fourth stage was

Atlas-Agena

Atlas-Centaur



Blue Scout

Titan IIIE-Centaur

launched successfully for the first time in August 1965. In addition to increasing the payload, this version can be maneuvered in yaw and can send a 100 lb payload more than 16,000 miles into space. A fifth-stage velocity package is available, which increases the Scout's hypersonic reentry performance, making possible highly elliptical deep-space orbits, and extending the vehicle's probe capabilities to the sun. Using the latest Algol III first-stage motor, Scouts can put 425 lb payloads (320 lb with the earlier motor) into a 310-mile easterly orbit, and have been used to launch many unmanned spacecraft, including classified military satellites.

Prime Contractor: Vought Corporation, (Subsidiary of LTV Corporation.)

Power Plant: first stage: Aerojet-General Algol IIB solid-propellant motor; 115,000 lb thrust or Algol III; 140,000 lb thrust; second stage: Thiokol Castor II solid-propellant motor; 60,000 lb thrust; third stage: Hercules Antares II (X259) solid-propellant motor; 21,000 lb thrust; fourth stage: UTC FW-4S solid-propellant motor; 6,000 lb thrust; fifth stage velocity package now available.

Guidance: simplified Honeywell gyro guidance system.

Dimensions: height overall 75 ft 2½ in, max body diameter 3 ft 9 in.

Launch Weight: 47,185 lb.

Titan III

As the standard US heavy-duty space "workhorse" booster, Titan III can be modified to launch a wide variety of payloads, both manned and unmanned, ranging from 35,000 lb in earth orbit to 7,000 lb for planetary missions. The basic core section consists of two booster stages evolved from the Titan II ICBM and an upper stage, known as Transtage, capable of functioning both in the boost phase of flight and as a restartable space propulsion vehicle. Principal configurations are:

Titan IIIB: basically the first two stages of the core section, able to accommodate various upper stages. First launched in July 1966 and used subsequently with Agena upper stages to launch classified USAF payloads.

Titan IIIC: consisting of the core section with two five-segment strap-on motors functioning as a booster before ignition of the main engines. First launched in June 1965; payloads include USAF early warning satellites.

Titan IIID: basically similar to IIIC but using only the first two stages of the core section and able to accept a variety of upper stages. Current vehicles use radio guidance instead of the Titan IIIC inertial guidance. Future vehicles will also use the Space Shuttle Interim Upper Stage (IUS) redundant avionics for improved reliability. Production contract for original IIID placed by USAF in 1967; first used in June 1971 to orbit the first Lockheed Big Bird photo-reconnaissance spacecraft.

Titan IIID/IUS. Basically a Titan IIID adapted to accommodate a Space Shuttle Inertial Upper Stage. This configuration is under consideration as a further reliability improvement to replace Titan IIIC.

Titan IIIE-Centaur: basically a Titan IIID that has been modified to accommodate a Centaur high-energy upper stage. Primary mission was to place two Viking spacecraft on Mars in 1976.

Titan IIIs have achieved well over 80 successful launchings since 1967, and additional contracts have extended production of various models to 1980.

Prime Contractor: Martin Marietta Corporation.

Power Plant: first and second stages: Aerojet liquid-propellant engines; first stage 526,000 lb thrust; second stage 102,000 lb thrust; Transtage Aerojet twin-chamber liquid-propellant engine; 16,000 lb thrust; Titan IIIC/Ds also have two UTC five-segment solid-propellant booster rocket motors; each more than 1,156,000 lb thrust.

Dimensions: first and second stages of core: height 96 ft 3½ in, diameter 10 ft 0 in; Transtage: height 15 ft 0 in, diameter 10 ft 0 in.

Launch Weights: core vehicle: approximately 450,000 lb; Titan IIIC, 1,400,000 lb.

Performance (Titan IIIC, approx): speed at burnout: solid-propellant boosters 4,100 mph, first stage 10,200 mph, second stage 17,100 mph, Transtage 17,500 mph.

Remotely Piloted Vehicles (RPVs)

Ryan AQM-34

Ryan BGM-34C

Ryan AQM-34

Of the large "family" of surveillance/reconnaissance RPVs encompassed within this basic USAF designation and the Ryan Model number 147, a total of twenty-four versions has been revealed, all evolved from the BQM-34A Firebee I target drone. They are air-launched from DC-130A, E, or H Hercules mother-planes which combine the functions of command, tracking, and data relay aircraft. Many hundreds of AQM-34s have been delivered for operational use, while versions have also been utilized widely for testing the effectiveness of new equipment in a combat environment without risk to personnel. The original AQM-34 was no more than a modified Firebee I with a new guidance system and increased fuel capacity. Typical current versions are: **AQM-34L,** a low-altitude reconnaissance version, with nose-mounted camera or other sensor. Used for many missions over North Vietnam, this vehicle and the Lockheed SR-71 manned strategic reconnaissance aircraft were the only US reconnaissance types permitted to overfly that country after the cessation of bombing in January 1973. **AQM-34M,** very similar to the AQM-34L, is an improved vehicle that has almost replaced the "L" in operational use. Seventy-eight delivered, with radar altimeter standard; some with Loran and some with underwing auxiliary fuel tanks. AQM-34L/M variants are operated by the 22d Tactical Drone Squadron (TDS), Davis-Monthan AFB, Ariz. **AQM-34P,** high-altitude surveillance version with extended span. One damaged airframe displayed in Peking in 1965. **AQM-34Q/R,** high-altitude surveillance drones, with span extended to 32 ft. These two models form part of USAF's Combat Dawn program, for electronic intelligence missions, with midair recovery by helicopter. Twenty "R"s ordered in 1971 were said to fly above 60,000 ft at 485 mph. **AQM-34V,** first flown in May 1976. Forty-seven produced as updated AGM-34H/Js, and 16 built as new, are currently operational with the 11th TDS at Davis-Monthan AFB. Improved flight controls; guidance compatible with Sperry Univac Multiple Drone Control (MDC) system installed in DC-130H. Active jamming equipment includes E-Systems (Melpar Division) modular noise jammers, and either Lundy ALE-2 or M.B. Associates ALE-38 underwing chaff dispenser pods. Can sequentially monitor. Prime recovery by Mid-Air Retrieval System (MARS) fitted to CH-3 or HH-53 helicopter; but ground landing bag system under development for retrofit when qualified.

Contractor: Teledyne Ryan Aeronautical, Division of Teledyne Inc.

Power Plant: AQM-34K, L, M 1,920 lb thrust Teledyne CAE J69-T-41A turbojet; AQM-34P, Q, R 2,700 lb thrust Teledyne CAE J100-CA-100; AQM-34V 1,700 lb thrust J69-T-29.

Dimensions: span AQM-34L 13 ft; AQM-34K, M, V 14 ft 6 in; AQM-34P, Q, R 32 ft; length AQM-34V 26 ft; AQM-34K 29 ft; AQM-34L, M, P, Q, R 30 ft; body diameter AQM-34K, L, M, V 3 ft 1¼ in; AQM-34P, Q, R 3 ft 3½ in.

Weights: gross AQM-34K 3,367 lb; AQM-34L 3,065 lb; AQM-34M 3,113 lb; AQM-34P 3,792 lb; AQM-34Q 3,870 lb; AQM-34R 6,200 lb; AQM-34V 4,500 lb.

Performance (AQM-34L): range at low altitude variable from 177 miles at 645 mph to 748 miles at 485 mph.

Ryan BGM-34

Plans to evolve combat drones for a variety of missions that at present require manned aircraft are reflected in this RPV which, though sharing the Firebee I parentage of the AQM-34, is intended to fulfill a more aggressive role. There are two current versions: **BGM-34B:** Eight built. At least one GBM-34B was fitted with an extended, modified nose housing target acquisition and designation equipment of the kind contained in the Aeronutronic Ford Pave Knife pods carried by F-4D Phantoms for use with laser-guided "smart bombs"; this enabled the RPV to be used in a pathfinder role. One other BGM-34B has been fitted with a Hughes high-resolution FLIR (forward-looking infrared) nose sensor instead of the TV installation. BGM-34Bs have made successful single and multiple passes against a variety of targets, launching a number of live and inert weapons, including SPASMs (self-propelled air-to-surface missiles) and Maverick TV-guided missiles. **BGM-34C** is an interim multimission RPV, for air or ground launch, with modular nose sections for reconnaissance, electronic warfare, or strike missions. Five ordered in 1974, with three modular reconnaissance noses, two strike noses, and one electronic warfare nose. Prototypes were converted from YAQM-34U RPVs, and completed 32 DT & E and IOT & E flights during 1977. A DC-130H capable of carrying and launching four BGM-34Cs has been developed.

Contractor: Teledyne Ryan Aeronautical, Division of Teledyne Inc.

Power Plant: Teledyne CAE J69-T-41A turbojet; 1,920 lb thrust.

Dimensions: span 14 ft 6 in, length BGM-34B 27 ft 4.6 in, BGM-34C 28 ft 6.2 in, body diameter 3 ft 1.2 in.

Weights: gross, BGM-34B 3,230 lb, BGM-34C 5,000 lb.

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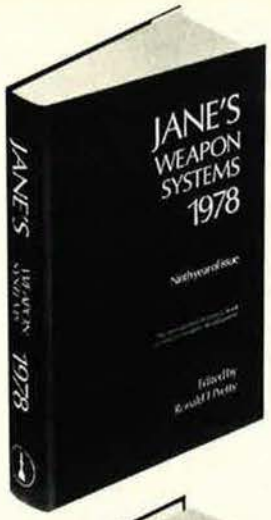

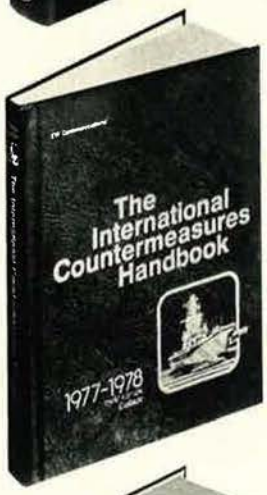

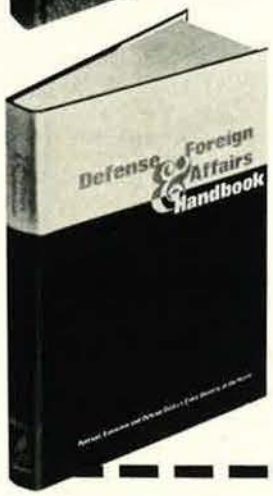

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AN AIR FORCE ALMANAC

THE UNITED STATES AIR FORCE IN FACTS AND FIGURES

On the following pages appears a variety of information and statistical material about the US Air Force—its people, organization, equipment, funding, activities, bases, and heroes. This "Almanac" section was compiled by the staff of AIR FORCE Magazine. We especially acknowledge the help of the Secretary of the Air Force Office of Information in its role as liaison with Air Staff agencies in bringing up to date the comparable data from last year's "Almanac." A word of caution: Personnel figures that appear in this section in different forms will not always 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—HOW IT GOT ITS NAME

DESIGNATION	FROM	TO
Aeronautical Div., US Signal Corps	Aug. 1, 1907	July 18, 1914
Aviation Section, US Signal Corps	July 18, 1914	May 24, 1918
Army Air Service	May 24, 1918	July 2, 1926
Army Air Corps	July 2, 1926	June 20, 1941
Army Air Forces	June 20, 1941	Sept. 18, 1947
United States Air Force	Sept. 18, 1947	

UNITED STATES AIR FORCE PERSONNEL STRENGTH—1907 THROUGH 1978

YEAR	STRENGTH	YEAR	STRENGTH	YEAR	STRENGTH	YEAR	STRENGTH
1907	3	1925	9,670	1943	2,197,114	1961	820,490
1908	13	1926	9,674	1944	2,372,292	1962	883,330
1909	27	1927	10,078	1945	2,282,259	1963	868,644
1910	11	1928	10,549	1946	455,515	1964	855,802
1911	23	1929	12,131	1947	305,827	1965	823,633
1912	51	1930	13,531	1948	387,730	1966	886,350
1913	114	1931	14,780	1949	419,347	1967	897,426
1914	122	1932	15,028	1950	411,277	1968	904,759
1915	208	1933	15,099	1951	788,381	1969	862,062
1916	311	1934	15,861	1952	973,474	1970	791,078
1917	1,218	1935	16,247	1953	977,593	1971	755,107
1918	195,023	1936	17,233	1954	947,918	1972	725,635
1919	25,603	1937	19,147	1955	959,946	1973	690,999
1920	9,050	1938	21,089	1956	909,958	1974	643,795
1921	11,649	1939	23,455	1957	919,835	1975	612,551
1922	9,642	1940	51,165	1958	871,156	1976	585,207
1923	9,441	1941	152,125	1959	840,028	1977	570,479
1924	10,547	1942	764,415	1960	814,213	1978	570,800*
						1979	565,000*

*Projected

USAF AND AIR RESERVE FORCES PERSONNEL BY CATEGORIES

CATEGORY	FY '64	FY '68	FY '74	FY '77	FY '78	FY '79 [1]
AIR FORCE MILITARY						
Officers	133,000	140,000	110,000	96,000	95,000	96,000
Airmen	720,000 [2]	762,000	529,000	470,000	471,000	465,000
Cadets	3,000	4,000	4,000	5,000	4,000	4,000
TOTAL, AIR FORCE MILITARY	**857,000**	**905,000**	**644,000**	**570,000**	**571,000**	**566,000**
Career Reenlistments	59,300	56,600	46,800	44,600	40,400	47,700
Rate	90%	88%	90%	86%	88%	89%
First-Term Reenlistments	17,400	10,700	19,300	15,200	15,800	17,200
Rate	30%	18%	31%	39%	38%	37%
CIVILIAN PERSONNEL						
Direct Hire (Including Technicians)	290,000	316,000	274,000	241,000	238,000	234,000
Indirect Hire—Foreign Nationals	33,000	26,000	16,000	15,000	15,000	15,000
TOTAL, CIVILIAN PERSONNEL	**322,000**	**342,000**	**289,000**	**255,000**	**253,000**	**249,000**
TOTAL MILITARY AND CIVILIAN [3]	**1,179,000**	**1,247,000**	**932,000**	**826,000**	**824,000**	**815,000**
TECHNICIANS (Included above as Direct Hire Civilians)						
AFR Technicians	—	—	6,000	7,000	7,000	7,000
ANG Technicians	15,000	17,000	22,000	22,000	22,000	23,000
AIR RESERVE FORCES						
Air National Guard, Paid	73,000	75,000	94,000	92,000	93,000	93,000
Air Force Reserve, Paid	67,000	46,000	48,000	51,000	54,000	55,000
Air Force Reserve, Nonpaid	97,000	145,000	119,000	61,000	54,000	52,000
TOTAL, READY RESERVE	**237,000**	**266,000**	**261,000**	**204,000**	**201,000**	**200,000**
Standby	130,000	101,000	46,000	44,000	42,000	42,000
TOTAL, AIR RESERVE FORCES [4]	**367,000**	**367,000**	**307,000**	**248,000**	**243,000**	**242,000**

[1] President's Budget Request.
[2] Excludes Aviation Cadets.
[3] FY '64–'77 are actuals; FY '78–'79 are estimates; excludes nonchargeable personnel.
[4] Excludes Retired Air Force Reserve.
NOTE: Totals may not add due to rounding.

USAF PERSONNEL STRENGTH BY COMMANDS AND AGENCIES

(Assigned Strengths as of 9/30/77)

MAJOR COMMAND	MILITARY	CIVILIAN	TOTAL
Aerospace Defense Command (ADCOM)	23,253	4,317	27,570
Air Force Communications Service (AFCS)	41,831	7,279	49,110
Air Force Logistics Command (AFLC)	9,081	82,005	91,086
Air Force Systems Command (AFSC)	25,027	26,132	51,159
Air Training Command (ATC)	64,508	14,432	78,940
Air University (AU)	7,085	1,985	9,070
Alaskan Air Command (AAC)	7,256	1,215	8,471
Military Airlift Command (MAC)	71,796	17,543	89,339
Pacific Air Forces (PACAF)	23,123	9,977	33,100
Strategic Air Command (SAC)	105,895	14,776	120,671
Tactical Air Command (TAC)	84,640	10,558	95,198
United States Air Forces in Europe (USAFE)	49,391	10,493	59,884
USAF Security Service (USAFSS)	13,602	2,167	15,769
TOTALS	**526,488**	**202,879**	**729,367**

SEPARATE OPERATING AGENCIES	MILITARY	CIVILIAN	TOTAL
Air Force Accounting and Finance Center (AFAFC)	258	1,806	2,064
Air Force Audit Agency (AFAA)	487	498	985
Air Force Data Automation Agency (AFDAA)	1,130	883	2,013
Air Force Engineering and Services Agency (AFESA)	925	9,251	10,176
Air Force Inspection and Safety Center (AFISC)	376	145	521
Air Force Intelligence Service (AFIS)	393	144	537
Air Force Management Engineering Agency (AFMEA)	232	69	301
Air Force Military Personnel Center (AFMPC)	1,336	675	2,011
Air Force Office of Special Investigations (AFOSI)	1,686	344	2,030
AFRES/Air Reserve Personnel Center (ARPC)	540	10,934	11,474
Air Force Test and Evaluation Center (AFTEC)	208	72	280
United States Air Force Academy (USAFA)	6,951	1,835	8,786
Office, Secretary of the AF/Air Staff	2,053	1,878	3,931
Other Hq. USAF	622	453	1,075
Other	7,843	195	8,038
Transients	18,951	—	18,951
TOTALS	**43,991**	**29,182**	**73,173**
TOTALS, COMMANDS AND AGENCIES	**570,479**	**232,061**	**802,540**

USAF TOTAL ACTIVE-DUTY STRENGTH BY GRADE

(As of March 15, 1978)

AIRMEN

GRADE	NUMBER
CHIEF MASTER SERGEANT	4,674
SENIOR MASTER SERGEANT	9,386
MASTER SERGEANT	33,325
TECHNICAL SERGEANT	52,814
STAFF SERGEANT	98,869
SERGEANT/SENIOR AIRMAN	111,990
AIRMAN FIRST CLASS	101,164
AIRMAN	31,120
AIRMAN BASIC	29,841
TOTAL	**473,183**

OFFICERS

GRADE	NUMBER
GENERAL	13
LIEUTENANT GENERAL	39
MAJOR GENERAL	134
BRIGADIER GENERAL	187
COLONEL	5,261
LIEUTENANT COLONEL	12,436
MAJOR	18,401
CAPTAIN	40,283
FIRST LIEUTENANT	10,552
SECOND LIEUTENANT	8,237
WARRANT OFFICER	4
TOTAL	**95,547**
CADETS	4,334
AIRMEN	473,183
TOTAL STRENGTH	**573,064**

USAF MILITARY PERSONNEL BY GRADE, RACE, AND SEX

(As of December 31, 1977)

OFFICERS

GRADE	FORCE	BLACK*	OTHER**	WOMEN***
GENERAL	373	6	1	3
COLONEL	5,261	77	39	48
LIEUTENANT COLONEL	12,436	191	113	299
MAJOR	18,401	447	275	709
CAPTAIN	40,283	1,194	461	2,023
FIRST LIEUTENANT	10,552	667	128	1,486
SECOND LIEUTENANT	8,237	658	174	1,004
WARRANT OFFICER	4	0	0	0
TOTALS	**95,547**	**3,240**	**1,191**	**5,572**

AIRMEN

GRADE	FORCE	BLACK*	OTHER**	WOMEN***
CHIEF MASTER SERGEANT	4,674	358	38	10
SENIOR MASTER SERGEANT	9,386	919	74	30
MASTER SERGEANT	33,325	4,021	376	96
TECHNICAL SERGEANT	52,814	7,654	640	224
STAFF SERGEANT	98,869	15,620	1,711	2,722
SERGEANT/SENIOR AIRMAN	111,990	21,289	2,701	12,200
AIRMAN FIRST CLASS	101,164	11,863	3,013	13,111
AIRMAN	31,120	3,714	1,051	3,892
AIRMAN BASIC	29,841	4,048	967	5,983
TOTALS	**473,183**	**69,486**	**10,571**	**38,268**
TOTALS, INCLUDING OFFICERS	**568,730**	**72,726**	**11,762**	**43,840**

* Includes 4,142 women.
** Includes 980 women.
*** Includes women from black and other categories.

AVERAGE AGES OF MILITARY PERSONNEL

(As of December 31, 1977)

Officers	Average 33.95 years of age
Airmen	Average 26.9 years of age

AIR FORCE FULL-TIME CIVILIAN EMPLOYMENT BY GRADE

(As of January 31, 1978)

GS		WP		WS		WL		WG	
GR	POP	GR	POP	GR	POP	GR	POP	GR	POP
1	159	4	1	1	65	1	3	1	452
2	1,694	8	3	2	44	2	37	2	1,607
3	10,873	9	7	3	158	3	8	3	1,060
4	17,519	10	3	4	235	4	105	4	2,420
5	21,895	11	4	5	482	5	69	5	4,809
6	8,951	12	12	6	586	6	72	6	5,601
7	12,595	13	1	7	1,106	7	51	7	6,181
8	4,058	14	7	8	959	8	216	8	8,558
9	17,156	16	5	9	2,084	9	429	9	8,634
10	1,433	17	4	10	2,101	10	1,142	10	26,468
11	15,583	18	1	11	925	11	103	11	7,161
12	13,554	21	1	12	570	12	42	12	5,705
13	8,650	24	1	13	348	13	4	13	707
14	2,960			14	243	14	0	14	220
15	937			15	121	15	0	15	1
16	96			16	46				
17	22			17	13				
18	7			18	2				
				19	1				
TOTALS	138,142		50		10,089		2,281		79,584

GR = Grade
GS = General Schedule
POP = Population
WP = Printing and Lithographic Pay Schedules
WS = Supervisory (Foreman) Pay Scales
WL = Leader Pay Schedules
WG = Nonsupervisory Pay Schedules
NOTE: Table includes ANG Technicians.

FEDERAL CIVILIAN PAY SCALE

General Schedule
(Effective Oct. 1, 1977)

GRADE	1	2	3	4	5	6	7	8	9	10
GS- 1	$6,219	$6,426	$6,633	$6,840	$7,047	$7,254	$7,461	$7,668	$7,875	$8,082
GS- 2	7,035	7,270	7,505	7,740	7,975	8,210	8,445	8,680	8,915	9,150
GS- 3	7,930	8,194	8,458	8,722	8,986	9,250	9,514	9,778	10,042	10,306
GS- 4	8,902	9,199	9,496	9,793	10,090	10,387	10,684	10,981	11,278	11,575
GS- 5	9,959	10,291	10,623	10,955	11,287	11,619	11,951	12,283	12,615	12,947
GS- 6	11,101	11,471	11,841	12,211	12,581	12,951	13,321	13,691	14,061	14,431
GS- 7	12,336	12,747	13,158	13,569	13,980	14,391	14,802	15,213	15,624	16,035
GS- 8	13,662	14,117	14,572	15,027	15,482	15,937	16,392	16,847	17,302	17,757
GS- 9	15,090	15,593	16,096	16,599	17,102	17,605	18,108	18,611	19,114	19,617
GS-10	16,618	17,172	17,726	18,280	18,834	19,388	19,942	20,496	21,050	21,604
GS-11	18,258	18,867	19,476	20,085	20,694	21,303	21,912	22,521	23,130	23,739
GS-12	21,883	22,612	23,341	24,070	24,799	25,528	26,257	26,986	27,715	28,444
GS-13	26,022	26,889	27,756	28,623	29,490	30,357	31,224	32,091	32,958	33,825
GS-14	30,750	31,775	32,800	33,825	34,850	35,875	36,900	37,925	38,950	39,975
GS-15	36,171	37,377	38,583	39,789	40,995	42,201	43,407	44,613	45,819	47,025
GS-16	42,423	43,837	42,251	46,665	48,079*	49,493*	50,907*	52,321*	53,735*	
GS-17	49,696*	51,353*	53,010*	54,667*	56,324*					
GS-18	58,245*									

* Rate for this level limited to $47,500 (Executive Schedule Level V).

MONTHLY MILITARY BASIC RATES OF PAY

(Effective October 1, 1977)

YEARS OF SERVICE

PAY GRADE	UNDER 2	2	3	4	6	8	10	12	14	16	18	20	22	26
COMMISSIONED OFFICERS														
O-10	$3,126	$3,236	$3,236	$3,236	$3,236	$3,360	$3,360	$3,406	$3,618	$3,650	$3,876	$3,894	$4,136*	$4,393*
O-9	2,770	2,843	2,904	2,904	2,904	2,978	2,978	3,101	3,101	3,360	3,360	3,406	3,618	3,650
O-8	2,509	2,584	2,646	2,646	2,646	2,843	2,843	2,978	2,978	3,101	3,236	3,360	3,495	3,495
O-7	2,085	2,227	2,227	2,227	2,326	2,326	2,462	2,462	2,584	2,843	3,039	3,039	3,039	3,039
O-6	1,545	1,698	1,809	1,809	1,809	1,809	1,809	1,809	1,870	2,166	2,277	2,326	2,462	2,670
O-5	1,236	1,452	1,551	1,551	1,551	1,551	1,599	1,684	1,797	1,932	2,043	2,104	2,178	2,178
O-4	1,042	1,268	1,353	1,353	1,378	1,439	1,537	1,624	1,698	1,772	1,821	1,821	1,821	1,821
O-3	968	1,082	1,157	1,280	1,341	1,390	1,464	1,537	1,575	1,575	1,575	1,575	1,575	1,575
O-2	844	922	1,107	1,145	1,168	1,168	1,168	1,168	1,168	1,168	1,168	1,168	1,168	1,168
O-1	732	762	922	922	922	922	922	922	922	922	922	922	922	922
COMMISSIONED OFFICERS WITH MORE THAN 4 YEARS ACTIVE SERVICE AS ENLISTED MEMBERS														
O-3	—	—	—	1,280	1,341	1,390	1,464	1,537	1,599	1,599	1,599	1,599	1,599	1,599
O-2	—	—	—	1,145	1,168	1,206	1,268	1,317	1,353	1,353	1,353	1,353	1,353	1,353
O-1	—	—	—	922	984	1,021	1,058	1,095	1,145	1,145	1,145	1,145	1,145	1,145
WARRANT OFFICERS														
W-4	986	1,058	1,058	1,082	1,131	1,181	1,231	1,317	1,378	1,427	1,464	1,512	1,563	1,684
W-3	897	972	972	984	996	1,069	1,131	1,168	1,206	1,242	1,280	1,329	1,378	1,427
W-2	785	849	849	874	922	972	1,009	1,046	1,082	1,120	1,157	1,193	1,242	1,242
W-1	654	750	750	812	849	886	922	960	996	1,033	1,069	1,107	1,107	1,107
ENLISTED MEMBERS														
E-9	—	—	—	—	—	—	1,120	1,146	1,172	1,199	1,225	1,249	1,315	1,443
E-8	—	—	—	—	—	940	966	992	1,044	1,044	1,069	1,095	1,159	1,289
E-7	656	708	735	760	786	811	837	863	902	928	954	966	1,031	1,159
E-6	567	618	644	671	696	721	748	786	811	837	850	850	850	850
E-5	498	541	568	592	631	657	683	708	721	721	721	721	721	721
E-4	478	505	534	576	599	599	599	599	599	599	599	599	599	599
E-3	460	485	504	525	525	525	525	525	525	525	525	525	525	525
E-2	443	443	443	443	443	443	443	443	443	443	443	443	443	443
E-1	397	397	397	397	397	397	397	397	397	397	397	397	397	397

NOTE: Amounts less than $1 have been omitted.

Basic pay while serving as Chairman of the Joint Chiefs of Staff or as Chief of Staff of the Air Force is $4,727.13, regardless of cumulative years of service.

* Basic pay is limited to $3,958.20 by Level V of the Executive Schedule.

Basic pay for the highest enlisted rank, while serving as Chief Master Sergeant of the Air Force, is $1,754.40, regardless of cumulative years of service.

BASIC ALLOWANCE FOR QUARTERS (BAQ)

Pay Grade	Without Dependents		With Dependents
	Full*	Partial**	
C/S and O-10	$339.30	$50.70	$424.20
O-9	339.30	50.70	424.20
O-8	339.30	50.70	424.20
O-7	339.30	50.70	424.20
O-6	304.50	39.60	371.40
O-5	280.80	33.00	338.10
O-4	249.90	26.70	301.80
O-3	219.90	22.20	271.20
O-2	190.80	17.70	241.50
O-1	148.80	13.20	193.80
W-4	240.90	25.20	290.70
W-3	214.80	20.70	264.60
W-2	186.90	15.90	237.30
W-1	168.60	13.80	218.40
CMSAF and E-9	181.80	18.60	255.60
E-8	167.40	15.30	236.40
E-7	142.50	12.00	219.90
E-6	129.30	9.90	202.20
E-5	124.20	8.70	185.70
E-4	109.80	8.10	163.50
E-3	98.10	7.80	142.50
E-2	86.70	7.20	142.50
E-1	81.90	6.90	142.50

* Payment for the full rate of basic allowance for quarters at these rates for members of the Uniformed Services to personnel without dependents is authorized by 37 U.S. Code 403 and Part IV of Finance Order 11157, as amended.

** 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. Code 403(b) or 403(c) are not entitled to the full rate of basic allowance for quarters, is authorized by 37 U.S. Code 1009(d) and Part IV of Executive Order 11157, as amended.

AVIATION CAREER INCENTIVE PAY SCHEDULE

PHASE I

Monthly Rate	Years of Aviation Service as an Officer *(Including flight training)*
$100	2 or less
$125	over 2
$150	over 3
$165	over 4
$245	over 6

PHASE II

Monthly Rate	Years of Service as an Officer
$225	over 18
$205	over 20
$185	over 22
$165	over 24 but not over 25
0	over 25

NOTE: An officer in pay grade O-7 may not be paid at a rate greater than $160 a month. And an officer in pay grade O-8 or above may not be paid at a rate greater than $165 a month.

BASIC ALLOWANCE FOR SUBSISTENCE (BAS)

Officers (Monthly)	Enlisted (Daily)		
	Separate Rations	Rations in Kind Not Available	Emergency Rations
$59.53	$2.84	$3.20	$4.25

COMPARISON OF DoD BUDGETS BY MILITARY PROGRAMS FOR FY 1977–79

(Billions of Dollars)

Military Program	Total Obligational Authority FY '77	FY '78	FY '79
Strategic Forces	$ 9.4	$ 9.3	$ 9.8
General Purpose Forces	38.2	42.6	46.9
Intelligence and Communications	7.4	7.8	8.3
Airlift and Sealift	1.5	1.6	1.8
Guard and Reserve Forces	5.9	6.7	6.7
Research and Development	9.9	10.2	11.0
Central Supply and Maintenance	11.1	12.0	12.8
Training, Medical, and Other General Personnel Activities	22.5	24.0	26.0
Administrative and Associated Activities	2.0	2.3	2.4
Support of Other Nations (Excludes MAP)	0.2	0.2	0.3
TOTALS	**$108.3**	**$116.8**	**$126.0**

NOTE: Totals may not add due to rounding.

DoD FINANCIAL SUMMARY BY COMPONENT FOR FY 1977–79

(Billions of Dollars)

Component	FY '77 Current $	FY '77 FY '79 $	FY '78 Current $	FY '78 FY '79 $	FY '79 Current $	FY '79 FY '79 $
Army	$ 26.7	$ 30.2	$ 28.9	$ 30.6	$ 32.1	$ 32.1
Navy	36.5	41.3	39.7	42.1	41.7	41.7
Air Force	31.6	35.6	33.2	35.1	35.6	35.6
Defense Agencies/OSD	3.8	4.3	4.1	4.4	4.5	4.5
Defense-wide	9.6	11.0	10.7	11.4	11.9	11.9
Civil Defense	0.1	0.1	0.1	0.1	0.1	0.1
TOTALS	**$108.3**	**$122.6**	**$116.8**	**$123.7**	**$126.0**	**$126.0**

NOTE: Totals may not add due to rounding.

EDUCATIONAL LEVELS—USAF LINE OFFICERS

Level	End of December 1977 Number	Percent
Below baccalaureate	1,935	2.3
Baccalaureate, no master's degree	50,752	61.3
Master's degree, no doctorate	28,765	34.7
Doctoral and professional degrees	1,370	1.7
TOTALS	**82,822**	**100.0**

EDUCATIONAL LEVELS—USAF ENLISTED FORCE

Level	End of December 1977 Number	Percent
Below high school (no GED)	5,971	1.3
GED passed (old system)—no diploma or civilian equivalency certificate	9,196	1.9
Recognized high school diploma or certificate	372,760*	79.1
Some post-secondary education, less than two years	45,590	9.7
Some post-secondary education, two or more years but below bachelor's	26,841**	5.7
Baccalaureate or higher	10,684	2.3
TOTALS	**471,042**	**100.0**

* Includes 15,888 with high school diploma or equivalency certificate based on GED (new system), and 356,872 with high school completion (diploma or certificate).

** Includes 4,224 with associate degrees.

INSTALLATIONS OF THE US AIR FORCE

Major Installations	FY '64	FY '68	FY '75	FY '76	FY '77	FY '78
US and Possessions	160	138	113	111	107	107
Foreign	56	60	35	29	27	27
Worldwide	**216**	**198**	**148**	**140**	**134**	**134**
Other Installations						
US and Possessions	3,650	2,723	2,323	2,372	2,305	2,307
Foreign	1,168	1,060	720	658	664	663
Worldwide	**4,818**	**3,783**	**3,043**	**3,030**	**2,969**	**2,970**
"Other Installations" includes:						
Auxiliary	2,849	1,892	—	—	—	—
Ballistic Missile	1,083	1,158	1,157	1,157	1,157	1,157
Industrial	55	43	—	—	—	—
Radar	331	183	—	—	—	—
Air National Guard	103	106	125	127	128	130
Tenant, Non-Air Force	348	357	—	—	—	—
War Only	49	44	—	—	—	—
Electronics Station or Site	—	—	599	579	569	569
General Support Annex	—	—	1,140	1,146	1,095	1,094
Auxiliary Airfield	—	—	22	21	20	20

AIR FORCE BUDGET AND FINANCE—FISCAL YEARS 1964–79

(Figures in millions of dollars)

	FY '64	FY '68	FY '74	FY '77	FY '78	FY '79
Gross National Product	$616,200	$829,900	$1,359,200	$1,838,000	$2,043,200	$2,274,600
Federal Budget, Outlays	118,600	178,800	269,600	401,900	462,200	500,200
DoD Budget, Outlays	50,786	78,027	78,445	95,650	105,300	115,200
DoD Percent of: GNP	8.2%	9.4%	5.8%	5.2%	5.2%	5.1%
Federal Budget	42.8%	43.6%	29.1%	23.8%	22.8%	23.0%
Air Force Budget Outlays						
Current Dollars	20,456	25,734	23,928	27,915	30,511	32,354
Constant FY '79 Prices	49,674	53,919	34,439	31,685	32,356	32,354
AF Percent of: GNP	3.3%	3.1%	1.8%	1.5%	1.5%	1.4%
Federal Budget	17.2%	14.4%	8.9%	6.9%	6.6%	6.5%
DoD Budget	40.3%	33.0%	30.5%	29.2%	29.0%	28.1%
Total Obligational Authority						
DoD—Current Dollars	50,647	75,627	85,054	108,276	116,778	126,000
Constant FY '79 Prices	129,937	162,394	120,143	122,558	123,731	126,000
AF—Current Dollars	19,958	24,974	24,779	31,550	33,200	34,939
Constant FY '79 Prices	49,410	52,931	34,973	35,627	35,145	34,939
(With anticipated pay supplementals)						35,590
Aircraft Procurement (3010)	3,620	5,306	2,837	5,632	6,275	6,898
Missile Procurement (3020)	2,220	1,408	1,419	1,791	1,804	1,677
Other Procurement (3080)	876	2,357	1,652	2,263	2,328	2,516
Procurement Subtotal	6,716	9,071	5,908	9,686	10,407	11,091
Military Construction—AF (3300)	497	481	321	823	485	667
Military Construction—AFRES (3730)	3	4	11	16	11	13
Military Construction—ANG (3830)	17	10	19	37	43	42
Military Construction Subtotal	517	495	351	876	539	722
RDT&E (3600)	3,627	3,412	3,062	3,816	4,193	4,339
TOTAL, INVESTMENT	**10,860**	**12,978**	**9,321**	**14,378**	**15,139**	**16,152**
Military Personnel—AF (3500)	4,423	5,677	7,479	7,316	7,602	7,576
Reserve Personnel—AF (3700)	57	64	126	158	179	184
National Guard Personnel—AF (3850)	60	84	182	222	244	252
Military Personnel Subtotal	4,540	5,825	7,787	7,696	8,025	8,012
Operation & Maintenance—AF (3400)	4,339	5,904	6,882	8,273	8,768	9,415
Operation & Maintenance—AFRES (3740)	—	—	239	355	385	395
Operation & Maintenance—ANG (3840)	220	266	551	790	849	939
Stock Fund (4921)	—	—	—	59	35	27
Operation & Maintenance Subtotal	4,559	6,170	7,672	9,477	10,037	10,776
TOTAL, OPERATING	**9,099**	**11,995**	**15,459**	**17,173**	**18,062**	**18,788**
Programs, TOA (Current $)						
I Strategic Forces	6,525	5,176	4,315	5,378	4,544	4,959
II General Purpose Forces	3,030	7,273	5,611	8,169	9,982	10,596
III Intelligence & Communications	2,979	3,622	3,340	3,836	4,091	4,196
IV Airlift & Sealift Forces	1,010	1,736	756	1,514	1,610	1,741
V Reserve & Guard Forces	502	621	1,223	1,718	2,132	2,143
VI Research & Development	2,063	1,556	2,401	3,656	3,633	3,744
VII Central Supply & Maintenance	1,767	2,375	2,763	3,590	3,458	3,796
VIII Training, Medical & Other General Activities	1,726	2,079	3,441	3,170	3,208	3,224
IX Administration & Associated Activities	342	352	568	495	514	511
X Support of Other Nations	12	182	363	25	28	29

NOTE: Totals may not add due to rounding.
FY '78 column reflects revised estimate.
FY '79 is President's budget request.

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 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.

an. 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.

ug. 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.

une 28, 1950 First mission in Korea: 12 B-26s of the 3d Bomb Gp., at Ashiya, Japan, and 4 B-29s of the 19th Bomb Gp., Kadena, Okinawa, attacked targets north of Seoul.

une 18, 1965 First heavy (and all-jet) mission in Vietnam: 27 B-52s of the Guam-based 7th and 320th Bomb Wgs., led by Col. Van Parker, attacked targets in South Vietnam.

THE NUMBER OF SQUADRONS IN USAF

MAJOR FORCE SQUADRONS	FY '64	FY '68	FY '74	FY '77	FY '78	FY '79
Bomber	75	40	28	25	24	24
ECM/Reconnaissance	5	3	1	1	1	1
IRBM/ICBM	35	26	26	26	26	26
Tanker	55	41	38	34	30	30
Interceptor	40	28	7	6	6	6
Bomarc	8	6	—	—	—	—
Command, Control & Surveillance	13	13	8	6	6	6
Tactical Bomber	2	1	—	—	—	—
Mace/Matador	8	2	—	—	—	—
Fighter	75	92	74	76	78	79
Reconnaissance	8	21	13	9	9	7
Tactical Air Control System	1	9	11	11	11	11
Special Operations Force	6	22	5	5	5	5
Tactical Airborne Command Control System	—	—	—	4	5	5
Tactical Airlift	26	31	17	15	15	15
Strategic Airlift	35	32	17	17	17	17
Aeromed Evacuation	5	6	3	3	3	3
Special Mission	2	2	2	2	1	1
Mapping	2	2	1	—	—	—
Weather	6	6	3	2	2	2
Air Rescue & Recovery	12	14	12	5	5	5
Intelligence	—	15	9	6	6	5
Other	20	15	2	7	8	7
TOTAL, USAF	**439**	**427***	**277**	**260**	**258**	**255**
Air National Guard	92	78	91	91	91	91
Air Force Reserve	50	37	53**	53**	53**	53**
TOTAL, MAJOR FORCE SQUADRONS	**581**	**542**	**421**	**400**	**402**	**399**

NOTE: Data for FY '64–77 columns are actual; FY '78 and FY '79 data are estimated.
* Includes 20 mobilized units.
** Includes Associate Squadrons.

Number of Aircraft Per Active-Duty USAF Squadron

Aircraft Type	Number
A-7	24
B-52	14
C-5	17
C-9	11
C-130	15
AC-130	10
KC-135	15
C-141	18
F-4	24
RF-4	18
F-5	18
F-15	24
F-106	18
F-111	24
FB-111	15

Projected UE Assignments for New Weapon Systems

A-10	24
E-3A	10
F-16	24

NOTE: In addition, four USAF aircraft types are counted as total Unit Equipment, not by squadrons. These include the HC-130 (24 total), the WC-130 (13 total), and the T-39 (104 total), all of the Military Airlift Command; and the T-38 trainer (948 total, plus those assigned to the Thunderbirds demonstration team).

THE NUMBER OF ACTIVE AIRCRAFT AND FLYING HOURS

TYPE OF AIRCRAFT	FY '64	FY '68	FY '74	FY '76	FY '77	FY '78	FY '79
Bomber, Strategic	1,364	714	500	494	489	486	486
Bomber, Other	145	65	—	—	—	—	—
Tanker	998	667	657	622	567	526	526
Fighter/Interceptor/Attack	3,538	3,985	2,387	2,496	2,599	2,676	2,658
Reconnaissance/Electronic Warfare	595	1,009	610	412	423	415	381
Cargo/Transport	2,327	2,358	1,253	889	860	854	850
Search & Research (Fixed Wing)	100	91	56	41	37	37	37
Helicopter (includes Rescue)	401	465	317	254	254	249	244
Special Research	3	5	—	—	—	—	—
Trainer	2,873	2,584	1,996	1,800	1,769	1,750	1,760
Utility/Observation	345	663	154	198	220	216	214
TOTAL, USAF	**12,689**	**12,606**	**7,930**	**7,206**	**7,218**	**7,209**	**7,156**
Air National Guard total	1,806	1,438	1,798	1,617	1,560	1,556	1,516
Air Force Reserve total	719	426	428	464	478	473	485
Free World Military Forces total	—	692	1,976	—	—	—	—
Earmarked (MAP, USN, and Other Non-Air Force)	166	165	—	—	—	—	—
TOTAL ACTIVE AIRCRAFT, USAF, ANG, AFRES	**15,380**	**15,327**	**12,132**	**9,287**	**9,256**	**9,238**	**9,157**
Active aircraft including foreign government owned						(9,396)	(9,305)
FLYING HOURS (000)							
USAF	6,028	7,068	3,272	2,606	2,642	2,658	2,725
Air National Guard	432	465	405	406	386	397	398
Air Force Reserve	202	164	128	137	139	139	142
TOTAL FLYING HOURS	**6,662**	**7,697**	**3,805**	**3,149**	**3,167**	**3,194**	**3,265**

NOTE: Data in FY '64–77 columns are actual; FY '78 and FY '79 data are estimated.

UNITED STATES AIR FORCE MEDAL OF HONOR WINNERS—1918–1978

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.	Superior, Wis.	Oct. 10–Nov. 15, 1944, Southwest Pacific	Killed, Aug. 6, 1945, Burbank, Calif.
Carswell, Maj. Horace S., Jr.	Fort Worth, Tex.	Oct. 26, 1944, South China Sea	KIA, Oct. 26, 1944
Castle, Brig. Gen. Frederick W.	Manila, P.I.	Dec. 24, 1944, Liège, Belgium	KIA, Dec. 24, 1944
Cheli, Maj. Ralph	San Francisco, Calif.	Aug. 13, 1943, Wewak, New Guinea	Died as POW, Mar. 6, 1944
Craw, Col. Demas T.	Traverse City, Mich.	Nov. 8, 1942, Port Lyautey, French Morocco	KIA, Nov. 8, 1942
Doolittle, Lt. Col. James H.	Alameda, Calif.	Apr. 18, 1942, Tokyo, Japan	Los Angeles, Calif. (Ret. Lt. Gen.)
Erwin, SSgt. Henry E.	Adamsville, Ala.	Apr. 12, 1945, Koriyama, Japan	Birmingham, Ala.
Femoyer, 2d Lt. Robert E.	Huntington, W. Va.	Nov. 2, 1944, Merseburg, Germany	KIA, Nov. 2, 1944
Gott, 1st Lt. Donald J.	Arnett, Okla.	Nov. 9, 1944, Saarbrücken, Germany	KIA, Nov. 9, 1944
Hamilton, Maj. Pierpont M.	Tuxedo Park, N.Y.	Nov. 8, 1942, Port Lyautey, French Morocco	Santa Barbara, Calif. (Ret. Maj. Gen.)
Howard, Lt. Col. James H.	Canton, China	Jan. 11, 1944, Oschersleben, Germany	Washington, D.C. (Ret. Brig. Gen.)
Hughes, 2d Lt. Lloyd H.	Alexandria, La.	Aug. 1, 1943, Ploesti, Romania	KIA, Aug. 1, 1943
Jerstad, Maj. John L.	Racine, Wis.	Aug. 1, 1943, Ploesti, Romania	KIA, Aug. 1, 1943
Johnson, Col. Leon W.	Columbia, Mo.	Aug. 1, 1943, Ploesti, Romania	McLean, Va. (Ret. Gen.)
Kane, Col. John R.	McGregor, Tex.	Aug. 1, 1943, Ploesti, Romania	Barber, Ark. (Ret. Col.)
Kearby, Col. Neel E.	Wichita Falls, Tex.	Oct. 11, 1943, Wewak, New Guinea	KIA, Mar. 5, 1944, Wewak, New Guinea
Kingsley, 2d Lt. David R.	Portland, Ore.	June 23, 1944, Ploesti, Romania	KIA, June 23, 1944
Knight, 1st Lt. Raymond L.	Houston, Tex.	Apr. 25, 1945, Po Valley, Italy	KIA, Apr. 25, 1945
Lawley, 1st Lt. William R., Jr.	Leeds, Ala.	Feb. 20, 1944, Leipzig, Germany	Montgomery, Ala. (Ret. Col.)
Lindsey, Capt. Darrell R.	Jefferson, Iowa	Aug. 9, 1944, Pontoise, France	KIA, Aug. 9, 1944
Mathies, SSgt. Archibald	Scotland	Feb. 20, 1944, Leipzig, Germany	KIA, Feb. 20, 1944
Mathis, 1st Lt. Jack W.	San Angelo, Tex.	Mar. 18, 1943, Vegesack, Germany	KIA, Mar. 18, 1943
McGuire, Maj. Thomas B., Jr.	Ridgewood, N.J.	Dec. 25–26, 1944, Luzon, P.I.	KIA, Jan. 7, 1945, Negros, P.I.
Metzger, 2d Lt. William E., Jr.	Lima, Ohio	Nov. 9, 1944, Saarbrücken, Germany	KIA, Nov. 9, 1944
Michael, 1st Lt. Edward S.	Chicago, Ill.	Apr. 11, 1944, Brunswick, Germany	Fairfield, Calif. (Ret. Col.)
Morgan, 2d Lt. John C.	Vernon, Tex.	July 28, 1943, Kiel, Germany	Greenwich, Conn. (Ret. Col.)
Pease, Capt. Harl, Jr.	Plymouth, N.H.	Aug. 7, 1942, Rabaul, New Britain	KIA, Aug. 7, 1942
Pucket, 1st Lt. Donald D.	Longmont, Colo.	July 9, 1944, Ploesti, Romania	KIA, July 9, 1944
Sarnoski, 2d Lt. Joseph R.	Simpson, Pa.	June 16, 1943, Buka, Solomon Is.	KIA, June 16, 1943
Shomo, Maj. William A.	Jeannette, Pa.	Jan. 11, 1945, Luzon, P.I.	Pittsburgh, Pa. (Ret. Lt. Col.)
Smith, SSgt. Maynard H.	Caro, Mich.	May 1, 1943, St. Nazaire, France	Long Island City, N.Y.
Truemper, 2d Lt. Walter E.	Aurora, Ill.	Feb. 20, 1944, Leipzig, Germany	KIA, Feb. 20, 1944
Vance, Lt. Col. Leon R., Jr.	Enid, Okla.	June 5, 1944, Wimereaux, France	Killed, July 26, 1944, near Iceland
Vosler, TSgt. Forrest L.	Lyndonville, N.Y.	Dec. 20, 1943, Bremen, Germany	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.	Hyannis, Mass. (Ret. Lt. Col.)
KOREA			
Davis, Maj. George A., Jr.	Dublin, Tex.	Feb. 10, 1952, Sinuiju-Yalu River, No. Korea	KIA, Feb. 10, 1952
Loring, Maj. Charles J., Jr.	Portand, Me.	Nov. 22, 1952, Sniper Ridge, No. Korea	KIA, Nov. 22, 1952
Sebille, Maj. Louis J.	Harbor Beach, Mich.	Aug. 5, 1950, Hamch'ang, So. Korea	KIA, Aug. 5, 1950
Walmsley, Capt. John S., Jr.	Baltimore, Md.	Sept. 14, 1951, Yangdok, No. Korea	KIA, Sept. 14, 1951
VIETNAM			
Bennett, Capt. Steven L.	Palestine, Tex.	June 29, 1972, Quang Tri, So. Vietnam	KIA, June 29, 1972
Day, Col. George E.	Sioux City, Iowa	Conspicuous gallantry while POW	Active duty, Col., Eglin AFB, Fla.
Dethlefsen, Maj. Merlyn H.	Greenville, Iowa	Mar. 10, 1967, Thai Nguyen, No. Vietnam	Active duty, Col., Dyess AFB, Tex.
Fisher, Maj. Bernard F.	San 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, Maj., RAF Woodbridge, UK
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	Glastonbury, Conn.
Sijan, Capt. Lance P.	Milwaukee, Wis.	Conspicuous gallantry while POW	Died while POW, Jan. 1968
Thorsness, Lt. Col. Leo K.	Walnut Grove, Minn.	Apr. 19, 1967, No. Vietnam	Sioux Falls, S. D. (Ret. Lt. Col.)
Wilbanks, Capt. Hilliard A.	Cornelia, Ga.	Feb. 24, 1967, Dalat, So. Vietnam	KIA, Feb. 24, 1967
Young, Capt. Gerald O.	Anacortes, Wash.	Nov. 9, 1967, Da Nang area, So. Vietnam	Active duty, Lt. Col., Bogota, Colombia

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
Thomas C. Reed	Jan. 2, 1976	Apr. 6, 1977
John C. Stetson	Apr. 6, 1977	

USAF CHIEFS OF STAFF

Gen. Carl A. Spaatz	Sept. 26, 1947	Apr. 29, 1948
Gen. Hoyt S. Vandenberg	Apr. 30, 1948	June 29, 1953
Gen. Nathan F. Twining	June 30, 1953	June 30, 1957
Gen. Thomas D. White	July 1, 1957	June 30, 1961
Gen. Curtis E. LeMay	June 30, 1961	Jan. 31, 1965
Gen. John P. McConnell	Feb. 1, 1965	July 31, 1969
Gen. John D. Ryan	Aug. 1, 1969	July 31, 1973
Gen. George S. Brown	Aug. 1, 1973	June 30, 1974
Gen. David C. Jones	July 1, 1974	

AEROSPACE DEFENSE COMMAND

Lt. Gen. George E. Stratemeyer	Mar. 21, 1946	Nov. 30, 1948
Maj. Gen. Gordon P. Saville	Dec. 1, 1948	Dec. 31, 1950
Lt. Gen. Ennis C. Whitehead	Jan. 1, 1951	Aug. 25, 1951
Gen. Benjamin W. Chidlaw	Aug. 25, 1951	May 31, 1955
Maj. Gen. Frederic H. Smith (acting)	May 31, 1955	July 19, 1955
Gen. Earle E. Partridge	July 20, 1955	Sept. 17, 1956
Lt. Gen. Joseph H. Atkinson	Sept. 17, 1956	Aug. 15, 1961
Lt. Gen. Robert M. Lee	Aug. 15, 1961	July 31, 1963
Lt. Gen. Herbert B. Thatcher	Aug. 1, 1963	July 31, 1967
Lt. Gen. Arthur C. Agan	Aug. 1, 1967	Feb. 28, 1970
Lt. Gen. Thomas K. McGehee	Mar. 1, 1970	July 1, 1973
Gen. Seth J. McKee	July 1, 1973	Oct. 1, 1973
Gen. Lucius D. Clay, Jr.	Oct. 1, 1973	Aug. 31, 1975
Gen. Daniel James, Jr.	Sept. 1, 1975	Dec. 5, 1977
Gen. James E. Hill	Dec. 6, 1977	

Formerly Air Defense Command.
Redesignated Aerospace Defense Command Jan. 1, 1968.

AIR FORCE COMMUNICATIONS SERVICE

Maj. Gen. Harold W. Grant	July 1, 1961	Feb. 15, 1962
Maj. Gen. Kenneth P. Bergquist	Feb. 16, 1962	June 30, 1965
Maj. Gen. J. Francis Taylor, Jr.	July 1, 1965	Oct. 31, 1965
Maj. Gen. Richard P. Klocko	Nov. 1, 1965	July 2, 1967
Maj. Gen. Robert W. Paulson	July 15, 1967	Aug. 1, 1969
Maj. Gen. Paul R. Stoney	Aug. 1, 1969	Oct. 31, 1973
Maj. Gen. Donald L. Werbeck	Nov. 1, 1973	Aug. 24, 1975
Maj. Gen. Rupert H. Burris	Aug. 25, 1975	Oct. 31, 1977
Maj. Gen. Robert E. Sadler	Nov. 1, 1977	

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	

Formerly Air Materiel Command.
Redesignated as Air Force Logistics Command Apr. 1, 1961.

AIR FORCE SYSTEMS COMMAND

Maj. Gen. David M. Schlatter	Feb. 1, 1950	June 24, 1951
Lt. Gen. Earle E. Partridge	June 24, 1951	June 20, 1953
Lt. Gen. Donald L. Putt	June 30, 1953	Apr. 14, 1954
Lt. Gen. Thomas S. Power	Apr. 15, 1954	June 30, 1957
Maj. Gen. John W. Sessums, Jr.	July 1, 1957	July 31, 1957
Lt. Gen. Samuel E. Anderson	Aug. 1, 1957	Mar. 9, 1959
Maj. Gen. John W. Sessums, Jr.	Mar. 10, 1959	Apr. 24, 1959
Gen. Bernard A. Schriever	Apr. 25, 1959	Aug. 31, 1966
Gen. James Ferguson	Sept. 1, 1966	Aug. 30, 1970
Gen. George S. Brown	Sept. 1, 1970	July 31, 1973
Gen. Samuel C. Phillips	Aug. 1, 1973	Aug. 31, 1975
Gen. William J. Evans	Sept. 1, 1975	July 31, 1977
Gen. Lew Allen	Aug. 1, 1977	Mar. 13, 1978
Gen. Alton D. Slay	Mar. 14, 1978	

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	

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	

Air University is scheduled to become part of Air Training Command, May 15, 1978.

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	

MILITARY AIRLIFT COMMAND

Lt. Gen. Laurence S. Kuter	June 1, 1948	Oct. 28, 1951
Lt. Gen. Joseph Smith	Nov. 15, 1951	June 30, 1958
Lt. Gen. William H. Tunner	July 1, 1958	May 31, 1960
Gen. Joe W. Kelly, Jr.	June 1, 1960	July 18, 1964
Gen. Howell M. Estes, Jr.	July 19, 1964	July 31, 1969
Gen. Jack J. Catton	Aug. 1, 1969	Sept. 12, 1972
Gen. Paul K. Carlton	Sept. 20, 1972	Mar. 31, 1977
Gen. William G. Moore, Jr.	Apr. 1, 1977	

Formerly Military Air Transport Service.
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	

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

STRATEGIC AIR COMMAND

Gen. George C. Kenney	Mar. 21, 1946	Oct. 15, 1948
Gen. Curtis E. LeMay	Oct. 16, 1948	June 30, 1957
Gen. Thomas S. Power	July 1, 1957	Nov. 30, 1964
Gen. John D. Ryan	Dec. 1, 1964	Jan. 31, 1967
Gen. Joseph J. Nazzaro	Feb. 1, 1967	July 31, 1968
Gen. Bruce K. Holloway	Aug. 1, 1968	Apr. 30, 1972
Gen. John C. Meyer	May 1, 1972	July 31, 1974
Gen. Russell E. Dougherty	Aug. 1, 1974	July 31, 1977
Gen. Richard H. Ellis	Aug. 1, 1977	

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. Wilbur L. Creech	May 1, 1978	

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	

USAF SECURITY SERVICE

Col. Roy H. Lynn	Oct. 26, 1948	July 5, 1949
Col. Travis M. Hetherington	July 6, 1949	Feb. 21, 1951
Maj. Gen. Roy H. Lynn	Feb. 22, 1951	Feb. 13, 1953
Maj. Gen. Harold H. Bassett	Feb. 14, 1953	Jan. 3, 1957
Maj. Gen. Gordon L. Blake	Jan. 4, 1957	Aug. 5, 1959
Maj. Gen. John B. Ackerman	Aug. 6, 1959	Sept. 20, 1959
Maj. Gen. Millard Lewis	Sept. 21, 1959	Aug. 31, 1962
Maj. Gen. Richard P. Klocko	Sept. 1, 1962	Oct. 15, 1965
Maj. Gen. Louis E. Coira	Oct. 16, 1965	July 18, 1969
Maj. Gen. Carl W. Stapleton	July 19, 1969	Feb. 23, 1973
Maj. Gen. Walter T. Galligan	Feb. 24, 1973	May 16, 1974
Maj. Gen. Howard P. Smith	May 17, 1974	July 31, 1975
Maj. Gen. (selectee) K. D. Burns	Aug. 1, 1975	

USAF ACADEMY, SUPERINTENDENTS

Lt. Gen. Hubert R. Harmon	July 27, 1954	July 27, 1956
Maj. Gen. James E. Briggs	July 28, 1956	Aug. 16, 1959
Maj. Gen. William S. Stone	Aug. 17, 1959	June 30, 1962
Maj. Gen. Robert H. Warren	July 1, 1962	June 30, 1965
Lt. Gen. Thomas S. Moorman	July 1, 1965	July 31, 1970
Lt. Gen. Albert P. Clark	Aug. 1, 1970	July 31, 1974
Lt. Gen. James R. Allen	Aug. 1, 1974	July 31, 1977
Lt. Gen. Kenneth L. Tallman	Aug. 1, 1977	

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	

AIR FORCE MAGAZINE'S GUIDE TO ACES

In compiling this list of aces who flew with USAF and its predecessor organizations (the Air Service and the Army Air Forces), AIR FORCE Magazine has used official USAF sources except for World War I. During that war, many Americans scored victories serving with foreign countries. As a result, these men do not appear on official lists as "American" aces. We have included in our list of World War I aces both those who flew with the American Air Service and with the British or French. The lists for World War II, Korea, and Vietnam include only AAF/USAF airmen.

The Albert F. Simpson Historical Research Center, Maxwell AFB, Ala., has completed a detailed accounting of the Air Service victory credits in World War I, AAF victory credits in World War II, and USAF victory credits in Korea and Southeast Asia. The World War II list, now at the printers, 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 should be available in printed form within the next two months. All World War II awards are open to challenge.

Although some World War I totals (notably Frank Luke's) include balloons, all entries for subsequent conflicts are for air-to-air victories.

—THE EDITORS

LEADING AMERICAN ACES OF WORLD WAR I

(Ten or more victories)

Rickenbacker, Capt. Edward V. (AEF)	26	Luke, 2d Lt. Frank, Jr. (AEF)	18	Bennett, 1st Lt. Louis B. (RFC)	12
Lambert, Capt. William C. (RFC)	22	Lufbery, Maj. Raoul G. (FFC/LE)	17	Kindley, Capt. Field E. (AEF)	12
Gillette, Capt. Frederick W. (RFC)	20	Kullberg, Lt. Harold A. (RFC)	16	Putnam, 1st Lt. David E. (LE/AEF)	12
Malone, Capt. John J. (RN)	20	Rose, Capt. Oren J. (RFC)	16	Springs, Capt. Elliott W. (AEF)	12
Wilkinson, Maj. Alan M. (RFC)	19	Warman, Lt. C. T. (RFC)	15	Iaccaci, Lt. Thayer A. (RFC)	11
Hale, Capt. Frank L. (RFC)	18	Libby, Capt. Frederick (RFC)	14	Landis, Capt. Reed G. (AEF)	11
Iaccaci, Capt. Paul T. (RFC)	18	Vaughn, 1st Lt. George A. (AEF)	13	Swaab, Capt. Jacques M. (AEF)	10
		Baylies, Lt. Frank L. (FFC/LE)	12		

AEF—American Expeditionary Force
FFC—French Flying Corps
LE—Lafayette Escadrille
RFC—Royal Flying Corps (British)
RN—Royal Navy (British)

LEADING ARMY AIR 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, Lt. Col. Clarence E., Jr.	16.25
McGuire, Maj. Thomas B., Jr.	38	Carson, Maj. Leonard K.	18.50	Dunham, Col. William D.	16
Gabreski, Col. Francis S.	28*	Eagleston, Lt. Col. Glenn T.	18.50*	Harris, Lt. Col. Bill	16
Johnson, Lt. Col. Robert S.	27	Hill, Maj. David L. (AVG/USAF)	18.25**	Welch, Maj. George S.	16
MacDonald, Col. Charles H.	27	Older, Lt. Col. Charles H. (AVG/USAF)	18.25**	Beerbower, Capt. Donald M.	15.50
Preddy, Maj. George E.	26.83	Beckham, Col. Walter C.	18	Brown, Capt. Samuel J.	15.50
Meyer, Col. John C.	24*	Green, Col. Herschel H.	18	Peterson, Maj. Richard A.	15.50
Schilling, Col. David C.	22.50	Herbst, Col. John C.	18	Whisner, Maj. William T., Jr.	15.50*
Johnson, Lt. Col. Gerald R.	22	Zemke, Col. Hubert	17.75	Blakeslee, Col. Donald J. M. (ES/USAF)	15**
Kearby, Col. Neel E.	22	England, Lt. Col. John B.	17.50	Bradley, Col. Jack T.	15
Robbins, Col. Jay T.	22	Beeson, Maj. Duane W.	17.33	Cragg, Maj. Edward	15
Christensen, Capt. Fred J.	21.50	Thornell, Maj. John F., Jr.	17.25	Foy, Maj. Robert W.	15
Wetmore, Capt. Ray S.	21.25	Reed, Maj. William N. (AVG/USAF)	17**	Hofer, 1st Lt. Ralph K.	15
Mahurin, Lt. Col. Walker M.	20.75*	Varnell, Capt. James S., Jr.	17	Homer, Maj. Cyril F.	15
Voll, Maj. John J.	20.50	Johnson, Col. Gerald W.	16.50	Landers, Lt. Col. John D.	14.50
Lynch, Lt. Col. Thomas J.	20	Godfrey, Capt. John T.	16.33	Powers, Capt. Joe H., Jr.	14.50
Westbrook, Lt. Col. Robert B.	20				
Gentile, Capt. Donald S.	19.83				

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

AVG—American Volunteer Group
ES—Eagle Squadron

** The Simpson Center has no way of verifying kills made while flying with AVG or ES.

USAF ACES OF THE KOREAN WAR

McConnell, Capt. Joseph, Jr.	16	Low, 1st Lt. James F.	9	Whisner, Maj. William T., Jr.	5.50*
Jabara, Maj. James	15*	Hagerstrom, Maj. James P.	8.50*	Baldwin, Col. Robert P.	5
Fernandez, Capt. Manuel J.	14.5	Risner, Capt. Robinson	8	Becker, Capt. Richard S.	5
Davis, Maj. George A., Jr.	14*	Ruddell, Lt. Col. George I.	8*	Bettinger, Maj. Stephen L.	5
Baker, Col. Royal N.	13*	Buttlemann, 1st Lt. Henry	7	Creighton, Maj. Richard D.	5*
Blesse, Maj. Frederick C.	10	Jolley, Capt. Clifford D.	7	Curtin, Capt. Clyde A.	5
Fischer, 1st Lt. Harold E.	10	Lilley, Capt. Leonard W.	7	Gibson, Capt. Ralph D.	5
Garrison, Lt. Col. Vermont	10*	Adams, Maj. Donald E.	6.50*	Kincheloe, Capt. Iven C., Jr.,	5
Johnson, Col. James K.	10*	Gabreski, Col. Francis S.	6.50*	Latshaw, Capt. Robert T., Jr.	5
Moore, Capt. Lonnie R.	10	Jones, Lt. Col. George L.	6.50	Moore, Capt. Robert H.	5
Parr, Capt. Ralph S., Jr.	10	Marshall, Maj. Winton W.	6.50	Overton, Capt. Dolphin D., III	5
Foster, Capt. Cecil G.	9	Kasler, 1st Lt. James H.	6	Thyng, Col. Harrison R.	5*
		Love, Capt. Robert J.	6	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	6.5	34.5	Johnson, Col. James K.	1	10	11
Meyer, Col. John C.	24	2	26	Adams, Maj. Donald E.	4	6.5	10.5
Mahurin, Col. Walker M.	20.75	3.5	24.25	Ruddell, Lt. Col. George I.	2.5	8	10.5
Davis, Mai. George A., Jr.	7	14	21	Thyng, Col. Harrison R.	5	5	10
Whisner, Maj. William T., Jr.	15.5	5.5	21.	Colman, Capt. Philip E.	5	4	9
Eagleston, Col. Glenn T.	18.5	2	20.5	Heller, Lt. Col. Edwin L.	5.5	3.5	9
Garrison, Lt. Col. Vermont	7.33	10	17.33	Chandler, Maj. Van E.	5	3	8
Baker, Col. Royal N.	3.5	13	16.5	Hockery, Maj. John J.	7	1	8
Jabara, Maj. James	1.5	15	16.5	Creighton, Maj. Richard D.	2	5	7
Olds, Col. Robin	12	4*	16	Emmert, Lt. Col. Benjamin H., Jr.	6	1	7
Mitchell, Col. John W.	11	4	15	Bettinger, Maj. Stephen L.	1	5	6
Brueland, Maj. Lowell K.	12.5	2	14.5	Visscher, Maj. Herman W.	5	1	6
Hagerstrom, Maj. James P.	6	8.5	14.5	Liles, Capt. Brooks J.	1	4	5
Hovde, Lt. Col. William J.	10.5	1	11.5	Mattson, Capt. Conrad E.	1	4	5
				Shaeffer, Maj. William F.	2	3	5

* Colonel Olds's 4 additional victories came in Vietnam.

AMERICAN ACES OF THE VIETNAM WAR

DeBellevue, Capt. Charles D. (USAF)	6
Cunningham, Lt. Randy (USN)	5
Driscoll, Lt. William (USN)	5
Feinstein, Capt. Jeffrey S. (USAF)	5
Ritchie, Capt. Richard S. (USAF)	5

LEADING AIR SERVICE/ AAF/USAF ACES OF ALL WARS

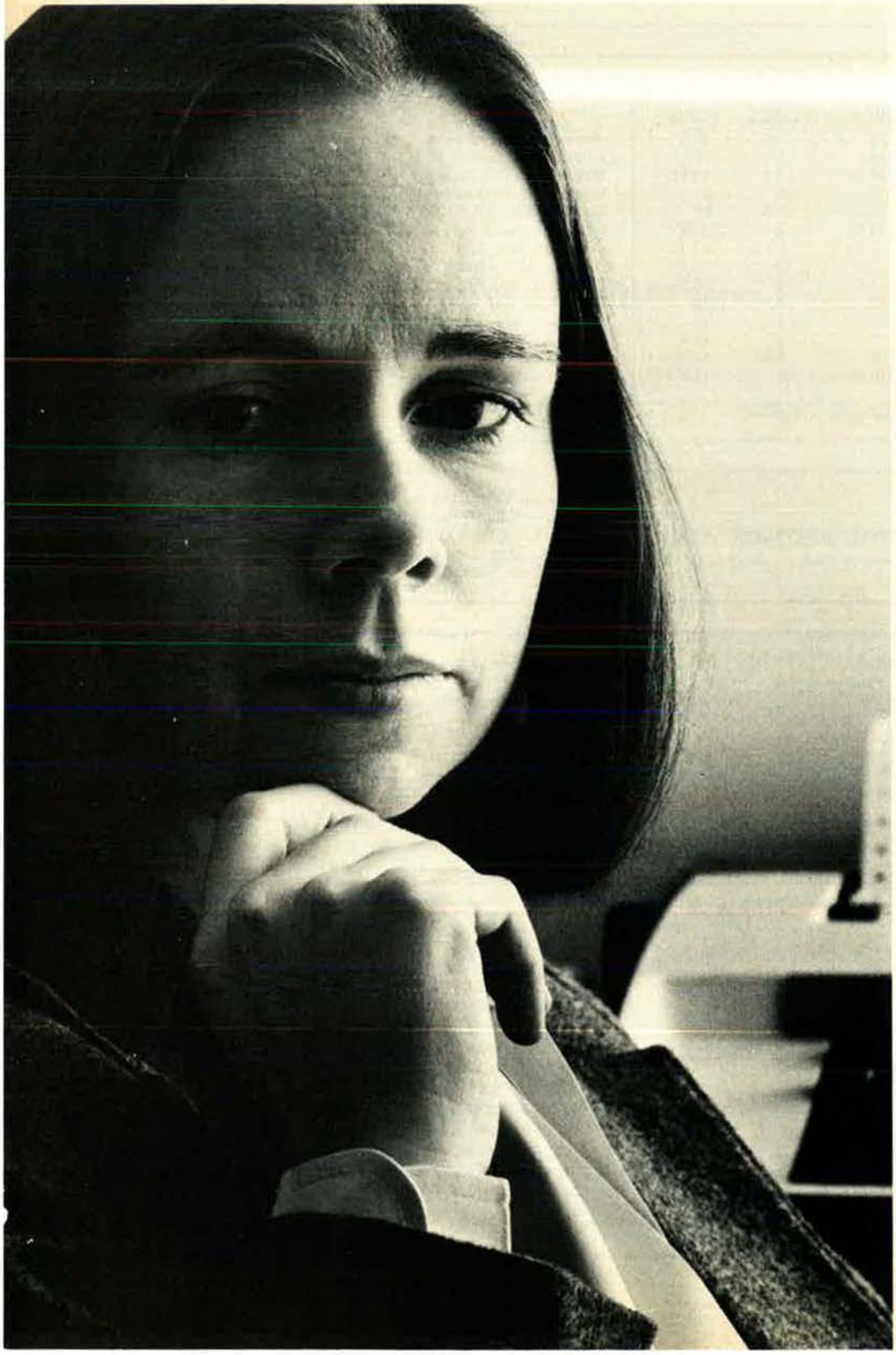
Bong, Maj. Richard I.	40	WW II		Kearby, Col. Neel E.	22	WW II	
McGuire, Maj. Thomas B., Jr.	38	WW II		Robbins, Col. Jay T.	22	WW II	
Gabreski, Col. Francis S.	34.50	WW II,	Korea	Christensen, Capt. Fred J.	21.50	WW II	
Johnson, Lt. Col. Robert S.	27	WW II		Wetmore, Capt. Ray S.	21.25	WW II	
MacDonald, Col. Charles H.	27	WW II		Davis, Maj. George A., Jr.	21	WW II,	Korea
Preddy, Maj. George E.	26.83	WW II		Whisner, Maj. William T., Jr.	21	WW II,	Korea
Meyer, Col. John C.	26	WW II,	Korea	Eagleston, Col. Glenn T.	20.50	WW II,	Korea
Rickenbacker, Capt. Edward V.	26	WW I		Voll, Maj. John J.	20.50	WW II	
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 with victories in WW II and Vietnam	Brig. Gen. 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.

Maureen Moon recommended WATS for data transmission.



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AIR FORCE MAGAZINE'S

GUIDE TO USAF BASES AT HOME AND ABROAD

(Includes civilian airports and airfields of other military services that provide basing for USAF units and activities.)

Altus AFB, Okla. 73521; 3 mi. NE of Altus. Phone: (405) 482-8100. AUTOVON: 866-1110. MAC base. 443d Military Airlift Wing, initial orientation and transition training for C-141 and C-5 crews. 340th Air Refueling Group (SAC); Detachment 4, 7th Weather Wing; Detachment 3, 1300th Management Engineering Squadron; and Detachment 4, 1365th Audio-Visual Squadron; 2002d Communications Squadron. Base activated Jan. 1943; inactivated May 1945; reactivated Jan. 1953. Area: 5,031 acres. Altitude: 1,376 ft. M–3,464; C–616; TP–$48.7M; O–163; N–637; T/G–4 (3 temporary quarters and 1 guest unit); H (25).

Andersen AFB, Guam 96334; 16.8 mi. N of Agana. Phone: (671) 366-1110. AUTOVON: 322-1110. SAC base. Hq. 3d Air Division, 43d Strategic Wing. 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: 20,736 acres, including off-base facilities. Altitude: 550 ft. M–3,716; C–1,149; TP–$58M; O–264; N–1,188.

Andrews AFB, Md. 20331; 11 mi. SE of Washington, D. C. Phone: (301) 981-9111. AUTOVON: 858-1110. MAC base. 76th Air Base Group; Hq. Air Force Systems Command; 76th Military Airlift Wing; 89th Military Airlift Group; 113th Tactical Fighter Wing (ANG); 459th Tactical Airlift Wing (AFRES); 2045th Communications Group. Base activated June 1943; named for Lt. Gen. Frank M. Andrews, military air pioneer, killed in an aircraft accident May 3, 1943. Area: 4,217 acres. Altitude: 279 ft. M–6,600; C–3,450; TP–$147M; O–392; N–1,696; T/G–332 (includes 60 temporary living quarters for incoming personnel, 8 officer and 14 enlisted guest houses, 200 VOQ spaces, and 50 TAQ spaces). H (250).

Arnold AFS, Tenn. 37389; approximately 7 mi. SE of Manchester. Phone: (615) 455-2611. AUTOVON: 882-1520. AFSC installation; site of the Arnold Engineering Development Center, the free world's largest complex of wind tunnels, jet and rocket engine test cells, space simulation chambers, and hyperballistic ranges, which support the acquisition of new aerospace systems by conducting research, development, and evaluation testing for the Air Force, other military services, and government agencies. Base activated Jan. 1, 1950; named for Gen. H. H. "Hap" Arnold, wartime Chief of the AAF. Area: 40,118 acres. Altitude: 950 to 1,150 ft. M–100; C–3,180; TP–$63.8M; O–24; N–16; D.

Barksdale AFB, La. 71110; in Bossier City. Phone: (318) 456-2252. AUTOVON: 781-1110. SAC base. Hq. 8th Air Force; 2d Bomb Wing. Base is also site of 917th Tactical Fighter Group (AFRES). Base activated Feb. 2, 1933; named for Lt. Eugene H. Barksdale, WW I airman killed in Aug. 1926 aircraft accident: Area: 22,000 acres (20,000 acres reserved for recreational area). Altitude: 167 ft. M–6,076; C–1,010; TP–$60.7M; O–347; N–703; T/G–230; H (75).

Beale AFB, Calif. 95903; 13 mi. E of Marysville. Phone: (916) 634-3000. AUTOVON: 368-1110. SAC base. 14th Air Division; 9th Strategic Reconnaissance Wing; 100th Air Refueling Wing. Beale is the only USAF base having SR-71 and U-2 reconnaissance aircraft. Originally US Army's Camp Beale; became AF installation in Nov. 1948; became AFB in Dec. 1951; named for Brig. Gen. E. F. Beale, Indian agent in California prior to Civil War. Area: 22,944 acres. Altitude: 113 ft. M–4,814; C–472; TP–$69.4M; O–395; N–1,342; T/G–45; H (30).

Bellows AFS, Hawaii 96853; approx. 12 mi. NE of Honolulu. Phone: (808) 422-0531. PACAF base. It is a closed airfield presently used by the Marine Corps as a tactical maneuver area, by the Army National Guard as an armory, and by the Air Force as a radio-transmitter site and recreation center. Activated in 1930 as Bellows Field in honor of 2d Lt. Franklin D. Bellows, killed in France during WW I. Became Bellows AFS on March 28, 1948. Area: 1,492 acres. Altitude: 15 ft. M–60; C–3.

Bergstrom AFB, Tex. 78743; 7 mi. SE of downtown Austin. Phone: (512) 385-4100. AUTOVON: 685-1110. TAC base. Hq. 12th Air Force; Hq. 10th Air Force (AFRES); 67th Tactical Reconnaissance Wing, RF-4C recon operations; 602d Tactical Air Control Wing manages 407L tactical air control system; 924th Tactical Airlift Group (AFRES); TAC NCO Academy. Base activated Sept. 22, 1942; named for Capt. John A. Bergstrom, first Austin serviceman killed in WW II. Area: 3,912.8 acres. Altitude: 541 ft. M–5,020; C–790; TP–$72.3M; O–92; N–612; T/G–90; H (30).

Blytheville AFB, Ark. 72315; 4 mi. NW of Blytheville. Phone: (501) 762-7000. AUTOVON: 637-1110. SAC base. 42d Air Division; 97th Bomb Wing. Base activated June 1942; inactivated Feb. 1947; reactivated Aug. 1955. Area: 3,093 acres. Altitude: 254 ft. M–2,764; C–558; TP–$36M; O–203; N–727; H (25).

Bolling AFB, D. C. 20332; 3 mi. S of the US Capitol. Phone: (202) 545-6700. AUTOVON: 227-0101. MAC base. 1100th Air Base Group; Air Force Office of Scientific Research (AFSC); Air Reserve Personnel Center Operating Location; Air

At the end of each entry in this Guide to Bases are data on base population and facilities, designated by the following symbols: M and C—assigned military and civilian personnel, including, where applicable, contractor, BX, and nonappropriated fund employees; TP—total military and civilian annual payroll; O, N, T/G—on-base Officer, NCO, and Transient/Guest housing units; H ( ), D—hospital, dispensary medical facilities with number of hospital beds in parentheses. In some instances, information was not available.

Force Chief of Chaplains; Air Force Chief of Security Police; and Command Services Unit, Secretary of the Air Force Office of Information. Activated Oct. 1917; named for Col. Raynal C. Bolling, Assistant Chief of Air Service, killed during WW I. Area: 604 acres. Altitude: 16 ft. M–1,562; C–1,157; TP–$26.5M; O–296; N–1,100; T/G–168 (includes 69 VAQs, 84 VOQs, and 15 guest quarters).

Brooks AFB, Tex. 78235; 7 mi. SE of San Antonio. Phone: (512) 536-1110. AUTOVON: 240-1110. AFSC base. Home of Aerospace Medical Division, USAF School of Aerospace Medicine; USAF Occupational and Environmental Lab, and USAF Human Resources Lab; tenant units include a security squadron and a communications squadron. Base activated Dec. 8, 1917; named for Cadet Sidney J. Brooks, Jr., killed Nov. 13, 1917, on his final solo flight before commissioning. Area: 1,330 acres. Altitude: 600 ft. M–1,300; C–900; TP–$35.3M; O–70; N–100; T/G–8; D.

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 Mediterranean. Area: 3,780 acres. Altitude: 4,295 ft. M–4,390; C–590; TP–$48.8M; O–149; N–863; T/G–34; H (30).

Carswell AFB, Tex. 76127; 7 mi. WNW of downtown Fort Worth. Phone: (817) 738-3511. AUTOVON: 739-1110. SAC base. 19th Air Division; 7th Bomb Wing; 301st Tactical Fighter Wing (AFRES). Activated Aug. 1942; named Jan. 30, 1948, for Maj. Horace S. Carswell, Jr., native of Fort Worth, WW II B-24 pilot and posthumous Medal of Honor winner. Area: 2,750 acres. Altitude: 650 ft. M–5,192; C–1,136; TP–$65.4M; O–128; N–680; H (120).

Castle AFB, Calif. 95342; 8 mi. NW of Merced. Phone: (209) 726-2011. AUTOVON: 347-1110. SAC base. 93d Bomb Wing. Conducts training of all SAC B-52G and H model aircraft and KC-135 crews. Also houses 84th Fighter Interceptor Squadron (ADCOM). Activated Sept. 1941; named for Brig. Gen. Frederick W. Castle, WW II B-17 pilot and Medal of Honor winner. Area: 2,700 acres. Altitude: 188 ft. M–5,900; C–300; TP–$61.5M; O–90; N–835; H (25).

Chanute AFB, Ill. 61866; 1 mi. S of Rantoul; 14 mi. N of Champaign. Phone: (217) 495-1110. AUTOVON: 862-1110. ATC base. Provides technical training in missile and aircraft maintenance and weather. Base has museum. Chanute Technical Training Display Center. Base activated May 1, 1917; named for Octave Chanute, aeronautical engineer and glider pioneer. Area: 2,100 acres. Altitude: 737 ft. M–9,783; C–1,461; TP–$106.8M; O–234; N–1,424; TG–8; H (65).

Charleston AFB, S. C. 29404; in North Charleston. Phone: (803) 554-0230. AUTOVON: 583-0111. MAC base. 437th Military Airlift Wing and 315th MAW (AFRES Associate). Also, 1968th Communications Squadron and 792d Radar Squadron (ADCOM). Base activated June 1942; inactivated Feb. 1946. Reactivated Aug. 1953. Area: 3,772 acres. Altitude: 45 ft. M–4,400; C–1,400; TP–$78.9M; O–201; N–754; T/G–434 (includes 117 VOQs and 317 VAQs); D.

Columbus AFB, Miss. 39701; 10 mi. NNW of Columbus. Phone: (601) 434-7322. AUTOVON: 742-1110. ATC base. 14th Flying Training Wing, undergraduate pilot training. Base activated in 1941 for pilot training. Area: 4,606 acres. Altitude: 214 ft. M–2,608; C–515; TP–$34.4M; O–282; N–538; H (15).

Davis-Monthan AFB, Ariz. 85707; 4 mi. SE of Tucson. Phone: (602) 748-3900. AUTOVON: 361-1110. TAC base. Headquarters Tactical Training, Davis-Monthan; 355th Tactical Fighter Wing, A-7D/A-10 combat crew training; 390th Strategic Missile Wing (Titan II) (SAC); 432d Tactical Drone Group (TAC). Also site of AFLC's Military Aircraft Storage and Disposition Center. Base activated in 1927; named for two Tucson aviator accident victims—1st Lt. Samuel H. Davis, killed Dec. 28, 1921; and 2d Lt. Oscar Monthan, killed Mar. 27, 1924. Area: 18,000 acres. Altitude: 2,705 ft. M–6,319; C–1,633; TP–$96.7M; O–215; N–1,040; H (80).

Dobbins AFB, Ga. 30060; 2 mi. S of Marietta; 10 mi. NW of Atlanta. Phone: (404) 424-8811. AUTOVON:- 925-1110. Hq. 14th Air Force (AFRES); 94th Tactical Airlift Wing (AFRES); 116th Tactical Fighter Wing (ANG). Base activated in 1943; named for Capt. Charles Dobbins, WW II pilot, killed in action. Area: 2,095 acres. Altitude: 1,068 ft. M–8; C–1,222; TP–$17.1M; O–3; N–6; D.

Dover AFB, Del. 19901; 4 mi. SE of Dover. Phone: (302) 678-7011. AUTOVON: 455-1110. MAC base. 436th Military Airlift Wing and 512th MAW (AFRES Associate). Dover is largest air cargo port on East Coast. Base activated Dec. 1941; inactivated 1946; reactivated Feb. 1951. Area: 3,600 acres. Altitude: 28 ft. M–5,019; C–1,856; TP–$72.9M; O–229; N–1,327; T/G–297; H (30).

Duluth International Airport, Minn. 55814; 5 mi. NW of Duluth. Phone: (218) 727-8211. AUTOVON: 825-0011. ADCOM base. 23d NORAD Region and 23d ADCOM Air Division; SAGE Control Center (NORAD); 4787th Air Base Group; 148th Tactical Recon Group (Minn. ANG). Activated Mar. 1951. Area: 1,139 acres. Altitude: 1,429 ft. M–1,218; C–619; TP–$21.8M; O–70; N–339; T/G–35; D.

Dyess AFB, Tex. 79607; 2 mi. WSW of Abilene. Phone: (915) 696-0212. AUTOVON: 461-1110. SAC base. 12th Air Division and 96th Bomb Wing (SAC). 463d Tactical Airlift Wing (MAC). Base activated April 1942; inactivated Dec. 1945; reactivated Sept. 1955; named for Lt. Col. William E. Dyess, WW II fighter pilot killed in accident, Dec. 1943. Area: 5,186 acres. Altitude: 1,789 ft. M–4,793; C–475; TP–$63.3M; O–177; N–822; T/G–115; H (50 normal/150 emergency).

Edwards AFB, Calif. 93523; 20 mi. E of Rosamond. Phone: (805) 277-1110. AUTOVON: 350-1110. AFSC base. AF Flight Test Center. USAF Test Pilot School trains pilots and flight-test engineers. NASA Dryden Flight Research Center is concerned with the Space Shuttle, lifting bodies, supersonic and transonic flight research. Other tenant units include US Army Aviation Engineering Flight Activity and USAF Rocket Propulsion Laboratory. Base activated Sept. 1933; named for Capt. Glen W. Edwards, killed June 5, 1948, in crash of a YB-49 "Flying Wing" experimental bomber. Area: 301,000 acres. Altitude: 2,302 ft. M–3,814; C–4,778; TP–$134.2M; O–486; N–1,570; T/G–153; H (25).

Eglin AFB, Fla. 32542; 2 mi. SE of Valparaiso; 7 mi. NE of Fort Walton Beach. Phone: (904) 881-6668. AUTOVON: 872-1110. AFSC base. Air Force Armament Development and Test Center; AF Armament Laboratory; 3246th Test Wing; 39th Aerospace Rescue and Recovery Wing; 33d Tactical Fighter Wing; Tac Air Warfare Center; 919th Special Operations Group (AFRES); new Air Force Armament Museum. Base activated in 1935; named for Lt. Col. Frederick I. Eglin, WW I flyer killed in aircraft accident, Jan. 1, 1937. Area: 464,980 acres. Altitude: 85 ft. M–11,405; C–4,097; TP–$185.3M; O–342; N–2,016; T/G–140; H (200).

Eielson AFB, Alaska 99506; 26 mi. SE of Fairbanks. Phone: (907) 372-1181. AUTOVON: (317) 377-1292. AAC base. Host unit: 5010th Combat Support Group. Air defense, search and rescue for AAC; 6th Strategic Wing (SAC) tanker operations; communications for AFCS, and Arctic Survival Training School (ATC). Activated Oct. 1944; named for Carl B. Eielson, Arctic aviation pioneer. Area: approx. 35,000 acres. Altitude: 534 ft. M–2,601; C–719; TP–$46.5M; O–148; N–1,015; T/G–20; D.

Ellsworth AFB, S. D. 57706; 11 mi. ENE of Rapid City. Phone: (605) 342-2400. AUTOVON: 747-1110. SAC base. 44th Strategic Missile Wing; 28th Bomb Wing; SAC post-attack command and control system squadron. Activated July 1954; named for Brig. Gen. Richard E. Ellsworth, killed Mar. 18, 1953, in crash of RB-36. Area: 5,675 acres. Altitude: 3,600 ft. M–6,238; C–965; TP–$79.4M; O–414; N–1,482; T/G–89; H (40).

Elmendorf AFB, Alaska 99506; 1 mi. NW of Anchorage. Phone: (907) 752-1110. AUTOVON: (317) 752-1110. AAC base. Hq. Alaskan Air Command and 21st Composite Wing; 343d Tactical Fighter Group; 531st Aircraft Control and Warning Group; 21st Air Base Group; 18th Tactical Fighter Squadron; 43d Tactical Fighter Squadron; 616th Military Airlift Group (MAC); 71st Aerospace Rescue and Recovery Squadron (MAC); 17th Tac-

tical Airlift Squadron; 1931st Communications Group (AFCS); and 6981st Security Squadron (USAFSS). Base activated July 1940; named for Capt. Hugh M. Elmendorf, killed in air accident, Jan. 13, 1933. Area: 13,400 acres. Altitude: 118 ft. M–5,959; C–1,622; TP–$87M; O–356; N–1,839; T/G–140; H (140).

England AFB, La. 71301; 5 mi. W of Alexandria. Phone: (318) 448-2100. AUTOVON: 683-1110. TAC base. 23d Tactical Fighter Wing, A-7D fighter operations. Base activated Oct. 1942; named for Lt. Col. John B. England, WW II ace, killed Nov. 17, 1954, in a crash. Area: 2,282 acres. Altitude: 89 ft. M–2,967; C–528; TP–$40.2M; O–109; N–491; T/G–44; H (70).

Fairchild AFB, Wash. 99011; 12 mi. WSW of Spokane. Phone: (509) 247-1212. AUTOVON: 352-1110. 47th Air Division; 92d Bomb Wing (SAC); 3636th Combat Crew Training Wing (ATC); 141st Air Refueling Wing (ANG); Detachment 24, 41st Rescue and Weather Reconnaissance Wing (MAC); and 2039th Communications Squadron (AFCS). Base activated Jan. 1942; named for Gen. Muir S. Fairchild, USAF Vice Chief of Staff, at his death in 1950. Area: 5,365 acres. Altitude: 2,462 ft. M–4,161; C–1,056; TP–$65.2M; O–453; N–1,257 (combined enlisted); H (45).

Francis E. Warren AFB, Wyo. 82001; adjacent to Cheyenne. Phone: (307) 775-2510. AUTOVON: 481-1110. SAC base. 4th Air Division; 90th Strategic Missile Wing. Base activated July 4, 1867; under Army jurisdiction until 1947 when reassigned to USAF. Home of first Atlas-D ICBM missile wing (1960–65); named for Francis Emory Warren, Wyoming senator and early governor. Base has 7,600 acres, plus 200 Minuteman III missile sites distributed over more than 15,000 sq. mi. Altitude: 6,125 ft. M–3,489; C–726; TP–$46.3M; O–190; N–166; T/G–13; H (40).

George AFB, Calif. 92392; 6 mi. NW of Victorville. Phone: (714) 269-1110. AUTOVON: 353-1110. TAC base. Headquarters Tactical Training, George; 35th Tactical Fighter Wing, F-4 and F-105 transitional and upgrade training. Home of USAF's only two operational F-105G "Wild Weasel" squadrons. ADCOM F-106 detachment. Base activated in 1941; named for Brig. Gen. Harold H. George, WW I fighter ace killed in Australia in aircraft accident, April 29, 1942. Area: 5,347 acres. Altitude: 2,875 ft. M–5,032; C–643; TP–$58.2M; O–319; N–1,322; T/G–40; H (30).

Goodfellow AFB, Tex. 76903; 2 mi. SE of San Angelo. Phone: (915) 653-3231. AUTOVON: 477-2011. USAF Security Service base. 6940th Security Wing; USAF School of Applied Cryptologic Sciences. Base activated Jan. 1941; named for 2d Lt. John J. Goodfellow, Jr., WW I fighter pilot killed in combat Sept. 17, 1918. Area: 1,127 acres. Altitude: 1,877 ft. M–2,071; C–405; TP–$26M; O–16; N–50; T/G–6; D.

Grand Forks AFB, N. D. 58205; 16 mi. W of Grand Forks. Phone: (701) 594-6011. AUTOVON: 362-1110. SAC base. 319th Bomb Wing; 321st Strategic Missile Wing (Minuteman III). Base activated in 1956. Area: 5,500 acres. Altitude: 911 ft. M–5,419; C–760; TP–$64.1M; O–542; N–1,682; T/G–40; H (25).

Griffiss AFB, N. Y. 13441; 1 mi. NE of Rome, N. Y. 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 AFCS's Northern Communications Area; 485th Communications & Installation Group; and an ADCOM fighter-interceptor squadron. 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: 3,888 acres. Altitude: 504 ft. M–3,903; C–3,268; TP–$102.9M; O–168; N–552; T/G–142; H (70).

Grissom AFB, Ind. 46971; 9 mi. S of Peru. Phone: (317) 689-5211. AUTOVON: 928-1110. SAC base. 305th Air Refueling Wing; 434th Tactical Fighter Wing (AFRES). Activated Jan. 1943 for Navy flight training; reactivated June 1954 as Bunker Hill AFB; renamed May 1968 for Lt. Col. Virgil I. "Gus" Grissom, killed Jan. 27, 1967, with other Astronauts Edward White and Roger Chaffee, in Apollo capsule fire. Area: 2,810 acres. Altitude: 800 ft. M–2,800; C–485; TP–$41M; O–370; N–758; T/G–16; D.

Gunter AFS, Ala. 36114; 4 mi. NE of Montgomery. Phone: (205) 279-1110. AUTOVON: 921-1110. ATC base. Hq. Air Force Data Automation Agency and site of AF Data Systems Design Center; Air Force Logistics Management Center; USAF Extension Course Institute; USAF Senior NCO Academy. Base activated Aug. 27, 1940; named for William A. Gunter, former mayor of Montgomery, who died in 1940. Area: about 2 sq. mi. Altitude: 166 ft. M–1,181; C–865; TP–*(see Maxwell AFB);* O–135; N–189; D.

Hancock Field, N. Y. 13225; 10 mi. NNE of Syracuse. Phone: (315) 458-5500. AUTOVON: 587-9100. ADCOM base. 21st NORAD Region and 21st ADCOM Air Division; also houses 174th Tactical Fighter Group (ANG); SAGE region control center (NORAD). Base activated Sept. 1942. Area: 1,125 acres. Altitude: 421 ft. M–1,053; C–367; TP–$15.6M; O–91; N–137; T/G–2; D.

Hanscom AFB, Mass. 01731; 17 mi. NW of Boston. Phone: (617) 861-4441. AUTOVON: 478-4441. AFSC base. Hq. Electronic Systems Div. (AFSC); also site of AF Geophysics Lab, formerly AF Cambridge Research Laboratories (AFSC) providing basic and applied research in electronics and geophysics. Joint federal-state use of the base began in 1946; named for Laurence G. Hanscom, pre-WW II advocate of private flying, killed in 1941 in a lightplane accident. Until recently was called Laurence G. Hanscom AFB. Area: 1,086 acres. Altitude: 133 ft. M–1,932; C–3,133; TP–$94.9M; O–339; N–357; T/G–19; D.

Hickam AFB, Hawaii 96853; 6 mi. W of Honolulu. Phone: (808) 422-0531. AUTOVON: (315) 430-0111. PACAF base. Hq. Pacific Air Forces; 15th Air Base Wing, support organization for Air Force units in Hawaii and throughout the Pacific; 154th Tactical Fighter Group (ANG); Hq. Pacific Communications Area (AFCS); 1st Weather Wing; 61st Military Airlift Support Wing. Base activated Sept. 1937; named for Lt. Col. Horace M. Hickam, air pioneer killed in crash Nov. 5, 1934. Area: 2,355 acres. Altitude: sea level. M–5,000; C–2,200; TP–$90.9M; O–567; N–2,919; D. (These figures include relevant data for Bellows AFS and Wheeler AFB.)

Hill AFB, Utah 84406; 7 mi. S of Ogden. Phone: (801) 777-7221. AUTOVON: 458-1110. AFLC base. Hq. Ogden Air Logistics Center; furnishes logistics support for Minuteman and Titan ICBMs; manager for F-4, F-101, and F-16 aircraft; also home of 388th Tactical Fighter Wing and drone test activity; 508th Tactical Fighter Group (AFRES). Base activated Nov. 1940; named for Maj. Ployer P. Hill, killed Oct. 30, 1935, test-flying the first B-17. Area: 7,000 acres. Altitude: 4,788 ft.; M–3,100; C–14,300; TP–$277M; O–263; N–882; T/G–8; H (35).

Holloman AFB, N. M. 88330; 6 mi. SW of Alamogordo. Phone: (505) 497-6511. AUTOVON: 867-1110. TAC base. Headquarters Tactical Training, Holloman. 49th Tactical Fighter Wing, F-15 fighter operations; 479th Tactical Training Wing, T-38 fighter lead-in training. AFSC conducts test and evaluation of aircraft and missile systems and operates Central Inertial Guidance Test Facility; AFSC Test Track Facility and Radar Target Scatter site (RATSCAT). Activated 1942; named for Col. George V. Holloman, guided missile pioneer, killed in crash Mar. 19, 1946. Area: 57,530 acres. Altitude: 4,092 ft. M–6,666; C–1,207; TP–$57M; O–319; N–1,233; T/G–212; H (25).

Homestead AFB, Fla. 33039; 5 mi. NNE of Homestead. Phone: (305) 257-8011. AUTOVON: 791-0111. TAC base. 31st Tactical Fighter Wing, F-4E fighter operations; site of ATC sea survival school; AFRES early warning and control group and aerospace rescue and recovery squadron. Base activated April 1955. Area: 3,558 acres. Altitude: 7 ft. M–6,921; C–1,500; TP–$85.9M; O–321; N–1,294; T/G–318; H (85).

Hurlburt Field, Fla. 32544 (Eglin AF Auxiliary Field #9); part of Eglin AFB (AFSC) reservation but TAC-operated base; 8 mi. W of Fort Walton Beach. Phone: (904) 881-5658. AUTOVON: 872-1110. Home of the 1st Special Operations Wing, focal point for all USAF special operations. Base houses USAF Special Operations School; MC-130E (Combat Talon), AC-130H (Spectre gunship); UH-1N (Huey gunship) and CH-3E (Sea King) helicopter squadrons; special operations combat control team; combat weather

team; air defense squadron; TAC Red Horse civil engineering squadron. Base activated in 1943; named for Lt. Donald W. Hurlburt, WW II pilot killed Oct. 2, 1943, in crash on Eglin reservation. Altitude: 35 ft. M–3,140; C–460; TP–$40.3M; O–100; N–280; T/G–300; H (200) at Eglin main base; clinic located on Hurlburt.

Indian Springs AF Auxiliary Field, Nev. 89018; 45 mi. NW of Las Vegas. Phone: (702) 897-6204. AUTOVON: 682-1800. TAC base. Provides bombing and gunnery range support for tactical operations from Nellis AFB; manages construction of realistic target complexes; supports the US Department of Energy research activities. Base activated in 1942, named for nearby town. Area: 3,014,422 acres (includes ranges). Altitude: 3,124 ft. M–156; C–27; TP–*(see Nellis AFB);* O–12; N–67; D.

Kelly AFB, Tex. 78241; 5 mi. SW of San Antonio. Phone: (512) 925-1110. AUTOVON: 945-1110. AFLC base. Hq. San Antonio Air Logistics Center; Hq. USAF Security Service; AF Communications Security Center; AF Electronic Warfare Center; AF Cryptologic Depot; USAF Environmental Health Laboratory; AF Commissary Service; 433d Tactical Airlift Wing (AFRES); 149th Tactical Fighter Group (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: 3,924 acres. Altitude: 689 ft. M–4,348; C–17,762; TP–$328.9M; O–60; N–50; D.

Kingsley Field, Ore. 97601; 5 mi. SE of Klamath Falls. Phone: (503) 882-4411. AUTOVON: 896-1670. ADCOM base. Supports fighter-interceptor detachment. Formerly a naval air station, base was activated by USAF in April 1956; named for 2d Lt. David R. Kingsley, WW II B-17 bombardier and Medal of Honor winner, who was killed in action June 23, 1944. Area: 1,640 acres. Altitude: 4,081 ft. M–381; C–226; TP–$6.6M; O–93; N–192; D.

Keesler AFB, Miss. 39534; located in Biloxi. Phone: (601) 377-1110. AUTOVON: 868-1110. ATC base. Keesler Technical Training Center (communications, electronics, personnel, and administrative courses); Keesler USAF Medical Center. Hosts MAC and AFRES weather recon units. TAC airborne command and control squadron, plus AFCS installation group. Base activated June 12, 1941; named for 2d Lt. Samuel R. Keesler, Jr., WW I aerial observer, killed in action Oct. 9, 1918. Area: 1,576 acres. Altitude: 26 ft. M–11,944; C–2,921; TP–$156.0M; O–531; N–1,431; T/G–90; H (330).

Kirtland AFB, N. M. 87117; S of Albuquerque. Phone: (505) 264-0011. AUTOVON: 964-0011. MAC base. 1606th Air Base Wing. Major agencies and units include AF Contract Management Division (AFSC); AF Test and Evaluation Center; AF Weapons Laboratory (AFSC); New Mexico ANG; 1550th Aircrew Training and Test 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; AF Directorate of Nuclear Surety; 1960th Communications Squadron, and 3098th Aviation Depot Squadron. 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. Base activated Jan. 1941; named for Col. Roy S. Kirtland, air pioneer and Commandant of Langley Field in the 1930s, died in 1941. Area: 54,108 acres. Altitude: 5,352 ft. M–4,584; C–4,596; TP–$210M; O–731; N–1,403; T/G–58; D and H (50).

K. I. Sawyer AFB, Mich. 49843; 16 mi. S of Marquette. Phone: (906) 346-6511. AUTOVON: 472-1110. SAC base. 410th Bomb Wing; ADCOM fighter-interceptor squadron. Base activated 1956; named for Kenneth I. Sawyer, who proposed site for a county airport, died in 1944. Area: 6,355 acres. Altitude: 1,220 ft. M–4,012; C–570; TP–$49M; O–337; N–1,356; BOQ units–41; T/G–40 units; H (15).

Lackland AFB, Tex. 78236; 8 mi. WSW of San Antonio. Phone: (512) 671-1110. AUTOVON: 473-1110. ATC base. Provides basic military training for airmen, precommissioning training for officers; technical training of basic, advanced security police/law enforcement personnel; patrol dog/handler courses; training of instructors, recruiters, and career-motivation and social actions/drug abuse counselors; USAF marksmanship training; USAF Occupational Measurement Center; USAF Defense Language Institute–English Language Center; Community College of the Air Force; Wilford Hall USAF Medical Center; named for Brig. Gen. Frank D. Lackland, early Commandant of Kelly Field flying school, who died in 1943. Area: 6,828 acres, including 4,017 acres at Lackland Training Annex. Altitude: 787 ft. M–23,080; C–2,546; TP–$230.8M; O–140; N–616; T/G–340; H (1,000).

Langley AFB, Va. 23665; 3 mi. N of Hampton. Phone: (804) 764-9990. AUTOVON: 432-1110. TAC base. Host unit 1st Tactical Fighter Wing, F-15 fighter operations; Hq. Tactical Air Command; 5th Weather Wing (MAC); 2d Aircraft Delivery Group (TAC); 460th Reconnaissance Technical Squadron (TAC); 6th Command and Control Squadron (TAC); US Army TRADOC Flight Detachment; 48th Fighter Interceptor Squadron (ADCOM). Base activated Dec. 30, 1916; is the oldest continuously active AFB in the US; named for aviation pioneer and scientist Samuel Pierpont Langley, who died in 1906. NASA Langley Research Center is located across base. Area: 3,500 acres. Altitude: 10 ft. M–8,135; C–1,525; TP–$185.5M; O–122; N–225; T/G–226; H (70); D.

Laughlin AFB, Tex. 78840; 6 mi. E of Del Rio. Phone: (512) 298-3511. AUTOVON: 732-1110. ATC base. 47th Flying Training Wing, undergraduate pilot training. Base activated Oct. 1942; named for 1st Lt. Jack T. Laughlin, killed in action Jan. 29, 1942. Area: 3,908 acres. Altitude: 1,080 ft. M–2,412; C–541; TP–$35.1M; O–255; N–348; T/G–2; H (15).

Laurence G. Hanscom AFB, Mass. *(see Hanscom AFB).*

Little Rock AFB, Ark. 72076; 12 mi. NE of Little Rock. Phone: (501) 988-3131. AUTOVON: 731-1110. MAC base. 314th Tactical Airlift Wing; 308th Strategic Missile Wing; combat crew training; SAC Titan ICBM support base; SAC satellite base; 189th Air Refueling Group (ANG). Base activated in 1955. Area: 6,100 acres. Altitude: 310 ft. M–6,516; C–902; TP–$60.3M; O–313; N–1,222; T/G–283 (includes 140 VAQs and 143 VOQs); H (25).

Loring AFB, Me. 04751; 4 mi. W of Limestone. Phone: (207) 999-1110. AU-

TOVON: 920-1110. SAC base. 42d Bomb Wing. Base activated Feb. 25, 1953; named for Maj. Charles J. Loring, Jr., F-80 pilot killed Nov. 22, 1952, in North Korea; posthumously awarded the Medal of Honor. Area: 8,700 acres. Altitude: 746 ft. M–3,769; C–655; TP–$44.M; O–470; N–1,509; T/G–16; H (5).

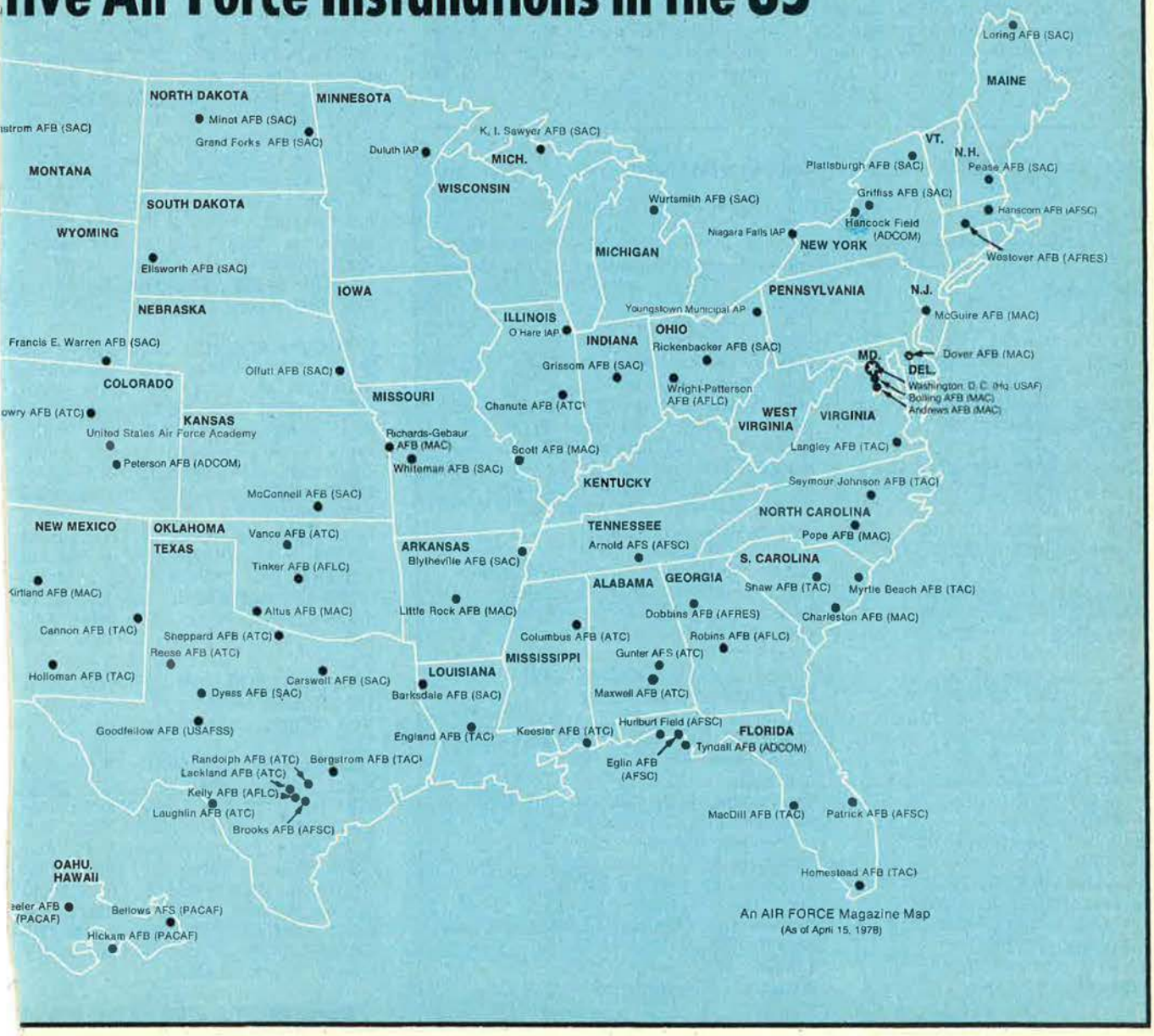
Los Angeles AFS, Calif. 90045; 12 mi. SW of Los Angeles. Phone: (213) 643-1000. AUTOVON: 833-1110. AFSC support base. Hq. AFSC's Space and Missile Systems Organization (SAMSO) manages the development, production, test, and delivery of DoD's space satellites and ballistic missiles. 23 tenant units. Station activated Dec. 14, 1960. M–1,328; C–1,062; TP–$85.3M.

Lowry AFB, Colo. 80230; 1 mi. SE of Denver. Phone: (303) 388-5411. AUTOVON: 926-1110. ATC base. Technical training center; Air Force Accounting and Finance Center. Base activated Feb. 26, 1938; named for 1st Lt. Francis B. Lowry, killed in action Sept. 26, 1918. Area: 1,863 acres. Altitude: 5,400 ft. M–10,053; C–4,553; TP–$158.1M; O–95; N–772; T/G–40; D.

Luke AFB, Ariz. 85309; 20 mi. WNW of Phoenix. Phone: (602) 935-7411. AUTOVON: 853-1110. TAC base. Headquarters Tactical Training, Luke; 58th Tactical Training Wing; Hq. 26th NORAD Region/Air Division (ADCOM); 302d Special Operations Squadron (AFRES). Luke is the largest fighter training base in the free world. Programs include training USAF aircrews in the F-4 and F-15; F-15 Ready Team training for maintenance people and aircrews from bases scheduled to receive the F-15; training West German students in the F-104G; and foreign training in the F-5 (at nearby Williams AFB). Base activated in 1941; named for 2d Lt. Frank Luke, Jr., balloon-busting ace in WW I and first flyer to receive Medal of Honor, killed in action on the ground behind enemy lines, Sept. 29, 1918. Area: 4,197 acres plus 2,700,000-acre range. Altitude: 1,101 ft. M–5,724; C–1,816; TP–$87M; O–149; N–726; T/G–51; H (80).

MacDill AFB, Fla. 33608; adjacent SSW to Tampa. Phone: (813) 830-1110. AUTOVON: 968-1110. TAC base. Hq. US Readiness Command; 56th Tactical Fighter Wing conducts replacement training in F-4E Phantoms; 14th Missile Warning Squadron (ADCOM). Base activated April 15, 1941; named for Col. Leslie MacDill, killed in airplane accident Nov. 8, 1938, near Washington, D. C. Area: 6,000 acres. Altitude: 6 ft. M–6,074; C–1,538; TP–$72.91M; O–138; N–667; T/G–350; H (70).

tive Air Force Installations in the US



An AIR FORCE Magazine Map
(As of April 15, 1978)

Malmstrom AFB, Mont. 59402; 4 mi. E of Great Falls. Phone: (406) 731-9990. AUTOVON: 632-1110. SAC base. 341st Strategic Missile Wing; also Hq. 24th Air Division (ADCOM), SAGE Region Control Center (NORAD). Base named for Col. Einar A. Malmstrom, WW II fighter commander. Base activated Dec. 15, 1942. Site of SAC's first Minuteman wing. Area: 3,573 acres, plus about 23,000 sq. mi. of the missile complex. Altitude: 3,525 ft. M–5,084; C–644; TP–$56.4M; O–320; N–1,086; T/G–40; H (15).

March AFB, Calif. 92518; 9 mi. SE of Riverside. Phone: (714) 655-1110. AUTOVON: 947-1110. SAC base. Hq. 15th AF; 22d Bomb Wing; 452d Air Refueling Wing (AFRES); 303d ARRS (AFRES). Base activated March 1, 1918; named for 2d Lt. Peyton C. March, Jr., who died in Texas of crash injuries Feb. 18, 1918. Area: 6,900 acres. Altitude: 1,538 ft. M–4,659; C–1,204; TP–$62M; O–103; N–599; T/G–112; H (125).

Mather AFB, Calif. 95655; 12 mi. ENE of Sacramento. Phone: (916) 364-1110. AUTOVON: 828-1110. ATC base. 323d Flying Training Wing; USAF's only training installation for navigators, navigator bombardiers, and electronic warfare officers; 320th Bomb Wing (SAC). Base activated 1918; named for 2d Lt. Carl S. Mather, killed in US Jan. 30, 1918, in midair collision. Area: 5,800 acres. Altitude: 96 ft. M–5,119; C–1,259; TP–$84.4M; O–451; N–820; T/G–40; H (75).

Maxwell AFB, Ala. 36112; 1 mi. WNW of Montgomery. Phone: (205) 293-1110. AUTOVON: 875-1110. ATC base. Hq. Air University, professional education center for USAF; site of Air War College, Air Command and Staff College, Squadron Officer School, Leadership and Management Development Center, Academic Instructor and Foreign Officer School, Hq. Air Force ROTC; Hq. Civil Air Patrol–USAF; 908th Tac Airlift Group (AFRES). (Senior NCO Academy and Extension Course Institute are at Gunter AFS.) Base activated 1918; named for 2d Lt. William C. Maxwell, killed in air accident Aug. 12, 1920, Luzon, P. I. Area: 3,161 acres. Altitude: 169 ft. M–3,311; C–1,669; TP–$153.8M; O–322; N–377; T/G–37; H (209). (Includes Gunter AFS.)

McChord AFB, Wash. 98438; 1 mi. S of Tacoma. Phone: (206) 984-1910. AUTOVON: 976-1110. MAC base. 62d Military Airlift Wing; Hq. 25th Air Division (ADCOM); 318th Fighter Interceptor Squadron (ADCOM); SAGE Region Control Center (NORAD); 446th Military Airlift Wing (AFRES Associate). Base activated June 7, 1940; named for Col. William C. McChord, 1937 crash victim. Area: 4,615 acres. Altitude: 550 ft. M–5,354; C–1,400; TP–$83.8M; O–187; N–806; T/G–284 (transient); D.

McClellan AFB, Calif. 95652; 9 mi. NE of Sacramento. Phone: (916) 643-2111. AUTOVON: 633-1110. AFLC base. Hq. Sacramento Air Logistics Center; management, maintenance, and supply support of such USAF weapon systems as F-111, FB-111, A-10, F-100, F-104, F-105, and various surveillance and warning systems, radar sites, missile tracking stations, airborne and ground-based power generators, and electric motors and distribution equipment. Houses 2049th Communications Group; USAF Occupational and Environmental Health Lab; 41st Rescue and Weather Reconnaissance Wing; 1155th Technical Operations Squadron; 2951st Combat Logistics Support Squadron; Hq. 4th Air Force (AFRES). Base activated July 1936; named for Maj. Hezekiah McClellan, pioneer in Arctic aeronautical experiments, killed in crash May 25, 1936. Area: 2,583 acres. Altitude: 76 ft. M–2,991; C–13,879; TP–$309.6M; O–448; N–2,543; T/G–18; D.

McConnell AFB, Kan. 67221; 5 mi. SE of Wichita. Phone: (316) 681-6100. AUTOVON: 962-1110. SAC base. 381st Strategic Missile Wing; 384th Air Refueling Wing; F-105 unit (ANG). Base activated June 5, 1951; named for Capt. Fred J. McConnell, WW II bomber pilot who died in crash of private plane Oct. 25, 1945; and for his brother, 2d Lt. Thomas L. McConnell, also a WW II bomber pilot killed July 10, 1943, during attack on Bougainville in the Pacific. Area: 2,508 acres. Altitude: 1,371 ft. M–3,957; C–655; TP–$48.5M; O–144; N–445; T/G–166; H (15).

McGuire AFB, N. J. 08641; 18 mi. SE of Trenton. Phone: (609) 724-1110. AUTOVON: 440-0111. MAC base. 438th Military Airlift Wing. Hq. 21st Air Force; N. J. ANG; and N. J. Civil Air Patrol. 170th Aerial Refueling Group (ANG), 108th Tactical Fighter Wing (ANG), 514th MAW (AFRES Associate); and the MAC NCO Academy East. Base adjoins Army's Ft. Dix; activated as AFB in 1949; named for Maj. Thomas B. McGuire, Jr., second leading US ace of WW II, holder of Medal of Honor, killed in action Jan. 7, 1945, in the Philippines. Area: 3,609 acres. Altitude: 133 ft. M–5,236; C–1,891; TP–$80.9M; O–442; N–1,312; T/G–620 (includes 186 VOQ units, 244 VAQ units, 160 transient family units, and 30 transient lodging quarters); D.

Minot AFB, N. D. 58701; 13 mi. N of Minot. Phone: (701) 727-4761. AUTOVON: 344-1110. SAC base. 57th Air Division; 91st Strategic Missile Wing; 5th Bomb Wing; fighter-interceptor unit (ADCOM). Base activated Feb. 1957. Area: 5,050 acres, plus additional 19,324 acres for missile sites. Altitude: 1,650 ft. M–6,050; C–823; TP–$73.2M; O–647; N–1,823; T/G–40; D, also 40-bed military hospital in city of Minot.

Moody AFB, Ga. 31601; 10 mi. NNE of

GUIDE TO AIR FORCE STATIONS

In addition to the major facilities listed in this "Guide to Bases," USAF has a number of Air Force Stations (AFS) throughout the United States and overseas. These stations, for the most part, perform an air defense mission and house radar, SAGE, or AC&W units. Here is AIR FORCE Magazine's listing of those stations, with state and ZIP code.

Almaden AFS, California 95042
Baudette AFS, Minnesota 56623
Blaine AFS, Washington 98230
Bucks Harbor AFS, Maine 04618
Calumet AFS, Michigan 49913
Cambria AFS, California 93428
Campion AFS, APO Seattle 98703
Cape Canaveral AFS, Florida 32925
Cape Charles AFS, Virginia 23310
Cape Lisburne AFS, APO Seattle 98716
Cape Newenham AFS, APO Seattle 98745
Cape Romanzof AFS, APO Seattle 98706
Caswell AFS, Maine 04422
Charleston AFS, Maine 04426
Cold Bay AFS, APO Seattle 98711
Cudjoe Key AFS, Florida 33042
Dauphin Island AFS, Alabama 36528
Empire AFS, Michigan 49630
Finland AFS, Minnesota 55603
Finley AFS, North Dakota 58230
Fort Fisher AFS, North Carolina 28449
Fort Lee AFS, Virginia 23801
Fort Yukon AFS, APO Seattle 98710
Fortuna AFS, North Dakota 59275
Gentile AFS, Ohio 45401
Gibbsboro AFS, New Jersey 08026
Havre AFS, Montana 59501
Indian Mountain AFS, APO Seattle 98748
Jacksonville AFS, Florida 32212
Kalispell AFS, Montana 59922
Keno AFS, Oregon 97601
Klamath AFS, California 95548
Kotzebue AFS, APO Seattle 98709
Lake Charles AFS, Louisiana 70601
Lockport AFS, New York 14098
Makah AFS, Washington 98357
Martinsburg AFS, West Virginia 25401
Mica Peak AFS, Washington 99023
Mill Valley AFS, California 94941
Minot AFS, North Dakota 58759
Montauk AFS, New York 11954
Mt. Hebo AFS, Oregon 97122
Mt. Laguna AFS, California 92048
Newark AFS, Ohio 43055
No. Bend AFS, Oregon 97459
No. Charleston AFS, South Carolina 29404
No. Truro AFS, Massachusetts 02652
Oklahoma City AFS, Oklahoma 73145
Opheim AFS, Montana 59250
Pillar Point AFS, California 94019
Point Arena AFS, California 95468
Port Austin AFS, Michigan 48467
Richmond AFS, Florida 33156
Roanoke Rapids AFS, North Carolina 27870
San Antonio AFS, Texas 78209
San Pedro Hill AFS, California 90274
Sault Sainte Marie AFS, Michigan 49783
Savannah AFS, Georgia 31402
Sparrevohn AFS, APO Seattle 98746
St. Albans AFS, Vermont 05478
St. Louis AFS, Missouri 63118
Sunnyvale AFS, California 94088
Tatalina AFS, APO Seattle 98747
Tin City AFS, APO Seattle 98715
Tonopah AFS, Nevada 89049
Watertown AFS, New York 13601

Valdosta. Phone: (912) 333-4211. AUTOVON: 460-1110. TAC base. 347th Tactical Fighter Wing, F-4E fighter operations. Base activated June 1941; named for George P. Moody, killed May 5, 1941, while testing Beech AT-10. Area: 6,015 acres. Altitude: 233 ft. M–2,847; C–618; TP–$37.8M; O–61; N–241; T/G–25; H (25).

Mountain Home AFB, Idaho 83648; 56 mi. SE of Boise. Phone: (208) 828-2111. AUTOVON: 857-1110. TAC base. 366th Tactical Fighter Wing, F-111 fighter operations. Base activated April 1942. Area: 6,639 acres. Altitude: 3,000 ft. M–4,217; C–783; TP–$48M; O–246; N–1,289; T/G–15; H (20).

Myrtle Beach AFB, S. C. 29577; adjacent S of Myrtle Beach. Phone: (803) 238-7211. AUTOVON: 748-1110. TAC base. 354th Tactical Fighter Wing, A-7 and A-10 fighter operations. Army air base, 1941–47; USAF base since 1956. Area: 3,800 acres. Altitude: 25 ft. M–3,091; C–479; TP–$41.1M; O–132; N–668; H (15).

Nellis AFB, Nev. 89191; 8 mi. NE of Las Vegas. Phone: (702) 643-1800. AUTOVON: 682-1800. TAC base. 57th Tactical Training Wing, host unit; USAF Tactical Fighter Weapons Center; 474th Tactical Fighter Wing, F-4D fighter operations; USAF Thunderbirds Air Demonstration Squadron; 4440th TFTG (Red Flag); TFWC Range Group; conducts initial and advanced tactical fighter training and realistic combat training for DoD; provides test and evaluation of air tactics and new equipment. Base activated July 1941; named for 1st Lt. William H. Nellis, WW II fighter pilot, killed Dec. 27, 1944, in Europe. Area: 3,052,695 acres (includes Indian Springs AFAF). Altitude: 1,868 ft. M–8,133; C–1,086; T/G–39; TP–$80M; H (35).

Niagara Falls International Airport, N. Y. 14304; 6 mi. E of Niagara Falls. Phone: (716) 297-4100. AUTOVON: 489-3011. 914th Tactical Airlift Group (AFRES); 107th Fighter Interceptor Group (ANG). Base activated Jan. 1952. Area: 979 acres. Altitude: 590 ft. M–4; C–261; TP–$8.2M; O–114; N–174.

Norton AFB, Calif. 92409; 59 mi. E of Los Angeles, within corporate limits of San Bernardino. Phone: (714) 382-1110. AUTOVON: 876-1110. MAC base. 63d Military Airlift Wing; Hq. Air Force Inspection and Safety Center, Air Force Audit Agency, and Aerospace Audio-Visual Service (MAC). Also, ICBM Program Office (SAMSO), 445th Military Airlift Wing (AFRES Associate), and MAC NCO Academy West. Base activated Mar. 2, 1942; named for Capt. Leland F. Norton, WW II bomber pilot, killed in aircraft accident in France, May 1944. Area: 2,407 acres. Altitude: 1,156 ft. M–5,672; C–4,723; TP–$89.4M; O–56; N–208; T/G–339 (includes 299 transient and 40 guest); D.

Offutt AFB, Neb. 68113; 8 mi. S of Omaha. Phone: (402) 291-2100. AUTOVON: 271-1110. SAC base. Hq. Strategic Air Command, 55th Strategic Reconnaissance Wing; 544th Aerospace Reconnaissance Technical Wing; AF Global Weather Central; 3d Weather Wing; 6944th Security Wing; and 3902d Air Base Wing. Base activated 1888 as Army's Ft. Crook; landing field named in 1924 for 1st Lt. Jarvis J. Offutt, WW I pilot who died in a crash Aug. 13, 1918. Area: 1,907 acres. Altitude: 1,049 ft. M–12,000; C–2,500; TP–$196M; O–597; N–2,083; T/G–60; H (70).

O'Hare International Airport, Ill. 60666; 22 mi. NW of Chicago Loop. Phone: (312) 694-3031. AUTOVON: 930-1110. 928th Tactical Airlift Group (AFRES); 126th Air Refueling Wing (ANG); Defense Contract Administration Services Region. Base activated in April 1946. Named for Lt. Cmdr. Edward H. "Butch" O'Hare, USN, Medal of Honor winner, killed Nov. 26, 1943, during battle for the Gilbert Islands. Area: 391 acres. Altitude: 643 ft. M–2,256; C–1,255; TP–$36.3M.

Patrick AFB, Fla. 32925; 2 mi. S of Cocoa Beach. Phone: (305) 494-1110. AUTOVON: 854-1110. AFSC base. Operated by the 6550th Air Base Wing in support of DoD, NASA, and other agency missile and space programs. Major tenants are Defense Race Relations Institute; AF Technical Applications Center; Deputy for Eastern Test Range; 549th Tactical Air Support Group; and 2d Combat Communications Group (AFCS). Activated in 1940, base is air-head for Cape Canaveral AFS. Named for Maj. Gen. Mason M. Patrick, Chief of AEF's Air Service in WW I and Chief of the Air Service/Air Corps, 1921–27. Area: 2,332 acres. Altitude: 9 ft. M–3,915; C–9,318; TP–$62M; O–248; N–1,431; T/G–10; H (30).

Pease AFB, N. H. 03801; 3½ mi. W of Portsmouth. Phone: (603) 436-0100. AUTOVON: 852-1110. SAC base. 45th Air Division; 509th Bomb Wing; 157th Air Refueling Group (ANG). Base activated 1956; named for Capt. Harl Pease, Jr., World War II B-17 pilot and Medal of Honor winner, killed Aug. 7, 1942, during attack on Rabaul, New Britain Island. Area: 4,373 acres. Altitude: 101 ft. M–3,622; C–540; TP–$44M; O–139; N–1,043; T/G–134; H (70).

Peterson AFB, Colo. 80914; 7 mi. E of Colorado Springs. Phone: (303) 591-7321. AUTOVON: 692-7011. 46th Aerospace Defense Wing, which supports Hq. North American Air Defense Command/Aerospace Defense Command and the NORAD/ADCOM Combat Operations Center in the Cheyenne Mountain complex. Base activated in 1941; named for 1st Lt. Edward J. Peterson, killed Aug. 8, 1942, in aircraft crash at the field. Area: 1,150 acres. Altitude: 6,200 ft. M–3,845; C–1,221; TP–$92.7M; O–138; N–352; T/G–40; D.

Plattsburgh AFB, N. Y. 12903; adjacent to Plattsburgh, N. Y. Phone: (518) 563-4500. AUTOVON: 689-1110. SAC base. 380th Bomb Wing, medium bomber and tanker operations with FB-111 and KC-135 Stratotanker. 4007th Combat Crew Training Squadron trains all FB-111 combat crews for SAC. Second oldest active military installation in the US, established 1814; AFB since 1955. Area: 3,305 acres. Altitude: 235 ft. M–4,200; C–683; TP–$49.8M; O–372; N–1,249; H (20).

Pope AFB, N. C. 28308; 12 mi. NNW of Fayetteville. Phone: (919) 394-0001. AUTOVON: 486-1110. MAC base. 317th Tactical Airlift Wing. 1st Aeromedical Evacuation Squadron; USAF Airlift Center; Detachment 1, 507th Tactical Air Control Wing (TAC); 21st Tactical Air Support Squadron (TAC); 1943d Communications Squadron; 53d Mobile Aerial Port Squadron (AFRES). Base adjoins Army's Ft. Bragg and provides tactical airlift support for airborne forces and other personnel, equipment, and supplies. Activated Sept. 1919; named for 1st Lt. Harley H. Pope, WW I flyer, killed Jan. 7, 1919, in a local crash. Area: 1,750 acres. Altitude: 218 ft. M–3,817; C–336; TP–$45.7M; O–89; N–370; T/G–116; D.

Randolph AFB, Tex. 78148; 20 mi. ENE of San Antonio. Phone: (512) 652-1110. AUTOVON: 487-1110. ATC base. Hq. Air Training Command; 12th Flying Training Wing; T-37 and T-38 pilot instructor training; Air Force Military Personnel Center; Hq. USAF Recruiting Service. Base activated Oct. 1931; named for Capt. William M. Randolph, killed Feb. 17, 1928, in crash. Area: 2,618 acres. Altitude: 761 ft. M–5,278; C–2,496; TP–$157.8M; O–361; N–658; T/G–13; D.

Reese AFB, Tex. 79401; 6 mi. W of Lubbock. Phone: (806) 885-4511. AUTOVON: 838-1110. ATC base. 64th Flying Training Wing, undergraduate pilot training. Base activated in 1942; named for 1st Lt. Augustus F. Reese, Jr., fighter pilot killed in Sardinia, May 14, 1943. Area: 3,597 acres. Altitude: 3,338 ft. M–3,031; C–628; TP–$35.5M; O–133; N–286; T/G–12; H (10).

Richards-Gebaur AFB, Mo. 64030; 17 mi. S of Kansas City. Phone: (816) 348-2000. AUTOVON: 465-1110. MAC base. 1607th Air Base Wing; 1879th Communications Squadron (AFCS); Detachment 12, 7th Weather Wing (MAC); 442d Tactical Airlift Wing (AFRES). Base activated Mar. 1944, named for 1st Lt. John F. Richards and Lt. Col. Arthur W. Gebaur, Jr. Richards was killed Sept. 26, 1918, in France, while on an artillery-spotting mission; Gebaur, Aug. 29, 1952, over North Korea. Area: 2,418 acres. Altitude: 1,090 ft. M–167; C–773.

Rickenbacker AFB, Ohio 43217; 13 mi. SSW of Columbus. Phone: (614) 492-8211. AUTOVON: 950-1110. SAC base. 301st Air Refueling Wing; 121st Tactical Fighter Wing (ANG); 302d Tactical Airlift Wing (AFRES); 160th Air Refueling Group (ANG). Base activated June 1942. Formerly Lockbourne AFB. Renamed on May 18, 1974, in honor of Capt. Edward V. Rickenbacker, America's leading WW I ace and Medal of Honor winner, who died July 23, 1973. Area: 4,100 acres. Altitude: 744 ft. M–2,300; C–1,230; TP–$39.5M; O–165; N–700; T/G–15; D.

Robins AFB, Ga. 31098; at Warner Robins, 18 mi. SSE of Macon. Phone: (912) 926-1110. AUTOVON: 468-1110. AFLC base. Hq. Warner Robins Air Logistics Center; Hq. AFRES. 19th Bomb Wing (SAC); 5th Combat Communications Group (AFCS); 3503d Recruiting Group. Base activated March 1942; named for Brig. Gen. Augustine Warner Robins, an early Chief of the Materiel Division of the Air Corps, died June 16, 1940. Area: 7,625 acres. Altitude: 294 ft. M–4,281; C–14,538; TP–$314.48M; O–352; N–1,044; T/G–40; H (40).

Scott AFB, Ill. 62225; 6 mi. ENE of Belleville. Phone: (618) 256-1110. AUTOVON: 638-1110. MAC base. 375th Aeromedical Airlift Wing; Headquarters for Military Airlift Command, Air Force Communications Service, Aerospace Rescue and Recovery Service, and Air Weather Service. Also, Defense Commercial Communications Office, Environmental Technical Applications Center, 1st Aeromedical Staging Flight, 7th Weather Wing, 932d Aeromedical Airlift Group (AFRES), and 375th Air Base Group. Base activated June 14, 1917; named for Cpl. Frank S. Scott, first enlisted man to die in an air accident, killed Sept. 28, 1912, at College Park, Md. Area: 2,800 acres. Altitude: 453 ft. M–6,205; C–3,634; TP–$173M; O–456; N–1,042; T/G–122; H (215).

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 with dual-based commitment to NATO; 68th Bomb Wing (SAC); 8th Tactical Deployment and Control Squadron (TAC). Base first activated June 12, 1941; named for Navy Lt. Seymour A. Johnson, killed in plane crash, 1941. Area: 4,093 acres. Altitude: 109 ft. M–5,869; C–973; TP–$65.6M; O–332; N–1,368; H (30).

Shaw AFB, S. C. 29152; 7 mi. WNW of Sumter. Phone: (803) 668-8110. AUTOVON: 965-1110. TAC base. Hq. 9th Air Force (TAC); 363d Tac Recon Wing, RF-4C recon operations and training; 507th Tac Air Control Wing, manages 407L tactical air control system. 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 July 9, 1918, while on a reconnaissance mission. Area: 3,082 acres and supports another 10,339 acres. Altitude: 252 ft. M–5,809; C–595; TP–$76.83M; O–389; N–1,316; T/G–16; H (90).

Shemya AFB, Alaska (APO Seattle 98736); located at western tip of the Aleutian chain, midway between Anchorage, Alaska, and Tokyo, Japan. Phone: (907) 572-3000. AUTOVON: (317) 572-3000. AAC base. Activated in 1943, Shemya was used as a bomber base in WW II. The International Date Line has been "bent" around Shemya so that local date is same as elsewhere in the US. Area: about 4½ mi. long by 2½ mi. wide. Altitude: 270 ft. M–648; C–173; TP–*(see Elmendorf AFB);* T/G–70; D.

Sheppard AFB, Tex. 76311; 4 mi. N of Wichita Falls. Phone: (817) 851-2511. AUTOVON: 736-1001. ATC base. Sheppard Technical Training Center; 80th Flying Training Wing; furnishes undergraduate pilot training for the German Air Force and for foreign students under Security Assistance Training. Base activated June 14, 1941; named for Morris E. Sheppard, US senator from Texas, died in 1941. Area: 5,082 acres. Altitude: 1,015 ft. M–10,421; C–1,864; TP–$147.7M; O–308; N–979; T/G–55; H (210).

Tinker AFB, Okla. 73145; 8 mi. SE of Oklahoma City. Phone: (405) 732-7321. AUTOVON: 735-1110. AFLC base. Hq. Oklahoma City Air Logistics Center; furnishes logistic support for bombers, jet engines, instruments, and electronics; Hq. AFCS's Southern Communications Area; 3d Combat Communications Group (AFCS); 552d Airborne Warning and Control Wing (TAC); 507th Tactical Fighter Group (AFRES). Base activated May 1941; named for Maj. Gen. Clarence L. Tinker. On June 7, 1942, at the end of the Battle of Midway, General Tinker's LB-30 (an early-model B-24) apparently went down at sea after attacking enemy ships retreating toward Wake Island. Area: 4,359 acres. Altitude: 1,291 ft. M–3,800; C–17,200; TP–$315M; O–110; N–422; H (30).

Travis AFB, Calif. 94535; at Fairfield, 50 mi. NE of San Francisco. Phone: (707) 438-4011. AUTOVON: 837-1110. MAC base. 60th Military Airlift Wing; Hq. 22d Air Force; 349th Military Airlift Wing (AFRES Associate); 307th Air Refueling Group (SAC). Base activated May 25, 1943; named for Brig. Gen. Robert F. Travis, killed Aug. 5, 1950, in a B-29 accident. Area: 5,026 acres. Altitude: 62 ft. M–9,100; C–2,615; TP–$181.6M; O–344; N–1,823; T/G–350 (includes 112 family transient, 130 VOQs, and 108 VAQs); H (473).

Tyndall AFB, Fla. 32401; 7 mi. SE of Panama City. Phone: (904) 283-1113. AUTOVON: 970-1110. ADCOM base. Air Defense Weapons Center; 678th Air Defense Group; conducts combat crew training for F-106 pilots; AF Civil Engineering Center. Base activated Dec. 7, 1941; named for 1st Lt. Frank B. Tyndall, WW I fighter pilot, killed in crash July 15, 1930. Area: 28,000 acres. Altitude: 18 ft. M–3,975; C–1,184; TP–$58.7M; O–190; N–883; H (80).

US Air Force Academy, Colo. 80840; 10 mi. N of Colorado Springs. Phone: (303) 472-1818. AUTOVON: 259-3110. Separate Operating Agency. Activated April 1, 1954, at Lowry AFB, Colo. Moved to permanent facilities Aug. 1958. Tenant units; 1876th Communications Squadron, Frank J. Seiler Research Lab (AFSC), DoD Medical Exam Review Board, AF Audit Agency, 557th Flying Training Squadron (ATC). Area: 18,000 acres. Altitude: 7,280 ft. M–2,615; C–1,931; TP–$38.7M; O–348; N–916; T/G–33; H (85).

Vance AFB, Okla. 73701; 3 mi. SSW of Enid. Phone: (405) 237-2121. AUTOVON: 962-7110. ATC base. 71st Flyin Training Wing, undergraduate pilot train ing base. Activated Nov. 1941; name for Lt. Col. Leon R. Vance, Jr., Medal o Honor winner, killed July 26, 1944, whe air-evac plane returning him to the US went down in the Atlantic near Iceland Area: 1,603 acres. Altitude: 1,307 ft. M–1,157; C–123; TP–$32.4M; O–146; N–84; T/G–1; D.

Vandenberg AFB, Calif. 93437; 8 mi. NNW of Lompoc. Phone: (805) 866-1611. AUTOVON: 276-1110. SAC base. Site of 1st Strategic Aerospace Division (SAC); Space and Missile Test Center (AFSC); 6595th Aerospace Test Wing. Conducts missile crew training and provides facilities and support for operational ICBM tests; research and development testing of Air Force space and ballistic missile programs; and unmanned polar-orbiting space operations of USAF, NASA contractors, foreign allies, *et al.* Originally Army's Camp Cooke; activated Oct. 1941, base was taken over by USAF June 7, 1957; renamed for Gen. Hoyt S. Vandenberg, USAF's second Chief of Staff, died April 2, 1954. Officers and airmen trained in computer-controlled simulators move on to alert duty with operational ICBM wings. It is the only AFB from which are launched operational ballistic missiles in the SAC deterrent force and polar-orbiting satellites in US space program. About 1,370 launches have taken place from Vandenberg since Dec. 1958. Area: 98,400 acres. Altitude: 400 ft. M–4,300; C–4,125; TP–$155.7M; O–416; N–1,674; T/G–20; H (45).

Warren AFB, Wyo. *(see Francis E. Warren AFB).*

Westover AFB, Mass. 01022; 5 mi. NE of Chicopee Falls. Phone: (413) 557-1110. AUTOVON: 589-1110. 439th Tac Airlift Wing (AFRES). Base activated Oct. 1939; named for Maj. Gen. Oscar Westover, Chief of the Air Corps, killed in 1938 in aircraft accident. Area: 2,500 acres. Altitude: 244 ft. M–130; C–1,000; TP–$12.2M; O–174; N–432; D.

Wheeler AFB, Hawaii 96854; located near center of the island of Oahu. Phone: (808) 422-0531. PACAF base. Furnishes administrative and logistic support to the Hawaiian Air Defense Division (326th Air Division); Joint Coordination Center, Far East; tactical air support squadron. Also supports US Army flying activities from adjacent Schofield Barracks. Base activated Feb. 1922; named for Maj. Sheldon H. Wheeler, killed July 13, 1921, during aerial exhibition. Area: 1,369 acres. Altitude: 845 ft. M–550; C–250; TP–*(see Hickam AFB);* D.

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 AAF airman to be shot down in WW II. Area: 3,384 acres, plus area encompassed by missile com-

plex of about 16,000 sq. mi. Altitude: 369 ft. M–2,829; C–512; TP–$40.5M; O–219; N–773; T/G–5; H (25). (New hospital currently under construction will have a 30-bed capacity.)

Williams AFB, Ariz. 85224; 16 mi. SE of Mesa, 10 mi. E of Chandler. Phone: (602) 988-2611. AUTOVON: 474-1011. ATC base. 82d Flying Training Wing, largest undergraduate pilot training base; also provides F-5 combat crew training for foreign students. Home of AFSC Human Resources Laboratory/Flying Training Division doing extensive research on flight simulators. Base activated July 1941; named for 1st Lt. Charles D. Williams, killed in crash July 6, 1927, during aerial demonstration. Area: 3,867 acres. Altitude: 1,385 ft. M–3,050; C–734; TP–$44.9M; O–309; N–499; T/G–40; H (25).

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 Division (AFSC); Foreign Technology Division (AFSC); AF Institute of Technology; USAF Medical Center, Wright-Patterson; Air Force Museum; Air Force Acquisition Logistics Division; plus more than 70 other DoD activities and government agencies. Originally separate, Wright Field and Patterson Field were merged and redesignated Wright-Patterson AFB on Jan. 13, 1948; named for aviation pioneers Orville and Wilbur Wright and for 1st Lt. Frank S. Patterson, killed June 19, 1918, in the crash of a DH-4. The Wright brothers did much of their early flying on Huffman Prairie, now Areas A and C of present base. Area: 8,147 acres. Altitude: 824 ft. M–7,462; C–16,482; TP–$468M; O–880; N–1,455; T/G–40; H (280).

Wurtsmith AFB, Mich. 48753; 3 mi. NW of Oscoda. Phone: (517) 739-2011. AUTOVON: 623-1110. SAC base. 40th Air Division; 379th Bomb Wing. Base activated 1924; assigned to SAC April 1, 1960; named for Maj. Gen. Paul B. Wurtsmith, killed Sept. 16, 1946, in a B-25 crash in North Carolina. Area: 5,200 acres. Altitude: 634 ft. M–3,100; C–500; TP–$39M; O–321; N–1,034; H (20).

Youngstown Municipal Airport, Vienna, Ohio 44473; 14 mi. N of Youngstown. Phone: (216) 856-1645. AUTOVON: 346-9211. 910th Tactical Fighter Group (AFRES). Base activated 1952. Area: 231 acres. Altitude: 1,196 ft. M–1; C–332; TP–$6.0M; T/G–5. ■

USAF'S MAJOR BASES OVERSEAS

Albrook AFS, Canal Zone
APO New York 09825
Hq. USAF Southern Air Division

Ankara AS, Turkey
APO New York 09254
TUSLOG detachment, USAFE

Aviano AB, Italy
APO New York 09293
Tactical group, USAFE

Bitburg AB, West Germany
APO New York 09132
Tactical fighter base, USAFE

Camp New Amsterdam,
The Netherlands
APO New York 09292
Fighter-interceptor base, USAFE

Clark AB, Philippines
APO San Francisco 96274
Hq. 13th Air Force, PACAF

Frankfurt, West Germany
APO New York 09101
Support base, USAFSS

Hahn AB, West Germany
APO New York 09109
Tactical fighter base, USAFE

Hellenikon AB, Greece
APO New York 09223
Support base, USAFE

Howard AFB, Canal Zone
APO New York 09817
Support base, USAF Southern Air Division

Incirlik AB, Turkey
APO New York 09289
Tactical fighter base, USAFE

Izmir AB, Turkey
APO New York 09224
Support base, USAFE

Kadena AB, Okinawa, Japan
APO San Francisco 96239
Air division base, PACAF
Strategic operations, SAC

Keflavik Airport, Iceland
FPO New York 09571
Fighter-interceptor base, ADCOM

Kunsan AB, South Korea
APO San Francisco 96264
Tactical fighter base, PACAF

Lajes Field, Azores
APO New York 09406
Airlift base, MAC

Lindsey AS, West Germany
APO New York 09633
Support base, USAFE

Moron AB, Spain
APO New York 09282
Support base, USAFE

Osan AB, South Korea
APO San Francisco 96570
Air division base, PACAF
Tactical fighter base, PACAF

RAF Alconbury, United Kingdom
APO New York 09238
Tactical reconnaissance base, USAFE

RAF Bentwaters, United Kingdom
APO New York 09755
Tactical fighter base, USAFE

RAF Lakenheath, United Kingdom
APO New York 09179
Tactical fighter base, USAFE

RAF Mildenhall, United Kingdom
APO New York 09127
Hq. 3d Air Force, USAFE
Tactical airlift base, USAFE

RAF Sculthorpe, United Kingdom
APO New York 09048
Support base, USAFE

RAF Upper Heyford, United Kingdom
APO New York 09194
Tactical fighter base, USAFE

RAF Wethersfield, United Kingdom
APO New York 09120
Support base, USAFE

RAF Woodbridge, United Kingdom
APO New York 09405
Tactical fighter base, USAFE

Ramstein AB, West Germany
APO New York 09012
Hq. USAFE
Tactical fighter base, USAFE
Hq. European Command Area, AFCS

Rhein-Main AB, West Germany
APO New York 09057
Tactical airlift base, MAC

Sembach AB, West Germany
APO New York 09130
Hq. 17th Air Force, USAFE
Support base, USAFE

Sondrestrom AB, Greenland
APO New York 09121
Support base, ADCOM

Spangdahlem AB, West Germany
APO New York 09123
Tactical fighter base, USAFE

Taegu AB, South Korea
APO San Francisco 96213
Combat support base, PACAF

Tempelhof Airport, Berlin, Germany
APO New York 09611
Support base, USAFE

Thule AB, Greenland
APO New York 09023
Aerospace defense base, ADCOM

Torrejon AB, Spain
APO New York 09283
Hq. 16th Air Force, USAFE
Tactical fighter base, USAFE

Wiesbaden AB, West Germany
APO New York 09332
Support base, USAFE
Weather base, MAC

Yokota AB, Japan
APO San Francisco 96328
Hq. 5th Air Force, PACAF

Zaragoza AB, Spain
APO New York 09286
Tactical fighter training base, USAFE

Zweibrücken AB, West Germany
APO New York 09860
Tactical fighter/reconnaissance base, USAFE

A GUIDE TO AIR NATIONAL GUARD BASES

The ANG bases listed below are at civilian airports. For ease of cross-referencing this list and the list of ANG units by major command assignments *(p. 111)*, the bases here are arranged alphabetically according to the city where the airport is. (Not all ANG units submitted information for this guide.) Other ANG units are at regular USAF bases, as indicated on p. 146. Note also that several Air Force Reserve (AFRES) units are collocated with ANG units on civilian airports, and in a few cases regular USAF units are at civilian airports where ANG bases are found. The key to the abbreviations is on p. 146.

Anchorage, Alaska 99502 (Kulis ANG Base at Anchorage IAP). Phone: (907) 243-1145. AUTOVON: 752-5215. 176th Tactical Airlift Group (ANG), 144th Tactical Airlift Squadron (ANG). Named for Lt. Albert Kulis, killed in training flight in 1954. Area: 101 acres. Altitude: 124 ft. M–590; C–181; TP–$5.93M; H (6); transient billeting on base.

Atlantic City, N. J. 08405 (National Aviation Facilities Experimental Center); 10 mi. W of Atlantic City. Phone: (609) 641-3200. AUTOVON: 234-1980. 177th Fighter Interceptor Group (ANG). Area: 130 acres. Altitude: 76 ft. M–495; C–307; TP–$6.5M.

Baltimore, Md. (Glenn L. Martin State Airport) 21220; 8 mi. E of Baltimore. 175th Tactical Fighter Group (ANG). Phone: (301) 687-6270. AUTOVON: 231-3850. 135th Tac Airlift Group (ANG). Phone: (301) 686-9100. AUTOVON: 231-1998. Area: 750 acres. Altitude: 89 ft. TP–$9.0M.

Bangor, Me., International Airport, 04401; 4 mi. NW of Bangor. Phone: (207) 947-0571. AUTOVON: 476-6210. 101st Air Refueling Wing (ANG). Area: 1,104 acres. Altitude: 192 ft. M–1,000; C–252; TP–$6.75M; D.

Battle Creek ANG Base, Mich. 49016; located near Battle Creek, adjacent to Kellogg Regional Airport. Phone: (616) 963-1596. AUTOVON: 889-3691. 110th Tactical Air Support Group (ANG). Area: 84 acres. Altitude: 941 ft. M–770; C–176; TP–$4.8M.

Birmingham Municipal Airport, Ala. (Smith ANG Base) 35206. Phone: (205) 591-8160. AUTOVON: 694-2110. 117th Tactical Reconnaissance Wing (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. M–1,272; C–293; TP–$5.5M.

Boise Air Terminal, Idaho (Gowen Field) 83701; 6 mi. S of Boise. Phone: (208) 385-5011. AUTOVON: 941-5011. 124th Tactical Reconnaissance Group (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 (461 acres military). Altitude: 2,858 ft. M–1,464; C–486; TP–$12.23M; T/G–limited 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 Wing; also host to Navy Reserve, Marine Reserve, ARNG, and USAF SAMSO units. Base activated April 1, 1942, and used as a gunnery training facility. ANG assumed control from US Navy in 1959. Named for Lt. John H. Buckley, National Guardsman, killed at Argonne, France, Sept. 27, 1918. Area: 3,251 acres. Altitude: 5,663 ft. M–843; C–301; TP–$13.5M; D.

Burlington, Vt. (Burlington International Airport) 05401; 3 mi. E of Burlington. Phone: (802) 658-0770. AUTOVON: 689-4310. 158th Defense Systems Evaluation Group (ANG). Area: 475 acres. Altitude: 371 ft. M–700; C–225; TP–$5.0M.

Charleston, W. Va. (Kanawha Airport) 25311; 4 mi. NE of Charleston. Phone: (304) 342-6194. AUTOVON: 366-9210. 130th Tactical Airlift Group (ANG). Area: 58 acres. Altitude: 981 ft. M–700; C–180; TP–$4.9M; D, Clinic.

Charlotte, N. C. (Douglas Municipal Airport) 28219. Phone: (704) 399-6363. AUTOVON: 583-9210. 145th Tactical Airlift Group (ANG). Area: 49 acres. Altitude: 750 ft. M–852; C–206; TP–$5.9M; D (4).

Des Moines Municipal Airport, Iowa 50321; in city of Des Moines. Phone: (515) 285-7182. AUTOVON: 939-3670. 132d Tactical Fighter Wing (ANG). Area: 112.1 acres. Altitude: 957 ft. M–798; C–5; TP–$6.4M.

Duluth International Airport, Minn. 55811; 5 mi. NW of Duluth. Phone: (218) 727-6886. AUTOVON: 825-7210. 148th Tactical Reconnaissance Group (ANG). USAF base also located at airport. Area: 152 acres. Altitude: 1,429 ft. M–854; C–235; TP–$6.2M.

Fort Smith Municipal Airport, Ark. 72906. Phone: (501) 646-1601. AUTOVON: 962-8210. 188th Tactical Fighter Group (ANG). Area: 95 acres. Altitude: 468 ft. M–700; C–200; TP–$5.0M.

Fresno Air Terminal, Calif. 93727; 5 mi. NE of Fresno. Phone: (209) 252-4041. AUTOVON: 949-9210. 26th NORAD Region and 26th ADCOM Air Division; 194th Fighter Interceptor Squadron (USAF); 144th Fighter Interceptor Wing (ANG). Area: 140 acres. Altitude: 332 ft. M–930; C–350; TP–$8.37M.

Gen. Billy Mitchell Fld., Wis. 53207; SE of Milwaukee. Phone: (414) 747-4410. AUTOVON: 786-9110. 128th Air Refueling Group (ANG). Also host to the 128th Tactical Control Flight (ANG) and 440th Tactical Airlift Wing (AFRES). Named for Brig. Gen. Billy Mitchell. Area: 58 acres. Altitude: 722 ft. M–744; C–185; TP–$5.8M.

Great Falls International Airport, Mont. 59401; 5 mi. SW of Great Falls. Phone: (406) 727-4650. AUTOVON: 279-2301. 24th NORAD Region and 24th ADCOM Air Division; SAGE Control Center (NORAD); 120th Fighter Interceptor Group (ANG). Area: 138 acres. Altitude: 3,674 ft. M–823; C–340; TP–$9.8M.

Gulfport-Biloxi Regional Airport, Miss. 39501; within the city limits of Gulfport. Phone: (601) 863-8624. AUTOVON: 363-8210. Training site, is also host to 173d Civil Engineering Flight, 255th Combat Communications Squadron, and the Army National Guard Transportation Repair Shop. An air-to-ground gunnery range is located 70 mi. due north of site. Area: 214 acres. Altitude: 28 ft. M–303; C–39; TP–$5.8M; D (4).

Harrisburg International Airport, Pa. 17057. Phone: (717) 944-0471. AUTOVON: 454-9210. 193d Tactical Electronic Warfare Group (ANG). M–987; C–228.

Hayward ANG Base, Calif. 94545; 2 mi. W of Hayward. Phone: (415) 783-1661. AUTOVON: 462-5673. 129th Aerospace Rescue and Recovery Group (ANG). Also host to 216th Electronic Installation Squadron and to the 234th Combat Communications Squadron. Area: 43.9 acres. Altitude: 49 ft. M–1,056; C–218; TP–$4.9M.

Jackson Municipal Airport, Miss. (Allen G. Thompson Field) 39208; 7 mi. E of Jackson. Phone: (601) 939-3633. AUTOVON: 731-9310. 172d Tactical Airlift Group (ANG). ANG area: 22 acres. Altitude: 346 ft. M–821; C–195; TP–$6.8M; D (6).

Jacksonville International Airport, Fla. 32229; 15 mi. NW of Jacksonville. Phone: (904) 757-1360. AUTOVON: 434-1544. 125th Fighter Interceptor Group (ANG).

Area: 158 acres. Altitude: 30 ft. M–951; C–320; TP–$7.5M; D (5).

Knoxville, Tenn. (McGhee Tyson Airport) 37901; 10 mi. SW of Knoxville. Phone: (615) 573-0111, (615) 983-1500. AUTOVON: 588-8210. Host unit is 134th Air Refueling Group (ANG). Tenants: 228th Combat Communications Squadron, 119th and 110th TAC Control Flights, and Air National Guard Professional Military Education Center. Area: 299 acres. Altitude: 980 ft. M–1,302; C–443; TP–$10M.

Lincoln Municipal Airport, Neb. 68524; 3 mi. NW of Lincoln. Phone: (402) 477-3904. AUTOVON: 939-1700. 155th Tactical Reconnaissance Group (ANG). Also hosts Army Reserve unit. Area: 162 acres. Altitude: 1,198 ft. M–801; C–247; TP–$6.4M; D.

Mansfield Lahm Airport, Ohio 44901; 3 mi. N of Mansfield. Phone: (419) 524-4621. AUTOVON: 889-1520. 179th Tactical Airlift Group (ANG). Named for aviation pioneer Brig. Gen. Frank P. Lahm. Area: 210 acres. Altitude: 1,296 ft. M–650; C–165; TP–$5.0M; D.

Martinsburg Municipal Airport, W. Va. 25401; 4 mi. S of Martinsburg. Phone: (304) 263-0801. AUTOVON: 242-9210. 167th Tactical Airlift Group (ANG). Area: 900 acres. Altitude: 556 ft. M–724; C–5; TP–$4.6M; D.

McEntire ANG Base, S. C. 29044; 12 mi. E of Columbia. Phone: (803) 776-5121. AUTOVON: 583-8301. 169th Tactical Fighter Group (ANG). Also host to Army Guard aviation unit. Base named for Brig. Gen. B. B. McEntire, Jr. (ANG), killed in an F-104 in 1961. Area: 2,322 acres. Altitude: 250 ft. M–6; C–339; TP–$4.0M; D.

Memphis International Airport, Tenn. 38118; 10 mi. S of Memphis. Phone: (901) 363-1212. AUTOVON: 966-8111. 164th Tactical Airlift Group (ANG). ANG occupies 81.1 acres. Altitude: 332 ft. M–703; C–27; TP–$4.9M; Clinic.

Minneapolis-St. Paul International Airport, Minn. 55111; adjacent to Minneapolis and St. Paul. Phone: (612) 725-5620. AUTOVON: 825-5620. 133d Tactical Airlift Wing (ANG) and 210th Electronic Installation Squadron, 237th Air Traffic Control Flight, and 133d Field Training Flight. Also 934th Tactical Airlift Group (AFRES). Area: 125.9 acres. Altitude: 840 ft. M–1,141; C–250; TP–$6.4M.

Montgomery, Ala. (Dannelly Field) 36105; 7 mi. SW of Montgomery. Phone: (205) 281-7770. AUTOVON: 485-9210. 187th Tactical Reconnaissance Group (ANG). Named for Ensign Clarence Dannelly, Navy pilot killed at Pensacola, Fla., during WW II. Area of base: 55 acres. Altitude: 219 ft. M–994; C–260; TP–$8.4M.

Nashville Metropolitan Airport, Tenn. 37217; 6 mi. SE of Nashville. Phone: (615) 741-4201. AUTOVON: 446-5011. 118th Tactical Airlift Wing (ANG). Area: 66 acres. Altitude: 597 ft. M–873; C–27; TP–$6.7M.

New Orleans Naval Air Station (Alvin Callender Field), La. 70146; 15 mi. S of New Orleans. Phone: (504) 393-3399. AUTOVON: 363-3399. 159th Tactical Fighter Group (ANG), 926th Tactical Fighter Group (AFRES), 87th Fighter Interceptor Squadron (USAF). NAS New Orleans was the first joint Air Reserve Training Facility to be established. Named for Alvin A. Callender, who served with the British Royal Flying Corps during World War I and was shot down over France in 1918. Area: 3,245 acres. Altitude: 3 ft. M–1,156; C–567; TP–$25M; O–82.

Ontario International Airport, Ontario, Calif. 91761. Phone: (714) 984-2705. AUTOVON: 898-3870. 163d Tactical Air Support Group (ANG). Area: 39 acres. Altitude: 900 ft.

Otis AFB, Mass. 02542; 7 mi. NNE of Falmouth. Phone: (617) 968-1000. AUTOVON: 557-1110. 102d Fighter Interceptor Wing (ANG). 4789th Air Base Group (Residual USAF Caretaker). 6th Missile Warning Squadron (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 in crash. Area: 19,925 acres. Altitude: 132 ft. M (including USCG and ANG) and C (including USCG) combined: 2,700. TP–$5M. 1,193 housing units on base: USCG administers 449 (10 Command, 45 Officer, 394 other ranks); 110 other units undergoing renovation.

Peoria Airport, Ill. 61607; 7 mi. SW of Peoria. Phone: (309) 697-6400. AUTOVON: 724-9210. 182d Tactical Air Support Group (ANG). Area: 27.9 acres. Altitude: 640 ft. M–685; C–140; TP–$3.9M.

Phelps Collins ANG Base, Mich. 49707; 7 mi. W of Alpena. Phone: (517) 354-4955. 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, March 1918. Area: 3,190 acres. Altitude: 689 ft. M–39; C–27; TP–$1.3M; seasonal during field training, O–86; N–40; T/G–14; H (10); D.

Phoenix, Ariz. (Sky Harbor IAP) 85034. Phone: (602) 244-9841. AUTOVON: 846-9210. 161st Air Refueling Group (ANG). Area: 51 acres. Altitude: 1,230 ft. M–1,092; C–250; TP–$7.0M.

Pittsburgh (Greater Pittsburgh) International Airport, Pa. 15231; 15 mi. NW of Pittsburgh. Phone: (412) 771-3711. AUTOVON: 277-8000. 171st Air Refueling Wing (ANG) and 112th Tactical Fighter Group (ANG). Also 911th Tactical Airlift Group (AFRES). Area: 90 acres. Altitude: 1,230 ft. M–1,451; C–411; TP–$10.4M.

Reno, Nev. (May ANG Base) 89502; 5 mi. SE of Reno. Phone: (702) 323-1011. AUTOVON: 830-8310. 152d Tactical Reconnaissance Group (ANG). Named for Maj. Gen. James A. May, state Adjutant General. Area: 66.6 acres. Altitude: 4,411 ft. M–786; C–237; TP–$6M; D.

Salt Lake City ANG Base, Utah 84116; 3 mi. W of Salt Lake City. Phone: (801) 521-7070. AUTOVON: 790-9210. 151st Air Refueling Group (ANG). Also hosts following ANG units: 109th Tactical Control Flight, 130th Electronic Installation Squadron, 299th Communication Squadron. Area: 75 acres. Altitude: 4,220 ft. M–1,256; C–290; TP–$7.4M; C.

San Juan, Puerto Rico (Muniz ANG Base at San Juan IAP) 00913. Phone: (809) 791-0340. 156th Tactical Fighter Group (ANG). Base named for Lt. Col. Jose A. Muniz, killed in an aircraft accident July 4, 1960. M–1,200; C–293; TP–$7.8M; D.

Savannah Municipal Airport, Ga. 31402; 4 mi. NW of Savannah. Phone: (912) 964-1941. AUTOVON: 860-8210. 165th Tactical Airlift Group (ANG). Also field training site. Area: 232 acres. Altitude: 50 ft. M–771; C–228; TP–$7.7M; O–156; N–100; D (3).

Schenectady County Airport, N. Y. 12301; 2 mi. N of Schenectady. Phone: (518) 372-5621. AUTOVON: 974-9210. 109th Tactical Airlift Group (ANG). Area: 106 acres. Altitude: 378 ft. M–702; C–185; TP–$5.1M; D.

Selfridge ANG Base, Mich. 48045; 3 mi. NE of Mount Clemens. Phone: (313) 466-4011. AUTOVON: 273-0111. 127th Tactical Fighter Wing (ANG); 191st Fighter Interceptor Group (ANG); 403d Rescue and Weather Reconnaissance Wing (AFRES); 927th Tactical Airlift Group (AFRES); also hosts Navy Reserve, Marine Air Reserve, Army Reserve, Army units, and US Coast Guard Air Station for Detroit. Base activated July 1917, and transferred to Mich. ANG, July 1971. Named for 1st Lt. Thomas E. Selfridge, first Army officer to fly in an airplane and first fatality of powered flight, killed Sept. 17, 1908, at Fort Myer, Va., when plane piloted by Orville Wright crashed. Area: 3,660 acres. Altitude: 583 ft. M–721; C–2,011; TP–$47.3M; T/G–12; D.

Sioux City Municipal Airport, Iowa 51110; 7 mi. S of Sioux City. Phone: (712) 255-3511. AUTOVON: 939-6210. 185th Tactical Fighter Group (ANG). Area: 2,550 acres. Altitude: 1,098 ft. M–714; C–231; TP–$4.95M; D.

Sioux Falls, S. D. (Joe Foss Field) 57104; N side of Sioux Falls. Phone: (605) 336-0670. AUTOVON: 939-7210. 114th Tactical Fighter Group (ANG). Named for Brig. Gen. Joseph J. Foss, WW II ace, former governor of South Dakota, and National President of AFA; founder of the South Dakota ANG. Area: 148 acres. Altitude: 1,428 ft. M–850; C–210; TP–$5.3M.

Springfield, Ill. (Capital Airport) 62707; NW of Springfield. Phone: (217) 753-8850. AUTOVON: 631-1990. 183d Tactical Fighter Group (ANG). Area: 70 acres. Altitude: 592 ft. M–804; C–233; TP–$6M; D.

Springfield Municipal Airport, Ohio 45501; 5 mi. S of Springfield. Phone: (513) 323-8653. AUTOVON: 889-1600. 178th Tactical Fighter Group (ANG). Area: 115 acres. Altitude: 1,052 ft. M–1,135 ANG authorizations; TP–$7.8M; D (6).

St. Joseph, Mo. (Rosecrans Memorial Airport) 64503; 4 mi. E of St. Joseph. Phone: (816) 364-2941. AUTOVON: 720-9210. 139th Tactical Airlift Group (ANG). Area: 54.5 acres. Altitude: 724 ft. M–700; C–200; TP–$4.9M.

Suffolk County Airport, Westhampton Beach, N. Y. 11978; in corporate limits of Westhampton Beach. Phone: (516) 288-4200. AUTOVON: 938-3720. 106th Aerospace Rescue and Recovery Group (ANG). Area: 55 acres. Altitude: 67 ft. TP–$5.5M.

Syracuse, N. Y. (Hancock Field) 13211; 5 mi. NE of Syracuse. Phone: (315) 458-5500. AUTOVON: 587-9110. 174th Tactical Fighter Group (ANG). Tenants are 108th Tactical Control Squadron (ANG), and base ops for Hancock AFB (NORAD site on remote part of Syracuse Hancock International Airport). Area: 443 acres. Altitude: 421 ft. M–954; C–197; TP–$5.25M.

Terre Haute, Ind. (Hulman Field) 47803; 5 mi. E of Terre Haute. Phone: (812) 232-8391. AUTOVON: 634-1581. 181st Tactical Fighter Group and 113th Tactical Fighter Squadron (ANG). Area: 60 acres. Altitude: 585 ft. M–900; C–203; TP–$2.4M; D (5).

Toledo Express Airport, Ohio 43558; 14 mi. W of Toledo. Phone: (419) 865-2396. AUTOVON: 889-1710. 180th Tactical Fighter Group (ANG), 112th Tactical Fighter Squadron (ANG); hosts 555th Air Force Band. Area: 79 acres. Altitude: 684 ft. M–857; C–211; TP–$6.3M; Clinic (4).

Truax Field, Madison, Wis. 53704; 2 mi. N of Madison. Phone: (608) 241-6200. AUTOVON: 472-6000. 128th Tactical Air Support Wing (ANG). Activated June 1942, as USAF base, taken over by Wis. ANG in April 1968. Named for Lt. T. L. Truax, killed in P-40 training accident in 1941. Area: 152 acres. Altitude: 862 ft. M–848; C–153; TP–$2.96M; T/G–7 units; D.

Tucson International Airport, Ariz. 85706; within Tucson city limits. Phone: (602) 748-5140. AUTOVON: 361-5140. 162d Tactical Fighter Training Group (ANG: A-7D). Area: 49 acres. Altitude: 2,650 ft. M–1,060; C–322; TP–$10.1M.

Volk Field ANG Base, Wis. 54618; 90 mi. NW of Madison. Phone: (608) 427-3341. AUTOVON: 884-3480. ANG Permanent Training Site, including air-to-air and air-to-ground gunnery ranges, to provide training for ANG flying units. Named for Lt. Jerome A. Volk, first Wis. ANG pilot killed in Korean War. Base proper: 2,450 acres. Altitude: 915 ft. M–40; C–36; TP–$1.2M.

Westfield, Mass. (Barnes Municipal Airport) 01085; 3 mi. N. of Westfield. Phone: (413) 562-3691. AUTOVON: 893-1470. 104th Tactical Fighter Group (ANG). Area: 133 acres. Altitude: 270 ft. M–750; C–200; TP–$4.1M.

White Plains, N. Y. (Westchester County Airport) 10604; 8 mi. NE of White Plains. Phone: (914) 956-9511. AUTOVON: 456-9210. 105th Tactical Air Support Wing (ANG). Area: 692 acres; ANG base: 27 acres. Altitude: 439 ft. M–775; C–150; TP–$6.5M.

Willow Grove Naval Air Station, Pa. 19090; 14 mi. N of Philadelphia. Phone: (215) 441-1000. AUTOVON: 991-1000. 111th Tactical Air Support Group (ANG). Included on base are units of Navy Reserve, Marine Reserve, Army Reserve, and Air Force Reserve (927th Tactical Airlift Group). Area: 1,000 acres. Altitude: 356 ft. Navy facilities include BX, enlisted club, and officers club for use by all Reservists. Transient quarters available to Navy personnel only.

Will Rogers World Airport, Okla. 73169; 7 mi. SW of Oklahoma City. Phone: (405) 681-7551. AUTOVON: 956-8210. 137th Tactical Airlift Wing (ANG). Area: 7,200 acres. Altitude: 1,290 ft. M–1,186; C–229; TP–$6.2M.

Wilmington, Del. (Greater Wilmington Airport) 19720; 5 mi. S of Wilmington. Phone: (302) 322-2261. AUTOVON: 455-9000. 166th Tactical Airlift Group (ANG); Army National Guard 198th Aviation Company. Area: 57 acres. Altitude: 80 ft. M–758; C–183; TP–$4.9M; D, Clinic (2).

Windsor Locks, Conn. (Bradley International Airport) 06096; 2 mi. W of Windsor Locks. Phone: (203) 623-8291. AUTOVON: 636-8310. 103d Tactical Fighter Group (ANG), and Army National Guard Aviation battalion. Named for Lt. Eugene M. Bradley, killed in P-40 crash in August 1941. Area: 2,000 acres. Altitude: 173 ft. M–900; C–200; TP–$6M. ■

A GUIDE TO USAF'S R&D FACILITIES

The United States Air Force is the product of a technological breakthrough —powered flight. From its inception, USAF has been the nation's principal user as well as provider of aerospace technology. The Air Force's dependence on technology increases steadily and with it the importance of USAF's role as a catalyst of scientific and technological advance. The Air Force Systems Command (AFSC) and its many diverse components formulate and manage USAF's scientific and technological activities and programs. Presented here is a guide to all key installations of the AFSC divisions, centers, and laboratories.

Principal R&D Facilities

From AFSC headquarters at Andrews AFB, Md., Gen. Alton D. Slay, AFSC Commander, directs the operations of the command's divisions, development and test centers, ranges, and laboratories. Those installations, valued at more than $2 billion, are described below.

Special AFSC Organizations

Foreign Technology Division (FTD), Wright-Patterson AFB, Ohio—To prevent technological surprise by a potential enemy, FTD acquires, evaluates, analyzes, and disseminates foreign aerospace technology, in concert with other divisions, laboratories, and centers. Information collected from a wide variety of sources is processed in unique electronic data-handling and laboratory-processing equipment and analyzed by scientific and technical specialists who assess potential hostile technological or operational environs with which USAF weapon systems must cope.

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. The AFCMD evaluates contractor performance and manages the administration of contracts executed by Air Force, Army, Navy, Defense Supply Agency, NASA, and other government purchasing agencies when required.

Aerospace Medical Division (AMD), Brooks AFB, Tex.—AMD plans and conducts basic research and exploratory development programs to provide biomedical support for aerospace systems, and to advance aerospace biotechnology. AMD determines the hazards to aircrews in aerospace environments and defines human tolerance to them. Other work is aimed at extending human capabilities and enhancing integration of man in weapon systems. AMD also provides epidemiological consultant and reference laboratory support to Air Force facilities

worldwide, in addition to occupational and environmental health services. AMD units include:

• **Wilford Hall USAF Medical Center,** Lackland AFB, Tex.—This 1,000-bed hospital, a complex of more than sixty separate medical facilities, is one of six in the Air Force and one of the largest in the Department of Defense. In addition to patient care in forty-five clinical specialties, it provides forty-eight percent of all in-house medical education in the Air Force, with training available in twenty-six specialties. The Center's third mission is clinical research. Approximately twenty-five plans for scientific experiments are completed each year. As a worldwide referral center, Wilford Hall offers sophisticated procedures such as open heart surgery, kidney and eye tissue transplants, cancer therapy, and facial reconstruction. Its newborn infants care unit has one of the lowest infant mortality rates in the world. The Air Force's only Computerized Tomographic Scanner, the latest in diagnostic X-ray equipment, is located at Wilford Hall.

• **6570th Aerospace Medical Research Laboratory (AMRL),** Wright-Patterson AFB, Ohio—AMRL specializes in theoretical and experimental medical research and development in the areas of biodynamics, human engineering, combined aerospace stress effects, toxic hazards, and is a center for noise research.

• **USAF School of Aerospace Medicine,** Brooks AFB, Tex.—The school conducts biotechnology research and development, medical evaluation and consultation, medical education, and aeromedical support to the Air Force. The school studies psycho-physiological effects on man in the aerospace environment. Investigations encompass laboratory and clinical studies in the full range of biological, environmental, and dynamic conditions that may affect the health and performance of Air Force personnel. It also provides medical evaluations for flying personnel. Consultation service is available to other military services and allied nations. The school also provides worldwide epidemiological consultation service and training in various aspects of aerospace medicine.

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 at Air Force installations. Environmental Health Laboratories at McClellan AFB, Calif., and Kelly AFB, Tex., and the Air Force Radiological Health Laboratory at Wright-Patterson AFB, Ohio, are to be consolidated at Brooks AFB during 1978.

Civil and Environmental Engineering Development Office (CEEDO), Tyndall AFB, Fla.—As the Air Force focal point and lead agency for environmental quality, CEEDO improves the technology and capabilities of Air Force civil and environmental engineering. CEEDO functions as an AFSC laboratory, conducting research, development, test, and evaluation methods and techniques to detect, assess, and control Air Force environmental pollution problems.

CEEDO also conducts civil engineering research to improve air base survivability, aircraft contingency launch and recovery surfaces, aircraft and tactical shelters, corrosion control technology, and air base equipment and facilities including aircraft crash fire/rescue equipment.

CEEDO is organizationally assigned to the Armament and Development Test Center, Eglin AFB, Fla.

Product Organizations

Aeronautical Systems Division (ASD), Wright-Patterson AFB, Ohio—Management control point for the development and acquisition of aeronautical systems, ASD has more than 7,000 officers, airmen, and civilians working with AFSC laboratory scientists and engineers.

Typical of the wide range of systems under ASD management are the Air Force air- and ground-launched missile program, the F-15 advanced tactical fighter, the F-16 air combat fighter, the A-10 close support aircraft, remotely piloted vehicles (RPVs), and the Maverick missile.

ASD's many other efforts include developing and acquiring training simulators, reconnaissance/strike and electronic warfare systems, air-to-air and air-to-surface missiles, and airlift and tanker aircraft.

Electronic Systems Division (ESD), Hanscom AFB, Mass.—ESD is responsible for development, acquisition, and delivery of electronic systems and equipment for the command control and communications functions of aerospace forces. These systems take many forms such as a joint US-Canada network of combined civilian-military radar sites that simultaneously controls civil air traffic and ensures air sovereignty; a major updating of the underground North American Air Defense Command (NORAD) combat operations center; long-range radars on both the East and West Coasts to warn of missile and aircraft attack; satellite communications terminals for ground, mobile, and aircraft use; and a new airborne radar-and-communications post that can give the Air Force an instant air defense and tactical control system anywhere in the world.

Space and Missile Systems Organization (SAMSO), Los Angeles AFS, Calif.—SAMSO manages the research, design, development, and acquisition of DoD space and ballistic missile systems. From its Los Angeles headquarters and through its worldwide field units, SAMSO is responsible for:

• Developing the spacecraft, launch vehicles, and ground support equipment to maintain and improve military space capabilities.

• Launching, orbiting, commanding, and controlling satellites for DoD and other government agencies.

• Conducting research, development, and test of advanced ballistic missile reentry vehicles.

• Identifying and developing space systems concepts and technological alternatives to satisfy critical military needs five to ten years in the future.

• Operating the Western and Eastern Test Ranges to support space and missile programs for the Air Force, DoD, NASA, and other government agencies.

• Maintaining a worldwide network of satellite tracking stations.

SAMSO activities are managed by the following technical program offices: Defense Meteorological Satellites, Space Navigation Systems, Advanced Space Programs, Space Communications, Intercontinental Ballistic Missiles (including the MX missile), Reentry Systems, and Launch Vehicles (including the Space Shuttle).

SAMSO major field elements include the Air Force Satellite Control Facility and the Space and Missile Test Center described below.

Laboratories

Director of Science & Technology (DL), Andrews AFB, Md.—Located at AFSC headquarters, the Director of Science & Technology provides policy, planning, and technical direction to programs of the command's research and development laboratories, and monitors their operations to ensure that they can respond promptly to the needs of the Air Force.

Laboratories under the Director of Science & Technology and their respective functional areas are:

• **Air Force Weapons Laboratory (AFWL),** Kirtland AFB, N. M.—AFWL conducts research and development programs in weapon effects and safety, laser technology, and nuclear survivability/vulnerability.

• **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. Rocket propulsion technology research is an important part of the laboratory's mission. AFRPL also conducts system support programs for other units and divisions of AFSC, other branches of the armed services, and NASA.

• **Air Force Human Resources Laboratory (AFHRL)**—With headquarters at Brooks AFB, Tex., AFHRL manages and conducts research and exploratory and advanced development programs for personnel management, training, and education. The laboratory provides technical and management assistance to support development planning activities, acquisition, testing, evaluation, and operation of aerospace systems and related equipment. Three of AFHRL's operational divisions are also located at Brooks AFB:

Personnel Research Division, Occupational and Manpower Research Division, and Computational Sciences Division. The other AFHRL divisions are the Advanced Systems Division at Wright-Patterson AFB, Ohio; the Flying Training Division at Williams AFB, Ariz.; and the Technical Training Division at Lowry AFB, Colo.

• **Air Force Geophysics Laboratory (AFGL),** Hanscom AFB, Mass.—AFGL is the center for research and exploratory development involving the earth's atmosphere and the space environment.

• **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 phenomena-oriented research in areas of the basic sciences directly related to Air Force needs. Research is selected for support from the unsolicited proposals of scientists investigating problems of their own choosing, involving 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 and the European Office of Aerospace Research and Development.

• **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 gas dynamics. 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 is the link between 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 United States Air Force requirements.

Wright Aeronautical Laboratories

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. AFWAL was established to combine common laboratory overhead, management, and support functions and to achieve increased systems support through a more functional alignment of the laboratories with the command's product divisions.

• **Air Force Flight Dynamics Laboratory** is concerned with flight-vehicle dynamics, performance, control, launching, alighting, structures, crew stations, environmental control and escape, and aerodynamic decelerators.

• **Air Force Materials Laboratory** handles technology in material sciences, metals and ceramics, nonmetallic materials, manufacturing technology, and material applications.

• **Air Force Avionics Laboratory** conducts research and development programs for reconnaissance, weapon delivery, electronic warfare, electronic technology, and avionics systems.

• **Air Force Aero Propulsion Laboratory** works in the areas of air-breathing engines, fuels and lubricants, and flight vehicle power.

Special Organizational Considerations

Several additional AFSC organizations contribute to the command's technological base and, while not directly responsible to the Director of Science and Technology, they do receive his technical direction. Some are discussed below; others have been discussed in the "Special AFSC Organizations" Section.

• **Rome Air Development Center (RADC),** Griffiss AFB, N. Y.—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, 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.

• **Air Force Armament Laboratory (AFATL),** Eglin AFB, Fla.—AFATL is the principal Air Force laboratory doing research and development of free-fall and guided and nonnuclear munitions and airborne targets and scorers to provide the future technological base for aircraft armaments. These include chemical and fuel-air explosives, energy sources and conversions, electronic and mechanical devices, bombs, dispensers, fuzes, flares, guns, and ammunition. AFATL also provides consulting services in nonnuclear munition safety, aircraft munition compatibility and analysis, and prediction of weapon effects. The Laboratory's activities include technical support and consulting services to other Air Force commands and government agencies, and to joint international cooperation, standardization, and development efforts. AFATL is organizationally assigned to the Armament Development and Test Center at Eglin.

Test Organizations

Space and Missile Test Center (SAMTEC), Vandenberg AFB, Calif.—SAMTEC provides field test management for all DoD-directed ballistic and space programs, and operates the Eastern and Western Test Ranges. SAMTEC conducts launch operations both at Vandenberg and Cape Canaveral AFS, Fla. Range operations incorporate a vast array of data-gathering sites scattered throughout the world, operating in support of SAMSO test programs and those of the Strategic Air Command, NASA, the US Navy, and various government agencies. Geographic elements of SAMTEC include:

• **Western Test Range**—Stretching halfway around the world from the California coast to the Indian Ocean, the Western Test Range is operated in support of both ballistic and space-test operations. The range also is used for aeronautical tests, employing the same sensors and data-gathering equipment used for ballistic and space-booster flights.

• **Eastern Test Range**—This 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, Grand Turk, Antigua and Ascension Islands, and Pretoria, South Africa. Detachment 1, SAMTEC, Patrick AFB, Fla., manages Eastern Test Range operations.

• **Air Force Satellite Control Facility (AFSCF),** Sunnyvale AFS, Calif.—AFSCF conducts on-orbit, real-time tests of DoD satellites. It maintains operating locations worldwide.

• **Air Force Flight Test Center (AFFTC),** Edwards AFB, Calif.—The AFFTC conducts and evaluates tests of manned and unmanned aircraft and aerospace research vehicles to include flying qualities and subsystem performance, reliability, maintainability, and functional capability under climatic extremes. The Center also does development testing of advanced and special-mission parachutes; tests and evaluates remotely piloted vehicle (RPV) midair recovery systems; operates the USAF Test Pilot School; and operates ranges, instrumentation, and the special technical support facilities required to carry out the Center mission. Edwards AFB, Calif., will serve as the landing site for the first series of Space Shuttle orbital flights scheduled for early 1979, and as an alternate landing site for subsequent flights.

Projects currently under evaluation include the B-1 strategic bomber; F-5E/F, F-15, and F-16 fighters; and A-10 close air support aircraft.

Collocated at the AFFTC are NASA's Dryden Flight Research Center, Air Force Rocket Propulsion Laboratory, the US Army Aviation Engineering Flight Activity, and approximately sixty military tenant and civilian contractor agencies.

Armament Development and Test Center (ADTC), Eglin AFB, Fla.—The Center's primary mission is to develop, test, and initially acquire all nonnuclear air armament for the Air Force's tactical and strategic forces. Development activities are conducted in four phases: basic research, exploratory, advanced, and en-

gineering development. In the first two phases, exploratory programs advance air armament-related science and technology; in the third phase, ADTC demonstrates the feasibility of new armament concepts; and in the final phase, the Center performs the engineering development of new armament systems for production.

ADTC is involved in the air armament acquisition process from conceptual planning to initial production of military hardware. Among items developed, tested, and initially acquired by ADTC are air-launched tactical and air-defense missiles, guided weapons, aircraft guns and ammunition, targets, and related armament support equipment. The Center also tests and evaluates electromagnetic warfare, intrusion interdiction, inertial navigation, and other systems. It manages more than 720 square miles of land test ranges and facilities, and more than 44,000 square miles of test area in the Gulf of Mexico.

Through its 6585th Test Group at Holloman AFB, N. M., ADTC operates the 50,000-foot precision rocket sled track and represents the Air Force through the Air Force Deputy at the Army's White Sands Missile Range.

Arnold Engineering Development Center (AEDC), Arnold AFS, Tenn.—AEDC has the most advanced and largest complex of aerospace flight simulation test facilities in the free world. Its 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.

AEDC operates some forty test units in which flight conditions can be simulated from sea level to altitudes of 1,000 miles and from subsonic velocities to more than 20,000 mph. Equipment tested ranges in size from small models to full-scale vehicles with propulsion systems installed and operating.

Some engineering development work for virtually every major US aerospace system has been supported by tests at the Center. In addition, a number of unexpected problems encountered in the operational use of systems have been quickly and economically solved. Tests are conducted for the Air Force, Army, Navy, NASA, and other federal agencies, and their aerospace industry contractors.

GUIDE TO NASA'S RESEARCH CENTERS

The National Aeronautics and Space Administration (NASA) operates a number of research, development, test, and evaluation (RDT&E) facilities that frequently participate in or coordinate their work with USAF R&D programs.

Following is a descriptive listing of key NASA installations:

Ames Research Center, Moffett Field, Calif.—Ames conducts such laboratory and flight research as atmospheric reentry, fundamental physics, solar physics and planetary environments, materials, chemistry, life sciences, guidance and control, aircraft supersonic flight, aircraft operational problems, and V/STOL. It manages such spaceflight programs as Pioneer. Named for Dr. Joseph S. Ames (1864–1943), Chairman of the National Advisory Committee for Aeronautics (NACA) from 1927 to 1939.

Hugh L. Dryden Flight Research Center, Edwards AFB, Calif.—Dryden Flight Research Center is concerned with manned flight within and outside the atmosphere, including low-speed, supersonic, hypersonic, and reentry flight, and aircraft operations. Examples of its studies are lifting bodies (wingless vehicles whose bodies provide lift in the atmosphere) and integration between man and technological systems and vehicles. The Approach and Landing Tests of the Space Shuttle Orbiter were held here. Dryden will serve as a Shuttle landing site for the first four orbital flights and as a contingency landing site afterwards. Named for Dr. Hugh L. Dryden (1898–1965), Director of NACA from 1949–58, and then Deputy Administrator of the new NASA.

Goddard Space Flight Center, Greenbelt, Md.—Goddard Space Flight Center is responsible for a broad variety of unmanned earth-orbiting satellites and sounding-rocket projects. Among its projects are Orbiting Observatories, Explorers, Nimbus, Applications Technology Satellites, and Landsat. Goddard is also the nerve center for the worldwide tracking and communications network for both manned and unmanned satellites, home of the Space Science Data Center, and manager of the Delta launch vehicle. Named for Dr. Robert H. Goddard (1882–1945), "father" of rocketry and the space age.

Jet Propulsion Laboratory, Pasadena, Calif.—Jet Propulsion Laboratory is operated for NASA under contract by the California Institute of Technology. The laboratory's primary role is investigation of the planets. It also designs and operates the Deep Space Network, which tracks, communicates with, and commands spacecraft on lunar, interplanetary, and planetary missions.

John F. Kennedy Space Center, Fla.—The Center makes preflight tests and prepares and launches manned and unmanned space vehicles for NASA. Launches from the Pacific Coast are conducted by the KSC Western Operations Division at Lompoc, Calif. The two principal Shuttle launching and landing sites are at Kennedy and at Vandenberg AFB in California.

Langley Research Center, Hampton, Va.—Oldest of the NASA centers, Langley provides technology for manned and unmanned exploration of space and for improvement and extension of performance, utility, and safety of aircraft. Langley devotes more than half its efforts to aeronautics. The Center was charged with overall project management for Viking. It manages the Scout launch vehicle program. Named for Samuel P. Langley (1834–1906), astronomer and aerodynamicist who pioneered in the theory and construction of heavier-than-air craft.

George C. Marshall Space Flight Center, Huntsville, Ala.—Marshall serves as one of NASA's primary Centers for the design and development of space transportation systems, orbital systems, scientific payloads, and other means for space exploration. The Center has major responsibilities for Space Shuttle activities, the Spacelab program, such scientific projects as the High Energy Astronomy Observatory, and programs in support of the Energy Research and Development Administration. It manages the Michoud Assembly Facility. Named for the late General of the Army George C. Marshall, recipient of the Nobel Peace Prize, who died in 1959.

Wallops Flight Center, Wallops Island, Va.—Wallops Station is one of the oldest and busiest ranges in the world. Some 300 experiments are sent aloft each year on vehicles that vary in size from small sounding rockets to the four-stage Scout with orbital capability. A sizable effort is devoted to aeronautical research and development.

Lewis Research Center, Cleveland, Ohio—Aircraft and rocket propulsion and energy systems for space and on earth are among the major programs of Lewis. These take the Center into such studies as metallurgy, fuels and lubricants, magnetohydrodynamics, and ion propulsion. Lewis has technical management of the Atlas-Centaur and Titan-Centaur launch vehicles and Agena rocket stage. Named for Dr. George W. Lewis (1882–1948), NACA Director of Aeronautical Research from 1924–47.

Lyndon B. Johnson Space Center, Houston, Tex.—The Center designs, tests, and develops manned spacecraft and selects and trains astronauts. It directs the Space Shuttle program. Mission Control for manned spaceflight is located at the Center. Named for the late President Johnson, during whose Administration the US manned space program gained its greatest impetus.

National Space Technology Laboratories, Bay St. Louis, Miss.—This complex conducts developmental tests of Space Shuttle main engines and environmental and related research. ■

The Bulletin Board

By James A. McDonnell, Jr., MILITARY RELATIONS EDITOR

Vets' Preference Attacked, Defended

Defense Secretary Harold Brown and other Administration leaders have urged Congress to torpedo the government's long-standing policy of giving nondisabled military veterans preference in filling federal jobs. The request came during recent congressional hearings on the President's sweeping Civil Service reform proposals.

The package's stated aim is to improve efficiency in federal agencies by making it easier to hire and fire people, and by instituting other reforms. That part has been getting mixed reviews, but the section on tampering with the veterans' preference rules has drawn almost unanimous fire from veterans organizations and many lawmakers. AFA also strongly opposes weakening vets' preference policies. The AFA Policy Paper on Manpower Issues, adopted unanimously by the delegates to the Association's National Convention on September 20, 1977, states: "We support . . . the current system of Veterans' Preference for veterans employed in—or seeking employment with—the Federal Civil Service."

Secretary Brown said existing preference rules work to reduce federal hiring of women and minorities "at the very time the government is demanding equal opportunity hiring and promotion policies in private industry."

The Administration's plan would end the lifetime preference for all vets as a group after October 1980. However, a time limit of ten years following separation from service would be established.

For retired captains and below, the time limit would be three years after leaving service; those retiring as major or above would receive no hiring preference. The Administration's rationale: "Retirees, especially senior officers, have gained valuable civilian-related job experience and need little, if any, additional special preference in employment consideration." More than 150,000 military retirees currently work for Uncle Sam.

Disabled veterans and those retired for disability would be exempt from the proposed changes. And a separate recommendation would give many of them noncompetitive appointments for jobs for which they meet basic requirements. To improve employment among Vietnam-era veterans, the package would also increase from GS-5 to GS-7 the job levels they could qualify for without going through the normal competition.

Bills benefiting veterans with service-connected total disability continue to predominate in Congress. Rep. David E. Bonior (D-Mich.) is behind one requiring the government to pay any special assessments levied against the home of such a vet or his surviving spouse. Rep. Jamie L. Whitten (D-Miss.) has introduced a measure automatically giving survivors of totally disabled veterans dependency-indemnity compensation; the veteran must have been 100 percent disabled for at least a year.

And mustering-out pay bills are back. Rep. Jack Kemp (R-N. Y.) has a wide-open one in the hopper. It provides MOP of $250 (CONUS service only) and $350 for anyone who served at least sixty days during the Vietnam era, was a captain or lower, and received any kind of a discharge except dishonorable. And there's something in the Kemp bill for those who served less than sixty days: $100.

Pay Report: "Lead Balloon"

The report of the President's Commission on Military Compensation flew in Air Force circles like a lead balloon, drawing scathing remarks from officials both high and low. Only for grandfathering-in the present retirement system for most active-duty people were any good marks given.

The only prominent figure talking for publication was one of the commissioners, Lt. Gen. Benjamin O. Davis, USAF (Ret.). In his minority report he blistered the majority for, among other things, seeking to dismantle the retirement system and offset pension cuts by laying on varying pay scales by grade, service, and even by skills. This "flexibility" in compensation to which the Commission devoted so much of its report would lead to confusing, morale-shattering pay scales, critics say.

Some see the report's provisions, if eventually implemented, driving good people out of uniform and crippling new enlistments. Others called the report a "disaster," "strictly a cost-cutting exercise," and "a disservice to the country." Of the numerous special reports on military pay over the years, this one easily drew the lowest marks, veteran observers feel.

The next step is up to the Administration.

In other military compensation areas:

- The services, to help junior enlisted families with noncommand-sponsored dependents combat soaring living costs in Germany, have begun paying them the "with dependent" housing and cost-of-living allowances. Previously they got the lower "without dependent" rate. The increase varies by location; at Ramstein AB, Germany, it amounts to about $30 a month. The Air Force has 33,560 members stationed in Germany.

  The Army also said it is letting dependents of all enlisteds and lieutenants in Germany eat in Army dining halls. USAF officials said local commanders in Germany have authority to do this, but there was no word on how many were doing it. Army has 198,000 members stationed in Germany.

- While some lawmakers appear ready to go along with the Pentagon's request for full overseas travel-transportation allowances for junior enlisted families, others don't. Sen. Thomas F. Eagleton (D-Mo.) is one; he says that the allowances

AFA Believes . . .

Equal Opportunity for USAF Band Members

AFA's Policy Paper on Defense Manpower Issues, adopted unanimously by our National Convention delegates, calls for—among other things—"repeal of the restriction that prohibits enlisted band members from the same off-duty employment opportunities available to all other members of the armed forces."

In a subsequent letter to Rep. Richard C. White (D-Tex.), Chairman of the Personnel Subcommittee, House Committee on Armed Services, who held hearings on this issue, AFA President Gerald V. Hasler said: "It is inconceivable to us in this day and age that such discrimination continues to exist and it certainly would be, we believe, a deterrent to a desire for enlistment in the all-volunteer force on the part of qualified musicians. . . . We appreciate your concern [in this matter]."

The AFA position, which first surfaced in a resolution from the Scott Memorial Chapter in 1975, has been championed strongly by AFA's Enlisted Council. The numbers involved are not large—about a thousand bands people are authorized in the Air Force—but the principle is a big one. AFA believes the time has come to correct this outmoded restriction.

We have received a number of questions about the specifics of the restrictions bands people are under. The following editorial, from the March 14 edition of the Washington *Post*, reprinted here by permission, explains these restrictions as well as anything we've seen. We're glad to have the *Post* in our corner.

The Washington Post

Moonlighting Sonatas

UNDER PRESENT federal law, enlisted members of the armed forces are not permitted and may not be ordered "to leave their posts to engage in civilian pursuits which interfere with the customary regular employment of civilians." Nevertheless, thousands of servicemen and servicewomen do engage in a little moonlighting here and there, and nobody seems to mind. But three other laws on the books specifically prohibit members of military bands from moonlighting, and efforts by the Pentagon to put those military musicians on an equal footing with their nonmusical colleagues in uniform have produced a terrible, atonal racket.

The quarrel centers on legislation (which has been approved by the House Armed Services Committee) to repeal all four laws. The chief combatants, as you might have expected, are the military musicians themselves, on the one hand, and, on the other, the local branch of the American Federation of Musicians. The union has argued that it is unfair to permit members of the military bands that are based in Washington to take money for private engagements after hours because, for one thing, they are getting federal benefits not available to plain old private working musicians and, for another, there are so many such military musicians in the capital area that the competition would be overwhelming and unfair.

In response, the military musicians point out that most of the members of the local chapter of the union in fact are moonlighting as musicians themselves, being employed at other full-time jobs, some with the federal government. They note that much of the moonlighting music at supper clubs and so forth is non-union at the moment, and that they would be willing to join the union if the local would let them.

The fact is that the Pentagon has been trying for several years to get all four laws wiped off the books, arguing—quite rightly, in our view—that the laws discriminate unfairly among different kinds of military personnel. The general restriction against moonlighting, for instance, applies to enlisted personnel, but not to officers. And the specific restrictions on the leisure-time activities of musicians apply to members, including officers, of all military bands—except those of the Coast Guard and the U.S. Naval Academy.

It is true, as five dissenting members of the Armed Services Committee pointed out in a minority statement, that the musicians' union was not heard in testimony on the legislation. And that seems to us a most unfortunate, not to say pointless, lapse on the part of the committee, because on substance, as distinct from procedure, we think the pro-repeal forces have the better of the argument. For the anomalies of the law governing military moonlighting are an accident of history and should not remain on the statute books. The same rules should apply to all military personnel, or at least to all those based in the same area. We can dream up a situation, such as another Great Depression, in which the government might believe it necessary to restrict the moonlighting activities of *all* its personnel in some localities to avoid interfering with the civilian labor force. But given the role of moonlighting in today's economy, the nature of the moonlighters (who count among their number employees from almost every government agency) and the need to keep restrictions to a minimum if you are to recruit a strong all-volunteer armed force, the Pentagon's proposal to wipe the existing legislation from the books makes sense.

The Bulletin Board

are costly and that denying them provides an incentive for working hard and getting promoted. AFA fully backs the increase, believing it to be a necessary complement to the all-volunteer force.

• The General Accounting Office, an arm of Congress, doesn't give up easily. It's coming up with more antimilitary personnel reports. One calls the benefits erosion issue a "myth," declaring instead that service people are "considerably better off today than in 1972." Another new GAO report recommends that Congress maintain twenty-year retirement only for combat personnel; all others would have to serve longer to qualify.

Spouse Bill Introduced

Rep. Pat Schroeder (D-Colo.) has introduced her controversial bill entitling former spouses married at least ten years to service members to (1) a pro rata share of retirement pay, and (2) a share of the survivor benefits after the member's death. The measure is anathema to the many military members who would be subject to its provisions. While insiders give it no chance of passage this year, opponents fear it may slowly gather steam and prevail within the next few years. Rep. John Burton (D-Calif.) is sponsoring a related bill that would give former spouses military medical and dental benefits.

Smoking Lamps Off, On

The Air Force has banned smoking in conference rooms, classrooms, auditoriums, elevators, ground-shuttle vehicles, commissaries, and the main sales areas of base exchanges. But the service, in new AFR 30-27, its first policy directive on smoking at USAF facilities, has okayed the practice i lobbies, restrooms, corridors, eatin facilities and hospital staff lounges offices, and other specially desig nated areas. Where feasible, non smoking areas will be set up in eating facilities.

Local commanders can, in many instances such as hospital patient rooms and morale-welfare activities, decide what the rules will be. Hq. USAF officials urged personnel to play it cool and not overreact when applying the new guidelines. The new regulation should be arriving at bases and units about now.

Other than a directive that several years ago suddenly banned smoking in Air Force hospitals—it was soon lifted—no Air Force-wide smoking reg has existed. AFR 30-27 implements, with modifications, a Defense Department instruction issued last fall. "Education programs to discourage smoking will be in-

Ed Gates . . . Speaking of People

Making USAF's Health Record Even Better

Let's suppose you are a thirty-five-year-old USAF member. Your blood pressure and cholesterol level are excellent. You don't smoke. You're not diabetic, and your recent electrocardiograph reading was on the money. Your chances of coming down with a heart attack during the next ten years are a mere three out of 1,000.

You are what Air Force physicians, in checking out the "risk factors" associated with cardiovascular ailments, call their "best case." They'd like every USAF member to be a best case—to curb suffering, improve mission effectiveness, and reduce the $50 million outlay that heart and blood vessel problems—directly or indirectly—cost the Air Force each year.

But some risk factors can't be reduced; age is a big one. Physicians in the Office of Air Force Surgeon General Lt. Gen. George E. Schafer report, for example, that the "best case" cited above, when he reaches forty-five, has about fourteen chances out of 1,000 of suffering a heart attack the following decade. Still, that's an excellent showing for that age.

But when various risk factors begin to increase, the likelihood of heart ailments increases sharply. The chart below tells the story. Take the thirty-five-year-old flyer—a more typical case. His blood pressure and cholesterol have risen. He smokes, but the other two factors remain normal. His chances of an attack are put at 115 out of 1,000. By the time he reaches forty-five, under the same conditions, the figure becomes 204, or a very worrisome twenty percent.

The odds for the "worst case" are downright frightening. As the chart shows, all the major risk factors are now present; by age forty-five he has better than a fifty percent chance of suffering a heart attack! And there are a number of such "worst cases" in uniform, according to Lt. Col. Cris Bisgard, Chief of Preventive Medicine, Aerospace Medicine Division, in the Surgeon General's Office. Many don't realize the danger they're in.

Dr. Bisgard, a graduate of Northwestern University medical school, noted that cardiovascular ailments are the second leading cause of Air Force deaths (after accidents) and a major contributor to other health problems. There's been particular concern throughout the Air Force hierarchy over the numerous high-ranking officers sidelined, or killed, by heart attacks in recent years.

So it's not surprising that General Schafer and his associates, backed foursquare by Chief of Staff Gen. David C. Jones and other senior officials, are tackling the problem. They're doing it via a recently launched program called HEART, for Health Evaluation and Risk Tabulation. They say it's one of the first such wide-scale projects ever conducted in military or civilian medical circles.

HEART is under development at the USAF School of Aerospace Medicine (SAM), Brooks AFB, Tex. It aims to eventually identify all Air Force members in the "high-risk" category and, by reducing or eliminating contributing causes, modify the risk.

Beside the factors cited above, obesity, stress hormones, use of alcohol and coffee, family history, physical inactivity, and others may also play a role. Just how much of a role is being studied by the experts at SAM. The schedule calls for them to complete the basic planning and award contracts (for materials, health specialists, etc.) this year. By 1980, teams will move into selected USAF bases, probably six, for a lengthy test of HEART. All active-duty members at the test sites will participate. Each will be screened and given lab tests. From the data gathered, risk factors will be calculated. Those who find themselves above a yet-to-be des-

corporated into base health education," AFR 30-27 also states. The military smoking directives, however, are less stringent than the one in operation at the Department of Health, Education and Welfare, officials acknowledged.

USAF Takes Problems to Hill

The Air Force, in connection with the FY '79 budget process, has taken many of its personnel problems to Congress. The growing bind on young scientific and engineering-type officers is one example.

Competition for S&E graduates has grown fierce. USAF personnel executives testified recently that civilian engineering firms are starting them off at $16,000 a year, compared to the $12,400 second lieutenants average. And civilian engineering requirements are expected to rise. So young engineers are losing interest in the military.

This is reflected in sagging S&E production from AFROTC. It means that several hundred fewer S&E types than programmed will enter service this year and next. To help plug the gap, Air Force is pressing Congress to finance 1,500 AFROTC scholarships that, though authorized, are not currently funded. They would go primarily to S&E cadets. USAF calls the scholarship funding drive a top-priority item.

Officer Training School, meanwhile, is headed for tremendous expansion, partly to help the S&E manning campaign. Last year, OTS produced only 690 new officers altogether, but under the expansion officials are projecting for FY '79 nearly 3,000 graduates. And almost 1,000 of them would be S&E types. Recruiters are scouring the campuses, but in view of the competition shortfalls wouldn't be surprising.

Air Force personnel officials, including DCS/Personnel Lt. Gen. Bennie Davis and Assistant Secretary (Manpower, Reserve Affairs and Logistics) Antonia H. Chayes, are also pushing Congress for funds to continue and expand the Airman Education Commission Program, the main route to gold bars for bright young airmen. All 200 enlisted people they plan to enroll in AECP next year, plus the 200 carryovers from this year, will be heading for duty exclusively in S&E-type jobs.

General Davis, who is trying to raise the FY '80 AECP entry quota to 300, notes that ninety-five percent of the AECP grads remain in uniform for full careers. That's far ahead of the other sources. The need to increase S&E officer production "is urgent," he told AIR FORCE Magazine.

Recruiters are also beating the bushes for physicians. Officials told Congress of doctor shortfalls all along the line and of the staggering sums required to hire civilian consultants to ease the strain. Part-time radiologists alone are costing USAF $3.5 million this year.

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ignated threshold can then enter a "risk-education" program and stay in the program until the risk factors drop to threshold level.

Thus, a person with elevated blood cholesterol and fats, who is too heavy and who smokes, will be taught how all that relates to heart disease and what to do about it. "There will be a general education of the patient and his family," officials said. Wives, in planning meals and running the household, will play an important role in the general treatment. They will be expected to impress on the military husband and their children the importance of following doctors' orders.

Members who fall below the threshold, while generally less susceptible to heart ailments, will be tested in subsequent years but probably not every year. Once having been exposed to the HEART program, the expectation is that they will embrace a prevention plan and stick with it.

The entire HEART effort is basically one of disease prevention, Colonel Bisgard said. "We want to make all Air Force persons more health-conscious," he added. If all goes as planned, the detailed test and evaluation of HEART at the six bases will last into early 1981. Implementation Air Force-wide could begin about October 1981.

Some noteworthy spinoff is possible. Officials noted that the periodic physical exams military people must take may prove unnecessary for those who, under HEART-type testing, fall well below the risk factor threshold. "We may be giving many physicals unnecessarily," Colonel Bisgard said.

HEART, in essence, is a key phase of a new overall preventive-medicine project the Air Force recently launched. It is labeled HEP, for Health Education Program. It aims to help the entire USAF community, dependents and retirees included, become more knowledgeable about the management of their own health care—and do something about it.

Rising medical costs and physician and other health-care personnel shortages sparked HEP. A major thrust is to reduce the number of people not really needing a doctor's care—medics call them the "worried well"—who clog USAF hospitals and clinics.

Under HEP, families at all bases will be provided information on a variety of health matters, ailments, nutrition, etc. This includes advice on coping with children's health problems, care of eyes and skin, preventing hearing deficiencies, how to deal with a mastectomy (breast removal), respiratory diseases, and much more.

Now gaining momentum, HEP is managed from a central office at the USAF School of Health Care Sciences, Sheppard AFB, Tex. It works up health material on a broad basis which, through local health education coordinators at each Air Force hospital and clinic, is targeted at all Air Force members. The hospital-clinic coordinators, now all in place, include nurses, administrators, even USAF civilians, as well as physicians. Colonel Bisgard said "we found people who are competent, enthusiastic about preventive health care, and are anxious to spread the word." Among other things, the coordinators distribute booklets, secure tapes and films for local showing, steer base people to worthy off-base health projects like Alcoholics Anonymous, and conceive special programs. Good ideas developed locally are passed along to the Sheppard office for crossfeed to other bases.

General Schafer, meanwhile, notes that although USAF's health record is the best in the military services, "we can and intend to do better." He urged the entire Air Force community to get solidly behind HEART and HEP. ■

Risk Factor Analyses

	BP	CHOL	Smoking	EKG	Diabetes	New Events/1,000 35 Yr	New Events/1,000 45 Yr
Best Case	110	140	No	Normal	No	3	14
Qualified for Flying	135	350	Yes	Normal	No	115	204
Worst Case	190	350	Yes	Abnormal	Yes	345	510

The Bulletin Board

Besides DOPMA, junior airmen travel benefits, and AFROTC scholarships (all of which AFA supports), the Air Force is also pressing Congress for blue-collar wage reform and broad authority to contract out many base jobs. Most of USAF's 81,000 blue-collar employees are actually paid eight to twelve percent more than comparable workers in local private industry, and the services want these scaled back in order to free mountains of dollars for vital projects. USAF alone could save $601 million over the next five years if the wage reform bill is passed, Secretary Chayes said. Government-wide, the savings figure is put at $2.5 billion.

Congress last year curbed the services' plans for large-scale contracting out, but the services want relief. Air Force has a long list of jobs—everything from housing maintenance to training support—it wants to assign to local contractors at fifty Stateside bases. Nearly 6,000 civilian and military spaces would be eliminated.

Housing for Attachés

The Defense Intelligence Agency is asking Congress for permission and funds to build thirty-two family housing units in eight foreign countries. They are for US military attachés. The average cost would be about $104,000. Two units sought in Brazil would cost $322,000, while the two for Kuala Lumpur, Malaysia, are estimated at $170,000. Other units are programmed for Cairo, Helsinki, Oslo, Manila, Stockholm, and Kinshasa, Zaire. The requests are contained in Defense's FY '79 military construction program, which —once again—contains no new USAF base family housing. New airmen dorms at just two bases, Nellis AFB, Nev., and Lackland AFB, Tex., are included. Existing dorms at fifteen Air Force bases, all Stateside, would be improved.

Engineer Authors Honored

Two USAF civil engineers, Lt. Cols. Charles Medlock, Jr., and Orlando F. Smith, are the latest winners of the Maj. Gen. A. M. Minton Best Author Award. It is given annually by AFA to the author of the best article published in the *Air Force Engineering and Services Quarterly*. However, the 1977 competition ended in a tie between Colonels Medlock and Smith, the former for his article, "San Antonio Real Property Maintenance Agency" and the latter for his article, "Our Ability to Fly and Fight: A Matter of Readiness." So both were named Best Author at a recent ceremony presided over by AFA Executive Director James H. Straubel (*see photo*). General Minton, who wanted his officers to articulate their achievements, was the seventh head of Air Force Civil Engineering.

VA Sharpening Image

The chief of the Veterans Administration, Max Cleland, has launched "Operation Better Letters," the second phase of his campaign to improve VA's contacts with its veteran clientele. Earlier, under phase one of the drive dubbed "May I Help You?", VA worked to improve face-to-face and telephone dealings between the agency's 200,000 employees and veterans, beneficiaries,

Senior Staff Changes

RETIREMENTS: M/G Herbert J. **Gavin;** M/G Hilding L. **Jacobson;** M/G Frank J. **Simokaitis;** M/G Eugene B. **Sterling.**

CHANGES: Col. (B/G selectee) Spence M. Armstrong, from Asst. DCS/Ops., Hq. ATC, Randolph AFB, Tex., to Dir., Planning, Programming, & Analysis, DCS/R&D, Hq. USAF, Washington, D. C. . . . **B/G (M/G selectee) Robert W. Bazley,** from Asst. for Readiness, Hq. USAFE, Ramstein AB, Germany, to Dep. Insp. Gen. for Insp. & Safety, and Cmdr., AFISC, Norton AFB, Calif., replacing M/G Richard E. Merkling . . . **B/G George M. Browning, Jr.,** from Insp. Gen., Hq. USAFE, Ramstein AB, Germany, to Asst. DCS/Ops. and Intel. for Ops., Hq. USAFE, Ramstein AB, Germany . . . **B/G John T. Buck,** from Dep. for Con. & Comm. Sys., ESD, AFSC, Hanscom AFB, Mass., to Sp. Project Off., Static War Hq., SHAPE, Casteau, Belgium, replacing M/G Charles L. Wilson . . . **B/G John T. Chain, Jr.,** from Cmdr., 1st TFW, TAC, Langley AFB, Va., to Mil. Asst. to the AF Sec., OSAF, Washington, D. C., replacing B/G William W. Hoover . . . **B/G Philip J. Conley, Jr.,** from C/S, Hq. AFSC, Andrews AFB, Md., to Cmdr., AF Flight Test Ctr., Edwards AFB, Calif., replacing M/G Thomas P. Stafford.

Col. (B/G selectee) Kenneth R. Fleenor, from Cmdr., 12th FTW, ATC, Randolph AFB, Tex., to Asst. DCS/Ops., Hq. ATC, Randolph AFB, Tex., replacing Col. (B/G selectee) Spence M. Armstrong . . . **Col. (B/G selectee) Harry A. Goodall,** from Mil. Asst. to Under Sec. of AF, SAFUS, Washington, D. C., to Asst. Dep. Dir. for International Negotiations, J-5, JCS, Washington, D. C. . . . **B/G William W. Hoover,** from Mil. Asst. to the AF Sec., OSAF, Washington, D. C., to Cmdr., Lowry TTC, ATC, Lowry AFB, Colo., replacing B/G (M/G selectee) Andrew Pringle, Jr. . . . **B/G Robert W. Kennedy,** from Dep. for Acq. Pgms., AFALD, AFLC, Wright-Patterson AFB, Ohio, to DCS/Data Sys., Hq. AFLC, Wright-Patterson AFB, Ohio . . . **B/G George J. Kertesz,** from Dir. of Insp., Hq. AFISC, Norton AFB, Calif., to Ch., Air Sec., MAAG, Teheran, Iran.

B/G Donald L. Lamberson, from Dep., Adv. Radiation Tech., AF Wpns. Lab., AFSC, Kirtland AFB, N. M., to Dep. for Acq. & Dev., ADTC, AFSC, Eglin AFB, Fla. . . . **Col. (B/G selectee) Gerald D. Larson,** from Cmdr., 20th TFW, USAFE, RAF Upper Heyford, England, to Insp. Gen., Hq. USAFE, Ramstein AB, Germany, replacing B/G George M. Browning, Jr. . . . **M/G Richard E. Merkling,** from Dep. Insp. Gen. for Insp. & Safety, and Cmdr., AFISC, Norton AFB, Calif., to Cmdr., Sacramento ALC, AFLC, McClellan AFB, Calif., replacing retiring M/G Herbert J. Gavin . . . **B/G (M/G selectee) Andrew Pringle, Jr.,** from Cmdr., Lowry TTC, ATC, Lowry AFB, Colo., to Cmdr., 3d Air Div., SAC, Andersen AFB, Guam, replacing retiring

Maj. Gen. Robert C. Thompson, Director of Engineering and Services, Hq. USAF (far left), congratulates Lt. Col. Orlando F. Smith, while James H. Straubel (far right), AFA Executive Director, congratulates Lt. Col. Charles Medlock, Jr., cowinners of this year's A. M. Minton Best Author Award.

M/G Hilding L. Jacobson, Jr. . . . **M/G (L/G selectee) Thomas P. Stafford,** from Cmdr., AF Flight Test Ctr., Edwards AFB, Calif., to DCS/R&D, Hq. USAF, Washington, D. C., replacing L/G (Gen. selectee) Alton D. Slay.

Col. (B/G selectee) William E. Thurman, from Dep. for Engineering, ASD, AFSC, Wright-Patterson AFB, Ohio, to Dep. for Con. & Comm. Sys., ESD, AFSC, Hanscom AFB, Mass., replacing B/G John T. Buck . . . **B/G William R. Usher,** from Asst. DCS/Ops. & Intel. (IN), Hq. USAFE, Ramstein AB, Germany, to Asst. for Readiness, Hq. USAFE, Ramstein AB, Germany, replacing B/G (M/G selectee) Robert W. Bazley . . . **B/G Alonzo J. Walter, Jr.,** from Dep. Dir., J-3, US European Comd., Vaihingen, Germany, to Dep. Dir., NMCC (#1), J-3, JCS, Washington, D. C. . . . **M/G Charles L. Wilson,** from Sp. Project Off., Static War Hq., SHAPE, Casteau, Belgium, to V/C, AFALD, AFLC, Wright-Patterson AFB, Ohio . . . **Col. (B/G selectee) Clinton H. Winne, Jr.,** from Cmdr., 28th BMW, SAC, Ellsworth AFB, S. D., to Asst. DCS/Ops. & Intel (IN), Hq. USAFE, Ramstein AB, Germany, replacing B/G William R. Usher . . . **B/G Thomas E. Wolters,** from Comdt., SOS, AU, Maxwell AFB, Ala., to Dir. of Insp., Hq. AFISC, Norton AFB, Calif., replacing B/G George K. Kertesz.

SENIOR ENLISTED ADVISOR CHANGES: CMSgt. George L. Proud, from Directorate of Soviet Affairs, AF Intel. Service, Washington, D. C., to Senior Enlisted Advisor, AF Intel. Service, Washington, D. C., replacing CMSgt. Wayne E. Ford. ■

The Bulletin Board

and the public. *(See "AFA Believes," January '78.)*

The new thrust aims to make VA letters more responsive, sensitive, and understandable. He called on his 350 top agency heads nationwide to get behind the effort.

Mr. Cleland, meanwhile, recently presented Rep. Olin E. Teague (D-Tex.) the agency's Exceptional Service Award for his "extraordinary contributions to America's veterans." No person in US history, Cleland declared, "has had such a salutary effect on the lives of veterans and their families" as has Congressman Teague. Some Vietnam War critics, however, contend Teague hasn't done enough. Representative Teague, who came to Congress in 1946 and has chaired the House Veterans Committee the past eighteen years, will retire next January. The *Congressional Quarterly* reports that he is one of the retiring senior lawmakers who will receive Congress' maximum pension of $46,000 annually.

Cleland also recently presented VA's Commendation Plaque to the United Service Organization (USO) in recognition of its increasing involvement with VA hospitals. Numerous AFA units have participated in the hospital support program. AFA's Executive Director James H. Straubel is a member of USO's board of directors.

Women's Job Mix Too Small

USAF has nearly 48,000 women in uniform and is pointing toward 81,000 by 1983. As part of that drive, officials want to assign qualified women throughout the many job areas in roughly the same proportion as men. But as some authorities feared, not enough women are available for "nontraditional" posts. Assistant Secretary (Manpower, Reserve Affairs and Logistics) Antonia H. Chayes told Congress recently that the "available pool of women with the mix of aptitudes, skills, and interests necessary for a large share of Air Force jobs appears to be too small."

This means larger-than-planned assignments of women to administrative, clerical, and other "traditional" women's fields.

Also, in reviewing USAF women's programs, Chayes deplored the fact that "too few" women and minority members are in higher officer grades. But improvement steps are under way. She says that "counseling techniques have been adopted to instruct . . . [them] on how and where to strengthen their records to insure competitiveness. Promotion boards have also been sensitized to this issue." A high Air Force source denied, however, that this means women and minority officers will receive special advancement consideration from future boards.

Pentagon authorities agree that the best way to handle the women-in-combat issue is to let the Defense and Service Secretaries decide policy. Accordingly, the Pentagon has asked Congress to repeal the current law that prohibits women from serving on combat aircraft and ships. The lawmakers appear in no hurry to act, however.

In related matters:

- Brig. Gen. Chris C. Mann, one of USAF's three women generals (all one-stars) will retire July 1. She heads the Human Resources Program at Hq. USAF. No women are on USAF star selection lists. The other two women generals are Brig. Gens. Norma E. Brown, personnel chief for Logistics Command, and Claire M. Garrecht, who heads the Air Force Nurse Corps.
- The service has opened, on a test basis, a handful of jobs for female airmen as KC-135 refueling operators and C-141 flight engineers. Training could begin in July. Women pilots are already assigned to both aircraft.
- Female officers have until July 1 to apply for the next round of pilot training. A board will meet that month, and selectees will begin T-41 training at Hondo, Tex., in September.
- Secretary Chayes's top aide, Lt. Col. Shirley Bach, in June will become deputy commandant of Defense's Race Relations Institute at Patrick AFB, Fla. She's regarded as a fast burner.

Baggers—Final Chapter

Another Air Force effort to retain the present Stateside commissary bagger setup has apparently fizzled. USAF Commissary Service chief Maj. Gen. Daniel L. Burkett led the effort at a mid-March congressional hearing on bills designed to exempt baggers from coming under the Fair Labor Standards Act (FLSA) starting August 1 *(see last month's "Bulletin Board").*

General Burkett said the 10,000 Stateside commissary baggers who would be affected are primarily military wives or children, off-duty servicemen, and retired military. For many, it is their only source of supplemental income, he said. Anyway, the present system has been working well.

Without exemption from the FLSA, General Burkett said, many baggers will lose their jobs. Others will lose income because most baggers earn more in tips than the minimum wage rates they will receive under the FLSA. And customers will have to pay a "user's fee."

Chairman John H. Dent (D-Pa.) of the House Education and Labor subcommittee brushed all the arguments aside. He claimed patrons will continue to tip even though the minimum wage is paid. Representatives of the Civil Service Commission and the Labor Department supported the Dent position. That seems to settle the issue.

Short Bursts

Looking for an exciting new job? Some **aerial gunner training slots** have just opened, for qualified E-4s through E-7s. This is B-52 duty. Lures include what the Air Force calls "assignment stability" and, depending on grade, an extra $65 to $105 per month in flight pay. Interested airmen can talk it over with SMSgt. John W. Timlake, a longtime gunner now the "resource manager" for the openings. He's at the Military Personnel Center (AUTOVON 487-4943).

Memo to supervisors from the Inspector General Brief: **Enforce dress and hair rules** just as strictly for women in blue suits as for men. Many supervisors, it seems, are too lax with the women and this makes male airmen mad. They apparently don't like to see the gals get away with wearing their hair longer than regulation.

Recently announced plans call for **Air University** to be absorbed by **Air Training Command,** but with no major changes in functions. Air War College and other senior schools are trimming enrollments next year from 333 to 301; intermediate schools are trimming from 647 to 631. ■

Plan Now To Attend...

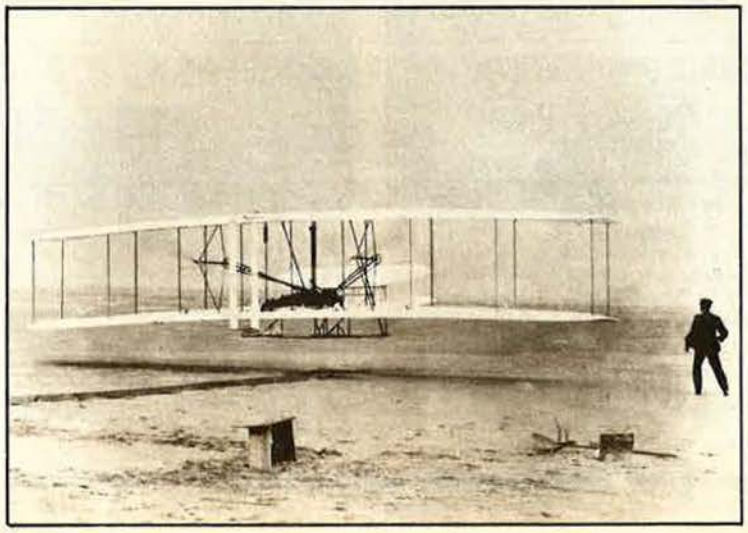
AFA's 1978 National Convention and Aerospace Development Briefings and Displays

aluting the 75th Anniversary of Powered Flight

September 17-21 • Washington, D.C.

AFA's 1978 National Convention and Aerospace Development Briefings and Displays will be held at the Sheraton-Park Hotel, Washington, D.C., September 17-21. Hotel accommodations are available at the Sheraton-Park, and a limited number of rooms are available at the nearby Shoreham-Americana Hotel.

All reservation requests for rooms and suites at the Sheraton-Park should be sent to: Reservations Office, Sheraton-Park Hotel, 2660 Woodley Road, N.W., Washington, D.C. 20008. The Shoreham-Americana Hotel's address is: 2500 Calvert St., N.W., Washington, D.C. 20008.



We urge you to make your reservations as soon as possible. To assure acceptance of your reservation request, refer to the AFA National Convention.

Arrivals after 6:00 p.m. require a one-night deposit or written guarantee for the night of arrival.

Convention activities will include AFA business sessions, luncheons honoring the Secretary of the Air Force and the Air Force Chief of Staff, JROTC Award Luncheon, the annual Salute to Congress, the AFA Delegates' Reception, and the Air Force Anniversary Reception and Dinner Dance. Program details will be presented in forthcoming issues of this magazine.

AFA News

By Don Steele, AFA AFFAIRS EDITOR

Unit of the Month

THE ANTELOPE VALLEY CHAPTER, CALIF. . . . cited for effective programming in support of the missions of the Air Force and the Air Force Association.

House Majority Leader Jim Wright was the guest of honor and recipient of the Nation's Capital Chapter's Distinguished American Award at its recent black-tie dinner dance in the Bolling AFB Officers' Club. Among the guests at the Guest of Honor's table were, from left, AFA President Gerald V. Hasler, Mrs. Stetson, Air Force Chief of Staff Gen. David C. Jones, Mrs. Alvarado, Congressman Wright, Chapter President Ricardo Alvarado, Mrs. Wright, and Air Force Secretary John C. Stetson. More than 300 members and guests attended, including Rep. G. V. "Sonny" Montgomery (D-Miss.), and AFA Board Chairman George M. Douglas together with a number of other AFA National Officers and Directors.

—USAF Photo by A1C Jerardo Medina

Rep. William M. Ketchum (R-Calif.) was the keynote speaker and awards presenter at the Antelope Valley Chapter's recent honor banquet in Edwards AFB Officers' Club. Ten Air Force and Army people, both military and civilian, were honored. The award recipients, shown with Congressman Ketchum, front row, far right, are: back row from left, Lt. Col. Orval L. Brown, Army Specialist 4 Jimmy L. Martinez, Dr. Joseph C. Stewart, Capt. George C. Nield IV, A1C Roger L. Smith, MSgt. George B. Miller, Jr.; front row from left, Army Maj. Robert L. Stewart, Lloyd E. Hicks, Capt. Dennis M. Gorman, and TSgt. Gary L. Hill. In recognition of this very effective program, AFA President Gerald V. Hasler names the Antelope Valley Chapter as the "Unit of the Month" for May.

Colorado State AFA President Edward C. Marriott, left, presents Col. E. J. Zulauf, center, Commander, Rocky Mountain Region Detachment 7, USAF-CAP, a check for $764, as Noel A. Bullock, right, Director of Aerospace Education for both the Colorado State AFA and the CAP's Rocky Mountain Region, looks on. The check is for two full scholarships to the Aerospace Education Leadership Development Course to be presented by the CAP's Center for Aerospace Education Development and the Middle Tennessee State University at the Air University, Maxwell AFB, Ala. The Front Range Chapter of Denver presented Colonel Zulauf a check for one full scholarship. This is the second consecutive year these two AFA units have sponsored scholarships for this course.

Gen. David C. Jones, USAF Chief of Staff, was the guest speaker at a luncheon recently cosponsored by the McGuire Chapters of the Air Force Association and the Air Force Sergeants Association, and the McGuire Junior Officers' Council. During the program, General Jones accepted checks for $1,000 each for the Air Force Assistance Fund and the Air Force Enlisted Widows' Home Foundation. More than 400 members of the sponsoring organizations and their guests attended, including Maj. Gen. Thomas M. Sadler, Commander, 21st Air Force, and AFA President Gerald V. Hasler. In the photo, General Jones, left, accepts the check for the Assistance Fund from William J. Demas, right, President of AFA's Thomas B. McGuire, Jr., Chapter, N. J., donor of the two checks.

chapter and state photo gallery

—Photo by Charles A. Rainey

Rep. Bob Wilson (R-Calif.), the Senior Minority Member of the House Armed Services Committee, was featured speaker at a recent dinner meeting cosponsored by the San Diego Chapter of the Air Force Association and the Association of Former Intelligence Officers. From left are AFIO Chapter President Don Perry, Representative Wilson, and AFA Chapter President Dan McPherson.

—Official Defense Mapping Agency Photo

During a recent meeting sponsored by AFA's Spirit of St. Louis Chapter, Missouri State AFA President Donald Kuhn presented Maj. Robert Cates of the Defense Mapping Agency Aerospace Center an AFA Citation of Honor. The award, one of AFA's highest, was presented in recognition of his outstanding contribution to the Air Force and the nation while assigned to the USAF Instrument Flight Center in Texas, where he was a flight instructor. Shown during the presentation are, from left, Chapter President Stuart Popp, Mr. Kuhn, Major Cates, and Col. Robert Burns, Deputy Director, Defense Mapping Agency Aerospace Center.

COMING EVENTS

Colorado State AFA Convention, Pueblo, May 12–13 . . . **Ohio State AFA Convention,** Granville Inn, Granville, May 13 . . . **California State AFA Convention,** Mansion Inn, Sacramento, May 19–21 . . . **New Jersey State AFA Convention,** Golden Eagle Inn, Cape May, May 19–21 . . . **Washington State AFA Convention,** Port Angeles, May 19–20 . . . **Utah State AFA Convention,** Ogden, May 20 . . . **AFA Golf and Tennis Tournaments,** The Broadmoor, Colorado Springs, Colo., May 26 . . . **AFA Board of Directors and Nominating Committee Meetings,** The Broadmoor, Colorado Springs, Colo., May 27 . . . AFA's Nineteenth Annual Dinner honoring the **Outstanding Squadron at the Air Force Academy,** The Broadmoor's International Center, Colorado Springs, Colo., May 27 . . . **Connecticut State AFA Convention,** Howard Johnson Conference Center, Windsor Locks, June 3 . . . **New York State AFA Convention,** Niagara Falls, June 9–10 . . . **Oklahoma State AFA Convention,** Vance AFB, June 16–17 . . . **Illinois State AFA Convention,** Regency Hotel, Peoria, June 17 . . . **Kansas State AFA Convention,** McConnell AFB, June 17 . . . **Louisiana State AFA Convention,** Hilton Inn, Bossier City, June 17 . . . **Georgia State AFA Convention,** Savannah, June 17 . . . **Oregon State AFA Convention,** Eugene, June 23–24 . . . **Pennsylvania State AFA Convention,** Penn State Sheraton Inn, State College, June 23–24 . . . **Texas State AFA Convention,** Kahler Green Oaks Inn, Fort Worth, July 28–30 . . . **AFA's 32d Annual National Convention,** Sheraton-Park Hotel, Washington, D. C., September 17–20 . . . **AFA's Aerospace Development Briefings and Displays,** Sheraton-Park Hotel, Washington, D. C., September 19–21 . . . **AFA National Symposium,** Los Angeles, Calif., October 26–27 . . . **Seventh Annual Air Force Ball,** Century Plaza Hotel, Century City, Calif., October 27.

Head-table guests at the Northern Virginia Chapter's recent dinner meeting in the Fort Myer Officers' Club included, from left, retired Brig. Gen. William McCall, Nominating Committee Chairman; Mrs. McCall; AFA Executive Director James H. Straubel; Miss Deborah Dyer; Mrs. Emrich; Washington's TV Channel 4 Weatherman Willard Scott, the guest speaker; AFA National Director Richard C. Emrich; Mrs. Dyer; and Chapter President Larry S. Dyer.

Les Brown, center, veteran Big Band Leader, was honored by AFA's Central Indiana Chapter during his "Salute to Glenn Miller" concert at the Indianapolis Clowes Hall. The citation was presented by Roy P. Whitton, left, a Past President of the Chapter and its current Treasurer, and TSgt. Mike Davis, right, USAFR, NCOIC, 434th TFW/OI, Grissom AFB. Mr. Brown was cited for his contributions to the morale of American servicemen and women over the past twenty-eight years as music director for the Bob Hope USO Shows. For eighteen consecutive Christmas seasons, Brown and members of his group provided entertainment to American service people throughout the world, including Southeast Asia where, on more than one occasion, they performed under battle conditions.

This Is AFA

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 to all mankind.

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CMSgt. Walter E. Scott
(ex officio)
Chairman,
Enlisted Council
Dixon, Calif.

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AFA News photo gallery

During recent ceremonies at Carswell AFB, Tex., Fort Worth Chapter Certificates of Appreciation were presented to the B-52 and KC-135 Crews of the Year. Shown during the presentation are, from left, Capt. Dennis Quien, B-52 aircraft commander; Capt. Terry Oldham, KC-135 tanker commander; Capt. Howard Williamson, radar navigator; Capt. Chris Robertson, navigator; Chapter Vice President Bryan L. Murphy, who made the presentation; and 1st Lt. Neal McKinney, electronic warfare officer.

Members of the Arnold Air Society's Gen. Don Zimmerman Squadron at the University of Oregon pose for photo after being named AAS Area H-2 Outstanding Squadron at the recent Area Conclave in Coeur d'Alene, Idaho. Capt. Donald Travis, second from left, front row, is the Squadron Advisor and an instructor in the AFROTC detachment at the University of Oregon.

More than 200 high school students, including AFJROTC and CAP cadets, from throughout Colorado attended the 5th Annual Colorado High School Aerospace Education Symposium at Lowry AFB. This annual program was cosponsored by AFA's Blue Barons Chapter, the Rocky Mountain Liaison Region of the CAP, and the AFJROTC unit at Hinkley High School. The program included a briefing on the Space Shuttle program, a tour of Lowry AFB facilities, and briefings on the functions of the units at the base. In the photo, students inspect first hand our active force weapon systems.

NEW HIGHER AVIATION DEATH BENEFITS

Dependable Protection from

Air Force Associatio

Important Benefits!

COVERAGE YOU CAN KEEP. Provided you apply for coverage under age 60 (see "ELIGIBILITY") your insurance may be retained at the same low group rates to age 75.

FULL TIME, WORLD WIDE PROTECTION. The policy contains no war clause, hazardous duty restriction, combat zone waiting period or geographical limitation.

DISABILITY WAIVER OF PREMIUM. If you become totally disabled at any time prior to age 60 for at least a 9-month period, your coverage will be continued in force without further payment of premiums as long as you remain disabled.

FULL CHOICE OF SETTLEMENT OPTIONS. All standard forms of settlement options, as well as special options agreed to by the insured and United of Omaha, are available to insured members.

CONVENIENT PAYMENT PLANS. Premium payments may be made by monthly government allotment (payable to Air Force Association), or direct to AFA in quarterly, annual or semi-annual installments.

DIVIDEND POLICY. AFA's primary policy is to provide maximum coverage at the lowest possible cost. Consistent with this policy, AFA has provided year end dividends (20% for 1976) to insured members in twelve of the past fifteen years, and has increased the basic amount of coverage on four separate occasions.

Additional Information

Effective Date of Your Coverage. All certificates are dated and take effect on the last day of the month in which your application for coverage is approved, and coverage runs concurrently with AFA membership. AFA Military Group Life Insurance is written in conformity with the insurance regulations of the State of Minnesota. The insurance will be provided under the group insurance policy issued by United of Omaha to the First National Bank of Minnesota as trustees of the Air Force Association Group Insurance Trust.

EXCEPTIONS: There are a few logical exceptions to this coverage. They are:

Group Life Insurance: Benefits for suicide or death from injuries intentionally self-inflicted while sane or insane will not be effective until your coverage has been in force for 12 months.

The Accidental Death Benefit and Aviation Death Benefit shall not be effective if death results: (1) From injuries intentionally self-inflicted while sane or insane, or (2) From injuries sustained while committing a felony, or (3) Either directly or indirectly from bodily or mental infirmity, poisoning or asphyxiation from carbon monoxide, or (4) During any period a member's coverage is being continued under the waiver of premium provision, or (5) From an aviation accident, either military or civilian, in which the insured was acting as pilot or crew member of the aircraft involved, except as provided under AVIATION DEATH BENEFIT.

Eligibility

All active duty personnel of the Armed Forces of the United States and members of the Ready Reserve* and National Guard* (under age 60), Armed Forces Academy cadets*, and college or university ROTC cadets* are eligible to apply for this coverage provided they are now, or become, members of the Air Force Association.

*Because of restrictions on the issuance of group insurance coverage, applications for coverage under the group program cannot be accepted from cadets or Reserve or Guard personnel residing in Florida, New York, Ohio or Texas. Members in these states may request special application forms from AFA for individual policies which provide coverage quite similar to the group program.

Please Retain This Medical Bureau Prenotification For Your Records

Information regarding your insurability will be treated as confidential. United Benefit Life Insurance Company may, however, make a brief report thereon to the Medical Information Bureau, a nonprofit membership organization of life insurance companies, which operates an information exchange on behalf of its members. If you apply to another bureau member company for life or health insurance coverage, or a claim for benefits is submitted to such a company, the Bureau, upon request, will supply such company with the information in its file.

Upon receipt of a request from you, the Bureau will arrange disclosure of any information it may have in your file. (Medical information will be disclosed only to your attending physician.) If you question the accuracy of information in the Bureau's file, you may contact the Bureau and seek a correction in accordance with the procedures set forth in the federal Fair Credit Reporting Act. The address of the Bureau's information office is P.O. Box 105, Essex Station, Boston, Mass. 02112. Phone (617) 426-3660.

United Benefit Life Insurance Company may also release information in its file to other life insurance companies to whom you may apply for life or health insurance, or to whom a claim for benefits may be submitted.

CURRENT BENEFIT TABLES

AFA STANDARD PLAN

PREMIUM: $10 per month

Insured's Attained Age	Basic Benefit*	Extra Accidental Death Benefit*	Total Benefit
20-24	$75,000	$12,500	$87,500
25-29	70,000	12,500	82,500
30-34	65,000	12,500	77,500
35-39	50,000	12,500	62,500
40-44	35,000	12,500	47,500
45-49	20,000	12,500	32,500
50-54	12,500	12,500	25,000
55-59	10,000	12,500	22,500
60-64	7,500	12,500	20,000
65-69	4,000	12,500	16,500
70-74	2,500	12,500	15,000

Aviation Death Benefit:*

Non-war related	$25,000
War related	$15,000

AFA HIGH OPTION PLAN

PREMIUM: $15 per month

Insured's Attained Age	Basic Benefit*	Extra Accidental Death Benefit*	Total Benefit
20-24	$112,500	$12,500	$125,000
25-29	105,000	12,500	112,500
30-34	97,500	12,500	110,000
35-39	75,000	12,500	87,500
40-44	52,500	12,500	65,000
45-49	30,000	12,500	42,500
50-54	18,750	12,500	31,250
55-59	15,000	12,500	27,500
60-64	11,250	12,500	23,750
65-69	6,000	12,500	18,500
70-74	3,750	12,500	16,250

Aviation Death Benefit:*

Non-war related	$37,500
War related	$22,500

*The Extra Accidental Death Benefit is payable in the event an accidental death occurs within 13 weeks of the accident, except as noted under **Aviation Death Benefit** (below).

***AVIATION DEATH BENEFIT:** The coverage provided under the Aviation Death Benefit is paid for death which is caused by an aviation accident in which the insured is serving as pilot or crew member of the aircraft involved. Under this condition, the Aviation Death Benefit is paid in lieu of all other benefits of this coverage. Furthermore the non-war related benefit will be paid in all cases where the death does not result from war or an act of war, whether declared or undeclared.

OPTIONAL FAMILY COVERAGE

(may be added to either Standard or High Option Plan)
PREMIUM: $2.50 per month

Insured's Attained Age	Life Insurance Coverage for Spouse	Life Insurance Coverage for each Child*
20-39	$10,000	$2,000
40-44	7,500	2,000
45-49	5,000	2,000
50-54	4,000	2,000
55-59	3,000	2,000
60-64	2,500	2,000
65-69	1,500	2,000
70-74	750	2,000

*Between the ages of six months and 21 years, each child is provided $2,000 coverage. Children under 6 months are provided with $250 coverage once they are 15 days old and discharged from hospital.

essional Association! Apply Now!

Military Group Life Insurance

APPLICATION FOR
AFA MILITARY GROUP LIFE INSURANCE

United of Omaha

Group Policy GLG-2625
United Benefit Life Insurance Company
Home Office Omaha Nebraska

Full name of member _____
Rank Last First Middle

Address _____
Number and Street City State ZIP Code

Date of birth Mo. Day Yr.	Height Weight	Social Security Number

Please indicate category of eligibility and branch of service.

- ☐ Extended Active Duty
- ☐ Ready Reserve or National Guard
- ☐ Air Force Academy
- ☐ ROTC Cadet _____ Name of college or university
- ☐ Air Force
- ☐ Other _____ (Branch of service)
- ☐ _____ Academy

Name and relationship of primary beneficiary

Name and relationship of contingent beneficiary

This insurance is available only to AFA members

- ☐ I enclose $13 for annual AFA membership dues (includes subscription ($9) to AIR FORCE Magazine).
- ☐ I am an AFA member.

Please indicate below the Mode of Payment and the Plan you elect.

HIGH OPTION PLAN		Mode of Payment	STANDARD PLAN	
Members Only	Members and Dependents		Members Only	Members and Dependents
☐ $ 15.00	☐ $ 17.50	**Monthly** government allotment. I enclose 2 months' premium to cover the period necessary for my allotment (payable to Air Force Association) to be established.	☐ $ 10.00	☐ $ 12.50
☐ $ 45.00	☐ $ 52.50	**Quarterly.** I enclose amount checked.	☐ $ 30.00	☐ $ 37.50
☐ $ 90.00	☐ $105.00	**Semiannually.** I enclose amount checked.	☐ $ 60.00	☐ $ 75.00
☐ $180.00	☐ $210.00	**Annually.** I enclose amount checked.	☐ $120.00	☐ $150.00

Names of Dependents To Be Insured	Relationship to Member	Dates of Birth Mo. Day Yr.	Height	Weight

Have you or any dependents for whom you are requesting insurance ever had or received advice or treatment for: kidney disease, cancer, diabetes, respiratory disease, epilepsy, arteriosclerosis, high blood pressure, heart disease or disorder, stroke, venereal disease or tuberculosis? Yes ☐ No ☐

Have you or any dependents for whom you are requesting insurance been confined to any hospital, sanitarium, asylum or similar institution in the past 5 years? Yes ☐ No ☐

Have you or any dependents for whom you are requesting insurance received medical attention or surgical advice or treatment in the past 5 years or are now under treatment or using medications for any disease or disorder? Yes ☐ No ☐

IF YOU ANSWERED "YES" TO ANY OF THE ABOVE QUESTIONS, EXPLAIN FULLY including date, name, degree of recovery and name and address of doctor. (Use additional sheet of paper if necessary.)

I apply to United Benefit Life Insurance Company for insurance under the group plan issued to the First National Bank of Minneapolis as Trustee of the Air Force Association Group Insurance Trust. Information in this application, a copy of which shall be attached to and made a part of my certificate when issued, is given to obtain the plan requested and is true and complete to the best of my knowledge and belief. I agree that no insurance will be effective until a certificate has been issued and the initial premium paid.

I hereby authorize any licensed physician, medical practitioner, hospital, clinic or other medical or medically related facility, insurance company, the Medical Information Bureau or other organization, institution or person, that has any records or knowledge of me or my health, to give to the United Benefit Life Insurance Company any such information. A photographic copy of this authorization shall be as valid as the original. I hereby acknowledge that I have a copy of the Medical Information Bureau's prenotification information.

Date _____, 19 ____ _____
Member's Signature

5/78
Form 3676GL App

Application must be accompanied by check or money order. Send remittance to Insurance Division, AFA, 1750 Pennsylvania Avenue, NW, Washington, D.C. 20006

Bob Stevens'

"There I was..."

IT'S NOSTALGIA TIME AGAIN AS WE CONTINUE OUR "REMEMBER WHEN?" TICKLERS THAT APPEARED IN THIS SPACE LAST MONTH. THIS TIME WE'LL WRAP IT UP WITH THESE GOODIES:

OVERSEAS WE HAD:

DINKY STOVES and TOKYO ROSE* (AXIS SALLY, TOO)

*THIS IS WHAT WE *THOUGHT* SHE LOOKED LIKE!

DOG TAGS

INITIAL TETANUS SERIES (ANYBODY KNOW WHY THEY WERE NOTCHED?)

GI SHOES

- FASHIONED FOR NORTH AFRICAN OR PACIFIC WEAR.

SANITATION FACILITIES -AL FRESCO

AIRCRAFT RECOGNITION

FLASH ... QUICK! P-47 OR TOGO?

American energy will win!

AT HOME IT WAS RATIONING:

MEAT, SUGAR, SHOES - YOU NAME IT - STAMPS

...and THE GALS TRIED TO LOOK LIKE VERONICA LAKE (WITH HER "PEEK-A-BOO" HAIR DO)

IKE and MAC

PARTICULARLY HARD TO GET WERE:

- HERSHEY BARS
- NEW TIRES
- NYLONS - WOMEN PAINTED THEIR LEGS INSTEAD
- and BOOZE!

"CANE NEUTRAL SPIRITS" WERE AVAILABLE, BUT IT'D BLOW A SAFE!

THEY EVEN PUT STRIPES DOWN THE BACK!

SCRAP DRIVES- WITH SOME LOCAL POL PUNCHIN' THE AXIS...

FINALLY - AFTER WHAT SEEMED LIKE EONS

Whose navigation aid can't mislead a pilot?

Key safety features are engineered into every E-Systems VOR/DME navigation aid. To insure that it will never send misleading information to a pilot, the system can automatically monitor its own performance, switch to a standby, or shut itself down in the unlikely event of a malfunction.

Fail-safe circuitry for critical applications is just one reason for E-Systems leadership in guidance and navigation aids. You'll also find

us heavily involved in sophisticated electronics products, command and control systems, aircraft maintenance and modification, communications, and electronic warfare.

This total involvement in advanced technology systems is a major reason why E-Systems has more than doubled sales in just five years as an independent business organization. For more information on E-Systems capabilities, write: E-Systems, Inc., P.O. Box 226030, Dallas, Texas 75266

E-Systems is the answer.

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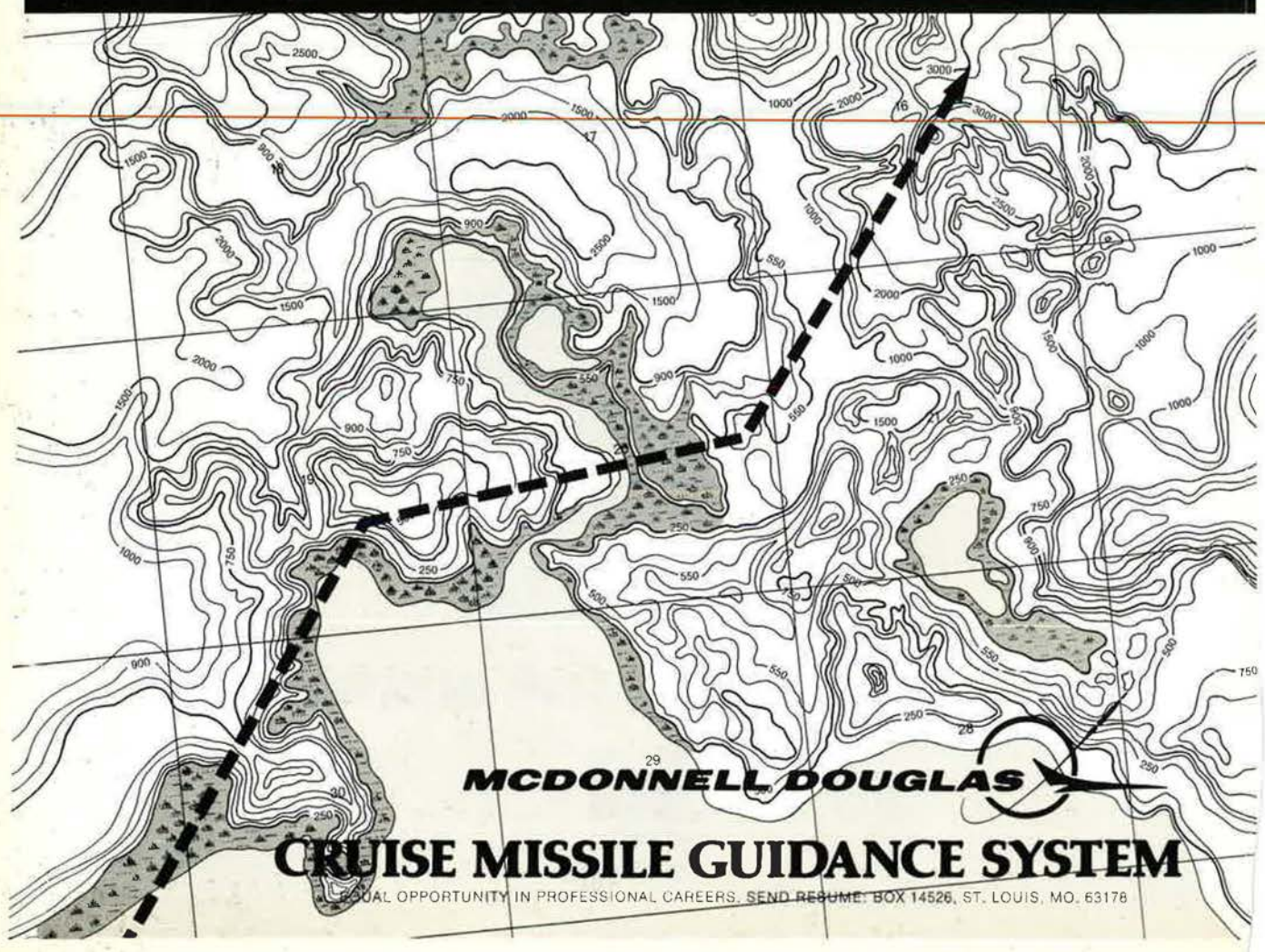
We lead the way for cruise missile...

Cruise missile will be launched from ships, submarines, ground-based units and aircraft. It is one of the most versatile and accurate missile systems ever developed.

McDonnell Douglas provides the navigation and guidance system for all cruise missiles. Our terrain correlation system for the land attack missile provides extremely accurate updates to the inertial navigation system, while terrain following enables the missile to fly at very low altitudes to avoid detection by enemy radar. The anti-ship version of cruise missile is guided by a modified version of our Harpoon anti-ship missile's guidance system.

McDonnell Douglas is working to make cruise missile even smarter and more versatile. By utilizing even more accurate flight demonstrated guidance techniques, cruise missile could deliver conventional warheads over great distances with unprecedented accuracy.



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