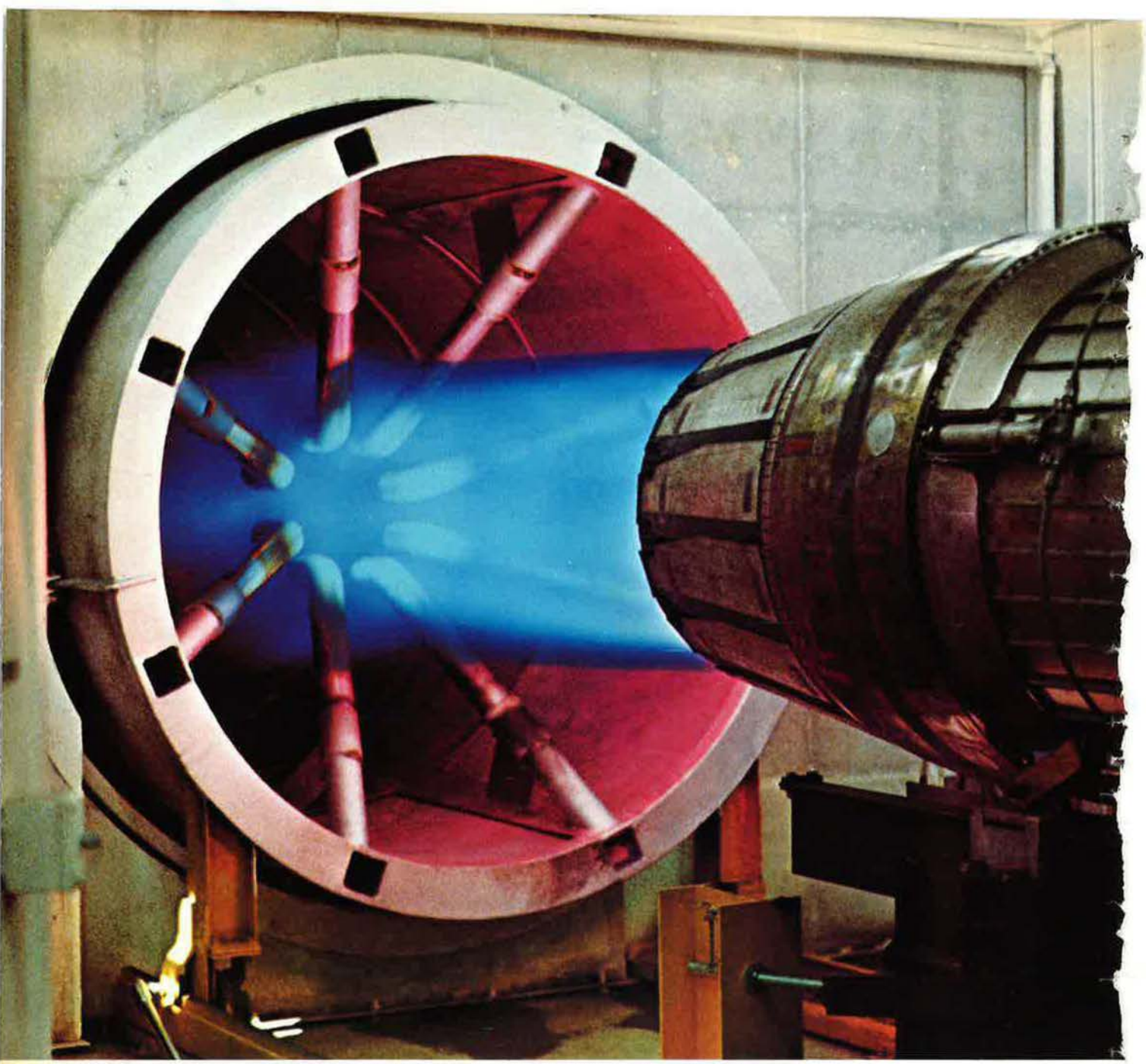
MAY 1980/$3

AIR FORCE MAGAZINE

PUBLISHED BY THE AIR FORCE ASSOCIATION

AIR FORCE ALMANAC 1980



PW F-100 engine in Zone 5 afterburner during a five-minute run in the AF32T-8 noise suppressor. The patented ACS air-cooled sparger tubes are shown.

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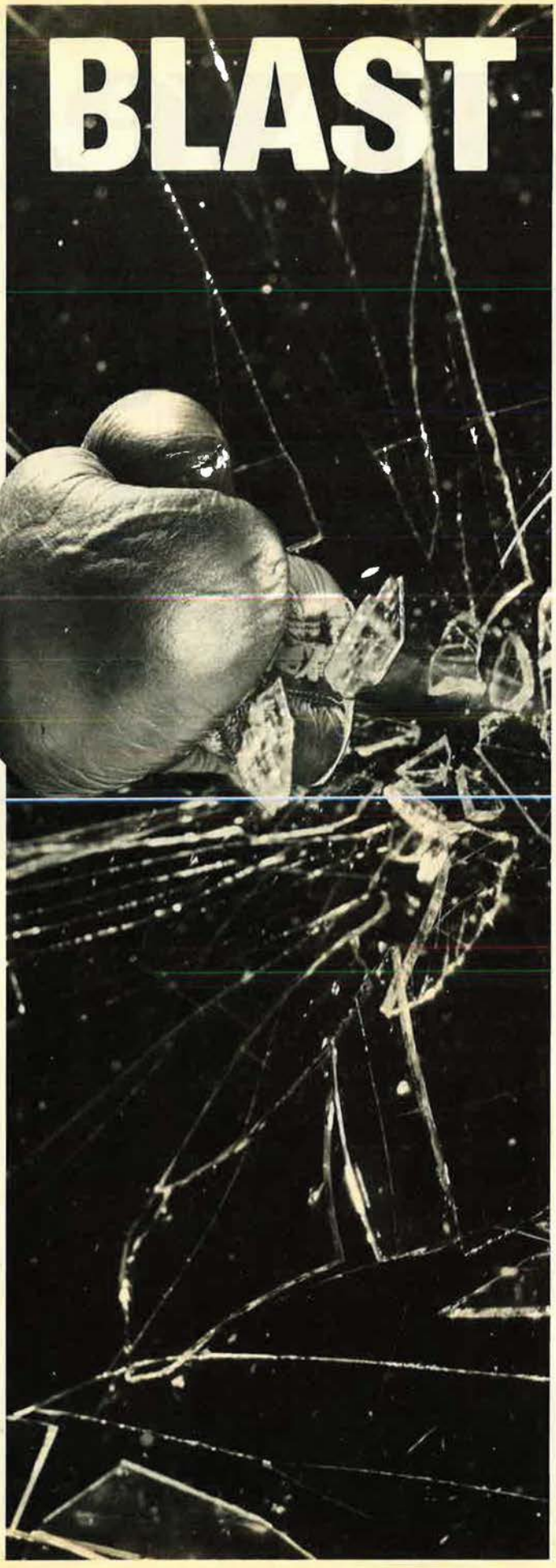

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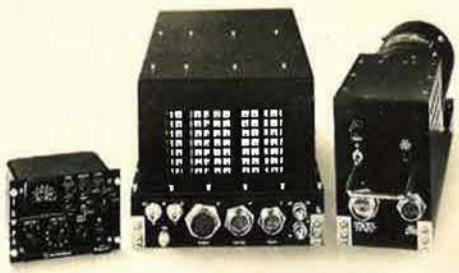

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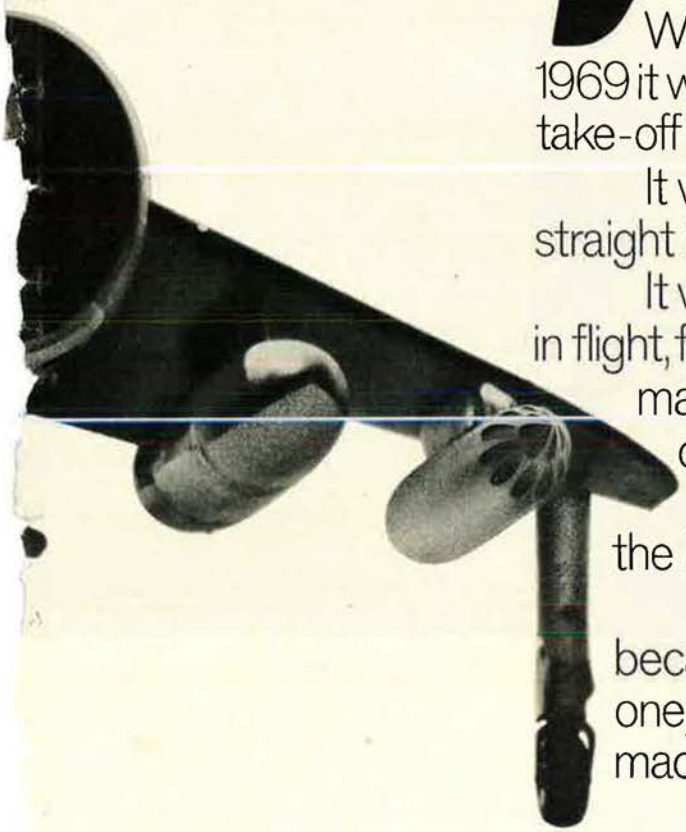

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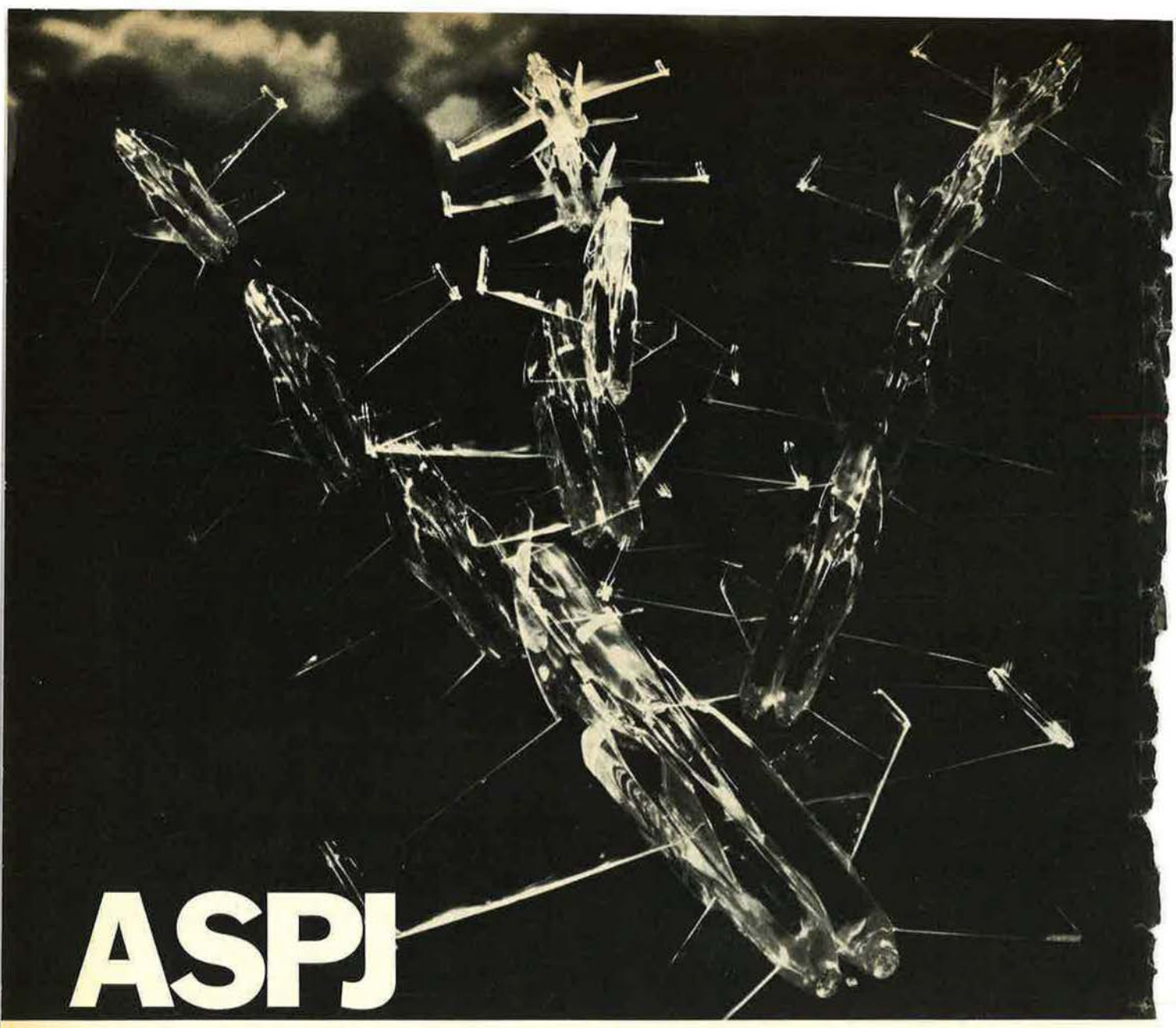

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AIR FORCE MAGAZINE
PUBLISHED BY THE AIR FORCE ASSOCIATION

MAY 1980
VOLUME 63, NUMBER 5

ANNUAL AIR FORCE ALMANAC ISSUE

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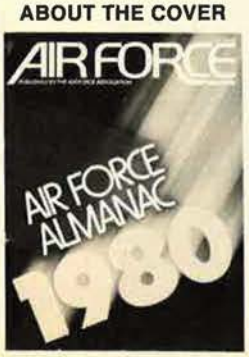

This annual Almanac issue is the most concise but comprehensive unclassified reference work available on the organization, missions, bases, personnel, equipment, and financing of the United States Air Force. The cover design is by Art Director William A. Ford.

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AIR FORCE Magazine (including SPACE DIGEST) is published monthly by the Air Force Association, Suite 400, 1750 Pennsylvania Ave., N.W., Washington, D.C. 20006. **Phone:** (202) 637-3300. Second-class postage paid at Washington, D.C., and additional mailing offices. **Membership rate:** $13 per year (includes $9 for one-year subscription); $30 for three-year membership (includes $21 for subscription). **Life Membership:** $200. **Subscription rate:** $13 per year; $12 additional for foreign postage. Regular issues $1 each. Special issues (Soviet Aerospace Almanac, USAF Almanac issue, Anniversary issue, and "Military Balance" issue) $3 each. **Change of address** requires four weeks' notice. Please include mailing label. Publisher assumes no responsibility for unsolicited material. Trademark registered by Air Force Association. Copyright 1980 by Air Force Association. All rights reserved. Pan-American Copyright Convention.

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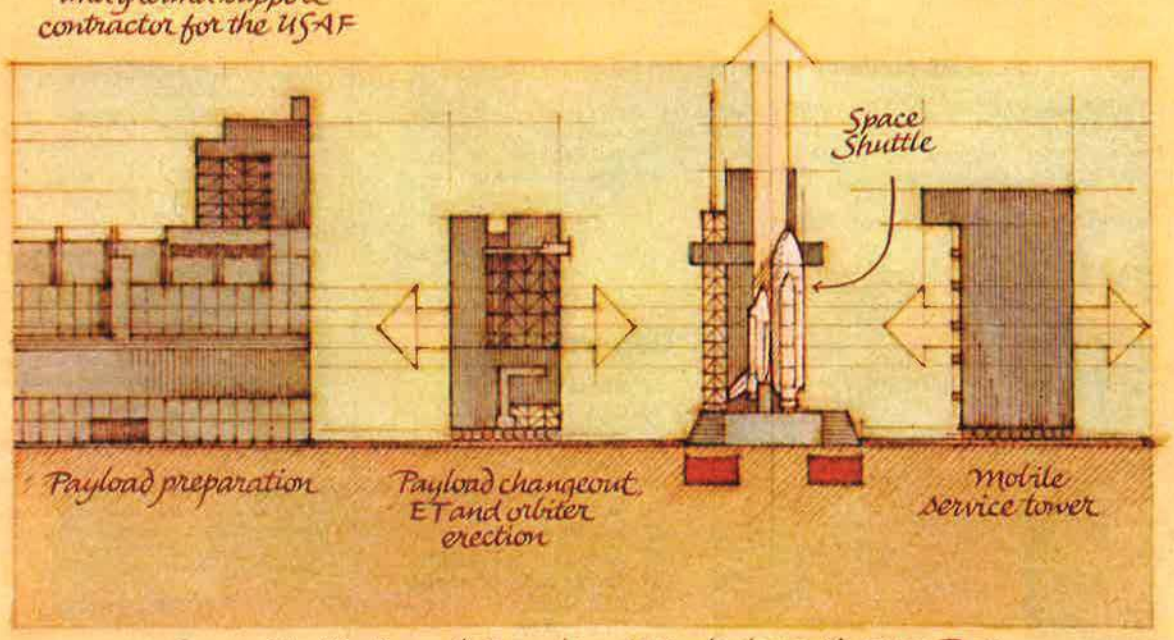
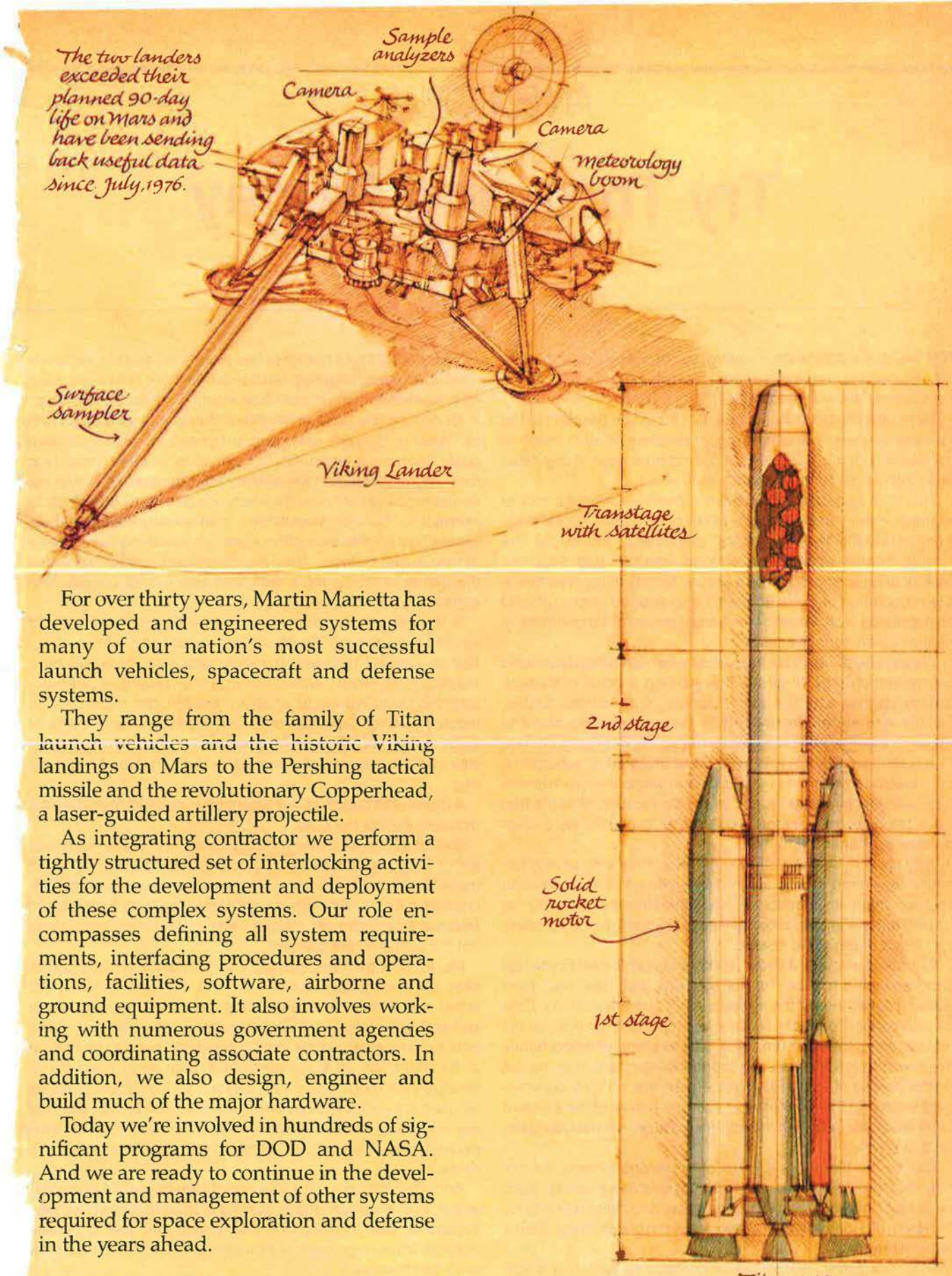


Space Shuttle Launch Complex at Vandenberg Air Force Base



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AN EDITORIAL

Try Throwing Money at It

THERE is a Washington saying, so often repeated that it has gained the status of a cliché, that goes: "You can't solve a problem by throwing money at it."

More often than not that is true. But there is a problem in the military—in most ways the biggest problem of all in terms of the security of this nation—that cannot be solved in any other way. You've got to throw money at it.

This is so because the problem is basically one of a lack of money—money in the pockets of our crew chiefs, pilots, electronics technicians, engineers, physicians. Money for the simple human necessities of food, shelter, and clothing. Money to raise and educate a family. Money to provide tangible recognition of skills achieved and applied under difficult and arduous work situations wherein payment for overtime is neither given nor expected.

We are speaking, of course, about what has been described as the hemorrhage of talent, the growing exodus of trained, quality people from the armed forces of the United States, people with ten to fifteen years in the suit, who are about to make, or thought they had already made, a career commitment to the military life. People who have invested a substantial chunk of their productive years, and in whom the government has invested immense sums, in the acquisition of skills that have become increasingly marketable in an intensely competitive economic system.

Why are they leaving? You know why. They are leaving because they need the money and they can get it in the civilian sector, which is uninhibited and unrestrained, thus far, in paying the going rate or better if necessary to get the numbers and kinds of people it needs.

Examples abound. Almost 3,000 pilots left the Air Force last year, a sizable number for the security, high pay, and good working schedules of the airlines. A noncommissioned officer can do better moonlighting as a fast-food cashier than on his regular assignment at the base. The average enlisted family income is below the lowest acceptable standard of living set by the Bureau of Labor Statistics. Each year, military commissaries cash $10 million in food stamps. A third of the enlisted force works for less than the minimum wage, not including unpaid overtime.

And so the litany goes. Most of these phenomena are not new. But they have been exacerbated over the years by such devices as unrealistic, unjust pay caps, and more recently by the ravaging inflation that chews up a paycheck faster than a paper-shredder.

True, the predicted recession already is having a slight positive impact on military manpower. As unemployment grows, so do recruiting rates. But the flip side of that one is the likelihood that military wives who work—a probable majority—will find it harder to find those jobs and the same will hold true for moonlighting husbands. So there is no such thing as a free lunch and no pain-free solutions to hard problems.

Of course, the "soldier-slighted" theme has long been with us. What is different now, probably because of the so obviously dangerous and delicate international scene (notably in Iran, Afghanistan, and the Middle East generally), is that the economic plight of the military family is getting a hearing and a ventilation. Service spokesmen, traditionally reticent about recruiting and retention difficulties, are speaking out as never before in our memory. They are convinced, presumably, that the notion of doing more with less has run its course, and especially so in the people area.

It is encouraging that service leaders are beginning to speak up so sharply. There is high interest and flurries of action on Capitol Hill, with the likelihood that there will be a modicum of relief, either through the retention-oriented, targeted Nunn-Warner approach or the broader, more general income-raising approach of Armstrong-Matsunaga. Some of each would help. There is heightened interest in the media as well and it is hard to tell which is the chicken and which is the egg.

It is one of those situations where everyone has identified the problem except the boss.

Just at a time when the nation's concern with the readiness of our forces should be at a peak, the Commander in Chief of those forces is upset because their weaknesses are being discussed publicly. So, almost petulantly, he tells Secretary of Defense Harold Brown, "When I was in the Navy, money was not the predominant concern."

Not for him, perhaps. He had a family business to go to and, after six years of active naval service, he went to it and did rather well with it. Now he is telling the troops they should not bother their heads about such mundane matters as paying the bills but at the same time stand cheerfully ready to march off, or fly off, or sail off at his command to far away places with strange-sounding names. And they will go if ordered, and they will perform well, probably under adverse conditions. But they are not going to stop worrying about their families, or their pocketbooks. They are not going to stop adding up their futures.

And when they get back a lot of them are going to say the hell with it. And the government is going to have to recruit four new people for every skilled one that leaves and spend several fortunes in training costs as well as eight plus years' lead time to be back where it is.

It just makes no sense at all.

Why don't we try throwing money at the problem? It's the only way to lick it. —JOHN F. LOOSBROCK, EDITOR IN CHIEF

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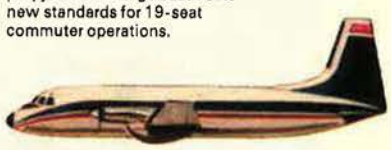
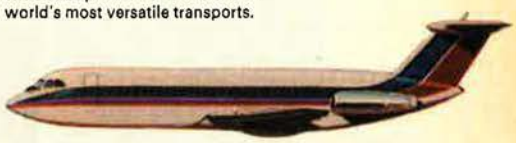


HS 748 - 2B – new 50-seat commuter development of the rugged propjet which has proved itself one of the world's most versatile transports.



BAC One-Eleven – twinjet airliner which, in 15 years of US service, has averaged more than 10 flights per aircraft per day.

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Airmail

Our Thanks to the General

Gen. Volney F. Warner, Commander in Chief of the United States Readiness Command and Director of the Joint Deployment Agency at MacDill AFB, Tampa, Fla., has asked me to relay his sincere thanks for two excellent articles in the February 1980 issue.

The articles, "The Airborne/Air Force Team—Spearhead for Rapid Deployment" and "The Civil Reserve Air Fleet—National Airlift Asset," were greatly appreciated by General Warner and members of our organizations. The authors, William P. Schlitz and F. Clifton Berry, Jr., obviously did excellent research and presented these complex subjects in a manner to be understood by all.

One of our major challenges in the military is to articulate our efforts to defend the country, yet not offend the public. In addition, our servicemen and women need to be reassured they have volunteered for a profession regarded highly by the public they have sworn to defend. . . .

Again, congratulations and thanks for two outstanding articles.

Col. Perry G. Stevens, USA
Public Affairs Officer
US Readiness Command
MacDill AFB, Fla.

And Thank You, Colonel

AIR FORCE Magazine continues to offer excellent and factual material that ably supports, supplements, and updates our curriculum, and is constantly in demand as research material for our students. My compliments to the editor and his outstanding staff.

On behalf of the staff and students of the SAC NCO Academy, I wish to thank you for your assistance and the progressive work you are doing for all ranks. Because of your help, the military is a better place to work, live, and serve.

Lt. Col. Frederick W. Weil, USAF
Commandant
SAC NCO Academy
Barksdale AFB, La.

Airborne/Air Force Team

When I saw the title of Mr. Schlitz's article, "The Airborne/Air Force Team—Spearhead for Rapid Deployment" (February '80), I thought I would be reading a piece on interoperability and all the elements that work together to accomplish the mission. Instead, I found a good overview of the 82d Airborne Division, a mention of the MAC side of the operation, and a quick brush over the other Air Force aspects. I enjoyed the article, but felt that it fell short of the promise of the title.

I am attached to the 1st Battalion (Airborne), 509th Infantry Battalion Combat Team in Vicenza, Italy, mentioned briefly in the inset on page 44. Stationed with me are two Tactical Air Command and Control Specialists (275X0), the enlisted members of the Tactical Air Control Party (TACP). We feel that Mr. Schlitz made two serious omissions in his article: the limited reference to the use of Close Air Support, and the mention only of the FAC as part of the TACP.

The Airborne Antiarmor Defense mentioned in the article is in use in Italy as well as with the 82d. In addition to the organic Army weapons mentioned, close air support is a vital part. We attempt to engage the enemy before it becomes a threat to the Airborne Force. Because the Airborne is light infantry, air support is essential. The commanders of the XVIII Airborne Corps, the 82d Airborne Division, and the 1/509th Infantry ABCT realize this and are firmly dedicated to the concept of close air support for airborne forces.

At each level of command from the battalion to the corps, Air Force TACPs live and work with the airborne. Mr. Schlitz mentioned jump-qualified FACs in two places and failed to mention any other member of the TACP. I am the only Battalion ALO, but with the 82d there is an ALO at each brigade or higher level. Our job is to provide a liaison between the Army and the Air Force and advise the Army commander on all matters relating to Air Force capabilities. FACs are assigned at the battalion level to advise the commander and control air strikes.

The most numerous element of the TACP is the 275. You will find 275s stationed from the battalion through the Corps. The Tactical Air Command and Control Specialist is the career NCO who holds the TACP together. While the ALO or FAC is in the job for two or three years, the 275 remains in the field. He is responsible for assisting the ALO or FAC in his duties as well as helping to maintain the equipment, operate the radios, and be familiar with all the little things that make a trip to the woods livable if not enjoyable. Every two or three years they have to train a new officer to do his job.

A recent job enrichment study of the 275 career field stated that there was a perception among 275s that they failed to get the recognition they deserved from the Army or the Air Force. Omission in this article is one more example. The FAC is not the only one who is jump-qualified. If a TACP is stationed with the airborne, every member of the TACP must be jump-qualified.

The Air Force has a proud tradition of supporting the airborne. When I return to a flying assignment, I will naturally be pleased, but I will always carry fond memories of the time I spent with the airborne. In this time of low morale among members of all the services, I feel proud and fortunate to have served with a unit that believes in doing things "ALL THE WAY."

Capt. Stephen B. Kniffen, USAF
Air Liaison Officer
1st Bn., 509th Inf. ABCT
Vicenza, Italy

. . . The title of the article, as well as the article itself, was interesting. However, it failed to recognize those Air Force people who are more directly associated with the Army airborne elements at Fort Bragg—specifically, the members of the Air Force Tactical Air Control Party (TACP), Det. 1, 507th Tactical Air Control Wing.

At Fort Bragg, the Air Liaison Officers (ALOs) and Tactical Air Command and Control Specialists (TACCSs), all of whom are parachutist-qualified, man positions at Corps, Division, and Brigade level. Battalion positions are manned by parachutist-qualified TACCSs from Fort Bragg and Forward Air Controllers (FACs) and TACCSs from Shaw AFB, S. C. Additionally, many of the support personnel who are part of the Fort Bragg TACP are also parachutist-qualified because of our airborne commitment.

The mission of the TACP is to provide liaison and tactical air support to the Corps and its subordinated units during exercises and contingencies. To this end, we at Fort Bragg are even more a part of the

Airmail

rapid-deployment concept than the other Air Force parachutists mentioned in your inset on p. 44 ("The US's Military Parachutists"). (Note: There are also Air Force weather personnel on jump status at Fort Bragg who support Army airborne units.)

My intent is not to detract from what other Air Force people provide to the Air Force and the rapid-deployment concept, but rather to point out those who I feel are the members of the "Airborne/Air Force Team." The members of the TACP at Fort Bragg will be the ones who will jump with the DRB, Brigade, Division, and Corps when the siren sounds.

Hopefully, this will never occur, but if it does, we will be with the lead elements and the follow-on elements fulfilling the role we train for.

MSgt. Lorrence R. Fiscus, USAF
Pope AFB, N. C.

The article on the Airborne/Air Force Team was interesting, but on p. 44 one very important group of parachutists was left out.

The missing group was the Air Force Flight Test Center Parachutists. The Test Parachutists perform a unique and essential mission for the Air Force: They test new and modified personnel parachute systems.

Without these parachutists, the Aerospace Rescue, the Combat Control teams, and ejected pilots may not have parachutes that have been thoroughly tested by live jumpers.

I feel this dedicated team needs mentioning when military parachutists are discussed.

2d Lt. Barry A. Dietter, USAF
Parachute Systems Engineer
Edwards AFB, Calif.

• *The article explored only the relationship of the 82d and USAF vis-à-vis the Rapid Deployment Force. A story detailing Army Aviation/Air Force close air support is in preparation.*—THE EDITORS

Not a Nationality

I noted in the March 1980 issue, included in the otherwise excellent article on Russia ["How the Soviet Union Is Ruled," by Cmdr. Steve F. Kime, USN], a mistake that is often made but should not be made by a prestigious journal like yours.

The diagram called "Figure 1: Relative Size of Soviet Nationalities," on page 54, lists among the nationalities, "Jews." You are confusing *nationalities* and *religions.* A Jew is someone who believes in the religion called Judaism—it is not a nationality. There are Italian Jews, French Jews, American Jews, etc.; although their *nationality* is respectively Italian, French, and American, their *religion* is Jewish.

I daresay that among the twenty-one other nationalities listed in your diagram, many are Jews—such as Armenian Jews, German Jews, Estonian Jews, etc.

Even the argument that Israel-is-a-Jewish-state-therefore-Jews-are-a-nationality is incorrect since there are Israeli Moslems, Israeli Islamics, Israeli Christians, etc. Israel is the *nation;* Jew a *religion.*

Neil November
Richmond, Va.

• *The writer is correct. However, the government of the USSR considers followers of the Jewish religion as a nationality, and so designates them on their passports.*—THE EDITORS

What's Happening

Gen. T. R. Milton's article "What's Happening to the Military Profession?" in the February 1980 issue, expounds on some of the reasons for the decline of the attractiveness of the military profession to both those in and those not in the military. It is an excellent article, and it closes with the plea for more (some) of the active military leadership to publicly comment on the reasons good people no longer find service life attractive.

Odd, that the general officers who lead this nation's military must be requested in this magazine to carry out their responsibility of looking out for the welfare of their men and keeping the civilian leadership of our nation clearly apprised of the actual facts of personnel retention and readiness at all times. However, I doubt that there will be any flood of senior "active-duty" military spokesmen on this or any other serious military problem areas. Rather, there will probably, over the next few years, be an equal number of articles and books on these subjects by senior military spokesmen with (Ret.) after their title, as there was after Vietnam.

Maj. John Henry Key, USMC
Camp Pendleton, Calif.

I just reread General Milton's editorial in the February issue, and it's right on target. I don't know how or where he gets his "vibes," but he's right on the pulse of a BIG problem that capsulized the frustrations of officers at all stages of their careers. I have felt the growth of layered management in the past several years as I have moved up the higher levels of command. From squadron, to wing, to headquarters, and now at the DoD . . . the higher the more obvious.

To wit, back in the '50s when my Dad was in the Air Force, young officers were taught the responsibilities, privileges, and authority of *commanders.* In the '60s, when I went from ROTC to active duty, this was modified to emphasize the theories of "leadership." We have just gone through a decade of "management," and now I fear that in the '80s there'll be no such thing as a "decision maker." I see missions steered by bureaucratic group pressure, popular opinion, and who can put together the best budget package. *Bring back the commanders!*

Maj. William C. Odell, Jr., USAF
Falls Church, Va.

Hairy Blast

I'd like to express my appreciation for lending the reputation and credibility of your fine magazine in giving credence to "the hair issue" in Ed Gates's "Speaking of People" editorial, "Is the Air Force Losing by a Hair?" It elevates the issue above the normal "conform or get out" manner in which it is often addressed. I'm the critic referred to near the end of the article, and I'm honored that my recent letter to *Air Force Times* about hair policy was actually read and pondered by your distinguished staff. Maybe some policymakers read it, too!

As a follow-up to that letter, I would not expect a change in hair regulations to be a panacea for discipline problems or recruiting problems. There will always be a minority who will "press the issue" no matter how liberal the standards.

On the other hand, I would not expect a change in hair regulations to sharply increase discipline problems or to have a negative impact on retention. Rather, a more reasonable hair policy (and I use that phrase quite deliberately) would force commanders and supervisors to focus on the substance of discipline problems instead of superficial issues. I would also expect the Air Force to retain "a few good men" each year as their response to recognition that the Air Force is using a reasonable approach

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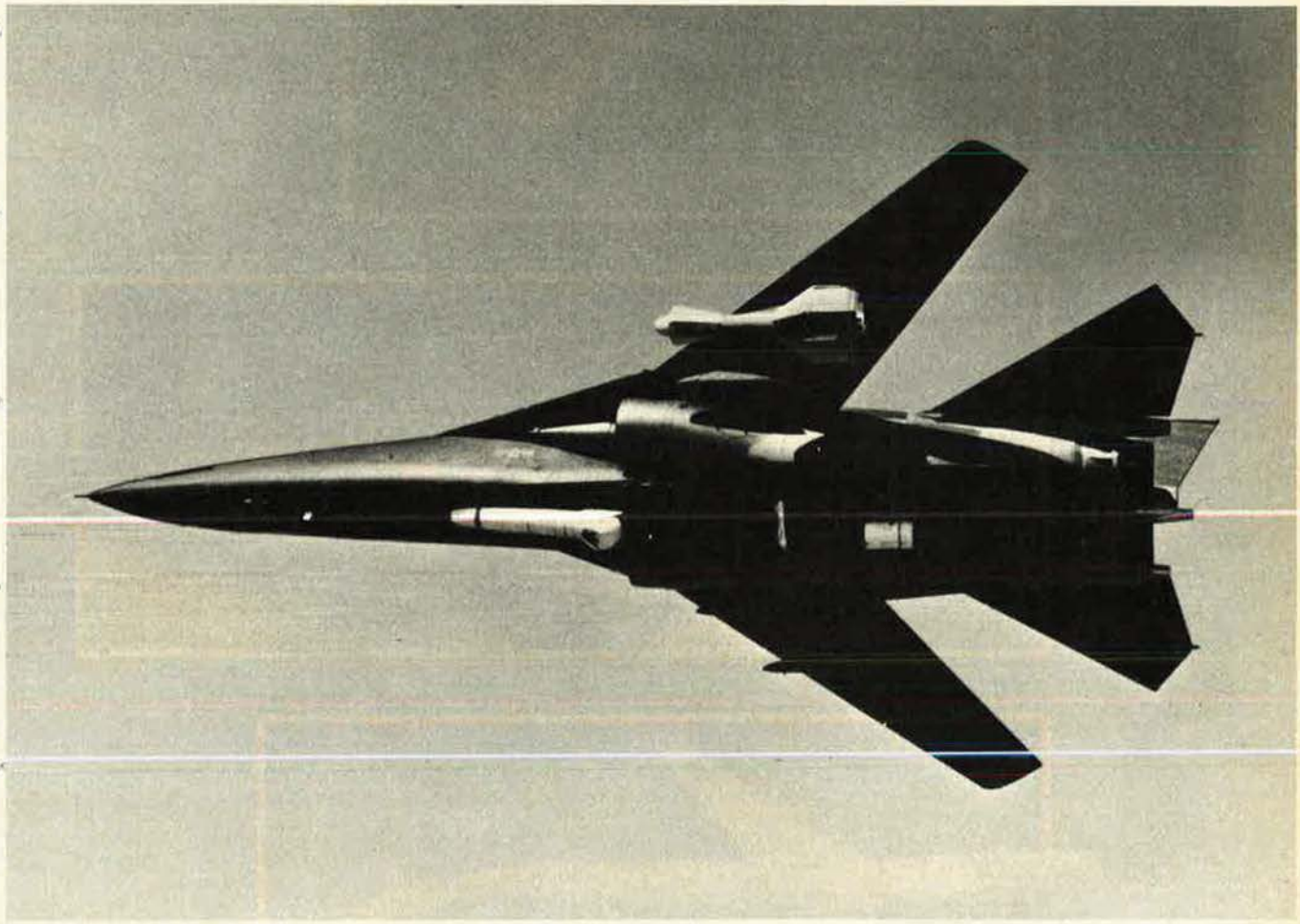

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GENERAL ELECTRIC

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in meeting reasonable requests. I would expect the impact of longer hair styles on drug abuse to be neutral, and would hope that the Air Force continues the firm and prudent drug-abuse policies recently initiated by our Chief of Staff.

Speaking of our Chief of Staff, I would humbly request that he show the lower echelon commanders what the "Buck Stop" program is all about by taking unilateral action (as he did with the 1-2-3 OER program) to implement more reasonable hair-length standards, without cumbersome and guarded staff studies. I believe that he would be pleasantly surprised by the improvement in morale over such a seemingly minor matter.

Finally, I still request anonymity. Like the "Unknown Comic," I have numerous reasons to remain the "Unknown Critic." While I see the issue as no big thing, there are simply too many brown-shoe colonels and master sergeants out there who see this type of request as a personal affront to the integrity and traditions of the corps.

Thanks again for the forum which you provide for discussion and the support you provide for improvement of the Air Force.

Name Withheld by Request

Ed Gates possibly could better serve the interests of the Air Force by referring the would-be hirsute prettyboys to their counterparts in the Marine Corps. Mr. Gates implies that he has a grasp of what young men feel is modern. Maybe. Unisex in the discos is one thing, military efficiency is another. We can all cite good reasons for short hair in the service.

Mr. Gates might devote a column designed to add to the solution rather than to the problem.

Ralph P. Thompson
Georgetown, Del.

The article "Speaking of People" was great. But you didn't mention that the women are now doing the same job with very little trouble with long hair.

Supposedly there is no sex discrimination, where possible, in the Air Force—but here it is. Hair grows on a female's head as well as a man's. Yes, there is a difference of face but this is where the Air Force should make its policy. This, of course, should reflect all laws passed on the subject, such as Title 9. It should be a DoD policy on hair, not the lower departments. It should be made standard policy between both sexes, when possible. Also with as few directions as possible. The few that are put down should be clear and precise, with no mistake in meaning.

W. B. Larson II
Fort Walton Beach, Fla.

It is not just the "young airmen." Even after years and years, it still frosts me that AFR 35-10 tells me that I must cut my sideburns to a 1950 style. We are not asking that standards be *relaxed.* We ask that they be *modernized.* Please! I'm forty years old already and I'm tired of waiting.

Thanks for printing Ed Gates's essay on this issue.

Maj. John F. Hulpke, WANG
Cheney, Wash.

I have been reading articles written by Ed Gates for several years and can now appreciate the monthly barrage of letters to the editor taking offense at his various positions. I had thought Mr. Gates to be a knowledgeable, conservative journalist; however, . . . he has demonstrated his flair for radical, yellow journalistic trouble-making.

Hasn't Mr. Gates read the results of a recent Eastern university study that proved a direct relationship between long-haired men and such traits as unreliability, lack of integrity, and deficiencies in judgment? Isn't it apparent to him that recent Air Force retirees consistently keep their hair trimmed to AFR 35-10 standards while in their new civilian life, thus demonstrating their support for such reasonable standards? Where does it say that Air Force personnel should be representative of the populace they have sworn to defend?

Air Force doctrine as defined in AFR 1-1 states that changes to such policies as hair, wearing hats and thin ties will not keep pace with the civilian community to avoid confusion in identifying and distinguishing military members from civilians.

I am sure Mr. Gates is proud of his long hair; however, he should study Air Force personnel policies for a few years before writing such disruptive articles.

David N. Gates
Dayton, Ohio

• *Mr. Gates's hair style falls well within the bounds of AFR 35-10.*—THE EDITORS

Too Late to Recover?

I trust that the February 1980 issue of AIR FORCE Magazine has been sent to every senator and representative in the US Congress, plus a number of copies for the White House; one, of course, earmarked for our Commander in Chief.

It is an excellent, hard-hitting issue (most usually are), but says what needs saying *now* and pulls no punches. As a thirty-two-year veteran of military service, having retired in 1971, I have watched with horror and growing frustration our civilian and some military leaders and the inept Congress gut the military and intelligence power of our country. I hope it isn't too late to recoup our lost advantages.

You spoke of the cancellation of the B-1 program as being one of the greatest errors of the decade; I think an equal error was made by President Carter when he pardoned those who had deserted the US in time of need during the Vietnam War.

I wonder what will happen if they do it again.

Lt. Col. Gordon E. Copeland, USAF (Ret.)
Clinton, Md.

Is It Really Needed?

I, like hundreds of thousands of other American white-collar salaried employees, receive a paycheck with my taxes deducted, which makes "skimming" on gross income impossible. On the other hand, I make just enough money to get by on a day-to-day basis and can't even afford the price of a cornerstone for a tax shelter, let alone the whole structure.

Keeping these thoughts in mind brings me to the burning question: Why does the Department of Defense want to put the American taxpayer through the "prolonged agony and expense" of an RFP, source selection, design, test, evaluation, and fly-off between two contractors for a new CX strategic airlifter when we have the C-5 in being?

Why not go into immediate production on a C-5X? A C-5X that incorporates the new wing currently under test will increase their useful life from 8,000 to 30,000 hours. A C-5X that incorporates a new, simplified, hard-surface-only landing-gear system and gets rid of the costly requirement for landing gear that can put the aircraft down on unprepared fields. If I'm not badly mistaken, the Air Force specification calls for the gear to transverse a ten-inch stump, which makes me wonder if they have never heard of a

Airmail

fine little device called a chain saw. And again, if I'm not badly mistaken, Lockheed demonstrated the C-5 could ride over a ten-inch stump on an unprepared field—and at the same time ruined four engines (at a million dollars a copy) by the foreign object debris (FOD) sucked in by those huge fanjet engines. Not too cost-effective, as I see it.

And, finally, a less costly C-5X that does *not* incorporate the requirement for an aerial delivery system. A C-anything big enough to carry an XM-1 tank is a sitting duck flying over a drop zone that requires aerial delivery to survive. All the Soviets need to down an aircraft of that size is a peasant with no arms and good sight to tell a blind soldier with an SA-7 in which direction to point and fire his shoulder-fired surface-to-air missile.

In the January 1980 editorial, you stated that "The years of greatest peril lie between 1982 and 1986." With the source selection, procurement, design, test, and evaluation cycles what they are today for a major weapon system such as a CX, the US would be outright lucky to see the first production CX by 1990.

I am in no way associated with Lockheed, nor do I own any of their stock. I am all for competitive procurement, but at a time when we are trying to stand up to the Soviets with a foreign policy made of spaghetti, I say it's time to throw the book on competitive procurement out the window and get on with a C-5X—now!

And, in conclusion, why aren't we stretching our C-130 fleet, adding in-flight refueling and the same inertial navigation system as used on the C-141? If we can gain cargo capacity equivalent to an additional ninety aircraft by modifying 271 C-141s, what would our gain be in additional aircraft by stretching the C-130 fleet?

For what it's worth, I'm in favor of putting my hard-earned tax dollars into an immediate production program on a C-5X and C-130X, and then let USAF go back to playing with a CX if that's what it takes to keep them happy.

R. H. Melton
Perry, Ga.

F-4G Wild Weasels

I read with great interest the *Jane's All the World's Aircraft* Supplement in your February 1980 issue concerning the newest Wild Weasel aircraft, the F-4G.

I thought you might be interested in the people who are creating the new Wild Weasel. The civilian work force at the Ogden Air Logistics Center has undertaken the most extensive modification to a fighter aircraft ever done in an organic depot facility. The personnel changing the formidable F-4E into a sophisticated hunter-killer, SAM-suppression aircraft deserve all of the recognition for technical competence that we can give them. I know that you are as proud of them as I am.

Maj. Gen. John J. Murphy, USAF
Commander
Ogden Air Logistics Center
Hill AFB, Utah

Retiree Volunteers

In view of the Soviets' implementation of its grand strategy (domination of the Middle East and the oil), we must look again at the problem the Air Force (and all services) is experiencing in retaining top-level people for the long haul. I believe we are missing the boat on a prime experienced manpower source—our retired people.

Why not allow retired types, who desire to volunteer, to be assigned to units on a training basis? They would be paid expenses only, no salary, and would wear a device that only signified officer or enlisted. They would work, during training periods, with an active-duty type to keep up as much as possible with their respective field of mobilization assignment. Active-duty rank, pay, etc., would be forthcoming if called to active duty.

Col. Al Nelson, USAF (Ret.)
Fox Island, Wash.

University of Virginia AAS

The Demas T. Craw Squadron of the AAS at the University of Virginia is updating its files, and we would like to hear from all our alumni. Drop us a line on where you are and what you are doing.

Arnold Air Society
Demas T. Craw Squadron
AFROTC Det. 890
c/o David Barnaby
Varsity Hall, University of Virginia
Charlottesville, Va. 22903

UNIT REUNIONS

AFIT Alumni

Greater Chicago Area Chapter being formed. Resident and nonresident participants of all programs forming an Association with Wright-Patterson AFB Chapter. For details and plans, **contact:** Lt. Col. Frank Voltaggio, USAF (Ret.), 204 Merton Ave., Glen Ellyn, Ill. 60137. Phone: (312) 259-9600 or 469-4627; or Dr. Paul A. Whelan, Pres., Lewis University, Romeoville, Ill. 60441. Phone: (815) 838-0500 or 723-9597.

WW II Bombardiers Alumni Ass'n

9th biennial reunion, August 20–24, Washington, D. C. **Contact:** Fred Bauer, P. O. Box 87, Annandale, Va. 22003. Phone: day (202) 426-8754, evening (703) 978-5479. For information on the Association, **Contact:** Bill Burmester, 485 E. Lincoln Ave., Mt. Vernon, N. Y. 10552. Phone: day (914) 390-5847, evening (914) 699-4196.

Cannon Troops

June 21–22, Cannon AFB, N. M., Officers' Club. All former Cannon troops, tell friends and send any names and addresses you have. **Contact:** Pat Miller, 3717 Linkwood, Clovis, N. M. 88101. Phone: (505) 784-3311, ext. 2666/2631 (office), (505) 763-6419 (home); or J. G. Boyd, 3537A Adenmor Ct., Clovis, N. M. 88101. Phone: (505) 762-1227.

Gathering of Warbirds

Fresno Chapter/AFA's 9th annual Gathering of Warbirds, August 16–17, Madera Municipal Airport, Madera, Calif. More than 55 WW II, Korean War, and between-wars fighters, bombers, trainers, and other military types. "New" warbirds making their debut. Simulated air-to-air, air-to-ground combat, precision military aerobatics, guest performers. **Contact:** James H. Estep, 6251 N. Del Rey Ave., Clovis, Calif. 93612. Phone: (209) 299-6904. **Press Contact:** S. Samuel Boghosian, 6012 N. Roosevelt, Fresno, Calif. 93704. Phone: (209) 439-3062.

Mesa del Rey

June 15, King City, Calif. All civilian and service personnel involved in primary flight training program during WW II at Mesa del Rey Airport. **Contact:** Mickey Muzinich, 331 Canal St., King City, Calif. 93930. Phone: (408) 385-5678.

Pampa Army Air Field

August 8–10, Coronado Inn, Pampa, Tex. **Contact:** John R. Mattingly, 5904 Rickey Dr., Austin, Tex. 78731.

1st Fighter Group

27th, 71st, and 94th Fighter Squadrons, WW II, September 11–14, Four Seasons Motel, Colorado Springs, Colo. **Contact:** Francis H. "Bucky" Harris, 2235 Caminito Loreta, La Jolla, Calif. 92037. Phone: (714) 459-9145.

3d Air Depot Group

Labor Day weekend, August 29–31, San Antonio, Tex., all WW II members. **Contact:** Reunion Committee, 3d Air Depot Group, 2623 West Craig, San Antonio, Tex. 78228.

8th Fighter Group

Hq., 8th, 33d, 35th, 36th, 80th Fighter

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SCIENCE/SCOPE

North American skies will be monitored automatically against attack by a fully computerized air defense system. The new Joint Surveillance System (JSS) will replace the operational centers of the SAGE (Semi-Automatic Ground Environment), BUIC (Back-Up Interceptor Control), and manually-operated centers. The network, which will jointly use civilian and military radars, is to consist of seven regional centers tied into the North American Air Defense Command (NORAD). It will be able to track and identify more targets in less time, as well as direct intercept missions more efficiently. JSS is being produced by Hughes under contract to the Electronic System Division of the U.S. Air Force Systems Command.

Improvements to a U.S. Navy torpedo will enable the weapon to remain effective against enemy submarines through the 1990s. Hughes has been awarded the prime contract to develop a new digital guidance and control subsystem for the Advanced Capability (ADCAP) Mk-48 heavyweight torpedo. The electronics will improve the torpedo's guidance and effectiveness, particularly in adverse open-ocean environments. Twenty-four electronics kits will be developed for installation and test during the 36-month validation phase of the contract. Teamed with Hughes is the Gould Corporation, builder of the Mk-48 torpedos.

Computers are freeing electronics engineers from monotonous tasks and giving them more time to be creative. With Computer Aided Design/Computer Aided Manufacturing (CAD/CAM) systems, engineers sketch designs on terminal screens and let computers create final drawings. They can have the computers assemble their parts or circuits and simulate the way they actually would work. In an important step toward "paperless" production, the computers also convert designs into coded form to run automated machinery in manufacturing. One Hughes CAD/CAM center helped to significantly reduce development costs of the AN/APG-65 radar, produced under contract to McDonnell Douglas for the F/A-18 Hornet.

The Calypso, undersea explorer Jacques Cousteau's vessel known worldwide for its oceanographic explorations and discoveries, is now using the communications services of the Marisat satellite network. The network's three satellites were built by Hughes under contract to a consortium led by Comsat General Corporation to provide telecommunications services for the U.S. Navy and commercial maritime industry. More than 300 terminals for modern maritime communications are installed on cargo ships, tankers, luxury liners, seismic ships, and off-shore drilling platforms around the world.

Finding wasted energy is one of many ways that a hand-held infrared viewer helps its users save money. The device, a Hughes Probeye® viewer, senses heat to create a red-on-black image for display through an eyepiece. It let workers at a large airport pinpoint underground steam leaks within a 10-foot circle, thereby avoiding costly exploratory excavations that would have disrupted airport operations. Paper manufacturers use the viewer to monitor paper sheets for moisture differences that can cause defects. The scanner picks up temperature changes caused by varying moisture conditions. Inquiries about the energy and safety uses of the Probeye viewer should be directed to (714) 438-9191, Ext. 223.

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Control Squadrons, and attached units, WW II, August 1–3, George Washington Motor Lodge, Allentown, Pa. **Contact:** Victor W. Stefanic, 21 Curston St., West Warwick, R. I. 02893.

14th Air Force Ass'n Flying Tigers
33d convention, July 31–August 2, M.G.M. Hotel, Reno, Nev. **Contact:** Douglas A. Erickson, 311 W. 4th St., Carson City, Nev. 89701.

49th Fighter Sqdn., 14th FG
August 8–10, Reno, Nev. **Contact:** Sheril D. Huff, 3200 Chetwood Dr., Del City, Okla. 73115.

66th Seabee Bn., 1022d Det., USN
WW II duty in Alaska, Aleutians, Guam, Okinawa, August 27–31, Hilton Airport Inn, No. 1 International Plaza, Nashville, Tenn. **Contact:** W. M. Howard, 2648 Country Green Rd., Memphis, Tenn. 38134.

75th Air Depot Wing
July 31–August 3, Sacramento, Calif. All squadrons that served at Kelly Field, Tex., K-10 Korea, or Iwakuni, Japan 1952–55. **Contact:** Kenneth M. Brunmeier, P. O. Box 181, Onida, S. D. 57564.

100th Bomb Wing (SAC)
August 8–10, Pease AFB, N. H. Vets of Pease, 1956–66. **Contact:** Richard Bottom, 6 Lakeshore Dr., Barrington, N. H. 03825. Phone: (603) 664-2011.

AC-130 Gunships
All Spectres and others associated with 16th SOS, 6th annual minireunion, May 23–25, Fontenelle Hills Country Club near Omaha, Neb. **Contact:** Col. R. A. Wicklund, 602 Martin Dr. North, Bellevue, Neb. 68005. Phone: (402) 291-4690.

308th Bomb Wing
July 4–6, Airport Quality Inn, Savannah, Ga. 2d reunion of personnel stationed at Hunter AFB, Ga., 1953–59. **Contact:** Ray Handley, 304 Lafayette Circle, Savannah, Ga. 31405. Phone: (912) 355-6867.

318th Fighter Group, 7th AF
June 26–28, Nashville, Tenn. **Contact:** 318th Fighter Group Association, c/o Thomas E. Foote, 166 Harvard Ave., Tacoma, Wash. 98466.

345th Fighter Sqdn. "Devil Hawks"
July 31–August 2, Minneapolis, Minn. **Contact:** Jake Kingsbury, 2106 Wesley Ave., Collinsville, Ill. 62234. Phone: (618) 344-0131.

369th Fighter Sqdn. Ass'n
359th Fighter Group, WW II, AAF Station 133, 557 England, August 7–10, Washington, D. C. **Contact:** Anthony Chardella, 105 Mohawk Trail Dr., Pittsburgh, Pa. 15235.

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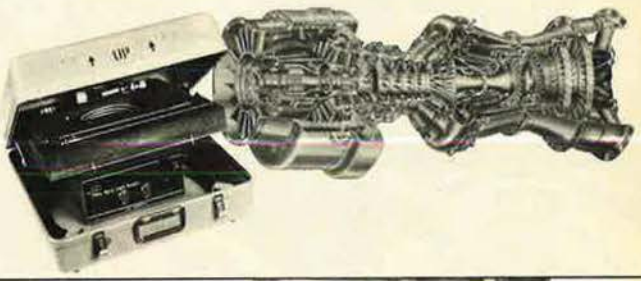

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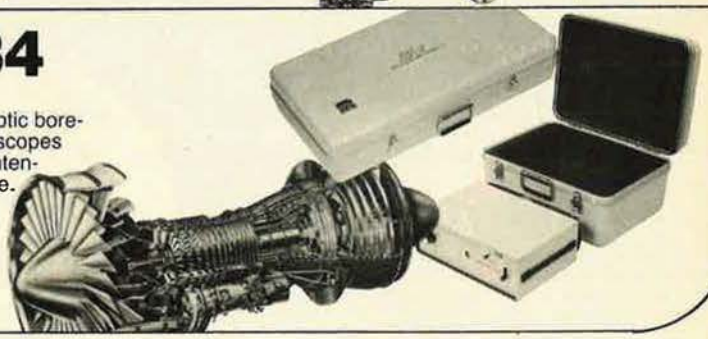

390th Bomb Group
3d reunion, June 6–8, John's Niagara Hotel, Niagara Falls, N. Y. **Contact:** Patrick Rossi, 390th Bomb Group Memorial Association, 58 Doat St., Buffalo, N. Y. 14211. Phone: (1-716) 895-5715.

434th Bomb Sqdn., 12th BG
35th annual reunion, June 25–29, Langford Hotel, Winter Park, Fla. **Contact:** John W. Trent, 2192 Quail Trail, Lake Worth, Fla. 33461.

451st Bomb Gp., 15th AF
Hq., 724th, 725th, 726th, and 727th Squadrons, August 1–3, Chicago, Ill. Former members wishing to attend or to get on mailing list, **Contact:** 451st Bomb Group, 1032 S. State St., Marengo, Ill. 60152.

464th Bomb Gp., 15th AF
August 1–3, Colorado Springs, Colo., for all members of the Group. **Contact:** H. Robert Anderson, 4321 Miller Ave., Erie, Pa. 16509. Phone: (814) 866-1465.

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In Focus...

BY EDGAR ULSAMER, SENIOR EDITOR

Washington, D. C., April 10

Soviets Violate Bacteriological Warfare Ban

On April 10, 1972, the Soviet Union, the United States, and England signed a binding agreement or "Convention" banning the "development, production, and stockpiling of bacteriological [biological] and toxin weapons." Toxins are substances that fall between the categories of biological and chemical warfare agents in that they act like chemicals but ordinarily are produced by biological or microbic processes. The agreement also contained ironclad provisions for the mandatory destruction of such materials in the possession of the signatories. The 1972 Convention serves as an extension of the 1925 Geneva Protocol—also cosigned by Moscow—outlawing the first use of poison gas and bacteriological warfare.

Hard evidence indicates that the Soviet Union has deliberately and blatantly violated both the Geneva Protocol and the 1972 Convention. There is concern in Congress over the Administration's reticence in providing relevant information. Motivation for this reticence is the Administration's seeming desire to bottle up information about the Soviet Union's failure to honor arms-control agreements. Most of the information produced by US intelligence sources concerning the Soviet Union's violations has been classified secret and thus kept out of the public domain. Congressional critics claim the Administration's reason for blocking the release of the incriminating information is the desire to "protect" pending and future arms-control negotiations. Administration officials contacted by this column privately concede that disclosing the details of the 1972 Convention violation would severely damage prospects for Senate approval of SALT II and could doom pending or planned arms-control negotiations on other subjects.

At the core of the issue, the US has "established" that a "severe outbreak" of a disease likely to be induced by the accidental release of a biological warfare agent occurred in the Soviet city of Sverdlovsk in April 1979 and was "serious enough to lead the Soviets to impose a quarantine in the area concerned, and the disease was not brought under control until late in May 1979."

According to reliable information made available to this column, "there is a military facility in Sverdlovsk that has long been suspected of being involved in research and development on biological warfare agents." The US recently obtained detailed information of symptoms associated with the disease in Sverdlovsk last year which indicates that pulmonary anthrax, a potential biological warfare agent, was involved. The US intelligence community reached the conclusion that an explanation for the outbreak of the disease "is that a quantity of biological warfare agent at the Sverdlovsk facility may have been scattered over the nearby area by an accidental explosion, resulting in the outbreak of pulmonary anthrax involving a substantial number of casualties." It follows from the number of casualties—thought to be about 200—that a significant amount of material was involved. The latter finding is pivotal since the 1972 Convention does not prohibit research involving small quantities of material of this type for prophylactic, protective, or other peaceful purposes.

There is evidence also that research and development involving biological warfare agents is being carried out at a number of other sites in the Soviet Union. They are identifiable in part by the particular photographic "signature" of the test sites and R&D facilities associated with biological warfare. US intelligence has located sites at Zagorsk, Omutninsk (an island in the Caspian Sea), and at two or three other locations in the Soviet Union. Some of these facilities appear to have been built after the Soviet Union signed the Convention. (One of the visible clues of biological warfare sites is the grid pattern formed by stakes to which animals are tied to measure the lethality of the agent.)

It is ironic that despite hard evidence of Soviet violations of the Convention, the US, as yet, has not lodged official protests. Ostensibly, the reason is that evidence is "insufficient" to support such charges; in reality, the lack of provisions for on-site inspection and other unambiguous means for enforcing compliance precludes preventing the Soviets from violating arms-control accords of this type.

Commenting on the Soviet violations as well as their use of nerve gas and other chemical warfare agents in Afghanistan, Sen. Gordon J. Humphrey (R-N. H.) urged on the floor of the Senate that "the Soviets should be branded international outlaws for their dangerous treachery. These Soviet violations should finally sound the death knell of twenty-five years of futile US arms-control efforts, too often based on wishful thinking about benign Soviet intentions."

US BMD Programs

Within seven or eight years, the US Army could field a reliable ballistic missile defense (BMD) system to protect hardened military targets, according to Maj. Gen. Grayson D. Tate, BMD Program Manager. A system, known as LoAD for Low-Altitude Defense, designed to protect 200 MX mobile ICBMs with a like number of BMD launchers (each with up to three interceptors) would cost between $7 and $8 billion.

LoAD, as now envisioned, would intercept Soviet reentry vehicles at altitudes between 6,000 and 8,000 feet with nuclear warheads yielding about two kilotons, General Tate told this column. The relatively low-powered, nuclear-hardened radars of LoAD embody a mature, low-risk technology. Overall, "it has been proven beyond reasonable doubt that we have the technology to build an effective terminal defense system that can detect, discriminate, and intercept ICBM warheads even in the extreme environment caused by massive ICBM attacks, ICBM tank fragments, and penetration aids," according to General Tate. First flight demonstration of the LoAD prototype system is expected within four or five years, assuming continued adequate funding of the program.

LoAD, by itself, makes sense only when used to protect a survivably based (multiple aim point) MX ICBM. In that case, the BMD launcher is located in one of the MX system's shelters near the shelter housing the MX missile. The attacker, of course, does not know which of the twenty-three shelters within an MX "closed-loop"

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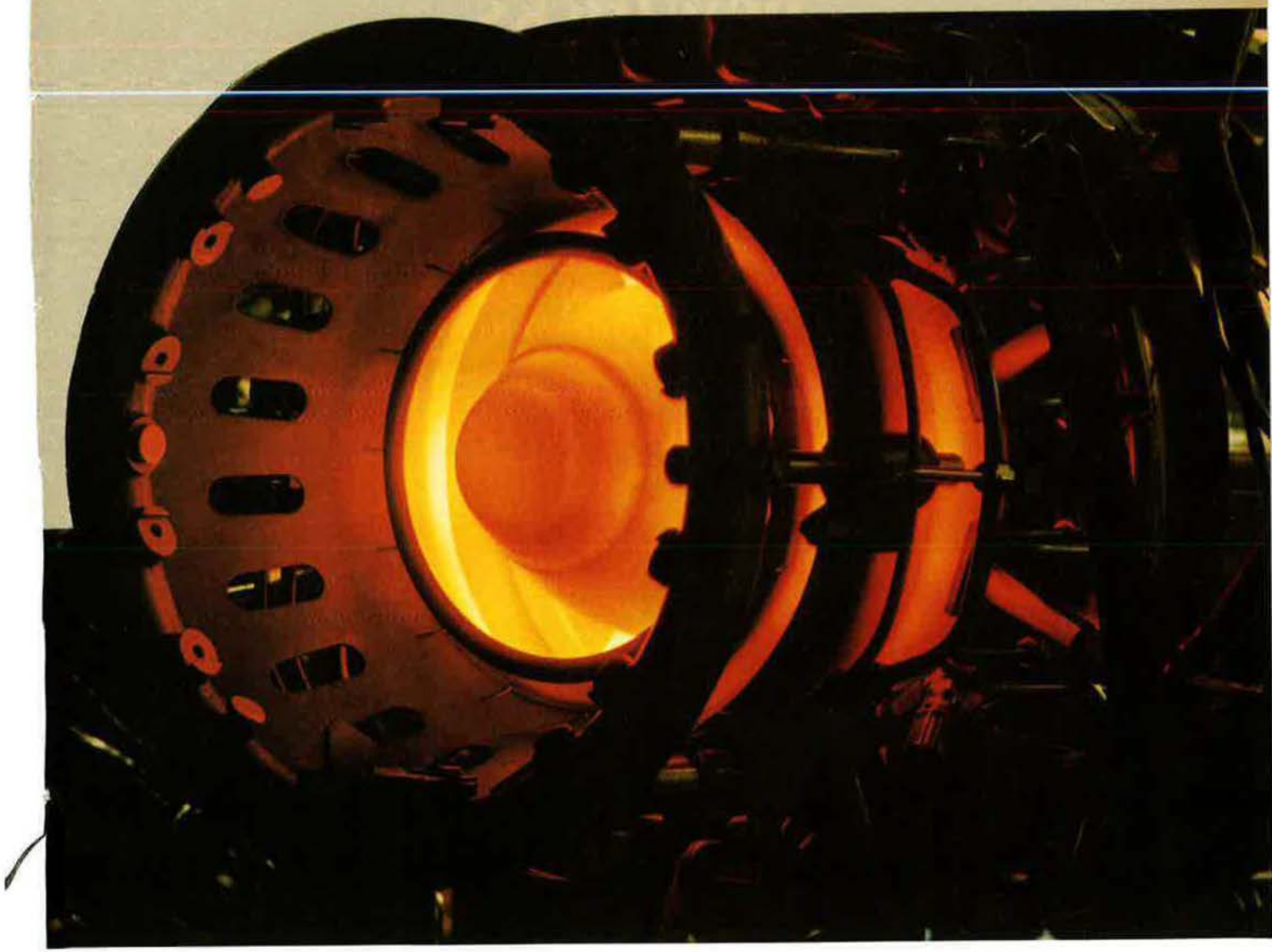

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complex houses the ICBM and which houses the BMD at a given time. The result, therefore, is "high leverage" for BMD when coupled to MX. The aggressor must attack each shelter twice in order to destroy the hidden ICBM because he knows that the first warhead aimed at the shelter housing MX will be destroyed by the BMD. The effect of the BMD/MX symbiosis thus is tantamount to doubling the number of shelters in a given MX complex, yet is more economical.

In addition to working in conjunction with MX, LoAD also could serve as the close-in element of a two-element "layered" BMD. The "overlay" element, General Tate said, would consist of long-range nonnuclear exoatmospheric interceptors to thin out the incoming warheads several hundred miles from the target area. Such a layered defense is suitable for softer targets such as SAC bases, command and control facilities, and the National Command Authorities. An overlay system using autonomous interceptors with optically homing kill vehicles and nonnuclear warheads involves untried technologies and is much further away than LoAD; however, a number of recent advances have been encouraging, according to the BMD Program Director. These include the so-called Designating Optical Tracker (DOT), which recently completed two successful flight tests, and the Homing Overlay Experiment (HOE). The latter is to consist of four flight tests involving intercepts of special target complexes. The launch vehicle will be a modified Minuteman I booster, and the kill mechanism will consist of a buckshot-like array, or net, that unfolds like an umbrella and impacts on the enemy's RVs with extreme velocity and hence lethality. This design provides a multiple kill capability against swarms of RVs. Such an approach, General Tate points out, would counteract fractionation (increasing the number of MIRVed warheads carried by Soviet ICBMs beyond the numbers stipulated by SALT II).

Long-term objectives of the layered defense system include developing a nonnuclear kill mechanism for LoAD and the ability to intercept maneuvering warheads (MaRVs). Two basic forms of maneuvering warheads are known to exist. One is a warhead design with a "bent nose" that makes it fly off course during its reentry flight. Since the RV rotates, this deflection causes a barrel-roll descent that makes interception difficult. The other MaRV technique uses aerodynamic control surfaces such as flaps that either could operate in a preprogrammed fashion or through command control. In the latter case, far-out designs might involve "smart RVs" that detect BMD interceptors and maneuver out of their path.

Nuclear Weapons Shortfalls

A recent congressional staff report on US military deficiencies warned of dangerous erosion of the country's nuclear weapons production complex. Nuclear weapons research has "become a backwater in American strategic planning and weapons development. . . . Simply producing a certain number of warheads and then going out of business is exceedingly dangerous."

Inadequate capacity for producing two crucial nuclear materials, plutonium and tritium, blocks "any effort to upgrade nuclear forces," according to the staff report. Therefore, "a new plutonium facility (at least one new reactor) to maintain weapons production in the 1980s and 1990s is absolutely required and cannot be deferred any longer. The new facility could be brought on line by the end of FY '85 if the program were authorized and initiated during FY '81." The cost of a new facility, according to the report, would be about $1.5 billion.

It is equally urgent that production of weapons grade oralloy, discontinued in 1963, be resumed. There is ample capacity for producing this material, which serves as the fission trigger for nuclear weapons, at existing gaseous diffusion plants that serve the nuclear power industry. These plants are running well below capacity because of government restrictions on the export of nuclear fuels. All that is needed is the Administration's decision to make use of this existing capacity, according to the congressional study. About $530 million would be required to assure adequate production of oralloy through FY '81.

The congressional study recommends that research on nuclear weapons design be increased by $500 million through FY '85 to make up for shortfalls in the Administration's Five-Year Defense Plan (FYDP). Additionally, about $1 billion is needed over the next five years to put nuclear weapons laboratories on a par with the Russian nuclear weapons program.

The congressional study points out that at a time when Russian nuclear weapons testing is accelerating to an unprecedented level, the US has brought its test program to a virtual standstill. The study finds that at least $200 million should be added to the FY '81 budget for nuclear weapons testing in order to meet the objectives contained in the Administration's defense budget.

One of the ironic sidelights of the US nuclear weapons program is the fact that this year the government had to buy on the open market about $200 million worth of precious metals (gold, silver, and platinum) that are required to boost nuclear weapons performance, thus driving up their price. Yet, at the same time, the US government is the owner of vast quantities of these metals that are used to backstop the dollar in a monetary sense.

Washington Observations

★ The Arms Control and Disarmament Agency recently confirmed an earlier report in this column about last summer's visit to US nuclear weapons development facilities by a team of Soviet defense scientists. According to ACDA, the sixteen Soviet "experts" visited various US facilities involved in developing seismic installations designed to monitor compliance with CTB (the comprehensive ban on testing all nuclear weapons, including underground detonations). The Soviet group was headed by M. Sadovski, Director of the Institute of Earth Physics of the Soviet Academy of Sciences.

After introductory meetings in Washington, D. C., the Soviet experts visited the Cumberland Plateau Observatory in Tennessee to inspect a prototype of the highly advanced automatic US seismic monitoring station. From there, ACDA reported, the Soviet experts went to Albuquerque, N. M., "where they were given technical briefings and held discussions on the national seismic station equipment that has been developed by Sandia Laboratories, under contract to the US Department of Energy. The group then visited the Massachusetts Institute of Technology's Lincoln Laboratory facility to discuss the Department of Defense-sponsored program for developing a seismic data-processing center. Finally, the group returned to Washington for a visit to the Seismic Data Analysis Center in Alexandria, Va." Among congres-

In Focus...

sional and Defense Department experts there is some concern that the Administration's eagerness to conclude such a treaty has led to excessive candor with Soviet defense experts.

★ On March 31, President Jimmy Carter presented Congress with plans for a revised, balanced budget for FY '81 that reduces federal outlays by $17.2 billion from the Administration's original budget request of January 1980. So far as DoD is concerned, the revamped budget employs considerable legerdemain; while there are "paper" increases to cover some of the effects of inflation, these increases are more than offset by real cuts.

In the defense sector, the revisions include both a supplemental funding request for FY '80 as well as amendments of the FY '81 request. Four primary areas are covered by the supplemental and the amendments: Unforeseen increases in the cost of fuel, higher-than-anticipated inflation, the need to shore up the so-called Rapid Deployment Force (RDF) and to increase US military presence in the Indian Ocean area, and "offsetting" cost reductions in other areas. The FY '80 supplemental, derisively referred to as the "zero" supplemental in Congress, illustrates the ambiguities underlying the revised budget. The increase in fuel costs—understated in the private view of Pentagon financial experts—is pegged at $2.5 billion; unforeseen inflation is calculated to amount to $300 million; and the cost of the Indian Ocean presence combined with late increases in RDF funding comes to $428 million. The total of the three items is $3.228 billion. Yet the amount of the supplemental is only $2.3 billion, or a shortfall of $928 million that is being "offset" by program cuts and deferrals, most of which appear to diminish military capabilities that were deemed essential by the Carter Administration as recently as January 1980.

The same condition obtains in the case of the amendments to the FY '81 defense budget request involving offsets of about $1.62 billion, as compared to new appropriations of about $2.9 billion. Overall, the FY '80 and FY '81 offsets amount to about $2.55 billion. The Air Force's share of the offsets—meaning program cuts—is $411 million in FY '80 and $436 million in FY '81. Among the most severely cut USAF R&D and procurement programs are high-energy laser weapons—$20 million—and acquisition of A-7K and C-130 aircraft—$198.5 million.

★ The US, Secretary of Defense Harold Brown told Congress, is designing a facility "that will have the capability to build binary chemical bombs, warheads, and projectiles." A binary munition consists of two chemical agents that are harmless when separated but when mixed become toxic. Agents of this type would be mixed after a shell is fired or a bomb dropped. First use of chemical weapons or incapacitants is prohibited by the Geneva Protocol of 1925, which was signed by the US and the USSR, among others. However, the United States and many of the other signatories have retained the right to retaliate with chemical weapons against a chemical attack.

According to Dr. Brown, "We continue to strive for an agreement with the USSR banning offensive CW weapons. However, in the absence of an adequate agreement eliminating the threat of chemical warfare and in view of improving Soviet CW capabilities, we must maintain a credible chemical warfare retaliatory capability to ensure that there are no real or perceived advantages to them in initiating a chemical attack."

★ Recent testimony by USAF witnesses in Congress brought out the far-reaching technological advances incorporated into the new Low-Altitude Navigation and Targeting Infrared System for Night (LANTIRN). An automated air-to-surface electro-optical fire-control system, LANTIRN integrates operationally proven head-up display (HUD), forward-looking infrared (FLIR) sensor, laser, and microprocessor computer technologies into a podded system usable on any tactical aircraft. The system is designed to let the pilot of a single-seat aircraft fly low to avoid enemy defenses while the pod automatically acquires and identifies critical battlefield targets. The pilot then can deliver weapons in a normal mode or automatically through the pod system. Additionally, the pod provides a single-seat, target-designation capability for laser-guided bombs. Initially, LANTIRN will be added to A-10 and F-16 aircraft to provide them night and under-the-weather capabilities.

★ The Advanced Ballistic Reentry Systems (ABRES) program of AFSC's Ballistic Missile Office involves developing a new reentry vehicle for MX that could involve a warhead with adjustable yields. Known as the Advanced Ballistic Reentry Vehicle (ABRV), this system also incorporates jam-resistant warhead fuzing arrangements and advanced penetration aids. Some of the latter also could be used by the Trident I Mark 500 Evader warhead. ABRV development is to be completed in FY '81 and will provide the option to arm MX with RVs of greater accuracy, flexibility, and effectiveness than the 335 kiloton-yield MK 12A. A longer-term option for MX is the ABRES program's Advanced Maneuvering Reentry Vehicle (AMaRV), which in recent test flights demonstrated the ability of an inertially guided maneuvering reentry vehicle to evade advanced ballistic missile defenses with no loss in accuracy.

Because of the high cost of equipping MX with a new advanced reentry vehicle and warhead, present plans are confined to deployment of the MK 12A on the new ICBM.

★ Late in February, Sens. Jesse Helms (R-N. C.) and Gordon J. Humphrey (R-N. H.) asked President Carter to provide details about Soviet encryption of a ballistic missile test flight involving the new "Typhoon" submarine-launched ballistic missile. The letter—so far unanswered—points out that the SALT II Treaty requires the US to monitor "the characteristics of new-type ICBMs with much more precision than the characteristics of SLBMs. Indeed, it is widely recognized that there is a major loophole in SALT II because the Soviets could circumvent all the constraints on new-type ICBMs merely by testing them under the guise of SLBMs. If the Typhoon were fired from a land-based launcher, and it turns out to have range greater than 5,500 kilometers, then it could easily be a new-type ICBM. Alternatively, it could violate the prohibition on heavy SLBMs."

★ One of the key questions associated with tentative plans for an advanced, high-flying, supersonic penetrating bomber hinges on the ability to provide such a system with laser weapons that can intercept nuclear-armed SAMs. The requirement is to neutralize low-yield warheads at "safe distances," before they can destroy the aircraft. ■

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Aerospace World News, Views & Comments

By William P. Schlitz, ASSISTANT MANAGING EDITOR

Washington, D. C., April 9

★ USAF in late March named Boeing Aerospace Co., Seattle, Wash., as prime contractor for the air-launched cruise missile program. As such, Boeing will produce some 3,400 of its AGM-86Bs over the next six or seven years in a program valued at about $4 billion.

Boeing's selection came following an eight-month competitive flyoff with General Dynamics Convair Division, San Diego, Calif., at Edwards AFB, Calif. Each of the two contractors had six successful flights of the ten ALCMs each launched, but the Boeing missile performed better technically, Air Force officials said. The launch failures for the most part were for reasons only "peripherally" related to the missiles' performance, officials said.

General Dynamics had previously been picked to build ground-launched and ship-launched cruise missiles.

Responsibility for the ALCM program will now shift from the Joint Cruise Missile Project Office in Washington to Air Force Systems Command.

Major subcontractors participating in the ALCM program will be Williams Research Corp., Walled Lake, Mich., which will build the ALCM jet engine, and McDonnell Douglas Astronautics Co., St. Louis, Mo., supplier of the ALCM inertial guidance systems. In all, about thirty concerns around the country will be involved in ALCM production.

The 1,500-mile-range ALCMs are to be deployed on B-52Gs beginning in September 1981, with the first SAC squadron equipped with twelve missiles to be operational by December 1982 at Griffiss AFB, N. Y. Additional units to receive ALCMs are at Wurtsmith AFB, Mich., Grand Forks AFB, N. D., and Ellsworth AFB, S. D.

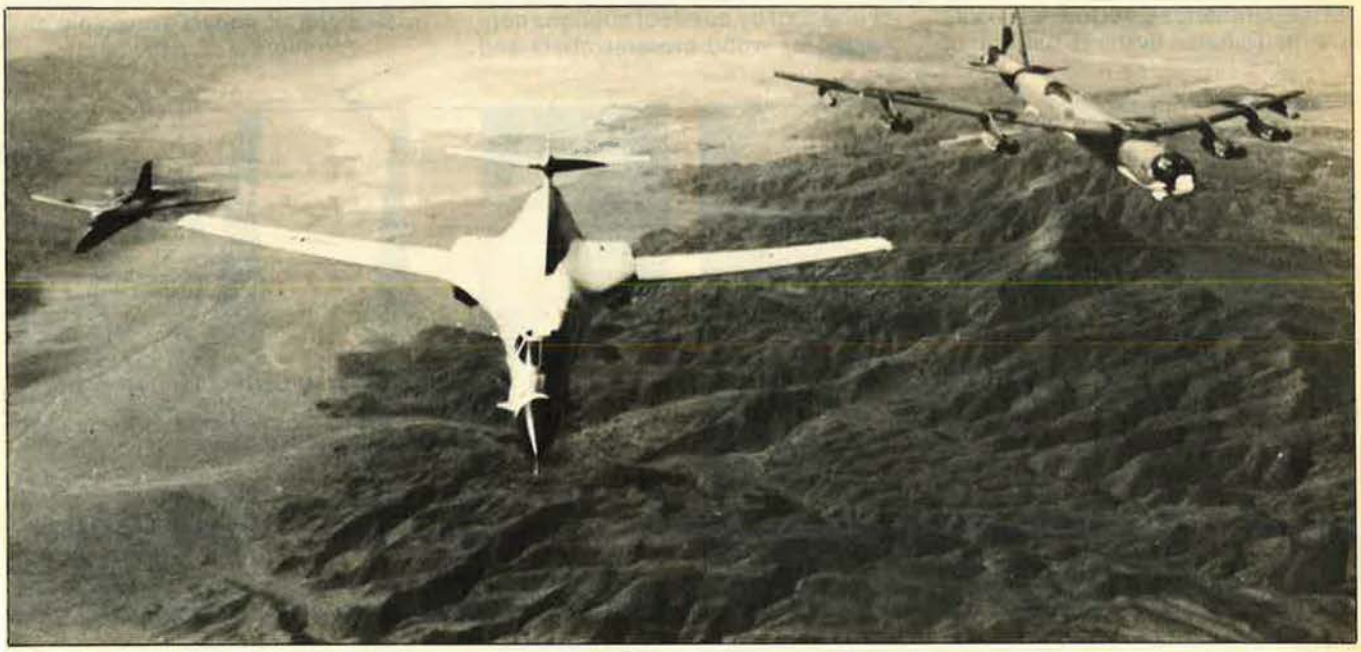
With ALCM-equipped aircraft to form an integral part of the nation's deterrent forces well into the next century, Air Force officials are already looking toward a replacement for the aging B-52 ALCM launchers.

★ USAF plans to base three squadrons of F-16 tactical fighters at Hahn AB, Germany, beginning in mid-1981. The F-16s will be the first stationed with US forces in Europe.

The aircraft will replace three squadrons of F-4E Phantoms of the base's 50th Tactical Fighter Wing. Pilots and maintenance people for the F-16s will be trained at an as yet undecided CONUS base, officials said. Initial pilot manning will include former F-4 pilots from Hahn and other sources, and a cadre of F-16-experienced people will be assigned as a maintenance nucleus.

While the civilian employee situation at Hahn is not expected to be affected by the action, officials are anticipating a twenty percent reduction in military personnel at the base and a ten percent drop in US dependents. That's because the F-16 has a crew of one vs. the F-4's two. Also, the F-16 should require less maintenance.

Forty-eight F-4Es from Hahn and twenty-four older USAFE models will be redistributed within the active and Reserve Forces. The newer models,



Aircraft over the test range at Edwards AFB, Calif., wait their turn for aerial refueling by a Strategic Air Command KC-135 tanker. The aircraft, from left, an F-111 built by General Dynamics Corp., a B-1 built by Rockwell International Corp., and a B-52 built by the Boeing Co.

Aerospace World

however, will stay in European units.

The F-16 will complement the F-15 in the air-superiority role in Europe and the A-10 and F-111 in the air-to-surface mission.

★At rollout ceremonies at Denver, Colo., in late February, Martin Marietta delivered to USAF the principal elements of the newest model space booster, Titan 34D.

The 34D is to serve as the Air Force's main launch vehicle until the Space Shuttle begins operational flights in the mid-'80s.

The hardware—two liquid-propelled core stages—will be flown by transport aircraft to Cape Canaveral, Fla., to undergo a lengthy series of preflight fit and readiness checks in a newly redesigned launch stand. The two stages, mated with twin solid-rocket motors and the inertial upper stage, will make a maiden flight in mid-1981.

★ In what is considered a procurement milestone, Air Force Systems Command in March awarded its first-ever major multiyear production contract.

The two-part action, totaling $330 million, consisted of awards to Aerojet Ordnance Co., Downey, Calif., and the Defense Systems Division of Honeywell, Inc., Hopkins, N. M., for 25,100,000 rounds of 30-mm ammunition for the A-10's GAU-8 gun. Aerojet received $176 million; and Honeywell, $154 million.

AFSC officials estimate the move will save $34 million.

In awarding the three-year contracts, AFSC Commander Gen. Alton D. Slay said, "This is just the beginning. It took a lot of effort on the part of contractors and government people to make it work. Now we're looking toward making this an accepted way of doing business."

The benefits of a multiyear contract approach are considerable. For example, it enables a contractor to offer reduced unit prices by spreading investment and manufacturing costs over a longer period; there is more incentive to compete for defense contracts, economical purchase of materials, firm subcontracts, and optimized production.

Secure long-term contracts are also seen as inducing contractors to invest in defense production facilities, thus increasing industry capacity to meet wartime requirements.

★ At Kirtland AFB, N. M., has been erected what purportedly is "the largest glued-laminated wood structure in the world." More than 6,000,000 board feet of lumber went into its construction—enough to build 4,000 frame houses.

Trestle, so-called because of the railroad structure it resembles, is built of one-foot by one-foot columns connected by wood crossmembers and held together by about 250,000 wooden bolts. Its laminated deck stands twelve stories above the ground, and can accommodate aircraft the size of the giant C-5 transport and weights up to 550,000 pounds *(see photo, p. 73).*

Access to Trestle's deck is via a 400-foot-long, fifty-foot-wide ramp, also built entirely of wood.

Trestle has been created to enable scientists and engineers to simulate in-flight electromagnetic pulse (EMP) effects on aircraft and electronic equipment. EMPs are those waves of energy that result from a nuclear explosion. Trestle, in a rigidly controlled environment (wood is nonmagnetic and thus can't distort test results), will simulate EMPs by using two 5,000,000-volt pulsers to discharge energy into transmission lines surrounding the aircraft. Sensors will capture aircraft EMP response signals and transmit them by fiber optic data channels to computers inside a shielded enclosure.

Data thus derived will determine the degree to which aircraft are hardened against nuclear detonations in their vicinity and what measures can be developed to minimize the effects of EMPs.

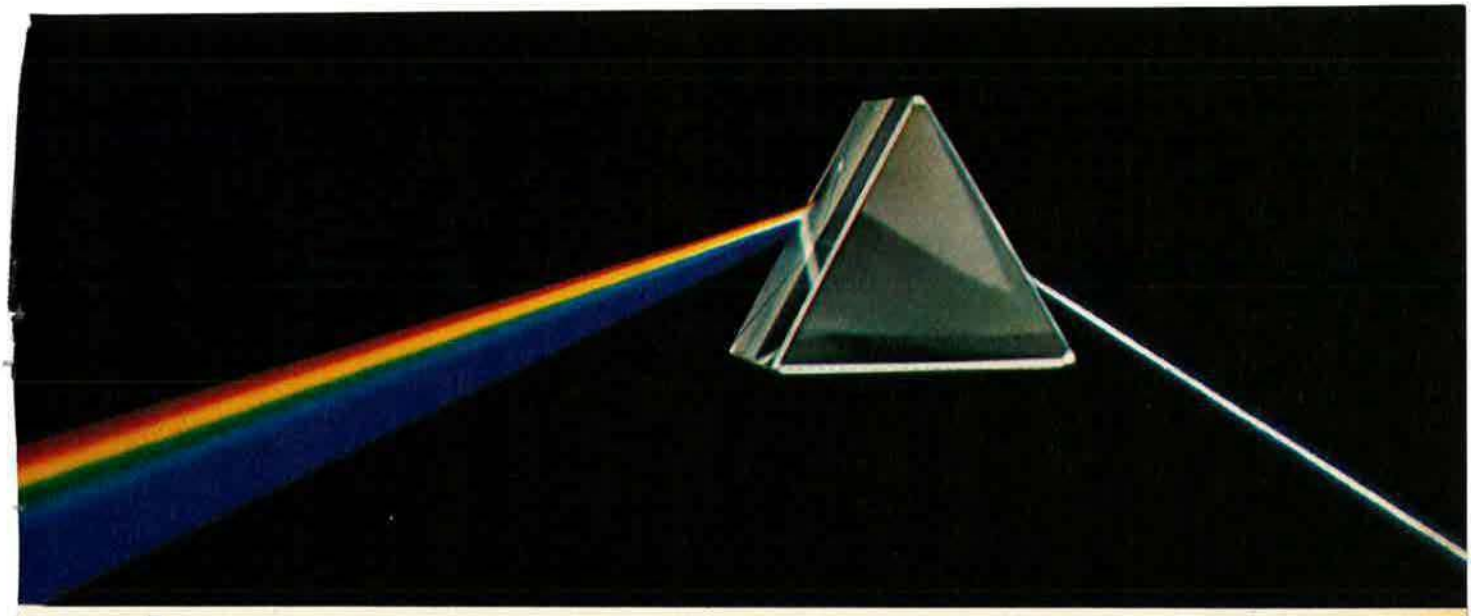
Operational tests of Trestle using a B-52 began in March.

★ The FAA's National Aviation Facilities Experimental Center (NAFEC) and NASA's Langley Research Center have funded three studies totaling $900,000 for detailed evaluations of impact-survivable air-

(continued on page 38)

Two war-horses still active: Lt. Gen. Jimmy Doolittle, USAF (Ret.), looks over the controls of a C-5 at Travis AFB, Calif. The eighty-three-year-old World War II hero received tribute during a recent Daedalian/AFA affair at the base. Meanwhile, retired Air

Force Chief of Staff Gen. Curtis E. LeMay, who helped build SAC as a deterrent force, visited the Air Force Academy and here chats with Superintendent Lt. Gen. K. L. Tallman. General LeMay lectured in classrooms and exchanged views with faculty members and cadets.



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Aerospace World

Holloman Pilots on Long-Endurance Flight

A record-breaking—even historic—mission was flown by two F-15 Eagles from Holloman AFB, N. M., late in February.

Piloted by Maj. Robert Summers and Capt. Thomas Vanderheyden, both of the 49th Tactical Fighter Wing's 7th TFS, the aircraft flew a fourteen-hour, nonstop 6,200-mile course that required six aerial refuelings. The mission set a record for the McDonnell Douglas air-superiority fighter and was one of the longest flights for any single-seat fighter.

Purpose of the mission was to determine if pilots in single-seat fighters could undergo long, nonstop flights without major problems and, in effect, was more a test of pilot endurance than aircraft capability, according to officials. The flight had special importance for the 49th TFW, since the wing's assignment is readiness for overseas deployment on short notice.

Departing Holloman, the pilots' route took them east to Oklahoma City, over Dallas–Fort Worth, past New Orleans to St. Petersburg, Fla., where they turned north. Over Pennsylvania, the F-15s headed west, to St. Louis, Kansas City, Denver, and Salt Lake City. Then they headed for the Texas Panhandle before the return approach to Holloman.

"The biggest problem was the weather," Major Summers commented. "We had about ten and a half hours of night weather time, an extraordinarily long time to be in the clouds." He explained that pilots flying long hours in weather at night tend to develop vertigo—spatial disorientation. The two pilots kept in close radio contact with one another to assure their bearings.

No major problems with their aircraft developed during the mission, and the two later filed a report to provide other pilots in the wing with an in-depth checklist of things to do to prepare for a safe and comfortable flight during a deployment.

Major Summers pointed out that there aren't many places in the world that couldn't be reached in a one-hop fourteen-hour flight.

Above, Maj. Robert Summers straps in for the long-endurance F-15 flight. Right, his wingmate, Capt. Thomas Vanderheyden, takes a moment for a coffee lift on completing the grueling fourteen-hour, 6,200-mile nonstop mission.

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liner accidents. NAFEC has contributed the major share of $740,000.

The studies, to take eighteen months, are to be conducted by Boeing Co., McDonnell Douglas Corp., and Lockheed Aircraft Corp. Objective of the program is to identify airliner structural features and subsystems that can be redesigned or strengthened to reduce the number of serious injuries or fatalities in impact-survivable crashes.

The crash scenarios will be categorized for such different types of aircraft as wide-body and narrow-body jetliners. Investigated will be such crash impact conditions as speed, sink rate, angle of attack, and terrain, and the studies will concentrate on accidents in which there is a "reasonable chance" of survival.

Using FAA and National Transportation Safety Board accident data, the studies will probe primary fuselage structures, seating, restraint systems, fuel tanks, number and type of engines, and advanced composite material use. Information generated by the studies could then be used by FAA to establish new or improved aircraft certification standards for industry.

In another air safety matter, NAFEC engineers and meteorologists have under development a higher-altitude, wind-shear warning system to complement the NAFEC-developed Low-Level Wind-Shear Alert System (LLWSAS) already in operation at several major airports.

While LLWSAS "is proving very effective in the detection and warning of wind shear" (violent changes in wind direction) up to sixty feet above ground level, NAFEC technicians hope to "marry" airport surveillance radar to a parabolic antenna and computers. The antenna would concentrate the radar's energy in order to identify discrepancies in atmospheric conditions and thus wind shear along the flight path up to 1,600 feet (488 m). In simple terms, the antenna could pick up a wind speed of five knots headed at the antenna at 200 feet altitude and wind speed of nine knots at 400 feet headed away from the antenna. This, in effect, would serve to warn the pilot that he will encounter a fourteen-knot wind shear (and loss of airspeed on descent) between 200 and 400 feet.

★ The US has agreed to sell Egypt F-16 fighters, M-60A3 tanks, and a "variety of other equipment" to put it more on a par militarily with Israel and another neighbor, Libya, which has been heavily armed by the USSR.

SSgt. William C. Popwell, right, an F-15 crew chief, points out the wing area where he and assistant crew chief Airman Keith R. Tyoe, center, discovered a potentially disastrous fuel leak. Looking on is quality control inspector TSgt. David W. Carroll. All three are with the 3205th Maintenance and Supply Group, Eglin AFB, Fla.

Egypt was also given the option of buying twin-engine F-15s, but deferred on that because of budgetary constraints (price tag on the F-15 is about $20 million; the F-16, $12 million). Egypt wants forty F-16s and 250 M-60 tanks, currently the US's most advanced armored vehicle.

For its part, Israel is purchasing seventy-five F-16s and fifteen F-15s.

★ Turkey in late March signed a formal agreement that allows the US the use of twelve military sites in the NATO-member country.

The installations include essential intelligence-gathering stations, the big base at Incirlik in southern Turkey, and scattered communications relay stations.

In exchange, the US is expected to extend an estimated $2.5 billion in military and economic aid over the next five years.

The agreement shores up relations between the two countries that were strained with the Turkish invasion of Cyprus in 1974 followed by the US arms embargo that ended in 1978.

The Turks specified that the US's utilization of the facilities be NATO-oriented and not for possible US military operations in the Middle East.

★ Plans are currently being formulated to assign Air Force women to several isolated and remote communications sites in Europe and Turkey.

In the past, the Air Force Communications Command (AFCC) could not assign women to the isolated or remote posts because adequate dormitory and latrine facilities weren't available, but renovations are being made at a number of sites to accommodate them.

Modifications are being made to living quarters at Feldberg, Germany, and Mount Virgine, Italy. In Turkey, women are to be assigned at Yamanlar, Elmadag, Sahin Tepest, and Malatya—all mountaintop facilities used in the relay of long-haul communications.

★ All seemed to be going well late in February following the successful launch by Japan of an experimental communications satellite known as Ayame-2.

But eight seconds into a planned twenty-six-second rocket firing that was to boost the satellite into a permanent geosynchronous equatorial orbit above northern New Guinea communications with Ayame-2 were lost.

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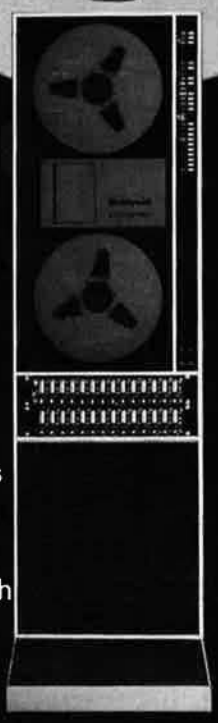

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ADCOM officials at Colorado Springs, Colo., said that the US had not been tracking the satellite at the time of its malfunction and since then could discover no sign of it.

The mysterious thing is that the disappearance of the $25 million Ayame-2 duplicated almost exactly the loss of RCA Corp.'s Satcom-3 last December. It, too, was being boosted into higher orbit when all communications were lost.

★ NASA has taken the first step in a new and innovative program to involve industry in the commercialization of space.

Under a Joint Endeavor agreement signed by the space agency and McDonnell Douglas Astronautics Co., a new technique in materials processing in space will be developed.

Under the agreement, signed late in January, McDonnell Douglas and a major pharmaceutical firm are to conduct research and development to determine the feasibility of separating biological materials in space using a process known as continuous-flow electrophoresis. The process has high promise of producing substances useful in the diagnosis, treatment, or prevention of human and animal diseases. Such substances are currently not being produced in sufficient quantities or purity in ground-based facilities.

The project is the first to involve the private sector in the definitive stages of a space research program where a technological advancement is needed and a potential commercial application is present. "In a Joint Endeavor, NASA and a private firm agree to be responsible for specific portions of the research effort and no funds are transferred between parties," space agency officials said.

★ In order to speed up considerably the processing of the vast amount of data continuously being sent down by satellites, NASA has initiated acquisition of a "massively parallel processor" (MPP).

Billed as "the fastest such machine ever built," the MPP will actually be an ultra-high-speed computer capable of processing data ten to 100 times faster than currently is possible and at significantly lower cost. The MPP design is based on research at NASA-Goddard's Computer Development Center over the past decade in developing parallel processing computers, which perform many computations simultaneously instead of in sequence.

The new MPP is to have 16,384 processing elements, compared to 1,024 in earlier parallel processors now operated by the Army and USAF. The processing elements will be packaged on small customized chips using very-large-scale integration techniques.

The MPP is to be built by Goodyear Aerospace Corp., Akron, Ohio, under a $4.7 million NASA award.

★ Introduced by Sen. Charles McC. Mathias (R-Md.) and supported by congressmen of both parties has been a bill that would designate a two-acre site in Washington, D. C., for a Vietnam War memorial. The measure is strongly endorsed by AFA in testimony on Capitol Hill.

The site would be in Constitution Gardens, a park area on the Mall adjacent to the Lincoln Memorial.

According to Senator Mathias, the memorial "will provide a long over-

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due acknowledgment by the American people of the sacrifice and service of Vietnam veterans. It will contribute greatly toward resolving the real and continuing divisions in our society as a result of that war."

Raising private contributions to pay for a monument on the site is the nonprofit Vietnam Veterans Memorial Fund, Inc., whose president, Jan C. Scruggs, is himself a Vietnam vet. At the memorial would be inscribed the names of the 57,414 Americans who died in SEA. Send contributions c/o the Vietnam Veterans Memorial Fund, P. O. Box 50096, Washington, D. C. 20004.

★ Dr. Paul B. MacCready, an atmospheric scientist, aeronautical engineer, and founder of AeroVironment, Inc., of Pasadena, Calif., has been named recipient of the 1979 Collier Trophy, the nation's oldest aviation award, sponsored by the National Aeronautic Association.

MacCready designed and built the *Gossamer Condor*, which accomplished the first controlled, sustained, human-powered flight, and *Gossamer Albatross*, the first human-powered aircraft to fly the English Channel (the twenty-two-mile crossing took place on June 12, 1979).

NAA gave special recognition to Bryan Allen, the hang-glider enthusiast and bicycle racer who piloted both aircraft on their history-making flights.

★ **NEWS NOTES**—For the second time in three years, **AFRES has been named recipient of the General Benjamin D. Foulois Memorial Award** for 1979 for the command's aircraft accident prevention program. The award is sponsored by the Daedalians, an association of US military pilots dedicated to advances in aviation.

The National Aeronautic Association announced that **Paul H. Poberezny**, president of the Experimental Aircraft Association since 1953, has been named recipient of the **1979 Frank G. Brewer Trophy**, the nation's top aerospace education honor. Cited was his "outstanding promotion of aviation education for the young for over a quarter of a century."

US Army plans to offer **"five or six" fellowships** for 1981 under its **Advanced Research Program in Military History.** The awards defray expenses during research and writing at the US Army Military History Institute, Carlisle Barracks, Pa., the Army's major repository for military history documents. Interservice projects are encouraged. Civilian and military scholars may apply to Director, US Army Military History Institute, Carlisle Barracks, Pa. 17013.

TSgt. Robert Wickley of the Aerospace Audiovisual Service, Norton AFB, Calif., has been named **1979 Military Photographer of the Year** by the National Press Photographers Association and the University of Missouri, joint sponsors of the competition.

AFLC's **San Antonio ALC** will host a symposium October 21–24 entitled **"Aviation Fuel Availability—The Impact on Readiness and Reliability."** Some 700 military and industry representatives are expected to attend the event. ■

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In these troubled and dangerous times, we need both quantity and quality in our armed forces. If both aren't obtainable within politically and economically feasible defense budgets, we may have to think about a solution . . .

Where Less Is Better

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

According to reports, the President does not want to hear any more Pentagon arguments for a military pay raise. Faced, as he is, with both an economic crisis and a political battle in trimming his new budget, and not forgetting that this is an election year, the President's reluctance to entertain any new military pay proposals is understandable. It will be hard enough, without attempting any sizable increase, to hold the defense figure at the proposed $158.7 billion in Total Obligational Authority, thus giving at least the appearance of supporting our NATO pledge to increase defense spending by three percent. The social welfare programs are going to be tough opponents for the military in the electioneering months ahead.

That, in turn, gives rise to a question. Are we not possibly facing a future in which the quality of our forces will be so sharply degraded as to make the defense budget itself a sort of social welfare program? Already there are signs of that, here and there in the military. And if we do face the danger of an All-Volunteer Force that cannot attract or, just as important, hold the first-class types the services need to fly and maintain the airplanes, work the ships, operate the electronic warfare gear, or do the hundreds of other technical jobs that make a modern force effective, then maybe the defense budget itself needs rethinking.

We are in perilous economic times, right enough, and so any plea for higher military pay must appear, at first glance, as irresponsible special pleading. But let's look at the problem from a detached viewpoint.

First of all, what is really so sacred about the existing force structure? Well, you say, there is the NATO commitment, for one thing. But what, when you get right down to it, is so sacred about that? Our NATO commitment is mainly based on what we had there when we made that commitment, in a time far different from the present. It would be reassuring to the Alliance, and undoubtedly the best thing for all of us, if we left that commitment undisturbed, judging from the commotion in NATO ten years or so ago, when the Canadians cut back on their NATO forces. The saving thing about that Canadian reduction was the high quality of the Canadian forces that remained. That, more than the reduction itself, is what has stayed in NATO's mind.

All this is not to argue against the present force structure, or for that matter, an increase in the defense budget. The facts of life these days are an argument for more of everything in the way of defense. What I am saying is that a considerable increase in pay and benefits is needed if we are going to have the kind of volunteer force—including Reserve Forces—that it now seems obvious we must have in the years ahead. And quality of people, however dearly purchased, should take precedence over mere numbers.

It is just three years since President Carter made his commencement speech at Notre Dame, a speech in which he outlined his philosophy for the brave new world we were entering. That speech, with its reassuring optimism about the inevitable triumph of democratic ideals and the general reasonableness of the Communist orbit, makes strange reading today. Instead, we now have the Carter Doctrine, a policy that seems to bear a strong resemblance to a tough stand of thirty years ago called the Truman Doctrine. Unlike the intervening Nixon Doctrine, both the Truman and, evidently, the Carter Doctrines are based on self-reliance.

The pay of the military was not much to write home about in the days of Harry Truman. We still had, of course, the incentive of the draft, but the regular forces—the volunteer part—managed to hold on to a high percentage of careerists. For reasons that are no longer clear, the military offered a more gratifying career in those days. Perhaps it was the attraction of relatively luxurious overseas duty in that era of a strong dollar and relative poverty abroad. Maybe it was the natural aftermath of World War II and a generation that found military life satisfying. Or maybe it was just more fun then, with such inducements as plenty of airplanes and cheap fuel. For whatever reason, there has been a distinct change in the attraction of a service career between the time of Harry Truman and that of Jimmy Carter.

It is, as we all know, very late in the day to begin rebuilding our military strength. We are badly in need of new weapons, more munitions, additional air- and sealift. But all this is worthless, or the next thing to it, if we cannot attract and hold the best people. In this competitive society, a pilot, for example, is not apt to stick around when there is a brighter future, one with higher pay and increased benefits, waiting for him in civilian life.

It seems almost painfully obvious that the services must be made more attractive if this new and tough Carter Doctrine is to have credibility. The best solution is plain enough, and that is to add on to the defense budget—right at the top of the defense budget—pay and benefit increases that are truly competitive, and never mind the screams from the other supplicants whose programs must pay that cost. If that is just too hard a political battle to take on, then let's cut the forces to pay for the kind of quality we need. ■

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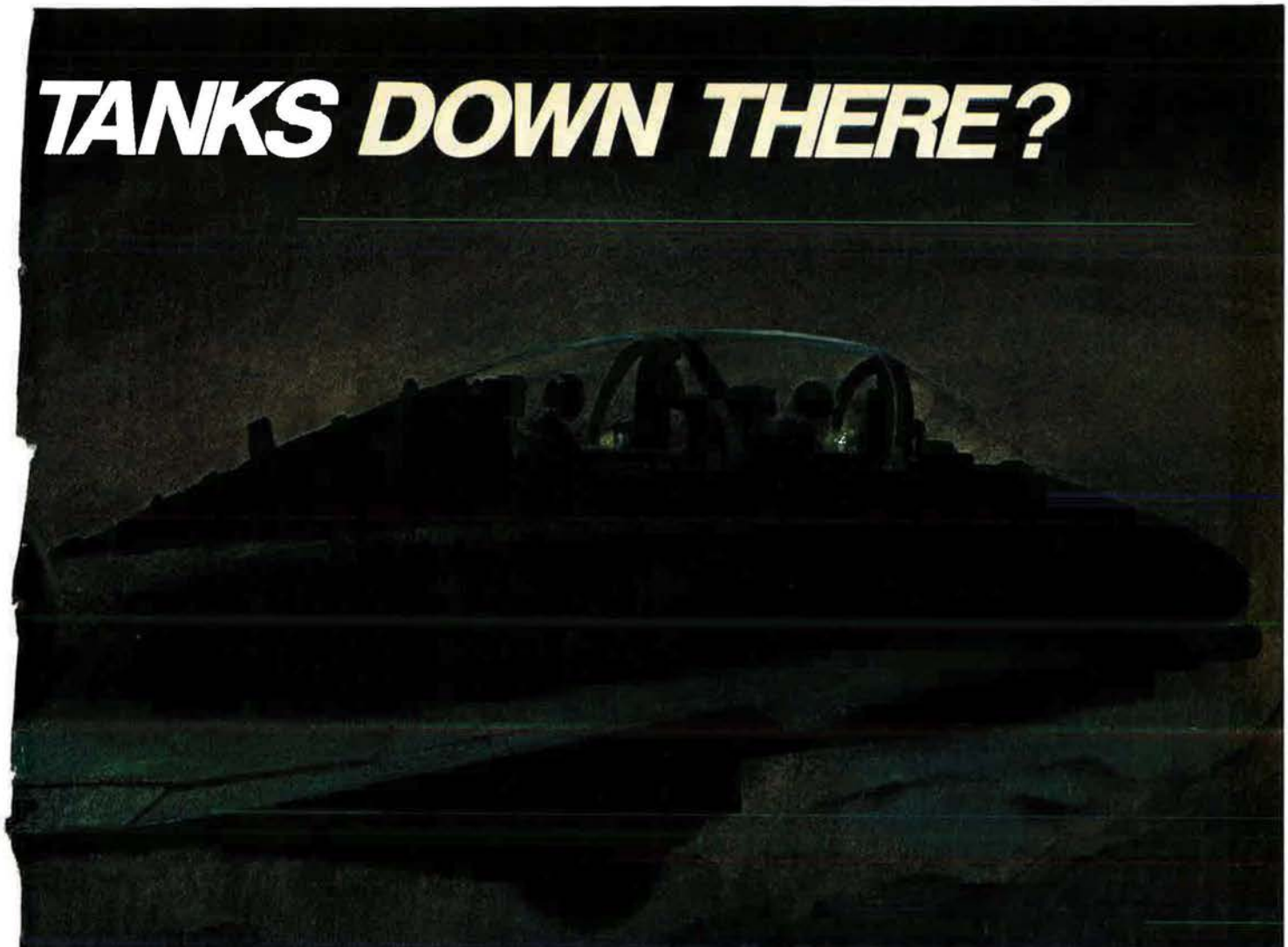

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In the wake of the Administration's new-found recognition of intrinsic Soviet malevolence toward non-Communist regimes, this country's central defense precept has been subjected to significant revisions. Even though an important step forward, the latest version of the "Countervailing Strategy" still lacks essential hardware backup.

DAWN OF A NEW STRATEGIC ERA?

BY EDGAR ULSAMER, SENIOR EDITOR

FROM the welter of congressional testimony on defense and other matters that is barraging Capitol Hill this spring, a number of noteworthy details stand out. Of signal importance is the revelation by Defense Secretary Harold Brown in his FY '81 Annual Report that the Carter Administration's central defense philosophy, the so-called Countervailing Strategy, has been given a face-lift to eliminate some of the wrinkled logic that initially marred it.

"We have," Secretary Brown announced, "recently completed a broad reexamination of our strategic policy." The results appear to be constructive. Gone is last year's startling reasoning that less is better for this country's strategic forces. Originally, the policy held that following a nuclear exchange, the surviving US capabilities should be no greater and preferrably less than those of the USSR or that effective deterrence can be realized without equivalence—that is, through US inferiority. The new definition of a countervailing strategy is impeccable: "We have concluded that if deterrence is to be fully effective, the United States must be able to respond at a level appropriate to the type and scale of a Soviet attack. Our goal is to make a Soviet victory as improbable (seen through Soviet eyes) as we can make it, over the broadest plausible range of scenarios. We must, therefore, have plans for attacks which pose a more credible threat than an all-out attack on Soviet industry and cities. These plans should include options to attack the targets that comprise the Soviet military force structure and political power structure, and to hold back a significant reserve."

Clearly, this revised reasoning is music to the ears of those who see minimum deterrence forces as destabilizing and an all-or-nothing approach to full-scale nuclear war. The music, however, is somewhat out of tempo with the rate and scope of the US strategic force modernization program detailed in the FY '81 Defense budget request and the new Five-Year Defense Plan (FYDP). Until MX achieves full operational capability, scheduled for 1989, the option to attack the Soviet military force structure comprehensively will remain illusory. Further, no broad stopgap measures are planned to counteract the so-called threat window that opens next year or in 1982 when the Soviet ICBM force will be able to destroy most of the US ICBM force in a first strike.

It is difficult to reconcile this asymmetry with the countervailing strategy's goal of being "able to attack the forces that could do damage to the United States and its allies." For example, the Soviet lead in ICBM throw-weight and number of missiles will enable them to carry out a first strike against the silo-based US ICBMs and still keep a major portion of their ballistic missile force in reserve. Yet once USAF's ICBMs are gone, this country lacks the ability to threaten the remaining Soviet ICBMs in their hardened silos with the rapidity that such a circumstance requires. For the time being the sea-launched ballistic missiles (SLBMs) appear incapable of destroying hardened silos. Bombers and air-launched cruise missiles (ALCMs) are too slow to neutralize the Kremlin's residual ICBM forces before the latter could be used to checkmate this country's SLBM and air-breathing strategic forces (manned aircraft and air-launched cruise missiles) or to threaten countervalue (civilian population centers and similar) targets.

It would seem optimistic, therefore, for the revised countervailing strategy to stake out these specific goals: "We must be able to deter Soviet attacks of less than all-out scale by making it clear to the Kremlin that, after such an attack, we would not be forced to the stark choice of either making no effective military response or totally destroying the Soviet Union. We could instead attack, in a selective and measured way, a range of military and political control targets, while retaining an assured destruction capability."

Secretary Brown's Annual Report underscores the unique role of the strategic offensive forces: "We have recognized for many years that our strategic nuclear capabilities could deter only a small number of contingencies. But there can be no doubt that these capabilities still provide the foundation on which our security rests. . . ." The Soviets, on the other hand, are out to undermine this foundation, his report points out: "The improvements they have made in their ICBMs, their continued emphasis on antibomber, antimissile, and

strategic antisubmarine defenses, together with their civil defense program, can be seen as a concerted effort to take away the effectiveness of our second-strike force."

The Soviet Civil Defense Program

The Soviet civil defense program, according to Dr. Brown's congressional testimony, appears to involve more than 16,000,000 Soviets, including a corps of about 100,000 full-time civil defense workers.

Hardened command posts have been constructed near Moscow and other major cities for senior Communist Party and government officials. The some 100,000 officials who US intelligence believes represent the "Soviet leadership" are provided hardened underground shelters near their offices and at relocation sites outside the cities. The "relatively few leadership shelters" that the US has been able to identify are vulnerable to direct attack, according to Dr. Brown. All told, the Soviets probably have built at least 20,000 blast-resistant shelters that under certain conditions could protect up to 13,000,000 people. Key emphasis appears to be on assuring the survival of skilled industrial workers and managers.

The vast majority of city dwellers would have to be evacuated to provide them with even rudimentary protection. Evacuation, according to US defense experts, would require from several days to a week, but "there is no evidence that evacuation exercises have been conducted involving the movement of large numbers of people." If the current rate of constructing urban blast shelters is continued until 1988, the number of people that can be protected will double—to about 26,000,000—according to Dr. Brown. The Soviet rationale for its massive civil defense program seems to be the assumption that such measures contribute to the USSR's war-survival and war-fighting capabilities. But the US view is that the effectiveness of Soviet civil defense in case of nuclear war with this country remains problematical.

Broad Soviet Gains

A key reason why Soviet military capabilities in important fields are overtaking those of the US, both quantitatively and qualitatively, Dr. William J. Perry, Under Secretary of Defense for Research and Engineering, told Congress is that since 1970 Moscow has outspent this country in military investment by about $240 billion. Last year, Soviet spending of this type exceeded that of the US by about eighty-five percent. Over the past decade, Soviet investment in strategic weapons, measured in dollars, was two and a half times the US outlay. In 1979, the gap widened to a ratio of three to one in favor of the USSR. Dr. Perry said that "it is clear from this commitment of resources and the huge quantity of strategic weapons which it is producing that the Soviet Union hopes to achieve overwhelming superiority of strategic forces."

Among the most significant recent Soviet advances in the strategic arena is the fact that a version of the SS-N-18 SLBM with seven warheads (MIRVs) is being deployed on Delta III submarines. The SS-N-18 has a range of up to 7,700 kilometers, greater than that of the US Navy's largest SLBM, the Trident I, which is just now entering the inventory. Over the past six years, the Soviet Union has put more than twenty new SSBNs (submarines carrying SLBMs) into commission; in the same period the US has launched only one SSBN, the Trident. It is not yet operational.

The situation, Dr. Perry pointed out, is equally lopsided in the field of strategic defense. Here the Soviets outspent the US eightfold over the past ten years. They have more than 7,000 air defense surveillance radars in operation compared to sixty for the US. Similarly, the Soviets have deployed two new manned interceptors since 1970 and are developing another advanced aircraft of this type.

According to Dr. Perry, "Development of a look-down/shoot-down capability and a new air-to-air missile for the modified [MiG-25] Foxbat is a major step toward improving their low-altitude defenses against bombers and fighters. As the Soviets deploy this system, they will deny us the significant advantage of avoiding airborne intercept by flying at low altitude."

This country's interceptors dedicated to air defense of the continental US are limited to aging F-106s augmented by F-15 and F-4 aircraft. As Air Force Secretary Hans M. Mark told Congress, USAF last year reorganized the air defense function to cut both cost and manpower: "The Tactical Air Command now manages the interceptor force, along with certain surveillance and ground control intercept radar stations; the Strategic Air Command manages the surveillance systems that warn of missile attack. The operational control of our air defense forces remains with the North American Air Defense Command." He added that current plans call for assigning an F-15 squadron to the air defense mission in 1984. "Additional F-15 squadrons will be needed in the 1980s to replace the aging interceptor force. Space-based sensors will vastly improve our ability to detect and track an at-

tacking force. For this reason, we intend to conduct the research and development necessary to perform the atmospheric warning mission from space."

Part of this research and development is being carried out under the Defense Advanced Research Projects Agency's (DARPA's) TEAL RUBY sensor program. The program is being prepared for a space experiment in FY '82 to demonstrate the feasibility of detecting strategic air vehicles and other small targets from space by using a large mosaic focal plane array and on-board signal processing. Using a cryogenic (super-cooled) infrared telescope and the revolutionary array technology, TEAL RUBY will be able to detect aircraft, missile upper stages, and satellites from geosynchronous orbit, according to DARPA.

Ballistic Missile Defenses

In ballistic missile defense (BMD), the Soviets have a clear advantage with a sixty-four-launcher complex in being. The US has none. While both countries have active R&D programs in support of BMD, the "Soviet effort includes a program of performance improvements for their large phased-array detection and tracking radars, with development of a rapidly deployable ABM [antiballistic missile] system, which includes a new interceptor," according to Dr. Perry. On the US side, the principal concern is to "avert any destabilizing technological surprise that might result from a Soviet lead."

For this reason, two major research and development programs are being carried out: the BMD Systems Technology program, funded at $133.5 million in FY '81; and the BMD Advanced Technology effort, to which about $133 million have been allocated in the coming fiscal year. The former, in the main, is designed to provide a series of options that can be realized quickly but will provide only limited capabilities. Its focus is on advanced radar technologies that will increase the ability to differentiate between RVs, space debris, and decoys, and to point the way to a "layered defense system," or LDS, capable of intercepts both within and beyond the atmosphere.

According to Dr. Perry, "a program to demonstrate the capability to destroy a reentry vehicle outside the atmosphere with a nonnuclear interceptor using a long-wave infrared (LWIR) homing sensor is under way." Known as the Homing Overlay Experiment (HOE), this program is scheduled to begin flight testing in 1982. Concurrently, Dr. Perry told Congress, work is under way to resolve key issues "associated with a small, low-altitude defense system. Analyses have shown that, if feasible, such a system could provide an effective and rapid response to assure the survivability of our land-based ICBM force in the case of a SALT breakout."

The BMD Advanced Technology Program is keyed largely to mosaic optical sensors, laser radars, and advances in target discrimination, tracking, guidance, and fuzing. Included are "a forward acquisition missile-borne long-wave infrared probe that would perform the functions of warning and attack assessment" and development of the technologies required to intercept reentry vehicles in the atmosphere with nonnuclear warheads.

Emphasis on Space

"The Soviets have tested an antisatellite (ASAT) system with limited capabilities against US space systems. The US is developing but has not tested an ASAT capability," Secretary Brown told Congress. The primary US ASAT effort, funded this year to the tune of about $125 million, is to develop a "high technology interceptor using a miniature vehicle," according to Dr. Perry. This design, he added, "has the advantage of being of low weight and will be launched from an F-15 aircraft. As a low-risk hedge to this approach, a conventional design has been completed."

The US nevertheless prefers "verifiable limitations on antisatellite weapons" and continues to oppose a space weapons race, according to Secretary Brown's testimony. The US Arms Control and Disarmament Agency's Annual Report discloses that bilateral negotiations with the Soviets concerning a ban on ASAT have been carried on intermittently since June 1978. The latest round took place from April 23 to June 17, 1979, in Vienna. "Progress was made in these discussions, but important issues remained to be solved," ACDA reports. Both sides, according to a joint communiqué, agreed "to continue actively searching for mutually acceptable agreement in the continuing negotiations on antisatellite systems."

The US space defense program, as presently conceived, has four elements. The first, according to Dr. Brown, "focuses on deterring an attack by improving our ability to monitor space activities. We are working on an improved ground-based system to enhance detection

"Clearly, this revised reasoning is music to the ears of those who see minimum deterrence as destabilizing, and an all-or-nothing approach to full-scale nuclear war."

and tracking of satellites and several research and development activities have been initiated to develop spaceborne sensors for responsive surveillance." A key element is GEODSS, for ground-based electro-optical deep space surveillance system. When fully operational, GEODSS will have five sites scattered across the equatorial region of the globe for observation of satellites up to geosynchronous altitudes when lighting and weather conditions are favorable. Since ground-based sensors assigned to the space surveillance mission are intrinsically handicapped, the long-term approach, according to Dr. Perry, envisions a "spaceborne LWIR sensor and cryogenic cooler . . . and [we] will launch Shuttle-borne experiments in 1983 and 1984 to demonstrate the feasibility of this concept."

The second element of the space defense program is meant to reduce the vulnerability of US military space systems. Involved are techniques for enhancing satellite survivability, including proliferation of the satellites that perform a given mission, designing satellites that are not easily observed, placing them in orbits beyond sensor surveillance range, hardening them against laser radiation, and employing decoys to deceive or a maneuver capability to evade an attacking interceptor.

The third element is the development of capabilities to destroy enemy military satellites that are a threat to the US. This includes, in addition to ASAT, work on high-power chemical lasers. Progress, according to DARPA, has been substantial and is paying off in high fuel efficiency and decreased weight. Related work by DARPA and other elements of the Defense Department involves new ways for acquiring and tracking targets and for pointing laser beams with high accuracy over extremely long ranges. Another major DARPA space defense project is the demonstration of visible light lasers that can operate with high average power. Recent advances, DARPA reported to Congress, established the feasibility of focusing high average laser power "over the very long ranges necessary for weapon applications."

The fourth element of space defense, as defined by Dr. Brown, provides the command control and communications (C^3) capabilities needed to manage all space defense resources. For that purpose, the Air Force, in October 1979, established a Space Defense Operations Center (SPADOC) at the North American Air Defense Command's Cheyenne Mountain Complex in Colorado. The initial SPADOC, while limited in capability, is adaptable to growth in surveillance, satellite attack warning, and ASAT flight testing.

Missile Warning and Attack Assessment

Recent Pentagon studies have brought out the need to improve this country's warning radars and satellite early warning system. In order to carry out the option of launching the ICBMs under attack—a burning issue because of the impending Soviet first-strike capability against this country's silo-based missiles—precise warning and attack characterization are imperative in order to make appropriate responses.

The satellite early warning system consists of three satellites in geostationary orbit. This system, known also as the Defense Support Program (DSP), has been classed as "fragile" by Dr. Perry, especially insofar as its ground terminal in Colorado is concerned. For this reason, mobile truck-mounted terminals (MGTs) are being developed. The number of MGTs can be increased economically and rapidly, and they are indistinguishable from other military service vans. Another modification of DSP involves the sensor evolutionary development (SED) that among other performance benefits extends the mean life of the satellite.

Earlier this year, the Defense Department convened a DSARC (Defense System Acquisition Review Council) meeting to develop options for a follow-on satellite system. These options are concerned in the main with the survivability of space-based warning, and stress such criteria as low cost and risk as well as shorter developmental lead times, according to testimony by Defense Department witnesses before Congress.

Strategic surveillance also includes the ability to monitor effects of nuclear strikes against the US, and of this country's weapons against an enemy. The need for strike assessment is heightened by the doctrine of flexible response on which the countervailing strategy depends. Real time assessment of a nuclear attack anywhere in the world, according to Dr. Perry, will be provided by the Integrated Operational NUDETS (Nuclear Detection System), or IONDS. The IONDS system involves deploying sensors as secondary payloads on various host satellites to detect, locate, and measure detonations of nuclear weapons, provide information via the World-Wide Military Command and Control System (WWMCCS) for estimating strike damage, and contrib-

"Of signal importance is the revelation by Defense Secretary Harold Brown in his FY '81 Annual Report that the Carter Administration's central defense philosophy, the so-called Countervailing Strategy, has been given a face-lift to eliminate some of the wrinkled logic that initially marred it."

ute to nuclear test ban treaty monitoring, according to Dr. Perry. IONDS, he said, will be installed on the eighteen satellites of the Navstar Global Positioning System, as well as on DSP spacecraft.

So far as warning of ICBM and SLBM attacks on targets within the continental United States is concerned, ground-based radars can be expected to corroborate information received from space-based systems, Dr. Brown told Congress. "For the northern approaches, we depend on the Ballistic Missile Early Warning System (BMEWS) radars at sites in Greenland, Alaska, and England to confirm an ICBM attack. Programmed improvements of the Greenland BMEWS radars, which view the missile approaches to central CONUS, will produce better estimates of attack size and impact points that should be sufficient to verify an attack on our Minuteman force. We also plan to complete the replacement of obsolete computers at all three BMEWS sites. The Perimeter Acquisition Radar Characterization System (PARCS), a converted ABM radar, will act as backup for BMEWS coverage of ICBM attacks against central CONUS until the BMEWS improvements are completed. The PARCS is being upgraded to provide more timely and accurate impact point predictions for a larger number of RVs."

Theater Nuclear Forces

US nuclear weapons programs are not confined to the strategic sector. Dr. Brown told Congress that the comprehensive modernization of Soviet theater nuclear forces (TNFs)—in particular massive deployment of the SS-20 MIRVed and mobile intermediate-range ballistic missile (IRBM), and the Backfire bomber—might cause Moscow to "make the mistaken judgment that they could threaten our allies without fear of retaliatory attacks on their territory, especially if they did not threaten to attack US forces or territory. To avoid any such error of perception, we are proceeding with the development of two land-based, longer-range mobile missiles: the Pershing II and the Ground-Launched Cruise Missile (GLCM). In accord with the NATO Ministerial decision of last December 12, we will deploy them in Great Britain and on the European continent."

The intent of the TNF modernization program, according to the Defense Department, is "to strengthen the linkage of US strategic forces to the defense of Europe. Modernization of the long-range theater nuclear forces will also provide a firm foundation for the pursuit of serious arms-control negotiations on this subject with the Soviet Union. The United States is prepared to undertake such negotiations within the framework of SALT III."

Theater nuclear forces fall into two broad categories: short-range weapons that support the forward defenses and longer-range systems assigned to interdiction and troop targets in the second echelon, enemy nuclear systems, and strategic targets deep in the enemy's homeland.

Both new US long-range systems have been authorized for deployment on NATO territory. Pershing II, a follow-on to the shorter-range Pershing IA currently deployed in Europe, is a ballistic missile now in engineering development. According to NATO's current plans, 106 Pershing IIs and 464 GLCMs are to be deployed. Both systems, according to Dr. Brown, have enough range to "reach the Soviet Union from NATO Europe, thereby reducing . . . any Soviet misperception that it might be possible to fight a theater nuclear war in such a way that their nuclear forces could operate from a sanctuary." He added that "Pershing II offers a particularly high assurance of penetrating Soviet defenses, the capability to strike time-urgent targets and take advantage of existing Pershing IA infrastructure."

By contrast, GLCMs have lower life-cycle costs and longer ranges, thus boosting the chances for participation by the allies through deployments on their soil. Also, "the deployment of a mixed ballistic/cruise missile force hedges against the failure of one type of system, provides the flexibility to select the best weapon for a given mission, and greatly complicates enemy planning," according to the Defense Department's Annual Report.

Pershing II will use the erector launcher of Pershing IA. But the warheads of the new weapon will incorporate a precision terminal guidance system and options for an "earth penetrator" warhead to increase hard-target kill capability. In the case of the GLCM, Dr. Perry told Congress, the Tomahawk missile will be integrated on an air-transportable, ground mobile unit which, together with its launch control van, will be housed in hardened shelters during peacetime. During crisis periods, the weapon would be in constant motion to provide location uncertainty. Among GLCM's unique advantages are a small radar cross section, very low altitude flight profile, and all-weather capabilities. Operational range of this weapon is 2,500 kilometers. Initial Operational Capability (IOC) is scheduled for 1983, according to Secretary Brown.

As in the case of strategic nuclear weapons, there is

concern about the survivability of TNFs. Current research and tests point toward survivable basing mode concepts similar to the multiple protective shelters (MPS) of MX.

The overall goals of the current TNF modernization program, according to Dr. Perry, are to boost range and accuracy of these weapons, while minimizing collateral effects; increase their survivability under nuclear and nonnuclear attack through greater mobility, hardness, and dispersal; improve their command and control system; and enhance the security and safety of theater nuclear weapons against a broad range of threats including terrorists, enemy agents, and special forces.

Improvement programs under way in the area of battlefield TNFs include a new eight-inch artillery shell with increased range and several yield options, including enhanced radiation (popularly known as the "neutron bomb"); a potential follow-on projectile with a range of up to seventy kilometers; a 155-mm artillery projectile; and the option to use enhanced radiation warheads on the US Army's Lance surface-to-surface missile.

Congressional experts are concerned about the availability of the special nuclear materials (SNM) that all nuclear weapons depend on for triggering detonation. As Secretary of Energy Charles W. Duncan admitted to the House Armed Services Committee in March, "Our Fiscal Year 1980 appropriations did not provide sufficient funding for meeting Presidential authorization for weapons production and schedules in light of unanticipated levels of inflation and unanticipated production difficulties." The result was a supplemental budget request for $30 million. Acknowledging that the House Armed Services Committee previously expressed concern over the availability of SNMs—such as plutonium and tritium—for weapons production, he asserted that "in the near term—through 1985—planned supplies of special nuclear materials are adequate for specified defense programs. For the latter part of the 1980s, the projections are more uncertain both in terms of requirements and rates of production. These are . . . being studied. In the meantime, the Administration proposes no increase in our national production capabilities. However, I assure the Committee that the Administration will take the necessary steps to produce the nuclear weapons and nuclear materials that are determined necessary to accomplish the United States defense policy and objectives."

The NATO Requirement

"We have been involved in European affairs since the foundation of the Republic; our two greatest wars involved Europe. We are prepared, if necessary, to fight in defense of our European allies again," Secretary Brown told Congress earlier this year. It would be, in the view of most congressional experts, an uphill fight. Gen. Bernard W. Rogers, Supreme Allied Commander, Europe (SACEUR), and Commander in Chief, United States European Command (USEUCOM), reported to the House Armed Services Committee in March that "the Soviets have surpassed the West—or soon will—in all three types of forces required by our NATO strategy—conventional, theater nuclear, and central strategic forces."

In the conventional warfare arena, he pointed out, "traditional Soviet numerical superiority has been supplemented by qualitative gains that [make] the Warsaw Pact weapon systems equal or superior to any now fielded by the US and NATO forces." These capabilities have been bolstered by "the proliferation and forward deployment of Soviet logistics bases containing supplies for intensive combat of some duration and the uploading of combat units with days of required wartime supplies [which] have complicated considerably our ability to provide the necessary warning time."

Lastly, General Rogers pointed out, the Soviets methodically have found and cured "those force weaknesses and vulnerabilities that previously enabled the West to counterbalance traditional Soviet strengths without matching them. As a result of that concentrated effort, no single facet of the Soviet military effort is today susceptible to unilateral Western exploitation."

Yet even in the face of the singular Soviet drive to boost Warsaw Pact capabilities over the past decade, "USEUCOM's conventional and theater nuclear force needs have been adversely affected by defense reductions resulting from the US defense budget's shrinking in real terms by more than twenty-two percent between 1970 and 1979." The consequences, he said, were:

- Program deferrals, slippages, and cancellations in the procurement of key weapon systems;
- Reduction in operation and maintenance funds, which have degraded training opportunities; living and duty environments; the level of availability for training of military personnel because many serve as borrowed labor; and the full effectiveness of our current equipment as well as the modern equipment being deployed; and
- A decaying quality of life for our military personnel and their dependents by a lack of funds for necessary support, off-duty facilities, and depreciation of the dollar against other currencies.

General Rogers also pointed out that manpower shortages are so severe that even under the most optimistic conditions the US Army would run short of combat personnel in a NATO-Warsaw Pact conflict before the draft—even if activated immediately—could provide replacements from the US.

Another serious deficiency, he added, is that current prepositioned war reserve stocks "are most inadequate."

"We can," the SACEUR stressed, "rely neither on rhetoric nor promised peace offensives and fail to provide an adequate deterrent and defensive force in the face of the Soviet threat. While NATO's three percent commitment is welcome, we should recognize that with the unabated growth of the threat we confront, it will not be enough to close the widening gap in Warsaw Pact/NATO military capabilities."

In the case of USAF combat aircraft procurement, the FY '81 Defense Budget provides no good answer to the problem posed by General Rogers. The net reduction from previously planned aircraft procurement is eighty-one aircraft. Another eight aircraft were cut from the EF-111 modification program. The Administration's current drive to balance the FY '81 budget bodes ill for earlier congressional plans to restore some of these cuts. ■

Overcoming the "Not Invented Here" syndrome is a formidable task. But with direction from Congress, and financial and time pressures, the Department of Defense and Air Force, Navy, and Army are making progress. A major step forward is . . .

FOREIGN WEAPONS EVALUATION

Potential for Saving Time and Money

BY F. CLIFTON BERRY, JR.
EXECUTIVE EDITOR

"LEVERAGE" is a term from the financial marketplace. It is relevant to understanding the Foreign Weapons Evaluation (FWE) being managed by the Department of Defense. A leveraged situation is one in which a little bit of money does the work of a lot more. It has potential for greatly increased profits at modest risk. The case for Foreign Weapons Evaluation is somewhat comparable; greatly reduced costs at modest risk.

Like the leveraged financial opportunity, Defense's current evaluation of foreign weapon systems is funded at a modest level. It was $9 million in FY '80. A similar amount, $9.15 million, is requested for FY '81. The money is aimed at conducting technical or operational evaluations of friendly foreign nations' weapon systems and technologies by the US Air Force, Army, and Navy. Systems that meet operational needs without further expenditure of development funds and time are candidates for direct procurement and use by US forces.

It is too early to assess results from the Foreign Weapons Evaluation project; the program is too new. But the potential direct returns may eventually be measured in financial savings of tens to hundreds of millions of dollars, or in years slashed from development time. Indirect results could be standardization (or at least interoperability) with the equipment of friendly nations. The leverage results from the low downside risk. Even if there are no positive results from FY '80 and '81 funding, only about $18 million will have been spent. That's equivalent to about three-quarters of the fly-away cost of a single F-15 fighter.

Program's Background

The Foreign Weapons Evaluation is not a technical intelligence exercise as performed by the services' foreign technology centers. Nor is it cooperative weapon system development under the rubric of NATO developmental cooperation, such as the JP-233 Low-Altitude Airfield Attack System or the LOCUST Low-Cost Expendable Harassment Vehicle. It is none of those. Nor is FWE a way to spend money redeveloping a foreign weapon to US measurements.

As one expert in the Office of the Secretary of Defense says: "This

The "Ping-Pong Paddle" concrete target used for tests of foreign airfield attack munitions at Eglin AFB, Fla.

program does not seek participation in joint development of systems. Instead, it asks a basic question: "Is there an item in a foreign inventory already—or far enough along in development—which meets a US requirement?" He also says the program's transfer of technology between allies lowers R&D costs.

Defense told the Congress that this program "directly supports the policy of the United States that equipment procured for use by personnel of the armed forces of the US stationed in Europe under terms of the North Atlantic Treaty be standardized or at least interoperable with equipment of other members of NATO." That policy, of which FWE is a part, encompasses US and NATO partners' efforts to bring rationality into NATO's collective defense posture. It responds to European perceptions that transatlantic cooperation in weapons development and procurement was a "one-way street," in which Europeans bought US systems, but not vice versa. In response, cooperative development programs got under way; the British JP-233 and German LOCUST systems are examples of close cooperative developments. (In fact, JP-233 consideration began under FWE funding.)

The Foreign Weapons Evaluation, thus, is part of the overall NATO Long-Term Defense Program. If the leverage potential of the program is to be realized, the partners need to accept each other's test and evaluation results. Otherwise, they will perpetuate past practices of repeating each other's tests to satisfy their own regulations.

Dr. William J. Perry, Under Secretary of Defense for Research and Engineering, has told Congress that he expects this year to conclude an agreement with the UK, the Federal Republic of Germany, and France on the mutual acceptance of weapon system test and evaluation results. Dr. Perry says, "The objective is to eliminate unwarranted duplication of testing on systems that are being offered by one country for acquisition by another."

A bilateral agreement to this effect already exists between the US and United Kingdom. It came into being in October 1978 as an amend

ment to the 1975 Memorandum of Understanding between the two countries' defense establishments. The new agreement provides for mutual acceptance of US and British test and evaluation standards, techniques, requirements, and results. According to an official who works in the field, "Under this agreement, the potential buyer is obligated to examine all test and evaluation work already performed by the originator before requesting additional testing." He cites the obvious savings in time and money by not repeating testing already performed.

The benefits of mutual acceptance of test and evaluation results will be magnified when the four-power agreement is reached, as Under Secretary Perry forecasts. But the preliminary work on the agreement is already helping, one official notes: "Understanding friendly nations' test and evaluation criteria and standards enables us to make informed judgments of foreign tests already completed."

The same expert injects a cautionary note. Just because the allies agree to mutual acceptance of test and evaluation results does not necessarily mean automatic procurement of candidate systems. He says, "Items working well in an ally's forces may not be acceptable to US forces. That is because ours require evaluation against extremes of environmental and climatic conditions. Also, our safety requirements may vary from theirs." Thus, testing performed in Central European conditions may prove out quite satisfactorily, but a candidate system may falter when subjected to Arctic, desert, or tropical extremes required by US forces.

However, the mutual acceptance agreement means that a foreign candidate can compete on an equal basis with a US-designed system, at least through a point where the same test criteria have been evaluated on both sides of the Atlantic. Additional testing may be required at Eglin, Edwards, or Wright-Patterson AFBs for features not already evaluated abroad, but acceptable foreign tests will not be repeated. That's the leverage at work, taking advantage of time and money already spent abroad to develop a candidate system.

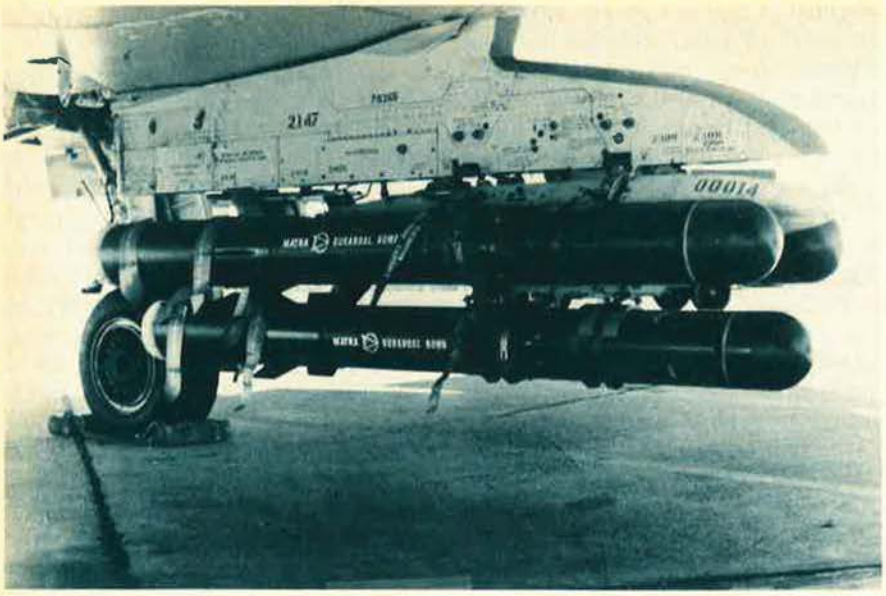
Some foreign weapons evaluations were done in the early 1970s, but the services' foreign weapons evaluation programs under the NATO initiatives really got going in the 1977–78 era. The Air Force, Army, and Navy each requested and justified funds for the purpose in their own research and development budgets. The amounts were quite modest. For FY '79 they were: Air Force, $2 million; Army, $2.7 million; and Navy, $1.4 million, for a total of $6.1 million.

Beginning with the 1980 Fiscal Year, however, the funds are consolidated at Defense Department level. This followed guidance from the House and Senate when considering the FY '79 fund requests. They sought more stringent controls over the management of these funds by placing responsibility for them with the Defense Director of Test and Evaluation, Rear Adm. I. W. Linder, USN (Ret.). He works for Dr. Perry as Director of Test and Evaluation at Defense Department level. Among its other functions, Admiral Linder's office manages and coordinates the FWE activities with the services and the international programs offices at Defense level.

On the Air Staff, the Foreign Weapons Evaluation is under Lt. Gen. Kelly H. Burke, Deputy Chief of Staff for Research, Development and Acquisition. Specifically, it fits in his Directorate of Operational Requirements. This ensures that candidates for evaluation meet specific USAF requirements, and are not tested just because they might be nice to have.

Within USAF, evaluations of foreign systems are under the management of Systems Command, and are carried out by its subsidiary units, such as the Flight Test Center

he MW-1 cluster munitions dispenser on Luftwaffe Tornado aircraft is the principal example of current applications of the twelve-year-old TREBO technology program.



French Matra Durandal parachute-retarded, rocket-boosted penetration bombs on a USAF Armament Division F-4 during the Eglin AFB evaluation of this weapon.

at Edwards AFB, Calif.; the Avionics Laboratory, Wright-Patterson AFB, Ohio; and the Armament Division, Eglin AFB, Fla. *(For more on armament development, see Edgar Ulsamer's article in the December '79 issue: "Armament: The Business End of the Air Force.")* Maj. Gen. Robert M. Bond, Commander of the Armament Division, says of FWE: "By evaluating armaments developed by our allies, we contribute to NATO standardization and interoperability. In addition, we forego the expense and R&D effort required to develop a particular item to meet USAF needs. This avoids duplication and applies development dollars more efficiently."

How the Process Works

Candidate systems come to the attention of the Air Force and other services in a variety of ways. The basic "fact of life" is that a valid requirement must exist. Then, Air Force developers keep their eyes peeled for likely existing foreign systems that could meet the requirements. Or, an air attaché in a foreign capital encounters a system or technology that meets a requirement he is aware of. Or a friendly foreign government may propose a system, or a government may introduce one of its manufacturers who has a system under development, or a foreign company might come forth with a proposal for testing, either on its own or through a US licensee. As one official notes, "We don't close off any possible avenue of information; we don't claim to know everything."

When a candidate foreign system is identified and matched with a requirement, the "potentially benefiting" service proposes testing it. At that point Admiral Linder's office asks the tough question: "If the tests are successful, will you be willing to procure the item?" (This overcomes the "Not Invented Here" syndrome.) If the answer is "Yes," testing of the candidate system is meshed with Defense-wide priorities. There are more potential systems than funds will cover; therefore, the services get involved in setting priorities, along with the Director, Test and Evaluation and the international programs offices. Approved projects then are tested at the appropriate activity; for the Air Force that is Eglin, Edwards, or Wright-Patterson.

Costs of the test articles can be as varied as the ways by which they come to light, according to the experts. They can be the "sticker price"—the foreign manufacturer's advertised cost—at the high end of the scale. Or, a foreign government or manufacturer may offer the item at a bargain-basement rate as a means of gaining access to the USAF market. The language is flexible in the justifying documents Defense has presented to Congress: "Depending on the specific equipment and the arrangements made for its evaluation, foreign companies or governments may provide test articles, spare parts, and support equipment or services as required."

Results So Far

As mentioned earlier, the FWE programs are too young to have yielded multiple results. (The continuing JP-233 development is one result.) Other promising candidates have surfaced. Also, many that appeared promising have been tested and found wanting. For the Air Force, the French Matra 250-kg high-drag bomb performed as predicted by the manufacturer. An additional quantity is being procured for certification on US aircraft. In ammunition, the Norwegian Raufoss Multipurpose Concept (MPC) fuzeless high-explosive ammunition shows good potential for US applications. DoD says that licensing rights have been obtained for it. (The MPC rounds are potentially usable in the GAU-8A and Vulcan M-61 guns.) The Air Force evaluated seven different foreign 9-mm handguns against its requirements. Four were eliminated. The

Promising Candidates for Foreign Weapons Evaluation Testing by USAF, FY '80 and '81

Handguns	Belgian Browning FA Italian Beretta M92S-1 Spanish Star M-28
Interim airfield attack system	Canadian CRV-7 French Matra Durandal French Thomson-Brandt BAP-100
Fuzeless high-explosive ammunition	Norwegian Raufoss .50-cal., 20-mm, and GAU-8 30-mm rounds

Source: Defense Department FY '81 Descriptive Summary, PE 65111D

three that remain in competition are the Belgian Browning FA, the Italian Beretta M92S-1, and the Spanish Star M-28.

Other potentially promising systems undergoing evaluation include three candidates for the interim airfield attack munition: the Canadian CRV-7, the French Matra Durandal, and the French Thomson-Brandt BAP-100. The BAP-100 and Durandal are penetration bombs; the CRV-7 is a penetration rocket. Other USAF evaluations upcoming include Norwegian .50-caliber and 20-mm fuzeless high-explosive ammunition, aircrew NBC (nuclear, biological, and chemical) defense assembly, and various low-cost aerial and surface targets.

Among the systems that were evaluated but terminated are: firing of the US GAU-8 30-mm round in the Swiss Oerlikon KCA gun, and the Swedish FFV .50-caliber Unipod.

If the foreign weapons evaluations can turn up really significant savings in development money and time, then a truly leveraged outcome will be realized. The beneficiaries will be the taxpayers and the men and women who safeguard their security. ■

Runway damage caused by Matra Durandal test at Armament Division, Eglin AFB, Fla.

Potentially Promising US Army and Navy Foreign Weapons Evaluations

Army

- Norwegian M70 20-mm cartridge
- Australian/German low-noise generator sets
- German Swingfire heater
- UK/Japanese smoke pots
- Swiss Boschung multivibratory compactor
- Canadian helicopter-mounted wire cutter
- British NBC defense assembly
- German training ammunition families

Navy

- Norwegian Raufoss .50-cal. ammunition
- Swedish 9LV200 shipboard fire-control system
- Canadian SHINPADS (Shipboard Integrated Processing and Display System)
- Dutch Lightweight Optronics Director

Source: Defense Department, FY '81 Descriptive Summary, PE 65111D

Priorities and Progress

BY THE HON. HANS M. MARK
SECRETARY OF THE AIR FORCE

LAST September, this magazine published an article in which I outlined what I believed were the important priorities that should govern Air Force programs in the coming years. I believe it might be useful to review these priorities, considering the events of the last eight or nine months, to see where we stand with respect to implementing some of our high-priority programs and perhaps, more important, to examine whether the priorities I stated then remain valid. It is crucial to determine whether the events of recent months have given us reasons to revise the priorities outlined last September or perhaps to add to the list other things that need to be done.

Let me repeat the priorities that were stated in September's article:

1. The enhancement of our strategic forces to maintain a level that will ensure strategic equivalence with the Soviet Union.

2. The enhancement of strategic and tactical airlift so we can adequately respond to worldwide contingencies where our national interests are involved.

3. The development of a doctrine and an organization that will permit greatly increased Air Force activities in space in order to take advantage of new technology to enhance communications, reconnaissance, and other vital Air Force functions.

Strategic Systems

I am pleased to report that significant progress has been made recently in all of these areas. In the modernization of our strategic deterrent forces, the recently completed cruise missile flight test program has provided a firm basis for the selection of a prime contractor. I see no reason why this very important project cannot now be completed successfully in the planned time period. It will be the first important strategic initiative to be completed since the fielding of the Poseidon submarine-based missiles a few years ago.

***Secretary Mark:* "Perhaps the most important consequence of events in the Persian Gulf is the heightened interest in the readiness of our armed forces to fight."**

Last September, the President also made the final decision to embark on full-scale development of the new MX land-based ballistic missile system. This decision firmly commits the United States to maintain a land-based missile system with the military advantages of high readiness and reliable command and control that land-based missiles have when compared to other strategic forces. An important feature of the proposed MX is that the new missiles will be deployed in such a way that they will remain relatively invulnerable to a first strike by Russian strategic forces. We are now engaged in a public debate on the MX system in which we hope and expect to explain the need for the system and its technical characteristics to the Congress and to the American people. I am confident that we will be successful and that the MX missile system will be fielded on schedule.

I am also pleased that our strategic program for Fiscal Year 1981 includes funds to conduct aircraft modification, flight evaluation, and advanced design of a Strategic ALCM Launcher (SAL). I believe this is a very important hedge against the possible need to enhance the B-52 cruise missile carrier force. In addition, we have three relatively low key but extremely important programs aimed at developing a better understanding of the technologies necessary for the development of a follow-on strategic aircraft, which we have come to call a Long-Range Combat Aircraft, or LRCA. These efforts include the B-1 Bomber Penetration Evaluation Program, the Strategic Bomber Enhancement Program, and elements of the Protective Systems Program. It is my hope that at some future date these programs will contribute to a new LRCA to replace the B-52s—an LRCA that a great nation like the United States must have in its military inventory.

Airlift Enhancement

The next priority item in the September article was the enhancement of our airlift capability. Airlift enhancement is on the priority list for two reasons. One is to put us in a position to meet the continued Russian and Warsaw Pact buildup in Europe. The second is to enhance our ability to exert influence elsewhere in the world. The most recent example of what we are able to accomplish, using our airlift forces, was the transportation of the British peacekeeping forces to Rhodesia. It is not at all clear whether a stable situation could have been achieved in that troubled country without the existence of our airlift forces.

In late November, the Air Force established a study task force headed by Maj. Gen. Emil Block to detail the requirements for a new transport aircraft that is being contemplated. A careful analysis was made of the kinds of airfields that might be available at likely destinations in future emergencies around the world. The essential conclusion is that the aircraft must be able to operate in a relatively austere environment at the destination. Narrow runways, on the order of 3,000 to 4,000 feet long, narrow taxiways, and small parking ramps are all characteristic of the airfields to be found in likely trouble spots. The aircraft will be capable of carrying outsized Army equipment and may use some of the technology that was developed as part of the advanced medium STOL transport (AMST) program. We expect to have a contractor start the development program in very early 1981 with the first airplane to be flown in about three and a half years from the date of the contract start.

Expanding Space Capabilities

The final priority that I mentioned was the enhancement of our ability to operate in space. We have created a Space Division in the Air Force Systems Command that is an important step in that direction. This organization will be the focal point for getting national security-related payloads on the new Space Shuttle vehicle. The Air Force is also on track in constructing the new launch site for the Space Shuttle on the West Coast at Vandenberg AFB.

Finally, upper stage vehicles for the Shuttle are being developed by the Air Force in spite of some technical difficulties. In February, NASA and the Department of Defense concluded a memorandum of understanding that defined how the Space Shuttle will be used for crucial missions related to the national security. We expect that this agreement will shape the way the Space Shuttle will finally be employed.

The Impact of Recent Events

Let me now turn to a discussion of the changes that have occurred in recent months, and how these have affected our thinking. When I wrote the article on priorities last September, the Iranians had not yet captured our Embassy staff and imprisoned them as hostages. Nor had the Russians invaded Afghanistan. These two events have heightened public interest in the nation's defense posture. Have they also changed the priorities I outlined in September?

Maintaining the strategic nuclear deterrent force must still be our first priority. A clear determination on our part to maintain the nuclear-weapon balance is still the best way to make the Russians understand that we mean to remain a great world power. We must do this to stay in the contest with Russia for influence throughout the rest of the world. The enhancement of our airlift capability has clearly become more important as a result of recent events in the Near East. The reasons for this are obvious and need not be expressed in detail here. Finally, the priority on space operations is perhaps least affected by events in the Middle East; this is something that is driven more by long-term developments in technology than by political events. The advent of the Space Shuttle is what is most important in this area, and this development must be taken into account in determining Air Force program priorities.

Perhaps the most important consequence of events in the Persian Gulf region is the heightened interest in the readiness of our armed forces to fight. This is a continuing problem that covers all of our priority programs. A second consideration that is most important is the creation of the new Rapid Deployment Force to deal with situations of the kind we face in the Persian Gulf. The Rapid Deployment Force is now being organized by the Joint Chiefs of Staff, and the Air Force will definitely have an important role to play in this vital enterprise. The Air Force is heavily involved in its creation and will have much to do if it is ever deployed.

The creation of the Rapid Deployment Force must now have a higher priority than some of the other items we have discussed. The Rapid Deployment Force will be established independent of new programs, but the forces that will be used to fill out its table of organization come from existing units. Thus, we must begin to program for the replacement of the material and manpower that has been taken from regular units around the world in order to develop the Rapid Deployment Force.

Focus on People

Finally, and most important of all, the increasing interest in our military forces caused by the events in the Middle East has focused more attention on the problems that are faced by people who are serving in our armed forces. This is a most important issue at a time when all the military services are experiencing serious problems in retaining the highly trained and specialized people who are absolutely essential if we are to carry out our military missions properly. Various economic developments have created a situation in which the comparability of military pay with the civil economy has been seriously eroded. This has, in the absence of a clear national emergency, caused many people of great value to leave the service.

Something must be done to increase the economic incentives for highly skilled people to stay in the service. We will continue to make proposals for improved compensation that, hopefully, will be accepted by the Administration and by the Congress. The Air Force is, among all our military services, at the cutting edge of what must be done, and it is absolutely essential that we continue to persuade people of the highest quality to pursue military careers in the Air Force. Only in this way can we maintain the first-class Air Force we have now and see to it that it is ready to fight with the very best weapons that modern technology can provide.

The objectives I have outlined in this article will continue to be the ones I will pursue as long as I am Secretary of the Air Force. I look forward to working with all of the people in the Air Force to achieve these ends. ■

Dr. Hans M. Mark was born in Germany and came to this country in 1940. He completed undergraduate work in physics at the University of California, Berkeley, and earned a doctorate in physics from the Massachusetts Institute of Technology in 1954. He has been a research physicist at the University of California and at Lawrence Radiation Laboratory, and chairman of the University's Department of Nuclear Engineering. In 1969, he was named head of NASA's Ames Research Center, a position he held until his appointment as Under Secretary of the Air Force in July 1977. On July 26, 1979, Dr. Mark became the thirteenth Secretary of the Air Force.

USAF's Responsibilities in the '80s

BY GEN. LEW ALLEN, JR.
CHIEF OF STAFF, UNITED STATES AIR FORCE

THE decade of the 1980s has opened on a decidedly sober note. Over the past year, three separate events—the public debate over the ratification of SALT II, the continuing turmoil and particularly the seizure of the American hostages in Iran, and the Soviet invasion of Afghanistan—have combined to alter both our perceptions and the reality of the challenges we face in a troubled world.

The SALT II Debate

The public and congressional discussions of the SALT II accords last summer and fall were significant on two counts. Not only did they produce a searching debate on the merits of the agreements themselves, but, more importantly, they sparked a widespread recognition of the threat posed to US security by the relentless buildup of Soviet military power. As a result, both opponents and supporters of the treaty have agreed that, whatever the ultimate fate of SALT II, the United States must take prompt steps to improve both its strategic nuclear forces and overall defenses if we are to maintain credible deterrence and strategic parity with the Soviet Union.

Events in Southwest Asia

The turmoil in Iran, dramatized by the prolonged captivity of the American hostages in Tehran, and the brutal Soviet aggression in Afghanistan have further underscored the requirement for increased US military strength. Both events raise the specter of expanded Soviet influence in Southwest Asia and the possibility of their gaining control of the critical energy resources of the Persian Gulf region. Moreover, the Soviet Army's occupation of Afghanistan provides disturbing evidence of a more assertive Soviet foreign policy and the Kremlin's increasing reliance on military power.

***General Allen:* "Our people seek intrinsic rewards from service . . . but, rightfully, they expect from the nation the dignity of a reasonable living standard."**

Such Soviet adventurism in the Third World was not a total surprise. Many, including the Joint Chiefs of Staff, had warned of such action as Soviet confidence grew with their improving position in the East-West military balance. Clearly, the US must move quickly to maintain parity in the strategic balance and to improve its ability to project and sustain military forces in the greater Middle East and elsewhere, if we are to deter further Soviet expansion.

The President has clearly committed this nation to meet the Soviet challenge across the spectrum of military capabilities, both in the near term—and especially in the Persian Gulf—and over the long term. He has submitted to the Congress a Fiscal Year 1981 Defense Budget with significant real growth and has pledged to sustain that growth in real dollar terms over the next five years. The Air Force is taking a number of steps to improve our readiness to fight if required and to strengthen both strategic nuclear forces and tactical, mobile forces.

Strategic Forces

Capable strategic forces are the bedrock of US deterrent strength. Modernizing these forces must be the nation's top defense priority, if we are to maintain credible deterrence and essential equivalence in the face of continuing Soviet improvements in their strategic capabilities.

The most urgent Air Force strategic modernization effort is the MX program, which will restore the survivability of our land-based ICBMs. The MX missile and its multiple protective structures (MPS) basing mode, now in full-scale engineering development, will meet demanding requirements of survivability, cost, environmental impact, and arms-limitation verifiability.

The current deferral of SALT II ratification has compelled us to reexamine the survivability of all our strategic forces against the possibility of Soviet threats larger than those projected within the SALT II constraints. We conclude that the MX is adequately resil-

ient in this regard. Its MPS basing configuration has been designed to allow timely modifications, should they be required, to maintain survivability against a wide range of increased Soviet strategic attack capabilities.

Deploying the MX in its MPS basing configuration, beginning in 1986, will make a unique and essential contribution to deterrence and allow us to maintain a dynamic, effective strategic triad. It will reestablish a survivable US ICBM capability that can be monitored effectively under SALT. It also will confront the Soviets with pressures that could compel them to deploy their ICBMs in a similar verifiable, mobile configuration, thus enhancing strategic stability.

We are also proceeding with programs to improve the air-breathing element of the nation's strategic nuclear arsenal. Over the next several years, we will be deploying small, highly accurate, strategic air-launched cruise missiles (ALCM) and updating the offensive avionics of our B-52s. We plan to use the ALCM initially on the B-52Gs and are maintaining the option of using them on the B-52Hs as well. Throughout the latter half of the 1980s, the B-52Gs and perhaps the Hs will be phasing out of the role as penetrators of the increasingly tough Soviet air defenses in favor of a standoff ALCM delivery mission. We remain convinced, however, of the value of a mixed force of ALCMs and penetrating bombers for possible SIOP (Single Integrated Operational Plan) missions against the USSR. Consequently, we are continuing to develop critical technologies to provide an option for deploying a new long-range strategic aircraft in the late '80s or early '90s.

Theater Nuclear Forces

Improvements in Soviet theater nuclear capabilities facing Europe, notably the SS-20 missile and the Backfire bomber, are compelling us to upgrade our capabilities in this area as well. Last December, the NATO Ministers agreed to proceed with a major program to modernize NATO's theater nuclear forces. As a result, the Air Force will be deploying mobile ground-launched cruise missiles in the United Kingdom and on the European continent in the early 1980s. This program, in combination with the US Army's deployment of the Pershing II medium-range ballistic missile, will help ensure that NATO has a full spectrum of capabilities to support flexible deterrence and defense in Europe.

Tactical Force Readiness

Events in the greater Middle East have focused attention on the prospects of employing US forces to protect vital national interests. The day-to-day readiness of our units and our ability to sustain them over protracted periods of intense combat are key factors that would determine the success of our forces. Our increasing emphasis on readiness in the latter half of the 1970s has paid dividends in our ability to deploy and fight on short notice, particularly in defense of Europe. There can be no doubt that the United States Air Force can rapidly bring highly effective force to bear in support of our national interests no matter where they might be challenged.

At the same time, we still have much to do in order to enhance the staying power of that capability. Thus, as we near completion of a major modernization program in our tactical air forces, we are now taking significant steps to expand aircrew training, bolster stocks of spare parts and munitions, and increase operations and maintenance funding.

Mobility

No matter how well-trained and equipped US military forces may be, their ability to effectively serve national goals in a crisis is clearly a function of how rapidly we can respond. Unfortunately, this is the weakest element in our military posture. Our current airlift capability falls far short of meeting stated requirements for prompt reinforcement of Europe. We confront mobility deficiencies of similar magnitude in planning for rapid deployment to the Persian Gulf and other far-flung regions vital to US interests.

In sum, we are faced with an array of potential contingencies that pose the very real possibility of simultaneous requirements for urgent airlift of large numbers of personnel, and heavy unit equipment, to widely divergent points on the globe. Improvement programs already under way—C-141 enhancements, C-5 and C-130 wing modifications, the Civil Reserve Air Fleet, increased wartime use rates, and KC-10 tanker procurement—will double our current capability. Nonetheless, we will still fall far short of the growing demand.

To help bridge this gap, the President has approved the rapid development and fielding of the CX, a new airlift aircraft designed to carry outsize cargo. The air-refuelable CX, capable of operating to and from austere airfields, will improve our ability to rapidly reinforce Europe and support Rapid Deployment Force requirements. We anticipate the CX would be used to support the heavy demands of strategic airlift from the US in the initial stages of a major conflict, then be shifted, at least in part, to in-theater support as sealift begins to ease the burden of long-range mobility needs.

People

Events of the past several months have led to a searching reassessment of the US-Soviet military balance, and

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Gen. Lew Allen, Jr., USAF's tenth Chief of Staff, is a 1946 graduate of the US Military Academy. After completing flying training, he was assigned to SAC as a bomber pilot. In 1954, he earned a doctorate in nuclear physics and spent the next seven years in the nuclear weapons field. From 1961 to 1971, General Allen filled a variety of assignments associated with space systems. Following duty as Director of the National Security Agency and Commander of Air Force Systems Command, he was named Vice Chief of Staff of the Air Force in April 1978. On July 1 of that year, General Allen became Chief of Staff.

have led to a growing consensus on the need for a stronger national defense. This process has made clear, once more, that the US Air Force is the world's best, that it is a vital institution for national defense, and that its contribution stems from the dedicated service of high-quality Air Force men and women. As we move to translate increased national awareness and resolve into greater military capability, it is these Air Force people who will be challenged to achieve more and to sacrifice more. They will deploy often, train rigorously, field new systems, and implement needed changes in the Air Force of the 1980s.

The heart of this Air Force will continue to be a committed, capable career force, whose invaluable training, experience, and leadership will enable us to meet the challenges of this decade. Unfortunately, today, at the very time we need them most, career enlisted technicians, navigators, pilots, physicians, and engineers are leaving the service in alarming numbers. From 1975 to 1979, second-term reenlistments of our airmen force declined from seventy-five to sixty percent. This fiscal year, the Air Force is headed toward a shortage of 400 navigators and 2,100 pilots. And if current retention rates persist, seventy-five out of every hundred pilots will separate by their eleventh year of service.

Increasing technical and flight training rates cannot offset these retention problems, for we are losing more than skills imparted by costly training. We are losing people with experience, leadership, and proven dedication to the Air Force. Because the causes for these losses are diverse and complex, our action to reduce this exodus must take several forms.

Public support is essential. Air Force men and women must know that the nation appreciates and supports their sacrifice. Public support can be simply encouraging words from individual citizens and public officials. Acts of kindness to military people and families, on the move or separated because of mission demands, can also help.

More important, however, would be providing adequate pay and benefits—protected from undue erosion by inflation. The Air Force is not a profession offering high monetary rewards. Our people seek intrinsic rewards from service in an exciting and vital undertaking. But, rightfully, they expect from the nation the dignity of a reasonable living standard. And they see their compensation relative to that of other professionals as an indication of public support. We can see some hopeful signs of a desire to restore the comparability once enjoyed by military pay. But there must be more action, particularly for the career force, whose declining retention rates signal real problems.

Improvements in public support and compensation will do much to improve career force retention. But there are other needed steps, which we are taking within the Air Force, to increase retention. These include increasing both challenge and job satisfaction by setting tough performance standards and providing Air Force men and women the opportunity to solve difficult problems. We have started an Air Force-wide program called Buck Stop, as an important step to move decision-making authority to the lowest possible level within the chain of command. We want supervisors and commanders to express confidence in the ability of Air Force people to accept responsibility and to get the job done. Greater emphasis must be placed on intrinsic rewards—satisfaction, fulfillment, and dignity—which, along with adequate benefits, compensation, and public support, will make the Air Force of the 1980s a more attractive profession.

As we enter the 1980s, it is clear that the nation faces stern challenges in a turbulent world. Over the past year, we have gained a clearer picture of how Soviet military growth and international instability endanger peace and security. Significant problems confront this nation and its allies. In response to these challenges, we must modernize our strategic forces, improve the readiness and sustainability of our tactical forces, increase force mobility, and retain a quality career force. These are heavy responsibilities, but they can and will be met by the outstanding men and women of the world's finest Air Force. ■

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AS Chief Master Sergeant of the Air Force, I have had the opportunity to visit with thousands of our Air Force enlisted people at their bases and units. I've talked to Security Police members at guard mounts, watched maintenance people in phase docks, observed munitions loaders in competition, seen radar operators maintain air and space surveillance on remote mountaintops, and listened to Air Force recruiters discuss the Air Force way of life with prospective applicants.

I've seen other maintenance personnel scurrying around their aircraft during surges and alerts, talked to the enlisted crew members both on alert and during their airborne duties, watched supply and fuels airmen perform their tasks, and observed others serving our people from behind food service lines, in Consolidated Base Personnel Office customer service centers, and in finance offices.

In every case, as I talked with the supervisors and senior noncommissioned officers, I would ask: "How are they? Are they well-trained? What do you think of the quality of our young people in the Air Force today?" Invariably, they reply with basically the same comment: "They're good, Chief, well-trained and truly dedicated."

In addition to visiting bases and units, I have been to our technical training schools and NCO Professional Military Education centers and held many discussions with the students. Throughout the Air Force, I have held question-and-answer sessions with our people, in all types of forums, and lis-

dership in y's Air Force

BY JAMES M. McCOY
CHIEF MASTER SERGEANT OF THE AIR FORCE

Chief McCoy: **" . . . I see these men and women as professionals, doing a tough job—and doing it well."**

tened to their comments. They are honest and sincere, and they project a great deal of concern, not only for themselves, but also for the future of our Air Force and our country. Their questions are well-reasoned and mature. They discuss relevant issues: pay and allowances, duty assignments, people programs, facility improvements and new construction needs, weapon systems acquisitions, and political situations in foreign nations. From my vantage point, I see these men and women as professionals, doing a tough job—and doing it well.

The New Breed of Airmen

All our indicators tell us that these people, who have volunteered to serve in the Air Force, are top-notch citizens who are willing to offer a period in their lives so that others may continue to enjoy the freedoms that we all have grown quite accustomed to. I like to refer to these airmen as our "Ice Cream, Hot Dog, Apple Pie Young Americans," dedicated to preserving what many before us have given in sacrifice. Often called upon to deploy at a moment's notice to some faraway place they may never have heard of, they respond without hesitation. They do everything they possibly can to assure our operational readiness. They are good because they want to be the best, as individuals and as part of a well-trained team.

While you may occasionally see headlines portraying instances of unacceptable behavior among our people, bear in mind that what's involved is a very small group that does not want to conform to authority or accept our standards, and they get our attention. From the first-line supervisors to the superintendents, we must correct and discipline those who won't conform. But it cannot stop there. We must continually display the proper example for the vast majority—those who want to perform in a truly outstanding manner.

Society has changed over the years and so have the young people who are entering today's Air Force. The "brown-shoe" days are gone. These airmen must be led—not pushed. Providing that leadership, by example, every hour, every day, is probably the single biggest challenge we face in keeping our force motivated. It's not an easy thing to do. Sometimes we have to make decisions that may not be popular, but these airmen will accept them if they understand why it's necessary. It takes time and effort and a great deal of patience. Unfortunately, some of us have gotten into the habit of not supervising, not leading—simply managing for eight hours a day, then forgetting about our Air Force and concentrating on other outside activities. Leadership in today's Air Force is a twenty-four-hour-a-day job!

Chief Master Sergeant of the Air Force James M. McCoy joined the Air Force in January 1951. He has served in Air Defense Command, Air Training Command, SAC, and Aerospace Rescue and Recovery Service. Much of Chief McCoy's career has been in the field of training and education, where he has had assignments as base training NCO, Assistant Commandant of AFROTC Cadets at Notre Dame, Commandant of SAC's NCO Preparatory School, and Chief of the Military Training Branch, Hq. PACAF. In March 1975, he became the first SAC senior enlisted advisor. Chief McCoy has a bachelor's degree in business administration and was one of the twelve Air Force Outstanding Airmen of 1974. He was selected for his present position in August 1979.

A Time for Reflection

Now is the time for all of us, first-term airmen, supervisors, and senior NCOs to stop and reflect on just exactly what we are doing and where we are going. To our senior NCOs, I say let's assume our proper role as the traditional noncommissioned officer who leads by example and experience. Be ready to listen and communicate with our people. To our supervisors, often the members' initial contact at their first permanent duty station, I say accept your responsibility to train these young airmen. Be aware and sensitive to their needs and aspirations and, most importantly, be honest with them. Let them know that their decision to enter the United States Air Force was a good one. To our young airmen, I say continue to do your best, learn from those who have gone before you, and prepare yourselves to assume their responsibilities. Develop yourselves as total team players.

Finally, to those of you who are concerned about the quality of the men and women of the United States Air Force, let me assure you that they stand ready and are well-trained and disciplined. They will exert all their energies to protect and defend our national interests. In short, they're good. ■

EF-111. NEWEST ELECTRONIC WARRIOR.

Eastern Europe has the densest thicket of electronic defenses in the world today.

The EF-111 Tactical Jamming System was developed by the Air Force and Grumman specifically to counter this potential threat—to provide cover for air-to-ground operations along the front line, and to support penetrating strike forces.

In a comprehensive four-year development and test program—the last six months conducted by Air Force personnel at Mountain Home Air Force Base in Idaho—the EF-111 significantly exceeded the operational reliability and "blue suit" maintainability standards set by the Air Force and Department of Defense.

Tests of the EF-111 system in a simulated Eastern European air-defense environment demonstrated its ability to detect and automatically assign jammers to counter and negate every type of threat encountered.

The need for the EF-111 is a well-established USAF requirement. EF-111 provides the capability to disrupt the Warsaw Pact radar net with support jamming in both standoff and escort roles.

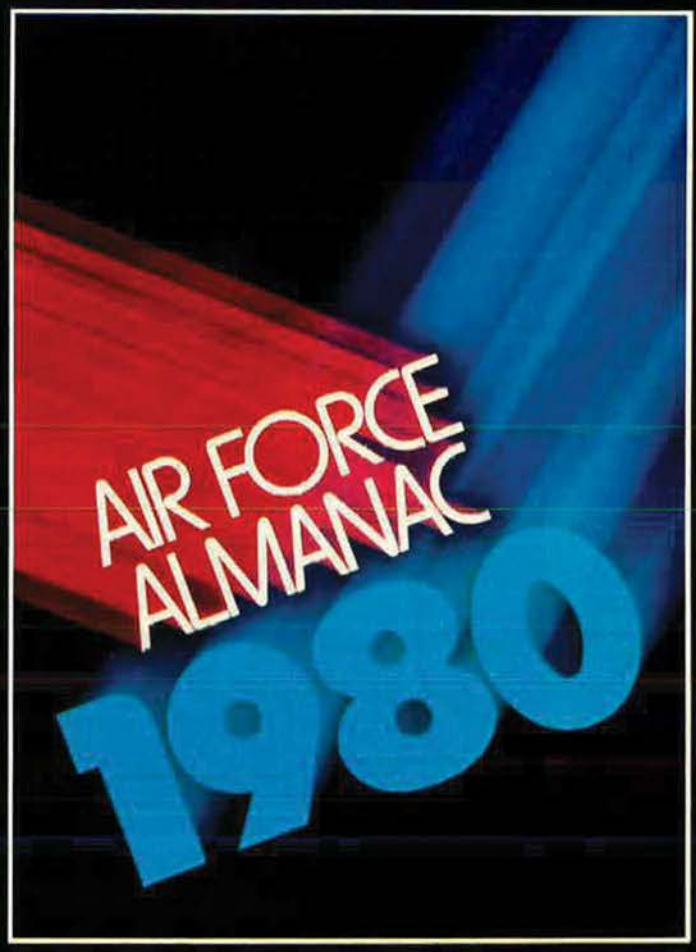
The EF-111. It can do the job. And with a built-in growth capability to cope with new and more sophisticated threat radars, it will continue to do the job in the future.

The EF-111. A real answer to a real need.

Grumman Aerospace Corporation, Bethpage, Long Island, New York 11714.

GRUMMAN

50 years



This thirtieth Almanac issue of AIR FORCE Magazine presents a comprehensive report on the status of Air Force component organizations, people, budgets, bases, and weapon systems. Statistical data is the latest available on March 1, 1980.

The theme of this year's Almanac is readiness — readiness to defend the country and its interests in a period of growing tensions, inadequate defense budgets, and a military balance that has shifted to the advantage of the Soviet Union.

Readiness, in quality if not in quantity, *is* being achieved, but only through the innovations, sacrifices, and dedication of Air Force men and women. Their contributions to national security far exceed the rewards and public recognition they receive. Righting that imbalance will continue to be the foremost priority of the Air Force Association.

The reports, and much of the data, that follow were assembled with the help of the Air Force Office of Public Affairs and its representatives throughout the Air Force. Their assistance is gratefully acknowledged.

—The Editors

Air Force Communications Command

A MAJOR COMMAND

Wherever the Air Force is, Air Force Communications Command is, too, meeting its mission of providing communications, air traffic control, and standardized automated data processing support for the Air Force and other federal activities throughout the world. Since these services play a pivotal role in war, readiness is the common denominator of command activities.

To provide these support services, AFCC has the most widely dispersed assets in the Air Force. The command is manned by 42,000 military personnel and nearly 7,000 civilians and has 150 squadron- and group-size units and more than 400 detachments and operating locations around the world. Unlike most other commands, AFCC owns no bases, but operates as a tenant at installations in forty-nine of the fifty states, the District of Columbia, and twenty-three foreign countries.

AFCC is supplemented by 189 Air National Guard and Air Force Reserve units with more than 16,000 people. ANG combat communicators constitute the major forces in support of Joint Chiefs of Staff exercises worldwide. The nineteen ANG electronics installations squadrons contribute some 450,000 man-hours of direct mission support each year.

AFCC's worldwide mission means that one-third of the work force always is located overseas. About 1,600 personnel are assigned to remote installations in Korea, Turkey, Greenland, and other countries.

In accomplishing its communications-electronics engineering and installation mission, the command has about 350 electronic installation teams and 604 engineers available for worldwide deployment. About seventy percent of these teams are on the road at any one time.

The command has four C-140s and two T-39s used by AFCC's facility checking squadrons to evaluate communications and navigational aid facilities at Air Force bases. These squadrons work in the air and on the ground, checking landing systems, navigational aids, radar approach controllers, and tower operators.

AFCC on-base communications services include telephone systems, intra-base radios, telecommunications centers, fire and crash alarms, intrusion detection and warning systems, and closed-circuit television. These systems are tied into long-distance networks known as the Defense Communications System (DCS). The DCS is the common-user long-distance voice and data network that serves all elements of the Department of Defense. The command is also the Air Force manager for the Military Affiliate Radio System

Technicians make preventive maintenance checks at the 1974th Communications Group's aeronautical radio station outside Scott AFB, Ill.

Maj. Gen. Robert T. Herres, Commander, AFCC.

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

(MARS) an organization of licensed volunteer amateur and military radio operators that provides a global emergency communications capability.

AFCC is responsible for managing and operating the world's largest military air traffic control system, which handles more than 12,000,000 air traffic control operations annually. The system includes 560-plus navigation aids at more than 150 installations around the world. Additional support to the flying mission is provided through the AFCC-managed Notice-to-Airmen (NOTAM) system, which gives aircrews real-time information on field and facilities conditions at distant bases. AFCC also manages the system of radio stations that allows Air Force and other government authorities, including the President, to be in contact with other aircraft or the White House while in worldwide flight. In another flying-related activity, command personnel maintain eighty-eight weather radars.

Through the Deputy Commander for Data Automation and direct reporting activities, AFCC acquires, develops, tests, evaluates, and maintains computer systems and software for the Air Force, in addition to providing design support to other DoD and federal agencies. More than 2,600 people and 154 computer systems are involved in these endeavors.

The year 1979 was one of expansion and change for AFCC, with new challenges and responsibilities added to the command's complex missions.

The most obvious change occurred when Air Force Communications Service was renamed Air Force Communications Command on November 15, 1979. Although it had been a major command since 1961, the name change more accurately denotes the command's role.

Another change occurred October 1 when realignment of Aerospace Defense Command (ADCOM) resources resulted in AFCC's absorbing more than 1,800 people at fifty worldwide locations, expanding the traditional AFCC electronics maintenance mission. Months earlier, the command had assumed responsibilities for communications centers that support the Electronic Security Command.

Significant improvements in 1979 include the completion of the Japan-to-Korea digital microwave system—project Rivet Switch—which replaced UHF/VHF radios at fixed locations with new solid-state equipment; the first operational use of the Air Force Satellite Communications System; acceptance of the first superhigh-frequency mobile tactical satellite communications terminals; and completion of the first stage of the new European Digital Backbone System (DEB), which became operational in Italy and southern Germany in November.

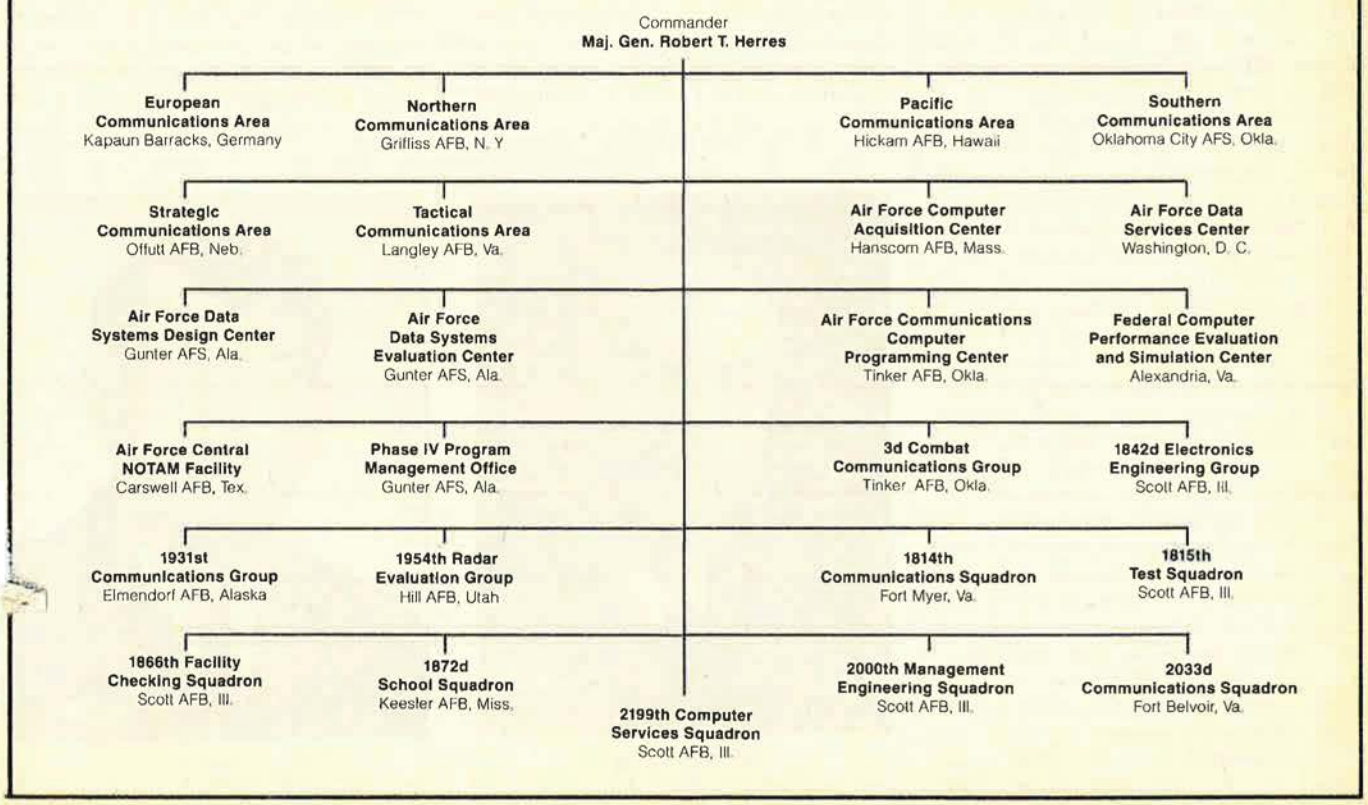
AFCC is the manager of the USAF Automated Telecommunications Programs, which use computer technology to improve efficiency and economy of base telecommunications centers. The command is deploying new minicomputer Automated Message Processing Exchanges (AMPE) to modernize eight large telecommunications centers. The first AMPE became operational at MacDill AFB, Fla., on December 2, 1979.

During 1980, the command will continue to reduce operating and support costs and correct deficiencies in the services it provides. Major efforts include upgrading base dial central offices, improving secure voice service, and modernizing RAPCONs, instrument landing systems, and aeronautical station equipment. The command has proposed a realignment of subordinate units aimed at streamlining operations and improving service to its major customers.

By its nature, AFCC rides on the forefront of technology. Great change at an ever-increasing pace is a fact of life. With the changes taking place and those planned, AFCC will continue to meet the challenges of its motto and "provide the reins of command." ■

AIR FORCE COMMUNICATIONS COMMAND

Headquarters, Scott AFB, Ill.



Air Force Logistics Command

A MAJOR COMMAND

Emerging from the paint shop at McDonnell Douglas, Long Beach, is the first USAF KC-10 Extender aircraft. AFLC's Acquisition Logistics Division placed orders for four Extenders during 1979. The first aircraft rolled out in ceremonies at Long Beach on April 16, 1980.

Increasing fuel prices, lengthening material and manufacturing lead times, and demanding environmental and work criteria dictated significant changes in the way Air Force Logistics Command did its job in 1979.

"Never before in the sixty-two years Air Force materiel and logistical people have been doing their jobs have the variables of cost and priority affected our product so much," Gen. Bryce Poe II, AFLC Commander, said recently. AFLC's more than 89,000 people recognize that if 1979 was a year of challenge, 1980 will be even more so, the AFLC Commander declared.

During the year, AFLC participated in exercises that evaluated how the systems it maintains would perform under realistic conditions. Increased logistics realism was emphasized in JCS exercises, with the US European Command, and others.

The command's Combat Logistics Support Squadrons (CLSS) were also given added attention. These elite, handpicked specialists in rapid aircraft battle damage repair and combat packaging and supply operations regularly perform miracles for AFLC's clients—the operating commands.

AFLC's program to enhance the Air Force airlift capacity moved along well in 1979. The first production model of the stretched C-141 came off the line on December 4, 1979—two weeks ahead of schedule and within cost. Lengthening the fuselage 280 inches and adding aerial refueling capability give a new dimension to the reliable StarLifter.

Last December, the first B-52 to receive the new offensive avionics system and cruise missile integration was turned over to Boeing by Oklahoma City Air Logistics Center. The turnover was a major step in a program to update the twenty-year-old electronics in the B-52 force, and a milestone for integration of the air-launched cruise missile. AFLC and Air Force Systems Command are working jointly on this significant modernization of the Stratofortress.

AFLC's Air Force Acquisition Logistics Division (AFALD) continued to improve its ability to ensure that new and developing weapon systems receive early consideration for integrated logistics support. AFALD exercised contract options to buy the next four KC-10 Extender tanker aircraft and their spares and equipment. The division also assumed responsibility for managing the airframe, engines, and support acquisition for the TR-1 tactical reconnaissance aircraft. Innovative warranty and guarantee clauses developed by AFALD improved the reliability and maintainability of weapon systems.

In 1979, the AFLC maintenance work force processed more than 4,000 aircraft through the five Air Logistics Centers (ALCs) and contractor plants. In addition, the command and its contractors overhauled or repaired some 4,400 engines. More than 36,000 civil-

Gen. Bryce Poe II, Commander, AFLC.

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

ian and 900 military man-years were used in this effort, which totaled 56,000,000 hours of production.

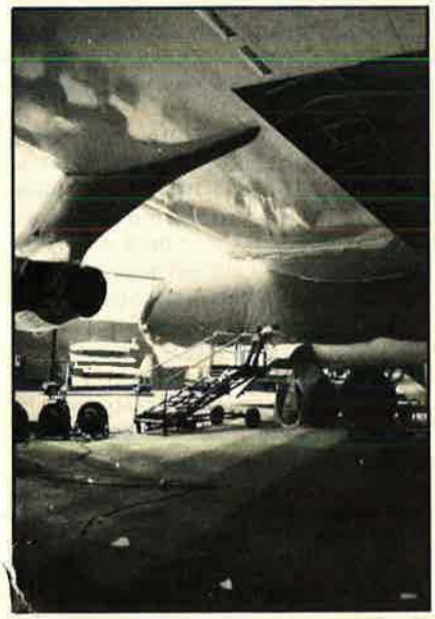
Continuing its heavy involvement with the International Logistics Program, AFLC managed Foreign Military Sales (FMS) programs for sixty-two countries. Thirty-six countries took part in the AFLC supply system through the Cooperative Logistics Supply Support Arrangement. The command handled sixty-two percent ($3.6 billion) of the Royal Saudi Air Force active FMS program, which totaled $5.8 billion during the year.

Energy initiatives were also continued in 1979. A contract was let to validate the AFLC-developed energy showcase base concept at McClellan AFB, Calif. If approved, the plan will be the basis of a $100 to $300 million construction program. It will create a technical display of applications for advanced energy resource management, along with selected new energy supply and conservation methods. The program is a joint Department of Energy/Defense/Air Force project. At Hill AFB, Utah, work continued on exploiting geothermal energy sources.

New tasks assigned during 1979 included logistics management for the ground-launched cruise missile to Oklahoma City ALC (OC-ALC), repair responsibility for the air-launched cruise missile (ALCM) to Ogden ALC, and the ALCM's F107 turbofan engine to OC-ALC.

Last year's fiscal management in the command involved funds totaling more than $15 billion. AFLC's appropriated budget was approximately $7 billion, while stock and industrial funds amounted to $6.2 billion.

The command's work force at the end of 1979 totaled 89,270, down about 2,300 from the previous year. The total includes 2,509 officers, 6,952 airmen, and 79,809 civilians. Women increased by nearly 400 to 22,259 and now represent twenty-seven percent of the total AFLC work force. ■



The first B-52 to be completely repainted since 1973 at AFLC's Oklahoma City Air Logistics Center (Tinker AFB, Okla.) receives final touches. The job was done in the base's new protective coating facility.

USAF C-5 Galaxy goes through a phase of depot-level maintenance inside the huge Aircraft Maintenance Hangar at AFLC's San Antonio Air Logistics Center at Kelly AFB, Tex. Kelly AFB is the only USAF installation overhauling the giant cargo carrier.

AIR FORCE LOGISTICS COMMAND

Headquarters, Wright-Patterson AFB, Ohio

Commander
Gen. Bryce Poe II

- **Ogden Air Logistics Center**, Hill AFB, Utah
- **Oklahoma City Air Logistics Center**, Tinker AFB, Okla.
- **Sacramento Air Logistics Center**, McClellan AFB, Calif.
- **San Antonio Air Logistics Center**, Kelly AFB, Tex.
- **Warner Robins Air Logistics Center**, Robins AFB, Ga.
- **AFLC International Logistics Center**, Wright-Patterson AFB, Ohio
- **Military Aircraft Storage and Disposition Center**, Davis-Monthan AFB, Ariz.
- **Aerospace Guidance and Metrology Center**, Newark AFS, Ohio
- **USAF Medical Center**, Wright-Patterson AFB, Ohio
- **Air Force Acquisition Logistics Division**, Wright-Patterson AFB, Ohio
- **Air Force Museum**, Wright-Patterson AFB, Ohio
- **2750th Air Base Wing**, Wright-Patterson AFB, Ohio

Air Force Systems Command

A MAJOR COMMAND

The mission of Air Force Systems Command (AFSC) is to advance aerospace technology, adapting it into logistically supportable, cost-effective aerospace systems. AFSC is responsible for design, construction, and purchase of weapons and equipment for Air Force operational and support commands. Primary emphasis is given to command control and communications, space satellites, munitions, strategic and tactical aircraft, and missiles.

The command has approximately 52,000 personnel with about fifty percent civilian, thirty percent enlisted, and twenty percent officer. Because of AFSC's technical mission, it is the Air Force's major employer of scientists and engineers.

Systems Command will manage approximately $17.4 billion in FY '80. Since more than sixty percent of its budget is used to acquire weapon systems manufactured by industry, AFSC emphasizes sound, innovative contracting techniques. Command initiatives that increase competition, expand the use of fixed-price contracts for production, provide stronger incentives, and award more multiyear contracts have attracted wide attention. As a result of these initiatives, money spent for new sole-source contracts was halved in 1979, while dollar awards for firm fixed-price contracts almost tripled.

To increase contractor productivity, a task force was established to develop a manufacturing technology investment strategy on major acquisition programs. A model for the project is the F-16 program in which manufacturing technology implementation and capital investment incentives to the contractor saved the Air Force about $200 million.

In an organizational change, the Space and Missile Systems Organization (SAMSO) was disestablished. Space-related activities are now performed by the new Space Division, while missile responsibilities were transferred to the new Ballistic Missile Office. As a part of the realignment, the Space and Missile Test Center was retitled the Space and Missile Test Organization, with launch operations continuing at newly designated Eastern and Western Space and Missile Centers. In a separate change, the Armament Development and Test Center was redesignated the Armament Division.

Many technological advances and other significant accomplishments or events were recorded during the past year. The more important ones are:

- Ground testing was completed and airborne tests began on a prototype laser communications system that could be used in space.
- Studies of a spacecraft orbiting at geosynchronous altitudes were conducted to determine yet unexplained electrical-arcing phenomena.
- A new, low-cost technique using a high-temperature alloy and an injection molding process for building rocket engines was demonstrated.
- A contract was awarded for the development, test, and launch of four replenishment satellites for Navstar, the military's all-weather, day-and-night, space-based navigational network.
- The Air Force Satellite Communications (AFSATCOM) system designed for two-way communications between strategic, nuclear-capable forces achieved an initial operating capability.
- Two Defense Satellite Communications Systems (DSCS) Phase II satellites were launched, providing for the first time a full complement of operational satellites and on-orbit spares available for worldwide DoD satellite communications coverage.
- The first construction phase was completed for the Space Shuttle launch complex at Vandenberg AFB, Calif.
- Full-scale engineering development, including design of missile and basing subsystems, began on the MX missile. The Air Force also concentrated on the environmental impact of the new land-based intercontinental ballistic missile.
- Flight tests began that demonstrated rocket ramjet technology as a propulsion system for the advanced strategic air-launched missile (ASALM).
- Prototype validation was initiated on an advanced medium-range air-to-air missile (AMRAAM) that will significantly improve future air-to-air combat capabilities.
- Production of A-10s continued, with more than 300 aircraft delivered to TAC, USAFE, and the Air National Guard. This is one of the few occasions when substantial numbers of a new first-line combat aircraft have been delivered to active and Air National Guard units concurrently. The Air Force is also evaluating a night attack version of the A-10.
- Requests for proposals were issued to industry for developing the single-seat F-16 and A-10 night attack system called Low-Altitude Navigation and Targeting Infrared System for Night (LANTIRN).
- The F-16 was delivered on schedule to five NATO nations—the United States, Belgium, the Netherlands, Norway, and Denmark.

Gen. Alton D. Slay, Commander, AFSC.

CMSgt. Arthur L. Andrews, Senior Enlisted Advisor, AFSC.

• Flight competition was conducted between the General Dynamics Corp. and Boeing Aircraft Co. air-launched cruise missiles (ALCMs).

• Initial studies explored potential military and commercial airframes with a potential for a strategic ALCM launcher.

• Contracts were awarded for full-scale production of the B-52 offensive avionics system and modifications for integration of the air-launched cruise missile.

• Manufacturing costs of the metallic structure for the air-launched cruise missile were reduced significantly by using castings rather than machine forgings.

• Two dissimilar, geographically separated aircraft simulators were linked to fly interactive air combat missions against each other.

• The CX System Program Office was established as the focal point for the development and acquisition of a new transport aircraft capable of rapid intertheater deployment and intratheater movement of combat forces.

• The highly maneuverable aircraft technology (HiMAT) research vehicle, which could form the basis for fighter aircraft designs of the 1990s, made its maiden flight at Edwards AFB, Calif.

• The high-flow, ready-pressure anti-G valve was developed to increase pilot tolerance to G forces in high-performance aircraft.

• Testing of the electronically agile radar, the world's most advanced multimode airborne radar, was completed.

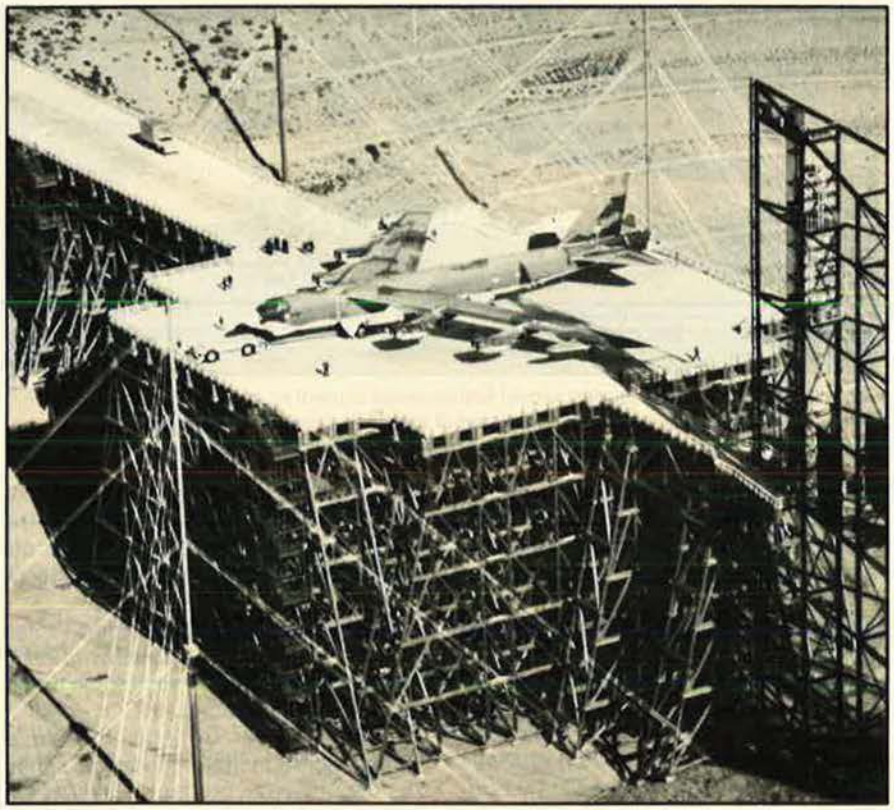
• Laboratory testing of antijam, antichaff, digitally coded radar was completed.

• The 16-kilobit-per-second modem was demonstrated to provide a dial-up secure AUTOVON voice capability.

• The sea-launched ballistic missile detection and warning system (PAVE PAWS) at Otis AFB, Mass., was accepted from the contractor as construction of an identical station at Beale AFB, Calif., continues.

• The Aeropropulsion Systems Test Facility, a $437 million research and development complex for air-breathing engines at Arnold AFS, Tenn., reached the halfway point in construction, with operational status scheduled for 1983.

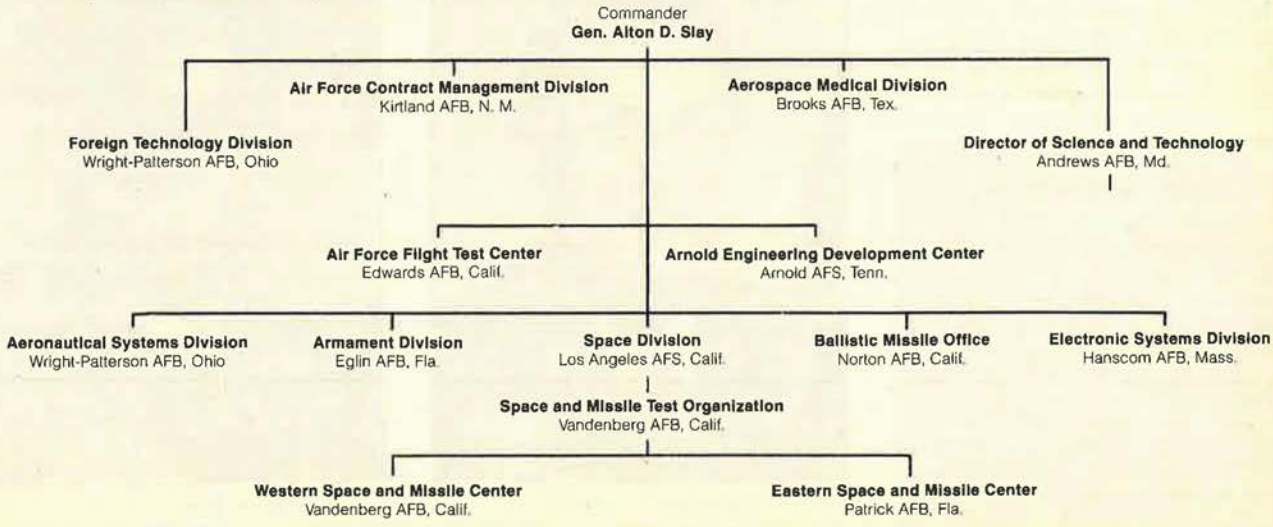
• A twelve-story-high, all-wood testing facility began operational checkout at Kirtland AFB, N. M., enabling scientists and engineers to simulate in-flight electromagnetic pulse effects on aircraft and electrical equipment. ■



A twelve-story, all-wood electromagnetic pulse simulator testing facility, called Trestle, began operational checkout at Kirtland AFB, N. M., by rolling out a B-52 aircraft onto the test platform.

AIR FORCE SYSTEMS COMMAND

Headquarters, Andrews AFB, Md.



Air Training Command

A MAJOR COMMAND

Air Training Command (ATC), with headquarters at Randolph AFB, Tex., is responsible for Air Force recruiting; basic, technical, and flying training; and professional military and specialized education.

ATC, the free world's largest training-education complex, has an operating budget of $1.8 billion, assets of more than $3.3 billion, 1,491 aircraft, and a force of more than 124,000 people.

Hq. ATC manages fifteen US installations and ninety worldwide Field Training Detachments (FTDs) and operating locations (OLs), which in 1979 produced approximately 134,000 graduates. In addition, some 70,000 recruits, including Air Force Reservists and Air National Guard members, received basic training at Lackland AFB, Tex. About 116,000 (including USAF civilians) completed technical training at one of five ATC training centers, and nearly 9,000 flying personnel completed land and water survival training.

Officer Training School (OTS), located at Lackland AFB, commissioned 3,954 young men and women during 1979—a number expected to rise to 5,700 in 1980.

ATC's flying training aircraft include 681 T-37s, 693 T-38s, 102 T-41s, thirteen T-43s, and two UV-18s.

The command trained 1,188 pilots and 890 navigators in 1979. Also, 378 foreign students completed specialized pilot training courses. Fifteen women became pilots, and a second group of eight entered navigator training.

ATC flew approximately eighteen percent of all USAF flying hours last year, but had less than six percent of reportable aircraft accidents, for a flying safety record of 1.5 accidents per 100,000 flying hours.

A crew chief of the 12th Organizational Maintenance Squadron at Randolph AFB, Tex., briefs a T-38 instructor pilot before the start of the day's flying mission.

More than 5,000 airmen from fifty-five allied nations received ATC training valued at more than $190 million. Close to 2,600 foreign students graduated from the Defense Language Institute's English Language Center at Lackland. More than 580 NCOs graduated from the command's NCO Academy, and 6,564 junior NCOs completed Phases I through III of Professional Military Education.

In technical training, two factors contributing directly to increased effectiveness were an improved Pipeline Management System (PMS), and hands-on training. PMS ensured that the Air Force recruited the right people, ready to receive the training needed at the correct time.

Air University (AU) provided Professional Military Education (PME) graduate studies and continuing career education for officers, NCOs, and civilians. Air War College, the senior professional military education school for the Air Force, prepared 228 resident graduates for senior command and staff positions. Air Command and Staff College graduated 538 officers. More than 2,408 graduated from Squadron

A Role In Readiness

In addition to training and education programs, ATC plays a direct role in Air Force readiness. ATC has approximately 3,600 personnel trained, equipped, and assigned to mobility teams designed to augment operational forces in crisis situations. ATC regularly participates in Joint Chiefs of Staff and Readiness Command exercises that test the effectiveness of command and control systems as well as mobility plans.

Gen. Bennie L. Davis, Commander, ATC.

CMSgt. Emory E. Walker, Senior Enlisted Advisor, ATC.

Officer School, and 1,157 completed the Senior NCO Academy.

The Air Force Institute of Technology at Wright-Patterson AFB, Ohio, provided university-level education in science, engineering, management, medicine, and other technical areas. AFIT graduated 171 resident Air Force officers with master's and twelve with doctoral degrees from its School of Engineering. An additional 138 received master's degrees from its School of Systems and Logistics. AFIT also sent students to 400 civilian institutions with 2,584 attending such nondegree programs as short courses and Education With Industry programs. Some 1,549 received degrees—687 in medical programs.

The Civil Air Patrol (CAP), the volunteer auxiliary unit of the Air Force, flew more than 1,000 search and rescue missions, located 499 search objectives, and was credited with saving fifty-five lives.

Meeting the Recruiting Challenge

Air Force Recruiting Service, also headquartered at Randolph AFB, continued in 1979 to recruit the quality men and women needed for the All-Volunteer Force.

Air Force recruiters enlisted more than 73,700 people during 1979, including some 66,616 without prior service, 1,542 health professionals, 1,200 former service members, and 4,416 applicants for Officer Training School.

More than 46,000 age-qualified leads were provided to recruiters during the past year through the Air Force Recruiter Assistance Program (AFRAP).

Under the Recruiter Helper Program, some 5,000 first-term airmen were credited with 5,148 enlistments in 1979. Air Force recruiters are assigned throughout the United States, Guam, Puerto Rico, England, Spain, the Philippines, and Germany.

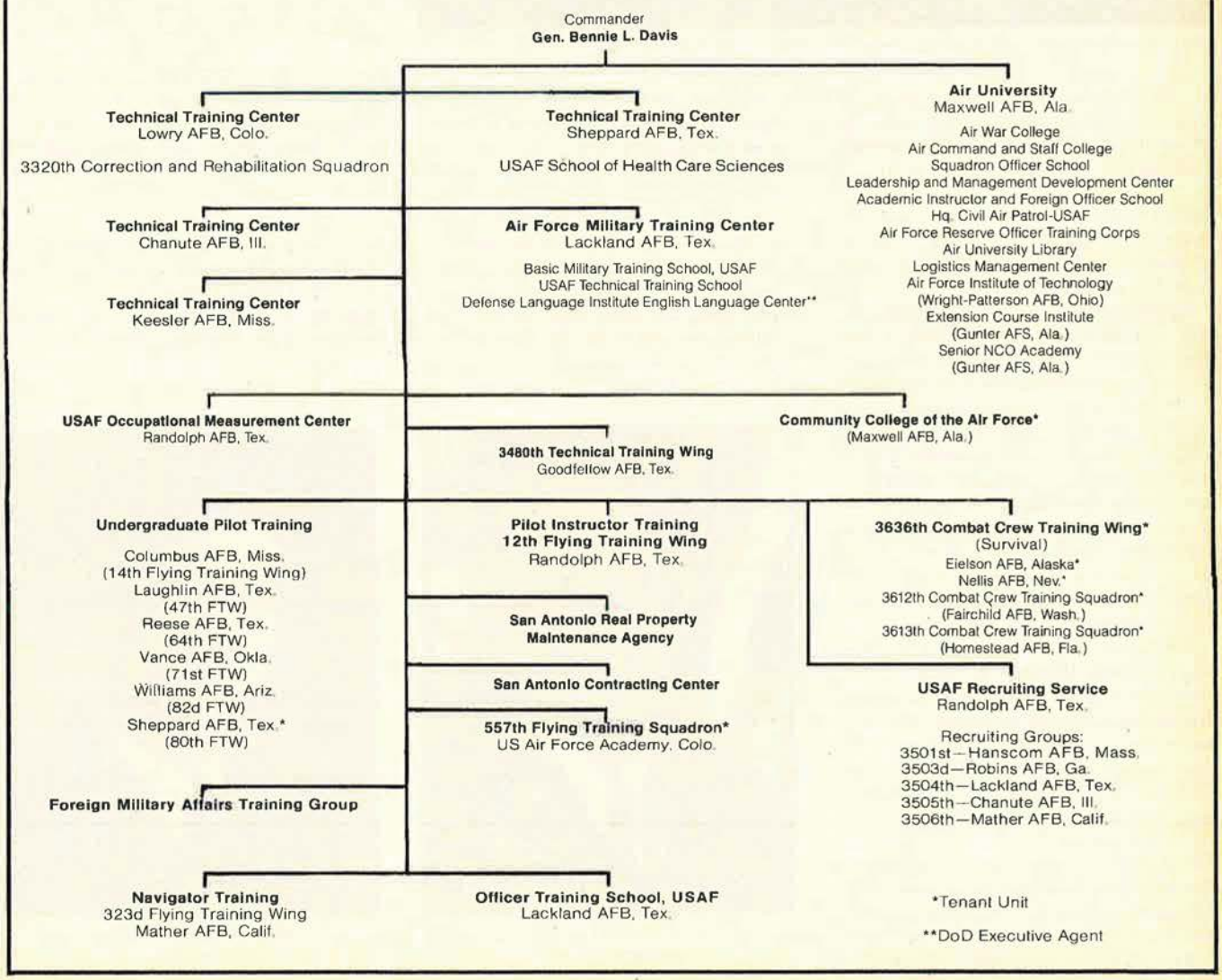
Air Force Reserve Officers Training Corps (AFROTC) commissioned 2,504 new line officers, including 341 women. At the end of 1979, some 20,400 men and women were enrolled in AFROTC at 141 college campuses, with 6,500 under full scholarships. Approximately 33,000 young men and women participated in junior ROTC at 278 high schools.

Other important AU functions include: the Academic Instructor and Foreign Officer School, the Extension Course Institute, the Logistics Management Center, and the Air University Library.

Community College of the Air Force registration mushroomed to nearly 108,540, with CCAF awarding 3,466 Associate degrees. ■

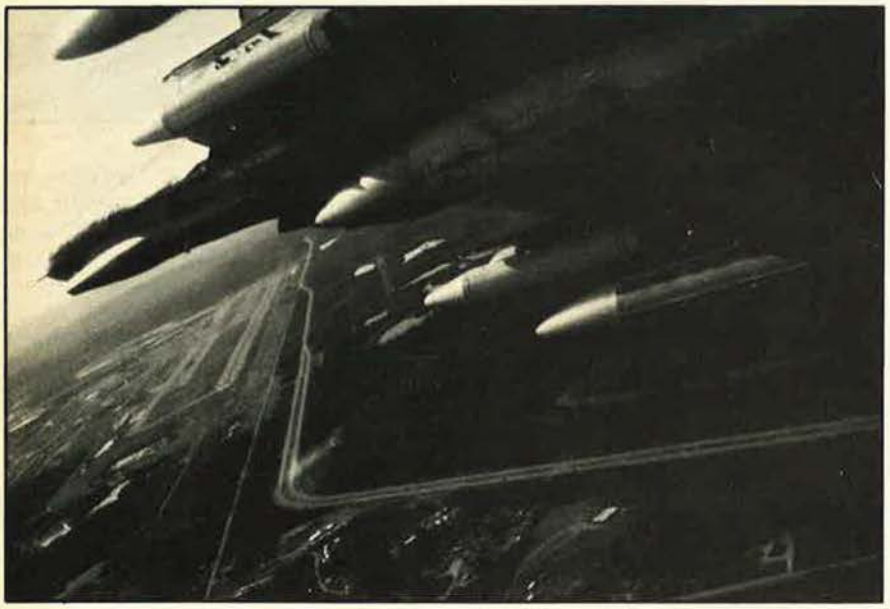
AIR TRAINING COMMAND

Headquarters, Randolph AFB, Tex.



Alaskan Air Command

A MAJOR COMMAND



An F-4E Phantom approaches the runway at Eielson AFB, near Fairbanks, Alaska.

The Alaskan Air Command (AAC) is charged with providing early warning of an air attack on the US and Canada, guarding the sovereignty of US airspace, and supporting US ground forces in Alaska. Its area of operations reaches to within fifty miles of Soviet Siberia, just across the Bering Strait from the western coastline of Alaska.

Fulfilling these tasks are 8,500 people: 820 officers, 6,500 enlisted personnel, and 1,180 civilian employees.

The AAC Commander also serves as Commander of the Alaskan North American Air Defense Command (NORAD) Region, and is responsible to the Commander in Chief, NORAD, for aerospace defense of the region. Also, as the senior military officer in Alaska, he is the coordinating authority for all joint military administrative and logistic matters and the military point of contact for the state.

AAC personnel are assigned to three main bases, thirteen aircraft control and warning (AC&W) squadrons, and two forward operating bases. The main bases are: Elmendorf AFB, bordering Anchorage, the state's largest city; Eielson AFB, twenty-six miles southeast of Fairbanks; and Shemya AFB, near the tip of the Aleutian Islands chain. The AC&W squadrons are along the western coast and in the interior of the state. Galena and King Salmon Airports are forward operating bases for F-4 aircraft from Elmendorf. In addition, AAC provides administrative and logistic support for SAC units at Shemya AFB and Clear AFS.

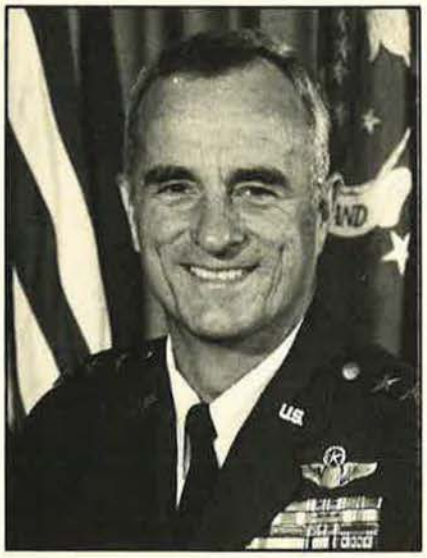
The 21st Composite Wing and the 21st Air Base Group, at Elmendorf AFB, were recently redesignated the 21st Tactical Fighter Wing and the 21st Combat Support Group, respectively. The group is the host unit for Elmendorf AFB, while the wing also has the managerial responsibility for Galena and King Salmon Airports.

In addition, the wing is the main flying arm of AAC. The wing's 43d and 18th Tactical Fighter Squadrons both fly the F-4E Phantom. The 21st TFW also uses a number of T-33 aircraft for training purposes.

Major tenants of Elmendorf include the 616th Military Airlift Group (MAC) and its 17th Tactical Airlift Squadron, equipped with C-130s; and the 71st Aerospace Rescue and Recovery Squadron, equipped with HC-130s and HH-3 helicopters. Other tenants include the 1931st Communications Group and the 6981st Security Squadron.

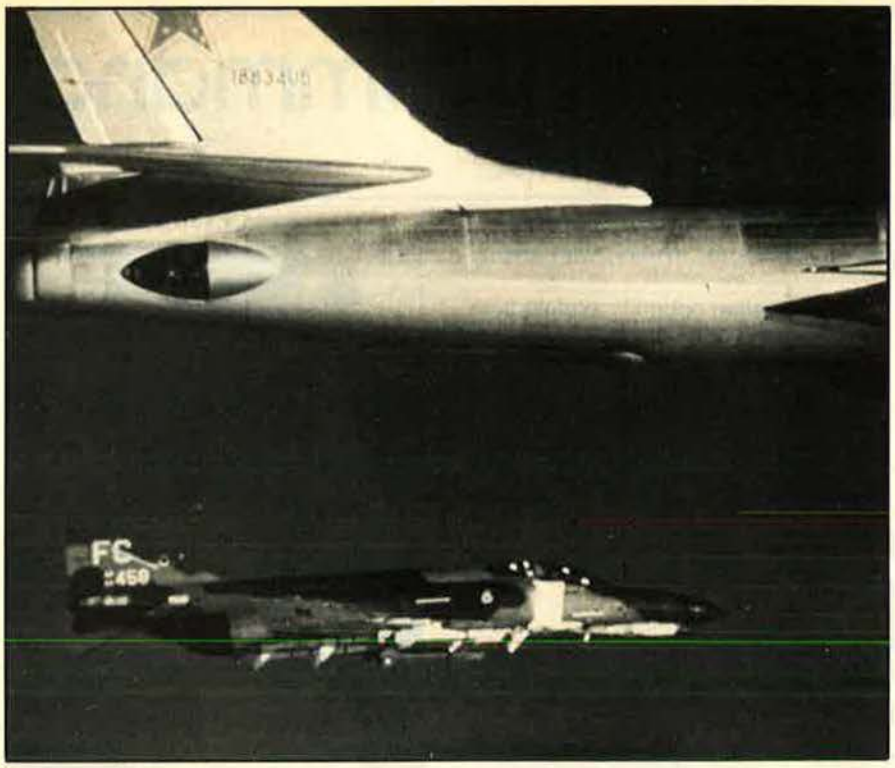
AAC's other flying unit is the 5010th Combat Support Group at Eielson AFB. The group's 25th Tactical Air Support Squadron flys the O-2A, primarily in support of US ground forces in Alaska. The group also has T-33s, which provide training targets and simulated air cover for ground forces during training maneuvers. Eielson's largest tenant unit is SAC's 6th Strategic Wing, equipped with KC-135 Stratotankers.

At Elmendorf, AAC operates the Alaska Rescue Coordination Center (RCC). When a search-and-rescue (SAR) mission is under way, the RCC may, and often does, coordinate the SAR efforts involving aircraft and personnel of all the military services within the state, plus the Civil Air Patrol, Alaska State Highway Patrol, Federal Aviation Administration, and civilian



Lt. Gen. Winfield W. Scott, Jr., Commander, AAC.

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



Above, an Alaskan Air Command F-4E Phantom completes an intercept of a Russian bomber, a Tu-16 Badger, off the coast of Alaska. Left, a weapons loader prepares an AIM-7 Sparrow radar-guided missile for uploading during the command's 1979 Combat Turnaround competition.

volunteers. During 1979, the RCC coordinated emergency assistance for 217 military and civilian persons in distress and was credited with saving 106 lives.

A Joint Task Force (JTF)—normally established by the Joint Chiefs of Staff for contingency/emergency operations—has been formed for joint Arctic training exercises involving up to 20,000 active-duty, National Guard, and Reserve personnel from all the military services and the Coast Guard. It is headed by the AAC Commander.

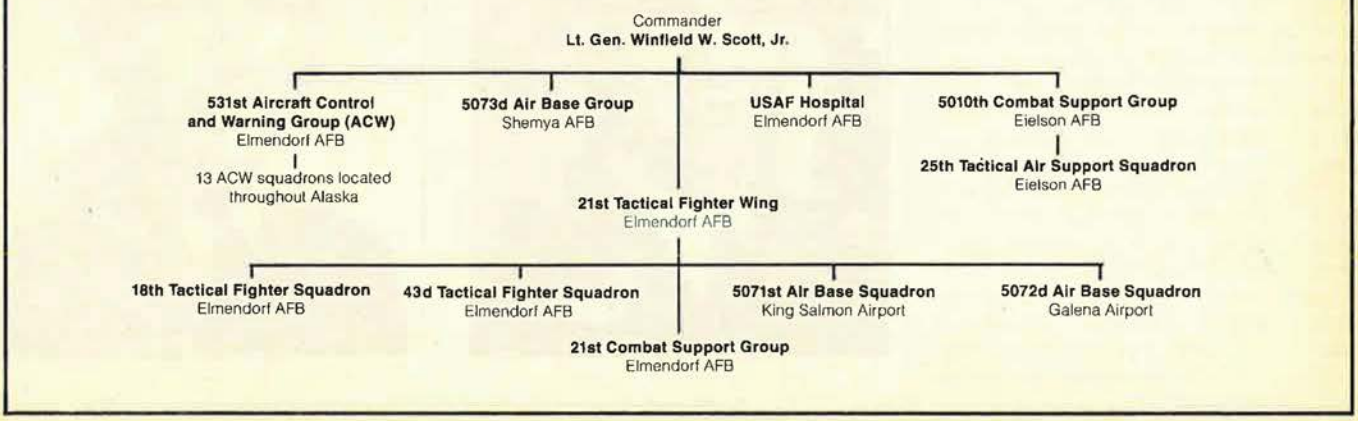
Looking to AAC's future, the Air Force recently announced it will station two E-3A Sentry Airborne Warning and Control System (AWACS) aircraft on a periodic basis at Elmendorf AFB. This AWACS deployment is not scheduled until the FY '82–83 period. Associated with this action is an estimated $5.6 million in new construction at Elmendorf. The E-3As will be deployed by their home unit, the 552d Airborne Warning and Control Wing at Tinker AFB, Okla.

The command is also moving ahead with the implementation of the Seek Igloo minimally attended radar (MAR) at its thirteen AC&W squadrons. Construction of the initial MAR began last year. The prototype is expected to be installed in March 1981 at the 705th AC&WS, King Salmon Airport, Alaska. MAR is expected to undergo extensive testing and evaluation during 1981–82 before becoming fully operational during the latter part of 1982. Once the prototype is operational and a production decision made, full-scale production of the other twelve MARs can begin.

Both the E-3A and MAR will be valuable resources as the men and women of the Alaskan Air Command continue, into the 1980s, their most important mission—providing "Top Cover for America." ■

ALASKAN AIR COMMAND

Headquarters, Elmendorf AFB, Alaska



Electronic Security Command

A MAJOR COMMAND

Here, camouflage protects ESC field sites. The command is responsible for protecting friendly C³ operations and developing countermeasures against enemy command control and communications.

On August 1, 1979, the USAF Security Service, which was established in 1948, became the Electronic Security Command (ESC). The command grew out of the Air Force's need to develop its offensive and defensive command control and communications countermeasures (C³CM), and its electronic warfare options.

The key to Air Force success in tomorrow's military operations may well be to capitalize on our technological capability, and to attack vulnerabilities in the enemy's C³ systems while protecting our own. The mission of Electronic Security Command is to provide products, services, and people to combat commanders in support of this objective.

C³CM includes offensive and defensive use of disruptive electronic warfare techniques to exploit, jam, confuse, or destroy opposing C³ systems. At the same time, C³CM protects our own systems from enemy attacks.

ESC operators collect, analyze, and report data about potential enemy C³ systems. They train in all facets of electronic warfare countermeasures techniques, including international Morse code, special electronic equipment operations, and equipment maintenance. The goal is to present combat commanders with both lethal and nonlethal options for dealing with enemy C³.

One nonlethal option is exploitation: gathering information about the enemy C³ system and passing that information quickly to the combat decision-maker. Once the commander knows as much as possible about an opposing C³ system, he may want to use other nonlethal options—such as jamming or confusing it.

Finally, a C³ target may be so critical that it must be eliminated by lethal ordnance.

Our potential enemies also realize the importance of command control and communications countermeasures. Therefore, ESC has been assigned an equally important defensive mission. It helps develop new equipment and procedures for securing our vulnerable C³ systems. The command also checks existing equipment for electronic leaks that would benefit a potential enemy's C³ countermeasures efforts. ESC has communications security teams that play the adversary role. They listen to Air Force military communications, just as an enemy would, to check possible compromise of classified information. The command is responsible for keeping the Air Force fully aware of the vulnerability of its communications to enemy C³CM.

Driving the command's accomplishment of its missions are some key organizational concepts:

Supporting the combat commander under field conditions is a key role of the new Electronic Security Command.

- ESC operates the Air Force Cryptologic Support Center (AFCSC). It buys, stores, distributes, and accounts for all the cryptographic communications security devices used by the Air Force and other DoD agencies. Its engineers help design and construct equipment to meet secure communications needs throughout the world.
- ESC also operates the Air Force Electronic Warfare Center (AFEWC). It

Maj. Gen. Doyle E. Larson, Commander, ESC.

CMSgt. William C. Chapman, Senior Enlisted Advisor, ESC.

serves as the Air Force's in-house consultant for all electronic warfare (EW) by conducting extensive electronic warfare analysis; evaluating the effectiveness of EW in combat, exercises, and training situations; providing advice and guidance to commanders and EW management activities on the effective use of offensive and defensive EW systems; and assisting other military agencies with advice in planning, developing, testing, and using electronic warfare equipment.

- ESC Headquarters operates an Alert Center. It is the command's action center for providing immediate guidance and rapid replies to those who need command control and communications countermeasures advice and assistance.
- Electronic Security officers at such key decision points as the headquarters of Tactical Air Command, US Air Forces Europe, and Pacific Air Forces are focal points for integrating ESC services with the tactical and strategic combat forces of the Air Force. Electronic security squadrons and groups in the Pacific and Europe train with and support the C³CM needs of the combat forces in those theaters.
- ESC has a mobile emergency reaction squadron in San Antonio, which participates in military combat exercises conducted in the continental United States. The squadron also participates in Joint Chiefs of Staff-sponsored worldwide and theater training exercises.

Morse systems still play a major role in the command control and communications countermeasures area.

Electronic Security Command is headquartered in San Antonio. It has about 12,000 military and civilian personnel at some seventy-eight locations in ten countries. Its Reserve Mobilization Augmentee Program has 1,000 jobs already, and it expects soon to develop plans for new Reserve units.

ESC Commander Maj. Gen. Doyle E. Larson says: "I believe the efforts we are making now will reap great dividends in strengthening our nation's defenses. The Electronic Security Command is the catalyst required to employ our forces more effectively against the growing numbers and sophistication of those who might threaten us. I am proud of our people and the way they are meeting this new challenge." ■

ELECTRONIC SECURITY COMMAND

Headquarters, San Antonio, Tex.

Commander
Maj. Gen. Doyle E. Larson

Electronic Security Combat Operations Staff
San Antonio, Tex.

Hq. Electronic Security, Tactical
Langley AFB, VA.

Hq. Electronic Security, Europe
Ramstein AB, Germany

- **6911th Electronic Security Group** — Hahn AB, Germany
- **6912th Electronic Security Group** — Tempelhof AP, Berlin
- **6913th Electronic Security Squadron** — Augsburg, Germany
- **6916th Electronic Security Squadron** — Hellenikon AB, Greece
- **6917th Electronic Security Group** — San Vito Dei Normanni AS, Italy
- **6918th Electronic Security Squadron** — Sembach, Germany
- **6931st Electronic Security Squadron** — Iraklion AS, Crete, Greece
- **6950th Electronic Security Group** — RAF Chicksands, UK
- **6954th Electronic Security Squadron** — RAF Mildenhall, UK

AF Cryptologic Support Center
San Antonio, Tex.

AF Electronic Warfare Center
San Antonio, Tex.

6949th Electronic Security Group
Offutt AFB, Neb.

- **6985th Electronic Security Squadron** — Eielson AFB, Alaska

6940th Electronic Security Wing
Fort Meade, Md.

- **6947th Electronic Security Squadron** — Homestead AFB, Fla.

6960th Support Group
San Antonio, Tex.

- **6906th Electronic Security Squadron** — Brooks AFB, Tex.

6948th Electronic Security Squadron
San Antonio, Tex.

- **6993d Electronic Security Squadron** — San Antonio, Tex.

6981st Electronic Security Squadron
Elmendorf AFB, Alaska

Hq. Electronic Security, Pacific
Hickam AFB, Hawaii

- **6903d Electronic Security Squadron** — Osan AB, Korea
- **6920th Electronic Security Group** — Misawa AB, Japan
- **6922d Electronic Security Squadron** — Clark AB, Philippines
- **6990th Electronic Security Squadron** — Okinawa, Japan

Military Airlift Command

A MAJOR COMMAND

From headquarters at Scott AFB, Ill., Military Airlift Command, a specified command, directs some 87,000 civilian and active-duty military people and more than 1,000 aircraft at 300-plus locations in twenty-three countries.

Operating thirteen bases in the United States and controlling US facilities at Lajes, in the Azores, and at Rhein-Main AB, Germany, MAC occupies a central position in America's defense strategy. The command, through its vital worldwide missions, serves as this nation's backbone of deterrence by providing mobility to our fighting forces. While training for ultimate use in conflict, MAC supports readiness of theater forces and projects the American spirit at home and abroad through its many humanitarian airlift operations.

MAC's major missions include deployment and employment of combat forces and their support equipment, and logistical resupply of these forces. In 1979, acting as the executive agent for Department of Defense airlift, MAC moved 280,237 tons of cargo and more than 1,000,000 people through domestic and overseas passenger and cargo terminals.

MAC brings together people and equipment from the command, the Air National Guard, the Air Force Reserve, and the civil air transport industry to form a national military air transport system. When mobilized, Air National Guard and Air Force Reserve Forces will provide—on a completely integrated basis—about half of MAC's capability, jointly contributing some 51,000 professionals, as well as C-130, C-7, and C-123 aircraft. The Civil Reserve Air Fleet (CRAF) is a successful twenty-eight-year partnership between civil air carriers and DoD. With a maximum of 461 civilian transport aircraft, both passenger and cargo, committed to the program, the CRAF is the fastest way to double the nation's military airlift capacity for response to a contingency.

Even the great airlift resources under MAC's direction might not be enough to satisfy the demands of a major contingency overseas, especially the need to move large, heavy, military equipment rapidly.

Several initiatives are under way to increase MAC's airlift capacity. The C-5's wing is being strengthened. The wing-modification test aircraft is scheduled to fly in August 1980, with the first production aircraft to be delivered in 1983. All C-5s will have their wings modified by mid-1987, extending the life of the entire fleet into the 21st century.

Troops prepare to board one of thirty-one C-141 StarLifter missions for the withdrawal of African peacekeeping force from Shaba, Zaire, August 1979.

The first stretched C-141 StarLifter was delivered to the command last December. Each aircraft is being lengthened by more than twenty-three feet, increasing cargo capacity by about thirty percent. In-flight refueling is also being added so the stretched StarLifter can fly anywhere in the world without landing en route. These modifications are ahead of schedule, below cost, and should be complete in July 1982.

Initiatives are also under way to increase the CRAF's cargo capability. By adding features such as wide doors and strong floors to future airliners, these civil transports could carry significantly more cargo—and more kinds of cargo—during contingencies. This

Gen. Robert E. Huyser, Commander in Chief, MAC.

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

contribution to defense displays the civil air carriers' dedication to the nation.

Even with these improvements, MAC still needs more capability to move military equipment, particularly such large, heavy items as the Army's main battle tank, over intercontinental distances. The Air Force is developing a new aircraft—the CX—that will give MAC a balanced capability to carry heavy loads long distances into small, austere fields close to the battle area. The CX will work beside the C-141 and C-5 in the intertheater role and also complement the C-130 by carrying large, heavy items into small fields within a theater of operations.

MAC is responsible for more than airlift. Its technical services perform several related missions:

• *The Aerospace Rescue and Recovery Service (ARRS)* is responsible for combat search and rescue, SAC missile site support, and worldwide weather reconnaissance. ARRS flies C-130 Hercules and C-135 aircraft, and H-1, H-3, and H-53 helicopters. ARRS also helps civilians in distress within the US and abroad. ARRS forces have been credited with more than 19,200 saves in the last thirty-four years.

ARRS, through the Air Force Rescue Coordination Center (AFRCC) located at Scott AFB, coordinates all inland search-and-rescue operations using ARRS, other military units, Civil Air Patrol, and a variety of volunteer organizations. The AFRCC also cooperates and works closely with state and local agencies to use the services of police and sheriff departments as well as local rescue teams aiding people in distress.

• *Air Weather Service (AWS)* provides global weather and environmental services to the Air Force and Army. Its primary mission is to support combat operations in wartime. AWS provides direct decision making assistance to military commanders, enabling them to take advantage of weather in their operations and to protect valuable resources. With ARRS, AWS provides tropical storm and special weather reconnaissance. These services have resulted in saving many lives and valuable assets.

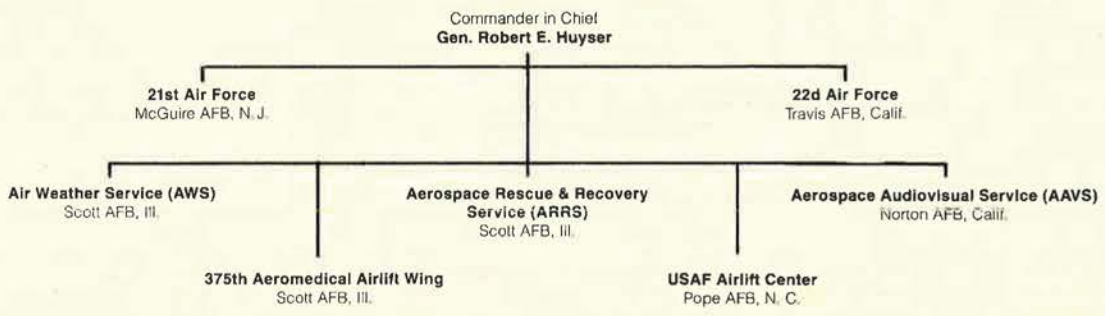
Seamen from the Korean freighter San Dae *cling to the hoist as a flight engineer from Det. 13, 33d Aerospace Rescue and Recovery Squadron, pulls them aboard the rescue helicopter. This MAC mission saved fifty-four lives in April 1979. The USAF rescue helicopter was based at Osan AB, Korea.*

A Military Airlift Command C-5 swallows a 74,000-pound minisubmarine, preparing to fly it nonstop from California to Scotland for a rescue effort off the Scottish coast, April 1979.

• *The Aerospace Audiovisual Service (AAVS)* is the single manager for Air Force motion picture and television production. It operates the largest production, distribution, and depository facility in DoD. As its primary mission, AAVS maintains a cadre of highly mobile, aircrew-qualified combat documentation teams to deploy worldwide and document Air Force participation

MILITARY AIRLIFT COMMAND

Headquarters, Scott AFB, Ill.



in events that are of national interest.

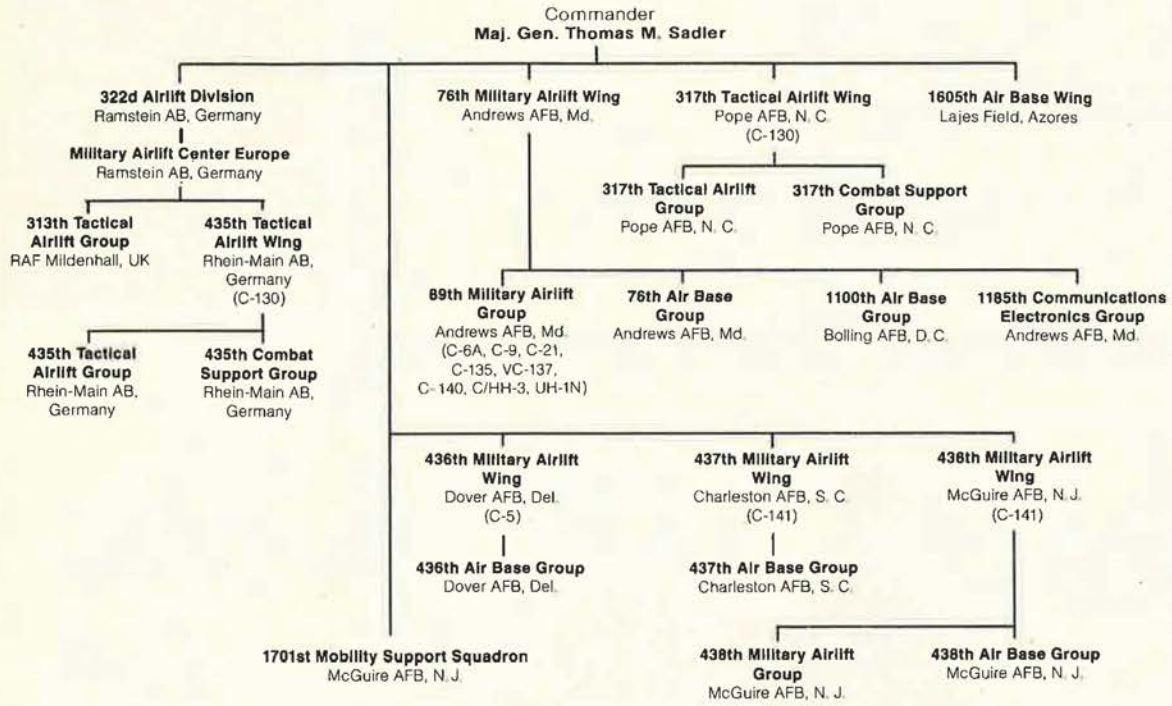
Aeromedical airlift is another important MAC mission. During 1979, aircrews, nurses, and medical technicians of the 375th Aeromedical Airlift Wing, using their C-9 Nightingales throughout the world, and assisted by C-141 StarLifters and C-130 Hercules from other MAC wings, flew 62,890 patients to hospital facilities for care not available at their duty stations.

Another special airlift unit, the 89th Military Airlift Group, provides airlift for the President, other US government officials, as well as for foreign dignitaries.

MAC's patriotic, dedicated people operate daily on a global scale to show the flag and to help achieve American objectives. The command's mission epitomizes America itself—always ready to serve. ■

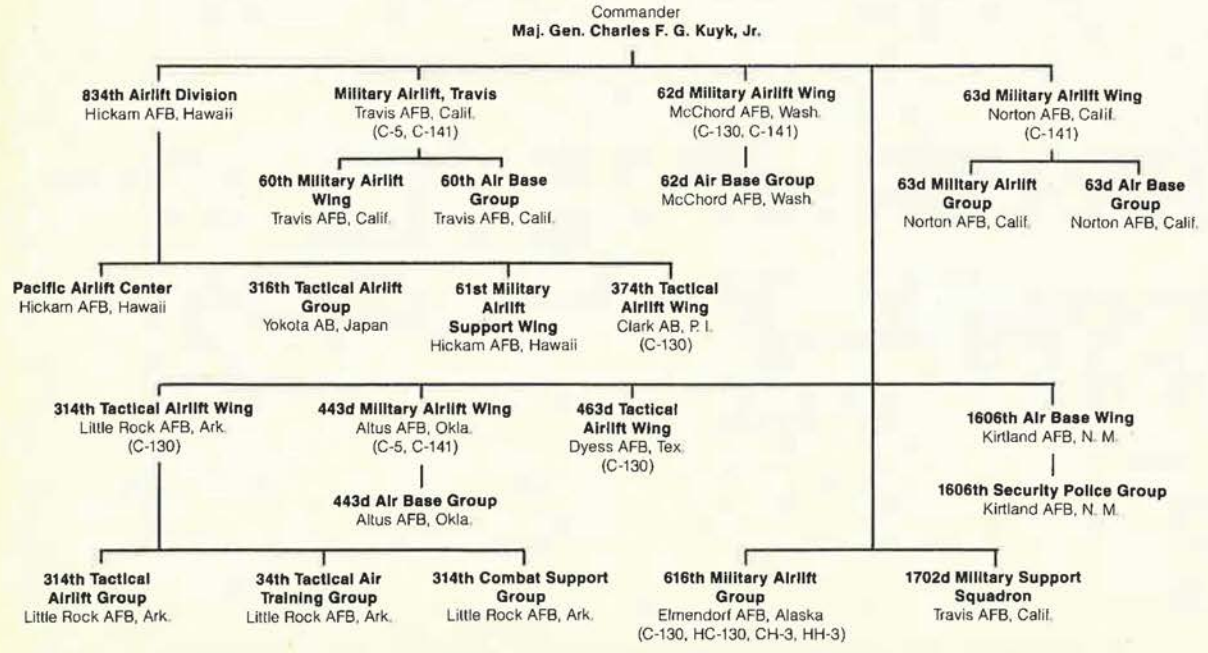
TWENTY-FIRST AIR FORCE (MAC)

Headquarters, McGuire AFB, N. J.



TWENTY-SECOND AIR FORCE (MAC)

Headquarters, Travis AFB, Calif.



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Rockwell International

...where science gets down to business

Pacific Air Forces

A MAJOR COMMAND

A flight of F-15 Eagles over Hawaii's Diamond Head en route to Kadena AB, Japan. The F-15 is one of the latest additions to PACAF.

Pacific Air Forces (PACAF), with headquarters at Hickam AFB, Hawaii, is the air component of the unified Pacific Command. PACAF's overall mission is to plan, conduct, control, and coordinate offensive and defensive air operations in accordance with tasks assigned by the Commander in Chief, Pacific Command (CINCPAC).

Lt. Gen. James D. Hughes, Commander in Chief, Pacific Air Forces (CINCPACAF), has an area of responsibility extending from the west coast of the Americas to the east coast of Africa and from the Arctic to the Antarctic—an area that encompasses more than half the earth's surface and includes some two billion people living under more than thirty-five different flags.

Working with other service component commanders, CINCPACAF supports the CINCPAC mission of maintaining security and defending the United States against attack throughout the Pacific. PACAF also assists in providing military aid to air forces of friendly nations, and support for other USAF commands operating in the Pacific area.

As a USAF major air commander, CINCPACAF commands more than 34,000 Air Force operational and support personnel stationed at eight major bases and more than eighty-seven facilities located principally in Japan, Korea, the Philippines, and Hawaii.

Calendar year 1979 was highlighted by a number of major qualitative improvements in PACAF force posture. In September, the first squadron of F-15C and D aircraft arrived at Kadena AB, Japan, and, by the end of the year, a second squadron was in place and fully operational.

At Clark AB in the Philippines, one of the 3d TFW's F-4 squadrons was converted to a combination of F-4E and F-4G Wild Weasel aircraft. This adds a new dimension to the command's ability to deal with the intense radar-controlled antiaircraft artillery and missile threats facing PACAF strike forces.

Further planned enhancement of PACAF force posture includes introduction of the E-3A Sentry at Kadena AB in the summer of 1980, announced plans for deployment of A-10s to the Republic of Korea, and the future replacement of F-4s with the F-16.

During 1979, PACAF units maintained their combat effectiveness

Lt. Gen. James D. Hughes, Commander in Chief, PACAF.

CMSgt. James C. Binnicker, Senior Enlisted Advisor, PACAF.

F-4s and F-15s being prepared for Cope Thunder at Clark AB, Philippines.

through an extensive series of exercises. Team Spirit '79, held in the Republic of Korea in March, again demonstrated the readiness of PACAF units and provided training for CONUS-based augmentation forces in rapid deployment and integration into combat operations.

Cope Thunder, a series of joint PACAF-US Navy-Marine Corps exercises at the Crow Valley Range in the Republic of the Philippines, continued to give tactical aircrews realistic training in a simulated battle environment. The PACAF air-to-air live firing program, called Combat Sage, provided weapons training for aircrews against radio-controlled drone targets. As a result of these and other training initiatives, PACAF today enjoys its highest state of readiness since the Vietnam conflict.

The concept of bilateral military planning has been approved by the Japanese government, and PACAF has, in recent months, expanded its combined exercise schedule with the Japanese Air Self-Defense Force (JASDF). In the Cope North series, for example, USAF F-4s and F-15s have participated in air-to-air exercises with JASDF aircraft at Misawa AB in northern Japan.

During 1979, PACAF personnel also assisted with numerous humanitarian activities, including initial reception of Southeast Asia refugees as their contract aircraft stopped at Kadena AB for refueling. Hickam AFB furnished personnel to help with the cleanup of Enewetak (formerly spelled Eniwetok") and also provided storm relief assistance to the tiny island of Majuro late in the year. Throughout the year, PACAF personnel and their families gave significant tangible support to the plight of Amerasian orphans in Korea.

In a dynamic geopolitical environment, the men and women of Pacific Air Forces stand ready to protect US national security interests and assist in maintaining peace and stability throughout the 100,000,000-square-mile area of PACAF responsibility. ■

THE MAJOR UNITS OF PACIFIC AIR FORCES (PACAF)

UNIT	LOCATION	AIRCRAFT
15th Air Base Wing	Hickam AFB, Hawaii	EC-135, T-33, O-2 (+ ANG F-4C)
326th Air Division	Wheeler AFB, Hawaii	
FIFTH AIR FORCE HQ., YOKOTA AB, JAPAN		
8th Tactical Fighter Wing	Kunsan AB, Korea	F-4D
18th Tactical Fighter Wing	Kadena AB, Japan	F-4D, RF-4C, MC-130, T-39, F-15, E-3A
51st Composite Wing (Tactical)	Osan AB, Korea	F-4E, OV-10
313th Air Division	Kadena AB, Japan	
314th Air Division	Osan AB, Korea	
475th Air Base Wing	Yokota AB, Japan	T-39, UH-1
6112th Air Base Wing	Misawa AB, Japan	
THIRTEENTH AIR FORCE HQ., CLARK AB, PHILIPPINES		
3d Tactical Fighter Wing	Clark AB, Philippines	F-4E, F-4G, F-5, T-38, T-39, T-33

PACIFIC AIR FORCES

Headquarters, Hickam AFB, Hawaii

Strategic Air Command

A MAJOR COMMAND

B-52 alert crew members at Griffiss AFB, N. Y., race for their airplane.

The Strategic Air Command (SAC) has been hailed, since its inception in 1946, as the world's most powerful global strategic force. SAC's primary mission is to deter war, particularly nuclear war, by providing ready, flexible, and credible strategic offensive forces capable of responding to any threat to the vital security interests of the United States. Hence the command motto, "Peace Is Our Profession."

SAC's long-range strike force of bombers and intercontinental ballistic missiles (ICBMs) form two legs of the nation's triad. The command employs manned bombers, aerial refueling tankers, strategic reconnaissance, command control aircraft, and ICBMs. The bomber force of long-range aircraft, which can deliver nuclear or conventional weapons, includes approximately 350 B-52s and about sixty-five FB-111s.

Under positive control, bombers provide National Command Authorities the option to strike or recall as the situation dictates.

The aerial refueling capability provided by more than 600 KC-135s gives the bomber fleet a global range. SAC is the wartime gaining command for sixteen Air Reserve Forces KC-135 units, which operate 128 of the total KC-135 fleet.

Reconnaissance aircraft include the RC-135, U-2, and SR-71, while command control aircraft are the EC-135 and the E-4A and B.

SAC's ICBM force of 1,054 missiles includes 550 equipped with multiple warheads. There are 1,000 Minuteman and fifty-four Titan II missiles.

SAC is now responsible for providing conventional support to NATO theater commanders in Europe, as well as allied commanders in the Western Pacific. Its presence in these areas is expanding.

The command, comprised of some 120,000 men and women, operates from more than fifty locations worldwide. These figures include three major installations, some twenty smaller units, and nearly 4,000 people gained by SAC as a result of the ADCOM realignment in late 1979. The major installations transferred to SAC were Peterson AFB, Colo., and Thule

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

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

Digital Technology for Avionics of the 80's

Today's military pilots need their on-board computers more than ever to help them navigate, automate weapons delivery, and access real-time mission information. This means the need to improve reliability and performance margins in avionics systems has increased. So has the need to reduce spiralling life-cycle costs.

That's why TRW has been working with the Department of Defense and NASA to apply digital technology to avionics—developing a wide range of advanced systems for air and space applications. Take DAIS, for example, the Air Force's Digital Avionics Information System. Since 1975, TRW has supported DAIS with advanced simulation technology, analytical and test software, and avionics integration and analysis. Programs like DAIS, investigating standard architectures and interfaces promise to reduce life-cycle costs in the acquisition and support of future systems.

We're also assisting the AF Logistics Command in applying digital technology to the development of Integrated Support Facilities for the F-4, F-15, and E-3A aircraft.

In the Electronic Warfare arena, we're helping to develop an in-theater reprogramming capability to ensure that critical mission data is always accurate and up-to-date.

We're also at work in space, developing advanced flight software for IUS, HEAO, and the TDRS system.

If you'd like to learn more about digital avionics technology at TRW, contact: Richard Maher, 1 Space Park, Redondo Beach, Ca., 90278. Phone (213) 536-3238.

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A COMPANY CALLED TRW

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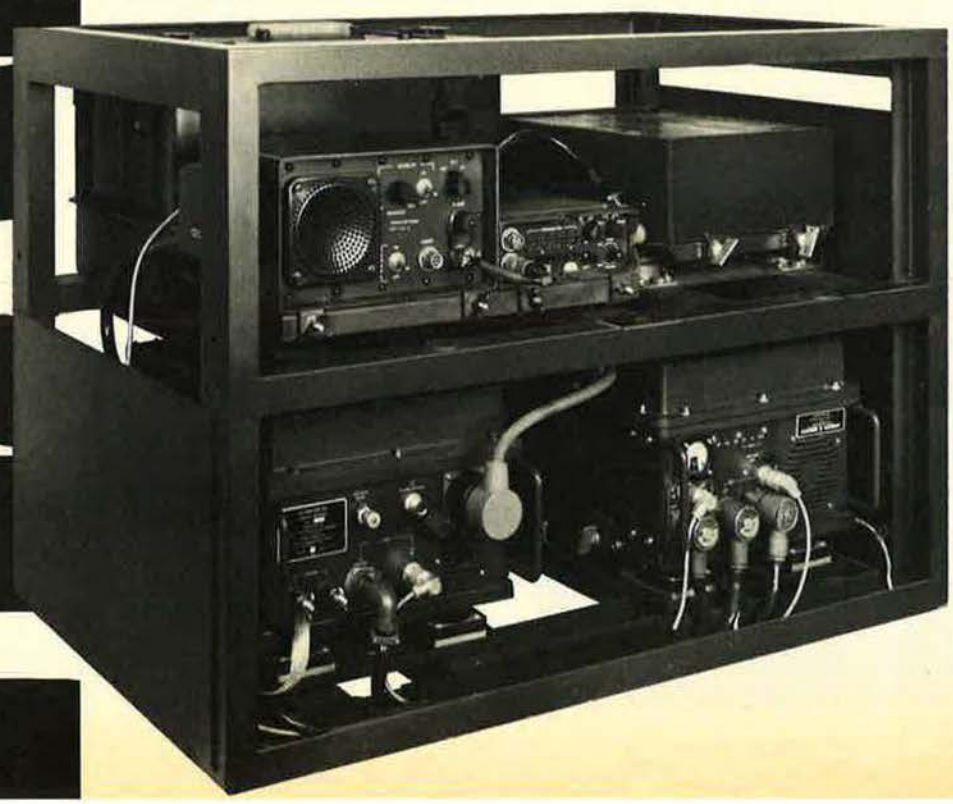


and Sondrestrom ABs, Greenland. As a result of this realignment, SAC now manages Air Force space surveillance and missile-warning field assets.

Last summer, SAC forces conducted Global Shield '79, their largest exercise in more than twenty years. Gen. Richard H. Ellis, SAC's Commander in Chief, said the exercise provided a "snapshot" of how well the command's mission could be performed—today. But at the same time, he added, it's important to modernize strategic forces to ensure that the same job can be done just as well in the future.

Command modernization includes several improvements to the B-52 fleet. The new Offensive Avionics System (OAS) will be installed in the B-52G and H beginning in 1981 to provide significantly improved navigation and weapon-delivery performance. The air-launched cruise missile (ALCM) will become operational at Griffiss AFB, N. Y., in 1982. Increased emphasis is also being given to improving the conventional role of the Stratofortress. B-52Ds have been modified to carry modern weapons for conventional air attacks, antiarmor warfare, and antiship operations. These improvements, plus structural modifications, help ensure that SAC can provide a rapid response to attack with tremendous firepower.

Other modernization includes a proposal to modify the FB-111s and F-111Ds by stretching the fuselage and adding new engines. During 1980, a Minuteman Silo Upgrade Program is to be completed, which will provide increased launch facility protection, and the MX was approved for full-scale engineering development, ensuring the continued effectiveness of the ICBM as a deterrent. A KC-135 reengining project has been approved.

The E-4 airborne command post, operated by SAC from Offutt AFB, Neb., for

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.

394th ICBM Test Maintenance Squadron
4000th Aerospace Applications Group
4315th Combat Crew Training Squadron
4392d Aerospace Support Group

3d Air Division
Hq. Andersen AFB, Guam

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

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

7th Air Division
Hq. Ramstein AB, Germany

306th Strategic Wing*
RAF Mildenhall, UK
TUSLOG Det. 8, Turkey
11th Strategic Group
RAF Fairford, UK

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.

3902d Air Base Wing
Offutt AFB, Neb.

*Tenant Unit

EIGHTH AIR FORCE (SAC)

Headquarters, Barksdale AFB, La.

Commander
Lt. Gen. Edgar S. Harris, Jr.

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)

6th Missile Warning Squadron
Otis AFB, Mass.

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)

4684th Air Base Group
Sondrestrom AB, Greenland

12th Missile Warning Group
Thule AB, Greenland

42nd 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)

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

14th Missile Warning Squadron*
MacDill AFB, Fla.

20th Missile Warning Squadron*
Eglin AFB, Fla.

* Tenant Unit

the National Military Command System, provides improved communications, increased survivability, and growth capability for the airborne command post system. The E-4B, received by SAC in January, has a second mission of serving as the SAC Airborne Command Post. This version provides a command control and communications link between the National Command Authorities and SAC's aircraft and missile forces. As weapon systems grow in complexity and as reaction times to attack are further reduced, other command and control improvements also will be required, and SAC is working steadily in these areas.

In addition, the Air Force has ordered six of an eventual fleet of twenty KC-10 aircraft to augment SAC's existing KC-135 tanker force. The aircraft will be capable of refueling fighters and simultaneously carrying their support equipment and personnel, refueling strategic airlifters, and providing cargo-carrying capability on a selected basis. The KC-10s initially will be stationed at Barksdale AFB, La., starting in October 1980.

In summary, much is happening in SAC today. General Ellis believes that continued modernization of SAC aircraft and missiles is imperative if the United States is to meet the threat projected for the 1980s. "As we move toward a new world strategy," General Ellis has said, "let there be no doubt that the price of freedom remains high. Providing for the nation's security is complicated and expensive, but it is an obligation we dare not neglect. We must be willing to make the tough decisions that now face us and commit the resources necessary for a modern defense." ■

KC-135 tanker refuels Strategic Air Command FB-111s.

FIFTEENTH AIR FORCE (SAC)

Headquarters, March AFB, Calif.

Commander
Lt. Gen. James P. Mullins

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

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

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

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

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

46th Aerospace Defense Wing
Peterson AFB, Colo.

*Tenant Unit

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)

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

13th Missile Warning Squadron
Clear AFS, Alaska

16th Surveillance Squadron
Shemya AFB, Alaska

57th Air Division
Minot AFB, N. D.

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

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

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

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

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)

7th Missile Warning Squadron
Beale AFB, Calif.

Bell's XV-15 goes full tilt.

On July 24, 1979, the NASA/Army XV-15 TiltRotor aircraft passed a major milestone in aviation history—its first in-flight conversion to airplane mode.

In more than 230 hours of ground runs, wind tunnel and flight tests, the XV-15 is proving the TiltRotor to be the ideal concept for many high-speed V/STOL missions.

Bell's TiltRotor offers *twice* the speed and range of present-day helicopter systems on the *same* amount of fuel. Projected cruise speeds of over 300 knots open up new operational capabilities never before possible in tactical profiles...and it's self-deployable worldwide.

With its excellent hover, low-speed performance and handling qualities, there's nothing like it for long-range rescue, ASW, AEW, troop transport, escort, reconnaisance, offshore, and oil support.

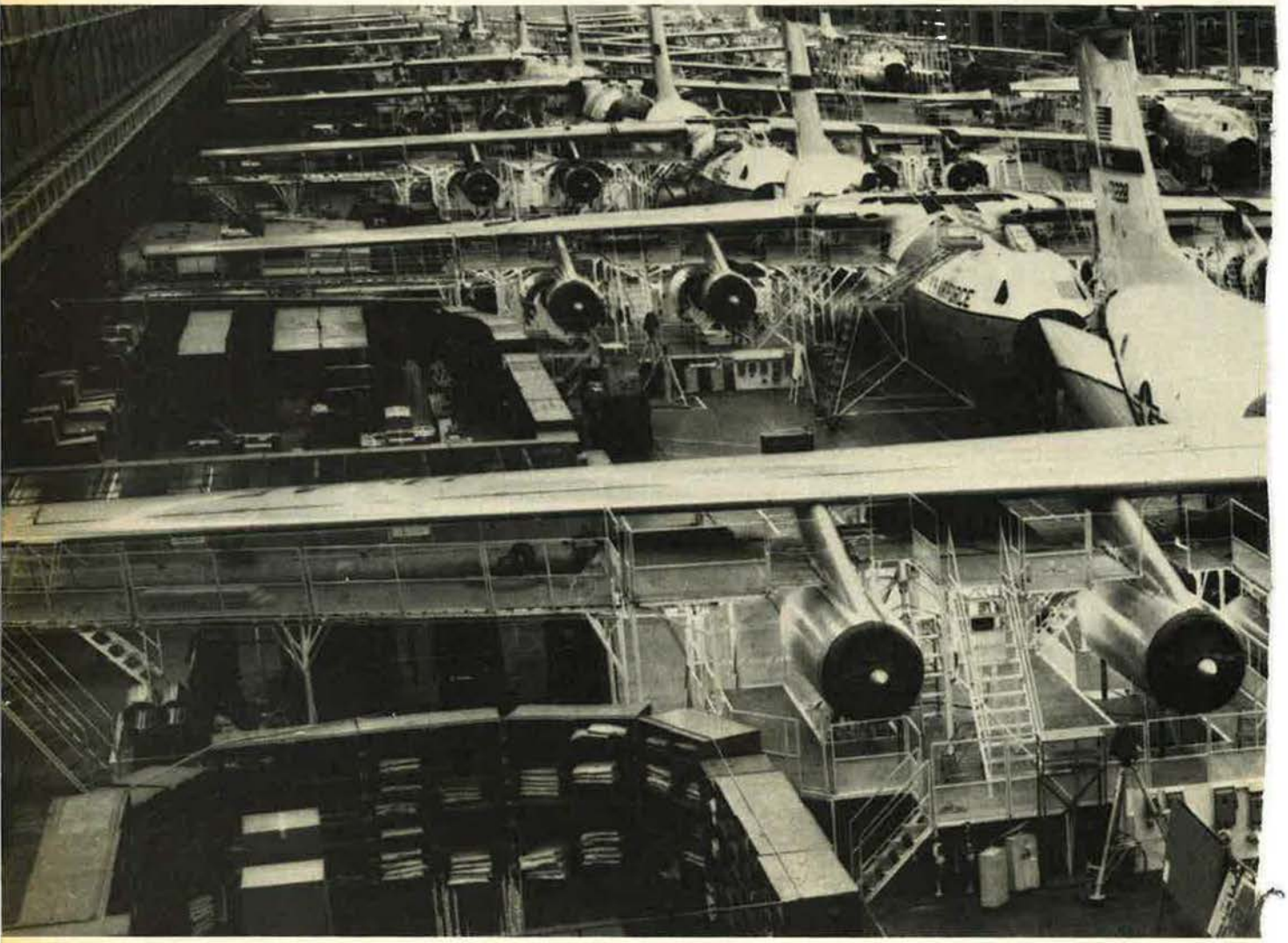
Bell's TiltRotor: The best qualities of helicopter and airplane... combined in one aircraft, and it's ready for prototype development now.

The Navy has now joined the program. Welcome aboard.

Imagine what one could do for you.

Stretching America's

Ahead of schedule,

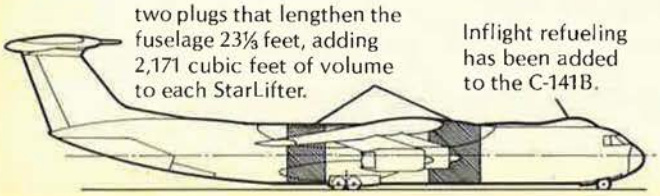


Most people agree that America needs more airlift capability, right now. And America's getting it, right now.

You're looking at stretched C-141 StarLifters rolling down the huge assembly line at Lockheed-Georgia Company. Each of those C-141s is having its fuselage lengthened 23⅓ feet. Each of those C-141s is ahead of schedule and under budget. By the end of the year, 80 stretched C-141Bs will have been delivered to the Military Airlift Command.

When the entire fleet of 270 C-141 StarLifters has been stretched, it will give America the equivalent of 90 more StarLifters. And the cost is equal to buying those 90 extra StarLifters at 1963 prices.

Below: the basic C-141 StarLifter.



Below: the C-141B StarLifter with two plugs that lengthen the fuselage 23⅓ feet, adding 2,171 cubic feet of volume to each StarLifter.

Inflight refueling has been added to the C-141B.

Range is also stretched.

The C-141B program also includes giving each StarLifter inflight refueling capability—and that means each C-141B will have global range.

In many respects, the C-141 stretch/inflight refueling program testifies to the long-life durability that the airlifter specialists at Lockheed-Georgia built into each StarLifter.

Most of the C-141s already have over 20,000 hours of rugged duty flight time. Stretched, they still are expected to have well over another 20,000 hours of flight time ahead of them.

That's called cost-effective.

Airlift Strength.
under budget.

Stretched C-141B in flight.

C-5 wing program also ahead of schedule, under budget.

The airlifter specialists at Lockheed-Georgia are also ahead of schedule and under budget on a program to extend the flying life of the C-5 Galaxy, world's largest airlifter. It's the only airlifter that can carry the Army's main battle tank...and it can carry two of them.

The program involves extending the service life of the C-5 wing. The test phase includes developing two sets of strengthened wings, one for a flight test aircraft and the other for ground fatigue testing to demonstrate a 30,000 hour service life. Fatigue testing already has passed 25,000 hours of the first 30,000 hour lifetime well ahead of schedule.

Flight testing will begin this summer to demonstrate the performance of the new wing under rigorous actual flight conditions. Production phases will involve rewinging the C-5 fleet.

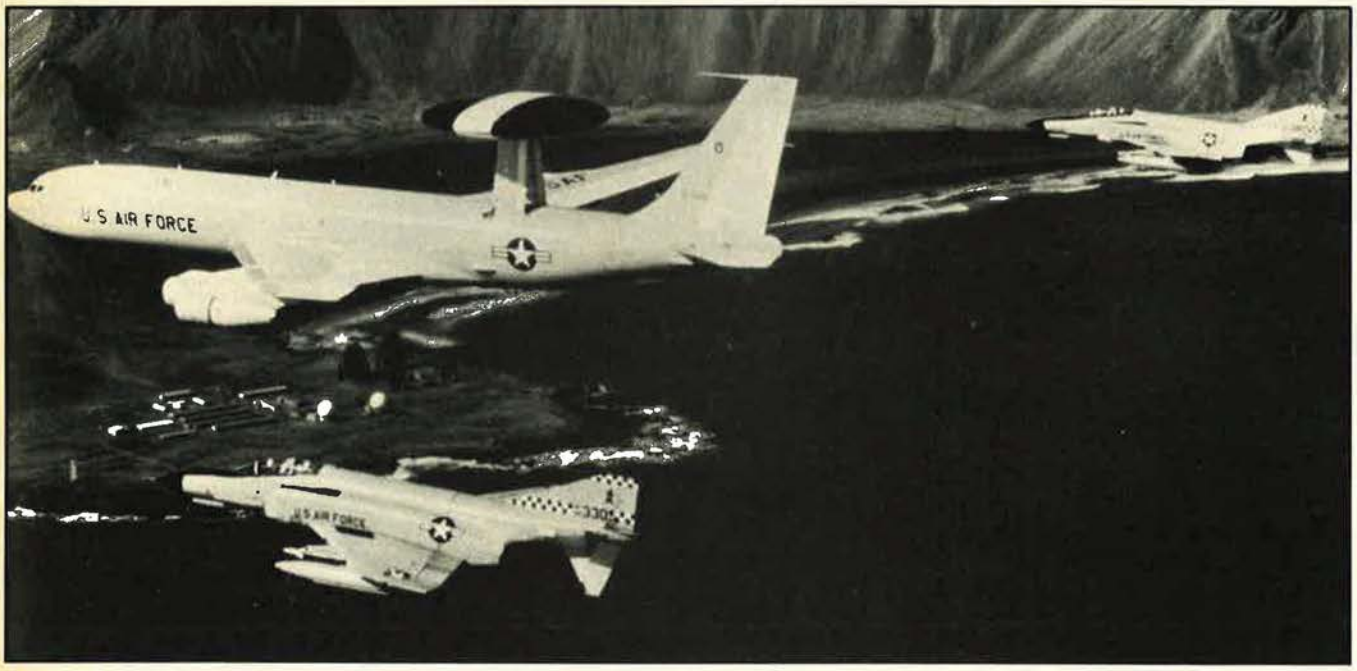
This new program will give the C-5 an operating life that takes it well into the 21st century, along with increased payload, improved fuel efficiency and added mission flexibility.

When it comes to airlifters, the engineers and craftsmen at Lockheed-Georgia have more experience, by far, than anyone else in the world.

Lockheed-Georgia

Tactical Air Command

A MAJOR COMMAND



A TAC E-3 AWACS (Airborne Warning and Control System) is escorted by a pair of Air National Guard F-4s during a training mission over Iceland.

Deployments plus exercises equal training—a way of life for more than 111,000 people assigned to the Tactical Air Command (TAC).

TAC continues to organize, equip, and train its assigned forces and to maintain a combat-ready reserve capable of rapid worldwide deployment. Upon mobilization, TAC would assume command of more than 59,000 Air National Guard and Air Force Reserve personnel and their equipment.

TAC's combat capability has increased through the continuing conversion of TAC and TAC-gained Air National Guard and Air Force Reserve units to more modern combat and support aircraft. Currently, TAC's 2,285 aircraft include 290 F-15s, 160 A-10s, sixty-nine F-16s, and twenty E-3As. Four squadrons of A-10 aircraft are being assigned to the Air National Guard, and Reserve Forces modernization continues with F-4s and A-7s being made available from TAC.

TAC assumed responsibility for the atmospheric air defense assets of USAF's Aerospace Defense Command on October 1, 1979. TAC's Deputy Commander for Air Defense is responsible for providing forces to the Commander in Chief, US Aerospace Defense Command (CINCAD) and North American Air Defense Command (CINCNORAD) for air defense operations. These forces include 14,000 people working at six air divisions and control centers and 455 active and Air National Guard fighter-interceptor aircraft at more than a hundred installations throughout the continental United States, Canada, Greenland, and Iceland. The TAC air defense mission is to organize, train, and equip these forces to meet the needs of peacetime air sovereignty and wartime air defense.

Consistent with the TAC motto, "Readiness Is Our Profession," training

Gen. W. L. Creech, Commander, TAC.

CMSgt. Norman O. Gallion, Senior Enlisted Advisor, TAC.

TACTICAL AIR COMMAND

Headquarters, Langley AFB, Va.

Commander
Gen. W. L. Creech

9th Air Force
Hq. Shaw AFB, S. C.
8 tactical fighter wings
1 special operations wing
1 tactical reconnaissance wing
1 tactical air control wing

12th Air Force
Hq. Bergstrom AFB, Tex.
6 tactical fighter wings
4 tactical training wings
1 tactical reconnaissance wing
1 tactical air control wing

Air Defense Forces, TAC
6 air divisions
Air Defense Weapons Center
Air Forces Iceland

USAF Southern Air Division
Hq. Howard AFB, Panama
1 composite wing
Inter-American Air Forces Academy

USAF Tactical Air Warfare Center
Hq. Eglin AFB, Fla.

4441st Tactical Training Group (Blue Flag)
Eglin AFB, Fla.

USAF Air-Ground Operations School
Hurlburt Field, Fla.

552d Airborne Warning & Control Wing
Tinker AFB, Okla.
Keesler AFB, Miss.
(E-3A, EC-135, EC-130)

USAF Tactical Fighter Weapons Center
Hq. Nellis AFB, Nev.

554th Operations Support Wing
Nellis AFB, Nev.
range group

57th Fighter Weapons Wing
Nellis AFB, Nev.
(F-15, F-111, A-10, F-4, F-5)
USAF Fighter Weapons School
Red Flag training group
Thunderbirds

NINTH AIR FORCE (TAC)

Headquarters, Shaw AFB, S. C.

Commander
Lt. Gen. A. W. Braswell

1st Tactical Fighter Wing
Langley AFB, Va.
(F-15, EC-135, UH-1)

363d Tactical Reconnaissance Wing
Shaw AFB, S. C.
(RF-4C)

507th Tactical Air Control Wing
Shaw AFB, S. C.
(O-2, 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, F-16)

354th Tactical Fighter Wing
Myrtle Beach AFB, S. C.
(A-10)

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

33d Tactical Fighter Wing
Eglin AFB, Fla.
(F-15)

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

1st Special Operations Wing
(CH-3, UH-1, MC/AC-130)

USAF Special Operations School
Hurlburt Field, Fla.

TWELFTH AIR FORCE (TAC)

Headquarters, Bergstrom AFB, Tex.

Commander
Lt. Gen. W. R. Nelson

Headquarters Tactical Training, George

35th Tactical Fighter Wing
George AFB, Calif.
(F-4E/G, F-105G, UH-1)

Headquarters Tactical Training, Luke

58th Tactical Training Wing
Luke AFB, Ariz.
(F-4, TF-104)

405th Tactical Training Wing
Luke AFB, Ariz.
(F-15, F-5)

Headquarters Tactical Training, Holloman

49th Tactical Fighter Wing
Holloman AFB, N.M.
(F-15)

479th Tactical Training Wing
Holloman AFB, N.M.
(T-38)

Headquarters Tactical Training, Davis-Monthan

355th Tactical Training Wing
Davis-Monthan AFB, Ariz.
(A-10)

602d Tactical Air Control Wing
Bergstrom AFB, Tex.
(O-2, OV-10)

388th Tactical Fighter Wing
Hill AFB, Utah
(F-16)

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

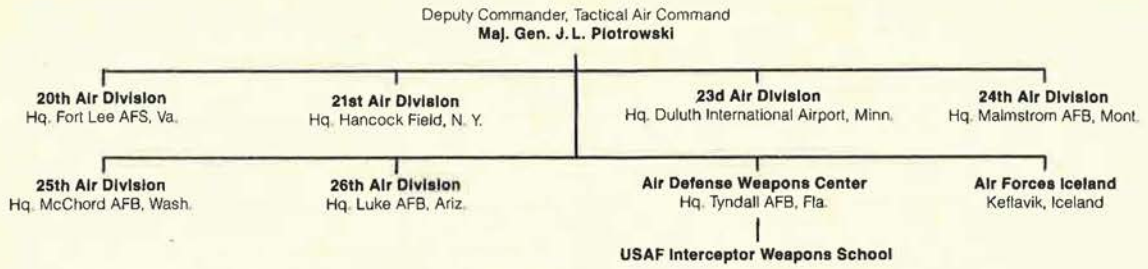
366th Tactical Fighter Wing
Mountain Home AFB, Idaho
(F-111A)

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

67th Tactical Reconnaissance Wing
Bergstrom AFB, Tex.
(RF-4C)

DEPUTY COMMANDER FOR AIR DEFENSE (TAC)

Headquarters, Colorado Springs, Colo.



Four F-16s fly in formation over the Utah mountains near Hill AFB, Utah.

will continue to be emphasized heavily throughout the 1980s. In 1979, more than 37,000 active-duty and Air Reserve Forces people took part in sixty-eight deployments and exercises in support of national objectives.

TAC aircrew training continued to increase over the past year. Total flying hours for FY '79 reached 537,664—up from 501,662 in FY '78. The command's aircraft utilization rates also continue to climb. TAC fighter aircraft flew six percent more during the first quarter of FY '80 than during the corresponding period for FY '79, and twenty-three percent more when compared to the same period for FY '78.

Realism is a key training objective, accomplished through TAC's "Flag" programs: Red Flag, Silver Flag, Gold Flag, Black Flag, Blue Flag, Green Flag, and Checkered Flag.

- *Red Flag* training exercises on the Nellis AFB, Nev., and Fort Irwin, Calif., ranges give fighter aircrews simulated combat experience in a high-threat environment with mock enemy ground-based and air opposition. These exercises involve up to 200 aircraft flying a total of 2,400 sorties over a four-week period.
- *Silver Flag* provides personnel augmentees in career fields that require additional manpower during contingencies. Silver Flag has three major elements—WARSKIL (Wartime Skill), WARFIL (Wartime Filler), and Base Augmentation Programs. WARSKIL trains TAC individuals working in less combat-essential career fields to augment law enforcement, construction, and medical service functions during the early stages of a conflict. WARFIL provides preselected personnel from the continental United States for overseas deployment in their own career fields to fill designated contingency positions in the event of war. Base Augmentation Programs provide the transportation support necessary to ensure that TAC forces deploy rapidly and efficiently.
- *Gold Flag* is designed to improve both the quantity and quality of training for TAC's aircrews.
- *Black Flag* provides an environment in which the aircraft maintenance force is trained and organized to perform its wartime mission.
- *Blue Flag* trains commanders and staff officers in decision-making for battle management and operations.
- *Green Flag* focuses on coordinating and increasing the electronic warfare capabilities of the tactical air forces.
- *Checkered Flag* provides realistic unit training in preparation for wartime operations from overseas bases. Its purpose is to assign every squadron in TAC to a wartime base overseas, have unit leaders visit their assigned bases once a year, and then have the units deploy and train at those bases.

TAC, in addition to being a major Air Force command, is the USAF's component of two unified commands—the Atlantic Command (LANTCOM), Norfolk, Va., and US Readiness Command (USREDCOM), MacDill AFB, Fla. TAC participates in five annual Joint Exercises sponsored by LANTCOM and USREDCOM, including the Brave Shield and Solid Shield series.

The US Air Force Southern Air Division is TAC's representative in Latin America. The Southern Air Division provides and controls the air elements for defense of the Panama Canal and furnishes training and assistance to Latin American air forces, and air support for joint training with the military forces of Latin America.

TAC's 552d Airborne Warning and Control Wing (AWACW) has grown to an organization of more than 2,600 people operating at Tinker AFB, Okla., Keesler AFB, Miss., and Keflavik, Iceland. The 552d provides unified commands radar surveillance and command and control with the E-3A aircraft, battlefield command and control with the EC-130E, and overseas deployment control of tactical fighter aircraft with the EC-135K.

People are the key to TAC's ability to perform its mission of rapid deployment. Commanders at all echelons recognize that quality of life, work, and family are critical to successful mission accomplishment. They are striving to create a better working environment in order to achieve greater productivity and job satisfaction. Through the delegation of authority to the lowest appropriate level, the men and women of TAC are developing technical and managerial skills needed to assume future positions of leadership.

TAC's most important element in the 1980s will continue to be people whose skills, dedication, and professionalism enable TAC to achieve its objective—Total Readiness. ■

ROLM's New ARTS Is A Fast Real-Time System. With WCS, It's Even Faster.

ROLM's Mil-Spec ECLIPSE® Computers now have a software/hardware combination that zeroes in on today's tough, real-time military applications.

The total package is fast, compact, and configurable. A real-time operating system designed for both time-critical and hostile environments.

ARTS (Advanced Real-Time System) expands the performance range of our Mil-Spec ECLIPSE line of computers by adding true real-time multiprogramming, multitasking capability. WCS (Writable Control Store) provides the additional hardware to access our microprogrammed processor and increase throughput for high-speed applications.

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modular, providing memory support from 64KB to 2048KB. ARTS can be memory-only or disk-based, depending on the needs of the application. Other features include: high order language support, (FORTRAN 5, PL/I, DG/L™ system programming language), memory resident file structure, and efficient interprocess communications.

The optional hardware part of the package, WCS, maximizes the computing power of our Mil-Spec ECLIPSE processors. And at the same time, it minimizes the critical path execution time for high-speed functions or processes. In time-critical operations, specialized functions can be tailored precisely to the application.

ROLM's Mil-Spec ECLIPSE Computers with ARTS and WCS give military system designers the optimum system. It solves today's real-time problems...with tomorrow's technology.

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United States Air Forces in Europe

A MAJOR COMMAND

United States Air Forces in Europe (USAFE) enters the 1980s with increased awareness of the Soviet and Warsaw Pact threat and renewed dedication to combat readiness and NATO interoperability.

According to Gen. John W. Pauly, USAFE Commander in Chief, "USAFE stands as the vanguard of the US air commitment to the NATO alliance. Our people, of all ranks and all skills, are highly motivated, trained, and equal to that challenge. Their dedication to readiness is unwavering, and I am extremely proud of them."

USAFE, with some 65,000 men and women, operates approximately 650 aircraft and twenty-four major installations. Dozens of smaller units are located in ten countries stretching from the United Kingdom to Turkey. USAFE's people are working in concert with their allied partners to achieve increased combat capabilities.

General Pauly also commands Allied Air Forces Central Europe (AAFCE) from headquarters adjoining USAFE's at Ramstein AB, Germany. AAFCE has been a significant catalyst in blending NATO's Central Region air team into a cohesive, responsive force. Created in 1974, AAFCE is a force in being of fighter and reconnaissance aircraft from six NATO partners.

The primary objective of AAFCE planning is to ensure a smooth and rapid transition from peace to war, when AAFCE would be the command and control instrument for conducting air combat operations.

During the early 1980s, USAFE will place increased emphasis on tough, realistic training exercises and on base survivability in a chemical environment.

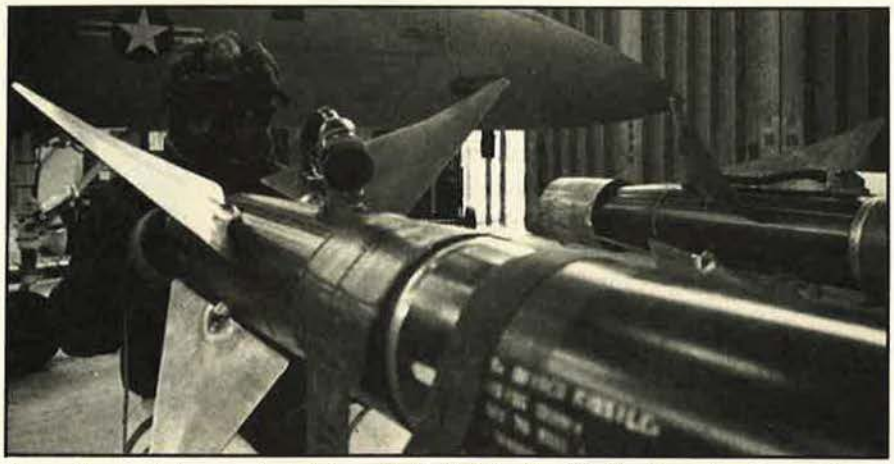
Additionally, the continuing assignment of A-10 aircraft to the USAFE inventory will expand the command's armor-killing, close-air-support capability. The 81st Tactical Fighter Wing (TFW) already operates detachments at Sembach and Ahlhorn ABs in Germany, putting A-10 firepower closer to the scene of potential conflict and providing the pilots terrain familiarity. Two more forward operating locations, both at German airfields, are scheduled to open in the future.

Upgrading USAFE's F-4 units with more advanced versions of the Phantom has been completed and the F-4E "Wild Weasel" defense-suppression aircraft is being phased into the 52d TFW at Spangdahlem AB, Germany.

The important all-weather, day-and-night strike capabilities of the dual-capable F-111 units located in the UK round out the command's offensive thrust.

Still to come is the F-16, which in future years will complement USAFE's tactical force, providing even greater flexibility and interoperability with the four European air forces already flying this advanced fighter.

USAFE's air defense contribution to the Central Region rests with the F-15 Eagles at Bitburg AB, Germany, and Camp New Amsterdam, the Netherlands, and the F-4 Phantoms at Ramstein AB. These units stand daily NATO alert, and refine their air defense tactics at a new air combat maneuvering in-



A munitions maintenance technician with the 32d Tactical Fighter Squadron, Camp New Amsterdam, the Netherlands, works on an AIM-9 air-to-air missile during one of the squadron's periodic "wartime" exercises. The purpose: to train for gas attacks.

Gen. John W. Pauly, Commander in Chief, USAFE.

CMSgt. Sam E. Parish, Senior Enlisted Advisor, USAFE.

strumentation (ACMI) range opened recently in Sardinia.

The command also has RF-4C reconnaissance units, OV-10 forward air control aircraft, a C-130 special operations unit, a CH-53 squadron, and F-5E "aggressor" aircraft.

The ability to intercept an enemy's aerial strike force, establish air superiority, destroy attacking ground armor, and interdict rearward supply lines and military targets day and night provides a well-rounded deterrent—a goal USAFE continues to stress.

In the event of hostilities in Europe, USAFE would rely heavily on rapid reinforcements from Tactical Air Command, Air National Guard, and Air Force Reserve forces. Squadron-size training deployments throughout the year provide European theater familiarization for these Stateside units.

Under the collocated operating base (COB) concept, most augmentation aircraft would fight from allied airfields. In arrangements with its NATO partners, USAFE has identified seventy-three COBs for wartime use, and through a series of bilateral memoranda is planning for dispersed operations from these locations.

Increased aircraft cross-servicing capabilities is another readiness program bearing fruit for USAFE and the allies. Eventually aircraft from any NATO air force will be able to land at an airfield of any other partner, be refueled and rearmed, and return to battle. Extensive USAFE training with allied ground and aircrew personnel, plus agreements on a NATO family of standardized munitions, are rapidly making this goal a reality.

Field command and control operations of the USAFE forces are conducted through elements of the 601st Tactical Control Wing, Sembach AB, Germany. Additionally, TAC E-3A Sentry aircraft have been conducting regular interface training in Europe since late 1979.

In peace or during non-NATO operational activity, USAFE is a component of the unified United States European Command (USEUCOM). However, in a NATO/Warsaw Pact confrontation, most of its tactical forces would come under control of AAFCE and its parent joint NATO command—Allied Forces Central Europe (AFCENT). Some in-place USAFE units would be under control of Allied Forces Southern Europe (AFSOUTH).

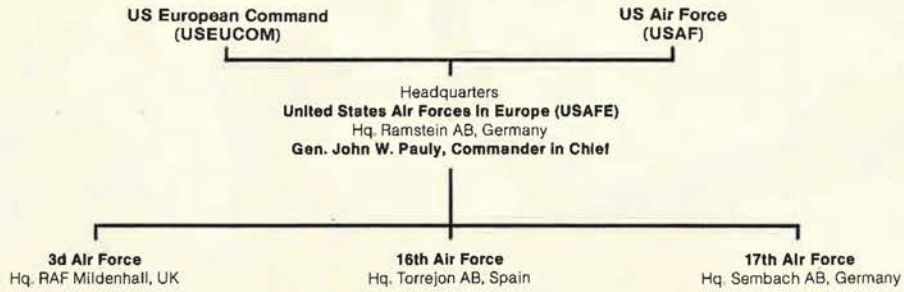
As USAFE enters the '80s, force modernization, interoperability, and the effective application of airpower remain priority objectives. Concurrently, realistic exercises relevant to every conceivable contingency ensure that the proficiency of aircrew and ground support personnel remains razor sharp. The result is a command with confidence, and determination to meet any challenge. ■

THE MAJOR OPERATING UNITS OF USAFE

UNIT	*LOCATION*	*AIRCRAFT/MISSION*
	England	
10th Tac Recon Wing	RAF Alconbury	RF-4, F-5
20th Tac Fighter Wing	RAF Upper Heyford	F-111
48th Tac Fighter Wing	RAF Lakenheath	F-111
81st Tac Fighter Wing	RAF Bentwaters/Woodbridge	A-10, MAC rescue HC-130, HH-53
513th Tac Airlift Wing	RAF Mildenhall	MAC rotational C-130, SAC rotational KC-135
7020th Air Base Group	RAF Fairford	SAC rotational KC-135
7274th Air Base Group	RAF Chicksands	Support and communications
	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
	Italy	
40th Tactical Group	Aviano AB	Rotational USAFE aircraft
7275th Air Base Group	San Vito AS	Support and communications
	Turkey	
Hq. TUSLOG	Ankara AS	Command and logistical management
Det. 10, TUSLOG	Incirlik CDI	Rotational USAFE aircraft
	Greece	
7206th Air Base Group	Hellenikon AB	Support and communications
7276th Air Base Group	Iraklion AS, Crete	Support and communications
	The Netherlands	
32d Tac Fighter Squadron	Camp New Amsterdam	F-15
	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-140, C-12
600th Tac Control Group	Hessisch-Oldendorf AS	Command control communications
601st Tac Control Wing	Sembach AB	Command control communications, forward air control, OV-10, CH-53
7100th Air Base Group	Lindsey AS	Command control communications
7350th Air Base Group	Tempelhof Central Airport, Berlin	Support and communications
435th Tac Airlift Wing (MAC)	Rhein-Main AB	MAC: C-9, C-130

UNITED STATES AIR FORCES IN EUROPE

Headquarters, Ramstein AB, Germany



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Dedicated to superior products, high reliability, full follow-on support and low life-cycle cost---total performance.

GUIDANCE AND CONTROL SYSTEMS

Litton has pioneered the development of inertial navigation techniques for aircraft applications and has delivered over 15,000 gimballed inertial reference systems which have gone through three generations of improvement in performance, size, reliability and producibility. In addition to the various aircraft using our modern, digital navigation systems for mission navigation and weapons delivery, our LN-35 is the inertial navigation element used on all U.S. cruise missile programs.

We have developed a new family of strapdown inertial systems using our new G-7 gyro, a dry-tuned-rotor, two-degree-of-freedom strapdown gyro. These systems are in the forefront of a developing market and have been selected on a number of important programs with additional applications to helicopter and aircraft attitude and heading reference systems, missile guidance, re-entry guidance, torpedo guidance, underwater mine guidance, land vehicle navigation, fire control, and survey and gun stabilization systems. We have also developed a family of ring laser gyros for strapdown applications for various systems with emphasis on precision navigation requirements of high-performance aircraft.

We have adapted aircraft inertial technology to shipboard applications and are delivering stabilized gyrocompasses and ships' inertial navigation equipment for use on U.S. and other free-world Navy ships.

AMECOM

AMECOM's broad involvement and continuing leadership in the design and development of Electronic Warfare systems, High Frequency Communications equipment, Terminal Communication Switching systems, Radio Navigation receivers and Telecommunications hardware enable us to offer fast, comprehensive design solutions to satisfy demanding systems-performance requirements.

AMECOM's thorough understanding of operational environments is derived from the successful deployment of such high-performance systems as the AN/ALR-59 Passive Detection System, the AN/ALQ-125 TEREC System, the AN/PSN-6 Manpack Loran set, the voice communications Air Traffic Control system operating at the world's largest airport in Dallas/Ft. Worth, and our HF communications equipment on board the DD-963 Class destroyer fleet.

With over 30 years' progressive experience, our expert engineers, scientists, technicians and support personnel apply knowledge of real-world system operations to the creation of mission-effective concepts and designs. We are dedicated to leadership, to total involvement in advancing systems technology.

DATALOG

DATALOG is a world leader in the research, development and production of sophisticated graphic data transmission/reproduction equipment and systems.

Major programs include the Tactical Digital Facsimile transceiver (TDF) for TRI-TAC; the FASTFAX/ 6000 transceiver utilized in the WASHFAX III Washington Area Secure High-Speed Facsimile switched network; the FASTFAX/2000 subminute secure digital facsimile transceiver terminal.

Non-impact, high-speed digital electronic line printers fulfill dual requirements of portability and ruggedness. These printers are used in the Tacfire Artillery Fire Direction System and other key DOD programs, and satisfy strict military specifications.

Weatherfax recorders are used to provide commercial and government agencies with the most advanced weather facsimile reception available.

Law enforcement agencies throughout the world utilize our Policefax systems to transmit and receive fingerprints and pertinent data rapidly and accurately.

DATA SYSTEMS

Data Systems is one of the world's foremost manufacturers of military electronic systems for command and control, data processing, display, weapons control, electronics identification, and digital communications.

Our TACFIRE and MISSILE MINDER provides automation for the U.S. Army's artillery fire control, and control of ground-to-air missiles, while our Tactical Air Operations Center (TAOC) provides the U.S. Marine Corps with automation of their total air defense system.

The NICS/TARE is another forward step in the automation of the NATO Communications System.

Data Systems is totally responsible for the entire electronics suite on the new Spruance Class (DD-963) Destroyer and the new LHA general purpose amphibious assault ships.

Our new C^3 family includes battery-powered, hand-held, portable, intelligent, digital terminals for composing, editing, transmitting, receiving and displaying messages and graphics. These terminals, with our single-color and multi-color LED displays, use state-of-the-art microprocessors, memories and modems, and advance the state of the art in communications.

MELLONICS

Mellonics is a major developer of realtime command and control software systems designed to operate in time-critical and error-free environments. We have developed management, methodologies, and techniques to assure high-quality-on-schedule software products. For more than sixteen years, we have provided software for command and control of U.S. satellites. The outstanding success of this mission reflects our dedication to both the quality and reliability of our products.

Mellonics' Information Center provides full data processing services to all sectors of Government and business communities. We use sophisticated large scale computing configurations to support both batch and interactive processing, and to offer a repertoire of systems software and data base management systems. We designed and manage this service to provide immediate response and full satisfaction of our customers' requirements.

Mellonics' scientists, engineers, and analysts provide high-technology services in such specialty areas as operational test and evaluation, computer modeling and simulation, and training systems research. Our new business area offers a complete range of Litigation Support Services, and includes requirements analysis, data base management and retrieval, consulting and paralegal services.

AERO PRODUCTS

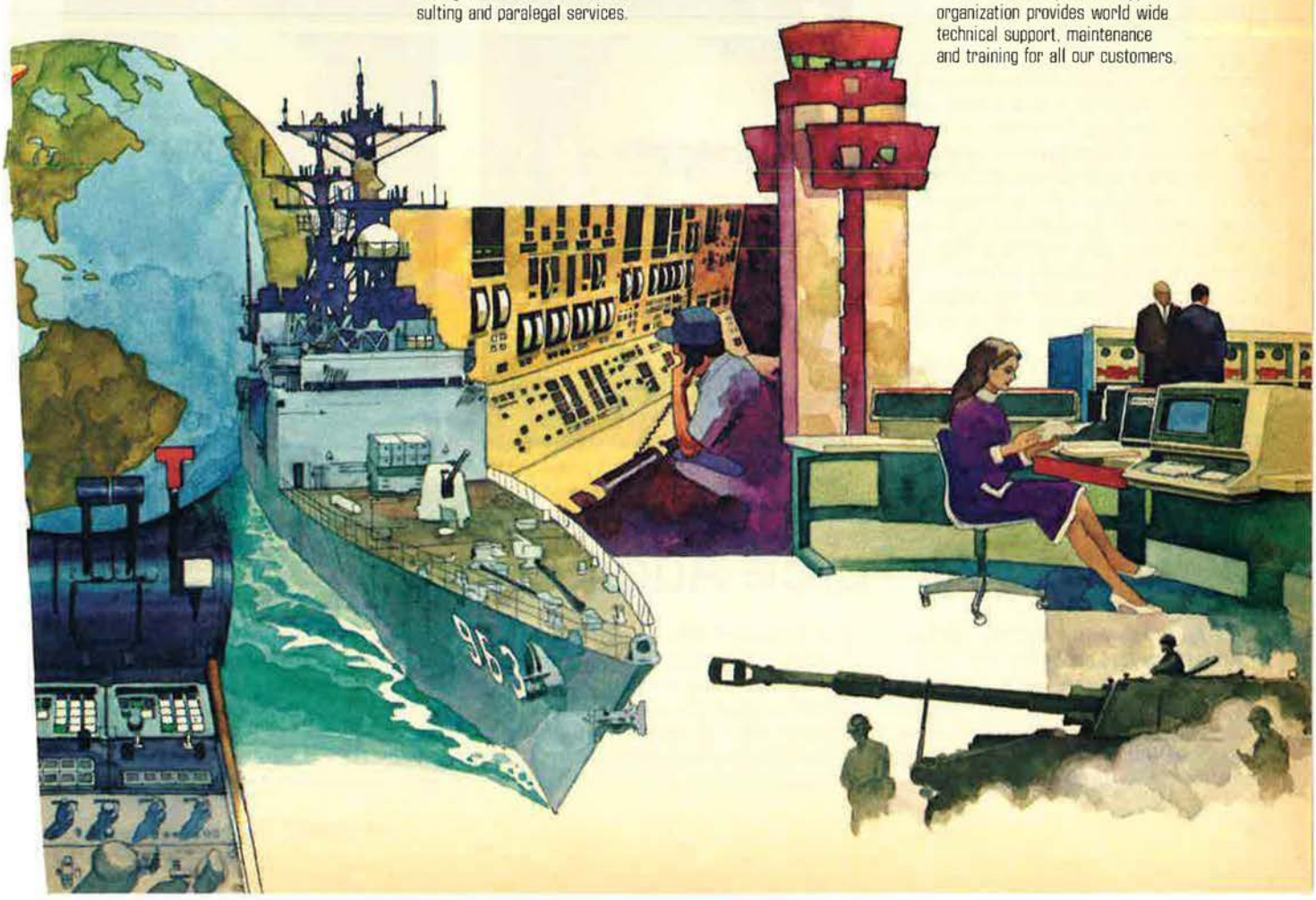
Aero Products is a world leader in design, development and application of commercial Inertial Navigation Systems and Omega Navigation Systems. Customers include more than 85 of the world's airlines in addition to military aircraft and business aviation aircraft. Currently, over 3,000 Inertial and 500 Omega navigation systems are in operation world wide.

Aero Products (APD) leases Inertial and Omega navigation systems for ferry flights and scientific research programs.

Unique applications of our Inertial Navigation Systems include Integrated Track Guidance System (ITGS) employed in photogrammetry and for spraying applications involving high precision lane flying capability. APD's INS-based flight inspection system provides real-time in-flight inspection of radio navigation aids including ILS.

APD is deeply committed to research and development of new generation avionics including the Strapdown Attitude and Heading Reference Systems (AHRS) and laser gyro based Inertial Reference Systems (IRS) designed for all operational aircraft. Development continues on advanced display panels using LED and other state-of-the-art technology.

Our extensive product support organization provides world wide technical support, maintenance and training for all our customers.



Air Force Accounting and Finance Center

The Air Force Accounting and Finance Center (AFAFC) at Lowry AFB, Colo., provides policy, technical guidance, and assistance to the worldwide network of 132 Air Force accounting and finance offices. The Center provides accounting reports to Air Force managers, OSD, Congress, and other federal departments, and operates centralized functions to pay all military personnel as well as billing, collecting, and trust-fund accounting for all DoD foreign military sales.

The magnitude of AFAFC's mission is apparent when considering the number of people and amount of money involved in its operation. The Center's thirty-six officers, 181 enlisted personnel, and 1,816 civilians pay more than 1,157,000 USAF people, including the active forces, Air National Guard, Air Force Reserve, retired members, and annuitants.

The Center accounts through its network for all the money appropriated to the Air Force by Congress—$39.9 billion in FY '80—and prepares reports on the use of these funds for financial managers throughout the government. AFAFC, through the Security Assistance Accounting Center (SAAC), also keeps the Pentagon and Congress informed of the financial status of the DoD foreign military sales program and bills the countries to which sales are made.

In 1979, AFAFC established new programs, continued to improve existing financial management systems, and planned future actions to meet the needs of the Center's many customers. A few recent initiatives are listed below.

- The Center established a Network Operations directorate in January 1980 to be more responsive to the needs of accounting and finance offices in the field.
- AFAFC served as the project office for an extensive three-year effort that produced the first DoD Retired Pay Manual in 1979. The manual standardizes pay entitlements for retirees and saves hours of research for finance people in all branches of the armed forces.
- Last year, six accounting and finance offices received computer remote terminals (CRTs), bringing to forty-nine the number of offices with direct inquiry access to the AFAFC military pay computer. The six CRTs were installed in England, Germany, Japan, Hawaii, and Spain. By the end of 1981, 112 offices worldwide are scheduled to have CRTs.
- Lowry AFB became the test-bed for a minicomputer system for military pay. The computer will allow base-level accounting and finance offices not only to inquire about the members' account, but also key and store transactions for transmission directly into the Center's computer. The first minicomputers are scheduled to be installed at Lowry AFB, Colo., and Eglin AFB, Fla.
- In September, a new direct payroll deposit system for civilian employees was tested in Newark AFS, Ohio. AFAFC is scheduled to implement Air Force-wide this electronic fund transfer (EFT) system beginning with Wright-Patterson AFB, Ohio, this summer.
- Participation in SURE-PAY—the direct payroll deposit system—continued to grow. By the end of 1979, more than eighty percent of the active force, seventy-five percent of civilians, and some seventy percent of the retired members were participating in the program.

These and similar advances increase productivity, allowing us to do more with less. Although the number of active-duty, Reserve, and retired pay accounts increased, and significant new workloads were added, the Center's manpower authorization was decreased by thirteen percent. In 1973, each AFAFC manpower authorization supported more than 450 pay accounts. Currently, each authorization supports 600, an increase of thirty percent.

In 1979 the Air Force Accounting and Finance Center was honored by award of the Air Force Outstanding Unit Award for its high-quality financial service to Air Force personnel. ■

Maj. Gen. George C. Lynch, Commander, AFAFC.

CMSgt. Donald E. Lindemann, Senior Enlisted Advisor, AFAFC.

Air Force Audit Agency

The Air Force Audit Agency (AFAA), with headquarters at Norton AFB, Calif., is the USAF's internal audit organization. It has eighty-four offices located on seventy-nine Air Force installations throughout the world. The Agency is authorized 899 professional auditors and a total of 186 support personnel.

Internal auditing includes evaluations of operating efficiency and effectiveness; program achievements; and compliance with established policies, procedures, and governing directives. The objective is to provide an independent evaluation and meaningful and useful data to Air Force management. The AFAA charter provides its auditors access to all Air Force units, activities, and functions.

Maj. Gen. Joseph B. Dodds, the Auditor General and Commander of AFAA,

F/A-18 Hornet aboard USS America (CV-66)

The U.S. Navy's new standard: Gould's TACAN beacon

Gould's AN/URN-25 TACAN beacon has earned Approval for Service Use (ASU) in some of the Navy's toughest technical and operational tests. It's the standard for the rest of this century.

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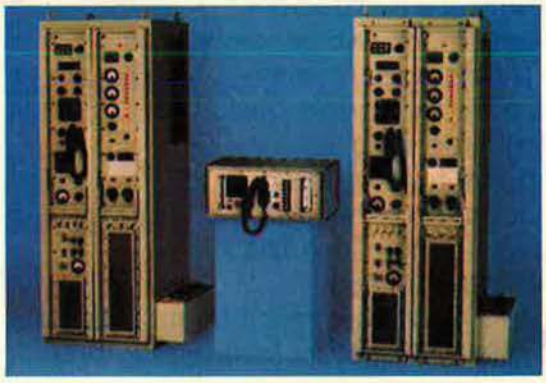
Available as a complete fixed or portable land-based system, as well as for shipboard use, this powerful performer has the versatility and capabilities to become the free world's standard new or replacement TACAN beacon. For specifics on the advanced AN/URN-25, contact Gould Inc., NavCom Systems Division, 4323 Arden Drive, El Monte, California 91731



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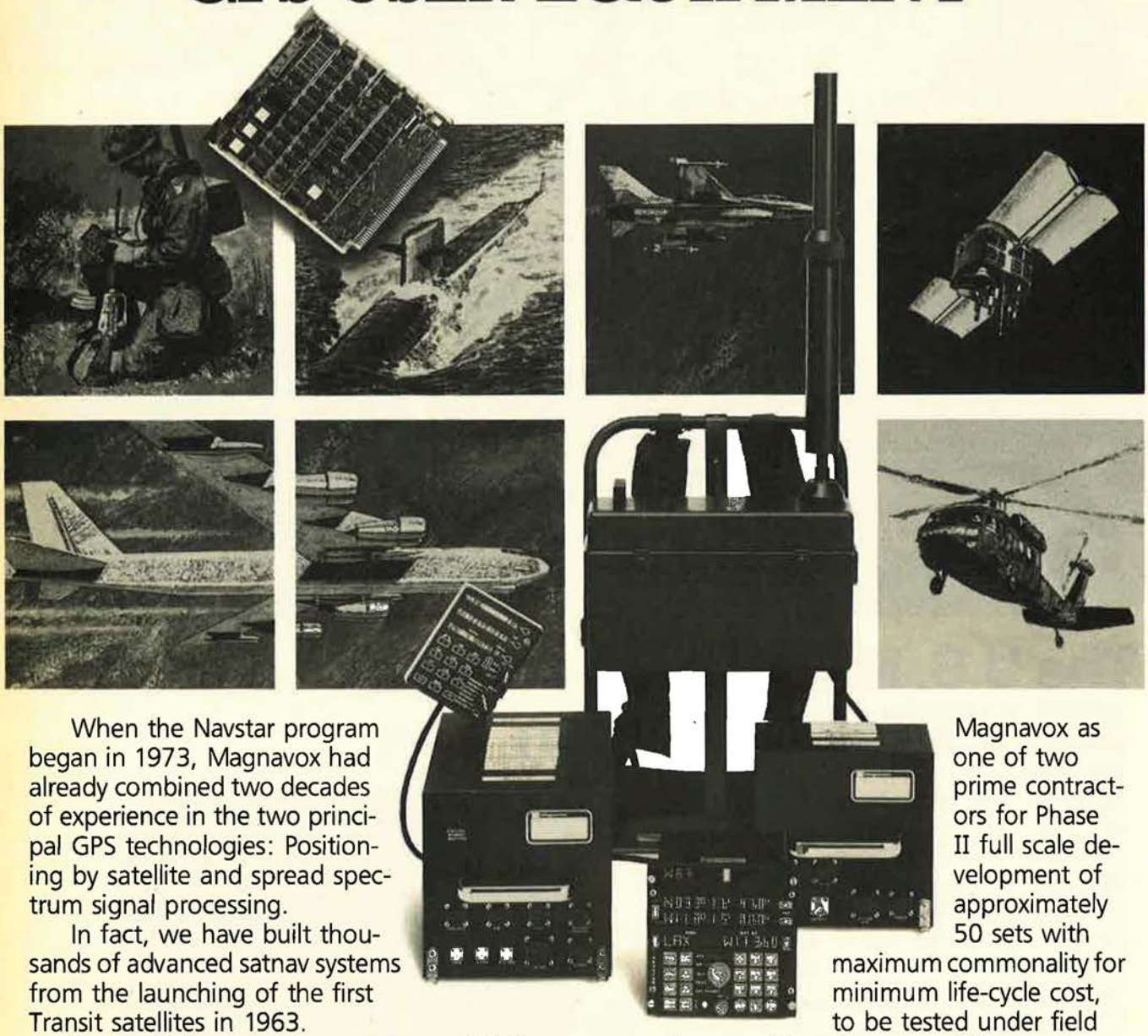


When the Navstar program began in 1973, Magnavox had already combined two decades of experience in the two principal GPS technologies: Positioning by satellite and spread spectrum signal processing.

In fact, we have built thousands of advanced satnav systems from the launching of the first Transit satellites in 1963.

And anti-jam spread spectrum modulation was originally developed by Magnavox in 1956.

During Phase I of GPS we qualified more user equipment than all other suppliers combined. We built more than 40 sets that met or exceeded specifications for flexible interfacing, cost effective design and performance; two full generations of equipment ranging from manpacks to systems capable of instant determination of velocity and 3D position within 10 meters in aircraft maneuvering in jamming environments.

The U.S. Air Force Space Division has selected Magnavox as one of two prime contractors for Phase II full scale development of approximately 50 sets with maximum commonality for minimum life-cycle cost, to be tested under field operating conditions in many different types of vehicles.

With more experience than anyone else in both anti-jam communications and satellite navigation, Magnavox occupies a unique position of leadership in the development and manufacture of user equipment for GPS in the decade ahead. Magnavox Advanced Products & Systems Company, 2829 Maricopa Street, Torrance, Calif. U.S.A. (213) 328-0770. Telex 674-373.

Magnavox

reports directly to the Secretary of the Air Force, and has direct access to the Chief of Staff. This enables the Agency to be independent of the activities and functions it audits.

Audits meet the needs of each management level. Centrally directed audits (CDAs) are typically performed concurrently at several locations to evaluate Air Force or major command programs, systems, and activities. Findings and recommendations are provided to top Air Force managers. This technique serves both the Hq. USAF and major command staffs.

Unlike Hq. USAF and major command audits, installation audits are conducted at single sites by the area audit office, responsible to the local commander. Results are reported to the appropriate installation and major command commanders. When findings warrant, these reports, together with pertinent recommendations, are also provided to the functional managers on the Air Staff for action as necessary.

The audit force is managed by the Auditor General through two geographic regions and two specialized directorates. The Western Region at Norton AFB includes Air Force activities in the western US, Alaska, and the Pacific. This region has thirty-two area audit offices. The Eastern Region at Langley AFB, Va., includes thirty-one offices and serves the eastern US, the Canal Zone, Greenland, and Europe.

The two 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 concentrates on the activities of the Air Force Systems Command and Air Force Logistics Command. It is deeply involved in life-cycle costs, weapon-system procurement and provisioning, and depot maintenance. Its products flow primarily to Air Force Logistics Command and Air Force Systems Command headquarters, and to Hq. USAF.

The Service-Wide Systems Directorate audits systems and programs common to the entire Air Force. This directorate has field offices at the Air Force Accounting and Finance Center, Air Force Manpower and Personnel Center, and Air Force Data Systems Design Center. It is concerned with evaluating such areas as the military and civilian pay systems, standard base supply system, centralized Air Force training and recruiting, and civil engineering policies and procedures. Reports go primarily to Hq. USAF.

AFAA auditors issued more than 3,200 audit reports in FY '79, resulting in $236 million in savings or cost avoidance. This is a ninefold return on auditing costs. ■

Maj. Gen. Joseph B. Dodds, Commander, AFAA.

CMSgt. Robert S. Wise, Senior Enlisted Advisor, AFAA.

Air Force Commissary Service

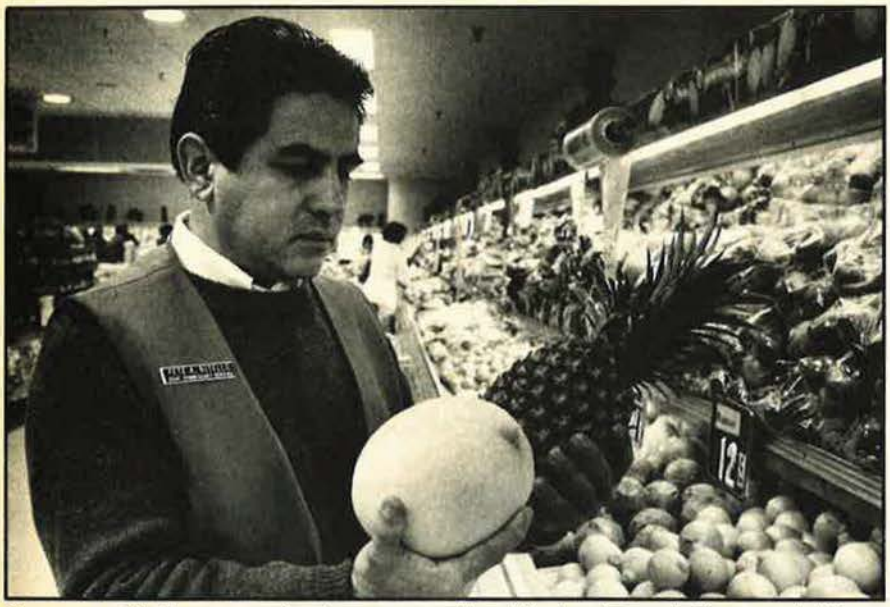
The Air Force Commissary Service (AFCOMS), a separate operating agency with headquarters at Kelly AFB, Tex., was activated in January 1976, and assumed operational control of USAF commissaries the following October.

AFCOMS is governed by a Board of Directors responsible to the Air Force Chief of Staff and comprised of Air Force general officers and the Chief Master Sergeant of the Air Force. The board provides direction to the AFCOMS commander for commissary operations and approves basic policies, plans, and programs.

Under the command of Maj. Gen. Charles E. Woods, the Air Force Commissary Service is comprised of approximately 9,100 civilian and 685 military personnel who operate 136 commissaries and 117 troop issue and

Maj. Gen. Charles E. Woods, Commander, AFCOMS.

CMSgt. Fred Dickinson, Senior Enlisted Advisor, AFCOMS.



Shoppers at Air Force commissaries are served by skilled and conscientious specialists. Many stores are being renovated to provide better lighting, heating, wider aisles, more shelf space, and better traffic flow.

subsistence functions in the CONUS and overseas. Total sales in FY '79 exceeded $1.6 billion.

The Agency manages commissaries through fifteen Stateside complexes and two overseas regions—Pacific (including Far East, Alaska, and Hawaii) and European.

AFCOMS supports the troop issue and subsistence program and sells food and household items to entitled patrons at cost plus a modest surcharge. It is required by law that sufficient earnings be generated through the surcharge program to pay for certain operating expenses and for construction costs.

Economies and enhanced services include more frequent vendor deliveries to reduce inventories, and automated systems for reports, inventory control, and accounts payable. AFCOMS calls upon the Air Force Audit Agency and the Office of Special Investigations for assistance in reducing inventory losses. It also coordinates with local and national vendors on special offers, discounts, and sales promotions.

AFCOMS patrons began paying a four percent surcharge at the checkout counter in 1976, and since then more than $80 million has been spent on new store construction and rehabilitation. By FY '85, an additional $220 million will be spent at Air Force installations around the world. New or renovated stores have better lighting, heating, and refrigeration, as well as wider aisles, more shelf space, and better traffic flow.

Data automation, electronic cash registers with scanners, and electronic scales are other improvements recently implemented or under consideration. Another on-going program involves continuous training of commissary employees in administrative, technical, professional, and management skills.

AFCOMS has contributed toward customer savings through a vigorous Patron Savings Program. Imaginative programs such as anniversary sales, mandatory stockage, and Best Buy sections have saved shoppers millions of dollars.

The command received the Air Force Organizational Excellence Award for the period April 1, 1976, through September 30, 1979.

AFCOMS operates for the good of the commissary patrons under the motto: "We Serve Where You Serve." ■

Air Force Engineering and Services Center

The Air Force Engineering and Services Center (AFESC), with headquarters at Tyndall AFB, Fla., serves as the focal point for engineering and services activities. Col. Hisao Yamada is the Commander of AFESC.

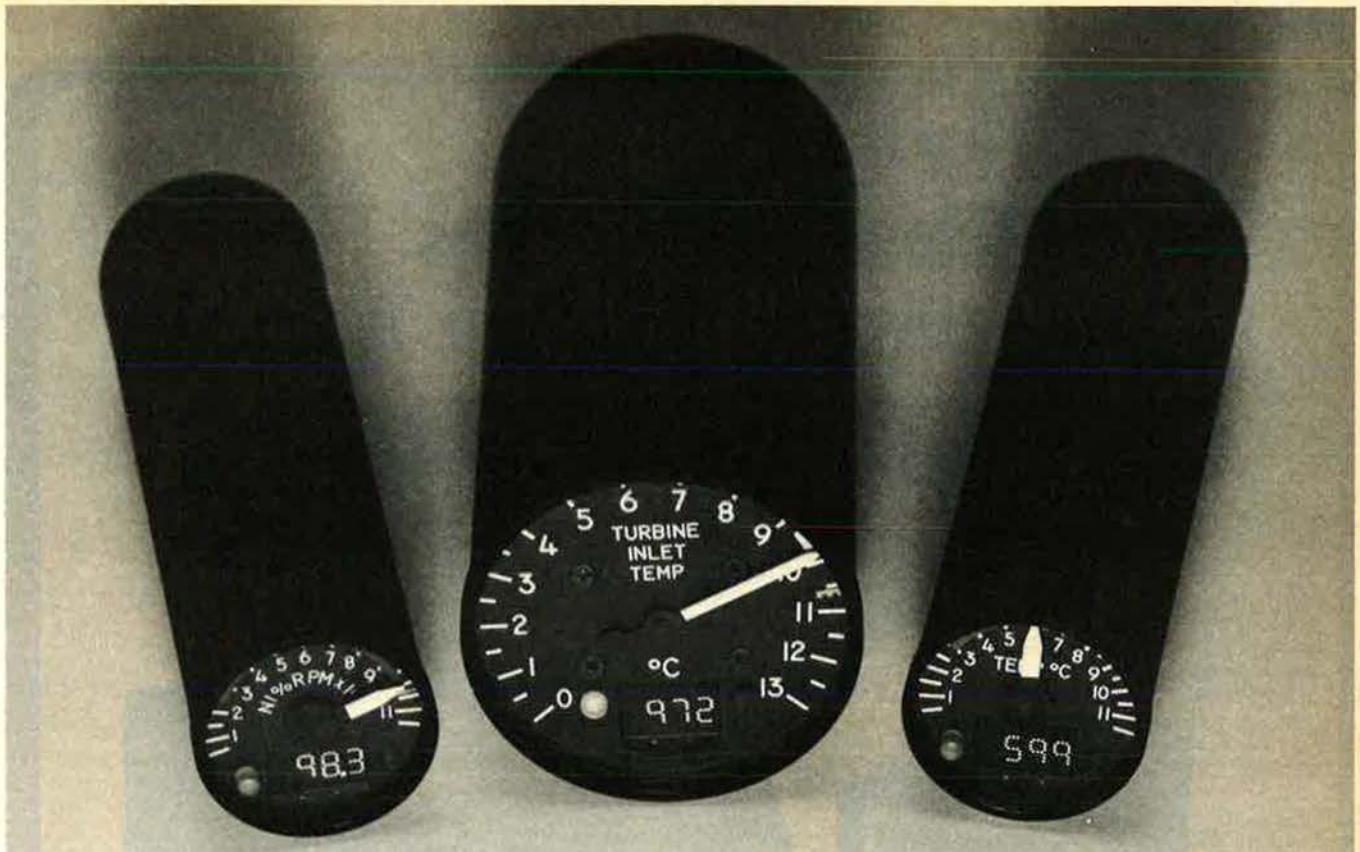
The Center guides and assists major commands and bases in the areas of readiness and contingency operations, facility energy, installation operations and maintenance, fire protection, environmental planning, billeting, food service, and other areas affecting the daily operations of the Air Force.

AFESC, with Air Force Systems Command, also manages the Air Force civil engineering research and development program. It serves as the Air Force interface with the Army's Natick Research and Development Command for food service-related programs.

Most of AFESC's 765 people are as-

Col. Hisao Yamada, Commander, AFESC.

CMSgt. Richard A. Pinto, Senior Enlisted Advisor, AFESC.



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Other products — Howell Instruments is the leading producer of turbine engine trimmers and aircraft temperature system analyzers in the world. Howell manufactures trimmers and testers for F100, J52, J57, J79, J85, TF30, and TF34 engines. Howell also makes engine monitors for J79, TF30, and TF34 engines, a TF30 engine stall computer, and an EPR tester.

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signed to the Center headquarters. The remainder are located at four Air Force Regional Civil Engineering Offices and at several operating locations.

AFESC provides a full range of management, training, and assistance expertise in engineering and services functional areas. Responsibilities include:

- Coordinating engineering and services readiness issues and initiatives, including training and worldwide deployment of contingency forces.
- Supporting unaccompanied personnel housing programs, food service, billeting, linen exchange, and laundry and dry-cleaning services.
- Planning Air Force programs of environmental protection, natural resources management, hazardous-waste management, community development, and air base livability.
- Reviewing the implementation of maintenance management policies, procedures, and methods for base civil engineering and services organizations throughout the world.
- Acting as the focal point for research and development initiatives involving environmental quality, and as lead agency for testing new products and materials and for air base survivability.
- Serving as the single point of contact for all facility energy matters within the Air Force.
- Planning and monitoring USAF's fire prevention, protection, and safety programs, including firefighting equipment and personnel capabilities.

Civil Engineering Maintenance, Inspection, Repair, and Training teams, located at five bases, provide a mobile depot-level maintenance work force in support of real property installed equipment on all Air Force installations. They also manage the excess real property program for the Air Force.

The Civil Engineering and Services Management Evaluation Team provides management evaluation and consultant service to base-level support activities.

Other teams travel to Air Force installations around the world and provide assistance in energy conservation, food management, bird/aircraft strike hazard reduction, pavement evaluations, corrosion control, contingency training, and fire protection.

The Air Force Regional Civil Engineers, located at San Francisco, Dallas, and Atlanta, manage design and construction projects for the Air Force, Air National Guard, and Air Force Reserve units within their respective areas. The Regional Civil Engineer at Norton AFB, Calif., serves the Air Force Ballistic Missile Office in the same fashion. All four regional offices also act as Air Force points of contact for federal and state environmental agencies. ■

AFESC is advancing the technology for rapid repair of runways, and for quick recovery after bomb damage.

Air Force Inspection and Safety Center

The Air Force Inspection and Safety Center (AFISC) at Norton AFB, Calif., provides the Secretary of the Air Force, the Chief of Staff, and major command and separate operating agency commanders with an assessment of Air Force fighting capability and resource management effectiveness. Maj. Gen. Len C. Russell commands AFISC and is also the Deputy Inspector General for Inspection and Safety, Hq. USAF.

AFISC has an assigned work force of 395 military and 140 civilian personnel, representing sixty-eight Air Force specialties. It is divided into four directorates and two offices.

- *The Directorate of Inspection* determines operational readiness status within the major commands by monitoring their Operational Readiness Inspection (ORI) reports and by conducting Over-the-Shoulder Inspections of command IG teams during ORIs. The Directorate also evaluates the effectiveness and efficiency of USAF management systems through Functional Management Inspections (FMIs) and System Acquisition Management Inspections (SAMIs). FMIs evaluate the management of well-defined Air Force activities and programs, while SAMIs are more specialized inspections involving the review of all aspects of new weapon systems acquisition. In addition, the Directorate

Maj. Gen. Len C. Russell, Commander, AFISC.

CMSgt. Philip A. Arvizo, Senior Enlisted Advisor, AFISC.

conducts an Inspection School to train all newly assigned Air Force, major command, and separate operating agency inspectors.

• *The Directorate of Aerospace Safety* monitors USAF mishap prevention programs in all areas of flight, ground, missile, and explosives safety. The Directorate also administers the mishap reporting system established by DoD, studying mishap trends to identify areas with a high payoff for mishap prevention. Directorate personnel design, plan, and develop resources for safety education programs, including university-level safety courses, and publish *Aerospace Safety, Driver,* and *Maintenance* magazines, and the *USAF Safety Journal*.

• *The Directorate of Medical Inspection* plans and directs all Air Force and Air Reserve Forces medical inspection programs to ensure efficient and effective management of health-care resources. Directorate personnel conduct Health Services Management Inspections, which are compliance- and management-oriented, and Functional Management Inspections, which address Air Force-wide management problems requiring major command or Air Staff action.

• *The Directorate of Nuclear Surety,* located at Kirtland AFB, N. M., plans, develops, directs, and evaluates the Air Force Nuclear Surety Program and makes recommendations to improve nuclear surety and the management of nuclear resources. The Directorate also publishes the quarterly *USAF Nuclear Surety Journal,* which disseminates nuclear safety, security, and inspection information to nuclear-capable units.

• *The Office of the Assistant for Inquiries and Complaints* develops inquiry and complaint policy and publishes directives for The Inspector General of the Air Force. The Office also processes administrative inquiries and complaints referred to The Inspector General and maintains data on all complaints submitted through the Air Force Inspector General System.

• *The Office of Management Support* manages manpower, personnel, budget, data automation, and administrative services for the Center and monitors major command and Air Force inspection schedules and activities. ■

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 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. As a means of continuing the original intelligence mission, the Air Force Intelligence Service was established the following year.

Col. Jack Morris is AFIS Commander. The Senior Enlisted Advisor is CMSgt. George L. Proud.

AFIS supports USAF planning and combat operations, responding to changing Air Force intelligence requirements. Its activities include:

• *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, photo research, and cartography; serves as Air Force intelligence contact with the Defense Mapping Agency; provides intelligence support to electronic warfare activities; 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 policies covering special intelligence and intelligence telecommunications.

• *Intelligence data management.* AFIS plans, coordinates, and exercises managerial control of worldwide Air Force intelligence data handling systems.

• *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 implements and manages the Air Force Intelligence Reserve Program, which includes recruiting, administering, training, and using intelligence mobilization augmentees. These Reservists

Col. Jack Morris, Commander, AFIS.

CMSgt. George L. Proud, Senior Enlisted Advisor, AFIS.

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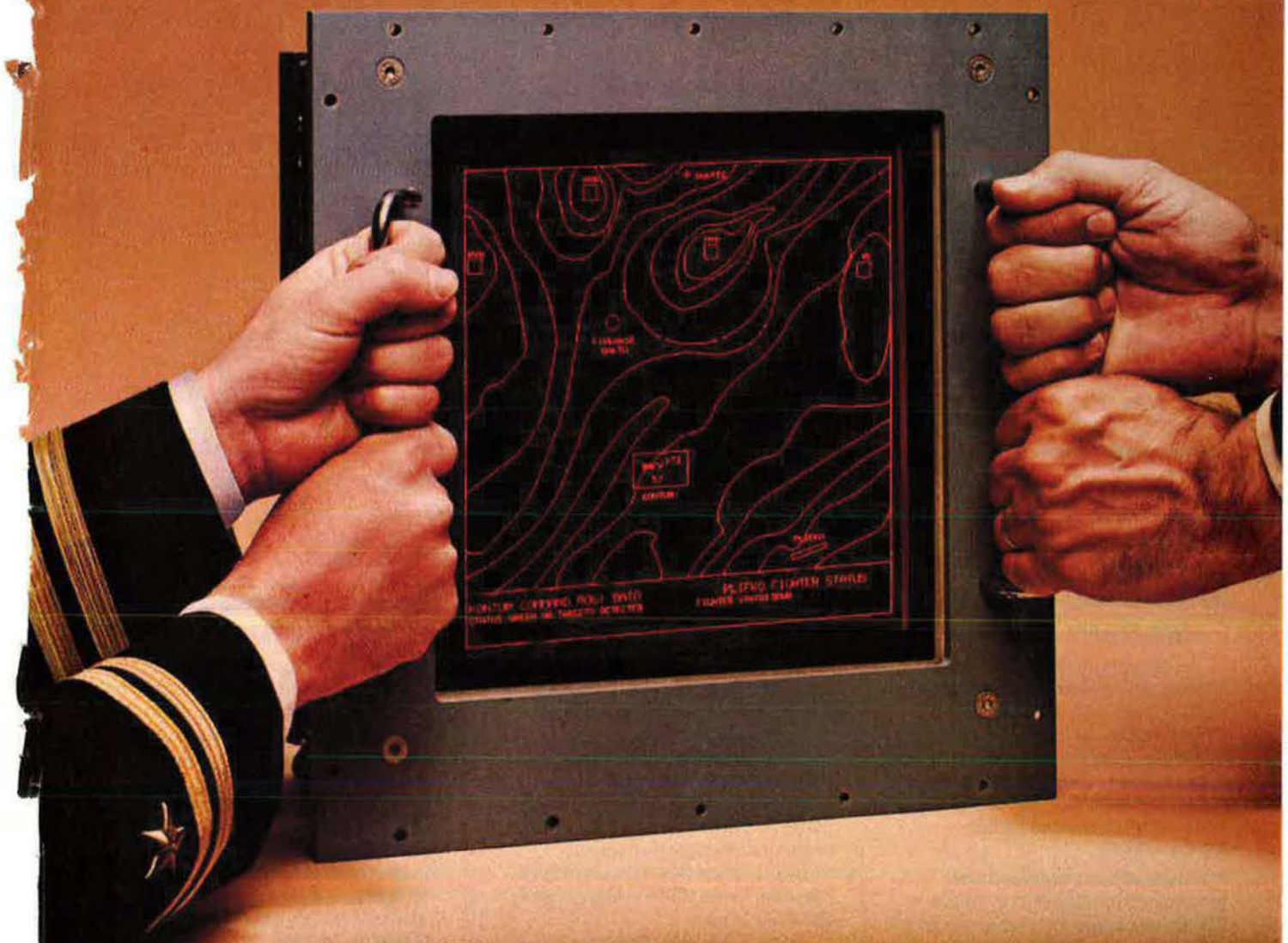

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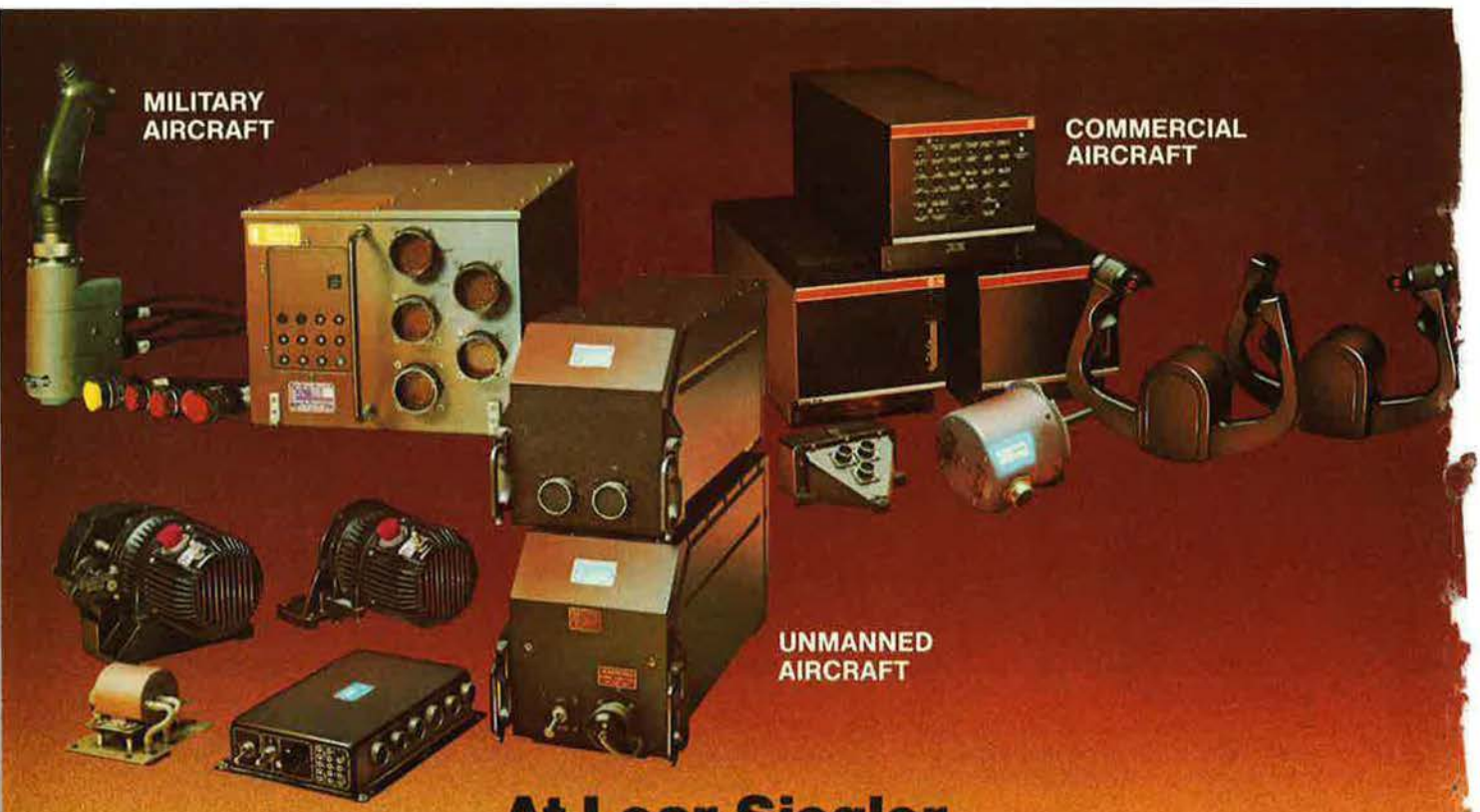

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When you're looking for experience and technology in flight control... the Astronics Division has the answers in:

MILITARY AIRCRAFT

As early as 1949, the Astronics Division achieved notable success in flight control with the receipt of the Collier Trophy for development of the first high-volume production autopilot for jet aircraft. The airplane was the **F-84**...the autopilot was one of more than 10,000 produced by LSI for the USAF.

The tradition continued with technology innovation—in 1953 the first fighter autopilot coupled to an ILS receiver for the **F-86D;** in 1954 the first jet transport autopilot for the **KC-135;** the first solid state 3-axis damper for the **F-104** in 1955.

More recently, the Astronics Division's AFCS for the **LTV A-7** initiated two breakthroughs—control augmentation with control stick steering and a two-channel fail passive AFCS. This system was later modified and put into production for the Lockheed **P-3C** to insure absolute reliability and safety.

The latest addition to the Astronics line of automatic flight control is the first production fly-by-wire flight control computer and sidestick controller for the General Dynamics **F-16.**

UNMANNED AIRCRAFT

The Astronics Division's success with Automatic Flight Controls for piloted aircraft led to the development of control systems for pilotless aircraft.

LSI's versatile drone autopilot was designed for use in many drone aircraft. By merely changing circuit cards and sensors, each drone can be programmed to fly a variety of missions. It has flown thousands of missions in the USAF/USN series of **BQM-34** targets.

The LSI TACAN Guidance Augmentation System was the first Astronics drone autopilot with homing capability, enabling the Drone to simulate a variety of incoming anti-ship missile threats.

In 20 years, LSI produced more than 4,000 drone autopilots.

Because of this broad experience, the U.S. Air Force selected the Astronics Division for the design and development of an integrated system of modular avionics to interface with new and existing remotely piloted vehicles.

The resulting "CORE" Avionics system was later selected for the USAF **BGM-34C** program and successfully completed a 30 flight test program.

COMMERCIAL AIRCRAFT

In 1956 the Astronics Division brought innovation to the commercial jet transport world with the first Category 3A automatic landing system for the **SUD Caravelle.**

This technology was later carried forward to the design of the avionic flight control system for the **Lockheed L-1011.** This system, with its automatic landing system technology provides complete "hands-off" operation from take-off through a Cat IIIA landing and automatic rollout.

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provide immediate support under the Total Force policy to the active force during peacetime, for contingencies, and mobilization.

• *Soviet affairs.* AFIS conducts the Air Force's Soviet Awareness Program, consisting of *The Soviet Military Thought* and *Studies in Communist Affairs* book series, "Soviet Press Selected Translation" periodical, internal publications, the Soviet Military Power Week, Soviet Awareness Team, and the Soviet Military Literature Research facility.

The 7602d Air Intelligence Group (AINTELG), headquartered at Fort Belvoir, Va., manages and collects worldwide human source intelligence, evasion and escape, and prisoner-of-war intelligence. It also plans and monitors code-of-conduct training programs for the US armed forces. These programs prepare military people to resist captor-handling techniques, interrogation, or exploitation attempts, and give guidelines for behavior in captivity.

In support of its many missions, 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 Legal Services Center

Defense counsel represents his client, the accused, before a military judge in a court-martial.

The duties of The Judge Advocate General (TJAG) and his Department are imposed by statute and by direction from the Secretary of Defense and the Secretary of the Air Force. In partial fulfillment of those duties, the Air Force Legal Services Center (AFLSC) provides Air Force-wide legal services in the areas of military justice, claims, litigation, and preventive law.

The Center headquarters is located in Washington, D. C., and commanded by Maj. Gen. Walter D. Reed, who is also The Judge Advocate General. His Senior Enlisted Advisor is CMSgt. Thomas R. Castleman. The 250 officer, 132 enlisted, and 171 civilian members of the Center are located throughout CONUS and in sixteen foreign countries.

A large number of the Center's personnel are involved in the administration of military justice in the Air Force. The Judge Advocate General assigns military judges and defense counsel to the Center to assure independence from local commands. Attorneys at the Center also perform post-trial appellate and clemency actions, including representation before the Air Force Court of Military Review and the US Court of Military Appeals.

In addition to supervising Air Force claims activity, which in 1979 included 125,000 actions totaling $40 million, AFLSC handles civil litigation on all subjects including general torts, medical malpractice, aviation law, environmental law, labor law, freedom of information, procurement, tax and utilities, and a wide variety of personnel disputes. The Center is also the most active federal body in patent litigation, and manages the Air Force inventory of more than 3,000 active patents.

The Air Force Preventive Law and Legal Assistance Program is directed by AFLSC. In 1979, that program advised nearly 400,000 clients on more than a million different personal civil matters. The office also provides the Air Force representatives on the Armed Services Individual Income Tax Council and the Armed Forces Tax Group.

Computers play an important role in the modern practice of law. The Center is the DoD executive agent for FLITE, or Federal Legal Information Through Electronics. FLITE provides computerized access for the research of many years of case law and precedent that would ordinarily fill several rooms with law books. It provides unique access to Comptroller General decisions and to Air Force administrative regulations. Computers also track claims with CAMP, the Claims Administrative Management Program, and monitor military justice activity with AMJAMS, the Automated Military Justice Analysis and Management System.

Though it is just one part of The Judge Advocate General's Department, AFLSC is one of the world's largest law firms. It is through the Center that commanders and airmen alike often benefit from ready access to legal counseling and assistance. ■

Maj. Gen. Walter D. Reed, Commander, AFLSC.

CMSgt. Thomas R. Castleman, Senior Enlisted Advisor, AFLSC.

Air Force Manpower and Personnel Center

The Air Force Manpower and Personnel Center (AFMPC) at Randolph AFB, Tex., continues as the operational arm of the DCS/Manpower and Personnel at Air Force Headquarters. It takes about 550 officers, 1,000 enlisted people, and 1,000 civilians to manage the programs affecting personnel from before they enter the Air Force to retirement. Two major AFMPC units are the Office of Civilian Personnel Operations and the Air Force Management Engineering Agency.

The changing complexion of the officer and enlisted force has presented AFMPC—and the entire Air Force—a challenge for the 1980s. An enlarged officer accession program will result in lieutenants comprising approximately thirty-eight to forty percent of the nonrated line officer force by the end of FY '80. This, coupled with the rated supplement drawdown, will result in a lower experience level for the support forces. Effective training, proper utilization, and careful assignment selection will become even more critical to unit effectiveness.

Officer retention is also an area of intense activity and concern. The AFMPC staff is working with major commands to reverse declining retention trends, especially in the pilot, navigator, scientific, and engineering career fields. Initiatives include personalizing the assignment process, reducing career irritants, supporting pay and compensation proposals, and directing a crossflow of major command retention activities. For example, a recently developed Assignment Information Directory contains information on all rated requirements and has been distributed to flying units and base CBPOs. With this information, officers will have a greater understanding of their assignment opportunities. Unit commanders will also play an important role in assignments through their recommendations to the resource managers.

Retention of enlisted personnel will be another major challenge for the '80s. First-term reenlistment objectives are increasing while the reenlistment pool is decreasing. To reverse recent retention trends, the Air Force must also redouble its efforts to retain second-term and career airmen. To meet requirements for FY '80, the Air Force will need to reenlist sixty-five percent of the second-term airmen and ninety-three percent of career eligibles—a goal requiring the attention of all Air Force leaders and supervisors. Because of the increasing importance of retention, the Center now has full-time offices for officer and for enlisted retention.

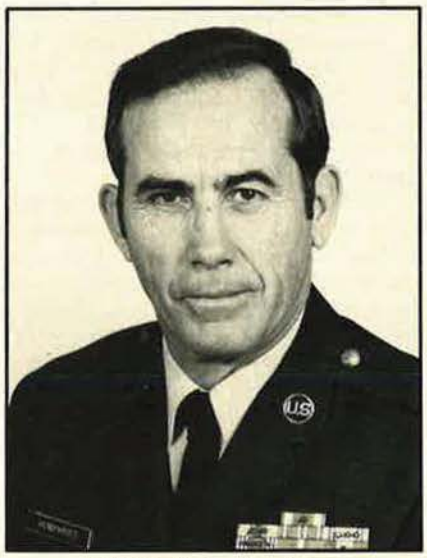
AFMPC convenes more than thirty-five boards annually. Included are boards for officer temporary and permanent promotions, regular appointment, selection for professional military education, and screening records for E-8 and E-9 promotions.

Fighting inflation and improving the quality of life for Air Force people is still another challenge the Center is facing. Higher fuel prices and the increasing cost of base recreation and entertainment call for such initiatives as providing additional high-quality free entertainment and operational changes in the Air Force Child Care Center Program. The Air Force Welfare Board recently announced its intention to hold the line on fees and charges in Morale, Welfare and Recreation activities. Funds furnished directly to bases for MWR activities will be increased and incentives given to encourage more MWR facilities.

The Center is sensitive to the people issues that confront Air Force personnel and their families on a daily basis. This includes humanitarian deferments and reassignments, and the various programs supporting the needs of people in a complex society such as ours.

To meet the challenges of the 1980s, AFMPC will continue to develop and administer people programs with an eye toward improving retention of the Total Force and enhancing the quality of life for Air Force members and their families. ■

Maj. Gen. L. W. Svendsen, Jr., Commander, AFMPC.



CMSgt. W. D. Humphries, Senior Enlisted Advisor, AFMPC.

THE ELECTRONIC AIR FORCE

In July, AIR FORCE Magazine will focus on "The Electronic Air Force."

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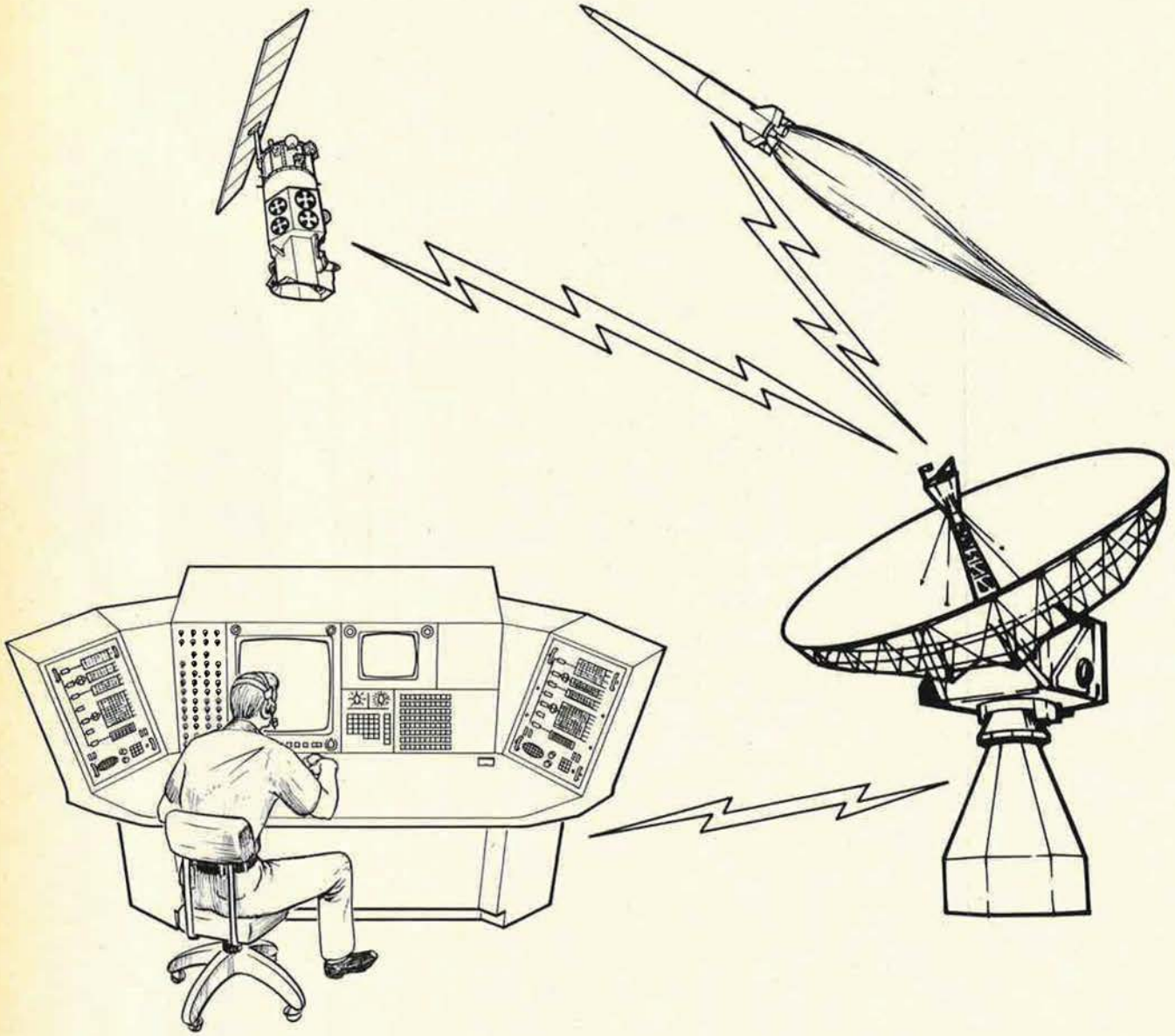

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Air Force Medical Service Center

The Air Force Medical Service Center (AFMSC) is a separate operating agency with headquarters at Brooks AFB, Tex. The Center was established on July 1, 1978, and became operational October 1, 1978. Brig. Gen. James F. Culver, the AFMSC Commander, also serves as Deputy Surgeon General for Operations and Director of Professional Services.

AFMSC assists the Air Force Surgeon General in developing policies and practices concerning routine and emergent health care in peace and war. The Center acts as the Air Force Surgeon General's agent for implementing policies, studies, and management and administrative research.

AFMSC has two directorates and two corps chiefs' offices. The directorates are Professional (clinical) Services and Health Care Support. The two corps are the Medical Service and the Biomedical Sciences Corps.

The Health Care Support Directorate, largest in AFMSC, develops plans and procedures to ensure that needed medical facilities are available, required medical supplies and material are provided, and that patient affairs, including medical records and statistics, are properly managed.

The Professional Services Directorate is involved in programs associated with the practice of medicine in the Air Force, including clinical, flight, and preventive medicine, and professional specialties associated with these areas.

The Directorate is also responsible for the USAF Radioisotope Committee, which coordinates all administrative and regulatory aspects of licensing, possession, use, storage, handling, and disposal of all radioactive material in the Air Force. This committee also acts as the single point of Air Force contact with the United States Nuclear Regulatory Commission on all matters of licensing.

The Medical Service Corps (MSC) and Biomedical Sciences Corps (BSC) chiefs are responsible for policy development and advice to the Surgeon General on matters involving their respective corps, including career development, monitoring and progression, and professional education. The MSC is concerned with health-care administration, and the BSC with the scientists and engineers who support the physicians in clinical and aerospace medicine professions.

AFMSC is directly involved on a daily basis with the Air Force Surgeon General, other Air Staff directorates, major commands, and other federal agencies. A continuing interchange is required as policy and practices for medical support are developed and implemented. ■

Brig. Gen. James F. Culver, Commander, AFMSC.

CMSgt. Paul F. Greenwood, Senior Enlisted Advisor, AFMSC.

Air Force Office of Security Police

The Air Force Office of Security Police (AFOSP), located at Kirtland AFB, N. M., was established as a separate operating agency on September 1, 1979. The Commander, Brig. Gen. William R. Brooksher, also serves as the Air Force Chief of Security Police. In both capacities, he is responsible to The Inspector General, USAF. A staff of thirty-three officers, fourteen enlisted people, and eighteen civilians is assigned to Kirtland; additional personnel are part of the Air Force Security Clearance Office, an operating location in Washington, D. C.

AFOSP develops the operational policies and practices necessary for the security of Air Force resources and information, and also implements Air Force IG-approved and -directed plans, policies, and programs. Specific areas of interest include: air base defense; management of security police personnel and training systems, and equipment programs; information, personnel, industrial, and wartime information security programs; maintenance of law and order, prisoner rehabilitation, and corrections programs; vehicle traffic management; and the military working dog program.

Among AFOSP's significant challenges and accomplishments during the past year were:

• Peacekeeper '80: A thorough examination of security police duties, leadership, organization, standards, and image. Peacekeeper '80 hopes to restructure and improve the career field and its mission effectiveness through innovation and investment. The goal is to ensure that the 35,000 security police men and women are an elite force capable of meeting any enemy or criminal threat. Improved spirit, effectiveness,

discipline, and retention will be the keys to a successful program.

- Intensified air base defense training: To increase the effectiveness of the Air Force's ground combat force, attendance at US Army infantry courses has been increased and new Air Force courses have been developed.
- A major effort to lower drug abuse with the increased help of drug-detection dogs. Apprehension rates indicate the program is working.
- Sponsorship of the annual worldwide marksmanship matches and symposium at Lackland AFB, Tex. The Royal Air Force, the National Guard, Air Force Reserve, and nine major commands participated.
- Test and evaluation of five new intrusion detection subsystems, one of which was adopted—the Perimeter Surveillance System/Closed Circuit Television (PSS-CCTV). The program could affect as many as 700 SP posts.
- Providing increased security expertise to the Air Force research and development community during all stages in the development of new weapon systems. AFOSP is deeply involved in developing security concepts for the ground-launched cruise missile system, the medium-range ballistic missile system, the MX missile system, and the Space Shuttle program. AFOSP is also providing security expertise for a conceptual study of storing nuclear weapons inside aircraft shelters.

The safety and survivability of vital Air Force resources are the bottom line of all AFOSP efforts. ■

Brig. Gen. William R. Brooksher, Commander, AFOSP.

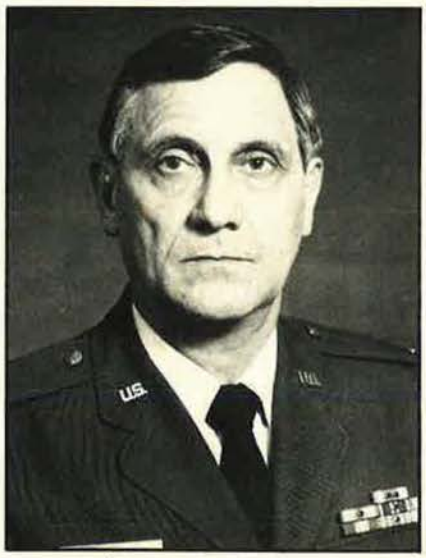
CMSgt. Robert J. McLaurine, Senior Enlisted Advisor, AFOSP.

Air Force Office of Special Investigations

The Air Force Office of Special Investigations (AFOSI), headquartered at Bolling AFB, D. C., is the Air Force's professional investigative service. AFOSI supports USAF commanders through some 1,900 special agent and support people, including highly trained forensic science specialists, in twenty-eight district offices and 125 detachments and operating locations worldwide. AFOSI functions only as an investigative agency. Judicial or administrative actions are taken by appropriate commanders on advice of their Staff Judge Advocates.

AFOSI's investigative responsibility includes crimes against USAF personnel or property, crimes committed on Air Force installations, and crimes committed by people subject to the Universal Code of Military Justice (UCMJ). Further, the Agency investigates fraudulent activities, violations of public trust, and administrative irregularities. Such investigations could involve Air Force contracting and acquisitions, disposal, pay and allowance matters, and nonappropriated fund activities. In addition, AFOSI serves as Executive Agency for coordinating investigative support to the Army and Air Force Exchange Service, and provides investigative assistance to Defense Logistics Agency field offices throughout the world.

Special Agents use offensive and defensive measures to detect, neutralize, and destroy the effectiveness of threats posed to Air Force security by hostile intelligence. AFOSI also detects terrorist threats to Air Force facilities and personnel, and warns the affected commanders. Coupled with this, AFOSI



Col. Forest A. Singhoff, Commander, AFOSI.

CMSgt. Lawrence A. Shellhammer, Senior Enlisted Advisor, AFOSI.

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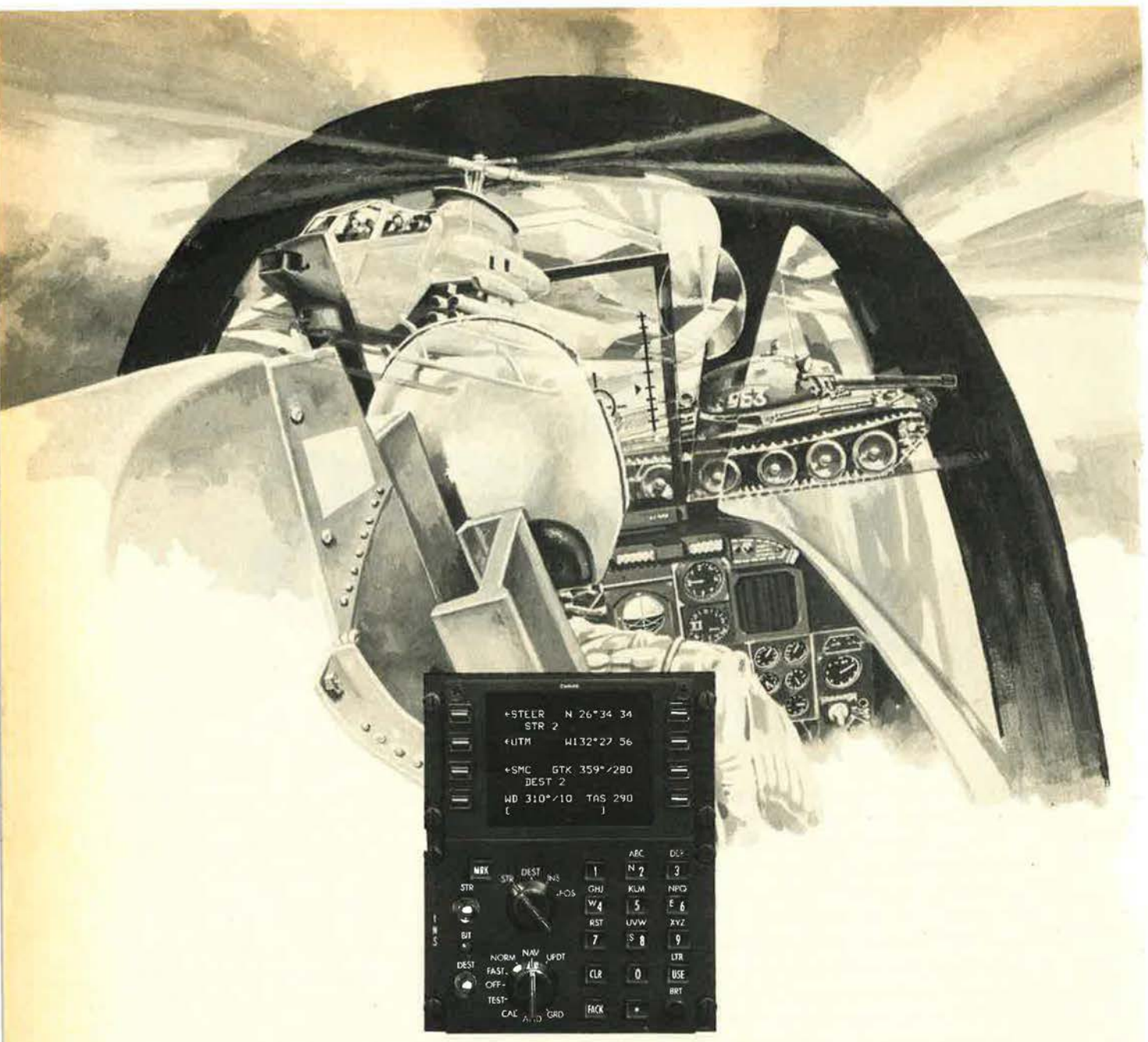

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supervises various counterterrorism services for Air Force commanders during heightened terrorist activity and also provides protective services to selected senior personnel as required.

The USAF Technical Surveillance Countermeasures (TSCM) program is another important responsibility. At the national level, AFOSI helps develop TSCM policies and procedures, and research and design for TSCM equipment. At Air Force level, these technical services support counterintelligence, criminal, and fraud investigations.

AFOSI also directs the USAF polygraph and Identi-kit programs, maintains the USAF master terminal to the FBI National Crime Information Center, and performs continuing crime and counterintelligence patterns and trends analyses.

Since many investigations extend beyond Air Force "boundaries" (people or bases), AFOSI maintains liaison with law enforcement and investigative organizations at international through local level jurisdictions. This liaison function helps assure Air Force commanders the most thorough investigative services possible.

To get the job done, AFOSI selects and trains special agents from among the most highly qualified and capable officer, NCO, and civilian volunteers. All agents attend an intensive ten-week course at the Air Force Special Investigations Academy in Washington, D. C. They usually return for advanced or specialized training after gaining administrative and investigative field experience.

In response to presidential, congressional, and DoD emphasis—and in concert with a major USAF effort—AFOSI is expanding its white-collar and computer-crime detection efforts and its briefing programs to sensitize commanders and managers to fraud; increasing its participation in joint task forces and surveys of high potential crime areas; and working closely to ensure exchange of information with USAF managers and counterpart agencies. ■

Air Force Service Information and News Center

The Air Force Service Information and News Center (AFSINC) helps inform both Air Force members and the general public about the roles and missions of the Air Force. This separate operating agency, commanded by Col. Donald Hilkemeier, provides information products and services directly to these audiences as well as to commanders and their public affairs representatives.

AFSINC was created following the announcement in April 1978 that several Air Force public affairs functions would be merged and relocated outside the Washington, D. C., area. AFSINC, with headquarters at Kelly AFB, Tex., became fully operational October 1, 1978. Today AFSINC conducts the Air Force Internal Information Program, produces and distributes printed and audiovisual material about Air Force systems and missions, and reports news about Air Force people to hometown newspapers and other media.

AFSINC, responsible to the Department of the Air Force through the Director of Public Affairs for the Secretary of the Air Force, has three directorates—Internal Information, Administration, and Hometown News. Air Force public affairs units in Chicago, Los Angeles, and New York get budgetary and administrative support from AFSINC.

The Directorate of Internal Information, charged with the Air Force's Internal Information Program, keeps Air Force military and civilians informed about Air Force, Department of Defense, and national policies, decisions, and actions. The Directorate prepares *Airman* magazine, the Commander's Policy Letter and its Supplement for Air Force commanders, Air Force News Service releases for base newspapers, general-officer and high-ranking civilian biographies, *Air Force Now*, and *Air Force Weekly*. It also manages the Air Force's base newspaper program and activities associated with the operation of Air Force American Forces Radio and Television stations overseas.

The Directorate of Administration handles administrative matters for AFSINC. The Directorate reproduces and distributes information products. These, along with some material provided by the Defense Department's American Forces Information Service, are distributed by the Directorate to more than 7,000 addressees worldwide. Computerized typesetting is provided by the Directorate's word-processing division for all of AFSINC's published information products.

In 1979, the Directorate of Hometown News assumed the functions of the Hometown News Center, formerly at Tinker AFB, Okla. The hometown news program provides stories about newsworthy activities of Air Force people to their hometown newspapers and other

Col. Donald Hilkemeier, Commander, AFSINC.

CMSgt. Herbert W. Vaughn, Senior Enlisted Advisor, AFSINC.

local media. In addition to reporting the accomplishments of active-duty people, the program covers the activities of Reservists and people enrolled in commissioning programs (US Air Force Academy, Air Force ROTC, and Officer Training School).

In October of this year, the US Army's Hometown News Center is scheduled to move from Kansas City, Mo., and become a part of the Directorate of Hometown News.

AFSINC currently has 147 people, including thirty-two officers, fifty-nine airmen, and fifty-six civilians. ■

Air Force Test and Evaluation Center

The Air Force Test and Evaluation Center (AFTEC) is the Air Force's independent agency for Operational Test and Evaluation (OT&E) on all emerging weapon systems. Now in its sixth year of operation, AFTEC provides DoD officials with vital information on the performance and maintainability of new hardware prior to major decision milestones in the weapon-system acquisition process.

"We strive to identify the deficiencies in a system so that they will be corrected early in the development, thus saving money while improving the product," notes Maj. Gen. Howard W. Leaf, AFTEC Commander.

Essentially, AFTEC determines how well systems proposed for Air Force procurement meet the combat needs of the personnel who will use and maintain them. The results of this early testing, normally conducted on prototype and preproduction versions, play an important part in the Defense Systems Acquisition Review Council's (DSARC) decision to give a production go-ahead on major systems. AFTEC's follow-on testing helps the Air Force verify the military utility, operational effectiveness, and suitability of production items, which are normally in a fully operational configuration.

The nucleus of the AFTEC organization is located at Kirtland AFB, N. M., where a staff of operational, technical, analytical, and test specialists design and evaluate the tests. Spread throughout the CONUS and also in Germany are some twenty-five field test teams, operating locations, and detachments where actual testing takes place. As of January 31, 1980, AFTEC had 232 military and seventy-three civilians assigned.

AFTEC is responsible for managing some seventy-five major Air Force OT&E programs and monitoring more than 250 others. To accomplish this comprehensive task, AFTEC relies on the using and supporting commands to supply the bulk of the people for the test teams. Some 700 personnel from these commands provide the expertise in operations, logistics, maintenance, and training.

In addition to strict acquisition systems testing, AFTEC is also heavily involved in managing and monitoring OT&E on DoD-directed joint tests. These tests evolve from service and JCS nomination, with DoD tasking a particular service as executive agent to conduct the tests. For example, AFTEC managed the Air Force support of TASVAL, a joint Army/Air Forces operation designed to test the survivability and effectiveness of tactical aircraft in a high threat, antiarmor scenario. AFTEC participated in other joint testing involving the Joint Tactical Information Distribution System (JTIDS), Identification Friend or Foe and Neutral (IFFN), and Data Link Vulnerability.

In 1979, AFTEC had a particularly active year in major OT&E efforts. Some of the milestones achieved included:

- F-16 European Test and Evaluation (ET&E). AFTEC headed a joint test team that conducted extensive OT&E testing in Norway, Denmark, Germany, and England.
- MX operational testing of the Transporter-Erector-Launcher (TEL) was started by the AFTEC Test Team in Nevada.
- The Air-Launched Cruise Missile (ALCM) OT&E Test Team was formed at Edwards AFB, Calif.
- F-5E Instrument Flight Simulator (IFS) OT&E testing was completed by AFTEC for the Saudi Arabian government.
- C-141B "Stretch" Follow-on Test and Evaluation (FOT&E) was completed and AFTEC qualified the first MAC crew to fly the aircraft.
- E-4B (Advanced Airborne Command Post) Initial Operational Test and Evaluation (IOT&E) was completed.
- EF-111A FOT&E was completed.

AFTEC will continue active OT&E testing this year with major milestones occurring in 1980 on such programs as ALCM, GLCM, MX (Milestone II), A-10 Flight Instrument Simulator (FIS), AIM-9M, TRI-TAC, Navstar (Milestone II completion), and the STS (Space Shuttle) IOT&E testing, to name a few.

"Emphasis on earlier OT&E continues to increase," says General Leaf. "The dividends have really become evident in the last two years as major systems have been more economically introduced into the inventory. It is prudent acquisition management to operationally test as soon as possible. By doing so, everyone benefits—the developer, the contractor, the user, the entire DoD, and, very importantly, the taxpayer." ■

Maj. Gen. Howard W. Leaf, Commander, AFTEC.

CMSgt. Ralph V. McKeown Senior Enlisted Advisor, AFTEC.

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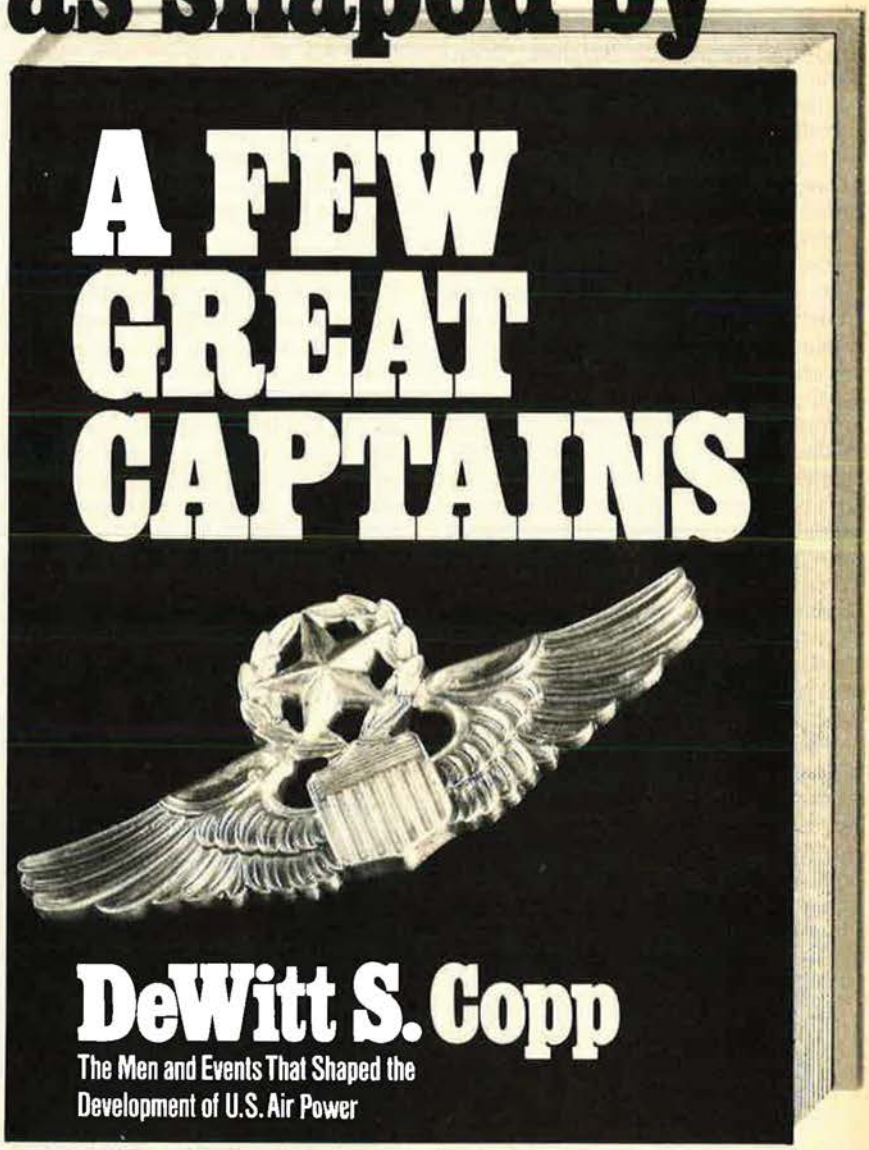

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DIRECT REPORTING UNITS

USAF has changed the designation of some of its Major Commands (MAJCOMs) and Separate Operating Agencies (SOAs) to "Direct Reporting Units" (DRUs). Among the DRUs that follow are several that have appeared in previous Air Force Almanac Issues as MAJCOMs or SOAs. Appearing in the Almanac Issue for the first time this year are reports on three Air Staff functional areas—the Air Force Chaplain Service, the Office of the Air Force Surgeon General, and The Judge Advocate General's Department.—THE EDITORS

Aerospace Defense Center

The Air Force recently lost a major command but gained a new organization to support the hub of the nation's strategic aerospace defense. Originally activated in 1946 as the Air Defense Command (ADC), it was later renamed the Aerospace Defense Command (ADCOM). Last year, in an economy move, the headquarters was phased out as a major command.

However, ADCOM retained its status as the US specified command component of North American Air Defense Command (NORAD), continuing to operationally control aerospace defense forces.

ADCOM's resource management of forces, however, has been transferred to the Tactical Air Command (TAC), Strategic Air Command (SAC), Air Force Communications Command (AFCC), and a newly established direct reporting unit, the Aerospace Defense Center (ADC). TAC now manages air defense radars, control centers, and interceptors; SAC operates missile warning and space surveillance sensors; and AFCC handles communications assets.

The Aerospace Defense Center, established December 1, 1979, provides Air Force manpower—some 1,600 military and civilian personnel—for both the combined NORAD and ADCOM. Lt. Gen. James V. Hartinger became the Center's Commander at the same time he became Commander in Chief of NORAD and ADCOM on January 1, 1980.

Last September, ADCOM, and then ADC, began operating a new 427M command and control computer system, located in the Cheyenne Mountain Combat Operations Complex near Colorado Springs. The 427M computer system replaced three other systems and the related data communication switching devices.

The 427M will greatly increase ADCOM's effectiveness by consolidating missile warning and space surveillance information into a single computer system. This will provide a faster and more reliable early warning capability and more accurate and timely monitoring of the space satellite population. The communications segment will assure an uninterrupted flow of information between the Cheyenne Mountain Complex and the worldwide surveillance systems feeding data into it. The new system will enhance ADCOM's capability to provide warning and attack assessment through the 1980s.

In addition, associated command post modifications, which include new data display consoles and screens, will increase command and control capability.

ADCOM's new Space Defense Operations Center (SPADOC) will serve as the focal point for national space defense functions. It began initial operations in Cheyenne Mountain last October and now monitors space activities to provide warning and assessment of threats against space systems of the United States or its allies. For space defense purposes, the new Center now has operational control over the Space Detection and Tracking System, the network of radars and other sensors that provides position data on earth-orbiting satellites.

As new space systems are deployed and defensive systems developed, SPADOC will expand its responsibility to protect those systems by employing assigned defense countermeasures. By the time SPADOC is fully operational, expected in the mid-1980s, it could command an extensive space object tracking network coupled with an effective antisatellite capability to protect US space assets.

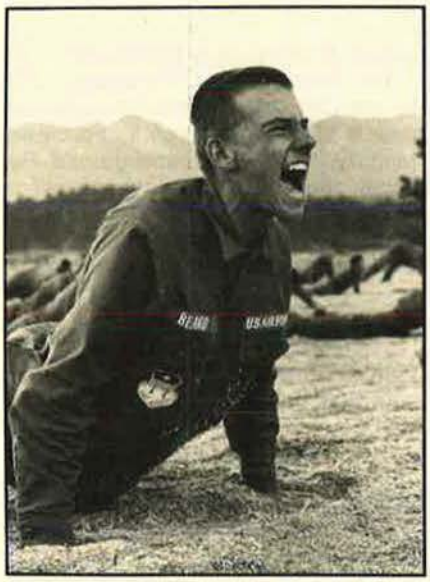
Several improvements being made or planned by TAC, SAC, and AFCC will significantly increase ADCOM's capability to accomplish its primary missions of missile warning, space and atmospheric surveillance, and defense.

Among them are modernizing the Ballistic Missile and Distant Early Warning radar systems, deploying the PAVE PAWS sea-launched ballistic missile warning system, and exploiting both the deep space capabilities provided by the Ground-Based Electro-Optical Deep Space Surveillance System and the early orbit detection capabilities of the Pacific Radar Barrier. ■

Lt. Gen. James V. Hartinger, Commander in Chief, NORAD and ADCOM; Commander, ADC.

CMSgt. Charles P. Zimkas, Jr., Senior Enlisted Advisor, ADC.

Air Force Academy



Physical conditioning during basic cadet training toughens new cadets to cope with the stresses of Academy life.

Ninety-eight women will march to the podium on May 28, 1980, to become the first women graduates of the Air Force Academy. They will join their 810 male counterparts as Air Force second lieutenants.

Lt. Gen. K. L. Tallman, Academy Superintendent, directs the training of future career Air Force officers with the help of 1,100 officers, 1,300 noncommissioned officers, and 1,900 civilians.

Military training for the 4,209 cadets who make up the Cadet Wing is under the leadership of Brig. Gen. Thomas C. Richards, Commandant of Cadets. Programs under General Richards's direction include military training and the flying, soaring, and parachuting programs.

The academic curriculum, accredited by the North Central Association of Colleges and Secondary Schools, is under the direction of Brig. Gen. William A. Orth, Dean of Faculty.

A rigorous physical education program, which includes intercollegiate and intramural competition as well as physical education, is run by Col. John J. Clune, Director of Athletics.

Military training takes place in every class and at every formation. Military discipline is first learned by cadets at the "follower" level. Later, as upperclassmen, cadets are given responsibilities and duties comparable to those of junior officers.

Field training is conducted in the summer. During the academic year, military training continues, emphasizing individual performance and responsibility. Supplementing formal classroom military studies is a series of lectures pertinent to leadership. Additionally, cadets have attended major command activities such as TAC's Red Flag and SAC's Bomb and Missile Competitions.

Flying programs begin during the cadets' first summer with sailplane orientation flights. Courses in aviation fundamentals and navigation are available during the third, second, and first class years. Beginning this fall, all freshmen, or fourth class cadets, will be required to take an aviation fundamentals class, which includes orientation in the T-41 flight simulator. Cadets eligible for pilot training may take the T-41 flying training program their senior year.

The academic curriculum is administered by fourteen departments organized into four divisions: basic sciences, engineering sciences, social sciences, and humanities. Each of the faculty's 560 officers and four distinguished visiting civilian professors has at least a master's degree and is a volunteer.

A core curriculum of 153 semester hours must be completed by every cadet. It is divided about evenly between the social sciences and humanities and the basic and engineering sciences, and also includes physical education and military training courses. Cadets may elect to major in one of twenty-three disciplines, with about half choosing science or engineering. Twenty-one graduates have won Rhodes Scholarships, and forty-four have been named Guggenheim Fellows.

The athletic program got a boost this year as the Academy joined the Western Athletic Conference. This will enable Academy athletic teams to compete for league honors and participate in post-season competition each year.

Eighteen intercollegiate sports are offered for men and ten for women, with forty-one varsity and junior varsity teams competing nationwide. The physical education program includes sixteen intramural sports, fielding 640 teams. With this extensive program and outstanding facilities, the Academy has produced 163 All-Americans.

During the past two years, the freshman class has played host to the Colorado Special Olympics, escorting 1,600 handicapped contestants for two days.

The Academy also has played host to the first two National Sports Festivals, under sponsorship of the United States Olympic Committee. In addition to providing housing for 1,400 athletes, the Academy was host for a majority of the sporting events. This festival received national television coverage.

The Academy will continue to provide a solid educational background for future Air Force officers, who will serve their country with pride, dedication, and a continuing commitment to excellence. ■

Lt. Gen. K. L. Tallman, Superintendent, USAFA.

CMSgt. Marvin G. Penfield, Senior Enlisted Advisor, USAFA.

Air Force Reserve

The Air Force Reserve (AFRES) will continue in the 1980s the trend that saw all of the command's flying units converting to newer aircraft during the last decade. Coming into the inventory this year will be A-10 Thunderbolt II close air support aircraft and more F-4 Phantom fighters. Some years later, Reservists will be flying the F-16 multipurpose fighter.

During 1979, all units with assigned aircraft were rated combat-ready, and the command exceeded its personnel end strength in Fiscal Years 1978 and 1979. To maintain readiness, AFRES personnel participated in thirty-five command and joint field training exercises overseas and in the continental United States. A major exercise, Operation Redoubt—Phase III, realistically and economically tested nearly every aspect of the command's capability to perform its varied missions if mobilized. The short-notice test was conducted at bases across the country and in a forward operating base environment.

In 1979, Reserve crews flew missions ranging from routine airlift to a full-scale tactical deployment to Italy. AFRES humanitarian missions began early in 1979 with the January evacuation of US citizens from Tehran, following civil disturbances in Iran.

When a 118-car train carrying hazardous material derailed in Florida, an AFRES special operations AC-130 used special sensors to detect and pinpoint chemical leakage. Reserve medical personnel also responded to treat the injured.

When an Easter Sunday earthquake rocked the Adriatic coastal area of Yugoslavia, the Air Force Reserve was there, delivering medical and emergency supplies to Titograd. While on Panama Canal rotational duty in July, Reservists airlifted thirty tons of relief supplies to St. Vincent Island, site of the Mt. Soufriere volcano eruption. Another Reserve unit evacuated US citizens from Nicaragua when that country was torn by strife.

In another part of the globe, Air Force Reservists, participating with the active force, airlifted American citizens from Zaire, transported Army and Air Force personnel to staging areas, and delivered United Nations medical supplies to that country.

In our own nation, helicopter-equipped Air Force Reserve units of the Aerospace Rescue and Recovery Service saved seventy-nine lives during 1979. Other Reservists flew insect control aerial spray missions over more than 160,000 acres, and more land was saved when the Reserve dropped forest fire retardant chemicals on blazes in Southern California.

Sick and injured Department of Defense personnel were transported daily to special treatment facilities in domestic and overseas aeromedical evacuation missions. Backing up the airlift in ground support roles, Reservists manned hospital and emergency facilities to provide needed medical care.

All AFRES civil engineering units were reorganized into new deployable units designed to better support full-time repair and to be self-sufficient when mobilized. The primary mission of these units is to provide rapid runway repair and damage-repair. Other Reservists furnished support in aerial port, communications, aircraft maintenance, and numerous other areas.

In October 1980, an AFRES associate unit will be established at Barksdale AFB, La., for the KC-10 Extender, a new advanced tanker/cargo aircraft to be operated by Strategic Air Command. Reservists will comprise fifty percent of the crews. Other AFRES units fly KC-135 Stratotankers on full alert status—similar to active-duty SAC units.

The Tactical Air Command's strike forces can be expanded by approximately 200 AFRES aircraft and crews. Military Airlift Command-gained Reserve crews comprise almost half of that command's strategic airlift aircrews and more than one-third of its strategic airlift maintenance force.

Six combat logistics support squadrons, gained by the Air Force Logistics Command when mobilized, train to repair battle-damaged aircraft anywhere in the world.

The Air Force Reserve is managed through three numbered air forces. Fourth Air Force (Reserve) at McClellan AFB, Calif.; Tenth Air Force (Reserve) at Bergstrom AFB, Tex.; and Fourteenth Air Force (Reserve) at Dobbins AFB, Ga. Headquarters AFRES at Robins AFB, Ga., administers the nationwide program with a fleet of more than 450 aircraft.

The Air Reserve Personnel Center at Denver, Colo., formerly a separate operating agency, is now an organizational element of the Air Force Reserve.

Accomplishing the diverse AFRES mission are some 49,400 Air Force Reservists in units, including about 6,900 Air Reserve Technicians (ARTs), more than 3,900 non-ART civilians, and 450 active-duty military personnel. ■

Maj. Gen. Richard Bodycombe, Commander, AFRES.

CMSgt. Jack E. Roberts, Senior Enlisted Advisor, AFRES.

AIR FORCE RESERVE FLYING WINGS AND ASSIGNED UNITS

AIR FORCE	WING HQ.	GROUP	SQUADRON	TYPE AIRCRAFT	LOCATION	GAINING COMMAND
	349th MAW (Assoc)		301st MAS (Assoc)	C-5	Travis AFB, Calif.	MAC
			312th MAS (Assoc)	C-5	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	HC-130H/N, HH-3E	Selfridge ANG Base, Mich.	MAC
			301st ARRS	HC-130H/N, HH-3E	Homestead AFB, Fla.	MAC
			303d ARRS	HC-130H	March AFB, Calif.	MAC
			304th ARRS	UH-1N, HH-1H	Portland IAP, Ore.	MAC
Fourth Air Force (Hq., McClellan AFB, Calif.)		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
Maj. Gen. Sidney S. Novaresi, Commander	440thTAW		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
			302d SOS	CH-3E	Luke AFB, Ariz.	TAC
		915th TFG	93d TFS	F-4C	Homestead AFB, Fla.	TAC
		919th SOG	711th SOS	AC-130A	Eglin AFB, Fla. (Aux. 3)	TAC
Tenth Air Force (Hq., Bergstrom AFB, Tex.)	301st TFW		457th TFS	F-105D	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
Maj. Gen. John E. Taylor, Jr., Commander		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 AREFW (H)		336th AREFS (H)	KC-135	March AFB, Calif.	SAC
		931st ARG (H)	72d AREFS (H)	KC-135	Grissom AFB, Ind.	SAC
		940th ARG (H)	314th AREFS (H)	KC-135	Mather AFB, Calif.	SAC
			420th AREFS (H) (Assoc)	KC-10	Barksdale AFB, La. (effective Oct. 1, 1980)	SAC
		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
Fourteenth Air Force (Hq., Dobbins AFB, Ga.)			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
Brig. Gen. James E. McAdoo, Commander		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

AAG (Assoc)	Aeromedical Airlift Group (Associate)	SOG	Special Operations Group
ARRS	Aerospace Rescue and Recovery Squadron	TAW	Tactical Airlift Wing
AREFW (H)	Air Refueling Wing (Heavy)	TFW	Tactical Fighter Wing
MAW (Assoc)	Military Airlift Wing (Associate)	WRG	Weather Reconnaissance Group
RWRW	Rescue and Weather Reconnaissance Wing	*	indicates AFRES Base

Air National Guard

A C-130 from the California Air Guard's 146th Tactical Airlift Wing makes a suppression pass over a forest fire. ANG fire-fighting C-130s also are assigned to Wyoming ANG's 153d Tactical Airlift Group.

The Air National Guard (ANG), with both federal and state missions, is unique among the world's reserve military forces. It provides an effective and economical military force for national defense and a trained, equipped, and disciplined force to protect life and property during natural disasters, civil disorders, and other emergencies.

ANG units may be called for federal service by the President, by Congress, or when otherwise authorized by law. All Air Guard units are assigned to "gaining" Air Force major commands during peacetime. The MAJCOMS establish training standards, provide advisory assistance, and evaluate unit training, readiness, and safety programs.

The Air Guard force includes twenty-four wings, ninety-one flying squadrons, and 231 major nonflying units. The flying squadrons operate sixteen different types of mission aircraft and constitute seventeen percent of the USAF Total Force. Nearly 93,400 men and women supported this force at the end of FY '79. Real property at 134 ANG installations is valued at $2.6 billion, including both facilities and real estate.

Currently, the Air National Guard provides 100 percent of the Air Force's defense system evaluation capability, sixty percent of the interceptor force, fifty-seven percent of the reconnaissance force, forty-two percent of tactical air support, thirty percent of the tactical airlift, twenty-five percent of the fighters, seventeen percent of the air refueling tankers, and fourteen percent of the rescue and recovery capability.

For twenty-five years, the ANG has had an air defense alert mission. KC-135 air refueling units are now performing a twenty-four-hour-per-day alert mission and continue to participate in European Tanker Task Force operations in the United Kingdom. The 157th Air Refueling Group, Pease AFB, N. H., won the Navigation Trophy in SAC's 1979 bombing competition.

ANG C-130s provide airlift support for the US Southern Command on a rotational basis, perform DEW Line and Arctic ice cap resupply, and aid the US Forest Service with Modular Airborne Fire Fighting capabilities. On October 1, 1978, A-7 units began the Coronet Cove rotational commitment in Panama, providing close air support in joint training programs in cooperation with the US Army.

This year, the F-105 Replacement Training Unit (RTU) converted to the F-4D, the A-37 attack mission phaseout was completed, and the O-2 phaseout was begun. Replacement aircraft will be the A-10, F-4, and the OA-37, in the forward air control mission.

In support of priority Civil Engineering maintenance and repair projects, the Air Guard deployed approximately 109 Prime BEEF/RED HORSE teams to both active Air Force installations and ANG sites. In addition, more than 100 Prime BEEF Firefighter teams participated in JCS exercises.

By the end of FY '80, most of the ANG tactical control units will have converted to the new three-dimensional tactical radars, the AN/TPS-43E. Nineteen ANG weather flights will convert in FY '80 from Air to Army support. Thirty-seven weather flights will then support the Army National Guard and two will

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, 1980)

STRATEGIC AIR COMMAND

KC-135 Stratotanker

101st	Air Refueling Wing	Bangor, Me.
126th	Air Refueling Wing	Chicago, Ill
141st	Air Refueling Wing	Fairchild AFB, Wash.
171st	Air Refueling Wing	Pittsburgh, Pa.
128th	Air Refueling Group	Gen. Billy Mitchell Field, Wis.
134th	Air Refueling Group	Knoxville, Tenn.
151st	Air Refueling Group	Salt Lake City, Utah
157th	Air Refueling Group	Pease AFB, N. H.
160th	Air Refueling Group	Rickenbacker AFB, Ohio*
161st	Air Refueling Group	Phoenix, Ariz.
170th	Air Refueling Group	McGuire AFB, N. J.
189th	Air Refueling Group	Little Rock AFB, Ark.
190th	Air Refueling Group	Forbes Field ANG Base, Kan.

MILITARY AIRLIFT COMMAND

C-130 Hercules

118th	Tactical Airlift Wing	Nashville, Tenn.
133d	Tactical Airlift Wing	Minneapolis/St. Paul, Minn.
136th	Tactical Airlift Wing	Dallas NAS, Tex.
137th	Tactical Airlift Wing	Oklahoma City, Okla.
146th	Tactical Airlift Wing	Van Nuys ANG Base, Calif.
109th	Tactical Airlift Group	Schenectady, N. Y.
130th	Tactical Airlift Group	Charleston, W. Va.
139th	Tactical Airlift Group	St. Joseph, Mo.
143d	Tactical Airlift Group	Providence, R. I.
145th	Tactical Airlift Group	Charlotte, N. C.
153d	Tactical Airlift Group	Cheyenne, Wyo.
164th	Tactical Airlift Group	Memphis, Tenn.
165th	Tactical Airlift Group	Savannah, Ga.
166th	Tactical Airlift Group	Wilmington, Del.
167th	Tactical Airlift Group	Martinsburg, W. Va.
172d	Tactical Airlift Group	Jackson, Miss.
176th	Tactical Airlift Group	Anchorage, Alaska
179th	Tactical Airlift Group	Mansfield, Ohio

C-7A Caribou

135th	Tactical Airlift Group	Baltimore, Md.

HC-130 Hercules/HH-3 Jolly Green Giant

106th	Aerospace Rescue & Recovery Group	Suffolk Co. Airport, N. Y.
129th	Aerospace Rescue & Recovery Group	Moffett NAS, Calif.

PACIFIC AIR FORCES

F-4 Phantom

154th	Tactical Fighter Group	Hickam AFB, Hawaii

TACTICAL AIR COMMAND

A-7D Corsair II

121st	Tactical Fighter Wing	Rickenbacker AFB, Ohio*
127th	Tactical Fighter Wing	Selfridge ANG Base, Mich.
132d	Tactical Fighter Wing	Des Moines, Iowa
140th	Tactical Fighter Wing	Buckley ANG Base, Colo.
112th	Tactical Fighter Group	Pittsburgh, Pa.
114th	Tactical Fighter Group	Sioux Falls, S. D.
138th	Tactical Fighter Group	Tulsa, Okla.
150th	Tactical Fighter Group	Kirtland AFB, N. M.
156th	Tactical Fighter Group	San Juan, Puerto Rico
162d	Tactical Fighter Group**	Tucson, Ariz.
169th	Tactical Fighter Group	McEntire ANG Base, S. C.
178th	Tactical Fighter Group	Springfield, Ohio
180th	Tactical Fighter Group	Toledo, Ohio
185th	Tactical Fighter Group	Sioux City, Iowa

A-10 Thunderbolt II

174th	Tactical Fighter Wing	Syracuse, N. Y.
103d	Tactical Fighter Group	Windsor Locks, Conn.
104th	Tactical Fighter Group	Westfield, Mass.
175th	Tactical Fighter Group	Baltimore, Md.

OA-37 Dragonfly

128th	Tactical Air Support Wing	Truax Field, Wis.
182d	Tactical Air Support Group	Peoria, Ill.

F-105B Thunderchief

108th	Tactical Fighter Wing	McGuire AFB, N. J.

F-105D Thunderchief

113th	Tactical Fighter Wing	Andrews AFB, Md.
192d	Tactical Fighter Group	Richmond, Va.

F-105G Thunderchief

116th	Tactical Fighter Wing	Dobbins AFB, Ga.

F-4C Phantom

122d	Tactical Fighter Wing	Fort Wayne, Ind.
131st	Tactical Fighter Wing	St. Louis, Mo.
149th	Tactical Fighter Group	Kelly AFB, Tex.
159th	Tactical Fighter Group	New Orleans NAS, La.
181st	Tactical Fighter Group	Terre Haute, Ind.
183d	Tactical Fighter Group	Springfield, Ill.
188th	Tactical Fighter Group	Fort Smith, Ark.

F-4D Phantom

184th	Tactical Fighter Group**	McConnell AFB, Kan.

RF-4C Phantom

117th	Tactical Reconnaissance Wing	Birmingham, Ala.
123d	Tactical Reconnaissance Wing	Louisville, Ky.
124th	Tactical Reconnaissance Group	Boise, Idaho
148th	Tactical Reconnaissance Group	Duluth, Minn.
152d	Tactical Reconnaissance Group	Reno, Nev.
155th	Tactical Reconnaissance Group	Lincoln, Neb.
186th	Tactical Reconnaissance Group	Meridian, Miss.
187th	Tactical Reconnaissance Group	Montgomery, Ala.

O-2A Super Skymaster

105th	Tactical Air Support Group	White Plains, N. Y.
110th	Tactical Air Support Group	Battle Creek ANG Base, Mich.
111th	Tactical Air Support Group	Willow Grove NAS, Pa.
163d	Tactical Air Support Group	Ontario, Calif.

EC-130E

193d	Tactical Electronic Warfare Group	Harrisburg, Pa.

AIR DEFENSE UNITS

F-101 Voodoo

107th	Fighter Interceptor Group	Niagara Falls, N. Y.
142d	Fighter Interceptor Group	Portland, Ore.
147th	Fighter Interceptor Group	Ellington AFB, Tex.*

F-106 Delta Dart

102d	Fighter Interceptor Wing	Otis AFB, Mass.*
144th	Fighter Interceptor Wing	Fresno, Calif.
120th	Fighter Interceptor Group	Great Falls, Mont.
125th	Fighter Interceptor Group	Jacksonville, Fla.
177th	Fighter Interceptor Group	Atlantic City, N. J.

F-4C/D Phantom

119th	Fighter Interceptor Group	Fargo, N. D.
191st	Fighter Interceptor Group	Selfridge ANG Base, Mich.

EB-57

158th	Defense System Evaluation Group	Burlington, Vt.

*No longer a major active Air Force base.
**Replacement Training Unit (RTU).

continue to support the ANG and active Air Force.

Fifty-nine ANG medical units performed their annual training in active-duty Air Force hospitals and clinics. Individual, critical manning assistance also was provided to selected Air Force hospitals and clinics in the areas of anesthesiology, surgery, dentistry, optometry, obstetrics, gynecology, radiology, and operating room nurses. Six ANG physicians participated in the Medical Red Flag (Battle Field Surgery) Exercise at Keesler AFB, Miss. Four additional Medical Red Flag Exercises are planned during FY '80.

Since 1976, the ANG has participated in twenty-two overseas deployments in support of USAFE and NATO, gaining realistic training in locations where the units may be called to fight. Realistic training is also being accomplished through joint exercises where the Air Guard has provided a majority of the combat communications and tactical control forces, in addition to participation by flying units.

Two A-10 Thunderbolt IIs from the 103d Tactical Fighter Group, Connecticut ANG, take off on a training mission. These new close air support aircraft are examples of the first-line equipment being assigned to the Air National Guard.

Deployments, exercises, and direct support to the Air Force on a day-to-day basis have given the Air National Guard a solid base for maintaining a high level of readiness at minimum expense to the taxpayer. ■

Albert F. Simpson Historical Research Center

The Albert F. Simpson Historical Research Center, which provides unique and invaluable services to the Air Force, was established as a Direct Reporting Unit on July 1, 1979. It was organized in 1949 at Maxwell AFB, Ala., where it remains today, with its collection of 42,000,000 pages of documentation. These materials describe Air Force history from the beginning.

Named in memory of Dr. Albert F. Simpson, Air Force Historian from 1946 to 1969, the Center is collocated with Air University, enabling it to offer its extensive research facilities to Air Force professional military education students. It manages the nation's largest and most valuable organized collection of documentation on US military aviation history—perhaps the most extensive collection of this type in the world. Annual accessions run about 2,000,000 pages.

More than eighty-five percent of the pre-1955 holdings have been declassified. The collection is recorded on 16-mm microfilm, copies of which are at the National Record Center, Suitland, Md., and at the Office of Air Force History, Bolling AFB, D. C.

The Center's holdings consist mainly of periodic unit histories, prepared regularly by major commands, numbered air forces, and other Air Force organizations. These histories provide excellent complete coverage of Air Force activities since 1942, when a Presidential order initiated the program. Extensive supporting documentation enhances the value of the histories.

The histories are supplemented by special collections. These include historical monographs and studies; end-of-tour reports; joint and combined command documents; Aircraft Record Cards; and materials from the US Army, British Air Ministry, and the German Air Force. The Center also maintains the personal papers of key retired Air Force people.

The Center's more than 280,000 documents on the Vietnam conflict are indexed for computerized retrieval. Abstracts of all new documents since 1974 are also available at the Center. They eventually will be accessible by computer Air Force-wide.

The Center's materials are used in countless ways, ranging from student research to the development of official plans, programs, analyses, and evaluations. Material obtained from the Center's records finds its way into orientation and indoctrination programs, public information activities, Air Force responses to Congress and other branches of government, research papers, books, television, and movie scripts, and many other products.

There are four divisions at the Center:

- *Reference:* Maintains documents and microfilm, answers inquiries about holdings, produces bibliographies, and gives other services to users.
- *Research:* Writes books, monographs, and research reports; determines lineage of Air Force units; determines combat credits of units and people; and performs other services.
- *Oral History:* Conducts oral history interviews, monitors the worldwide end-of-tour report program, and collects personal papers.
- *Technical Systems:* Accessions, catalogs, and indexes documents; develops automatic data processing and microfilming to support the Center; and coordinates systems applications for the Air Force historical programs. ■

"Just take plenty of spare parts and teach yourself to fly."

–General James Allen, 1909

Lt. Benjamin D. Foulois had logged exactly 54 minutes in an aircraft, all as Wilbur Wright's passenger. But soon he and a Wright brothers' "Flyer" would be bundled off to San Antonio to pioneer military aviation. Gen. James Allen sent Foulois for "flight training" in the military's first flying machine with these blithe words: "Your orders are simple. Just take plenty of spare parts, and teach yourself to fly."

Foulois hastily fired off a letter to Orville Wright for instructions on how to fly a plane. Then he and his helpers waded into the crates containing Aeroplane No. 1 and painstakingly reassembled the craft.

On March 2, 1910, townspeople eagerly gathered to witness the inaugural flight of the intrepid "crazy birdman." For 7½ triumphant minutes Foulois flew the 25-hp. contraption round and round the parade ground. Landing it was another matter. Just as he switched off the engine for a dead-stick landing, a car chugged into his path. Foulois gave the control stick a ferocious yank, leap-frogged the car with the last of his flying speed, and fluttered down safely for a hero's welcome.

The do-or-die spirit that lifted Benjamin Foulois' one-man air force into the sky back in 1910 spawned a magnificent new breed dedicated to the challenge of the wild blue yonder. The United States Air Force was off and flying.

USAA has been privileged to serve the insurance needs of Air Force Officers since the Service began. Today, 9 out of 10 military officers insure with USAA. If you're a Cadet, or a Regular, Reserve, National Guard or Retired Officer (whether drawing retirement pay or not), you're eligible to join USAA. For more information, call USAA, USAA Building, San Antonio, Texas. 1-800-531-8080.

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Air Force Chaplain Service

The US Air Force Chaplain Service has primary responsibility to provide for the religious and moral needs of Air Force people and their families. It became a separate and coequal service with the Army and Navy Chaplain Services when the Office of the Chief of Air Force Chaplains was established on May 10, 1949. Before that time, chaplains for the Air Force came from the Army Chaplaincy. Chaplain Maj. Gen. Richard Carr, Chief of Chaplains, is the seventh Chief of the Air Force Chaplain Service.

The mission of the Chaplain Service is to provide opportunity for the religious expression and moral growth of Air Force people and their families. Chapel programs are designed to meet the needs of these people through a comprehensive ministry that matches personnel and resources to the particular environment of each Air Force community. The chaplain's mission is to conduct religious services, promote religious education, provide pastoral care to include personal and family counseling, visit, create spiritual renewal opportunities, encourage stewardship and humanitarian projects, implement social concern activities, and develop good relations with the civilian community. Chaplains have a special concern for the people in their communities. They constantly explore new approaches to ministry and provide support to new elements of the military community, such as single parents, military couples, women in the military, and changing patterns of family life.

One of the special duties of Chaplain Carr is that of a principal advisor to the Secretary of the Air Force and the Air Force Chief of Staff on religion, morals, and the well-being of Air Force people. His responsibilities include: manpower and personnel, professional and military training, policy guidance, religious facilities, funds and materials, ecclesiastical and public relations, and program support.

Each major command and several numbered air forces have senior chaplains who serve on the commander's special staff and supervise and support the Chaplain Service within the command. The senior chaplain assigned to an installation serves on that commander's staff and is responsible for a comprehensive chapel program on the installation. This includes ensuring that personnel assigned to isolated units are provided an adequate religious program.

Chapel Management Personnel are responsible for the administration, financial management, and professional program support of the Chaplain Service at each level of assignment. When they meet the qualifications for the career field, Chapel Managers receive special training in the varied, unique, and specific areas of chaplain ministry support. They are true professionals in the Chaplain Service.

Another group important to the Chaplaincy is the Chaplain Service Reserve Forces. Chaplains and Chapel Management personnel perform a vital function in the active-duty and day-to-day involvement of Reserve Forces commitment in the operational function of the Air Force. They also provide a trained source of additional chapel personnel in the event of mobilization.

Headquarters for the Chief of Chaplains is at Bolling AFB, D. C. From here he directs 846 active-duty chaplains, representing more than 100 denominational groups. He also supervises 719 chapel managers, 452 Reserve Forces chaplains, 150 chaplain candidates, and 962 Civil Air Patrol chaplains, auxiliary chaplains, and civilian employees of the Chaplain Service.

The Chaplain Service fulfills a responsibility to the military institution. It serves as a resource for meeting the moral and ethical concerns of the bases and the Air Force structure. It assists military leaders in being aware of the needs of their people at every echelon of command. It aids them in addressing the moral ambiguities associated with the mission while undergirding the authentic values of the American tradition. In essence, it is a ministry of openness, sharing, caring, enabling, and moral sensitivity. ■

Maj. Gen. Richard Carr, Chief of Chaplains.

The Air Force Surgeon General

The primary mission of the Air Force Medical Service is to provide any medical support necessary to maintain the highest degree of Air Force combat readiness and effectiveness.

Lt. Gen. Paul W. Myers, Air Force Surgeon General, serves as head of the Air Force Medical Service and medical staff advisor to the Secretary of the Air Force and the Chief of Staff. He works closely with the Assistant Secretary of Defense for Health Affairs, the Surgeons General of the Army, Navy, and Public Health Service, and with the medical director of the Veterans Administration to achieve maximum utilization of medical resources.

The Surgeon General establishes programs, plans, and policies to assure the health and combat effectiveness of Air Force members, and to provide for wartime readiness of the Air Force Medical Service and the Air Reserve Forces medical support mission. Activities in the Office of the Surgeon General that provide guidance and develop planning are: the Assistant Surgeon General for Dental Services; Chief, Air Force Nurse Corps; Director, Medical Plans and Resources; Assistant for Congressional and Public Affairs; and several elements related to professional activities. The Veterinary Corps was disestablished March 31, 1980. The immediate Office of the Surgeon General, located at Bolling AFB, Washington, D. C., has sixty-nine military and forty civilian personnel.

General Myers provides direction and advice to the Air Force Medical Service Center at Brooks AFB, Tex., which includes the Directorates of

Professional Services and Health Care Support, and Chiefs of the Medical Service Corps and Biomedical Sciences Corps.

The Air Force Medical Service has major responsibilities in support of the Air Force mission. These include: planning and operating programs in aerospace medicine, military public health, and dental care; developing long-range medical objectives for USAF war plans and planning for medical support of all phases of Air Force activity in disaster and emergency conditions; formulating plans for procuring, educating, training, and using Medical Service personnel; establishing physical standards for selection, retention, and retirement of all Air Force personnel; and developing and implementing plans and policies for medical aspects of defense against biological, chemical, nuclear, and other physical agents.

With an annual budget in excess of $1 billion, the Air Force Medical Service operates eighty-one hospitals and thirty-eight clinics around the world. The Medical Service has an authorized strength of approximately 45,000, including active-duty officer, enlisted, and civilian members, and serves a beneficiary population of approximately 3,000,000.

This year the Medical Service will continue to address several key issues relevant to both wartime and peacetime needs. Among them:

- Assuring that there will be the proper number and correct mix of health-care providers and support people;
- Modernizing or replacing antiquated or poorly designed facilities;
- Assessing current and projected equipment needs;
- Providing adequate continuing health education; and
- Enhancing professional and personal satisfaction in the professions within the Air Force Medical Service.

The Air Force Surgeon General and the Air Force Medical Service are dedicated to providing quality health care to the Air Force family. During the coming year, there will be increased emphasis on medical readiness and continued efforts to provide the maximum amount of care to all beneficiaries. ■

Lt. Gen. Paul W. Myers, Air Force Surgeon General.

The Judge Advocate General's Department

The mission of The Judge Advocate General's Department is to provide essential professional legal services at all levels of command to help maintain the highest degree of USAF effectiveness. The Judge Advocate General (TJAG), Maj. Gen. Walter D. Reed, is one of only three Air Force officers appointed by the President, by and with the advice and consent of the Senate, with a specified term and grade. General Reed directs a Department of approximately 1,100 judge advocates, 160 civilian attorneys, and 750 enlisted and 650 civilian legal services specialists.

The Judge Advocate General's Department Reserve, including the Air National Guard, has an additional 1,000 judge advocates and 250 enlisted legal services specialists. Members of the Department are assigned to 344 separate legal offices in the United States and sixteen foreign countries.

Claims, legal assistance, and military justice are the JAG activities best known to Air Force personnel. Data on the volume of JAG legal assistance in 1979, including claims actions, may be found in the AFLSC report on page 113. There also were 1,100 active tort suits involving nearly $450 million and covering subjects ranging from auto accidents to aircraft accidents and medical malpractice. Military justice experts assisted in almost 25,000 Article 15 actions, tried nearly 1,300 courts-martial, and participated in more than 300 appeals before the Air Force Court of Military Review and United States Court of Military Appeals.

Air Force law offices are also active in many areas seldom encountered by most military members. For example, at the end of 1979 there were an additional 800 active civil suits outside the torts area, involving the Air Force in such matters as environmental law, freedom of information, labor relations, tax and utilities, procurement, and personnel suits. Air Force attorneys are involved in more than eighty percent of all federal patent litigation, and manage a portfolio of some 3,000 active patents.

Specialists in international and space law closely observe actions in foreign courts to assure the rights of the Air Force and its people are protected. They also review new weapons for consistency with international law, and provide lawyers for American delegations at international conferences and treaty negotiations.

Members of the Department must provide daily advice to commanders on civil law matters. They are frequently called upon to review procurement actions, draft regulations, interpret statutes and case law, and recommend courses of action in potential or actual conflicts.

Statutes, court decisions, and regulatory requirements have had an increasing impact on the Air Force mission. To ensure the continued responsiveness of legal support, The Judge Advocate General's Department has adopted "Counsel for Commanders" as its theme for 1980. ■

Maj. Gen. Walter D. Reed, The Judge Advocate General.

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1980 will be bigger and better.

Convention '80 will present:

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- The latest in aviation and space education programs and publications.
- The most complete and extensive exhibit on aviation and space education (more than 100 exhibits).
- Representatives from every major National Aviation and Space Education Program.
- The 37th Annual Aerospace Education Awards Banquet.

Location:

Florida Institute of Technology, Melbourne, Florida and the NASA Kennedy Space Center.

One of the real benefits of the Convention is the site itself. The Florida Institute of Technology is certainly one of the most beautiful campuses in the world. The housing (apartments and dormitories with swimming pools), the exhibit area, auditorium, and classrooms are outstanding.

Dates:
July 19-27, 1980
19th & 20th will be arrival days.
21st-25th Convention Program.
26th & 27th will be departure days.

Room and Board:
$17.00/day* includes lodging and three meals per day. (*Double occupancy rate, Single rate is $25.00/day)

Registration:
$35.00 member ($50.00 non-member). Registration and room and board prices include all fees for the 1980 Convention except for optional programs.

Sponsors:

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Please note:

Although more than a thousand individuals will be attending various sessions of the Convention, full-time ***registration is limited*** to 500.

Space Center Day:

Includes a tour of the Kennedy Space Center (shown above) and fascinating presentations by astronauts and other NASA officials on the *Space Shuttle* and the *Future of the Space Program.*

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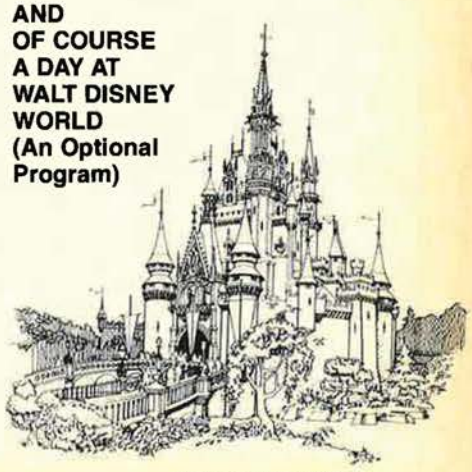
A special Sport Aviation Air Show with colorful presentations by national champions and authorities on all phases of Sport Aviation: aeromodeling; aerobatics; ballooning; experimental & homebuilt aircraft; hang gliding; lighter-than-air vehicles; parachuting/skydiving; and soaring.

AND OF COURSE A DAY AT WALT DISNEY WORLD (An Optional Program)



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GALLERY OF USAF WEAPONS

BY SUSAN 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

Bombers

B-1

B-52H Stratofortress

B-1

Production plans for this intended replacement for the B-52 were canceled by the President in June 1977. The DoD Annual Report for FY '80 stated, "We are continuing the testing of the B-1 bomber design so that the technical base will be available, in the very unlikely event that, because alternative strategic systems run into difficulty, we decide to reconsider B-1 deployment. This program will evaluate the penetration effectiveness of the B-1; provide information on current and future applications of the B-1 defensive avionics and engine design; and measure the B-1's resistance to nuclear effects." The fourth and last B-1 aircraft flew for the first time on February 14, 1979, with both the offensive and defensive avionics installed. The first and second prototypes were retired in 1978 and 1979 respectively, in order to utilize the limited funds available on the most advanced aircraft. The data from the fourth aircraft's flight-test program will help in the design of future strategic penetrating aircraft, as well as providing a measure of the B-1's capability as a cruise missile carrier.

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 Group, 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 395,000 lb.

Performance: max speed at 50,000 ft Mach 2.1, max range without refueling intercontinental.

Armament: three internal weapon bays, accommodating 24 AGM-69 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

Although well into its third decade of operational service, the B-52 Stratofortress still constitutes the major piloted element of SAC. Three hundred and forty-nine aircraft remain in the inventory, capable of delivering a wide range of weapons, including conventional and nuclear bombs, and nuclear-tipped air-to-surface short-range attack missiles. Apart from its primary strategic mission, the B-52 can be deployed in four conventional roles: show of force; area denial; precision strikes; and defense suppression. Other missions in recent years have included sea-surveillance flights in cooperation with the US Navy and support for NATO exercises.

Since first entering USAF service in 1955, the B-52 has undergone numerous improvement programs in order to satisfy prevailing defense requirements. More than 300 B-52s are expected to continue in the USAF inventory for the remainder of the century. Versions still operational are: **B-52D**, total of 170 built with J57-P-29W turbojet engines, with delivery from December 1956. Eighty "D"s were refurbished in 1975–77 to extend their service life. These aircraft are equipped with an MA-6A bombing/navigation system and A-3A or MD-9 fire control for the tail guns. They will be retained at least until the mid-eighties, their conventional warfare capability being greater than that of the later still-operational models. **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, 281 B-52Gs and "H"s were modified to carry 20 AGM-69A Short-Range Attack Missiles (SRAM), six under each wing and eight in the bomb bay. Additionally, all "G"s 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. Under USAF's Rivet Ace program, initiated in 1974, about 270 "G"s and "H"s are being progressively updated with Phase VI ECM. This will include, by 1981, ALQ-122 SNOE (Smart Noise Operation Equipment) countermeasures and AN/ALQ-155(V) advanced ECM; in 1978–82, an AF SATCOM kit permitting worldwide communication via satellite; and, by 1984, a Northrop ALT-28 updated transmitter and power management system, designed to reduce the effectiveness of enemy radar. Other equipment is being developed for future procurement, with relevant funding being sought.

In addition, the B-52G is being adapted as carrier aircraft for the cruise missile. Full-scale development of the relevant equipment, as an integral part of the cruise missile program, began in 1978 and three modified B-52Gs were used in the fly-off between Boeing and General Dynamics, which ended in February this year. Funding of $122.4 million has been sought in the FY '81 budget proposals for another 40 B-52 modifications (total 65 in 1979–81), and it is anticipated that one B-52G cruise missile squadron should be operationally capable by December 1982. Full operational capability is planned for 1990, when 151 B-52G aircraft will be loaded, each with 12 external and 8 internal cruise missiles.

Updating B-52G/Hs is anticipated until at least the end of the eighties, in order to prolong their effectiveness as both cruise missile carriers and bombers. (Data for B-52G, except where noted.)

Contractor: The Boeing Aerospace Company.

Power Plant: eight Pratt & Whitney J57-P-43WB turbojet engines, each 13,750 lb thrust.
Accommodation: two pilots, side-by-side, plus navigator, radar-navigator, ECM operator, and tail gunner.
Dimensions: span 185 ft 0 in, length 160 ft 11 in, height 40 ft 8 in.
Weight: G/H models gross 488,000 lb, D model gross 460,000 lb.
Performance (approx): max speed at 20,000 ft 660 mph, service ceiling 55,000 ft, range 7,500 miles.
Armament: D/G models have four 0.50 caliber guns in tail turret; H model has 20-mm gun; up to 20 SRAM missiles can be carried on G/H models, plus nuclear free-fall bombs.

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 a total of 60 FB-111As are the 380th and 509th Bomb Wings. Since the cancellation of B-1 production, various proposals have been put forward to develop the FB-111 as a manned penetration bomber capable of carrying up to 15 nuclear weapons.
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.

FB-111s

Fighters

F-4 Phantom II

Essentially a two-seat, twin-engine, all-weather fighter designed in the mid-1950s, the F-4 has undergone continuous updating in order to remain an effective force 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 and 18th Tactical Fighter Squadrons, 57th FIS, Iceland, and several ANG and AFRES squadrons are similarly equipped. Several F-4 units are now, however, re-equipping with F-15s (*see under F-15 entry*). 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 503 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 equipped with modified F-4Cs, designated **EF-4Cs**, 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 multibarrel 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 were built for USAF. System improvements include the Pave Tack system, which provides a day/night adverse weather capability to acquire, track, and designate ground targets for laser, infrared, and electro-optically guided weapons, 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. First F-4Gs entered service with 35th TFW at George AFB, Calif., in October 1978. The last of 116 modification kits were procured last year. (Data for F-4E.)
Contractor: McDonnell Aircraft Company, Division of McDonnell Douglas Corporation.

F-4E Phantom

Power Plant: two General Electric J79-GE-17A turbojets, each 17,900 lb thrust with afterburning.
Accommodation: pilot and weapon systems operator in tandem.
Dimensions: span 38 ft 7½ in, length 63 ft 0 in, height 16 ft 5½ in.
Weights: empty 30,328 lb, gross 61,795 lb.
Performance: max speed at 40,000 ft, Mach 2.0 class, range with typical tactical load 1,300 miles.
Armament: one 20-mm M-61A1 multibarrel gun; provision for up to four AIM-7E Sparrow, AGM-45A Shrike, or AIM-9 Sidewinder missiles on four underfuselage and four underwing mountings, or up to 16,000 lb external stores.

F-5E/F Tiger II

Developed as the successor to Northrop's F-5A export fighter, the Tiger II is intended primarily to provide America's allies with an uncomplicated air-superiority tactical fighter, which can be operated and maintained relatively inexpensively. The single-seat **F-5E**, first flown in August 1972, is basically a VFR day/night fighter with limited all-weather capability. Design emphasis is on maneuverability rather than high speed, notably through the use of maneuvering flaps. To extend the range of armament options, an F-5E completed a technology flying demonstration with a 30-mm underbelly gun pod developed by General Electric. 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, and by PACAF's 26th Tactical Fighter Training Squadron, located at Clark AB, Philippines. (Data for F-5E.)
Contractor: Northrop Corporation, Aircraft Division.
Power Plant: two General Electric J85-GE-21A turbojet engines; each 5,000 lb thrust with afterburning.

F-5E Tiger II

F-15 Eagle

F-16s

F-101B Voodoo

F-105

Accommodation: pilot only.
Dimensions: span 26 ft 8 in, length 48 ft 2 in, height 13 ft 4 in.
Weights: empty 9,683 lb, gross 24,676 lb.
Performance (at 13,350 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) 1,543 miles.
Armament: two AIM-9 Sidewinder missiles on wingtip launchers; two M-39A2 20-mm cannon in nose, with 280 rounds per gun (one 20-mm in F-5F); up to 7,000 lb of mixed ordnance on four underwing attachments and one underfuselage station. Optional armament and equipment includes AGM-65 Maverick, laser-guided bombs, centerline multiple ejector rack, and (F-5F only) a laser designator.

F-15 Eagle

Although designed specifically for an air-superiority role, this fixed-wing all-weather fighter has an inherent air-to-surface attack capability. Since the mid-'70s, the original single-seat **F-15A** and two-seat **F-15B** have progressively replaced the F-4 as USAF's primary air-superiority aircraft. Beginning in June 1979, they have been followed by the single-seat **F-15C** and two-seat **F-15D**, embodying Production Eagle Package (PEP-2000) improvements. These include 2,000 lb of additional internal fuel, and provision for carrying conformal fuel tanks, which has increased maximum gross weight to 68,000 lb. From mid-1980, all F-15C/Ds will have a programmable signal processor to enhance radar capability and flexibility. Planned total production of all models is 729 aircraft for USAF by FY '85. Orders to date total 579 for operational use by USAF. An additional 60 were approved in the FY '80 budget, and 30 are requested for FY '81. The first F-15A flew in July 1972. TAC's 1st TFW at Langley AFB, Va., and 49th TFW at Holloman AFB, N. M., USAFE's 36th TFW at Bitburg AB, Germany, and 32d TFS at Camp New Amsterdam, the Netherlands, have been fully equipped. The 33d TFW at Eglin AFB, Fla., and PACAF's 18th TFW at Kadena AB, Okinawa, Japan, began equipping in 1979. F-15 pilot training is accomplished at Luke AFB, Ariz., in both single-seat and two-seat Eagles. Specialized equipment in the F-15 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.

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 F-15A 56,000 lb; F-15C 68,000 lb.
Performance: max speed Mach 2.5, combat ceiling 65,000 ft, ferry range, without external fuel tanks, 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 16,000 lb of ordnance on weapon stations.

F-16

On January 6, 1979, the 388th TFW at Hill AFB, Utah, received its first F-16s. These aircraft, which evolved from the USAF Lightweight Fighter Prototype Program, incorporate a number of advanced technologies, making the F-16 one of the most maneuverable fighters ever built. The advances include: decreased structural weight through the use of composites; decreased drag resulting from reduced static stability margin; fly-by-wire flight controls with side stick force controller; high *g* tolerance/high visibility cockpit with a 30-degree reclined seat and single-piece bubble canopy; blended wing-body aerodynamics with forebody strakes; and automatically variable wing leading-edge flaps. The F-16 is powered by a single afterburning turbofan engine. All digital avionics are integrated through a digital multiplex system, to reduce permanent wiring as well as to take advantage of the versatility of modern high-speed computers. Other equipment includes a multimode radar with clutter-free look-down capability, advanced radar warning receiver, a headup display, internal chaff or flare dispensers, and a 500-round 20-mm internal gun. The aircraft also has provisions for ECM.

To date, USAF has initiated procurement of 425 F-16s, with a total planned purchase of 1,388 aircraft, in **F-16A** single-seat and **F-16B** two-seat versions. These will equip ten active fighter wings, as well as modernize the Air Reserve Forces. In addition, four NATO allies (Belgium, Denmark, the Netherlands, and Norway) are purchasing 348 F-16s under coproduction arrangements. The first European aircraft flew in December 1978 and was accepted by Belgium in January 1979. First deliveries have since been made to the Netherlands, Norway, and Denmark, as well as to Israel, which has signed a Letter of Offer and Acceptance to purchase 75 F-16s.

Late in 1978, an F-16 prototype, fitted with a Martin Marietta ATLIS II pod, became the first single-seat fighter to hit ground targets with GBU-10 and GBU-16 laser-guided bombs without help from air/ground locators. In December that year, USAF selected the F-16 as a testbed to explore promising new fighter technologies, under the Advanced Fighter Technology Integration (AFTI-16) program. (Data for F-16A.)
Contractor: General Dynamics Corporation.
Power Plant: one Pratt & Whitney F100-PW-200(3) turbofan engine; approximately 25,000 lb thrust with afterburning.
Accommodation: pilot only.
Dimensions: span 32 ft 10 in, length excl probe 47 ft 7.7 in, height 16 ft 5.2 in.
Weight: empty operating 16,126 lb; gross with external loads 35,400 lb.
Performance: max speed Mach 2 class, service ceiling more than 50,000 ft, ferry range more than 2,000 miles.
Armament: one M-61A1 20-mm multibarrel cannon, with 500 rounds, mounted in fuselage; externally-mounted infrared missiles; seven other external stores stations for fuel tanks, air-to-air and air-to-surface munitions.

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 the Tactical Air Command, providing a significant part of the air defense interceptor force for the continental United States. The aircraft also continues to serve with the Canadian Armed Forces under NORAD control.
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

Of more than 600 **F-105D** single-seat all-weather fighter-bombers built, several remain in squadron 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. 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 (at 35th TFW, George AFB, Calif.) have also flown 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 countermea-

sures pods mounted on the underfuselage. However, these are being replaced with F-4G "Wild Weasels." During FY '79 some F-105Gs were transferred to the ANG, beginning a new mission for the Guard. 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. Constant updating enabled Aerospace Defense Command to maintain its effectiveness, and 231 continued to serve with active USAF squadrons until FY '77, by the end of which about half of the F-106s had been transferred to the ANG. The active-duty squadrons are now assigned to the Tactical Air Command. 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 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 3⅓ in.

Weights (approx): empty 25,300 lb, gross 42,400 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; four AIM-4F/G Falcon air-to-air missiles carried internally; and a 20-mm cannon on most F-106As.

F-111

Four versions of this pioneer variable-geometry tactical fighter are currently in service with USAF. Initial **F-111A** aircraft, delivered to a training unit in July 1967, were development models. Deliveries of production aircraft to the first operational wing began in October 1967. A total of 141 production F-111As was built; this version served with distinction in SEA in 1972–73 and currently equips the 366th TFW. The "A" was superseded in production by the **F-111E,** a version with modified air intakes 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. An RDT&E program involving the replacement of current analog bombing and navigation systems with digital equipment is scheduled to continue through FY '81. This will enable F-111A/E aircraft to handle modern guided munitions and advanced sensors, as well as future systems such as Navstar and JTIDS. The **F-111D** had from the start 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, 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 RAF Lakenheath in 1977.

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 *(see page 141)*. SAC has a strategic bomber version of the F-111, designated **FB-111A** *(see page 137)*. 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 nuclear bombs in internal weapon bay; four swiveling and fixed jettisonable wing pylons carrying total external load of up to 25,000 lb of bombs, rockets, missiles, or fuel tanks.

F-106 Delta Darts

F-111E

Attack and Observation Aircraft

A-7D Corsair II

The A-7D Corsair II is a single-seat, subsonic tactical fighter, 459 of which were 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 have been modified to carry a Pave Penny laser target designation pod.

Since 1973, A-7Ds have been delivered also to ANG units in ten states and Puerto Rico, representing the first new aircraft received by these units in more than 20 years. To facilitate transition training, 12 two-seat **A-7Ks** were funded in the FY '79 budget, and 12 more in FY '80, as part of a planned procurement of 42 for service from 1981. The aircraft's combat capability is retained. (Data for A-7D.)

Contractor: Vought Corporation, subsidiary of the LTV Corporation.

Power Plant: one Allison TF41-A-1 non-afterburning turbofan engine; 14,500 lb thrust.

Accommodation: pilot only.

Dimensions: span 38 ft 9 in, length 46 ft 1½ in, height 16 ft 0¾ in.

Weights: empty 19,781 lb, gross 42,000 lb.

Performance: max speed at S/L 698 mph, ferry range with external tanks 2,871 miles.

Armament: one 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 installed on 383 aircraft.

A-10 Thunderbolt II

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 headup display, laser seeker, target penetration aids, and associated equipment for Maverick missiles. Two prototypes, six preproduction, and 627 production A-10s have been funded to date, with a further 60 requested in the FY '81 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. In early 1978, the 354th TFW began operating A-10s equipped with the Pave Penny laser target designation pod, now approved as standard equipment for the aircraft. By January 1978, the first A-10 squadron had completed an operational readiness inspection by deploying to Travis Field, Ga., and operating under simulated combat conditions. Four of six squadrons of A-10s have been deployed at RAF Bentwaters and Woodbridge in the UK. Procurement of the currently planned total of 825 aircraft will be completed by 1986, equipping three active-duty wings and two Reserve Force wings.

A-7D Corsair II

A-10 Thunderbolt II

A-37B Dragonfly

AC-130

O-2A

OV-10A Bronco

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, range with 9,500 lb of weapons and 1.8 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 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

Currently in service with the 434th TFW of the Air Force Reserve, the A-37B was evolved from the T-37 trainer for use in armed counterinsurgency (COIN) missions from short, unimproved airstrips. A total of 511 was built, of which many served in Southeast Asia. Others have been delivered to foreign air forces, mainly in Latin America. A new version, designated **OA-37,** will supersede the O-2A in the forward air controller role. (Data for A-37B.)
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 3¾ in, height 8 ft 10½ in.
Weights: empty 6,211 lb, gross 14,000 lb.
Performance: max level speed at 16,000 ft 507 mph, service ceiling 41,765 ft, range with max payload, including 4,100 lb ordnance, 460 miles.
Armament: one GAU-2B/A 7.62-mm Minigun installed in forward fuselage, four pylons under each wing able to carry various combinations of rockets and bombs.

AC-130A/H

Half of the AC-130 gunships still in USAF's inventory were transferred to the Air Force Reserve in 1976; others continue in active service with TAC's 1st Special Operations Wing. 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 142).*

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. Operational units include AAC's 25th Tactical Air Support Squadron, PACAF's 15th Air Base Wing, TAC's 24th Composite Wing and 507th and 602d Tactical Air Control Wings, and four ANG units. Specialized equipment and electronics permit control of air strikes, visual reconnaissance, target identification and marking, ground-air coordination, and damage assessment. The O-2A will be replaced by the OA-37.
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

This counterinsurgency combat aircraft, first flown in August 1967, was acquired by USAF for use in the forward air control role, and for limited quick-response ground support pending the arrival of tactical fighters. One hundred and fifty-seven were delivered to USAF before production of the OV-10A for the US services ended in April 1969. Versions are also in service with the USN, US Marine Corps, and foreign air forces.
Contractor: Rockwell International Corporation, North American Aircraft Group.
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 6,893 lb, overload gross weight 14,444 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

Known unofficially as "Blackbirds," these multisensored supersonic, strategic reconnaissance aircraft were developed initially to succeed the U-2, and to supplement information obtained with reconnaissance satellites; at least 30 are thought to have been built. In July 1976, the SR-71A established a series of world records which confirmed it as the fastest, highest-flying production aircraft ever built. Flown by three USAF crews 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. For pre-attack and post-attack strategic reconnaissance, each SR-71A carries equipment ranging from simple battlefield surveillance systems to multiple-sensor, high-performance systems capable of specialized surveillance of up to 100,000 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 at Mach 3.0 (1,980 mph) at 78,750 ft 2,982 miles.
Armament: none.

TR-1 and U-2

The FY '79 budget initiated funding for the **TR-1,** var-

iant of the well-proven U-2R, and 25 will be acquired eventually for high-altitude standoff surveillance missions by USAF, primarily in Europe. The TR-1 will be equipped with electronic sensors to provide continuously available, day or night, all-weather surveillance of the battle area, or potential battle area, in direct support of US and allied ground and air forces during peace, crises, and war situations. Currently planned equipment includes an advanced synthetic aperture radar system (ASARS), all-weather side-looking airborne radar (SLAR) with a standoff range of approximately 35 miles, and modern ECM. Funding for two two-seat **TR-1B** trainers was approved in the FY '80 budget; the first four single-seat TR-1s are requested in FY '81.

Production of the basic U-2 began in the late 1950s, and it remains an important element of the USAF inventory. It 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 HASPU-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. Air Force U-2s have performed important non-military missions, including flights for the Department of Agriculture land management and crop estimate programs; photographic work in connection with flood, hurricane, and tornado damage; data gathering for a geothermal energy program; and search missions for missing boats and aircraft. (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, 19,850 lb; max permissible more than 21,000 lb.
Performance: max speed at 40,000 ft 528 mph, operational ceiling about 85,000 ft, range about 4,000 miles.

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 by units of the ANG. 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. Data similar to F-4.

EC-130E

This electronic surveillance version of the Hercules has been developed for USAF to replace the EC-121. Large blade antennas are added under each outer wing and above the dorsal fin, with a smaller horizontal blade antenna on each side of the rear fuselage. Bullet-shape canisters outboard of each underwing antenna and at extreme tail of aircraft house trailing-wire antennas that extend several hundred feet behind the EC-130E in flight. Data similar to C-130.

EC-135, etc.

Several aircraft in the KC-135 Stratotanker series were modified for specialized missions during production or at a later date. 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 turbofan **RC-135Vs,** equipped also for electronic reconnaissance with SAC; **RC-135Ss** and **RC-135Us. WC-135Bs,** converted C-135Bs, are used by MAC for long-range weather reconnaissance missions. Although they have been in service for many years, EC/RC-135s continue to perform valuable roles, and the aircraft's lower wing skins are being replaced to add 27,000 flying hours to their operational life. Data basically as C-135 *(page 143).*

EF-111A

A modification of the basic General Dynamics F-111A airframe, the EF-111A incorporates many off-the-shelf components to accomplish its defense suppression mission role. The EF-111A is designed as a replacement for the EB-66 and EB-57, to provide worldwide support of US tactical strike forces, by denying information to the radars that provide data to hostile command and control systems. The prime jammer, the ALQ-99E, is a modification of the Navy ALQ-99, and is carried internally in the EF-111A. Other modifications include incorporation of self-protection systems from the F/FB-111 (ALQ-137/ALR-62), a new vertical stabilizer to house ALQ-99E receivers, a revised crew capsule, updated environmental cooling system, and high-capacity generators from the F-14.

Flight testing of the EF-111A began in March 1977, continuing through December 1979 to ensure that system effectiveness and reliability/maintainability had been achieved. First deliveries are expected in the summer of 1981, with a total of 42 aircraft planned to equip two USAF squadrons in the early 1980s.

Contractor: Grumman Aerospace Corporation.
Power Plant: two Pratt & Whitney TF30-P-3 turbofan engines, each 18,500 lb thrust with afterburning.
Crew: two, side-by-side in escape module.
Dimensions: span spread 63 ft 0 in, fully swept 32 ft 0 in, length, 73 ft 6 in, height 20 ft 0.5 in.
Weight: gross 86,935 lb.
Performance: similar to F-111A/E.
Armament: none.

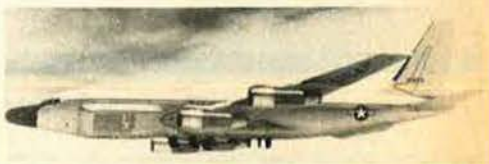
E-3A Sentry (AWACS)

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, 28 have been authorized to date, with two more requested under the FY '81 budget. Twenty had been delivered by the end of last year. E-3As achieved initial operational status in April 1978, and have since been deployed in Alaska, Iceland, and the Pacific. They took up a role in US continental air defense in January 1979, when NORAD personnel began augmenting TAC E-3A flight crews on all operational NORAD missions from Tinker AFB. In addition, NATO has approved purchase of 18 E-3As to upgrade the command and control of its air defense forces. 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. 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 earlier surveillance systems. In addition, Westinghouse is developing a maritime surveillance capability which could be incorporated retrospectively in the radar of all operational E-3As. 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-P-100/100A turbofan engines; each 21,000 lb thrust.
Accommodation: operational crew of 17.
Dimensions: span 145 ft 9 in, length 152 ft 11 in, height 41 ft 4 in.
Weight: gross 325,000 lb.
Performance: max speed 530 mph, ceiling above 29,000 ft, endurance 6 hr on station 1,000 miles from base.

WU-2

RF-4C Phantom II



RC-135

EF-111

E-3A AWACS

E-4A (AABNCP)

EB-57

E-4A/B

SAC is the Air Force single resource manager for the E-4 airborne command post aircraft. Three **E-4As,** modified Boeing 747 aircraft, support the National Emergency Airborne Command Post (NEACP). They provide an interim capability, utilizing the existing EC-135 command control and communications (C^3) equipment. The main operating base for these aircraft is Offutt AFB, Neb. The **E-4B,** the Advanced Airborne Command Post, has been under development for several years, and eventually will support both the NEACP and SAC Airborne Command Post missions. The aircraft is equipped for in-flight refueling and contains a new 1,200 kWA electrical system designed to support advanced electronics, and a wide variety of new communications equipment. This includes an LF/VLF system, improved satellite communications system, and communications processing equipment. The first E-4B was delivered to SAC in January this year. Present plans are to retrofit the E-4A aircraft to the E-4B configuration, and procure two additional E-4Bs for a total of six aircraft.

Contractor: The Boeing Aerospace Company.

Power Plant: four General Electric F103-GE-100 turbofan engines, each 52,500 lb thrust.

Dimensions: span 195 ft 8 in, length 231 ft 4 in, height 63 ft 5 in.

Performance: unrefueled endurance in excess of 12 hours.

EB-57

A two-seat version of the EB-57 continues in service with ANG's 158th Defense System Evaluation Group and TAC's 17th Defense System Evaluation Squadron at Malmstrom AFB, Mont.; the latter to be deactivated. 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

Twenty-one 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-12A

C-5 Galaxy

First flown in June 1968, the C-5 Galaxy is the largest aircraft in service anywhere in the world. Deliveries began to MAC in December 1969, and all 81 aircraft had been received by May 1973. Each is capable of airlifting loads up to 204,900 lb, such as two M-60 tanks or three CH-47 Chinook helicopters, over transoceanic ranges, and with an in-flight refueling capability. The 76 aircraft currently in service have participated in many special airlift missions, including a nonstop flight from Chicago to Moscow in June 1977, when the first C-5 to land in the Soviet Union carried a forty-ton super-conducting magnet for a joint US-Soviet magnetohydrodynamic electrical project. Early this year a contract was awarded for long lead planning and materials for manufacture of the first four production wing replacement kits aimed at extending the aircraft's operational life by 30,000 hours. The new kits replace only the five main wing boxes, with other components transferred to the new structure. One prototype wing is currently undergoing fatigue testing, while a second wing has been installed on an operational C-5 and will begin flight trials late this summer. Funding of $177.8 million has been sought in the FY '81 budget for the project, with $166.7 million for modification of 12 aircraft and $11.1 million for R&D. If tests are successful, all operational C-5s will be refitted by 1987.

Contractor: Lockheed-Georgia Company.

Power Plant: four General Electric TF39-GE-1C turbofan engines: each 40,100 lb thrust.

Accommodation: crew of five, rest area for 15 (relief crew, etc); 73 troops and 36 standard 463L pallets or assorted vehicles, or additional 270 troops.

Dimensions: span 222 ft 8½ in, length 247 ft 10 in, height 65 ft 1½ in.

Weight: empty 354,000 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 144,000 lb payload 3,450 miles.

C-7A Caribou

Still maintaining its role as part of USAF's tactical airlift capacity, the C-7A continues in service with AF Reserve's 94th Tactical Airlift Wing and with ANG's 135th Tactical Airlift Group. The Caribou is a Canadian-built twin-engine STOL utility transport which 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 11 other persons.

Dimensions: span 95 ft 8 in, length 74 ft 11 in, height 31 ft 9 in.

Weights: empty 18,335 lb, gross 28,500 lb.

Performance: max speed at 6,000 ft 216 mph, service ceiling 27,100 ft, range 200 to 1,175 miles.

C-9A Nightingale and VC-9C

In service since August 1968, the C-9A is an aeromedical airlift transport, based on the DC-9 Srs 30 commercial transport but modified to include a special-care compartment with separate atmospheric and ventilation controls. Delivery of 21 to MAC's 375th Aeromedical Airlift Wing was completed by February 1973. The Nightingale is also currently performing overseas theater aeromedical evacuation missions in Europe. Three specially configured **VC-9Cs** were 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 30 were delivered to USAF. 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 299 mph, service ceiling 31,000 ft, range at max cruising speed 1,824 miles.

C-123 Provider

Currently in service with four Air Force Reserve squadrons, as a part of USAF's tactical airlift capacity, the **C-123K** is the only version of the basic C-123 troop and supply transport still in the USAF inventory. First flown in 1966, it is fitted with two underwing pylon-mounted auxiliary turbojets, improved landing gear, and a new stall warning system. (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 21,000 ft, range with 15,000 lb payload 1,035 miles.

C-130 Hercules

Although originating from a TAC specification dating back to 1951, the C-130 is still in production and con-

tinues to perform a diversity of roles including airlift support, aeromedical missions, and fire fighting duties for the US Forest Service. However, some of the new, heavier US Army equipment is now outside the C-130's capabilities and a replacement tactical airlifter is being sought by MAC. 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. Seven were modified to MC-130E standard, for flight-refueling operations, with special emphasis on exterior lighting to facilitate night missions. This version is used by Air Force Special Operations Forces. 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/N/P** 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 4,910 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 6 in.
Weights: empty 75,331 lb, gross 175,000 lb.
Performance: max speed 386 mph, service ceiling above 25,000 ft, range with 15,000 lb payload 2,100 miles.

HC-130

Constituting a major element of the Aerospace Rescue and Recovery Service, 66 extended-range C-130s, designated **HC-130H,** were ordered in 1963 with uprated T56-A-15 engines and specialized search and rescue equipment for the recovery of aircrews and retrieval of space hardware. This includes advanced direction-finding equipment, and surface-to-air (STAR) and air-to-air (ATAR) recovery systems. Initial flight was made in December 1964. Crew complement is ten to twelve. 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.

KC-135 Stratotanker

As single manager of all USAF KC-135 tankers, SAC supports its own strategic bombardment and reconnaissance aircraft, and the cargo and tactical aircraft of other Air Force commands, the US Navy and Marines, and other nations. The high-speed, high-altitude capabilities of the **KC-135A** enable it to be used also as a long-range passenger and/or cargo transport. A total of 732 was built, of which the first flew in August 1956; about 600 remain operational, including those currently assigned to sixteen Air Force Reserve and ANG units, replacing older types such as the KC-97. Variants include the **KC-135Q,** adapted to refuel Lockheed SR-71s; and **KC-135R** and **KC-135T** for special reconnaissance. The lower wing skins of all aircraft are being replaced, to extend flying life by 27,000 hours, thereby enabling the aircraft to remain operational well past the year 2000. This in turn has justified the retrofitting of modern technology engines, and selection of the General Electric/SNECMA CFM56 for evaluation on a KC-135 testbed was announced early this year. In addition, NASA began flight testing winglets for the KC-135A in July last year, with a view to fuel savings as well as improved takeoff performance and a slight enhancing of fuel off-load capability. (Data for KC-135A.)

Contractor: The Boeing Company.
Power Plant: four Pratt & Whitney J57-P-59W turbojet engines; each 13,750 lb thrust.
Accommodation: crew of four or five; up to 80 passengers.
Dimensions: span 130 ft 10 in, length 136 ft 3 in, height 38 ft 4 in.
Weights: empty 98,466 lb, gross 297,000 lb.
Performance: max speed at 30,000 ft 585 mph, service ceiling 50,000 ft, range with 120,000 lb of transfer fuel 1,150 miles, ferry mission 9,200 miles.

C-135 Stratolifter

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 Group 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. 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 Command (AFCC) for inspecting worldwide military navigation aids. Six **VC-140B** transport versions are in service with the 89th Military Airlift Group, Special Missions, of MAC, operating from Andrews AFB, Md. Five **C-140Bs** are used in USAFE for operational support airlift.

Contractor: Lockheed-Georgia Company.
Power Plant: four Pratt & Whitney J60-P-5A turbojet engines; each 3,000 lb thrust.
Accommodation: C-140A crew of five; 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 has funded modification of the entire force of 271 aircraft to "B" standard, with the fuselage lengthened by 23 ft 4 in. The conversion also provides an in-flight refueling capability. The YC-141B prototype made its maiden flight in March 1977. All of MAC's C-141s will be modified to "B" standard by the end of 1982. (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 five; 154 troops; 122 paratroops; or 64,000 lb of freight.
Dimensions: span 159 ft 11 in, length "A" model 145 ft 0 in ("B" model 168 ft 4 in), height 39 ft 3 in.


C-123K Provider


C-130H


KC-135 Stratotanker


VC-137C


C-140 JetStar


C-141A (rear) and B "stretched" version

Artist's impression of KC-10A

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.

KC-10A

Competitive evaluation of the McDonnell Douglas DC-10 and the Boeing 747 to fulfill USAF requirements for an Advanced Tanker/Cargo Aircraft (ATCA), resulted in a contract being awarded to the former company in December 1977. The Air Force exercised production options for the first two KC-10As in November 1978; delivery is anticipated for October and December this year, followed by four more approved under the FY '80 budget. 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 refueling receptacle, and military avionics. In its primary role of increasing US air mobility, a single KC-10A 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. The range of refueling equipment installed will enable the KC-10A to service USN, USMC, and NATO aircraft, as well as older types of fighters still operated by ANG and Reserve units. In terms of active deployment, the KC-10A's refueling capabilities and long range will, in most situations, dispense with the need for forward bases, while also leaving vital fuel supplies in the theater of operations untouched. Available funding over the next five years will determine the number of aircraft to be ordered by USAF, but a force of 26 aircraft is anticipated, with funding for six requested in the FY '81 budget proposals, adding to six ordered earlier.
Contractor: McDonnell Douglas Corporation.
Power Plant: three General Electric CF6-50C1 turbofan engines; each 52,500 lb st.
Accommodation: max cargo payload 170,027 lb.
Dimensions: span 165 ft 4 in, length 181 ft 7 in, height 58 ft 1 in.
Weight: gross 590,000 lb.
Performance estimated: max range with max cargo 3,800 miles; or delivery of 193,000 lb of transfer fuel to a receiver 2,000 nm from its home base, and return.

Trainers

T-33

T-33A

Derived from the Shooting Star jet fighter, which flew for the first time thirty-six years ago, at least 300 T-33As remain in service for use in combat support missions and for proficiency and radar target evaluation training. Compared with the fighter, a lengthened fuselage accommodates a second cockpit in tandem, with the canopy extended to cover both. Combat armament is replaced by an all-weather "navigational nose."
Contractor: Lockheed Aircraft Corporation.
Power Plant: one Allison J33-A-35 turbojet engine; 4,600 lb thrust.
Accommodation: crew of two, in tandem.
Dimensions: span 38 ft 10½ in, length 37 ft 9 in, height 11 ft 4 in.
Weights: empty 8,084 lb, gross 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

T-37B

Two-seat primary trainer, 680 of which are currently in service with Air Training Command. In cooperation with SAC, ATC 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.
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

T-38 Talon

The T-38 is a lightweight twin-jet advanced trainer, which was in continuous production from 1956 to 1972. Like the F-5 tactical fighter, it 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 more than 900 remain in service throughout the Air Force, including 693 with ATC, and others with PACAF's aggressor training squadron at Clark AB, Philippines, and the Thunderbirds Air Demonstration Squadron.
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

CT-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 CT-39B basic utility and training aircraft with J60 turbojet engines, of which 143 were delivered for service throughout the Air Force. Of those still in the inventory, 113 are assigned to MAC for airlift support, and are stationed at 15 CONUS bases. Sabreliners are also in service with PACAF, USAFE, and with AFCC facility checking squadrons, which use two Sabreliners, together with four C-140As, in evaluating communications and navigation aids at Air Force bases.
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

T-41A Mescalero

Acquired by USAF as a trainer under the designation T-41A, this standard Cessna Model 172 light aircraft is used in a preliminary flight screening program of about 14 hours for USAF pilot candidates. An initial order for 170 aircraft in 1964 was supplemented by a further 34 in July 1967. The more powerful **T-41C**, based on the Cessna Model R172E, was ordered by USAF in October 1967 for cadet flight training at the USAF Academy. A total of 52 "C"s was built. (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

Derived from the commercial Boeing Model 737-200, the T-43A navigation trainer made its first flight in April 1973. It was developed as a replacement for the piston-engined T-29, and 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 and 13 remain in the ATC inventory; the other 6 are assigned to the ANG.
Contractor: The Boeing Aerospace Company.
Power Plant: two Pratt & Whitney JT8D-9 turbofan engines; each 14,500 lb thrust.
Accommodation: crew of two, 12 students, 4 advanced students, and 3 instructors.
Dimensions: span 93 ft 0 in, length 100 ft 0 in, height 37 ft 0 in.
Weight: gross 115,500 lb.
Performance: econ cruising speed at 35,000 ft Mach 0.7, operational range 2,995 miles.

T-43A

Helicopters

UH-1F and HH-1H

Developed to take part in a design competition for a missile site support helicopter, the UH-1F is basically a military version of the Bell Model 204. 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 missions in Vietnam. **TH-1F** is a version of the UH-1F used for instrument operations training. A total of 40 of these three versions are in service. 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. Initial orders on behalf of the US services included 79 for USAF, of which some 54 remain in the MAC inventory. Deliveries began in 1970.
Contractor: Bell Helicopter Textron.
Power Plant: Pratt & Whitney (Canada) T400-CP-400 Turbo "Twin-Pac," consisting of two PT6 turboshaft engines coupled to a combining gearbox with a single output shaft; flat-rated to 1,290 shp.
Accommodation: pilot and 14 passengers or cargo; or external load of 4,000 lb.
Dimensions: rotor diameter (with tracking tips) 48 ft 2¼ in, length of fuselage 42 ft 4¾ in, height 14 ft 10¼ in.
Weight: gross 10,500 lb.
Performance: max cruising speed at S/L 115 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

This twin-engined amphibious transport helicopter, based on the US Navy's SH-3A, incorporates important design changes which permit speedier cargo handling and ease of maintenance, with built-in equipment for the removal and replacement of all major components in remote areas. The initial version was the CH-3C. Introduction of uprated engines led to the designation CH-3E in February 1966, applicable to both 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-7 turboshaft engines; each 3,925 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,** an improved version of the HH-53B, was first delivered to USAF in August 1968. With a maximum speed of 196 mph, it can transport 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. Ten generally similar **CH-53Cs** are used to provide battlefield mobility for the Air Force mobile Tactical Air Control System.

HH-53H Pave Low III

Under USAF's Pave Low III program, nine HH-53s are being modified for night and adverse weather search and rescue operations. Equipment includes a stabilized FLIR installation mounted below the refueling boom, a B-52 type inertial navigation system, a new Doppler navigation system, and the computer, projected map display, and radar from the A-7D, with the radar installed in an offset "thimble" fairing on the nose.

The first of the Pave Low aircraft was delivered in mid-1979, and the final modification is due to be completed in the middle of this year. These helicopters will provide a significant increase in ARRS capability and effectiveness.

UH-1F

UH-1N

CH-3E

HH-3E Jolly Green Giant

HH-53B

Strategic Missiles

LGM-25C Titan II

Bearing a thermonuclear warhead with the largest yield of any carried by a US missile, Titan II is a two-stage ICBM which has been in service since 1963. The missile has a launch reaction time of one minute from its fully hardened underground silo; it is deployed in six squadrons, each with nine missiles, based at Davis-Monthan AFB, Ariz.; McConnell AFB, Kan.; and Little Rock AFB, Ark.

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

This three-stage, solid-propellant, second-generation ICBM, though of similar range, is smaller and lighter than the liquid-propellant Titan 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 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 test launch was made in 1968, and Minuteman III is operational at Minot AFB, N. D., F. E. Warren AFB, Wyo., Grand Forks AFB, N. D., and Malmstrom AFB, Mont. 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 November 1978; current funding, extending into the 1980s, is primarily for the purchase of components, guidance systems, and spares. Recent R&D has been aimed at providing improved command control and communications, and 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 300 Minuteman IIIs, with initial operational capability this year.

Assembly and Checkout: The Boeing Aerospace Company.

LGM-25C Titan II

Minuteman III

AGM-69 SRAM aboard B-52

Boeing ALCM

General Dynamics ALCM

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 Mk11 reentry vehicle; LGM-30G multiple thermonuclear warheads, each in a General Electric Mk12 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

In service since 1972, this defense suppression and primary attack missile was first deployed with the B-52Gs of SAC's 42d Heavy Bombardment Wing at Loring AFB, Me. USAF contracts covering the production of 1,500 AGM-69As had been authorized in 1971, and deliveries to equip 17 B-52 wings and two FB-111 wings at 18 SAC bases were completed in July 1975. Development of an improved propellant for SRAM's rocket motor has been undertaken, aimed at ensuring a minimum service life of ten 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.

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 dogleg courses.

Warhead: nuclear, of similar yield to that of single Minuteman III warhead.

Dimensions: length 14 ft 0 in, body diameter 1 ft 5½ in.

Weight: launch weight approx 2,230 lb.

Performance: speed up to Mach 2.5, range 100 miles at high altitude, 35 miles at low altitude.

ALCM

Competitive flight trials of USAF's two candidate ALCMs (Air-Launched Cruise Missiles) ended on February 8 this year. Three of the ten Boeing **AGM-86Bs** had crashed, and another flight suffered unscheduled termination; four of the ten General Dynamics **AGM-109s** had crashed. Further development flights are now planned, but program officials believe the overall fly-off achieved its targets, and the missile eventually selected is expected to attain initial operational capability on its B-52G launch aircraft by the originally planned date of December 1982. Production is expected to total 3,418 missiles. (*The AGM-86 was selected on March 25.*)

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. When launched in large numbers, each of the missiles would have to be countered, making defense against them both costly and complicated. Additionally, by diluting defenses, the ability of manned aircraft to penetrate to major targets would be improved. Guidance is by a combination of inertial and terrain comparison techniques. Small radar signature and low-level flight capability enhance the missile's effectiveness. A B-52 could carry 12 ALCMs externally while retaining current internal loads of free-fall bombs and SRAMs.

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, wing span 8–12 ft.

Weights: 2,500–3,500 lb.

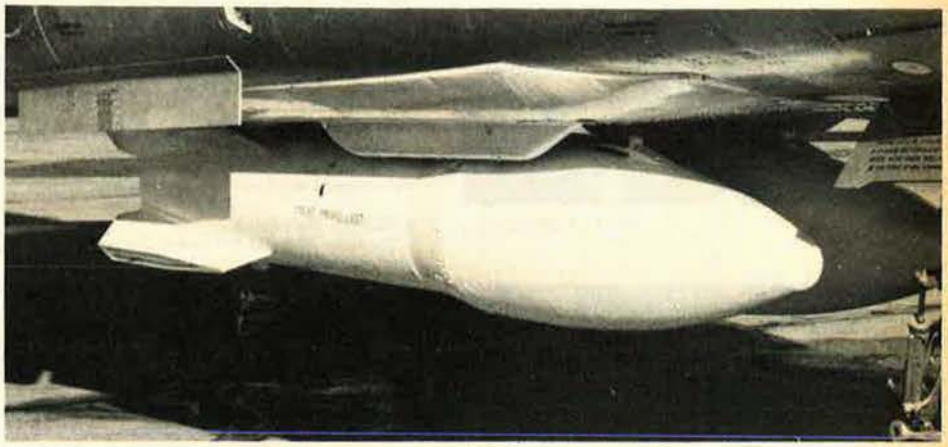
Performance: classified.

Airborne Tactical and Defense Missiles

AIR-2A Genie

Continuing in first-line service with the F-106 squadrons of USAF, as well as the F-101Bs of the Canadian Armed Forces, the AIR-2A Genie was produced in many thousands before production ended in 1962. 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 precautions, the missile remains inert in a nuclear sense until it is armed in the air, a few moments before firing. A training version, without nuclear warhead, is also in service.

Contractor: McDonnell Douglas Astronautics Company.
Power Plant: Thiokol SR49-TC-1 solid-propellant rocket motor; 36,000 lb thrust.
Guidance: no guidance system.
Warhead: nuclear, with reported yield of 1.5 kilotons.
Dimensions: length 9 ft 7 in, body diameter 1 ft 5.35 in, fin span 3 ft 3½ in.
Weight: launch weight 820 lb.
Performance: max speed Mach 3, max range 6 miles.



AIR-2A Genie

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.

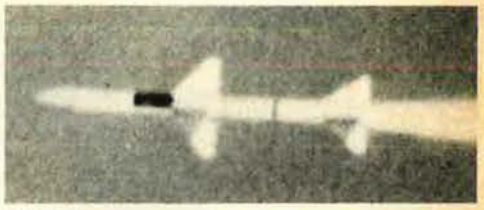
Contractor: Hughes Aircraft Company.
Power Plant: Thiokol M58-E4 solid-propellant rocket motor; 6,000 lb thrust.
Guidance: AIM-4A: Hughes semiactive radar homing system; AIM-4C/D: infrared homing system.
Warhead: high-explosive.
Dimensions: length AIM-4A 6 ft 6 in, AIM-4C/D 6 ft 7½ in, body diameter 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-4D Falcon

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-7F Sparrow

AIM-7 Sparrow

One of the most important air combat 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. This version was approved for deployment in early 1977, and USAF procurement of the "F" is expected to total 9,150, to supersede the AIM-7E and to arm the F-15, with a further increment of 910 requested in the FY '81 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 version with this seeker has been redesignated **AIM-7M,** and is expected to enter operational service next year. (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 more than 25 miles.

AIM-9 Sidewinders on F-111

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: modification by Philco of original-production AIM-9B, with improved guidance and control. Production completed, with more than 3,000 in service.

AIM-9H: version with improved close-range capability, produced for USN; one-time procurement of 800 by USAF in FY '76. Solid-state guidance, off-boresight acquisition/launch capability. Lead bias function moves missile impact point forward to more vulnerable area on target aircraft.

AIM-9J: modification of AIM-9B/E, with both increased range and improved maneuvering capability for dogfighting. Delivered to USAF by Ford Aerospace in 1977–78, to equip the F-15 and other Sidewinder-compatible aircraft.

AIM-9P: improved version of AIM-9J with increased lethality due to fuze improvements. Reduced-smoke rocket motor.

AIM-9J+ (J-3): further improvement of AIM-9J, under development by Ford Aerospace. Increased target acquisition envelope, solid-state electronics, and increased lethality due to seeker improvements. Proposed production by conversion of existing AIM-9Es and 9Js.

AIM-9L/M: third-generation Sidewinder for USAF and USN, with all-aspect intercept capability. New Mk 36 Mod 7/8 solid-propellant motors. Double-delta nose fins for improved inner boundary performance and maneuverability. AM-FM conical scan for increased seeker sensitivity and improved tracking stability. Annular blast fragmentation warhead, and active optical fuze for increased lethality and low susceptibility to countermeasures. "M" variant has a new closed-cycle IR cooling unit claimed to be easier to service and more effective than the open-cycle gas unit used in earlier versions. Planned USAF procurement was for more than 5,000 AIM-9L missiles between FY '76 and FY '80; eventual total for USAF/USN is expected to be 14,950. (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

AGM-65 Mavericks

AGM-78 Standard ARM

Electro-Optical Guided Bomb (EOGB)

Modular Glide Weapon System (GBU-15)

AGM-45A Shrike

Twelve versions of this supersonic air-to-surface missile have been produced for USAF and USN, differing primarily in the frequency coverage of the front end detachable seeker sections. Designed to home automatically on enemy radar installations, the AGM-45 entered operational service in Vietnam during 1965. Thereafter, it played an important part in the US air offensive, becoming a standard penetration aid on US tactical aircraft. More than 13,000 were delivered to USAF between 1965 and 1978. Latest models equip "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/E, F-5E/F, F-111F, 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 been completed.

To overcome limitations of the TV Maverick, which can be used only in daylight clear-weather conditions, a new version is being developed:

AGM-65D: with imaging infrared seeker (IIR). The AGM-65D entered engineering development in October 1978. Developmental and operational flight testing will begin in July/August this year, respectively. Also under development is an alternate blast/penetrator warhead in the 300 lb class, for use against larger hardened targets such as command bunkers. (Data for AGM-65A.)

Contractor: Hughes Aircraft Company.
Power Plant: Thiokol TX-481 solid-propellant rocket motor.
Guidance: self-homing electro-optical guidance system.
Warhead: high-explosive, shaped charge.
Dimensions: length 8 ft 1 in, body diameter 1 ft 0 in, wing span 2 ft 4 in.
Weight: launch weight 462 lb.
Performance: classified.

AGM-78 Standard ARM

Although no longer in production, this air-launched, antiradar missile remains an important item in the USAF and USN inventories. The original **AGM-78A** version of Standard ARM (Anti-Radiation Missile) was designed to provide a significant increase in capability over earlier weapons in countering the threat of radar-controlled antiaircraft guided missiles and guns. It entered production in 1968, and several advanced models were developed subsequently, some highly classified. The AGM-78A 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 F-4G, 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 an imaging infrared seeker, and a mid-course system that includes distance measuring equipment (DME), for increased accuracy. The TV-guided cruciform wing GBU-15 has completed all development and testing, and is expected to precede into service the planar wing/DME version which is intended for use in conjunction with the Lockheed U-2R Precision Location Strike System (PLSS), for all-weather area target attack. (Data for Mk 84 version, unless indicated otherwise.)

Contractors: Hughes Aircraft Corporation (planar wing), Rockwell International Corporation (cruciform wing).
Guidance: TV with data-link, imaging infrared, and 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 2,600 lb.

Atlas-Agena

Launch Vehicles

Agena

Offering a wide range of applications, Agenas have, since 1959, served as satellite or booster on more missions than any other spacecraft in the world. This inherent versatility derives basically from a payload section (nosecone) able to accommodate a variety of earth-orbiting and space probes weighing up to several hundred pounds. Agena 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

Atlas is a "stage-and-a-half" vehicle, consisting of side booster and central sustainer sections. 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. Evolved primarily for use with the Agena upper stage, but able to 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, Centaur has demonstrated widely ranging applications and capabilities. The nose section of Atlas 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 provided guidance for its Titan booster. A 10 ft diameter fairing protects payloads for Centaur D-1A, for which launch missions have been assigned into 1981. Titan IIIE production has ended. 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 oxygen/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.

Scout

More than 100 launchings have been accomplished by this vehicle, which was 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. The basic current version, with an improved fourth stage, was launched successfully for the first time in August 1965. In addition to increasing the payload, this version can be maneuvered in yaw and can send a 100 lb payload more than 16,000 miles into space. 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 (330 lb with the earlier motor) into a 310-mile easterly orbit, and have been used to launch many unmanned spacecraft, including classified military satellites, for the Department of Defense, NASA, and international groups.

Prime Contractor: Vought Corporation (subsidiary of LTV Corporation).

Power Plant: first stage: CSD Algol III; 140,000 lb thrust; second stage: Thiokol Castor II solid-propellant motor; 60,000 lb thrust; third stage: Thiokol Antares III solid-propellant motor; 18,700 lb thrust; fourth stage: Thiokol Altair III 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. Current 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, including the Transtage upper stage, 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. 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. On February 7 this year, a Titan IIID launched the latest USAF KH-11 Digital Imaging Reconnaissance Spacecraft, supplementing the Lockheed film-return satellites.

Titan 34-D. Instead of Transtage, future Titan IIIs will use the Boeing Inertial Upper Stage that is being developed for the Space Shuttle. Designated Titan 34-D, these vehicles will be used for some primary launches, as well as for backup of the Space Shuttle during that vehicle's transition period. The Titan 34-D is expected to replace current Titans, with an estimated requirement for 23 in the 1980s.

Titan IIIs have achieved well over 80 successful launchings since 1967, and additional contracts extended production of various models to this current year.

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 1,150,000 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.

Thor LV-2F/Block 5D-1

Following the start of inactivation of ADCOM, and the subsequent merger of its 10th Aerospace Defense Squadron (10th AERODS) into SAC's 394th ICBM Test Maintenance Squadron on November 1, 1979, the Thor space boosters continue to equip the only completely all-military space launch organization in the US. The Thor boosters are refurbished versions of the SM-75 Intermediate Range Ballistic Missile that was based in the UK between 1958 and 1962. It was the first missile launched from Vandenberg AFB in December 1958; and it holds the record for the greatest number of launches, with more than 500, including the boosting of Pioneer-1 towards the moon and the Discoverer series of satellites into orbit.

Thor LV-2F/Block 5D-I is essentially a three-stage system, comprising the basic Thor LV-2F space booster as the first stage; a second stage containing a Thiokol solid-propellant rocket motor and hydrazine thrusters, and an integrated third stage/spacecraft. The Thiokol rocket motor in the third stage goes into orbit with the payload. The booster has five compartments: the conical Transition section, containing the majority of the electrical, flight control, and command destruct equipment; the Fuel Tank, containing approximately 4,823 US gallons; the Center Section separating the fuel tank from the Lox tank, and containing the telemetry system and the rate gyro package; the Liquid Oxygen Tank, containing approximately 7,512 gallons; and the Boat-tail Section, containing the propulsion, pneumatic, hydraulic, and engine accessory systems.

Various programs have been serviced by the Thor boosters since the mid-sixties, one of the more significant being the Anti-Ballistic Missile Defense (ABM) Test Target Program. Recent launchings have been for the Defense Meteorological Satellite Program (DMSP), the latest DMSP spacecraft being the Block 5D, which is an "integrated spacecraft" combining the function of launch vehicle upper stage and a highly complex military weather satellite. On June 6, 1979, a 1,131 lb weather satellite was placed into a near-perfect polar orbit. In anticipation of a more sophisticated Block 5D-2 satellite, a special Thor booster is being equipped with three Castor II strap-on solid-propellant rocket motors which will double the booster's 170,000 lb of thrust. (Data for LV-2F.)

Prime Contractor: Douglas Aircraft Company.

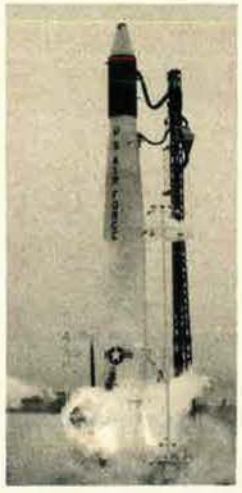
Power Plant: Rocketdyne MB-3 Block III main engine, 170,000 lb thrust; two Rocketdyne vernier engines, each 1,060 lb thrust. All three engines burn a mixture of liquid oxygen and RJ-1 fuel.

Dimensions: length 56 ft, with upper stage and payload nearly 80 ft, diameter 8 ft.

Dry Weight: 6,491 lb. ■

Scout

Titan III



Thor

May 24 at The Broadmoor, Colorado Springs, Colorado

THE TWENTY-FIRST ANNUAL OUTSTANDING SQUADRON DINNER

Saluting the 1980 Outstanding Squadron at the United States Air Force Academy
Cosponsored by the Air Force Association and its Colorado Springs Chapter

More than 600 guests — including parents and friends of the cadets, together with aerospace, AFA, and government leaders from throughout the country — will pay tribute to the top Academy Squadron, selected for excellence in all elements of cadet life, from academic standings and military leadership to drilling and intramural athletics. This is the Academy's most outstanding award of the year.

Reception 6:15 p.m., Dinner 7:00 p.m., Dancing 10:00 p.m.; the International Center of the Broadmoor

Dress: Black-tie for civilians, Summer Mess Dress for Military

Cost: $40 single, $70 per couple

Hotel reservations may be made direct with: The Broadmoor, Colorado Springs, Colorado 80901, telephone (303) 634-7711. Singles $75-$100, Doubles $80-$105, or the Four Seasons Motor Inn, 2886 S. Circle Drive, Colorado Springs, Colorado 80906, telephone (303) 576-5900.

Singles $38, Doubles $43, or the Antlers Motor Inn (under Broadmoor management) for $43 Single, $51 Twin. Be sure to mention AFA when writing or calling for accommodations.

Golf and tennis tournaments will be conducted at The Broadmoor on Friday, May 23. Please write AFA for details.

Dinner Reservation Form

Return to Air Force Association, 1750 Pennsylvania Ave., N.W., Washington, D.C. 20006, Attn: D. Flanagan

Please make the following reservations for me at AFA's 1980 Outstanding Squadron Dinner:

_____ Singles @ $40 $ _____

_____ Couples @ $70 $ _____

Enclosed is my check for $ _____

☐ Please send information on the golf and tennis tournaments.

Name _____

Address _____

City _____ State _____ Zip _____

Telephone ( ) _____

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 Public Affairs in its role as liaison with Air Staff agencies in bringing up to date the comparable data from last year's "Almanac." A word of caution: Personnel figures that appear in this section in different forms will not 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 1981

YEAR	STRENGTH	YEAR	STRENGTH	YEAR	STRENGTH	YEAR	STRENGTH
1907	3	1926	9,674	1945	2,282,259	1964	855,802
1908	13	1927	10,078	1946	455,515	1965	823,633
1909	27	1928	10,549	1947	305,827	1966	886,350
1910	11	1929	12,131	1948	387,730	1967	897,426
1911	23	1930	13,531	1949	419,347	1968	904,759
1912	51	1931	14,780	1950	411,277	1969	862,062
1913	114	1932	15,028	1951	788,381	1970	791,078
1914	122	1933	15,099	1952	973,474	1971	755,107
1915	208	1934	15,861	1953	977,593	1972	725,635
1916	311	1935	16,247	1954	947,918	1973	690,999
1917	1,218	1936	17,233	1955	959,946	1974	643,795
1918	195,023	1937	19,147	1956	909,958	1975	612,551
1919	25,603	1938	21,089	1957	919,835	1976	585,207
1920	9,050	1939	23,455	1958	871,156	1977	570,479
1921	11,649	1940	51,165	1959	840,028	1978	569,491
1922	9,642	1941	152,125	1960	814,213	1979	559,450
1923	9,441	1942	764,415	1961	820,490	1980	559,000*
1924	10,547	1943	2,197,114	1962	883,330	1981	564,000*
1925	9,670	1944	2,372,292	1963	868,644		

*Projected

USAF AND AIR RESERVE FORCES PERSONNEL BY CATEGORIES

CATEGORY	FY '64	FY '68	FY '74	FY '79	FY '80	FY '81[1]
AIR FORCE MILITARY						
Officers	133,000	140,000	110,000	96,000	97,000	98,000
Airmen	720,000[2]	762,000	529,000	459,000	456,000	462,000
Cadets	3,000	4,000	4,000	4,000	4,000	4,000
TOTAL, AIR FORCE MILITARY	**857,000**	**905,000**	**644,000**	**559,000**	**557,000**	**564,000**
Career Reenlistments	59,300	56,600	46,800	36,200	41,600	39,000
Rate	90%	88%	90%	82%	80%	82%
First-Term Reenlistments	17,400	10,700	19,300	15,900	17,700	19,000
Rate	30%	18%	31%	38%	38%	41%
CIVILIAN PERSONNEL						
Direct Hire (Including Technicians)	290,000	316,000	274,000	232,000	230,000	227,000
Indirect Hire—Foreign Nationals	33,000	26,000	16,000	13,000	14,000	14,000
TOTAL, CIVILIAN PERSONNEL	**322,000**	**342,000**	**289,000**	**245,000**	**244,000**	**241,000**
TOTAL MILITARY AND CIVILIAN[3]	**1,179,000**	**1,247,000**	**932,000**	**804,000**	**801,000**	**805,000**
Technicians (included above as Direct Hire Civilians)						
AFRES Technicians	—	—	6,000	7,000	7,000	7,000
ANG Technicians	15,000	17,000	22,000	22,000	22,000	22,000
AIR RESERVE FORCES						
Air National Guard, Selected Reserve	73,000	75,000	94,000	93,000	94,000	96,000
Air Force Reserve, Paid	67,000	46,000	48,000	58,000	59,000	60,000
Air Force Reserve, Nonpaid	97,000	145,000	119,000	43,000	42,000	42,000
TOTAL, READY RESERVE	**237,000**	**266,000**	**261,000**	**194,000**	**195,000**	**198,000**
Standby	130,000	101,000	46,000	43,000	44,000	44,000
TOTAL, AIR RESERVE FORCES[4]	**367,000**	**367,000**	**307,000**	**237,000**	**239,000**	**242,000**

[1]President's Budget Request.
[2]Excludes Aviation Cadets.
[3]FY '64–79 are actuals; FY '80–81 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 September 30, 1979)

MAJOR COMMANDS	MILITARY	CIVILIAN	TOTAL
Aerospace Defense Command (ADCOM)	20,100	3,684	23,784
Air Force Communications Command (AFCC)	41,323	6,774	48,097
Air Force Logistics Command (AFLC)	9,657	79,810	89,467
Air Force Systems Command (AFSC)	26,274	25,657	51,931
Air Training Command (ATC)	81,052	15,928	96,980
Alaskan Air Command (AAC)	7,488	1,256	8,744
Electronic Security Command (ESC)	9,731	864	10,595
Military Airlift Command (MAC)	71,963	16,315	88,278
Pacific Air Forces (PACAF)	24,947	9,677	34,624
Strategic Air Command (SAC)	102,914	13,091	116,005
Tactical Air Command (TAC)	85,976	10,277	96,253
United States Air Forces in Europe (USAFE)	53,737	9,835	63,572
TOTALS	**535,162**	**193,168**	**728,330**

SEPARATE OPERATING AGENCIES AND DRUs	MILITARY	CIVILIAN	TOTAL
Air Force Accounting and Finance Center (AFAFC)	222	1,750	1,972
Air Force Audit Agency (AFAA)	303	643	946
Air Force Engineering and Services Center (AFESC)	310	283	593
Air Force Inspection and Safety Center (AFISC)	381	137	518
Air Force Intelligence Service (AFIS)	389	137	526
Air Force Manpower and Personnel Center (AFMPC)	1,722	826	2,548
Air Force Office of Special Investigations (AFOSI)	1,633	354	1,987
AFRES/Air Reserve Personnel Center (ARPC)	612	10,788	11,400
Air Force Test and Evaluation Center (AFTEC)	309	85	394
United States Air Force Academy (USAFA)*	2,450	1,732	4,182
Office Secretary of the AF/Air Staff/National Guard Bureau (NGB)	1,890	1,915	3,805
Air Force Commissary Service (AFCOMS)	673	8,796	9,469
Air Force Medical Service Center (AFMSC)	85	105	190
Albert F. Simpson Historical Research Center (AFSHRC)	3	19	22
Air Force Service Information and News Center (AFSINC)	79	39	118
Air Force Legal Service Center (AFLSC)	355	146	501
Other	8,505	11,000	19,505
TOTALS	**19,921**	**38,755**	**58,676**
TOTALS, COMMANDS AND AGENCIES	**555,083**	**231,923**	**787,006**

*4,000 cadets not included.

USAF TOTAL ACTIVE-DUTY STRENGTH BY GRADE

(As of September 30, 1979)

AIRMEN		OFFICERS	
GRADE	**NUMBER**	**GRADE**	**NUMBER**
CHIEF MASTER SERGEANT	4,540	GENERAL	13
SENIOR MASTER SERGEANT	8,886	LIEUTENANT GENERAL	37
MASTER SERGEANT	33,179	MAJOR GENERAL	130
TECHNICAL SERGEANT	51,989	BRIGADIER GENERAL	180
STAFF SERGEANT	99,842	COLONEL	5,148
SERGEANT/SENIOR AIRMAN	102,624	LIEUTENANT COLONEL	12,596
AIRMAN FIRST CLASS	99,286	MAJOR	18,101
AIRMAN	28,315	CAPTAIN	37,180
AIRMAN BASIC	30,292	FIRST LIEUTENANT	9,456
		SECOND LIEUTENANT	13,288
		WARRANT OFFICER	1
TOTAL	**458,953**	**TOTAL**	**96,130**
		CADETS	4,367
		AIRMEN	458,953
		TOTAL STRENGTH	**559,450**

USAF MILITARY PERSONNEL BY GRADE, RACE, AND SEX

(As of September 30, 1979)

OFFICERS

GRADE	FORCE	BLACK*	OTHER**	WOMEN***
GENERAL	360	7	3	2
COLONEL	5,148	79	44	51
LIEUTENANT COLONEL	12,596	231	151	309
MAJOR	18,101	443	387	721
CAPTAIN	37,180	1,457	477	2,630
FIRST LIEUTENANT	9,456	703	163	1,556
SECOND LIEUTENANT	13,288	1,169	356	2,007
WARRANT OFFICER	1	0	0	0
TOTALS	**96,130**	**4,089**	**1,581**	**7,276**

AIRMEN

GRADE	FORCE	BLACK*	OTHER**	WOMEN***
CHIEF MASTER SERGEANT	4,540	393	49	11
SENIOR MASTER SERGEANT	8,886	1,020	90	26
MASTER SERGEANT	33,179	4,425	467	104
TECHNICAL SERGEANT	51,989	7,869	768	331
STAFF SERGEANT	99,842	17,741	2,262	5,373
SERGEANT/SENIOR AIRMAN	102,624	17,629	3,326	13,248
AIRMAN FIRST CLASS	99,286	13,653	3,363	15,484
AIRMAN	28,315	4,851	997	6,122
AIRMAN BASIC	30,292	5,078	1,121	5,255
TOTALS	**458,953**	**72,659**	**12,443**	**45,954**
TOTALS, INCLUDING OFFICERS	**555,083**	**76,748**	**14,024**	**53,230**

*Includes 8,761 women.
**Includes 3,305 women.
***Includes women from black and other categories.

AVERAGE AGES OF MILITARY PERSONNEL

(As of September 30, 1979)

Officers	Average 34 years of age
Airmen	Average 27 years of age

NUMBER OF OFFICERS IN EACH MAJOR CAREER FIELD*

CODE	UTILIZATION FIELD TITLE	ASSIGNED
**00	Commanders and Directors	3,144
02	International-Politico-Military Affairs	179
05	Disaster Preparedness	153
10–14	Pilot	19,224
15 & 22	Navigator	9,168
16	Air Traffic Control	467
17	Air Weapons Director	1,848
18	Missile Operations	3,120
20	Space Systems	503
23	Audio-Visual	114
25	Weather	1,400
26	Scientific	1,274
27	Acquisition Program Management	1,767
28	Development Engineer	4,356
29	Program Management	159
30	Communications-Electronics	3,247
31	Missile Maintenance	523
40	Aircraft Maintenance & Munitions	3,948
51	Computer Technology	2,527
55	Civil Engineering	1,831
57	Cartography/Geodesy	82
60	Transportation	984
62	Supply Service	382
64	Supply Management	1,484
65	Procurement/Manufacturing Management	1,405
66	Logistics Plans & Programs	918
67	Financial	1,257
69	Management Analysis	216
70	Administration	2,476
73	Personnel	2,121
74	Manpower Management	605
75	Education & Training	675
79	Public Affairs	574
80	Intelligence	2,605
81	Security Police	1,028
82	Special Investigations & Counter-Intelligence	489
87	Band	31
88	Legal	1,103
89	Chaplain	843
90	Health Services Management	1,036
91 & 92	Biomedical Sciences	1,734
93–95	Physician	3,288
96	Medical Research	10
97	Nurse	3,914
98	Dental	1,506
99	Veterinary	324

*These figures do not include general officers or UPT/UNT/medical/law students.
**Commanders and director specialties in various career fields, e.g., operations, logistics, programming, etc.

NUMBER OF ENLISTED IN EACH MAJOR CAREER FIELD

CODE	CAREER FIELD TITLE	ASSIGNED
10	First Sergeant	1,507
11	Aircrew Operations	6,616
20	Intelligence	10,897
22	Photomapping	115
23	Audio-Visual	3,429
24	Safety	1,200
25	Weather	2,947
27	Command Control Systems Operations	16,937
29	Communications Operations	10,619
30	Communications-Electronics Systems	26,831
31	Missile Electronic Maintenance	5,097
32	Avionics Systems	26,824
34	Training Devices	2,450
36	Wire Communications Systems Maintenance	4,919
39	Maintenance Management Systems	3,273
40	Intricate Equipment Maintenance	1,155
42	Aircraft Systems Maintenance	38,124
43	Aircraft Maintenance	42,967
44	Missile Maintenance	2,149
46	Munitions & Weapons Maintenance	19,830
47	Vehicle Maintenance	4,938
51	Computer Systems	5,971
54	Mechanical/Electrical	10,656
55	Structural/Pavements	11,969
56	Sanitation	1,512
57	Fire Protection	5,877
59	Marine	120
60	Transportation	13,414
61	Supply Services	1,509
62	Food Services	4,907
63	Fuels	6,565
64	Supply	24,849
65	Procurement	1,450
66	Logistics Plans	668
67	Accounting & Finance, and Auditing	5,301
69	Management Analysis	445
70	Administration	28,122
71	Printing	679
73	Personnel	11,114
74	Morale, Welfare & Recreation	1,935
75	Education & Training	3,117
79	Public Affairs	1,141
81	Security Police	34,451
82	Special Investigations & Counter-Intelligence	779
87	Band	1,120
90 & 91	Medical	21,500
92	Aircrew Protection	2,412
98	Dental	3,453
99	Miscellaneous (Special Duty, Patients, Unclassified, etc.)	21,090

AIR FORCE MILITARY PERSONNEL DISTRIBUTION BY GEOGRAPHIC AREA

(As of September 30, 1979)

TOTAL MILITARY PERSONNEL	**555,083**
US TERRITORY AND SPECIAL LOCATIONS (Includes 1,885 in Panama)	**447,676**
TOTAL IN FOREIGN COUNTRIES	**107,407**
Western and Southern Europe (Major concentrations in Germany—34,979, UK—20,497, Spain—4,831, Italy—4,332, Turkey—3,653)	75,447
East Asia and Pacific (Major concentrations in Japan/Okinawa—14,370, Philippines—8,170, South Korea—8,315)	31,190
Africa, Near East, S. Asia (Major concentration in Saudi Arabia—132)	312
Western Hemisphere (The majority, 251, in Canada)	321
Eastern Europe	25
Undistributed	112

AIR FORCE FULL-TIME CIVILIAN EMPLOYMENT BY GRADE

(As of November 30, 1979)

GS/OTHER		WG		WL		WS	
GR	POP	GR	POP	GR	POP	GR	POP
1	133	1	488	1	4	1	39
2	1,587	2	1,665	2	37	2	62
3	9,697	3	941	3	5	3	160
4	16,601	4	1,833	4	76	4	234
5	20,921	5	4,742	5	49	5	472
6	8,827	6	4,948	6	51	6	553
7	12,642	7	5,788	7	34	7	1,083
8	3,642	8	8,417	8	181	8	962
9	17,161	9	8,116	9	337	9	1,940
10	1,314	10	25,054	10	1,041	10	2,166
11	14,915	11	7,036	11	102	11	887
12	14,336	12	5,183	12	36	12	579
13	8,330	13	560	13	4	13	346
14	2,883	14	187	14	0	14	227
15	915	15	2	15	0	15	114
16	1					16	42
17	1					17	13
18	0					18	3
ST	8					19	1
SES	171						
TOTALS	**134,085**		**74,960**		**1,957**		**9,883**

NOTE: Table includes ANG Technicians

GR = Grade
GS = General Schedule
ST = Scientific and Professional
SES = Senior Executive Service

POP = Population
WG = Wage Grade Positions
WL = Wage Grade Leader Positions
WS = Wage Grade Supervisory Positions

FEDERAL CIVILIAN PAY SCALE

General Schedule

(Effective October 1, 1979)

GRADE	1	2	3	4	5	6	7	8	9	10
GS-1	$7,210	$7,450	$7,690	$7,930	$8,170	$8,410	$8,650	$8,890	$8,902	$9,126
GS-2	8,128	8,399	8,670	8,902	9,002	9,267	9,532	9,797	10,062	10,327
GS-3	8,952	9,250	9,548	9,846	10,144	10,442	10,740	11,038	11,336	11,634
GS-4	10,049	10,384	10,719	11,054	11,389	11,724	12,059	12,394	12,729	13,064
GS-5	11,243	11,618	11,993	12,368	12,743	13,118	13,493	13,868	14,243	14,618
GS-6	12,531	12,949	13,367	13,785	14,203	14,621	15,039	15,457	15,875	16,293
GS-7	13,925	14,389	14,853	15,317	15,781	16,245	16,709	17,173	17,637	18,101
GS-8	15,423	15,937	16,451	16,965	17,479	17,993	18,507	19,021	19,535	20,049
GS-9	17,035	17,603	18,171	18,739	19,307	19,875	20,443	21,011	21,579	22,147
GS-10	18,760	19,385	20,010	20,635	21,260	21,885	22,510	23,135	23,760	24,385
GS-11	20,611	21,298	21,985	22,672	23,359	24,046	24,733	25,420	26,107	26,794
GS-12	24,703	25,526	26,349	27,172	27,995	28,818	29,641	30,464	31,287	32,110
GS-13	29,375	30,354	31,333	32,312	33,291	34,270	35,249	36,228	37,207	38,186
GS-14	34,713	35,870	37,027	38,184	39,341	40,498	41,655	42,812	43,969	45,126
GS-15	40,832	42,193	43,554	44,915	46,276	47,637	48,998	50,359*	51,720*	53,081*
GS-16	47,889	49,485	51,081*	52,677*	54,273*	55,869*	57,465*	59,061*	60,657*	
GS-17	56,099*	57,969*	59,839*	61,709*	63,579*					
GS-18	65,750*									

Senior Executive Service

LEVEL	1	2	3	4	5	6
	$47,889	$49,499	$51,164**	$52,884**	$54,662**	$56,500**

*Pay limited to Level V of the Executive Schedule, $50,112.50.
**Basic pay for employees at these rates is limited to $50,112.50, in accordance with 5 U.S.C. 5308 and section 101(c) of Public Law 96-86.

AIR FORCE CIVILIAN PERSONNEL AVERAGE AGE AND LENGTH OF SERVICE

(As of September 30, 1979)

Average age	44.1 years
Average length of service	16.1 years

MONTHLY MILITARY BASIC RATES OF PAY

(Effective October 1, 1979)

YEARS OF SERVICE

PAY GRADE	UNDER 2	2	3	4	6	8	10	12	14	16	18	20	22	26
COMMISSIONED OFFICERS														
O-10	$3,529	$3,654	$3,654	$3,654	$3,654	$3,794	$3,794	$4,084	$4,084	$4,377*	$4,377*	$4,669*	$4,669*	$4,961*
O-9	3,128	3,210	3,278	3,278	3,278	3,362	3,362	3,501	3,501	3,794	3,794	4,084	4,084	4,377*
O-8	2,833	2,918	2,987	2,987	2,987	3,210	3,210	3,362	3,362	3,501	3,654	3,794	3,946	3,946
O-7	2,354	2,514	2,514	2,514	2,627	2,627	2,779	2,779	2,918	3,210	3,431	3,431	3,431	3,431
O-6	1,745	1,917	2,042	2,042	2,042	2,042	2,042	2,042	2,112	2,446	2,571	2,627	2,779	3,014
O-5	1,395	1,639	1,752	1,752	1,752	1,752	1,805	1,902	2,029	2,181	2,307	2,376	2,459	2,459
O-4	1,176	1,432	1,528	1,528	1,556	1,625	1,736	1,833	1,917	2,001	2,057	2,057	2,057	2,057
O-3	1,093	1,222	1,306	1,445	1,514	1,569	1,653	1,736	1,778	1,778	1,778	1,778	1,778	1,778
O-2	953	1,041	1,250	1,293	1,319	1,319	1,319	1,319	1,319	1,319	1,319	1,319	1,319	1,319
O-1	827	861	1,041	1,041	1,041	1,041	1,041	1,041	1,041	1,041	1,041	1,041	1,041	1,041
COMMISSIONED OFFICERS WITH MORE THAN 4 YEARS OF ACTIVE SERVICE AS ENLISTED MEMBERS														
O-3	—	—	—	1,445	1,514	1,569	1,653	1,736	1,805	1,805	1,805	1,805	1,805	1,805
O-2	—	—	—	1,293	1,319	1,361	1,432	1,487	1,528	1,528	1,528	1,528	1,528	1,528
O-1	—	—	—	1,041	1,112	1,153	1,194	1,236	1,293	1,293	1,293	1,293	1,293	1,293
WARRANT OFFICERS														
W-4	1,113	1,194	1,194	1,222	1,278	1,334	1,390	1,487	1,556	1,611	1,653	1,707	1,765	1,902
W-3	1,012	1,098	1,098	1,112	1,125	1,207	1,278	1,319	1,361	1,402	1,445	1,501	1,556	1,611
W-2	886	959	959	987	1,041	1,098	1,139	1,181	1,222	1,265	1,306	1,347	1,402	1,402
W-1	738	847	847	917	959	1,000	1,041	1,084	1,125	1,166	1,207	1,250	1,250	1,250
ENLISTED MEMBERS														
E-9	—	—	—	—	—	—	1,265	1,294	1,323	1,354	1,384	1,411	1,485	1,629
E-8	—	—	—	—	—	1,061	1,091	1,120	1,149	1,179	1,207	1,236	1,309	1,455
E-7	741	800	829	858	888	916	945	975	1,019	1,047	1,077	1,091	1,164	1,309
E-6	640	698	727	757	786	814	844	883	916	945	960	960	960	960
E-5	562	611	641	669	713	742	771	800	814	814	814	814	814	814
E-4	540	570	603	651	676	676	676	676	676	676	676	676	676	676
E-3	519	548	570	592	592	592	592	592	592	592	592	592	592	592
E-2	500	500	500	500	500	500	500	500	500	500	500	500	500	500
E-1	448	448	448	448	448	448	448	448	448	448	448	448	448	448

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 $5,373.80, regardless of cumulative years of service.

*Basic pay is limited to $4,176 by Level V of the Executive Schedule.

Basic pay while serving as Chief Master Sergeant of the Air Force is $1,980.90, regardless of cumulative years of service.

BASIC ALLOWANCE FOR QUARTERS (BAQ)

Pay Grade	Without Dependents		With Dependents
	Full*	Partial**	
C/S and O-10	$383.10	$50.70	$479.10
O-9	383.10	50.70	479.10
O-8	383.10	50.70	479.10
O-7	383.10	50.70	479.10
O-6	343.80	39.60	419.40
O-5	316.80	33.00	381.60
O-4	282.30	26.70	340.50
O-3	248.10	22.20	306.30
O-2	215.40	17.70	272.70
O-1	168.00	13.20	219.00
W-4	271.80	25.20	328.20
W-3	242.40	20.70	298.80
W-2	210.90	15.90	268.20
W-1	190.50	13.80	246.60
CMSAF and E-9	205.20	18.60	288.60
E-8	189.00	15.30	266.70
E-7	160.80	12.00	248.10
E-6	146.10	9.90	228.30
E-5	140.40	8.70	209.70
E-4	123.90	8.10	184.50
E-3	110.70	7.80	160.80
E-2	97.80	7.20	160.80
E-1	92.40	6.90	160.80

*Payment of 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 Executive 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 as Computed under 37 U.S.C. 205
$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. An officer in pay grade O-8 or above may not be paid at a rate greater than $165 a month. Officers with more than 18 years of commissioned service and less than 6 years of aviation service are entitled to Phase I rates.

BASIC ALLOWANCE FOR SUBSISTENCE (BAS)

Officers (Monthly)	Enlisted (Daily)		
	Separate Rations	Rations in Kind Not Available	Emergency Rations
$67.21	$3.21	$3.62	$4.79

COMPARISON OF DoD BUDGETS BY MILITARY PROGRAMS FOR FY 1978–83

(Billions of Dollars)

Military Program	Total Obligational Authority in Current Dollars					
	1978	1979	1980	1981*	1982*	1983*
Strategic Forces	$ 9.1	$ 8.0	$ 10.3	$ 11.7	$ 13.3	$ 14.9
General-Purpose Forces	41.3	47.4	51.6	58.3	66.1	74.1
Intelligence and Communications	7.9	8.0	9.1	10.6	12.0	13.5
Airlift and Sealift	1.6	1.7	2.0	2.4	2.7	3.1
Guard and Reserve Forces	6.9	6.9	7.6	8.7	9.9	11.1
Research and Development[1]	10.0	10.9	11.8	14.1	16.0	17.9
Central Supply and Maintenance	12.0	13.0	14.5	15.6	17.7	19.8
Training, Medical, and Other General Personnel Activities	23.9	26.4	28.7	32.9	37.3	41.7
Administrative and Associated Activities	2.2	2.3	2.5	3.0	3.3	3.6
Support of Other Nations	0.3	0.4	0.6	0.9	1.1	1.3
TOTAL BUDGET AUTHORITY	**$115.3**	**$125.0**	**$138.6**	**$158.2**	**$179.4**	**$201.0**
Prior-year funds and other financial adjustments	+1.2	−0.2	+0.7	+0.6	+0.6	+0.5
TOTAL OBLIGATIONAL AUTHORITY	**$116.5**	**$124.8**	**$139.3**	**$158.7**	**$180.0**	**$201.5**

NOTE: Totals may not add due to rounding.

[1]Excludes R&D in other program areas on systems approved for production.

*Estimate

DoD FINANCIAL SUMMARY BY COMPONENT FOR FY 1979–81

(TOA in Billions of Dollars)

Component	FY '79 Current	FY '79 FY '81 $	FY '80 Current	FY '80 FY '81 $	FY '81* Current	FY '81* FY '81 $
Army	$ 31.4	$ 36.5	$ 34.3	$ 37.0	$ 39.8	$ 39.8
Navy	41.8	48.7	46.1	49.7	50.3	50.3
Air Force	34.9	40.8	39.9	43.1	46.3	46.3
Defense Agencies/OSD	4.6	5.4	5.3	5.7	6.1	6.1
Defense-wide	12.0	15.0	13.7	15.2	16.2	16.2
TOTALS	**$124.8**	**$146.4**	**$139.3**	**$150.7**	**$158.7**	**$158.7**

NOTE: Totals may not add due to rounding.
*Includes $2.1 billion estimate for contingencies.

EDUCATIONAL LEVELS—USAF LINE OFFICERS

Level	End of September 1979 Number	Percent
Below baccalaureate/unknown	1,186	1.4
Baccalaureate, no master's degree	47,738	58.4
Master's degree, no doctorate	31,387	38.5
Doctoral and professional degrees	1,386	1.7
TOTALS	**81,697**	**100.0**

EDUCATIONAL LEVELS—USAF ENLISTED FORCE

Level	End of September 1979 Number	Percent
Below high school (no GED)	6,082	1.3
GED passed (old system)—no diploma or civilian equivalency certificate	5,110	1.1
Recognized high school diploma or certificate	351,724[1]	76.7
Some post-secondary education, less than two years	54,428	11.9
Some post-secondary education, two or more years but below bachelor's	30,737[2]	6.7
Baccalaureate or higher	10,338	2.3
TOTALS	**458,419[3]**	**100.0**

[1]Includes 20,450 with high school diplomas or equivalency certificate based on GED (new system) and 331,274 with high school completion (diploma or certificate).
[2]Includes 5,813 with associate degrees.
[3]Does not include 534 coded "unknown."

INSTALLATIONS OF THE US AIR FORCE

MAJOR INSTALLATIONS	FY '64	FY '68	FY '75	FY '76	FY '77	FY '78	FY '79	FY '80
US and Possessions	160	138	113	111	107	107	107	107
Foreign	56	60	35	29	27	27	27	27
Worldwide	**216**	**198**	**148**	**140**	**134**	**134**	**134**	**134**
OTHER INSTALLATIONS								
US and Possessions	3,650	2,723	2,323	2,372	2,305	2,202	2,169	2,168
Foreign	1,168	1,060	720	658	664	661	645	645
Worldwide	**4,818**	**3,783**	**3,043**	**3,030**	**2,969**	**2,863**	**2,814**	**2,813**
"Other Installations" includes:								
Auxiliary	2,849	1,892	—	—	—	—	—	—
Ballistic Missile	1,083	1,158	1,157	1,157	1,157	1,157	1,157	1,157
Industrial	55	43	—	—	—	—	—	—
Radar	331	183	—	—	—	—	—	—
Air National Guard	103	106	125	127	128	127	128	128
Tenant, Non-Air Force	348	357	—	—	—	—	—	—
War Only	49	44	—	—	—	—	—	—
Electronics Station or Site	—	—	599	579	569	545	530	530
General Support Annex	—	—	1,140	1,146	1,095	1,016	981	980
Auxiliary Airfield	—	—	22	21	20	18	18	18

AIR FORCE BUDGET AND FINANCE—FISCAL YEARS 1964–81

(Figures in millions of dollars)

	FY '64	FY '68	FY '74	FY '79	FY '80	FY '81
Gross National Product	$616,200	$829,900	$1,359,200	$2,343,000	$2,567,000	$2,842,000
Federal Budget, Outlays	118,600	178,800	269,600	493,400	563,600	615,800
DoD Budget, Outlays	50,786	78,027	78,445	111,900	127,400	142,700
DoD Percent of: GNP	8.2%	9.4%	5.8%	4.8%	5.1%	5.2%
Federal Budget	42.8%	43.6%	29.1%	22.7%	22.7%	23.2%
Air Force Budget Outlays						
Current Dollars	20,456	25,734	23,928	31,468	35,681	40,265
Constant FY '80 Prices	53,491	58,099	34,726	33,451	38,631	40,265
AF Percent of: GNP	3.3%	3.1%	1.8%	1.3%	1.4%	1.4%
Federal Budget	17.2%	14.4%	8.9%	6.4%	6.3%	6.5%
DoD Budget	40.3%	33.0%	30.5%	28.1%	28.0%	28.2%
Total Obligational Authority						
DoD—Current Dollars	50,647	75,627	85,054	125,740	139,343	158,739
Constant FY '80 Prices	137,159	173,252	123,726	133,248	150,668	158,739
AF—Current Dollars	19,958	24,974	24,779	35,427	39,928	45,732
Constant FY '80 Prices (With anticipated supplementals)	53,174	56,971	36,152	37,476	43,112	45,732
Aircraft Procurement (3010)	3,620	5,306	2,837	7,145	8,082	8,555
Missile Procurement (3020)	2,220	1,408	1,419	1,514	2,183	3,042
Other Procurement (3080)	876	2,357	1,652	2,405	2,633	2,973
Procurement Subtotal	6,716	9,071	5,908	11,064	12,898	14,570
Military Construction—AF (3500)	497	481	321	558	565	815
Military Construction—AFRES (3730)	3	4	11	13	12	23
Military Construction—ANG (3830)	17	10	19	45	36	90
Military Construction Subtotal	517	495	351	616	613	928
RDT&E (3600)	3,627	3,412	3,062	4,598	5,026	7,085
TOTAL, INVESTMENT	**10,860**	**12,978**	**9,321**	**16,278**	**18,537**	**22,583**
Military Personnel—AF (3500)	4,423	5,677	7,479	7,908	8,416	8,701
Reserve Personnel—AF (3700)	57	64	126	199	226	244
National Guard Personnel—AF (3850)	60	84	182	265	291	323
Military Personnel Subtotal	4,540	5,825	7,787	8,372	8,933	9,268
Operation & Maintenance—AF (3400)	4,339	5,904	6,882	9,406	10,904	12,138
Operation & Maintenance—AFRES (3740)	—	—	239	393	439	486
Operation & Maintenance—ANG (3840)	220	266	551	952	1,115	1,229
Stock Fund (4921)	—	—	—	27	—	28
Operation & Maintenance Subtotal	4,559	6,170	7,672	10,778	12,458	13,881
TOTAL, OPERATING	**9,099**	**11,995**	**15,459**	**19,150**	**21,391**	**23,149**
Programs, TOA (Current $)						
I Strategic Forces	6,525	5,176	4,315	4,961	6,182	6,941
II General-Purpose Forces	3,030	7,273	5,611	10,533	11,174	12,641
III Intelligence & Communications	2,979	3,622	3,340	4,100	4,668	5,500
IV Airlift & Sealift Forces	1,010	1,736	756	1,795	1,914	2,325
V Reserve & Guard Forces	502	621	1,223	2,372	2,830	2,837
VI Research & Development	2,063	1,556	2,401	3,916	4,197	5,689
VII Central Supply & Maintenance	1,767	2,375	2,763	3,848	4,448	4,674
VIII Training, Medical & Other General Activities	1,726	2,079	3,441	3,260	3,655	4,022
IX Administration & Associated Activities	342	352	568	525	579	683
X Support of Other Nations	12	182	363	116	281	420

NOTE: Totals may not add due to rounding. FY '80–81 columns reflect revised estimates. FY '81 is President's budget request.

USAF AIRCRAFT PROCUREMENT—FY '68–80

CATEGORY	FY '68	FY '73	FY '74	FY '75	FY '76	FY '77	FY '78	FY '79	FY '80
Fixed-Wing Aircraft									
Total Budgeted	1,152	161	165	195	181	219	335	392	408
Accepted/Scheduled Acceptances	935	255	117	94	269	182	378	308	361
Helicopters									
Total Budgeted	38	6	0	0	0	4	0	0	0
Accepted/Scheduled Acceptances	36	29	1	5	0	0	0	0	0

NOTE: FY '68–79 columns are actual. FY '80 data are planned.

USAF'S AIRCRAFT—HOW MANY OF EACH TYPE AND HOW OLD?

(Current as of September 30, 1979)

	0-2 yrs.	3-5 yrs.	6-8 yrs.	9-11 yrs.	12-14 yrs.	15-17 yrs.	18-20 yrs.	21-23 yrs.	24+ yrs.	TOTAL NUMBER
A-7		9	68	11						88
A-10	198	14								212
A-37		1	2	1						4
B-1	1	1								2
B-52						58	211	80		349
FB-111			42	24						66
C-5		2	60	15						77
C-6					1					1
C-9		3	9	11						23
C-12	4	11								15
C-130	10	61	26	43	86	135	8	2		371
C-131									1	1
C-135					34	270	236	79		619
C-137			1			1	3			5
C-140						15				15
C-141				28	240	7				275
E-3	15	5								20
E-4		2	2							4
F-4	9	123	131	583	481	36				1,363
F-5	8	78	20							106
F-15	319	105	4							428
F-16	49	1								50
F-101							20			20
F-105					1	22				23
F-106							126	19		145
F-111	1	22	192	149						364
H-1			70	11						130
H-3			3	21	21	6				51
H-53		6	13	24	6					49
O-2				112	11					123
OV-10				85						85
T-33							57	53	10	120
T-37				138	65	46	301	112		662
T-38			47	221	296	286	7			857
T-39						112	20			132
T-41				52						52
T-43		11	2							13
UV-18	2									2
TOTALS	**616**	**455**	**692**	**1,529**	**1,291**	**994**	**989**	**345**	**11**	**6,922**
PERCENT	**9%**	**7%**	**10%**	**22%**	**19%**	**14%**	**14%**	**5%**	**—**	

Less than 9 years old: 1,763 aircraft (25.5%)
More than 9 years old: 5,159 aircraft (74.5%)

AIR NATIONAL GUARD AIRCRAFT—HOW MANY, HOW OLD?

(Current as of September 30, 1979)

	0-2 yrs.	3-5 yrs.	6-8 yrs.	9-11 yrs.	12-14 yrs.	15-17 yrs.	18-20 yrs.	21-23 yrs.	24+ yrs.	TOTAL NUMBER
A-7	7	63	203	15						288
A-10	31									31
A-37		18	7	25						50
B-57									19	19
C-7					13		4			17
C-130	8				8	60	47	64	1	188
C-131								9	24	33
C-135							64	40		104
F-4				6	275	89				370
F-101							58			58
F-105					4	60	37			101
F-106							77	1		78
H-3				4	9					13
O-2				77	41					118
T-33							2	11	35	48
T-43		6								6
TOTALS	**46**	**87**	**210**	**127**	**350**	**209**	**289**	**125**	**79**	**1,522**
PERCENT	**3%**	**6%**	**14%**	**8%**	**23%**	**14%**	**19%**	**8%**	**5%**	

Less than 9 years old: 343 aircraft (22.5%)
More than 9 years old: 1,179 aircraft (77.5%)

AIR FORCE RESERVE AIRCRAFT—HOW MANY, HOW OLD?

(Current as of September 30, 1979)

	0-2 yrs.	3-5 yrs.	6-8 yrs.	9-11 yrs.	12-14 yrs.	15-17 yrs.	18-20 yrs.	21-23 yrs.	24+ yrs.	TOTAL NUMBER
A-37		37	37	18						92
C-7					26	2	4			32
C-123								57	6	63
C-130				4	19	47	25	55		150
C-135							19	5		24
F-4					13	7				20
F-105					1	38	26			65
H-1			22							22
H-3				6	8	1				15
T-33							1	3		4
TOTALS		**37**	**59**	**28**	**67**	**95**	**75**	**120**	**6**	**487**
PERCENT		**7%**	**12%**	**6%**	**14%**	**20%**	**15%**	**25%**	**1%**	

Less than 9 years old: 96 aircraft (20%)
More than 9 years old: 391 aircraft (80%)

ACTIVE-DUTY MILITARY PERSONNEL, RESERVE COMPONENT MILITARY PERSONNEL, AND CIVILIAN PERSONNEL STRENGTH

(Figures in thousands)

	FY '64	FY '68	FY '72	FY '76	FY '79	FY '80	FY '81
Active-Duty Military							
Army	972	1,570	811	779	758	774	776
Navy	667	765	588	525	522	528	534
Marine Corps	190	307	198	192	185	185	185
Air Force	856	905	726	585	559	558	564
Total	**2,685**	**3,547**	**2,322**	**2,081**	**2,024**	**2,045**	**2,059**
Reserve Components (in paid status)							
Army National Guard	382	389	388	362	346	359	381
Army Reserve	269	244	235	195	190	200	211
Naval Reserve	123	124	124	97	88	87	87
Marine Corps Reserve	46	47	41	30	33	34	34
Air National Guard	73	75	89	91	93	94	96
Air Force Reserve	61	43	47	48	57	58	59
Total	**953**	**922**	**925**	**823**	**807**	**832**	**868**
Direct Hire Civilian							
Army*	360	462	367	329	359	359	359
Navy	332	419	342	311	310	308	310
Air Force*	305	331	280	248	245	244	241
Defense Agencies	38	75	61	72	77	80	81
Total*	**1,035**	**1,287**	**1,050**	**960**	**991**	**991**	**990**

NOTE: Totals may not add due to rounding.

*These totals include Army and Air National Guard Technicians, who were converted from State to Federal employees in FY 1979. The FY 1964 and 1968 totals have been adjusted to include approximately 38,000 and 39,000 technicians respectively.

USAF SQUADRONS BY TYPE AND NUMBER

MAJOR AIR FORCE SQUADRONS	FY '64	FY '68	FY '74	FY '79	FY '80	FY '81
Bomber	75	40	28	25	25	25
ECM/Reconnaissance	5	3	1	1	1	1
IRBM/ICBM	35	26	26	26	26	26
Tanker	55	41	38	34	33	33
Interceptor	40	28	7	6	6	6
Bomarc	8	6	—	—	—	—
Command, Control & Surveillance	13	13	8	4	4	4
Tactical Bomber	2	1	—	—	—	—
Mace/Matador	8	2	—	—	—	—
Fighter	75	92	74	79	78	77
Reconnaissance	8	21	13	7	6	6
Tanker/Cargo	—	—	—	—	—	1
Tactical Air Control System	1	9	11	13	12	10
Special Operations Force	6	22	5	5	5	5
Tactical Airborne Command Control System	—	—	—	5	5	5
Tactical Electronic Warfare Support	—	—	—	—	—	1
Tactical Airlift	26	31	17	13	13	13
Strategic Airlift	35	32	17	17	17	17
Aeromed Evacuation	5	6	3	3	3	3
Special Mission	2	2	2	1	1	1
Mapping	2	2	1	—	—	—
Weather	6	6	3	2	2	1
Air Rescue & Recovery	12	14	12	7	7	7
Intelligence	—	15	9	5	5	5
Other	20	15	2	4	4	4
TOTAL, USAF	**439**	**427[1]**	**277**	**257**	**253**	**251**
Air National Guard	92	78	91	91	91	91
Air Force Reserve	50	37	53[2]	53[2]	53[2]	55
TOTAL, MAJOR FORCE SQUADRONS	**581**	**542**	**421**	**401**	**397**	**397**

NOTE: Data in FY '64–79 columns are actual; FY '80 and FY '81 data are estimated.
[1]Includes 20 Mobilized Units.
[2]Includes Associate Squadrons.

NUMBER OF AIRCRAFT PER ACTIVE-DUTY USAF SQUADRON

Aircraft Type	Number*
A-7	24
A-10	18 or 24
B-52	14, 15, 17, or 20
C-5	17 or 18
C-9	11
C-130	16
AC-130	10
KC-135	10, 15, or 16
C-141	18
E-3A	10
F-4	18 or 24
RF-4	18
F-5	22
F-15	18 or 24
F-16	18 or 24
F-106	18
F-111	18 or 24
FB-111	13

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

THE NUMBER OF ACTIVE AIRCRAFT AND FLYING HOURS

TYPE OF AIRCRAFT	FY '64	FY '68	FY '74	FY '78	FY '79	FY '80	FY '81
Bomber, Strategic	1,364	714	500	448	417	412	409
Bomber, Other	145	65	—	—	—	—	—
Tanker	998	667	657	525	525	528	533
Fighter/Interceptor/Attack	3,538	3,985	2,387	2,652	2,622	2,804	2,880
Reconnaissance/Electronic Warfare	595	1,009	610	419	366	356	357
Cargo/Transport	2,327	2,358	1,253	845	841	838	833
Search & Rescue (Fixed Wing)	100	91	56	37	35	35	35
Helicopter (includes Rescue)	401	465	317	246	230	223	221
Special Research	3	5	—	—	—	—	—
Trainer	2,873	2,584	1,996	1,739	1,704	1,687	1,678
Utility/Observation	345	663	154	210	210	195	197
TOTAL, USAF	**12,689**	**12,606**	**7,930**	**7,121**	**6,950**	**7,078**	**7,143**
Air National Guard total	1,806	1,438	1,798	1,539	1,522	1,561	1,661
Air Force Reserve total	719	426	428	478	487	489	459
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**	**9,138**	**8,959**	**9,128**	**9,263**
Active aircraft including foreign government owned				(9,301)	(9,150)	(9,268)	(9,408)
FLYING HOURS (000)							
USAF	6,028	7,068	3,272	2,582	2,646	2,668	2,654
Air National Guard	432	465	405	382	381	393	415
Air Force Reserve	202	164	128	139	139	137	133
TOTAL FLYING HOURS	**6,662**	**7,697**	**3,805**	**3,103**	**3,166**	**3,198**	**3,202**

NOTE: Data in FY '64–79 columns are actual; FY '80 and FY '81 data are estimated.

UNITED STATES AIR FORCE MEDAL OF HONOR WINNERS—1918–1980

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. 18, 1943, Wewak, New Guinea	Died as POW, Mar. 6, 1944
Craw, Col. Demas T.	Traverse City, Mich.	Nov. 8, 1942, Port Lyautey, French Morocco	KIA, Nov. 8, 1942
Doolittle, Lt. Col. James H.	Alameda, Calif.	Apr. 18, 1942, Tokyo, Japan	Los Angeles, Calif. (Ret. Lt. Gen.)
Erwin, SSgt. Henry E.	Adamsville, Ala.	Apr. 12, 1945, Koriyama, Japan	Birmingham, Ala.
Fernoyer, 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. Willlam 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	Marina Del Rey, Calif. (Ret. Col.)
Pease, Capt. Harl, Jr.	Plymouth, N.H.	Aug. 7, 1942, Rabaul, New Britain	KIA, Aug. 7, 1942
Pucket, 1st Lt. Donald D.	Longmont, Colo.	July 9, 1944, Ploesti, Romania	KIA, July 9, 1944
Sarnoski, 2d Lt. Joseph R.	Simpson, Pa.	June 16, 1943, Buka, Solomon Is.	KIA, June 16, 1943
Shomo, Maj. William A.	Jeannette, Pa.	Jan. 11, 1945, Luzon, P.I.	Pittsburgh, Pa. (Ret. Lt. Col.)
Smith, SSgt. Maynard H.	Caro, Mich.	May 1, 1943, St. Nazaire, France	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.	Boothbay Harbor, Me. (Ret. Col.)
KOREA			
Davis, Maj. George A., Jr.	Dublin, Tex.	Feb. 10, 1952, Sinuiju-Yalu River, No. Korea	KIA, Feb. 10, 1952
Loring, Maj. Charles J., Jr.	Portland, Me.	Nov. 22, 1952, Sniper Ridge, No. Korea	KIA, Nov. 22, 1952
Sebille, Maj. Louis J.	Harbor Beach, Mich.	Aug. 5, 1950, Hamch'ang, So. Korea	KIA, Aug. 5, 1950
Walmsley, Capt. John S., Jr.	Baltimore, Md.	Sept. 14, 1951, Yangdok, No. Korea	KIA, Sept. 14, 1951
VIETNAM			
Bennett, Capt. Steven L.	Palestine, Tex.	June 29, 1972, Quang Tri, So. Vietnam	KIA, June 29, 1972
Day, Col. George E.	Sioux City, Iowa	Conspicuous gallantry while POW	Shalimar, Fla. (Ret. Col.)
Dethlefsen, Maj. Merlyn H.	Greenville, Iowa	Mar. 10, 1967, Thai Nguyen, No. Vietnam	Fort Worth, Tex. (Ret. Col.)
Fisher, Maj. Bernard F.	San Bernardino, Calif.	Mar. 10, 1966, A Shau Valley, So. Vietnam	Kuna, Idaho (Ret. Col.)
Fleming, 1st Lt. James P.	Sedalia, Mo.	Nov. 26, 1968, Duc Co, So. Vietnam	Active duty, Maj., Marion, Tex.
Jackson, Lt. Col. Joe M.	Newnan, Ga.	May 12, 1968, Kham Duc, So. Vietnam	Kent, Wash. (Ret. Col.)
Jones, Lt. Col. William A. III	Norfolk, Va.	Sept. 1, 1968, Dong Hoi, No. Vietnam	Killed, Nov. 15, 1969, Woodbridge, Va.
Levitow, A1C John L.	Hartford, Conn.	Feb. 24, 1969, Long Binh, So. Vietnam	Vienna, Va.
Sijan, Capt. Lance P.	Milwaukee, Wis.	Conspicuous gallantry while POW	Died while POW, Jan. 1968
Thorsness, Lt. Col. Leo K.	Walnut Grove, Minn.	Apr. 19, 1967, No. Vietnam	Santa Monica, Calif. (Ret. Col.)
Wilbanks, Capt. Hilliard A.	Cornelia, Ga.	Feb. 24, 1967, Dalat, So. Vietnam	KIA, Feb. 24, 1967
Young, Capt. Gerald O.	Anacortes, Wash.	Nov. 9, 1967, Da Nang area, So. Vietnam	Active duty, Lt. Col., Shaw AFB, S.C.

SOME FAMOUS FIRSTS AMONG US BOMBARDMENT UNITS

June 12, 1918 First bombs dropped by an AEF bomb unit: 8 Breguet 14s of the 96th Aero Sqdn., led by Maj. Harry M. Brown, on Dommary-Baroncourt railyards in France.

Dec. 10, 1941 First heavy bomb mission of WW II: 5 B-17s of the 93d Bomb Sqdn., 19th Bomb Gp., led by Maj. Cecil Combs, attacked Japanese convoy near Vigan, P.I., also sank the first enemy vessel by US aerial combat bombing.

Apr. 18, 1942 First mission against Japan: 16 B-25s of the 17th Bomb Gp. and 89th Recce Sqdn., led by Lt. Col. James H. Doolittle, launched from the carrier *Hornet*.

June 12, 1942 First mission against a European target: 13 B-24s of HALPRO Detachment, led by Col. H. A. Halverson, flying from Egypt against Ploesti oil fields.

Jan. 27, 1943 First mission against the German homeland: 53 B-17s and B-24s of the 1st and 2d Bomb Wgs., flying from the UK, attacked the Wilhelmshaven naval base.

Aug. 6, 1945 First atomic bomb mission: The *Enola Gay*, a 509th Composite Gp. B-29, piloted by Col. Paul W. Tibbets, Jr., flying from Tinian, attacked Hiroshima, Japan.

USAF LEADERS THROUGH THE YEARS

SECRETARIES OF THE AIR FORCE

Stuart Symington	Sept. 18, 1947	Apr. 24, 1950
Thomas K. Finletter	Apr. 24, 1950	Jan. 20, 1953
Harold E. Talbott	Feb. 4, 1953	Aug. 13, 1955
Donald A. Quarles	Aug. 15, 1955	Apr. 30, 1957
James H. Douglas, Jr.	May 1, 1957	Dec. 10, 1959
Dudley C. Sharp	Dec. 11, 1959	Jan. 20, 1961
Eugene M. Zuckert	Jan. 24, 1961	Sept. 30, 1965
Harold Brown	Oct. 1, 1965	Feb. 15, 1969
Robert C. Seamans, Jr.	Feb. 15, 1969	May 14, 1973
John L. McLucas	July 18, 1973	Nov. 23, 1975
James W. Plummer (acting)	Nov. 24, 1975	Jan. 1, 1976
Thomas C. Reed	Jan. 2, 1976	Apr. 6, 1977
John C. Stetson	Apr. 6, 1977	May 18, 1979
Hans M. Mark	July 26, 1979	

USAF CHIEFS OF STAFF

Gen. Carl A. Spaatz	Sept. 26, 1947	Apr. 29, 1948
Gen. Hoyt S. Vandenberg	Apr. 30, 1948	June 29, 1953
Gen. Nathan F. Twining	June 30, 1953	June 30, 1957
Gen. Thomas D. White	July 1, 1957	June 30, 1961
Gen. Curtis E. LeMay	June 30, 1961	Jan. 31, 1965
Gen. John P. McConnell	Feb. 1, 1965	July 31, 1969
Gen. John D. Ryan	Aug. 1, 1969	July 31, 1973
Gen. George S. Brown	Aug. 1, 1973	June 30, 1974
Gen. David C. Jones	July 1, 1974	June 20, 1978
Gen. Lew Allen, Jr.	July 1, 1978	

AEROSPACE DEFENSE CENTER

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, Jr. (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	Jan. 1, 1980
Lt. Gen. James V. Hartinger	Jan. 1, 1980	

Formerly Air Defense Command.
Redesignated Aerospace Defense Command Jan. 1, 1968.
Redesignated Aerospace Defense Center Dec. 1, 1979.

AIR FORCE COMMUNICATIONS COMMAND

Maj. Gen. Harold W. Grant	July 1, 1961	Feb. 15, 1962
Maj. Gen. Kenneth P. Bergquist	Feb. 16, 1962	June 30, 1965
Maj. Gen. J. Francis Taylor, Jr.	July 1, 1965	Oct. 31, 1965
Maj. Gen. Richard P. Klocko	Nov. 1, 1965	July 2, 1967
Maj. Gen. Robert W. Paulson	July 15, 1967	Aug. 1, 1969
Maj. Gen. Paul R. Stoney	Aug. 1, 1969	Oct. 31, 1973
Maj. Gen. Donald L. Werbeck	Nov. 1, 1973	Aug. 24, 1975
Maj. Gen. Rupert H. Burris	Aug. 25, 1975	Oct. 31, 1977
Maj. Gen. Robert E. Sadler	Nov. 1, 1977	July 1, 1979
Maj. Gen. Robert T. Herres	July 1, 1979	

Formerly Air Force Communications Service.
Redesignated Air Force Communications Command Nov. 15, 1979.

AIR FORCE LOGISTICS COMMAND

Gen. Joseph T. McNarney	Oct. 14, 1947	Aug. 31, 1949
Lt. Gen. Benjamin W. Chidlaw	Sept. 1, 1949	Aug. 20, 1951
Gen. Edwin W. Rawlings	Aug. 21, 1951	Feb. 28, 1959
Lt. Gen. William F. McKee	Mar. 1, 1959	Mar. 14, 1959
Gen. Samuel E. Anderson	Mar. 15, 1959	July 31, 1961
Gen. William F. McKee	Aug. 1, 1961	June 30, 1962
Gen. Mark E. Bradley, Jr.	July 1, 1962	July 31, 1965
Gen. Kenneth B. Hobson	Aug. 1, 1965	July 31, 1967
Gen. Thomas P. Gerrity	Aug. 1, 1967	Feb. 24, 1968
Lt. Gen. Lewis L. Mundell (acting)	Feb. 24, 1968	Mar. 28, 1968
Gen. Jack G. Merrell	Mar. 29, 1968	Sept. 11, 1972
Gen. Jack J. Catton	Sept. 12, 1972	Aug. 31, 1974
Gen. William V. McBride	Sept. 1, 1974	Aug. 31, 1975
Gen. F. Michael Rogers	Sept. 1, 1975	Jan. 27, 1978
Gen. Bryce Poe II	Jan. 28, 1978	

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, Jr.	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	Apr. 1, 1979
Gen. Bennie L. Davis	Apr. 1, 1979	

AIR UNIVERSITY

Maj. Gen. Muir S. Fairchild	Mar. 15, 1946	May 17, 1948
Maj. Gen. Robert W. Harper	May 17, 1948	Oct. 15, 1948
Gen. George C. Kenney	Oct. 16, 1948	July 27, 1951
Lt. Gen. Idwal H. Edwards	July 28, 1951	Feb. 28, 1953
Lt. Gen. Laurence S. Kuter	Apr. 15, 1953	May 31, 1955
Lt. Gen. Dean C. Strother	June 1, 1955	June 30, 1958
Lt. Gen. Walter E. Todd	July 15, 1958	July 31, 1961
Lt. Gen. Troup Miller, Jr.	Aug. 1, 1961	Dec. 31, 1963
Lt. Gen. Ralph P. Swofford, Jr.	Jan. 1, 1964	July 31, 1965
Lt. Gen. John W. Carpenter III	Aug. 1, 1965	July 31, 1968
Lt. Gen. Albert P. Clark	Aug. 1, 1968	July 31, 1970
Lt. Gen. Alvan C. Gillem II	Aug. 1, 1970	Oct. 31, 1973
Lt. Gen. F. Michael Rogers	Nov. 1, 1973	Aug. 31, 1975
Lt. Gen. Raymond B. Furlong	Sept. 1, 1975	July 1, 1979
Lt. Gen. Stanley M. Umstead	July 1, 1979	

Air University became 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	June 30, 1978
Lt. Gen. Winfield W. Scott, Jr.	July 1, 1978	

MILITARY AIRLIFT COMMAND

Lt. Gen. Laurence S. Kuter	June 1, 1948	Oct. 28, 1951
Lt. Gen. Joseph Smith	Nov. 15, 1951	June 30, 1958
Lt. Gen. William H. Tunner	July 1, 1958	May 31, 1960
Gen. Joe W. Kelly, Jr.	June 1, 1960	July 18, 1964
Gen. Howell M. Estes, Jr.	July 19, 1964	July 31, 1969
Gen. Jack J. Catton	Aug. 1, 1969	Sept. 12, 1972
Gen. Paul K. Carlton	Sept. 20, 1972	Mar. 31, 1977
Gen. William G. Moore, Jr.	Apr. 1, 1977	June 30, 1979
Gen. Robert E. Huyser	July 1, 1979	

Formerly Military Air Transport Service.
Redesignated as Military Airlift Command Jan. 1, 1966.

PACIFIC AIR FORCES

Lt. Gen. Ennis C. Whitehead	Dec. 30, 1945	Apr. 25, 1949
Lt. Gen. George E. Stratemeyer	Apr. 26, 1949	May 20, 1951
Lt. Gen. Earle E. Partridge (acting)	May 21, 1951	June 9, 1951
Gen. O. P. Weyland	June 10, 1951	Mar. 25, 1954
Gen. Earle E. Partridge	Mar. 26, 1954	May 31, 1955
Gen. Laurence S. Kuter	June 1, 1955	July 31, 1959
Gen. Emmett O'Donnell, Jr.	Aug. 1, 1959	July 31, 1963
Gen. Jacob E. Smart	Aug. 1, 1963	July 31, 1964
Gen. Hunter Harris, Jr.	Aug. 1, 1964	Jan. 31, 1967
Gen. John D. Ryan	Feb. 1, 1967	July 31, 1968
Gen. Joseph J. Nazzaro	Aug. 1, 1968	July 31, 1971
Gen. Lucius D. Clay, Jr.	Aug. 1, 1971	Sept. 30, 1973
Gen. John W. Vogt	Oct. 1, 1973	June 30, 1974
Gen. Louis L. Wilson, Jr.	July 1, 1974	May 31, 1977
Lt. Gen. James A. Hill	June 1, 1977	June 14, 1978
Lt. Gen. James D. Hughes	June 15, 1978	

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. W. 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	Aug. 1, 1978
Gen. John W. Pauly	Aug. 1, 1978	

ELECTRONIC SECURITY COMMAND

Col. Roy H. Lynn	Oct. 26, 1948	July 5, 1949
Col. Travis M. Hetherington	July 6, 1949	Feb. 21, 1951
Maj. Gen. Roy H. Lynn	Feb. 22, 1951	Feb. 13, 1953
Maj. Gen. Harold H. Bassett	Feb. 14, 1953	Jan. 3, 1957
Maj. Gen. Gordon L. Blake	Jan. 4, 1957	Aug. 5, 1959
Maj. Gen. John B. Ackerman	Aug. 6, 1959	Sept. 20, 1959
Maj. Gen. Millard Lewis	Sept. 21, 1959	Aug. 31, 1962
Maj. Gen. Richard P. Klocko	Sept. 1, 1962	Oct. 15, 1965
Maj. Gen. Louis E. Coira	Oct. 16, 1965	July 18, 1969
Maj. Gen. Carl W. Stapleton	July 19, 1969	Feb. 23, 1973
Maj. Gen. Walter T. Galligan	Feb. 24, 1973	May 16, 1974
Maj. Gen. Howard P. Smith	May 17, 1974	July 31, 1975
Maj. Gen. K. D. Burns	Aug. 1, 1975	Jan. 18, 1979
Maj. Gen. Doyle E. Larson	Jan. 19, 1979	

Formerly USAF Security Service.
Redesignated Electronic Security Command Aug. 1, 1979.

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	

AIR FORCE RESERVE

Maj. Gen. Rollin B. Moore, Jr.	Aug. 1, 1968	Jan. 26, 1972
Brig. Gen. Alfred Verhulst (acting)	Jan. 27, 1972	Mar. 15, 1972
Maj. Gen. Homer I. Lewis	Mar. 16, 1972	Apr. 8, 1975
Maj. Gen. William Lyon	Apr. 16, 1975	Apr. 16, 1979
Maj. Gen. Richard Bodycombe	Apr. 17, 1979	

Since Mar. 16, 1972, the Chief of Air Force Reserve has been dual-hatted as Commander, Hq. Air Force Reserve (AFRES). The earlier Chief of Air Force Reserve was Maj. Gen. Tom E. Marchbanks, Jr., from Jan. 18, 1968, to Feb. 1, 1971.

AIR NATIONAL GUARD

Col. William A. R. Robertson	Nov. 28, 1945	Oct. 1948
Maj. Gen. George G. Finch	Oct. 1948	Sept. 25, 1950
Maj. Gen. Earl T. Ricks	Oct. 13, 1950	Jan. 4, 1954
Maj. Gen. Winston P. Wilson	Jan. 26, 1954	Aug. 5, 1962
Maj. Gen. I. G. Brown	Aug. 6, 1962	Apr. 19, 1974
Maj. Gen. John J. Pesch	Apr. 20, 1974	Jan. 31, 1977
Maj. Gen. John T. Guice	Feb. 1, 1977	

The ANG head was Chief, Aviation Group, National Guard Bureau until 1948, when the title changed to Chief, Air Force Division, NGB. In Dec. 1969 the title was changed to the present Director, Air National Guard.

CHIEF MASTER SERGEANTS OF THE AIR FORCE

CMSAF Paul W. Airey	Apr. 3, 1967	Aug. 1, 1969
CMSAF Donald L. Harlow	Aug. 1, 1969	Oct. 1, 1971
CMSAF Richard D. Kisling	Oct. 1, 1971	Oct. 1, 1973
CMSAF Thomas N. Barnes	Oct. 1, 1973	Aug. 1, 1977
CMSAF Robert D. Gaylor	Aug. 1, 1977	Aug. 1, 1979
CMSAF James M. McCoy	Aug. 1, 1979	

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 took much time as a result of the great number of victories (16,591 full and partial credits) and the many different procedures used to record them. The final documented list of all World War II combat scores is now available in printed form. It is USAF Historical Study No. 85, titled "USAF Credits for the Destruction of Enemy Aircraft, World War II." Copies at $8.85 each may be ordered from the Albert F. Simpson Historical Research Center, Maxwell AFB, Ala. 36112.

Although some World War I totals (notably Frank Luke's) include balloons, all entries for subsequent conflicts are for air-to-air victories.

—THE EDITORS

LEADING AMERICAN ACES OF WORLD WAR I

(Ten or more victories)

Rickenbacker, Capt. Edward V. (AEF)	26	Luke, 2d Lt. Frank, Jr. (AEF)	18	Bennett, 1st Lt. Louis B. (RFC)	12
Lambert, Capt. William C. (RFC)	22	Lufbery, Maj. Raoul G. (FFC/LE)	17	Kindley, Capt. Field E. (AEF)	12
Gillette, Capt. Frederick W. (RFC)	20	Kullberg, Lt. Harold A. (RFC)	16	Putnam, 1st Lt. David E. (LE/AEF)	12
Malone, Capt. John J. (RN)	20	Rose, Capt. Oren J. (RFC)	16	Springs, Capt. Elliott W. (AEF)	12
Wilkinson, Maj. Alan M. (RFC)	19	Warman, Lt. C. T. (RFC)	15	Iaccaci, Lt. Thayer A. (RFC)	11
Hale, Capt. Frank L. (RFC)	18	Libby, Capt. Frederick (RFC)	14	Landis, Capt. Reed G. (AEF)	11
Iaccaci, Capt. Paul T. (RFC)	18	Vaughn, 1st Lt. George A. (AEF)	13	Swaab, Capt. Jacques M. (AEF)	10
		Baylies, Lt. Frank L. (FFC/LE)	12		

AEF—American Expeditionary Force
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	Godfrey, Capt. John T.	16.33
McGuire, Maj. Thomas B., Jr.	38	Carson, Capt. Leonard K.	18.50	Anderson, Capt. Clarence E., Jr.	16.25
Gabreski, Lt. Col. Francis S.	28*	Eagleston, Maj. Glenn T.	18.50*	Dunham, Lt. Col. William D.	16
Johnson, Capt. Robert S.	27	Hill, Col. David L. (AVG/USAF) (12.25)	18.25**	Harris, Lt. Col. Bill	16
MacDonald, Col. Charles H.	27			Welch, Capt. George S.	16
Preddy, Maj. George E.	26.83	Older, Lt. Col. Charles H. (AVG/USAF) (11.25)	18.25**	Beerbower, Capt. Donald M.	15.50
Meyer, Lt. Col. John C.	24*			Brown, Maj. Samuel J.	15.50
Schilling, Col. David C.	22.50	Beckham, Maj. Walter C.	18	Peterson, Capt. Richard A.	15.50
Johnson, Lt. Col. Gerald R.	22	Green, Maj. Herschel H.	18	Whisner, Capt. William T., Jr.	15.50*
Kearby, Col. Neel E.	22	Herbst, Col. John C.	18	Blakeslee, Col. Donald J. M. (ES/USAF) (3.5)	15**
Robbins, Maj. Jay T.	22	Zemke, Lt. Col. Hubert	17.75		
Christensen, Capt. Fred J.	21.50	England, Maj. John B.	17.50	Bradley, Lt. Col. Jack T.	15
Wetmore, Capt. Ray S.	21.25	Beeson, Capt. Duane W.	17.33	Cragg, Maj. Edward	15
Voll, Capt. John J.	21	Thornell, 1st Lt. John F., Jr.	17.25	Foy, Maj. Robert W.	15
Mahurin, Maj. Walker M.	20.75*	Reed, Lt. Col. William N. (AVG/USAF) (11)	17**	Hofer, 2d Lt. Ralph K.	15
Lynch, Lt. Col. Thomas J.	20			Homer, Capt. Cyril F.	15
Westbrook, Lt. Col. Robert B.	20	Varnell, Capt. James S., Jr.	17	Landers, Lt. Col. John D.	14.50
Gentile, Capt. Donald S.	19.83	Johnson, Maj. Gerald W.	16.50	Powers, Capt. Joe H., Jr.	14.50

* Aces who added to these scores by victories in the Korean War. Ranks are as of last victory in World War II.

AVG—American Volunteer Group
ES—Eagle Squadron

** The Simpson Center has no way of verifying kills claimed (in parentheses) while flying with AVG or ES.

USAF ACES OF THE KOREAN WAR

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

* Colonel Olds's 4 additional victories came during the Vietnam War.

AMERICAN ACES OF THE VIETNAM WAR

DeBellevue, Capt. Charles 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, Maj. Jay T.	22	WW II
Gabreski, Col. Francis S.	34.50	WW II, Korea	Christensen, Capt. Fred J.	21.50	WW II
Johnson, Lt. Col. Robert S.	27	WW II	Wetmore, Capt. Ray S.	21.25	WW II
MacDonald, Col. Charles H.	27	WW II	Davis, Maj. George A., Jr.	21	WW II, Korea
Preddy, Maj. George E.	26.83	WW II	Voll, Capt. John J.	21	WW II
Meyer, Col. John C.	26	WW II, Korea	Whisner, Maj. William T., Jr.	21	WW II, Korea
Rickenbacker, Capt. Edward V.	26	WW I	Eagleston, Col. Glenn T.	20.50	WW II, Korea
Mahurin, Col. Walker M.	24.25	WW II, Korea	Lynch, Lt. Col. Thomas J.	20	WW II
Schilling, Col. David C.	22.50	WW II	Westbrook, Lt. Col. Robert B.	20	WW II
Johnson, Lt. Col. Gerald R.	22	WW II	Gentile, Capt. Donald S.	19.83	WW II

SOME FAMOUS FIGHTER FIRSTS

First American to down 5 enemy aircraft in WW I	Capt. Frederick Libby (serving with the RFC)
First American ace of WW I	Capt. Alan M. Wilkinson (RFC)
First American ace to serve with the AEF	Capt. Raoul G. Lufbery (FFC/LE)
First American AEF ace of WW I	Capt. Douglas Campbell
First American ace of WW II	Pilot Officer William R. Dunn (RAF)
First American USAAF ace of WW II	Lt. Boyd D. "Buzz" Wagner
First American to score an aerial victory in Korea	1st Lt. William G. Hudson (June 27, 1950)
First jet-to-jet kill of the Korean War	1st. Lt. Russell J. Brown (Nov. 8, 1950)
First American ace of the Korean War	Capt. James Jabara (May 20, 1951)
First American ace of two wars	Maj. A. J. "Ajax" Baumler (8 in Spain; 5 in WW II)
First USAF ace of two wars	Maj. William T. Whisner, Jr. (15.5 in WW II; 5.5 in Korea)
First USAF ace with victories in WW II and Vietnam	Col. Robin Olds (12 in WW II; 4 in Vietnam)

Source: *Fighter Aces*, by Col. Raymond F. Toliver and Trevor J. Constable, Macmillan Co., N. Y., 1965.

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, training for C-141 and C-5 crews; basic Flight Engineer course. 340th Air Refueling Gp. (SAC); 2002d Communications Sqdn. (AFCC). Base activated Jan. 1943; inactivated May 1945; reactivated Jan. 1953. Area 4,113 acres. Altitude 1,376 ft. Military 3,315; civilians 847. Payroll $50.7 million. Housing: 163 officer; 637 NCO; 5 transient (3 temp. quarters, 2 guest units). 40-bed hospital.

Andersen AFB, Guam 96334; 16.8 mi. N of Agana. Phone (671) 366-1110; AUTOVON 322-1110. SAC base. Hq. 3d Air Div., 43d Strategic Wing. Base activated as North Field, 1945. Renamed Oct. 7, 1949, in memory of Brig. Gen. James Roy Andersen, reported missing on flight from Guam to Hawaii, Feb. 26, 1945. Area 20,736 acres, incl. off-base facilities. Altitude 550 ft. Military 3,746; civilians 1,265. Payroll $58.3 million. Housing: 331 officer; 1,420 NCO.

Andrews AFB, Md. 20331; 11 mi. SE of Washington, D. C. Phone (301) 981-9111; AUTOVON 858-1110. MAC base. 76th Air Base Gp.; Hq. Air Force Systems Command; 76th Military Airlift Wing; 89th Military Airlift Gp.; 113th Tactical Fighter Wing (ANG); 459th Tactical Airlift Wing (AFRES); 2045th Communications Gp.; Det. 11, 1361st Audiovisual Sqdn. Base activated June 1943; named for Lt. Gen. Frank M. Andrews, military air pioneer, WW II CG, European Theater, killed in aircraft accident May 3, 1943, in Iceland. Area 4,216 acres. Altitude 279 ft. Military 5,360; civilians 2,397. Payroll $138 million. Housing: 392 officer; 1,696 NCO; 273 transient (incl. 82 temp. living quarters for incoming personnel, 141 VOQ spaces, 50 TAQ spaces). 250-bed hospital.

Arnold AFS, Tenn. 37389; approx. 7 mi. SE of Manchester. Phone (615) 455-2611; AUTOVON 882-1520. AFSC station; site of Arnold Engineering Development Center, free world's largest complex of wind tunnels, jet and rocket engine test cells, space simulation chambers, and hyperballistic ranges, which support the acquisition of new aerospace systems by conducting research, development, and evaluation testing for USAF, other 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. Military 90; civilians 3,180. Payroll $86 million. Housing: 24 officer; 16 NCO; 48 transient. Dispensary.

Barksdale AFB, La. 71110; in Bossier City. Phone (318) 456-2252; AUTOVON 781-1110. SAC base. Hq. 8th Air Force; 2d Bomb Wing. Base is also site of 917th Tactical Fighter Gp. (AFRES). In Oct. 1980 will become first USAF installation to receive the KC-10 Extender tanker aircraft. Base named for Lt. Eugene H. Barksdale, WW I airman killed Aug. 11, 1926, in crash near Wright Field, Ohio. Area 22,000 acres (20,000 acres reserved for recreational area). Altitude 167 ft. Military 5,463; civilians 918. Payroll $91.3 million. Housing: 170 officer; 863 NCO; 29 transient. 65-bed hospital.

Beale AFB, Calif. 95903; 13 mi. E of Marysville. Phone (916) 634-3000; AUTOVON 368-1110. SAC base. 14th Air Div.; 9th Strategic Recon Wing; 100th Air Refueling Wing; 7th Missile Warning Sqdn. (PAVE PAWS); 1883d Communications Sqdn. (AFCC). Beale is the only USAF base having SR-71 and U-2 reconnaissance aircraft. Originally US Army's Camp Beale, it became an Air Force installation in Nov. 1948 and an AFB in Dec. 1951. Named for Brig. Gen. Edward F. Beale, Indian agent in California before the Civil War. Area 22,944 acres. Altitude 113 ft. Military 4,370; civilians 575. Payroll $60.8 million. Housing: 395 officer; 1,342 NCO; 45 transient. 30-bed hospital.

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 Recon Wing (host) with RF-4C recon operations; 602d Tactical Air Control Wing; 924th Tactical Airlift Gp. (AFRES) with C-130B airlift operations; TAC NCO Academy. Base activated Sept. 22, 1942; named for Capt. John A. E. Bergstrom, first Austin serviceman killed in WW II, died Dec. 8, 1941, at Clark Field, Philippines. Area 3,998 acres. Altitude 541 ft. Military 4,717; civilians 752. Payroll $88.5 million. Housing: 92 officer; 612 NCO; 190 transient. 30-bed hospital.

Blytheville AFB, Ark. 72315; 4 mi. NW of Blytheville. Phone (501) 762-7000; AUTOVON 637-1110. SAC base. 42d Air Div.; 97th Bomb Wing. Base activated June 1942; inactivated Feb. 1947; reactivated Aug. 1955. Area 3,093 acres. Altitude 254 ft. Military 2,808; civilians 409. Payroll $37 million. Housing: 203 officer; 727 NCO. 25-bed hospital.

Bolling AFB, D. C. 20332; 3 mi. S of US Capitol. Phone (202) 545-6700; AUTOVON 227-0101. MAC base. 1100th Air Base Gp.; Air Force Office of Scientific Research (AFSC); Air Reserve Personnel Center Operating Location; Air Force Chief of Chaplains; US Air Force Office of History. Activated Oct. 1917; named for Col. Raynal C. Bolling, Ass't Chief of Air Service, killed in France during WW I. Area 604 acres. Altitude 16 ft. Military 1,562; civilians 1,157. Payroll $26.5 million. Housing: 296 officer; 1,100 NCO; 168 transient (incl. 69 VAQs, 84 VOQs, 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 Div., USAF School of Aerospace Medicine; USAF Occupational and Environmental Lab, and USAF Human Resources Lab; tenant units include the USAF Medical Service Center, a security squadron, and a communications group. Base activated Dec. 8, 1917; named for Cadet Sidney J. Brooks, Jr., killed Nov. 13, 1917, on his final solo flight before commissioning. Area 1,330 acres. Altitude 600 ft. Military 1,415; civilians 865. Payroll $42 million. Housing: 70 officer; 100 NCO; 8 transient. Dispensary.

Cannon AFB, N. M. 88101; 7 mi. W of Clovis. Phone (505) 784-3311; AUTOVON 681-1110. TAC base. 27th Tactical Fighter Wing, F-111D fighter operations. Activated Aug. 1942; named for Gen. John K. Cannon, WW II commander of all Allied Air Forces in Mediterranean theater. Area 3,780 acres. Altitude 4,295 ft. Military 3,773; civilians 404. Payroll $54.6 million. Housing: 149 officer; 862 NCO; 104 transient. 25-bed hospital.

Carswell AFB, Tex. 76127; 7 mi. WNW of downtown Fort Worth. Phone (817) 738-5000; AUTOVON 739-1110. SAC base. 19th Air Div.; 7th

Bomb Wing (SAC); 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. Military 5,192; civilians 1,136. Payroll $68 million. Housing: 128 officer; 679 NCO. 140-bed hospital.

Castle AFB, Calif. 95342; 8 mi. NW of Merced. Phone (209) 726-2011; AUTOVON 347-1110. SAC base. 93d Bomb Wing. Base conducts training of all SAC B-52G and H and KC-135 crews. Also houses 84th Fighter Interceptor Sqdn. (TAC). 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. Military 5,690; civilians 825. Payroll $82.2 million. Housing: 90 officer; 844 NCO; 380 transient (incl. 104 VAQs, 276 VOQs, 4 TLQs). 30-bed hospital.

Chanute AFB, Ill. 61868; 14 mi. N of Champaign. Phone (217) 495-1110; AUTOVON 862-1110. ATC base. Chanute Technical Training Center provides technical training in missile and aircraft maintenance, fire fighting, and weather. Chanute Technical Training Display Center is base museum. Base activated May 1, 1917; named for Octave Chanute, aeronautical engineer and glider pioneer who died in 1910. Area 2,100 acres. Altitude 737 ft. Military 7,361; civilians 1,411. Payroll $85 million. Housing: 140 officer; 1,518 NCO; 8 transient. 60-bed hospital.

Charleston AFB, S. C. 29404; in North Charleston. Phone (803) 554-0230; AUTOVON 583-0111. MAC base, joint-use airport. 437th Military Airlift Wing and 315th MAW (AFRES Associate). Also 1968th Communications Sqdn.; Det. 1, 48th Fighter Interceptor Sqdn. (TAC); and Det. 7, 1361st Audiovisual Sqdn. Base activated June 1942, inactivated Feb. 1946; reactivated Aug. 1953. Area 3,772 acres. Altitude 45 ft. Military 7,049 (incl. Reserves); civilians 1,750. Payroll $82.5 million. Housing: 142 officer; 813 NCO; 75 trailer spaces; 463 transient (incl. 117 VOQs, 346 VAQs). Dispensary.

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. Military 2,402; civilians 666. Payroll $35 million. Housing: 262 officer; 558 NCO. 15-bed hospital.

Davis-Monthan AFB, Ariz. 85707; within city limits of Tucson. Phone (602) 748-3900; AUTOVON 361-1110. TAC base. Hq. Tactical Training, Davis-Monthan; 355th Tactical Fighter Wing; A-10 combat crew training; 390th Strategic Missile Wing (Titan II) (SAC). Also site of AFLC's Military Aircraft Storage and Disposition Center. Base activated in 1927; named for two local aviation accident victims—1st Lt. Samuel H. Davis, killed Dec. 28, 1921; and 2d Lt. Oscar Monthan, killed Mar. 27, 1924. Area 11,000 acres. Altitude 2,705 ft. Military 5,621; civilians 1,559. Payroll $92.5 million. Housing: 215 officer; 1,040 NCO. 80-bed hospital.

Dobbins AFB, Ga. 30060; 2 mi. S of Marietta; 16 mi. NW of Atlanta. Phone (404) 424-8811; AUTOVON 925-1110. AFRES base. Hq. 14th Air Force

ctive Air Force Installations in the US

(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 near Sicily. Area 2,214 acres. Altitude 1,068 ft. Military 142; civilians 756; Reserve 1,360. Payroll $15.2 million. Housing: 3 officer; 6 NCO. Dispensary.

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 the largest air cargo port on the East Coast. Base activated Dec. 1941; inactivated 1946; reactivated Feb. 1951. Area 3,600 acres. Altitude 28 ft. Military 5,084; civilians 1,384. Payroll $84.4 million. Housing: 229 officer; 1,327 NCO; 297 transient. 30-bed hospital.

Duluth International Airport, Minn. 55814; 5 mi. NW of Duluth. Phone (218) 727-8211; AUTOVON 825-0011. 23d NORAD Region; 23d Air Div. (TAC); SAGE Control Center (NORAD); 4787th Air Base Gp. (TAC); 148th Tactical Recon Gp. (MANG). Activated Mar. 1951. Area 1,139 acres. Altitude 1,429 ft. Military 1,038; civilians 268. Payroll $19.1 million. Housing: 70 officer; 361 military; 24 transient. Dispensary.

Dyess AFB, Tex. 79607; WSW border of Abilene. Phone (915) 696-0212; AUTOVON 461-1110. SAC base. 12th Air Div. and 96th Bomb Wing (SAC); 463d Tactical Airlift Wing (MAC). Base activated Apr. 1942; deactivated Dec. 1945; reactivated Sept. 1955; named for Lt. Col. William E. Dyess, WW II fighter pilot killed in P-38 crash at Burbank, Calif., Dec. 23, 1943. Area 6,058 acres. Altitude 1,789 ft. Military 4,850; civilians 423. Payroll $69.3 million. Housing: 177 officer; 847 NCO; 124 transient. 40-bed hospital (155 capacity in 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, and supersonic and transonic flight research. Other tenant units include US Army Aviation Engineering Flight Activity and USAF Rocket Propulsion Lab. 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. Military 4,038; civilians 4,824. Payroll $159.9 million. Housing: 658 officer; 3,380 NCO; 125 transient. 30-bed hospital.

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. AF Armament Development and Test Center; AF Armament Lab; 3246th Test Wing; 39th Aerospace Rescue and Recovery Wing; 33d Tactical Fighter Wing; Tac Air Warfare Center; 919th Special Operations Gp. (AFRES); 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. Military 12,604; civilians 3,586. Payroll $205.6 million. Housing: 313 officer; 2,024 NCO; 84 transient. 185-bed hospital.

Eielson AFB, Alaska 99702; 26 mi. SE of Fairbanks. Phone (907) 372-1181; AUTOVON (317) 377-1292. AAC base. 5010th Combat Support Gp. is host unit. Air defense, search and rescue for AAC; 6th Strategic Wing (SAC) tanker operations; communications for AFCC; Arctic Survival School (ATC). Activated Oct. 1944; named for Carl B. Eielson, Arctic aviation pioneer, died Nov. 1929. Area 35,000 acres (approx.). Altitude 534 ft. Military 2,576; civilians 344. Payroll $49.2 million. Housing: 148 officer; 1,015 NCO; 20 transient. Dispensary.

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 postattack command and control system sqdn. Activated July 1954; named for Brig. Gen. Richard E. Ellsworth, killed Mar. 18, 1953, in crash of an RB-36 in Newfoundland. Area 5,675 acres. Altitude 3,600 ft. Military 5,937; civilians 778. Payroll $88.2 million. Housing: 414 officer; 1,482 NCO; 141 transient. 40-bed hospital.

Elmendorf AFB, Alaska 99506; bordering Anchorage. Phone (907) 752-1110; AUTOVON (317) 752-1110. AAC base. Hq. Alaskan Air Command; 21st Tactical Fighter Wing: NORAD Region Control Center; Rescue Coordination Center; 531st Aircraft Control and Warning Gp.; 21st Combat Support Gp.; 18th Tactical Fighter Sqdn.; 43d Tactical Fighter Sqdn.; 1931st Communications Gp. (AFCC); 6981st Electronic Security Sqdn. (ESC); 616th Military Airlift Gp. (MAC); 17th Tactical Airlift Sqdn. (MAC); 71st Aerospace Rescue and Recovery Sqdn. (MAC); 11th Weather Sqdn. (MAC); plus varied US Army and Navy activities. Base activated July 1940; named for Capt. Hugh M. Elmendorf, killed Jan. 13, 1933, at Wright Field, Ohio, while flight-testing a new type of pursuit plane. Area 13,400 acres. Altitude 118 ft. Military 6,184; civilians 1,222. Payroll $90 million. Housing: 356 officer; 1,839 NCO; 140 transient. 140-bed hospital.

England AFB, La. 71301; 5 mi. W of Alexandria. Phone (318) 448-2100; AUTOVON 683-1110. TAC base. 23d Tactical Fighter Wing, A-7D fighter operations. Base activated Oct. 1942; named for Lt. Col. John B. England, WW II P-51 pilot and ace, credited with 17.5 victories, killed Nov. 17, 1954, in France, in F-86 crash. Area 2,282 acres. Altitude 89 ft. Military 2,992; civilians 558. Payroll $37.9 million. Housing: 109 officer; 491 NCO; 44 transient. 40-bed hospital.

Fairchild AFB, Wash. 99011; 12 mi. WSW of Spokane. Phone (509) 247-1212; AUTOVON 352-1110. SAC base. 47th Air Div.; 92d Bomb Wing (SAC); 3636th Combat Crew Training Wing (ATC); 141st Air Refueling Wing (ANG); Det. 24, 40th Aerospace Rescue and Recovery Sqdn. (MAC); Det. 1, 4000th Aerospace Applications Gp. (SAC); and 2039th Communications Sqdn. (AFCC). Base activated Jan. 1942; named for Gen. Muir S. Fairchild, USAF Vice Chief of Staff at time of his death in 1950. Area 5,021 acres. Altitude 2,462 ft. Military 4,000; civilians 1,025. Payroll $73.8 million. Housing: 502 officer; 1,079 NCO; 122 transient (60 VOQs, 62 VAQs). 45-bed hospital.

Francis E. Warren AFB, Wyo. 82001; adjacent to Cheyenne. Phone (307) 775-1110; AUTOVON 481-1110. SAC base. 4th Air Div.; 90th Strategic Missile Wing. Base activated July 4, 1867; under Army jurisdiction until 1947, when assigned to USAF. Home of the first Atlas-D ICBM missile wing (1960–65), named for Francis Emory Warren, Wyoming senator and early governor of the state. Base has 7,600 acres, plus 200 Minuteman III missile sites distributed over more than 15,000 sq. mi. Altitude 6,124 ft. Military 3,610; civilians 506. Payroll $45.9 million. Housing: 211 officer; 620 NCO; 36 transient. 25-bed hospital.

George AFB, Calif. 92392; 6 mi. NW of Victorville. Phone (714) 269-1110; AUTOVON 353-1110. TAC base. Hq. Tactical Training, George; 35th Tactical Fighter Wing, F-4 and F-105 transitional and upgrade training; German Air Force training in the F-4. Home of TAC's F-4G and F-105G "Wild Weasel" sqdns. TAC F-106 detachment. Base activated in 1941; named for Brig. Gen. Harold H. George, WW I fighter ace, killed Apr. 29, 1942, in Australia in aircraft accident. Area 5,347 acres. Altitude 2,875 ft. Military 4,838; civilians 548. Payroll $62.8 million. Housing: 229 officer; 1,412 NCO; 40 transient. 30-bed hospital.

Goodfellow AFB, Tex. 76903; 2 mi. SE of San Angelo. Phone (915) 653-3231; AUTOVON 477-2011. ATC base. 3480th Technical Training Wing; USAF Technical Training School. Base activated Jan. 1941; named for Lt. John J. Goodfellow, Jr., WW I fighter pilot killed in combat Sept. 17, 1918. Area 1,127 acres. Altitude 1,877 ft. Military 2,291; civilians 380. Payroll $29 million. Housing: 3 officer; 96 NCO; 86 transient (23 VAQs, 63 VOQs). Dispensary.

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. Military 5,140; civilians 705. Payroll $67.2 million. Housing: 542 officer; 1,661 NCO; 71 transient. 30-bed hospital.

Griffiss AFB, N. Y. 13441; 1 mi. NE of Rome. Phone (315) 330-1110; AUTOVON 587-1110. SAC base. 416th Bomb Wing. Major tenant is Rome Air Development Center (RADC), part of AFSC. Base also houses Hq. AFCC's Northern Communications Area; 485th Communications and Installations Gp.; and a TAC fighter interceptor sqdn. 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 in line of duty during WW II. Area 3,696 acres. Altitude 504 ft. Military 3,850; civilians 2,893. Payroll $104.1 million. Housing: 175 officer; 558 NCO; 140 transient. 70-bed hospital.

Grissom AFB, Ind. 46971; 7 mi. S of Peru. Phone (317) 689-5211; AUTOVON 928-1110. SAC base. 305th Air Refueling Wing; 434th Tactical Fighter Wing (AFRES). 931st Air Refueling Gp. (AFRES). Activated Jan. 1943 for Navy flight training; reactivated June 1954 as Bunker Hill AFB; renamed May 1968 for Lt. Col. Virgil I. "Gus" Grissom, killed Jan. 27, 1967, at Cape Kennedy, Fla., with other Astronauts Edward White and Roger Chaffee, in Apollo capsule fire. Area 2,810 acres. Altitude 800 ft. Military 4,183; civilians 696. Payroll $29.9 million (SAC only). Housing: 324 officer; 1,988 NCO; 18 transient. Dispensary.

Gunter AFS, Ala. 36114; 4 mi. NE of Montgomery. Phone (205) 279-1110; AUTOVON 921-1110. ATC station. 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, longtime mayor of Montgomery and airpower exponent, died 1940. Area about 2 sq. mi. Altitude 166 ft. Military 1,167; civilians 829. (Payroll included in entry for Maxwell AFB, below.) Housing: 118 officer; 206 NCO; 108 transient.

Hancock Field, N. Y. 13225; 10 mi. NNE of Syracuse. Phone (315) 458-5500; AUTOVON 587-9110. TAC base. 4789th Air Base Gp., host unit, supports 21st NORAD Region/Air Div.; 113th Tactical Control Flight (NYANG); 174th Tactical Fighter Wing (NYANG); 3513th USAF Recruiting Sqdn. Base activated Sept. 1942 as Syracuse Army Air Base, renamed Mar. 1952 for Clarence E. Hancock (1885–1949), prominent local citizen and member of US House of Representatives. Area 765 acres. Altitude 421 ft. Military 1,065; civilians 306. Payroll $15.2 million. Housing: 61 officer; 167 NCO; 20 transient.

Hanscom AFB, Mass. 01731; 17 mi. NW of Boston. Phone (617) 861-4441; AUTOVON 478-4441. AFSC base. Hq. Electronic Systems Div. (AFSC), manages development and acquisition of command control and communications systems. Also site of AF Geophysics Lab, center for research and exploratory development in the terrestrial, atmospheric, and space environments. Base has no flying mission; transient USAF aircraft use runways of Laurence G. Hanscom Field, state-operated airfield adjoining the base. Named for a pre-WW II advocate of private aviation, killed in a lightplane accident in 1941. Area 887 acres. Altitude 133 ft. Military 1,870; civilians 3,200. Payroll $103.4 million. Housing: 289 officer; 406 NCO; 16 transient. Dispensary.

Hickam AFB, Hawaii 96853; 6 mi. W of Honolulu. Phone (808) 422-0531; AUTOVON 430-0111. PACAF base. Hq. Pacific Air Forces; 15th Air Base Wing, support organization for Air Force units in Hawaii and throughout the Pacific; 154th Tactical Fighter Gp. (ANG); Hq. Pacific Communications Area (AFCC); 1st Weather Wing; 834th Airlift Division. Base activated Sept. 1937; named for Lt. Col Horace M. Hickam, air pioneer killed in crash Nov 5, 1934, at Fort Crockett, Tex. Area 2,731 acres. Al

titude sea level. Military, 5,000; civilians 2,000. Payroll $164.3 million (incl. Hickam, Wheeler AFB, and Bellows AFS). Housing: 556 officer; 2,443 NCO. Dispensary.

Hill AFB, Utah 84056; 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 II ICBMs; Bomarc drone and Maverick missiles; Walleye; laser and electro-optical-guided bombs; emergency rocket communications systems; MX missile; manager for F-4, F-16, and F-101; air munitions; aircraft landing gears; wheels, brakes, tires, and tubes; photographic and aerospace training equipment; and COM-10. Also home of 388th Tactical Fighter Wing; 508th Tactical Fighter Gp. (AFRES); 6545th Test Gp. (AFSC), which includes management of Utah Test and Training Range and RPV test programs. Base activated Nov. 1940; named for Maj. Ployer P. Hill, killed Oct. 30, 1935, at Wright Field, Ohio, test-flying the first B-17. Area 7,000 acres. Altitude 4,788 ft. Military 5,168; civilians 14,193. Payroll $327 million. Housing: 263 officer; 882 NCO; 8 transient. 35-bed hospital.

Holloman AFB, N. M. 88330; 6 mi. SW of Alamogordo. Phone (505) 497-6511; AUTOVON 867-1110. TAC base. Hq. 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 (RATSCAT) site. Base activated in 1942; named for Col. George V. Holloman, guided missile pioneer, killed in B-17 crash in Formosa, Mar. 19, 1946. Area 57,530 acres. Altitude 4,092 feet. Military 5,995; civilians 2,420. Payroll $81.5 million. Housing: 192 officer; 1,360 NCO; 250 transient. 35-bed hospital.

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 and training; site of ATC sea-survival school; 915th Tactical Fighter Gp. (AFRES) and aerospace rescue and recovery sqdn. Base activated Apr. 1955. Area 3,558 acres. Altitude 7 ft. Military 5,320; civilians 1,230. Payroll $74 million. Housing: 321 officer; 1,294 NCO; 203 transient. 80-bed hospital.

Hurlburt Field, Fla. 32544; 8 mi. W of Fort Walton Beach. Phone (904) 881-6668; AUTOVON 872-1110. TAC base, though part of the Eglin AFB (AFSC) reservation; also known as Eglin AFB Auxiliary Field No. 9. Home of 1st Special Operations Wing, focal point of all USAF Special Operations; USAF Special Operations School; MC-130E (Combat Talon), AC-130H (Spectre Gunship); UH-1N (Huey Gunship), and CH-3E (Sea King) helicopter sqdns.; TAC's only special operations combat control team and special operations weather team; air defense sqdn. det.; 823d Civil Engineering Sqdn. (Red Horse). 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. Military 3,284; civilians 361. Payroll $56.5 million. Housing: 100 officer; 280 NCO; 300 transient. Clinic only at Hurlburt, but 200-bed hospital at main Eglin base.

Indian Springs AF Auxiliary Field, Nev. 89018; 45 mi. NW of Las Vegas. Phone (702) 897-6204; AUTOVON 682-6204. TAC base. 57th Combat Support Sqdn.; Det. 1, 57th Tactical Training Wing; provides bombing and gunnery range support for tactical operations from Nellis AFB; manages construction of realistic target complexes; supports US Department of Energy research activities. Base activated in 1942. Area 1,652 acres. Altitude 3,124 ft. Military 240; civilians 29. (Payroll included in Nellis AFB entry, below.) Housing: 6 officer; 90 NCO. Dispensary.

Keesler AFB, Miss. 39534; located in Biloxi. Phone (601) 377-1110; AUTOVON 868-1110. ATC base. Hq. 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 sqdn., AFCC installation gp., and AFCC NCO Academy/Leadership School. Base activated June 12, 1941; named for 2d Lt. Samuel R. Keesler, Jr., WW I aerial observer, killed in action Oct. 9, 1918, near Verdun, France. Area 3,600 acres. Altitude 26 ft. Military 11,239; civilians 3,462. Payroll $177 million. Housing: 428 officer; 1,531 NCO; 90 transient. 325-bed hospital.

Kelly AFB, Tex. 78241; 5 mi. SW of San Antonio. Phone (512) 925-1110; AUTOVON 945-1110. AFLC base. Hq. San Antonio Air Logistics Center; Hq. Electronic Security Command; AF Electronic Warfare Center; AF Cryptologic Support Center; USAF Service Information and News Center; AF Commissary Service; 433d Tactical Airlift Wing (AFRES); 149th Tactical Fighter Gp. (ANG). Base activated May 7, 1917; named for Lt. George E. M. Kelly, first Army pilot to lose his life in a military aircraft; killed May 10, 1911, in crash of his Curtiss D Pusher Type IV, at Fort Sam Houston, Tex. Area 3,924 acres. Altitude 689 ft. Military 4,757; civilians 17,519. Payroll $367 million. Housing: 46 officer; 368 NCO. Dispensary.

Kirtland AFB, N. M. 87117; S of Albuquerque. Phone (505) 844-0011; AUTOVON 244-0011. MAC base. 1606th Air Base Wing. Major agencies and units include AF Contract Management Div. (AFSC); AF Test and Evaluation Center; AF Weapons Lab (AFSC); Office of the Chief of Security Police; 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; 150th Tactical Fighter Gp. (ANG); 1960th Communications Sqdn., 3098th Aviation Depot Sqdn.; and Det. 1, 1369th Audiovisual Sqdn. These agencies furnish contract management; nuclear and laser research, development, and testing; operational test and evaluation services; advanced helicopter training; and HC-130 search and rescue training. Base activated Jan. 1941; named for Col. Roy S. Kirtland, air pioneer and commandant of Langley Field in the 1930s, died May 2, 1941. Area 53,816 acres. Altitude 5,352 ft. Military 4,469; civilians 11,789. Payroll $436.8 million. Housing: 1,231 officer; 3,238 NCO; 58 transient. Dispensary and 50-bed hospital.

K. I. Sawyer AFB, Mich. 49843; 20 mi. S of Marquette. Phone (906) 346-6511; AUTOVON 472-

GUIDE TO AIR FORCE STATIONS

In addition to the major facilities in this Guide to Bases, USAF has a number of Air Force stations (AFS) throughout the US and overseas. These stations, for the most part, perform an air defense mission and house radar, SAGE, or AC&W units. Here is a listing of those stations with state and ZIP code. Where a station can be reached by a general-purpose AUTOVON number, such a number (AV) is listed. Commercial telephone numbers (AC) are given for stations not having access to AUTOVON.

Albrook AFS, APO Miami 34002	AV 313-28-1110
Almaden AFS, California 95042	AC (408) 268-3512
Bellows AFS, Hawaii 96853	AC (808) 259-5428
Calumet AFS, Michigan 49913	AC (906) 337-4200
Cambria AFS, California 93428	AC (805) 927-4611
Campion AFS, APO Seattle 98703	AV 317-743-1200
Cape Canaveral AFS, Florida 32925	AV 467-1110
Cape Charles AFS, Virginia 23310	AC (804) 331-2765
Cape Lisburne AFS, APO Seattle 98716	AV 317-725-1200
Cape Newenham AFS, APO Seattle 98745	AV 317-794-1200
Cape Romanzof AFS, APO Seattle 98706	AV 317-795-1200
Caswell AFS, Maine 04422	AC (207) 325-3411
Cold Bay AFS, APO Seattle 98711	AV 317-565-7200
Concrete MEWS, North Dakota 58221	AV 330-3297
Cudjoe Key AFS, Florida 33042	AC (305) 745-3957
Dauphin Island AFS, Alabama 36528	AC (205) 868-2972
Finland AFS, Minnesota 55603	AC (218) 353-7444
Fort Fisher AFS, North Carolina 28449	AC (919) 458-8251
Fort Lee AFS, Virginia 23801	AV 687-4003
Fort Yukon AFS, APO Seattle 98710	AV 317-732-1200
Fortuna AFS, North Dakota 59275	AC (701) 834-2251
Gentile AFS, Ohio 45401	AV 850-5111
Gibbsboro AFS, New Jersey 08026	AC (609) 783-1449
Indian Mountain AFS, APO Seattle 98748	AV 317-722-1200
Jacksonville AFS, Florida 32212	AC (905) 777-9695
Klamath AFS, California 95548	AC (707) 482-2411
Kotzebue AFS, APO Seattle 98709	AV 317-748-1200
Lake Charles AFS, Louisiana 70601	AV 683-5684
Makah AFS, Washington 98357	AC (206) 645-2231
Mica Peak AFS, Washington 99023	AC (509) 247-2669
Mill Valley AFS, California 94941	AC (415) 388-0130
Montauk AFS, New York 11954	AC (516) 668-2321
Mt. Hebo AFS, Oregon 97122	AC (503) 392-3111
Mt. Laguna AFS, California 92048	AC (714) 442-0347
Newark AFS, Ohio 43055	AV 580-1110
No. Bend AFS, Oregon 97459	AC (503) 756-4146
No. Charleston AFS, South Carolina 29404	AC (919) 744-7481
No. Truro AFS, Massachusetts 02652	AC (617) 487-1248
Oklahoma City AFS, Oklahoma 73145	AV 735-9011
Point Arena AFS, California 95468	AC (707) 882-2165
Richmond AFS, Florida 33156	AC (305) 233-7321
San Pedro Hill AFS, California 90274	AC (213) 377-7522
Savannah AFS, Georgia 31402	AC (912) 352-5414
Sparrevohn AFS, APO Seattle 98746	AV 317-731-1200
Sunnyvale AFS, California 94088	AV 359-3611
Tatalina AFS, APO Seattle 98747	AV 317-728-1200
Tin City AFS, APO Seattle 98715	AV 317-724-1200
Tonopah AFS, Nevada 89049	AC (702) 643-9252

1110. SAC base. 410th Bomb Wing; 46th Air Refueling Sqdn.; TAC fighter interceptor sqdn. Base activated in 1959; named for Kenneth I. Sawyer, who proposed the site for a county airport; died 1944. Area 5,224 acres. Altitude 1,220 ft. Military 3,696; civilians 517. Payroll $56 million. Housing: 337 officer; 1,356 NCO; 40 BOQ units; 24 transient rooms. 50-bed hospital.

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; technical training of basic, advanced security police/law enforcement personnel; patrol dog-handler courses; training of instructors, recruiters, and social actions/drug abuse counselors; USAF marksmanship training; Officer Training School; Defense Language Institute–English Language Center; Wilford Hall USAF Medical Center. Base activated in 1941; named for Brig. Gen. Frank D. Lackland, early commandant of Kelly Field flying school, died 1943. Area 6,828 acres, incl. 4,017 acres at Lackland Training Annex. Altitude 787 ft. Military 30,833; civilians 4,544. Payroll $256.3 million. Housing: 155 officer; 165 NCO; 1,069 transient. 1,000-bed hospital.

Langley AFB, Va. 23665; 3 mi. N of Hampton. Phone (804) 764-9990; AUTOVON 432-1110. TAC base. Host unit is 1st Tactical Fighter Wing, F-15 fighter operations; Hq. Tactical Air Command; 5th Weather Wing (MAC); 2d Aircraft Delivery Gp. (TAC); 460th Recon Technical Sqdn. (TAC); 6th Airborne Command and Control Sqdn. (TAC); US Army TRADOC flight det.; 48th Fighter Interceptor Sqdn. (TAC). Base activated Dec. 30, 1916; 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 the base. Area 3,500 acres. Altitude 10 ft. Military 8,157; civilians 2,277. Payroll $156.8 million. Housing: 384 officer; 2,269 NOC; 267 transient. Dispensary and 65-bed hospital.

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, B-17 pilot killed over Java, Jan. 29, 1942. Area 4,008 acres. Altitude 1,080 ft. Military 2,471; civilians 530. Payroll $39 million. Housing: 255 officer; 350 NCO; 24 transient. 25-bed hospital.

Laurence G. Hanscom AFB (*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; 189th Air Refueling Gp. (ANG); Det. 9, 1365th Audiovisual Sqdn. Base activated in 1955. Area 6,100 acres. Altitude 310 ft. Military 6,565; civilians 566. Payroll $84.6 million. Housing: 313 officer; 1,222 NCO; 140 transient (VAQs). 25-bed hospital.

Loring AFB, Me. 04751; 4 mi. W of Limestone. Phone (207) 999-1110; AUTOVON 920-1110. SAC base. 42d Bomb Wing. Base activated Feb. 25, 1953, as Limestone AFB; renamed for Maj. Charles J. Loring, Jr., F-80 pilot killed Nov. 22, 1952, in North Korea; posthumously awarded Medal of Honor. Area 9,000-plus acres. Altitude 746 ft. Military 3,240; civilians 947. Payroll $57 million. Housing: 654 officer; 1,364 NCO; 12 transient; 4 VIP. 10-bed hospital.

Los Angeles AFS, Calif. 90009; in metropolitan Los Angeles area, city of El Segundo. Phone (213) 643-1000; AUTOVON 833-1110. AFSC station. Space Division of AFSC manages the development, launch, and on-orbit control of DoD's space programs. 23 tenant units. Station activated Dec. 14, 1960. Military 1,400; civilians 1,000. Payroll $60 million.

Lowry AFB, Colo. 80230; 1 mi. SE of Denver. Phone (303) 388-5411; AUTOVON 926-1110. ATC base. Technical Training Center; AF Accounting and Finance Center; Air Reserve Personnel Center. Base activated Feb. 26, 1938; named for 1st Lt. Francis B. Lowry, killed in action near Crepion, France, while on a photo mission, Sept. 26, 1918. Area 1,863 acres. Altitude 5,400 ft. Military 8,132; civilians 5,050. Payroll $155 million. Housing: 95 officer; 772 NCO; 40 transient. Dispensary.

Luke AFB, Ariz. 85309; 20 mi. WNW of Phoenix. Phone (602) 935-7411; AUTOVON 853-1110. TAC base. Hq. Tactical Training, Luke; 405th Tactical Training Wing; 58th Tactical Training Wing; Hq. 26th NORAD Region/Air Div. (TAC); 302d Special Operations Sqdn. (AFRES). Luke, the largest fighter training base in the free world, conducts training of USAF aircrews in the F-4C and F-15, 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 of WW I and first flyer to receive the Medal of Honor, killed in action Sept. 29, 1918, near Murvaux, France. Area 4,197 acres, plus 2,700,000-acre range. Altitude 1,101 ft. Military 7,100; civilians 1,200. Payroll $125 million. Housing: 149 officer; 726 NCO; 51 transient. 105-bed hospital.

MacDill AFB, Fla. 33608; adjacent to Tampa. Phone (813) 830-1110; AUTOVON 968-1110. TAC base. Hq. US Readiness Command; 56th Tactical Fighter Wing conducts replacement training in F-4D; presently converting to F-16 RTU mission. Base activated Apr. 15, 1941; named for Col. Leslie MacDill, killed in aircraft accident Nov. 8, 1938, near Washington, D. C. Area 5,621 acres. Altitude 6 ft. Military 6,378; civilians 1,253. Payroll $88.4 million. Housing: 138 officer; 667 NCO; 350 transient. 70-bed hospital.

Malmstrom AFB, Mont. 59402; 4 mi. E of Great Falls. Phone (406) 731-9990; AUTOVON 632-1110. SAC base. 341st Strategic Missile Wing; Hq. 24th Air Div. (TAC); SAGE Region Control Center (NORAD); 17th Defense Evaluation Sqdn. Base activated Dec. 15, 1942; named for Col. Einar A. Malmstrom, WW II fighter commander killed in T-33 accident Aug. 21, 1954. Site of SAC's first Minuteman wing, 1961. Area 3,573 acres, plus about 23,000 sq. mi. of the missile complex. Altitude 3,525 ft. Military 5,607; civilians 565. Payroll $60.9 million. Housing: 320 officer; 1,086 NCO; 40 transient. 15-bed hospital.

March AFB, Calif. 92518; 9 mi. SE of Riverside. Phone (714) 655-1110; AUTOVON 947-1110. SAC base. Hq. 15th Air Force; 22d Bomb Wing; 452d Air Refueling Wing (AFRES); 303d Aerospace Rescue and Recovery Sqdn. (AFRES). Base activated Mar. 1, 1918; named for 2d Lt. Peyton C. March, Jr., who died in Texas of crash injuries Feb. 18, 1918. Area 7,117 acres. Altitude 1,530 ft. Military 4,114; civilians 1,468. Payroll $74 million. Housing: 103 officer; 609 NCO; 4 transient. 120-bed hospital.

Mather AFB, Calif. 95655; 12 mi. ESE of Sacramento. Phone (916) 364-1110; AUTOVON 828-1110. ATC base. DoD executive manager for navigator training (USAF, Navy, Coast Guard, Marine Corps basic navigation training). Only navigator training base; also trains USAF electronic warfare officers and navigator-bombardiers. 320th Bomb Wing (SAC); 940th Air Refueling Gp. (AFRES); 3506th Recruiting Gp. Base activated 1918; named for 2d Lt. Carl S. Mather, killed in midair collision, Jan. 30, 1918, at Ellington Field, Tex. Area 5,800 acres. Altitude 96 ft. Military 4,728; civilians 1,959. Payroll $93 million. Housing: 407 officer; 864 NCO; 40 transient. 70-bed hospital.

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; Community College of the Air Force; 908th Tac Airlift Gp. (AFRES). (The Senior NCO Academy and Extension Course Institute are at Gunter AFS.) Base activated 1918; named for 2d Lt. William C. Maxwell, killed in an air accident Aug. 12, 1920, in the Philippines. Area 3,161 acres. Altitude 169 ft. Military 3,027; civilians 1,524. Payroll $132 million. Housing: 300 officer; 224 NCO; 34 transient. 85-bed hospital.

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 Div. (TAC); 318th Fighter Interceptor Sqdn. (TAC); SAGE Region Control Center (NORAD); 446th Military Airlift Wing (AFRES Associate). Base activated May 5, 1938; named for Col. William C. McChord, killed Aug. 18, 1937, while attempting a forced landing at Maidens, Va. Area 4,615 acres. Altitude 322 ft. Military 5,354; civilians 1,400. Payroll $83.8 million. Housing: 187 officer; 806 NCO; 284 transient. Dispensary.

McClellan AFB, Calif. 95652; 9 mi. NE of Sacramento. Phone (916) 643-2111; AUTOVON 633-1110. AFLC base. Hq. Sacramento Air Logistics Center; management, maintenance, and supply support for such USAF weapon systems as F-111, FB-111, A-10, F-105, T-39; various surveillance and warning systems; radar sites; missile-tracking stations; airborne and ground power generators; electric motors. Houses 2049th Communications and Installation Gp. (AFCC); 41st Rescue and Weather Recon Wing (MAC); 1155th Technical Operations Sqdn. (AFSC); Hq. 4th Air Force (AFRES); Defense Logistics Agency; US Coast Guard Air Station, Sacramento (DOT). Named for Maj. Hezekiah McClellan, pioneer in Arctic aeronautical experiments, killed in crash May 25, 1936. Area 2,598 acres. Altitude 76 ft. Military 3,487; civilians 12,653. Payroll $316.5 million. Housing: 168 officer; 507 NCO; 21 transient. Dispensary.

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; 184th Tactical Fighter Gp. (ANG). Base activated June 5, 1951; named for Capt. Fred J. McConnell, WW II B-24 pilot who died in crash of a private plane Oct. 25, 1945; and for his brother, 2d Lt. Thomas L. McConnell, also a WW II B-24 pilot, killed July 10, 1943, during attack on Bougainville in the Pacific. Area 4,569 acres. Altitude 1,371 ft. Military 4,136; civilians 753. Payroll $57 million. Housing: 149 officer; 445 NCO; 167 transient. 20-bed hospital.

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; N. J. Civil Air Patrol; 170th Air Refueling Gp. (ANG); 108th Tactical Fighter Wing (ANG); 514th Military Airlift Wing (AFRES Associate); the MAC NCO Academy East; and USAF Band of the East. Base adjoins Army's Fort Dix; formerly Fort Dix Army Air Base; activated as AFB in 1949; named for Maj. Thomas B. McGuire, Jr., P-38 pilot, second leading US ace of WW II, holder of Medal of Honor, killed in action Jan. 7, 1945, in the Philippines. Area 3,552 acres. Altitude 133 ft. Military 4,876; civilians 2,137. Payroll $97 million. Housing: 275 officer; 1,489 NCO; 620 transient (incl. 186 VOQ units, 244 VAQ units, 160 transient family units, and 30 transient lodging quarters). Dispensary and 163-bed hospital.

Minot AFB, N. D. 58705; 13 mi. N of Minot. Phone (701) 727-4761; AUTOVON 344-1110. SAC base. 57th Air Div.; 91st Strategic Missile Wing; 5th Bomb Wing; fighter interceptor unit (TAC). Base activated Feb. 1957. Area 5,050 acres, plus additional 19,324 acres for missile sites. Altitude 1,650 ft. Military 6,207; civilians 605. Payroll $80.2 million. Housing: 543 officer; 1,927 NCO; 104 transient. Dispensary, plus 40-bed military hospital in city of Minot.

Moody AFB, Ga. 31601; 10 mi. NNE of Valdosta. Phone (912) 333-4211; AUTOVON 460-1110. TAC base. 347th Tactical Fighter Wing, F-4E fighter operations. Base activated June 1941; named for Maj. George P. Moody, killed May 5, 1941, while test-flying Beech AT-10. Area 6,015 acres. Altitude

233 ft. Military 2,900; civilians 452. Payroll $35.2 million. Housing: 61 officer; 245 NCO; 51 transient. 25-bed hospital.

Mountain Home AFB, Idaho 83648; 56 mi. SE of Boise. Phone (208) 828-2111; AUTOVON 857-1110. TAC base. 366th Tactical Fighter Wing, F-111A fighter operations. Base activated Apr. 1942. Area 6,639 acres. Altitude 3,000 ft. Military 3,843; civilians 650. Payroll $55 million. Housing: 246 officer; 1,292 NCO; 104 transient. 25-bed hospital.

Myrtle Beach AFB, S. C. 29577; adjacent to Myrtle Beach, following annexation in 1977. Phone (803) 238-7211; AUTOVON 748-1110. TAC base; shares runway with Myrtle Beach Jetport. 354th Tactical Fighter Wing; A-10 fighter operations. Served as Army air base, 1941–47; USAF base since 1956. Area 3,793 acres. Altitude 24 ft. Military 3,198; civilians 811. Payroll $36.1 million. Housing: 132 officer; 668 NCO; 65 trailer lots. 20-bed hospital.

Nellis AFB, Nev. 89191; 8 mi. NE of Las Vegas. Phone (702) 643-1800; AUTOVON 682-1800. TAC base. Tactical Fighter Weapons Center, host unit. F-4D/E, F-5E, F-15, F-16, F-111, A-10, T-38, UH-1N operations; 57th Fighter Weapons Wing; 474th Tactical Fighter Wing; USAF Thunderbirds Air Demonstration Sqdn.; 4440th Tactical Fighter Training Gp. (Red Flag); 554th Operational Support Wing, 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 P-47 fighter pilot, killed Dec. 27, 1944, in Europe. Area 11,272 acres, with ranges totaling 3,012,770 acres. Altitude 2,171 ft. Military 8,464; civilians 1,680. Payroll $130 million. Housing: 168 officer; 1,329 NCO; 769 transient (incl. 565 VAQs, 178 VOQs, 26 TLQs). 35-bed hospital.

Niagara Falls International Airport, N. Y. 14304; 6 mi. E of Niagara Falls. Phone (716) 297-4100; AUTOVON 489-3011. 914th Tactical Airlift Gp. (AFRES); 107th Fighter Interceptor Gp. (ANG). Base activated in Jan. 1952. Area 979 acres. Altitude 590 ft. Military 3; civilians 327; Reservists 783. Payroll $8.4 million.

Norton AFB, Calif. 92409; 59 mi. E of Los Angeles, within San Bernardino corporate limits. Phone (714) 382-1110; AUTOVON 876-1110. MAC base. 63d Military Airlift Wing; Hq. AF Inspection and Safety Center; Hq. AF Audit Agency; Hq. Aerospace Audiovisual Service (MAC). Also Ballistic Missile Office (AFSC); 445th Military Airlift Wing (AFRES Associate); MAC NCO Academy West and 22d Air Force Leadership School. Base activated Mar. 2, 1942; named for Capt. Leland F. Norton, native of San Bernardino, WW II A-20 attack bomber pilot, killed in action May 27, 1944, near Amiens, France. Area 2,407 acres. Altitude 1,156 ft. Military 5,467; civilians 2,753. Payroll $121.7 million. Housing: 56 officer; 208 NCO; 339 transient (incl. 289 transient, 40 TQ, 10 guest). Clinic.

Offutt AFB, Neb. 68113; 8 mi. S of Omaha. Phone (402) 294-1110; AUTOVON 271-1110. SAC base. Hq. Strategic Air Command; 55th Strategic Recon Wing; 544th Strategic Intelligence Wing; AF Global Weather Central; 3d Weather Wing; 3902d Air Base Wing. Base activated in 1888 as Army's Fort Crook; landing field named in 1924 for 1st Lt. Jarvis J. Offutt, WW I pilot who died Aug. 13, 1918, from injuries received from enemy fire over Valheureux, France. Area 1,914 acres. Altitude 1,048 ft. Military 12,121; civilians 2,447. Payroll $216.6 million. Housing: 882 officer; 1,798 NCO; 60 transient. 65-bed hospital.

O'Hare International Airport, Ill. 60666; 22 mi. NW of Chicago's Loop. Phone (312) 694-3031; AUTOVON 930-1110. 928th Tactical Airlift Gp. (AFRES); 126th Air Refueling Wing (ANG); Defense Contract Administration Services Region. Base activated in Apr. 1946; named for Lt. Cmdr. Edward H. "Butch" O'Hare, USN, Medal of Honor winner, killed Nov. 26, 1943, during battle for the Gilbert

USAF'S PRINCIPAL BASES OVERSEAS

Ankara AS, Turkey
APO New York 09254
AUTOVON 672-1110
TUSLOG Hq., USAFE

Aviano AB, Italy
APO New York 09293
AUTOVON 632-1110
Tactical group, USAFE

Bitburg AB, Germany
APO New York 09132
AUTOVON 455-1110
Tactical fighter base, USAFE

Camp New Amsterdam, The Netherlands
APO New York 09292
Tactical fighter unit, USAFE
(Call Ramstein, AUTOVON 424-1110; ask for Camp New Amsterdam.)

Clark AB, Philippines
APO San Francisco 96274
AUTOVON 822-1201
Hq. 13th Air Force, PACAF

Hahn AB, Germany
APO New York 09109
AUTOVON 453-1110
Tactical fighter base, USAFE

Hellenikon AB, Greece
APO New York 09223
AUTOVON 662-1110
Support base, USAFE

Hessisch-Oldendorf AS, Germany
APO New York 09669
Support base, USAFE
(Call Sembach, AUTOVON 427-1110; ask for Hessisch-Oldendorf.)

Howard AFB, Panama
APO Miami 34001
AUTOVON 284-1110
HQ USAF Southern Air Division

Incirlik CDI, Turkey
APO New York 09289
AUTOVON 676-1110
Support base, USAFE

Iraklion AS, Crete, Greece
APO New York 09291
AUTOVON 668-1110
Support base, USAFE

Izmir AS, Turkey
APO New York 09224
AUTOVON 675-1110
Support base, USAFE

Kadena AB, Okinawa, Japan
APO San Francisco 96239
AUTOVON 630-1110
Air division base, PACAF
Strategic operations, Strategic Air Command

Keflavik Airport, Iceland
FPO New York 09571
AUTOVON 231-1290
Fighter-interceptor base, TAC

Kunsan AB, South Korea
APO San Francisco 96264
AUTOVON 272-1110
Tactical fighter base, PACAF

Lajes Field, Azores
APO New York 09406
AUTOVON 895-3490
Airlift base, MAC

Lindsey AS, Germany
APO New York 09633
AUTOVON 472-1110
Support base, USAFE

Misawa AB, Japan
APO San Francisco 96519
AUTOVON 248-1101
Support base, PACAF

Osan AB, South Korea
APO San Francisco 96570
AUTOVON 271-1234
Air division base, PACAF
Tactical fighter base, PACAF

RAF Alconbury, United Kingdom
APO New York 09238
AUTOVON 223-1110
Tactical reconnaissance base, USAFE

RAF Bentwaters, United Kingdom
APO New York 09755
AUTOVON 225-1110
Tactical fighter base, USAFE

RAF Chicksands, United Kingdom
APO New York 09193
AUTOVON 234-1110
Support base, USAFE

RAF Fairford, United Kingdom
APO New York 09125
KC-135 refueling support base, USAFE/SAC
(Call RAF Upper Heyford, AUTOVON 263-1110; ask for RAF Fairford.)

RAF Lakenheath, United Kingdom
APO New York 09179
AUTOVON 226-1110
Tactical fighter base, USAFE

RAF Mildenhall, United Kingdom
APO New York 09127
AUTOVON 238-1110
Hq. 3d Air Force, USAFE
Tactical airlift base, USAFE
Rotational KC-135, SAC

RAF Upper Heyford, United Kingdom
APO New York 09194
AUTOVON 263-1110
Tactical fighter base, USAFE

RAF Woodbridge, United Kingdom
APO New York 09405
AUTOVON 225-1110
Tactical fighter base, USAFE

Ramstein AB, Germany
APO New York 09012
AUTOVON 424-1110
Hq. USAFE
Tactical fighter base, USAFE
Hq. European Communications Area, AFCC
7th Air Division, SAC
322d Airlift Division, MAC
2d Weather Wing, MAC

Rhein-Main AB, Germany
APO New York 09057
AUTOVON 462-1110
Tactical airlift base, MAC

San Vito AS, Italy
APO New York 09240
AUTOVON 633-1110
Support base, USAFE

Sembach AB, Germany
APO New York 09130
Hq. 17th Air Force, USAFE
Tactical air control base, USAFE

Sondrestrom AB, Greenland
APO New York 09121
Support base, SAC
(Call Malmstrom AFB, AUTOVON 632-1110; ask for Sondrestrom AB.)

Spangdahlem AB, Germany
APO New York 09123
AUTOVON 454-1110
Tactical fighter base, USAFE

Taegu AB, South Korea
APO San Francisco 96213
Combat support base, PACAF
(Call Korea, AUTOVON 262-1101; ask for Taegu AB.)

Tempelhof Airport, Berlin
APO New York 09611
AUTOVON 442-1110
Support base, USAFE

Thule AB, Greenland
APO New York 09023
AUTOVON 221-7356
Strategic Air Command base

Torrejon AB, Spain
APO New York 09283
AUTOVON 723-1110
Hq. 16th Air Force, USAFE
Tactical fighter base, USAFE

Yokota AB, Japan
APO San Francisco 96328
AUTOVON 248-1101
Hq. 5th Air Force, PACAF

Zaragoza AB, Spain
APO New York 09286
AUTOVON 274-1110
Tactical fighter training base, USAFE

Zweibrücken AB, Germany
APO New York 09860
AUTOVON 425-1110
Tactical reconnaissance base, USAFE

Islands. Area 391 acres. Altitude 643 ft. Military 5; civilians 405; Reservists 1,189. Payroll $9.9 million.

Patrick AFB, Fla. 32925; 2 mi. S of Cocoa Beach. Phone (305) 494-1110; AUTOVON 854-1110. AFSC base. Operated by the Eastern Space and Missile Center in support of DoD, NASA, and other agency missile and space programs. Major tenants are Equal Opportunity Management Institute; AF Technical Applications Center; 549th Tactical Air Support Gp.; and 2d Combat Communications Gp. (AFCC). Activated in 1940, base is airhead 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. Military 3,750; civilians 5,175. Payroll $92 million. Housing: 650 officer; 3,100 NCO. 25-bed hospital.

Pease AFB, N. H. 03801; 3 mi. W of Portsmouth. Phone (603) 436-0100; AUTOVON 852-1110. SAC base. 45th Air Div.; 509th Bomb Wing; 157th Air Refueling Gp. (ANG). Base activated in 1956; named for Capt. Harl Pease, Jr., WW II B-17 pilot and Medal of Honor winner, killed Aug. 7, 1942, during attack on Rabaul, New Britain Island. Area 4,373 acres. Altitude 101 ft. Military 3,835; civilians 556. Payroll $50 million. Housing: 139 officer; 1,073 NCO; 129 transient. 70-bed hospital.

Peterson AFB, Colo. 80914; 7 mi. E of Colorado Springs. Phone (303) 591-7321; AUTOVON 692-7011. SAC base. Home of 46th Aerospace Defense Wing (SAC), which supports Hq. North American Air Defense Command/Aerospace Defense Command (NORAD/ADCOM) Combat Operations Center in the Cheyenne Mountain complex; Aerospace Defense Center; the Air Force Academy; and Fort Carson, Colo. Base was activated in 1941; named for 1st Lt. Edward J. Peterson, killed Aug. 8, 1942, in aircraft crash at the field. Area 1,176 acres. Altitude 6,200 ft. Military 4,301; civilians 1,879. Payroll $93 million. Housing: 106 officer; 384 NCO; 40 transient. Dispensary.

Plattsburgh AFB, N. Y. 12903; adjacent to Plattsburgh. Phone (518) 563-4500; AUTOVON 689-1110. SAC base. 380th Bomb Wing; medium bomber and tanker operations with FB-111 and KC-135. 4007th Combat Crew Training Sqdn. trains all FB-111 combat crews for SAC. Second oldest active military installation in the US, established 1814; AFB since 1955. Area 3,305 acres. Altitude 235 ft. Military 3,796; civilians 662. Payroll $54.8 million. Housing: 242 officer; 1,397 NCO. 15-bed hospital.

Pope AFB, N. C. 28308; 12 mi. NNW of Fayetteville. Phone (919) 394-0001; AUTOVON 486-1110. MAC base. USAF Airlift Center; 317th Tactical Airlift Wing; 1st Aeromedical Evacuation Sqdn.; 1943d Communications Sqdn.; 53d Mobile Aerial Port Sqdn. (AFRES). Base adjoins Army's Fort Bragg and provides tactical airlift support for airborne forces and other personnel, equipment, and supplies. Base activated 1919; named for 1st Lt. Harley H. Pope, WW I flyer, killed Jan. 7, 1919, when his JN-4 "Jenny" ran out of fuel near Fayetteville and crashed. Area 1,750 acres. Altitude 218 ft. Military 3,817; civilians 336. Payroll $45.7 million. Housing: 89 officer; 370 NCO; 116 transient. Dispensary.

Randolph AFB, Tex. 78148; 20 mi. ENE of San Antonio. Phone (512) 652-1110; AUTOVON 487-1110. ATC base. 12th Flying Training Wing, T-37 and T-38 pilot instructor training. Major tenants are Hq. Air Training Command; Air Force Manpower and Personnel Center; Occupational Measurement Center; Office of Civilian Personnel Operations; and Hq. USAF Recruiting Service. Base activated June 1930; named for Capt. William M. Randolph, killed Feb. 17, 1928, when his AT-4 crashed on takeoff at Gorman, Tex. Area 2,901 acres. Altitude 761 ft. Military 5,387; civilians 2,385. Payroll $133.6 million. Housing: 203 officer; 816 NCO; 13 transient. Dispensary.

Reese AFB, Tex. 79489; 6 mi. W of Lubbock. Phone (806) 885-4511; AUTOVON 838-1110. ATC base. 64th Flying Training Wing, undergraduate pilot training. Base activated in 1942; named for 1st Lt. Augustus F. Reese, Jr., P-38 fighter pilot killed in Sardinia, May 14, 1943. Area 3,597 acres. Altitude 3,338 ft. Military 2,721; civilians 607. Payroll $44 million. Housing: 117 officer; 290 NCO; 12 transient. 10-bed hospital.

Richards-Gebaur AFB, Mo. 64030; 17 mi. S of Kansas City. Phone (816) 348-2000; AUTOVON 465-1110. MAC base. 1607th Air Base Sqdn.; 1879th Communications Sqdn. (AFCC); Det. 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, an F-84 pilot, killed Aug. 29, 1952, over North Korea during his 99th mission. Area 2,418 acres. Altitude 1,090 ft. Military 167; civilians 773. Payroll $9.0 million. Housing: 24 officer; 217 NCO; 104 transient.

Robins AFB, Ga. 31098; at Warner Robins, 18 mi. SSE of Macon. Phone (912) 926-1110; AUTOVON 468-1001. AFLC base. Hq. Warner Robins Air Logistics Center (AFLC); Hq. Air Force Reserve (AFRES); 2853d Air Base Gp.; 19th Bomb Wing (SAC); 5th Combat Communications Gp. (AFCC); 3503d Recruiting Gp.; 1926th Communications and Installations Gp. (AFCC). Base activated Mar. 1942; named for Brig. Gen. Augustine Warner Robins, an early Chief of the Materiel Div. of the Air Corps, died June 16, 1940. Area 8,728 acres. Altitude 294 ft. Military 4,000; civilians 14,900. Payroll $352.7 million. Housing: 245 officer; 1,151 NCO; 40 transient. 40-bed hospital.

Sawyer AFB *(see K. I. Sawyer AFB).*

Scott AFB, Ill. 62225; 6 mi. ENE of Belleville. Phone (618) 256-1110; AUTOVON 638-1110. MAC base. 375th Aeromedical Airlift Wing; Hq. Military Airlift Command; Hq. Air Force Communications Command; Hq. Aerospace Rescue and Recovery Service; Hq. Air Weather Service. Also, Defense Commercial Communications Office; Environmental Technical Applications Center; USAF Medical Center, Scott; 7th Weather Wing; 932d Aeromedical Airlift Gp. (AFRES Associate); and 375th Air Base Gp. Base activated June 14, 1917; named for Cpl. Frank S. Scott, first enlisted man to die in an air accident, killed Sept. 28, 1912, at College Park, Md. Area 3,000 acres. Altitude 453 ft. Military 6,502; civilians 4,160. Payroll $174 million. Housing: 407 officer; 1,469 NCO, plus 120 spaces for privately owned trailers; 283 transient. 180-bed hospital, plus 100-bed aeromedical staging facility.

Seymour Johnson AFB, N. C. 27531; adjacent to Goldsboro. Phone (919) 736-0000; AUTOVON 488-1110. TAC base. 4th Tactical Fighter Wing, F-4E fighter operations with dual-based commitment to NATO; 68th Bomb Wing (SAC); 2012th Communications Sqdn. (AFCC). Base activated June 12, 1941; named for Navy Lt. Seymour A. Johnson, native of Goldsboro, killed Mar. 4, 1941, in crash in Maryland. Area 4,281 acres. Altitude 109 ft. Military 5,336; civilians 993. Payroll $76 million. Housing: 332 officer; 1,368 NCO; 88 transient. 25-bed hospital.

Shaw AFB, S. C. 29152; 10 mi. WNW of Sumter. Phone (803) 668-8110; AUTOVON 965-1110. TAC base. Hq. 9th Air Force (TAC); 363d Tactical Recon Wing, RF-4C recon operations and training; 507th Tactical Air Control Wing, manages 407L/485L tactical air control systems. Base activated Aug. 30, 1941; named for 2d Lt. Ervin D. Shaw, one of the first Americans to see air action in WW I, killed in action in France July 9, 1918, when his Bristol fighter was shot down during a reconnaissance mission. Area 3,269 acres; supports another 10,429 acres. Altitude 244 ft. Military 5,463; civilians 557. Payroll $79 million. Housing: 389 officer; 1,315 NCO; 16 transient. 45-bed hospital.

Shemya AFB, Alaska (APO Seattle 98736); located at western tip of the Aleutian Islands chain, midway between Anchorage, Alaska, and Tokyo, Japan. Phone (907) 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 the local date is the same as elsewhere in the US. Area about 4.5 mi. long by 2.5 mi. wide. Altitude 270 ft. Military 572; civilians 154. Payroll included in entry for Elmendorf AFB. Housing: 70 transient. Dispensary.

Sheppard AFB, Tex. 76331; 4 mi. N of Wichita Falls. Phone (817) 851-2511; AUTOVON 736-1001. ATC base. Sheppard Technical Training Center provides resident courses in aircraft maintenance, civil engineering, communications, missile, comptroller, transportation, and instructor training. The 3785th Field Training Gp. provides specialized and advanced training at 70 field training detachments and 20 operating locations worldwide. The School of Health Care Sciences provides training in medicine, dentistry, nursing, biomedical sciences, and health services administration. 80th Flying Training Wing provides undergraduate pilot training for German Air Force and other foreign students under the Security Assistance Program, as well as fixed-wing transition training for USAF helicopter pilots. Base activated June 14, 1941; named for Morris E. Sheppard, US senator from Texas, died in 1941. Area 5,000 acres. Altitude 1,015 ft. Military 8,500; civilians 3,500. Payroll $117 million. Housing: 236 officer; 1,000 NCO; 34 transient. 170-bed hospital.

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. AFCC's Southern Communications Area; 3d Combat Communications Gp. (AFCC); 552d Airborne Warning and Control Wing (TAC); 507th Tactical Fighter Gp. (AFRES). Base activated May 1941; named for Maj. Gen. Clarence L. Tinker, whose LB-30 (an early model B-24) apparently went down at sea after attacking enemy ships retreating toward Wake Island on June 7, 1942, at the end of the Battle of Midway. Area 4,359 acres. Altitude 1,291 ft. Military 5,500; civilians 16,200. Payroll $391 million. Housing: 110 officer; 422 NCO. 30-bed hospital.

Travis AFB, Calif. 94535; at Fairfield, 50 mi. NE of San Francisco. Phone (707) 438-4011; AUTOVON 837-1110. MAC base. Hq. 22d Air Force; 60th Military Airlift Wing; 349th Military Airlift Wing (AFRES Associate); 307th Air Refueling Gp. (SAC); David Grant Medical Center, Military Airlift-Travis. Base activated May 25, 1943; named for Brig. Gen. Robert F. Travis, killed at the site, Aug. 5, 1950, in a B-29 accident. Area 6,028 acres. Altitude 62 ft. Military 9,898; civilians 2,618. Payroll $112.7 million. Housing: 341 officer; 1,826 NCO; 570 transient (incl. 152 family transient, 230 VOQs, 188 VAQs). 280-bed hospital.

Tyndall AFB, Fla. 32403; 13 mi. E of Panama City. Phone (904) 283-1113; AUTOVON 970-1110. TAC base. Home of the Air Defense Weapons Center, a single DoD unit for centralization of operational and technical expertise on air defense. Conducts weapons-firing programs and evaluation for fighter-interceptor pilots; tests new air defense-related equipment and tactics. Tenants include AF Engineering and Services Center; 3625th Technical Training Sqdn. (ATC); 678th Air Defense Gp. (TAC); 2d Fighter Interceptor Training Sqdn.; 95th Fighter Interceptor Training Sqdn.; AF Interceptor Weapons School, and 475th Test Sqdn. Base activated Dec. 7, 1941; named for 1st Lt. Frank B. Tyndall, WW I fighter pilot, killed July 15, 1930, in crash of a P-1 near Mooresville, N. C. Area 28,000 acres. Altitude 18 ft. Military 4,300; civilians 1,600. Payroll $70 million. Housing: 142 officer; 929 NCO. Dispensary and 80-bed hospital.

US Air Force Academy, Colo. 80840; 10 mi. N of Colorado Springs. Phone (303) 472-1818; AUTOVON 259-3110. Direct reporting unit; activated Apr. 1, 1954, at Lowry AFB, Colo. Moved to permanent location Aug. 1958. Tenant units include 1876th Communications Sqdn.; Frank J. Seiler Re

search Lab (AFSC); DoD Medical Exam Review Board; Det. 470 of AF Audit Agency; 557th Flying Training Sqdn. (ATC). Area 18,000 acres. Altitude 7,280 ft. Military 2,435; civilians 1,882. Payroll $99.2 million. Housing: 348 officer; 916 NCO; 33 transient. 85-bed hospital.

Vance AFB, Okla. 73701; 3 mi. SSW of Enid. Phone (405) 237-2121; AUTOVON 962-7110. ATC base. 71st Flying Training Wing, undergraduate pilot training. Base activated Nov. 1941; named for Lt. Col. Leon R. Vance, Jr., native of Enid, 1939 West Point graduate, Medal of Honor winner, killed July 26, 1944, when the air-evac plane returning him to the US went down in the Atlantic, near Iceland. Area 1,811 acres. Altitude 1,307 ft. Military 1,400; civilians 1,200. Payroll $35 million. Housing: 119 officer; 111 NCO; 1 transient. Dispensary.

Vandenberg AFB, Calif. 93437; 8 mi. NNW of Lompoc. Phone (805) 866-1611; AUTOVON 276-1110. SAC base. Site of 1st Strategic Aerospace Div. (SAC); Western Space and Missile Center (AFSC); 6595th Aerospace Test Wing. Conducts missile crew training and provides facilities and support for operational ICBM tests; research and development testing of USAF space and ballistic missile programs; and unmanned polar-orbiting space operations of USAF, NASA contractors, foreign allies, and others. Vandenberg is the only base that launches operational ballistic missiles in the SAC deterrent force and polar-orbiting satellites in the US space program; about 1,480 such launches have taken place from Vandenberg since Dec. 1958. Originally Army's Camp Cooke; activated Oct. 1941; taken over by USAF June 7, 1957; renamed for Gen. Hoyt S. Vandenberg, USAF's second Chief of Staff, died Apr. 2, 1954. Area 98,400 acres. Altitude 400 ft. Military 4,741; civilians 6,000. Payroll $149.9 million. Housing: 538 officer; 1,645 NCO; 20 transient. 45-bed hospital.

Warren AFB *(see Francis E. Warren AFB).*

Westover AFB, Mass. 01022; 5 mi. NE of Chicopee Falls. Phone (413) 557-1110; AUTOVON 589-1110. AFRES base. 439th Tac Airlift Wing (AFRES). Also home of Army, Navy, and Marine Corps Reserve and Massachusetts Army National Guard. Base dedicated Apr. 6, 1940; named for Maj. Gen. Oscar Westover, Chief of the Air Corps, killed Sept. 21, 1938, in crash near Burbank, Calif. Area 2,500 acres. Altitude 244 ft. Military 1,850; civilians 859. Payroll $15.9 million. Housing: 313 family quarters; 432 dormitory rooms; 25 VOQs; 174 BOQs.

Wheeler AFB, Hawaii 96854; near center of the island of Oahu, adjacent to Army's Schofield Barracks. Phone (808) 655-1112; AUTOVON 430-0111. PACAF base. Furnishes administrative and logistic support to the Hawaiian Air Defense Div. (326th Air Div.); Air Defense Control Center, Far East; tactical air support sqdn. Also supports US Army flying activities from Schofield Barracks. Base activated Feb. 1922; named for Maj. Sheldon H. Wheeler, who became CO of Luke Field, Hawaii, in 1919 and was killed there July 13, 1921, when his biplane crashed during aerial exhibition. Area 1,369 acres. Altitude 845 ft. Military 497; civilians 137. Payroll included in entry for Hickam AFB. Dispensary.

Whiteman AFB, Mo. 65305; 1.5 mi. S of Knob Noster. Phone (816) 687-1110; AUTOVON 975-1110. SAC base. 351st Strategic Missile Wing. Base activated 1942; named for 2d Lt. George A. Whiteman, shot down while taking off in a fighter from Wheeler Field, Hawaii, Dec. 7, 1941, the first Air Force casualty of WW II. Area 3,384 acres, plus missile complex of about 10,000 sq. mi. Altitude 869 ft. Military 3,081; civilians 416. Payroll $41.6 million. Housing: 201 officer; 791 NCO; 57 transient (incl. 19 VOQs, 4 guest houses, 55 VAQs). 10-bed hospital.

Williams AFB, Ariz. 85224; 16 mi. SE of Mesa. Phone (602) 988-2611; AUTOVON 474-1001. ATC base. 82d Flying Training Wing, largest undergraduate pilot training base; also provides F-5 combat crew training for foreign students. Home of AFSC Human Resources Lab/Flying Training Div. doing extensive research on flight simulators. Base activated July 1941; named for 1st Lt. Charles D. Williams, killed in crash of a bomber near Fort DeRussy, Hawaii, July 6, 1927. Area 3,867 acres. Altitude 1,385 ft. Military 3,320; civilians 1,100. Payroll $54.5 million. Housing: 309 officer; 499 NCO; 40 transient. 25-bed hospital.

Wright-Patterson AFB, Ohio 45433; 10 mi. ENE of Dayton. Phone (513) 257-1110; AUTOVON 782-1110. AFLC base. Hq. Air Force Logistics Command; Hq. Aeronautical Systems Div. (AFSC); Foreign Technology Div. (AFSC); AF Institute of Technology; USAF Medical Center, Wright-Patterson; Air Force Museum; AF Acquisition Logistics Div.; AFLC International Logistics Center, 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 crash of a DH-4 while testing gun synchronization. The Wrights did much of their early flying on Huffman Prairie, now Areas A and C of the present base. Area 8,174 acres. Altitude 824 ft. Military 8,200; civilians 16,000; contracted services employees 7,200. Payroll $502 million. Housing: 1,090 officer; 1,245 NCO; 40 transient. 280-bed hospital.

Wurtsmith AFB, Mich. 48753; 3 mi. NW of Oscoda. Phone (517) 739-2011; AUTOVON 623-1110. SAC base. 40th Air Div.; 379th Bomb Wing. Base activated 1924 as Camp Skeel, gunnery camp for Selfridge Field; became Oscoda Army Air Field during WW II; renamed in 1953 for Maj. Gen. Paul B. Wurtsmith, killed Sept. 13, 1948, in B-25 crash near Asheville, N. C. Area 5,200 acres. Altitude 634 ft. Military 3,140; civilians 409. Payroll $31.7 million. Housing: 294 officer; 1,061 NCO; 59 transient. 20-bed hospital.

Youngstown Municipal Airport, Ohio 44473; 16 mi. N of Youngstown. Phone (216) 856-1645; AUTOVON 346-9211. 910th Tactical Fighter Gp. (AFRES); 757th Tactical Fighter Sqdn. (AFRES). Base activated 1952. Area 226 acres. Altitude 1,784 ft. Military 774; civilians 326; Reservists 800. Payroll $7.6 million.

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. 128)*, the bases here are arranged alphabetically according to the city where the airport is. Other ANG units are at regular USAF bases, as indicated on p. 168. Note also that several AFRES units are collocated with ANG units on civilian airports. In a few cases regular USAF units are at civilian airports where ANG bases are found.

Anchorage, Alaska (Kulis ANG Base at Anchorage IAP) 99502. Phone (907) 243-1145; AUTOVON 752-5215. 176th Tactical Airlift Gp. (ANG). 144th Tactical Airlift Sqdn. (ANG). Named for Lt. Albert Kulis, killed in training flight in 1954. Area 101 acres. Altitude 124 ft. Military 659; civilians 178. Payroll $7.2 million. 6-bed hospital.

Atlanta, Ga. (McCollum Airport, Kennesaw, Ga.) 30144; 27 mi. N of Atlanta. Phone (404) 422-2500; AUTOVON 925-2474. 129th Tactical Control Sqdn. and 129th Tactical Control Flight. 10 mi. from Dobbins AFB, Ga. Area 15 acres. Altitude 1,060 ft. Military 259; civilians 36. Payroll $0.7 million (military pay only. Civilians paid through Dobbins).

Atlantic City, N. J. (National Aviation Facilities Experimental Center) 08405; 10 mi. W of Atlantic City. Phone (609) 641-8200; AUTOVON 234-1980. 177th Fighter Interceptor Gp. (ANG). Area 130 acres. Altitude 76 ft. Military 812; civilians 295. Payroll $8.2 million.

Baltimore, Md. (Glenn L. Martin State Airport) 21220; 8 mi. E of Baltimore. 175th Tactical Fighter Gp. (ANG). Phone (301) 687-6270; AUTOVON 235-9210. 135th Tac Airlift Gp. (ANG). Phone (301) 687-6270; AUTOVON 235-9210. Area 750 acres. Altitude 89 ft. Military 1,494; civilians 300. Payroll $9.9 million.

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. Military 920; civilians 242. Payroll $7.9 million. Dispensary.

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 Gp. (ANG). Area 84 acres. Altitude 941 ft. Military 683; civilians 138. Payroll $5.6 million.

Birmingham Municipal Airport, Ala. (Smith ANG Base) 35217. Phone (205) 591-8160; AUTOVON 694-2260. 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. Military 1,114; civilians 262. Payroll $9.2 million.

Boise Air Terminal, Idaho (Gowen Field) 83701; 6 mi. S of Boise. Phone (208) 385-5339; AUTOVON 941-5011. 124th Tactical Reconnaissance Gp. (ANG). Also host to ARNG (Army Field Training site), and Marine Corps Reserve. Airport named for Lt. Paul R. Gowen, killed in B-10 crash in Panama, July 11, 1938. Area 2,600 acres (461 acres military). Altitude 2,858 ft. Military 867; civilians 236. Payroll $7.3 million. Limited transient facilities available during Army Guard camps.

Buckley ANG Base, Colo. 80011; 8 mi. E of Denver. Phone (303) 390-9011; AUTOVON 877-9011. 140th Tactical Fighter Wing (ANG); also host to Navy Reserve, Marine Corps Reserve, ARNG, and Air Force units. Base activated Apr. 1, 1942, and used as a gunnery training facility. ANG assumed control from US Navy in 1959. Named for Lt. John H. Buckley, National Guardsman, killed at Argonne, France, Sept. 27, 1918. Area 3,263 acres. Altitude 5,663 ft. Military 924 active-duty AF, 1,400 ANG; civilians 264. Payroll $9.5 million. Dispensary.

Burlington, Vt. (Burlington International Airport) 05401; 3 mi. E of Burlington. Phone (802) 658-0770; AUTOVON 689-4310. 158th Defense Systems Evaluation Gp. (ANG). Area 475 acres. Altitude 371 ft. Military 720; civilians 458. Payroll $6.1 million.

Charleston, W. Va. (Kanawha Airport) 25311; 4 mi. NE of Charleston. Phone (304) 342-6194; AUTOVON 366-9210. 130th Tactical Airlift Gp. (ANG). Area 58 acres. Altitude 981 ft. Military 770; civilians 174. Payroll $5.9 million. Dispensary, clinic.

Charlotte, N. C. (Douglas Municipal Airport)

28219. Phone (704) 399-6363; AUTOVON 583-9210. 145th Tactical Airlift Gp. (ANG). Area 49 acres. Altitude 749 ft. Military 952; civilians 189. Payroll $6.8 million. 4-bed dispensary.

Cheyenne, Wyo. (Cheyenne Municipal Airport) 82001. Phone (307) 772-6201; AUTOVON 943-6201. 153d Tactical Airlift Gp. (ANG). Area 46 acres. Altitude 6,156 ft. Military 665; civilians 189. Payroll $3.1 million.

Dallas Naval Air Station, Tex. (Hensley Field) 75211. Phone (214) 266-6111; AUTOVON 874-6111. 136th Tactical Airlift Wing (ANG), 181st Weather Flight, 531st USAF Band. Area 49 acres. Altitude 495 ft. Military 915; civilians 198. Payroll $7.1 million.

Des Moines Municipal Airport, Iowa 50321; in city of Des Moines. Phone (515) 285-7182; AUTOVON 939-8210. 132d Tactical Fighter Wing (ANG). Area 112.1 acres. Altitude 957 ft. Military 815; civilians 230. Payroll $7.2 million.

Duluth International Airport, Minn. 55811; 5 mi. NW of Duluth. Phone (218) 727-6886; AUTOVON 825-7210. 148th Tactical Reconnaissance Gp. (ANG). USAF base also located at airport. Area 152 acres. Altitude 1,429 ft. Military 852; civilians 232. Payroll $7.4 million.

Fargo, N. D. (Hector Field) 58105. Phone (701) 237-6030; AUTOVON 362-8110. 119th Fighter Interceptor Gp. (ANG). Area 133 acres. Altitude 900 ft. Military 1,091; civilians 276. Payroll $8.6 million.

Forbes Field ANG Base, Kan. 66620; 5 mi. S of Topeka. Phone (913) 862-1234; AUTOVON 720-4210. 190th Air Refueling Gp. (ANG). Area 160 acres. Altitude 1,079 ft. Military 683; civilians 232. Payroll $7.1 million.

Fort Smith Municipal Airport, Ark. (Ebing ANG Base) 72906. Phone (501) 646-1601; AUTOVON 962-8210. 188th Tactical Fighter Gp. (ANG). Area 95 acres. Altitude 468 ft. Military 787; civilians 223. Payroll $6.3 million.

Fort Wayne, Ind. (Fort Wayne Municipal Airport) 46809; 5 mi. SSW of Fort Wayne. Phone (219) 747-4141; AUTOVON 889-1550. 122d Tactical Fighter Wing (ANG), 235th Air Traffic Control Flight, 163d Weather Flight. Area 87 acres. Altitude 800 ft. Military 837; civilians 254. Payroll $7.5 million.

Fresno Air Terminal, Calif. 93727; 5 mi. NE of Fresno. Phone (209) 252-4041; AUTOVON 949-9210. 26th NORAD Region and 26th Air Division (TAC); 194th Fighter Interceptor Sqdn. (TAC); 144th Fighter Interceptor Wing (ANG). Area 140 acres. Altitude 332 ft. Military 934; civilians 308. Payroll $9.1 million.

Gen. Billy Mitchell Field, Wis. 53207; SE of Milwaukee. Altitude 722 ft. ANG and AFRES have separate phones and facilities. ANG phone (414) 747-4410; AUTOVON 580-8410. 128th Air Refueling Gp. and 128th Tactical Control Flight (ANG). ANG: Area 58 acres. Military 822; civilians 239. Payroll $7.2 million. AFRES phone (414) 481-6400; AUTOVON 786-9110. 440th Tactical Airlift Wing (AFRES). AFRES: Area 99 acres. Military 5; civilians 335; Reserve 927. Payroll $8.2 million.

Great Falls International Airport, Mont. 59404; 5 mi. SW of Great Falls. Phone (406) 727-4650; AUTOVON 279-2301. 24th NORAD Region and 24th Air Div. (TAC); SAGE Control Center (NORAD); 120th Fighter Interceptor Gp. (ANG). Area 138 acres. Altitude 3,674 ft. Military 789; civilians 304. Payroll $9.0 million. Dispensary.

Gulfport-Biloxi Regional Airport, Miss. 39501; within city limits of Gulfport. Phone (601) 863-8624; AUTOVON 363-8210. Training site; also host to 173d Civil Engineering Flight, 255th Combat Communications Sqdn., 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. Military 310; civilians 24. Payroll $0.9 million (military pay only; civilians paid through Jackson). 2-bed dispensary.

Harrisburg International Airport, Pa. 17057. Phone (717) 944-0471; AUTOVON 454-9210. 193d Tactical Electronic Warfare Gp. (ANG). Altitude 310 ft. Military 987; civilians 228. Payroll $8.9 million.

Hayward ANG Base, Calif. Moved. See listing under Moffett Naval Air Station.

Houston, Tex. (Ellington AFB) 77209; 17 mi. SE of Houston. Phone (713) 481-1400; AUTOVON 954-2110. 147th Fighter Interceptor Gp. (ANG). Other tenants: NASA Operations, US Coast Guard, Army National Guard, FAA, Military Sealift Command, ANG Transition Caretaker Force (USAF funded). Named for Lt. Eric L. Ellington, a pilot killed Nov. 1913. Area 2,300 acres. Altitude 40 ft. Military 870; civilians 425. Payroll $10.2 million.

Jackson Municipal Airport, Miss. (Allen C. Thompson Field) 39208; 7 mi. E of Jackson. Phone (601) 939-3633; AUTOVON 731-9310. 172d Tactical Airlift Gp. (ANG). ANG area 22 acres. Altitude 346 ft. Military 775; civilians 173. Payroll $6.8 million. 6-bed dispensary.

Jacksonville International Airport, Fla. 32229; 15 mi. NW of Jacksonville. Phone (904) 757-1360; AUTOVON 460-7210. 125th Fighter Interceptor Gp. (ANG). Area 158 acres. Altitude 30 ft. Military 947; civilians 311. Payroll $9.4 million. 5-bed dispensary.

Knoxville, Tenn. (McGhee Tyson Airport) 37901; 10 mi. SW of Knoxville. Phone (615) 573-0111; AUTOVON 588-8210. Host unit is 134th Air Refueling Gp. (ANG). Tenants: 228th Combat Communications Sqdn., 119th and 110th Tactical Control Flights, and ANG's I. G. Brown Professional Military Education Center. Area 299 acres. Altitude 980 ft. Military 1,113; civilians 315. Payroll $9.0 million. Dispensary.

Lincoln Municipal Airport, Neb. 68524; 3 mi. NW of Lincoln. Phone (402) 477-3904; AUTOVON 939-1700. 155th Tactical Reconnaissance Gp. (ANG). Also hosts Army National Guard and Army Reserve unit. Area 162 acres. Altitude 1,198 ft. Military 834; civilians 238. Payroll $7.0 million. Dispensary.

Louisville, Ky. (Standiford Field) 40213. Phone (502) 566-9400; AUTOVON 989-4400. 123d Tactical Reconnaissance Wing (ANG). Area 65 acres. Altitude 497 ft. Military 966; civilians 238. Payroll $7.6 million.

Mansfield Lahm Airport, Ohio 44901; 3 mi. N of Mansfield. Phone (419) 524-4621; AUTOVON 889-1520. 179th Tactical Airlift Gp. (ANG). Named for aviation pioneer Brig. Gen. Frank P. Lahm. Area 210 acres. Altitude 1,296 ft. Military 722; civilians 177. Payroll $5.7 million. Dispensary.

Martinsburg, W. Va. (East West Va. Regional Airport) 25401; 4 mi. S of Martinsburg. Phone (304) 263-0801; AUTOVON 242-9210. 167th Tactical Airlift Gp. (ANG). Area 900 acres. Altitude 556 ft. Military 811; civilians 180. Payroll $5.8 million. Dispensary.

McEntire ANG Base, S. C. 29044; 12 mi. E of Columbia. Phone (803) 776-5121; AUTOVON 583-8201. 169th Tactical Fighter Gp. (ANG). Also host to 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. Military 907; civilians 241. Payroll $7.4 million. Dispensary.

Memphis International Airport, Tenn. 38118; 10 mi. S of Memphis. Phone (901) 363-1212; AUTOVON 966-8111. 164th Tactical Airlift Gp. (ANG). ANG occupies 81.1 acres. Altitude 332 ft. Military 772; civilians 173. Payroll $5.8 million. Clinic.

Meridian, Miss. (Key Field) 39301; within city limits. Phone (601) 693-5031; AUTOVON 363-9210. 186th Tactical Reconnaissance Gp. (ANG), 238th Combat Communications Flight, and 238th Air Traffic Control Flight. Area 55 acres. Altitude 297 ft. Military 1,010; civilians 249. Payroll $7.9 million. 2-bed dispensary.

Minneapolis-St. Paul International Airport, Minn. 55450; in Minneapolis near junction of Mississippi and Minnesota Rivers. Altitude 840 ft. ANG and AFRES have separate phones and facilities. ANG phone (612) 725-5011; AUTOVON 825-5681. 133d Tactical Airlift Wing (ANG). ANG: Area 126 acres. Military 1,080; civilians 239. Payroll $8.2 million. AFRES phone (612) 725-5011; AUTOVON 825-5110. 934th Tactical Airlift Gp. (AFRES). AFRES: Area 300 acres. Military 820; civilians 480. Payroll $8.4 million. Other units include 210th Electronic Installation Sqdn.; 237th Air Traffic Control Flight; 133d Field Training Flight; Det. 1, 1963d Communications Sqdn.; US Naval Reserve units; and Defense Investigative Service.

Moffett Naval Air Station, Calif. 94043; 2 mi. N of Mountain View. 129th Aerospace Rescue and Recovery Gp. (ANG) is moving to Moffett from Hayward ANG Base, Calif. Altitude 34 ft. Military 718.

Montgomery, Ala. (Dannelly Field) 36105; 7 mi. SW of Montgomery. Phone (205) 281-7770; AUTOVON 485-9210. 187th Tactical Reconnaissance Gp. (ANG). Hosts 232d Combat Communications Gp. Named for Ens. Clarence Dannelly, Navy pilot killed at Pensacola, Fla., during WW II. Area of base 55 acres. Altitude 221 ft. Military 988; civilians 272. Payroll $8.5 million. Dispensary.

Nashville Metropolitan Airport, Tenn. 37217; 6 mi. SE of Nashville. Phone (615) 361-4600; AUTOVON 446-6210. 118th Tactical Airlift Wing (ANG). Area 66 acres. Altitude 597 ft. Military 942; civilians 234. Payroll $7.1 million.

New Orleans Naval Air Station, La. (Alvin Callender Field) 70146; 15 mi. S of New Orleans. Area 3,245 acres. Altitude 3 ft. ANG and AFRES have separate phones and facilities. ANG phone (504) 394-2818; AUTOVON 363-3399. 159th Tactical Fighter Gp. (ANG). ANG: Military 770; civilians 236. Payroll $7.1 million. AFRES phone (504) 393-3399; AUTOVON 363-3399. 926th Tactical Fighter Gp. (AFRES). AFRES: Military 1,156; civilians 207; Reservists 547. Payroll $4.9 million. NAS New Orleans was the first joint Air Reserve Training Facility. Named for Alvin A. Callender, who served with the British Royal Flying Corps during WW I and was shot down over France in 1918. Dispensary.

Oklahoma City, Okla. (Will Rogers World Airport) 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. Military 1,136; civilians 224. Payroll $7.8 million.

Ontario International Airport, Ontario, Calif. 91761. Phone (714) 984-2705; AUTOVON 898-3870. 163d Tactical Air Support Gp. (ANG). Area 39 acres. Altitude 900 ft. Military 730; civilians 142. Payroll $5.6 million.

Otis AFB, Mass. 02542; 7 mi. NNE of Falmouth. Phone (617) 968-4667; AUTOVON 557-4667. 102d Fighter Interceptor Wing (ANG). 4789th Air Base Gp. (Residual USAF Caretaker). 6th Missile Warning Sqdn. (PAVE PAWS). Other tenants include Coast Guard Air Station Cape Cod; Army National Guard Aviation; Camp Edwards ARNG Training Installation; VA National Cemetery. Named for 1st Lt. Frank J. Otis, ANG flight surgeon and pilot killed in 1937 crash. Area 19,925 acres. Altitude 132 ft. Military 878; civilians 508. Payroll $13.5 million. 1,193 housing units on base; USCG administers 601 (10 Command, 45 Officer, 546 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 Gp. (ANG). Area 27.9 acres. Altitude 640 ft. Military 649; civilians 162. Payroll $4.7 million. Dispensary.

Phelps Collins ANG Base, Mich. 49707; 7 mi. W of Alpena. Phone (517) 354-4141; AUTOVON 722-3760. Training site detachment. Facilities used by ANG and AFRES units for annual field training; also ARNG and Marine Reserve for special training. Named for Capt. W. H. Phelps Collins

American Flying Corps, killed in France, Mar. 1918. Area 3,190 acres. Altitude 689 ft. Military 30; civilians 3. Payroll $0.5 million (military pay only; civilians paid through Battle Creek); seasonal during field training. Housing: 86 officer; 40 NCO; 14 transient. 10-bed hospital. Dispensary.

Phoenix, Ariz. (Sky Harbor International Airport) 85034. Phone (602) 244-9841; AUTOVON 853-9211. 161st Air Refueling Gp. (ANG). Area 51 acres. Altitude 1,230 ft. Military 837; civilians 244. Payroll $7.5 million.

Pittsburgh (Greater Pittsburgh) International Airport, Pa. 15231; 15 mi. NW of Pittsburgh. Altitude 1,203 ft. ANG and AFRES have separate phones and facilities. ANG phone (412) 264-3380; AUTOVON 936-1760. 171st Air Refueling Wing and 112th Tactical Fighter Gp. (ANG). ANG: Area 90 acres. Military 1,380; civilians 392. Payroll $12.1 million. AFRES phone (412) 264-5000; AUTOVON 277-8000. 911th Tactical Airlift Gp. (host unit). AFRES: Area 165 acres. Military 21; civilians 325; Reservists 1,004. Payroll $8.4 million. Other units include 2046th Communications Installation Gp. (AFCC); USAF Liaison, Pa. CAP. Base activated 1943. 50 VOQ; 224 enlisted qtrs.

Portland International Airport, Portland, Ore. 97218. Phone (503) 288-5611; AUTOVON 891-1701. 142d Fighter Interceptor Gp. (ANG). Also host to 304th Aerospace Rescue and Recovery Sqdn. (AFRES), 83d Air Police Sqdn. (AFRES). Area 400 acres. Altitude 26 ft. Military 1,514; civilians 362. Payroll $12.2 million.

Providence, R. I. (T. F. Green Airport) 02886; 10 mi. S of Providence. Phone (401) 737-2100; AUTOVON 881-1440. 143d Tactical Airlift Gp. (ANG). Area 22 acres. Altitude 56 ft. Military 703; civilians 187. Payroll $6.9 million.

Reno, Nev. (Cannon International Airport—May ANG Base) 89502; 5 mi. SE of Reno. Phone (702) 323-1011; AUTOVON 830-8310. 152d Tactical Reconnaissance Gp. (ANG). Named for Maj. Gen. James A. May, state Adjutant General. Area 66.6 acres. Altitude 4,411 ft. Military 781; civilians 232. Payroll $7.0 million. Dispensary.

Richmond, Va. (Byrd International Airport) 23150; 4 mi. SE of downtown Richmond. Phone (804) 222-8884; AUTOVON 274-8210. 192d Tactical Fighter Gp. (ANG). Airfield named for Adm. Richard E. Byrd, famous Arctic and Antarctic explorer. Area 137 acres. Altitude 167 ft. Military 971; civilians 249. Payroll $8.1 million.

Rickenbacker AFB, Ohio 43217; 13 mi. SSW of Columbus. Phone (614) 492-8211; AUTOVON 950-1110. Base transferred from SAC to ANG Apr. 1, 1980. SAC forces are being withdrawn through Oct. 1982. 121st Tactical Fighter Wing (ANG); 302d Tactical Airlift Wing (AFRES); 160th Air Refueling Gp. (ANG). Base activated 1942. Formerly Lockbourne AFB. Renamed May 18, 1974, in honor of Capt. Edward V. Rickenbacker, America's leading WW I ace and Medal of Honor winner, died July 23, 1973. Area 4,100 acres. Approximately 2,000 acres to be declared excess and turned over to General Services Administration. Some 1,500 acres shared by military and civilian concerns. Altitude 744 ft. ANG military 1,731; civilians 391. On-base housing to be declared excess. Aid station.

Salt Lake City International Airport (ANG Base), Utah 84116; 3 mi. W of Salt Lake City. Phone (801) 521-7070; AUTOVON 790-9210. 151st Air Refueling Gp. (ANG). Also hosts following ANG units: 109th Tactical Control Flight, 106th Tactical Control Flight, 130th Electronic Installation Sqdn., 299th Communications Sqdn. Area 75 acres. Altitude 4,220 ft. Military 1,171; civilians 304. Payroll $9.0 million. Dispensary.

San Juan, Puerto Rico (Muniz ANG Base at San Juan IAP) 00913. Phone (809) 791-5450; AUTOVON 434-1860. 156th Tactical Fighter Gp. (ANG). Base named for Lt. Col. Jose A. Muniz, killed in an aircraft accident July 4, 1960. Military 950; civilians 204. Payroll $8.4 million. Dispensary.

Savannah Municipal Airport, Ga. 31402; 4 mi. NW of Savannah. Phone (912) 964-1941; AUTOVON 860-8210. 165th Tactical Airlift Gp. (ANG). Also field training site. Area 232 acres. Altitude 50 ft. Military 857; civilians 230. Payroll $7.9 million. Housing: 156 officer; 100 NCO. 3-bed dispensary.

Schenectady County Airport, N. Y. 12301; 2 mi. N of Schenectady. Phone (518) 372-5621; AUTOVON 974-9221. 109th Tactical Airlift Gp. (ANG). Area 106 acres. Altitude 378 ft. Military 732; civilians 184. Payroll $6.0 million. Dispensary.

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 Gp. (ANG); 403d Rescue and Weather Reconnaissance Wing (AFRES); 927th Tactical Airlift Gp. (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. Military 1,458; civilians 930. Payroll $22.0 million. Housing; 12 transient. Dispensary.

Sioux City Municipal Airport, Iowa 51110; 7 mi. S of Sioux City. Phone (712) 255-3511; AUTOVON 939-6210. 185th Tactical Fighter Gp. (ANG). Area 2,550 acres. Altitude 1,098 ft. Military 676; civilians 208. Payroll $6.5 million. Dispensary.

Sioux Falls, S. D. (Joe Foss Field) 57104; N side of Sioux Falls. Phone (605) 336-0670; AUTOVON 939-7210. 114th Tactical Fighter Gp. (ANG). Named for Brig. Gen. Joseph J. Foss, WW II ace, former governor of South Dakota, and National President of AFA, founder of the South Dakota ANG. Area 148 acres. Altitude 1,428 ft. Military 738; civilians 213. Payroll $6.4 million.

Springfield, Ill. (Capitol Airport) 62707; NW of Springfield. Phone (217) 753-8850; AUTOVON 631-8210. 183d Tactical Fighter Gp. (ANG). Area 70 acres. Altitude 592 ft. Military 829; civilians 253. Payroll $7.3 million. Dispensary.

Springfield Municipal Airport, Ohio 45501; 5 mi. S of Springfield. Phone (513) 323-8653; AUTOVON 346-2210. 178th Tactical Fighter Gp. (ANG). Area 115 acres. Altitude 1,052 ft. Military 1,043 ANG authorizations; civilians 249. Payroll $8.5 million. 6-bed dispensary.

St. Joseph, Mo. (Rosecrans Memorial Airport) 64503; 4 mi. W of St. Joseph. Phone (816) 364-2941; AUTOVON 720-9210. 139th Tactical Airlift Gp. (ANG). Area 54.3 acres. Altitude 724 ft. Military 646; civilians 180. Payroll $5.7 million.

St. Louis International Airport, Mo. 63145. Phone (314) 263-6356; AUTOVON 693-6356. 131st Tactical Fighter Wing (ANG), 239th Combat Communications Flight, 241st Air Traffic Control Flight, 110th Weather Flight, 571st USAF Band. Area 39 acres. Altitude 589 ft. Military 1,205; civilians 310. Payroll $10.7 million.

Suffolk County Airport, Westhampton Beach, N. Y. 11978; within corporate limits of Westhampton Beach. Phone (516) 288-4200; AUTOVON 456-7210. 106th Aerospace Rescue and Recovery Gp. (ANG). Area 55 acres. Altitude 67 ft. Military 707; civilians 185. Payroll $5.8 million.

Syracuse, N. Y. (Hancock Field) 13211; 5 mi. NE of Syracuse. Phone (315) 458-5500; AUTOVON 587-9110. 174th Tactical Fighter Wing (ANG). Tenants are 108th Tactical Control Sqdn. (ANG), and base operations for Hancock AFB (NORAD site on remote part of Syracuse Hancock International Airport). Area 443 acres. Altitude 421 ft. Military 938; civilians 215. Payroll $6.5 million. Dispensary.

Terre Haute, Ind. (Hulman Field) 47803; 5 mi. E of Terre Haute. Phone (812) 877-2551; AUTOVON 634-1581. 181st Tactical Fighter Gp. (ANG). Area 60 acres. Altitude 585 ft. Military 817; civilians 220. Payroll $7.0 million. 5-bed dispensary.

Toledo Express Airport, Ohio 43558; 14 mi. W of Toledo. Phone (419) 866-2078; AUTOVON 580-2110. 180th Tactical Fighter Gp. (ANG); hosts 555th USAF Band. Area 79 acres. Altitude 684 ft. Military 837; civilians 211. Payroll $7.4 million. 4-bed clinic.

Truax Field, Madison, Wis. 53704; 2 mi. N of Madison. Phone (608) 241-6200; AUTOVON 273-8210. 128th Tactical Air Support Wing (ANG). Activated June 1942, as AAF base, taken over by Wis. ANG in Apr. 1968. Named for Lt. T. L. Truax, killed in P-40 training accident in 1941. Area 152 acres. Altitude 862 ft. Military 905; civilians 169. Payroll $6.6 million. Housing: 7 transient. Dispensary.

Tucson International Airport, Ariz. 85734; within Tucson city limits. Phone (602) 748-1110; AUTOVON 361-1110. 162d Tactical Fighter Gp. (ANG). Area 49 acres. Altitude 2,650 ft. Military 1,041; civilians 418. Payroll $12.1 million.

Tulsa International Airport, Okla. 74115. Phone (918) 836-0381; AUTOVON 956-5297. 138th Tactical Fighter Gp. (ANG), 125th Weather Flight. Area 78 acres. Altitude 676 ft. Military 745; civilians 214. Payroll $6.3 million.

Van Nuys ANG Base, Calif. (Van Nuys Airport) 91409. Phone (213) 781-5980; AUTOVON 873-6310. 146th Tactical Airlift Wing (ANG), 147th Combat Communications Sqdn. (Contingency), 195th Weather Flight, 562d USAF Band. Area 62.5 acres. Altitude 799 ft. Military 1,454; civilians 332. Payroll $10.1 million.

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 Wisconsin ANG pilot killed in Korean War. Base proper 2,450 acres. Altitude 915 ft. Military 39; civilians 1. Payroll $0.1 million (military pay only; civilians paid through Truax).

Westfield, Mass. (Barnes Municipal Airport) 01085; 3 mi. N of Westfield. Phone (413) 562-3691; AUTOVON 893-1470. 104th Tactical Fighter Gp. (ANG). Area 133 acres. Altitude 270 ft. Military 806; civilians 196. Payroll $6.7 million.

White Plains, N. Y. (Westchester County Airport) 10604; 8 mi. NE of White Plains. Phone (914) 946-9511; AUTOVON 456-9210. 105th Tactical Air Support Gp. (ANG). Area 692 acres; ANG base 27 acres. Altitude 439 ft. Military 794; civilians 146. Payroll $6.8 million. Dispensary.

Willow Grove Naval Air Station, Pa. 19090; 14 mi. N of Philadelphia. ANG and AFRES have separate phones and facilities. Altitude 356 ft. ANG phone (215) 441-1500; AUTOVON 991-1500. 111th Tactical Air Support Gp. (ANG). ANG: Area 1,000 acres. Military 748; civilians 135. Payroll $5.2 million. AFRES phone (215) 443-1062; AUTOVON 991-1062. 913th Tactical Airlift Gp. (AFRES). AFRES: Area 162 acres. Military 1,666; civilians 157; Reservists 700. Payroll $6.4 million. Other units include Army, Navy, and Marine Corps Reserve; 1998th Communications Sqdn. (AFCC); Defense Contract Administration Services Region, Philadelphia; 92d Aerial Port Sqdn. (MAC) as offbase tenant. Base activated Aug. 1958. Navy transient qtrs. available to Navy personnel only.

Wilmington, Del. (Greater Wilmington Airport) 19720; 5 mi. S of Wilmington. Phone (302) 322-2261; AUTOVON 455-9000. 166th Tactical Airlift Gp. (ANG); Army National Guard 198th Aviation Company. Area 57 acres. Altitude 80 ft. Military 765; civilians 173. Payroll $6.0 million. 2-bed dispensary.

Windsor Locks, Conn. (Bradley International Airport) 06096; 15 mi. N of Hartford. Phone (203) 623-8291; AUTOVON 636-8310. 103d Tactical Fighter Gp. (ANG), and Army National Guard Aviation battalion. Named for Lt. Eugene M. Bradley, killed in P-40 crash in Aug. 1941. Area 2,000 acres. Altitude 173 ft. Military 721; civilians 202. Payroll $6.8 million.

A GUIDE TO USAF'S R&D FACILITIES

Principal AFSC 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. These organizations are described below.

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.

The wide range of systems in development and production includes the A-10, F-15, and F-16 aircraft; the air-launched cruise missile and cruise missile carrier aircraft; the advanced strategic air-launched missile; the new CX transport; EF-111 tactical jammer; a new primary trainer; night-attack systems; expendable drones; flight simulators; life-support equipment; precision location strike system; C-5 wing modifications; and modernization of the B-52 aircraft.

Armament Division (AD), Eglin, AFB, Fla.—The Division'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, and exploratory, advanced, and engineering development. In the first two phases, exploratory programs advance air armament-related science and technology; in the third phase, AD demonstrates the feasibility of new armament concepts; and, in the final phase, the Division performs the engineering development of new armament systems for production.

AD 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 AD are air-launched tactical and air-defense missiles, guided weapons, aircraft guns and ammunition, targets, and related armament support equipment. The Division 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., AD 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.

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. More than 100 projects are under way, including modernization of the North American air defense with new control centers and joint-use Air Force/Federal Aviation Administration radars; sea-launched ballistic missile detection and warning radars on the East and West Coasts; satellite communications terminals for ground and aircraft use; optical and electromagnetic sensors to warn of solar-induced disruptions of the atmosphere; a triservice secure and survivable tactical communications network for air, ground, and sea forces; upgrading of the NORAD Space Operations Center; the E-3A Sentry airborne radar/direction center for Air Force and NATO; and the E-4 Airborne Command Post for the Strategic Air Command and the National Command Authorities. ESD also works directly with the major commands to plan for evolutionary command control and communications improvements.

Space Division (SD), Los Angeles AFS, Calif.—SD provides and manages the majority of the nation's military space systems. SD's responsibilities include:

- Providing and maintaining space-based communications, meteorological, navigation, and surveillance systems in support of combat forces on the ground, at sea, and in the atmosphere.
- Developing spacecraft, launch vehicles, and ground-terminal equipment to maintain and improve military space capabilities.
- Launching and controlling on-orbit satellites for DoD and other government agencies.
- Developing space defense and survivability technology to ensure protection of the nation's space assets.
- Managing DoD activities in the national Space Transportation System (Space Shuttle) being developed by NASA.
- Operating national test ranges and launch facilities to support space and missile programs for the Air Force, DoD, NASA, and other agencies.
- Operating a worldwide network of satellite tracking stations.

The Space and Missile Test Organization and the Air Force Satellite Control Facility, major field elements of SD, are described below. Another major element is the Manned Space Flight Support Group at Johnson Space Center in Houston, Tex. This group supports Space Transportation System (Space Shuttle) development activities and is preparing a cadre of Air Force people for the evolving DoD role in manned space flight operations.

Ballistic Missile Office (BMO), Norton AFB, Calif.—BMO manages the research, design, development, and acquisition of DoD ballistic missile systems. BMO's mission is to plan, implement, and manage programs to acquire ballistic missile systems and subsystems, support equipment, and related hardware. In addition, BMO provides for the alteration of missile sites and launch facilities and acts as executive agent for designated Air Force, DoD, and international missile programs.

BMO is currently managing full-scale engineering development of the MX missile system, the new land-based mobile intercontinental ballistic missile scheduled to be deployed in mid-1986.

BMO also currently provides for the Advanced Ballistic Reentry Systems triservice mission requirements.

Test Organizations

Space and Missile Test Organization (SAMTO), Vandenberg AFB, Calif.—SAMTO has two specific functions. First is the management of field test and launch operations for all DoD-directed space programs and long-range ballistic research and development programs. The other is development, management, and operation, through the Eastern and Western Space and Missile Centers, of the national test ranges.

Western Space and Missile Center (WSMC), Vandenberg AFB, Calif.—The Center is responsible for conducting launch and launch-support activities for space and missile research and development programs of the Air Force and user agencies. 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 Space and Missile Center (ESMC), Patrick AFB, Fla.—The Center is responsible for conducting launch and launch support activities for the Air Force and user agencies. In addition, it operates Patrick AFB. The Eastern Test Range extends more than 10,000 miles down the Atlantic into the Indian Ocean where it joins the Western Test Range to form a worldwide network. Tracking and data-gathering stations are located at Grand Bahama, Grand Turk, Antigua, and the Ascension Islands.

Air Force Satellite Control Facility (AFSCF), Sunnyvale AFS, Calif.—AFSCF develops, maintains, and operates for the Space Division a worldwide network of tracking stations to perform on-orbit tracking, data acquisition, and command and control of DoD space vehicles.

Air Force Flight Test Center (AFFTC), Edwards AFB, Calif.—AFFTC conducts and supports tests of manned and unmanned aircraft and aerospace research vehicles. Included in the evaluation are flying qualities and subsystem performance, reliability, maintainability, and functional capability under climatic extremes. The Center not only supports Air Force test programs but also DoD and other government agency, foreign, and contractor programs. Developmental testing of advanced and special mission parachutes is also conducted. AFFTC is responsible for operating the USAF Test Pilot School. Edwards AFB will serve as the landing site for the first series of Space Shuttle orbital flights and as an alternate site for subsequent flights.

Projects currently under evaluation include the F-15 and F-16 fighters, A-10 close support aircraft, the air-launched cruise missile, and the B-1.

AFFTC has management responsibility for the Utah Test and Training Range. Located in northwestern Utah, the range has 1,700,000 acres of land. Use of the range covers many development test and evaluation programs, including cruise missiles and remotely piloted vehicles. The Tactical Air Command and Strategic Air Command also conduct operations test and evaluation training programs.

Arnold Engineering Development Center (AEDC), Arnold AFS, Tenn.—AEDC has the largest complex of advanced aerospace flight simulation test facilities in the Western world. The Center operates forty test units—including wind tunnels, altitude test cells, space chambers, and aeroballistics ranges—in which flight conditions can be simulated from sea level to altitudes of 1,000 miles, and from subsonic speeds to more than 20,000 mph.

AEDC's mission is to assist in ensuring that aircraft, missiles, spacecraft, jet and rocket propulsion systems, and other aerospace hardware meet specified requirements the first time launched or flown. Problems encountered with operational systems also are investigated.

Tests are conducted for the Air Force, Army, Navy, NASA, other federal agencies, and aerospace industry contractors. The development of essentially every major US aerospace program for the past quarter century has been supported by AEDC test work.

To meet flight simulation needs for the 1980s and 1990s, the Air Force is constructing the Aeropropulsion Systems Test Facility at AEDC, a $437 million complex to be completed in early 1983. It is designed to test the large, advanced jet aircraft engine systems required for future aircraft.

Laboratories

Director of Science & Technology (DL), Andrews AFB, Md.—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.

Laboratories under DL 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, nuclear survivability/vulnerability, and advanced weapons concepts.

• **Air Force Rocket Propulsion Laboratory (AFRPL),** Edwards AFB, Calif.—AFRPL conducts exploratory and advanced development programs for liquid, solid, and hybrid rockets; advanced rocket propellants; and associated ground-support equipment. AFRPL also conducts system support programs for other units and divisions of AFSC, other branches of the armed services, and NASA.

• **Air Force Human Resources Laboratory (AFHRL),** Brooks AFB, Tex.—AFHRL manages and conducts research and exploratory and advanced development programs for personnel management and training. 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 terrestrial, atmospheric, and space environments. AFGL scientists study the effects of the space environment on Air Force satellites; the interactions of the ionosphere and upper atmosphere with Air Force systems; the optical properties of the atmosphere, both as a transmission medium and as an emitter of radiation; the measurement of the earth's gravity field and its crustal motions to determine their effects on ballistic missiles; and new and better ways to predict the weather and measure weather elements.

• **Air Force Office of Scientific Research (AFOSR),** Bolling AFB, D. C.—AFOSR is the single manager of Air Force basic research. It awards grants and contracts for basic research directly related to Air Force needs. Research is selected to support the search for new knowledge and the expansion of scientific principles. AFOSR is also responsible for the activities of the Frank J. Seiler Research Laboratory 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 aerospace mechanics. The laboratory sponsors related research conducted by the faculty and cadets of the USAF Academy.

• **European Office of Aerospace Research and Development (EOARD),** London, England—This unit links the Air Force and the scientific communities in Europe, Africa, and the Near East. It identifies foreign technology, engineering, and manufacturing advances that can be applied to USAF requirements.

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.

• **Flight Dynamics Laboratory** is concerned with the development of flight-vehicle technology. Specific technical areas include structural design and durability, vehicle dynamics, aeroacoustics, vehicle equipment, mechanical subsystems, environmental control, crew escape and recovery, survivability and vulnerability, flight control, crew station design, flight simulation, performance analysis, aerodynamics, configuration synthesis, and technology integration.

• **Materials Laboratory** conducts the complete USAF program in materials exploratory development and manufacturing technology. Areas of current emphasis include thermal protection materials; metallic and nonmetallic structural materials; aerospace propulsion materials; fluids, lubricants, and fluid-containment materials; protective coatings; and electronic and electromagnetic materials.

• **Avionics Laboratory** conducts research and development programs for reconnaissance, weapon delivery, electronic warfare, electronic technology, and avionics systems.

• **Aero Propulsion Laboratory** conducts Air Force exploratory and advanced development programs in turbine engines, ramjets, fuels, turbine engine lubricants, aircraft fire protection, 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 C^3I (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 on free-fall and guided nonnuclear munitions, and airborne targets and scorers to provide the future technological base for aircraft armaments. These include bombs, dispensers, fuzes, guns, and ammunition. AFATL also provides consulting services in aircraft munition compatibility and analysis, and prediction of weapon effects. AFATL is organizationally assigned to the Armament Division at Eglin AFB, Fla.

• **Air Force Engineering and Services Center, Research and Development Division (AFESC/RD),** Tyndall AFB, Fla.—is organizationally assigned to Headquarters Air Force Engineering and Services Center. It acts as the Systems Command agent in executing civil engineering, environmental quality, and facilities energy RDT&E. AFESC/RD evaluates methods and techniques to detect, assess, control, and abate Air Force environmental problems. The Division also conducts civil engineering R&D to improve air base survivability, aircraft contingency launch and recovery surfaces, aircraft and tactical shelters, and air base equipment/facilities.

Special AFSC Organizations

Foreign Technology Division (FTD), Wright-Patterson AFB, Ohio—FTD acquires, evaluates, analyzes, and disseminates information on foreign aerospace technology, in concert with other divisions, laboratories, and centers. Information collected from a wide variety of sources is processed in unique electronic data-handling and laboratory-processing equipment and analyzed by scientific and technical specialists.

Air Force Contract Management Division (AFCMD), Kirtland, AFB, N. M.—AFCMD is responsible for DoD contract management activities in twenty major contractor plants assigned to the Air Force under the DoD National Plant Cognizance Program. 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.

Aerospace Medical Division (AMD), Brooks AFB, Tex.—AMD is charged with management and conduct of research and development in aerospace biotechnology which support the Air Force mission. Specialized and postgraduate professional education is also conducted in medicine, dentistry, and aerospace medical subjects. AMD scientists seek to counter potential hazards and ensure maximum crew performance in all aerospace environments.

• **Wilford Hall USAF Medical Center (WHMC),** Lackland AFB, Tex.—This 1,000-bed medical center is one of six in the Air Force and one of the largest in the Department of Defense. In addition to its primary mission of patient care, in clinical specialties, it provides more than fifty-five percent of all postgraduate medical training in the Air Force. In the Center's mission of clinical research, investigations have resulted in unprecedented advances in surgical and treatment procedures in such areas as dental work, drug therapy, internal medicine, psychiatric treatment, cancer treatment, experimental surgery, and organ transplants. As a worldwide referral center, Wilford Hall offers such sophisticated procedures as open-heart surgery, kidney and corneal transplants, cancer therapy, and reconstruction of various parts of the body. Its care unit for newborn infants has one of the lowest infant mortality rates in the world. A computerized Tomographic Scanner, the latest in diagnostic X-ray equipment, is located here.

• **USAF Aerospace Medical Research Laboratory (AMRL),** Wright-Patterson AFB, Ohio—AMRL is part of the Aerospace Medical Division. It conducts behavioral and biomedical research to define the limits of human tolerance and the degradation of human performance under the conditions of environmental stress. AMRL also establishes design criteria and new biotechnology techniques to protect and sustain personnel in future aerospace systems. The four areas of laboratory research are: occupational and environmental toxic hazards in Air Force operations, safety and aircrew effectiveness in mechanical force environments, man-machine integration technology, and manned weapon-system effectiveness.

• **USAF School of Aerospace Medicine (USAFSAM),** Brooks AFB, Tex.—The school is part of the Aerospace Medical Division. Its research mission includes both in-house and contractual work dealing with applied aspects of aeromedical research. Investigations in the Divisions of Data Sciences, Clinical Sciences, Environmental Sciences, and Radiobiology encompass laboratory and clinical studies in biological, environmental, and dynamic conditions that may affect the health and efficiency of aircrews. The Epidemiology Division serves as a consultant and reference laboratory to Air Force medical facilities throughout the world. One of its principal responsibilities is to give advice and assistance in the investigation of disease outbreaks at Air Force installations. USAFSAM operates the sole USAF Hyperbaric Oxygen Treatment facility.

• **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.

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. Flight testing includes HiMAT (Highly Maneuverable Aircraft Technology), RPRVs (Remotely Piloted Research Vehicles), pivot-wing subsonic aircraft, digital fly-by-wire flight control systems, and wake vortex alleviation methods. 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, weather 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 manages the Voyager and Galileo programs. JPL designed 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 Support Office 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 transport, military, and general aviation aircraft. Langley devotes more than half its efforts to aeronautics. The Center also managed the Viking project that orbited and landed spacecraft on Mars in 1976, and 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.

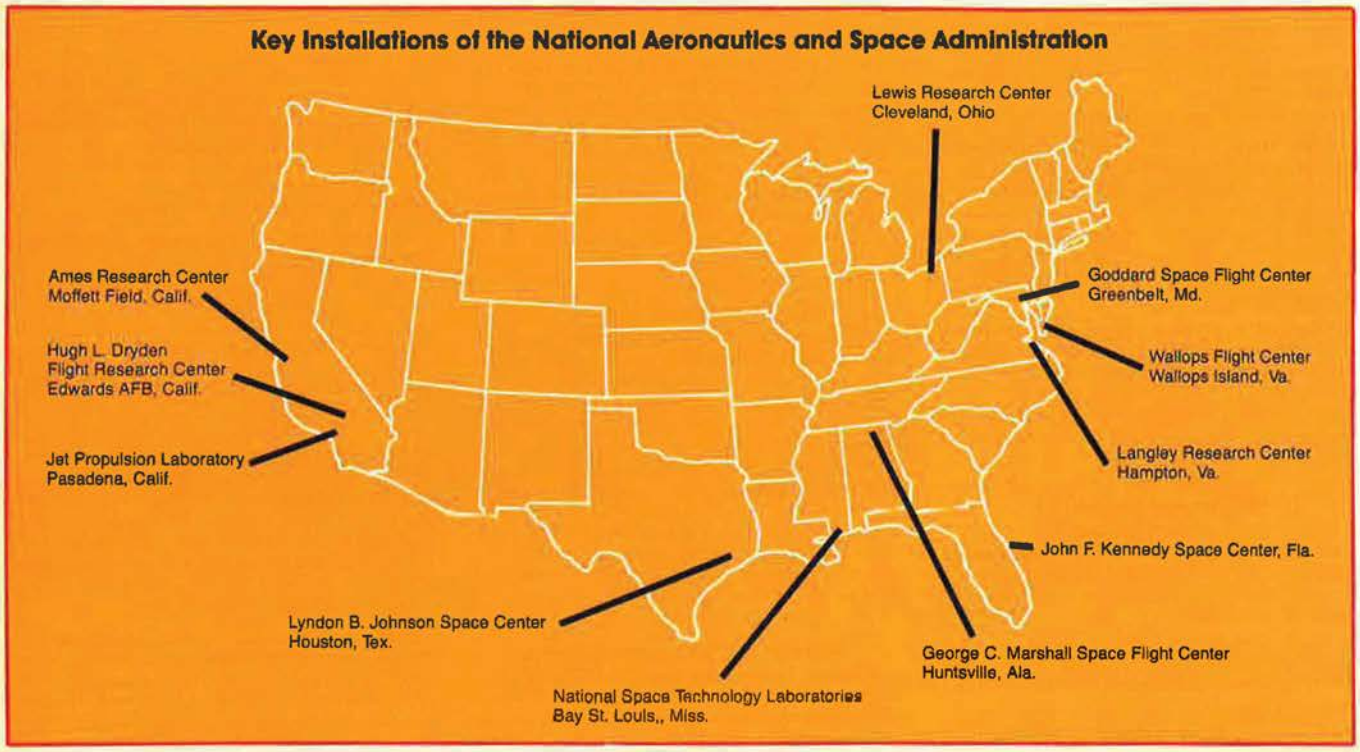
George C. Marshall Space Flight Center, Huntsville, Ala.—Marshall serves as one of NASA's primary Centers for the design and development of space transportation systems, orbital systems, scientific payloads, and other means for space exploration. The Center has major responsibilities for Space Shuttle development, testing, and fabrication, including the main engine and solid rocket boosters. Other major projects are: Spacelab, Space Telescope, High Energy Astronomy Observatories, solar electric propulsion, and space processing. It manages the Michoud Assembly Facility in New Orleans. 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 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. It is the main NASA center engaged in energy activities for the Department of Energy. 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. ■



Industrial Associates of the Air Force Association

"Partners in Aerospace Power"

Listed below are the Industrial Associates of the Air Force Association. Through this affiliation, these companies support the objectives of AFA as they relate to the responsible use of aerospace technology for the betterment of society, and the maintenance of adequate aerospace power as a requisite of national security and international amity.

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**New affiliation*

Airman's Bookshelf

The Advent of the Jet Engine

The Jet Age: Forty Years of Jet Aviation, edited by Walter J. Boyne and Donald S. Lopez. Smithsonian Institution Press, Washington, D. C., 1979. 190 pages with bibliography and bibliographic note. $17.50 cloth bound, $7.95 paperback.

According to the dust jacket, this large format book is a collection of essays presented by the Smithsonian's Air and Space Museum to commemorate the world's first jet flight on August 27, 1939. The essays might well be called adventure stories, written by seven men who were pioneers in the development of the jet engine and the aircraft and transportation systems that jets made possible.

Among the authors are Hans von Ohain, the German physicist who designed the engine that powered the Heinkel 178 in the first-ever jet flight; Sir Frank Whittle, von Ohain's British counterpart; Anselm Franz, developer of the Junkers Jumo 004, the first axial-flow turbojet and the first jet engine to be mass-produced; Gerhard Neumann, until recently Chief Executive of General Electric's Aircraft Engine Group, who writes about the past, present, and future of powerplants; Najeeb Halaby, one-time US Navy test pilot, Deputy Assistant Secretary of Defense, FAA Administrator, and Chief Executive of Pan American World Airways, who discusses the managerial and political problems of developing a jet transport system; and John E. Steiner, a Boeing vice president, who looks at the jet age from a company perspective.

No book on jet flying would be complete without a word from the first man to break the sound barrier, Brig. Gen. Charles Yeager, USAF (Ret.). The truly incomparable Chuck Yeager writes about flying (and shooting down) jets, and about going supersonic for the first time in the Bell X-1.

Interspersed throughout the book are three strikingly illustrated photo essays on the evolution of jet fighters, bombers, and transports by editors Boyne and Lopez. Both men are former Air Force pilots, Lopez a World War II ace and military test pilot. Both now hold executive positions at the Air and Space Museum. The book is rounded out by a bibliography and bibliographic essay done by Dominick Pisano, the Museum's Reference Librarian.

The Jet Age strikes a happy balance that is difficult to achieve when dealing with a diverse and often necessarily technical subject. Its essays are in enough depth to satisfy the professional engineer or aerospace manager but still understandable and exciting reading for the layman. It's a book to buy, to read, and to keep.

—Reviewed by John Frisbee, Editor.

Check It in Jane's

Jane's All the World's Aircraft, edited by John W. R. Taylor, Jane's Publishing Co., London, 1979. Published in the US by Franklin Watts, Inc., New York, N. Y. 820 pages, including index and addenda, with hundreds of black-and-white photos and line drawings. $95.

Identify an item the following places have in common: a Cessna distributor's sales office in Delaware; a planner's office at the Air Staff in the Pentagon; the desk of a foreign military attaché on Embassy Row in Washington; and the bookcase of an arms policy officer at the Department of State.

The title of this review gives the answer, of course. *Jane's All the World's Aircraft* was spotted at all those sites by a Washington writer in the course of his recent travels. His bookcase contains a copy, too. In all cases, the 1979–80 version was not the only edition in sight. One or more previous *JAWAs* were on hand.

These sightings epitomize the value of *Jane's* aircraft book to people interested in aviation matters worldwide. It is current and comprehensive. More important, the volume is so authoritative that disparate offices around the world find common ground in its pages.

Furthermore, if one has retained earlier editions (and one should do so), the index to the current volume will tell where to find details about older aircraft. Readers do keep their old editions, as Editor John W. R. Taylor learned at the 1979 Paris Air Show while talking with one of the Soviet Union's great aircraft designers, Oleg K. Antonov. Antonov "remarked proudly that he had personal copies of *All the World's Aircraft* going back to 1922."

This 1979–80 edition marks John Taylor's twentieth year as the Editor, fifth in succession since the book began appearing in 1909. That long-term continuity of Taylor, his assistant Kenneth Munson, and their fellow compilers around the world means that the reader can rely on the information they have assembled. Their world network of sources of data and photos is unsurpassed, resulting in a true international reference book.

Readers of AIR FORCE Magazine are treated each January to a preview of John Taylor's Foreword, in an exclusive excerpt he prepares for that issue. We also see his "*Jane's Supplements*" in the magazine regularly throughout the year. So in theory, at least, one could stay fairly well abreast of *Jane's* just by reading AIR FORCE Magazine. Not so. The complete volume contains additional details not present in the Supplements. In addition, it features sections on home-built aircraft, sailplanes, hang-gliders, lighter-than-air craft, RPVs and targets, air-launched missiles, spaceflight, satellites and space activities, aero-engines, plus sections on first flights and official records.

The highlight of each edition is the photo occupying what John Taylor calls the "place of honour" as the frontispiece. Previous aircraft in that position have been the YF-16, B-1, Tornado, and "Ski-jump" Harrier. He says the choice this time required not a moment's hesitation: It is "pilot/engine Bryan Allen, midway over the English Channel on the first-ever

manpowered crossing" in June 1979, in the Gossamer Albatross. An altogether fitting choice, well worth contemplating in this era of depersonalized, bureaucratic aviation projects. From that point on through to Sam Williams's tiny WR34 turboshaft engine on page 769, the book is a delight and a daily source of needed information. There is no substitute.

—Reviewed by F. Clifton Berry, Jr., Executive Editor.

New Books in Brief

A-26 Invader in Action, by Jim Mesko. The Douglas A-26, a heavier, souped-up follow-on to the A-20 Havoc, served a span of years from World War II to the Vietnam conflict. This rugged aircraft had been overshadowed by more glamorous types, but here takes the spotlight. With photos, line drawings, and markings. Squadron/Signal Publications, Inc., 1115 Crowley Dr., Carrollton, Tex. 75006, 1980. 49 pages. $4.95.

Aircraft Carriers of the US Navy, by Stefan Terzibaschitsch. This book from Germany is a comprehensive catalog of the US Navy's aircraft carrier force, beginning with the first American carrier, the *Langley*, and ending with the recently operational nuclear aircraft carrier *Eisenhower*. Each carrier entry contains vital statistics, line drawings, a short operational history, and photographs. This compilation should serve as an excellent quick reference source for carrier aficionados. Mayflower Books, New York, N. Y., 1980. 320 pages. $35.

Aircraft of the Royal Air Force Since 1918, by Owen Thetford. This book is, with some limitations, a virtual encyclopedia of aircraft that have served with the RAF since 1918. In its seventh edition, it continues its tradition of alphabetical listing (by manufacturer) of aircraft types, accompanied by full-length descriptions, line drawings, and photographs. Incorporated in this edition are the new and projected aircraft to enter RAF's inventory, and new research on the operational histories of some aircraft. Appendices, index. Putnam & Co., London, 1980. 650 pages. $26.95.

The CIA and the American Ethic: An Unfinished Debate, by Ernest W. Lefever and Roy Godson. Are foreign intelligence operations—including those requiring "covert action"—compatible with the American ethic? Has the debate over the American intelligence community been adequate? The authors contend foreign intelligence can indeed be justified on ethical grounds, and that the key questions concerning the intelligence controversy have scarcely been examined. In an afterword, Charles Lichenstein suggests several fundamental areas of inquiry for the debate. Includes an article excerpted from AIR FORCE Magazine. Ethics and Public Policy Center, Washington, D. C., 1979. 161 pages. $9.50 cloth; $5 paper.

The Fall of South Vietnam, by Stephen T. Hosmer, Konrad Kellen, and Brian M. Jenkins. The Rand Corp., in an effort to discover South Vietnamese perceptions of the collapse of their country, interviewed twenty-seven former high-ranking South Vietnamese military and civilian officials during 1976. Here in a summary narrative is the result of their responses. Although there is no strict consensus among them, most interviewed expressed the opinion that loss of American support and corruption and indecisiveness in South Vietnam's military and civilian command were major factors in the fall of their nation to the Communists. Index. Crane, Russak & Co., Inc., New York, N. Y., 1980. 267 pages. $14.50.

Man With Wings, by Edward Jablonski. A massive pictorial history of man's fascination with flight, *Man With Wings* traces aviation history in text and illustrations, from ancient Chinese attempts to become airborne to the Space Shuttle and a flimsy, sixty-pound aircraft called the Gossamer Albatross. Of special delight is the accent on the eccentric and the flamboyant throughout the history of flight. Over 1,000 photographs, some quite rare, complement the extensive narrative. Bibliography and index. Doubleday & Co., New York, N. Y., 1980. 485 pages. $17.95.

P-40 Hawks at War, by Joe Christy and Jeff Ethell. Although the Curtiss P-40 is perhaps best remembered for its role with the American Volunteer Group, the "Flying Tigers" of the CBI theater, the reliable Warhawks (or elsewhere called Kittyhawks and Tomahawks) served with several air forces, including that of the Soviet Union, in almost every theater of World War II. The authors chart the progress of the P-40 from its parent, the P-36, through its early development, to its pitched battles against the Axis powers. Photos and appendices with data on production, markings, and types. Charles Scribner's Sons, New York, N. Y., 1980. 128 pages. $15.95.

Thunderbolt, by Warren M. Bodie. A special publication of *Wings* magazine, this monograph on the P-47 "Jug" recounts the evolution of one of the toughest and fastest fighter aircraft of World War II. More than 200 action photographs, including sixteen full-page color photos and illustrations. Available from Sentry Books, 10718 White Oak Ave., Granada Hills, Calif. 91344, 1979. 74 pages. $3.25 postpaid.

Twentieth Air Force Story, by Kenn C. Rust. On April 4, 1944, the Twentieth Air Force was activated in Washington, D. C. It was the first and only Air Force in American history to exist for the purpose of taking into action a single type of aircraft—the then-unproven B-29 Superfortress. This book is packed with information, anecdotes, drawings, and photographs; old B-29 hands will particularly appreciate the photo assortment of Superfort nose art. Part of the "U.S. Air Force Series," published by Historical Aviation Album. Available from Aviation Book Co., 1640 Victory Blvd., Glendale, Calif. 91201, 1979. 64 pages. $7.50.

The United States in the 1980s, edited by Peter Duignan and Alvin Rabushka. As the United States enters the decade of the 1980s, it faces difficult choices both at home and abroad. In this volume, thirty-two prominent and respected experts present individual discussions of the restrictions and possibilities faced by the nation in the coming years. Hoover Institution Press, Stanford University, Calif. 94305, 1980. 868 pages. $20.

U.S. Army Handbook 1939–1945, by George Forty. The United States Army in World War II was perhaps one of the most impressive feats of organization in American history (despite its bequest of the term "snafu"). Presented in concise detail, here from British perspective are the nuts and bolts of that organization and the ingenuity that made it work. Photos, charts, appendices, and bibliography. Charles Scribner's Sons, New York, N. Y., 1980. 160 pages. $14.95.

—Reviewed by Hugh Winkler, Editorial Assistant.

Air Force Association Position Paper

as unanimously adopted by the Board of Directors
March 1, 1980

THE United States is experiencing a severe national emergency that is likely to persist and intensify. The Soviet thrust into Afghanistan gives the Kremlin a staging area for control of crucial Middle East oil supplies. It provides further evidence of Moscow's unchanging commitment to expansionism and imperialism.

This is *not* a time for business as usual. This is not a time to sell to the Soviets unique US technological capabilities that help the Kremlin's war machine.

This *is* a time for measures that stem the tide of Soviet imperialism.

At long last, the Administration has recognized publicly the Soviet threat in realistic terms. Now the challenge is to translate this awareness into national unity of purpose and to sustain that purpose. The Administration and Congress must signal clearly to the American people, and to the world at large, the rebirth of a dynamic United States.

There is a clear-cut need to formulate and maintain a coherent, consistent, and credible national strategy that reflects the enduring goals of the United States. The reactive, inconsistent, and often self-defeating stance of the past must be supplanted by an active and bold policy that seizes opportunities to prevent further Soviet expansionism.

It is imperative, for instance, to secure a network of bases in key areas to which the US has reliable access.

Also, the Monroe Doctrine should be invoked to forestall further Soviet infiltration of the Western hemisphere.

Correcting the cumulative effects of years of cutbacks, deferrals, and cancellations of essential defense programs—especially in the areas of strategic and force projection capabilities—will take time.

First we must support the forces in being. Materials for training and for war-readiness—from munitions and tactical missiles to spare parts—continue to be in disastrously short supply. This condition can be corrected relatively rapidly and will produce a major, across-the-board gain in the defense capabilities. The necessary steps must be taken at once.

It is equally urgent to restore US intelligence capabilities to levels adequate to support the national defense requirements. A charter for the intelligence community can accommodate both responsible oversight and the latitude needed to act creatively, boldly, and rapidly. Above all, new laws must be promulgated to shield our intelligence agents from exposure.

The Air Force Association sees a need for the following:

- Across-the-board pay raises augmented by selective benefits—including a fifty percent increase in flight pay—are essential to ease the retention problem.
- The "Neutron Bomb" should be put into immediate production. This would have major psychological as well as military benefits.
- The MX program must be accelerated, and the Administration—from the President on down—should identify this weapon system as the key element in modernizing our strategic deterrence.
- The Air Force, the Executive Branch, and the Congress should select and obtain an effective, rapidly producible follow-on system to the aging B-52. The crucial capabilities of a large, long-range manned penetrator and standoff weapons launcher must continue to be available for both strategic and force projection missions.
- The production rate of aircraft—especially combat aircraft—must be restored to the levels originally programmed. This will increase operational capabilities and achieve a more economic buy rate. Stretching out the purchase of vital equipment is penny-wise and pound-foolish; it, in fact, drives up the total program cost and shortchanges military requirements.
- The Administration should declare firmly and clearly its support of the Seafarer strategic command and control system, which is urgently needed to improve the effectiveness and survivability of the ballistic missile-launching submarine fleet.
- The deployment rate of the Trident strategic submarine and its C-4 missile must be stepped up.
- Conversion of Polaris submarines to attack submarine configuration and their use as cruise missile carriers must be expedited.
- Strategic command and control must be upgraded to include modern radar warning systems to prevent sneak attacks on our bases by Soviet bombers and cruise missiles.
- A fleet of at least fifty KC-10 tanker aircraft is essential.
- Reengining the entire KC-135 tanker fleet is essential to provide a fifty percent increase in its refueling capacity.
- Expeditious development of the Rapid Deployment Force and its associated elements, including the CX, is mandatory.
- Intensified R&D and proof-testing of directed energy weapons such as high-energy lasers are essential.
- A firm public commitment to mobilize the Reserve components is required.
- Registration and classification are required to meet the critical manpower problem.

The Soviet Union, year in, year out, allocates about thirteen percent of its gross national product (GNP) to defense while the US confines its defense spending to about five percent of GNP. The consequence is growing US military inferiority. This is unacceptable.

Supplemental funds for FY '80 must be provided. In addition, the FY '81 Defense Budget and the Five-Year Defense Plan must be increased and revised to accommodate the new and accelerated programs that national security requires. For the longer haul, methods and procedures must be found to assure that vital defense programs are funded and supported from inception to completion at required levels and from administration to administration. ■

The Bulletin Board

By James A. McDonnell, Jr., MILITARY RELATIONS EDITOR

Pentagon Presents Personnel Shopping List

High Pentagon officials have been beating a path to Capitol Hill to testify on the Administration's FY '81 military budget, which contains far fewer goodies than the service community feels are necessary.

USAF's top manpower official, Joseph C. Zengerle, conceded that it would be too expensive to "correct all of the pay inadequacies . . . in a single year. . . ." The new Assistant Secretary of the Air Force for Manpower proposed instead "a long-term plan and commitment for additive funds to solve this [compensation] problem over the next two to five years. . . ." AFA feels strongly that this may be too long for a good many uniformed members to wait, however.

Robert B. Pirie, Assistant Secretary of Defense for Manpower, Reserve Affairs and Logistics, led the parade to Congress. He told various committees that the service community will benefit if Congress will sever the link between military and federal civilian pay. Military pay would then be based on private-sector wages and, for FY '81, would provide an estimated 7.4 percent military raise, he said. Even that prospect probably won't thrill the military membership, many of whom feel they're entitled to much more.

Secretary Pirie again urged passage of the military retirement overhaul the Administration proposed earlier. He also supported a broadened enlistment and reenlistment bonus program *(see details in last month's "Bulletin Board")*, increased personnel travel funds, forgiveness of educational loans as a recruiting aid, a bigger trailer allowance, a family separation allowance for low-ranking enlistees, advanced pay on registration of an allotment (to soften the financial sting), leave and travel entitlements between consecutive tours of duty, a "singles" COLA for unaccompanied members overseas, and several minor proposals. The COLA request got the congressional brush-off last year. And the lawmakers have rejected the trailer and separation allowances several times before.

Defense's shopping list does not contain the variable housing allowance that Air Force officials want in the worst way, although the Nunn-Warner special pay package passed recently by the Senate does contain a VHA.

Secretaries Pirie and Zengerle have been concentrating on the Armed Services and Appropriations Committees. Meantime, the influential House and Senate Budget Committees are pressing to eliminate the twice-a-year cost-of-living retired pay raises for military and federal retirees. Their plan calls for one annual catch-up raise—starting in July—instead of the present March and September hikes. This would bring the military and federal employees' position in line with the Social Security adjustment schedule.

Secretary Zengerle's presentations have been laced with references to USAF's slumping retention performance, the dismal statistics on pilot, navigator, and engineer shortfalls, and the drop in experience levels. He endorsed the twenty-five percent increase in flight pay in the Nunn-Warner pay package *(see April "Bulletin Board")*, but said the Air Force (as does AFA) backed a fifty percent boost as "a more attractive retention incentive." The Office of Management and Budget was reviewing the Air Force plan, he added.

The Air Force is "very concerned" about the Presidential veto of the doctor bonus bill *(see last month's "Bulletin Board")*, Secretary Zengerle said, noting that a "revised bill" is sorely needed to halt heavy physician losses *(see item below)*. He also plugged for the "singles COLA" and other programs advanced by Secretary Pirie, and called for an increase in fully funded graduate education programs for officers. Mr. Zengerle urged passage of DOPMA as submitted by the Pentagon (not the promotion-cutting version passed by the Senate), restoration of Air Force authority to commission physician assistants, an increase of 356 persons to the USAF recruiter force, and greater active-duty and Reserve Forces personnel strengths. This marks the first time since 1968 that active-duty manpower is slated to rise. The accompanying table shows the increases.

	FY '79 Actual	FY '80 Estimate	FY '81 Budget Request
Active Military	559,220	558,000	564,500
Selected Reserve	150,040	152,219	155,187
ANGUS*	93,379	94,000	95,844
USAFR*	56,661	58,219	59,343
Civilian	245,082	243,900	240,600

*ANGUS/USAFR dual-status technicians are also included in civilian totals (28,636 in FY '81).

Many Generals Rose from Ranks

A quarter of the Air Force's general officers began their military careers as enlisted men, serving in that status from as little as a few months to more than eight years. The longest enlisted service, according to detailed statistics furnished by the Hq. USAF General Officer office, was compiled by Brig. Gen. (selectee) Richard A. Ingram, Commander of the 64th Flying Training Wing, Reese AFB, Tex. He was an airman from June 1950 to December 1958.

The service's star ranks have been dwindling, courtesy of the US Senate, with only 360 currently on board. Counting fifty BG selectees waiting for their promotions, the corps at a recent date totaled 410. Of these, ninety-six began service as enlisted men.

Some, such as Maj. Gens. John R. Paulk and Robert M. Bond, went on to aviation cadet status, winning their commissions in the process. Others like Lt. Gens. William H. Ginn, Jr., and Richard C. Henry enlisted in other

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services (Ginn in the Marines, Henry in the Army), and later switched to USAF.

Source-of-commission statistics show 124 of the generals and selectees emerging from aviation cadets. ROTC has provided 111, West Point eighty-nine, the Naval Academy thirty-two, OCS sixteen, and OTS one. Thirty-four received direct commissions. The three general officers who are Air Force Academy graduates were selected in 1978 and 1979. This year's new star selection list contains no USAFA grads.

Two four-star generals—W. L. Creech and Alton D. Slay—have enlisted service, as do eleven lieutenant generals, including Lt. Gen. James P. Mullins, who had nearly three years of enlisted time.

Among the major generals, William D. Gilbert leads with seven years of enlisted time, while Charles C. Irions has nearly six and one-half years of enlisted service. BG (selectee) Donald O. Aldridge, now with the Office of the JCS at the Pentagon, put in nearly seven enlisted years.

MWR Programs Get Big Push

"In 1980 and through the 1980s, MWR activities will be the places for Air Force families to go to get the most out of their money and to beat inflation."

That's the message Hq. USAF is spreading around as, frustrated by the government's failure to provide adequate military compensation, it vows to do what it can in-house. This includes improving Morale, Welfare, and Recreation (MWR) programs; getting more people to participate; holding the priceline, thus easing the impact of inflation; and generally improving the quality of life in uniform.

The MWR spotlight is focused on clubs, bowling alleys, rec centers, sports, youth activities, arts and crafts, recreation, and child-care centers. Plans are under way to beef them up. The care centers are particularly important, USAF's top military personnel official, Lt. Gen. A. P. Iosue, told AIR FORCE Magazine. Well-run, low-cost centers enable wives to work outside the home and contribute to the family income, without fear for the children's well-being.

General Iosue said that the care centers, along with improved club and other MWR programs, should ease members' worries about compensation woes and help them forget about what he called the "Mickey Mouse" irritants the government forces military people to put up with. He cited, among others, the $10 space-available charge, the charge for parking at various bases, and the annual fiscal year-end threat that (due to congressional bungling) military paychecks will be delayed.

Members of the AFJROTC unit at Norwalk High School, Norwalk, Conn., made contact with the aerospace industry recently. The occasion was a briefing and tour of the Norden Systems plant, which produces many military systems. Explaining an airborne radar system to the students is Norden's test foreman Peter G. Callahan (far right). Next to him is CMSgt. Alton G. Hudson, USAF (Ret.), also a Norden Systems employee. Chief Hudson is a former chairman of the AFA Enlisted Council and presently Connecticut State AFA Vice President.

Meanwhile, the personnel chief has a "family-retention" group on his staff trying to develop some important policy changes. One would give DoD job priority overseas to wives of airmen. Another would allow personal use of AUTOVON by USAF members and families during TDYs or unaccompanied overseas tours. Other such initiatives call for cost-sharing dental insurance for Air Force families, reducing the hassle associated with inspections when clearing base housing, and providing free trips to CONUS or intermediate R&R sites for members serving unaccompanied tours abroad.

Improving club programs won't be easy, especially in view of a new congressional attack on the entire military club system. It's a report issued by the House Armed Services Investigations Subcommittee that directs the services to have their clubs entirely self-supporting no later than FY '82. That's less than eighteen months away.

Clubs currently receive profits from package (liquor) store sales and some direct appropriated fund money. What angered the subcommittee is that in 1978 the 1,500 military clubs, while they wound up with a net deficit of $18.3 million, were bailed out with $40 million of the $60 million in profits from the package stores that year. Distribute package store profits to all MWR activities, not just the clubs, the subcommittee directed. Liquor profits must be used to "benefit all service personnel, not just club members," the report added.

General Iosue conceded that the order may hurt some Air Force clubs.

Enlisted Recall Set

To offset growing shortages of specialists in numerous skills, Hq. USAF has announced plans to recall—voluntarily—1,250 enlisted members of the Air National Guard and Air Force Reserve this summer. They are needed to fill shortages in 170 career fields in the Regular Air Force.

Interested Air Guard and Reserve airmen will be considered for recall by a board slated to meet this month. At least three months of previous active-duty service is one requirement.

The new call-up is similar to the officer-recall program in operation well over a year. More than 500 former active-duty pilots, navigators, engineers, and other skills have returned to the fold *(see report in the January '80* AIR FORCE *Magazine)*.

While officer and airmen recalls help solve some manning problems, they are not slated to expand. "Recalls will not become a major supplier of personnel," high Hq. USAF officials told AIR FORCE Magazine.

As previously reported, the service is inviting many airmen reaching their high year of tenure (normal retirement date) to serve two extra years and thus help ease the retention turmoil and shore up the dwindling experience level in the enlisted force.

Pilot retention remains Air Force's most serious manning difficulty, though officials said the loss rate early this year showed signs of leveling off. The service, however, has still not recovered from the FY '79 disaster during which, as one official put it, USAF "lost 37,000 man-years of pilot experience" (representing more than 3,000 pilot losses with an average of eleven-plus years of service). At a recent date, Air Force was short 1,300 pilots and forty navigators. Should the FY '79 retention rate persist, those shortages will grow to 3,400 and 900 respectively by the end of FY '82, authorities said.

Doc Pay Veto Boosts PA Image

The President's recent veto of the military doctor bonus bill, which shocked and saddened the military leadership, "makes commissions for

Ed Gates . . . Speaking of People

Benefits Abuse: No More Free Lunches?

Serve just six months in uniform and receive full veterans' benefits; never mind that you signed on for three or four years

Serve only three months and qualify for unemployment benefits.

And if your service, regardless of how long or short it is, is of very poor quality, don't fret. Chances are your exit will not be accompanied by a bad discharge.

Uncle Sam, it would seem, has been over backward to mollify the nonperformer in service. Previous occasional protests from patriotic groups were not enough to build up any grass-roots head of steam that would lead to tightening the rules. But now there is action on Capitol Hill in the form of new bills and some tough declarations that call for changes in the right direction.

Various lawmakers are sponsoring legislation that would require additional service to qualify for veterans' benefits. One such measure, sponsored by Sen. Alan K. Simpson (R-Wyo.) and others, would require eighteen months of service to qualify. Other senators are supporting the bill, and similar plans are percolating in the House of Representatives. These proposals, of course, contain exceptions for disability and hardship cases.

Eighteen months, though hardly a tough requirement, is definitely an improvement over the inadequate 180-day proviso that has long existed.

Senator Simpson, a member of the Senate Veterans Affairs Committee, advances his case with some eloquence. In a letter soliciting AFA's views on the legislation, he points out that "the entire purpose of veterans laws and benefits is to provide compensatory and rehabilitative programs for those individuals . . . who have served honorably in our armed forces. . . ."

"No real service is rendered, no sacrifices made" by those who enter service "under contractual agreement and fail to serve honorably or decide to default on their contractual obligation," he declared.

Annually, about 100,000 enlisted members of all services fail to complete a year of duty, at an enormous cost. According to Senator Simpson, the "immediate cost" of early service attrition during a recent four-year period was $5 billion. And that figure does not include "the costs associated with according such individuals various veterans' benefits for the rest of their lives!

"My fellow senators and cosponsors can conceive of no rational reason why individuals in full and self-determined default of their enlistment contracts should be rewarded for their actions by the continuing receipt of tax dollars for services which they never rendered.

"As a matter of simple economy, but more importantly as a matter of fairness to those who have and will serve faithfully, this abuse of veterans' benefits must be terminated," he concluded.

To which this column says "amen," though a strong case might be made for a still longer service requirement. The President's budget balancers should find this a lucrative area for reducing outlays.

In separate but related action, the Senate recently voted to increase from the present ninety days to one year the period of military service required to qualify for unemployment compensation. This modest extension, which proponents say would save $90 million a year, was actually opposed by some senators. Sen. Daniel P. Moynihan (D-N. Y.), for example, claimed that requiring a year's stint in uniform "may discourage candidates to join the Army."

But the full-year proviso prevailed, and the issue is now up to the House of Representatives. Meanwhile, several lawmakers, including Sen. Robert Morgan (D-N. C.) and Rep. Robin Beard (R-Tenn.), want a much tougher provision: completion of at least five-sixth of the initial service obligation in order to collect unemployment benefits.

Rep. John H. Rousselot (R-Calif.) declared that thousands of military recruits are dropping out of service to collect unemployment compensation, adding that a service person's "contractual obligation is virtually terminable at will. . . ." He urged Congress "to lift the burden of these 'ninety-day wonders' from the backs of the American taxpayer." Tighter screening of volunteers would help too.

Other quarters are angry over Pentagon discharge procedures which, they contend, impose no penalty for misconduct, incompetence, and worse. Rep. Paul Hammerschmidt (R-Ark.), for one, claims that current rules allow "the almost immediate separation" of malcontents who can "simply walk away from their sworn obligations without the stigma of a bad discharge." He is sponsoring legislation denying veterans' benefits to anyone who is discharged for misconduct, unsuitability, marginal performance of duty, or other similar reasons.

Other legislators, military careerists, retirees, and patriotic groups are equally upset over the government's propensity for upgrading less-than-honorable discharges, which, in some cases, gives these veterans full VA benefits. The latest of such Defense Department decisions, in response to a US District Court order, went to 10,000 Army veterans who had received administrative discharges because urinalysis tests, which they had been forced to submit to, showed they used drugs. Those who meet the eligibility requirements will be mailed honorable discharges, the Army said.

The advent of the All-Volunteer Force brought a sharp rise in attrition among first-term enlistees of all the services, but Defense Department officials say the services are gradually getting the problem under control. Servicewide, about thirty percent of the male first-termers are failing to complete three years of initial service. For the Air Force, the figure is twenty-six to twenty-seven percent; that's good progress though still a too heavy and too costly loss rate.

Enactment of these bills should further reduce early attrition. And curb abuses. As Senator Simpson told the Air Force Association, many youths "are improperly enticed into three- and four-year enlistment contracts with the understanding that only six months of service will qualify an individual for almost all veterans' benefits. To the unemployed and unemployable, a brief period of military service appears to be an attractive expediency—especially with the sure knowledge that military service can be terminated at any time—and at will." ■

The Bulletin Board

physician assistants (PAs) more important than ever," says the Hq. USAF DCS/Personnel Lt. Gen. A. P. Iosue.

But USAF, under last year's congressional edict, is barred from commissioning more PAs, so interest among qualified airmen is lagging. Medical care could suffer. Adds Assistant Secretary of the Air Force for Manpower Joseph C. Zengerle, USAF "does not believe it can recruit and retain PAs unless commissioning is allowed."

Military executives fear a large-scale exodus of physicians because of the Presidential veto. The Chief Executive said he shot down the measure because it was too costly and included dentists and other health professionals. While there's talk that Congress and the Administration may get together on a scaled-down bonus bill, the vetoed bill took nearly two years to move through Congress. Many uniformed doctors are fed up with waiting.

Accordingly, increased physician shortages loom for all the services, thus elevating the PAs' importance in the military health-care picture. USAF began commissioning PAs two years ago, following a Rand Corp. study that found nearly half of the PAs would leave service if the commission decision were unfavorable.

There is one glimmer of light at the end of the PA tunnel: A House Armed Services subcommittee has voted to permit PA commissioning. But any restoration is a long way away; after all, it was the Appropriations Committee that halted the practice, and there's no indication its members have changed their minds.

Councils Convene in Florida

Fort Walton Beach, Fla., was the site of the February 28–March 1 joint meeting of AFA's Junior Officer Advisory Council (JOAC) Executive Committee and Enlisted Council. The two groups, following a welcome by AFA President Victor R. Kregel and other headquarters officials, were briefed by Maj. Gen. William R. Usher, the Hq. USAF Director of Personnel Plans, on the key "people issues" of the day. The Enlisted group also met with Richard Kisling, a former Chief Master Sergeant of the Air Force who now, as a civilian employee working for General Usher, specializes in enlisted programs. They also visited and received a thorough briefing on the Enlisted Men's Widows and Dependents Home.

Maj. Gen. Charles C. Blanton, USAF's Director of Legislative Liaison, was the luncheon speaker on the final day of activities. The Councils are scheduled to meet again this summer in Washington. Last year's groups produced recruiting pamphlets aimed at their civilian peers, slated for publication shortly.

Defense O'Sea Schools Deteriorating

Defense Department schools abroad are in poor shape and are likely to deteriorate even further in the near future. Many of the 277 schools "do not meet even minimum standards established for Stateside schools," according to DoD Dependent Schools logistics chief William F. Delaney.

DoD authorities, he explained to Congress recently, have assessed the condition of its schools and identified half a billion dollars worth of construction projects needed to bring them up to par.

"After decades of neglect, it is essential that inadequate school facilities be replaced as rapidly as possible," Mr. Delaney said.

But against this huge requirement, how much is DoD seeking for FY '81? The answer is $47 million, less than one-tenth the need. That request is for what Mr. Delaney called "twelve urgently needed school construction projects"—four of these are in Germany, three each in Japan and Korea, one in Bermuda, and one in the Philippines.

Many military parents have complained about the poor condition of the overseas schools. By October 1982, DoD will lose control of the schools; that's when the newly created Department of Education will take over.

Schools are not the only military construction projects lacking funds. Air Force officials told Congress recently that $350 million is needed to modernize and replace USAF hospital facilities, yet DoD has let Air Force request just $46 million for that purpose in the FY '81 budget. Similarly with bachelor housing, Air Force is asking for FY '81 funds to improve and replace just 4,000 rundown bachelor spaces.

Yet the service has identified more than 80,000 inadequate spaces that are sorely in need of refurbishing or replacement.

Short Bursts

The Pentagon stands foursquare behind **forgiving the federal education loans of individuals who enlist** and serve in the military. As Robert B. Pirie, Defense's Assistant Secretary (Manpower, Reserve Affairs and Logistics) puts it, the move would "bolster the appeal of military service among prospective recruits with some college experience." He said the plan would be better for the services than the old GI Bill by providing assistance for education which has already taken place and not providing an incentive to leave service to attend school. The cost, Secretary Pirie is telling Congress, would be small.

The Air Force is encouraging airmen in their early thirties to seek **commissions through the AFROTC program.** Some, apparently, haven't been aware this is possible. The route, for airmen who will be under thirty-five when commissioned, starts with an early release to enter college and an AFROTC unit, graduation within two years, and return to active duty as second lieutenants. No AFROTC scholarships are provided, though applicants normally would have GI Bill entitlement. Those interested in additional information may contact AFROTC/PA, Maxwell AFB, Ala. 36112, or call (205) 293-2825.

Rep. Bob Wilson (R-Calif.) has introduced a **bill to increase the ROTC subsistence** allowance from $100 to $150 per month. He said a "modest increase . . . such as I am proposing will assist the services in meeting officer production goals."

Air Force recruiters are toiling more than fifty-eight hours a week, service officials are telling congressional committees handling the FY '81 military budget. Because of this heavy work load and the fact that the Air Force hopes to sign up 84,000 recruits that year, the service is seeking **356 more recruiters** and a recruiting-advertising budget of nearly $90 million. That's $16 million more than this year. The FY '81 recruiting "objective" is 7,700 more than this year and 16,000 more than in FY '79.

The Veterans Administration has been hiring **Vietnam-era vets** at a fast clip, with nearly half of them landing jobs without going through the regular Civil Service competitive employment process. This is permitted under a 1970 law. Last year, the VA hired

3,800 more Vietnam-era vets than it did in 1978. The agency also reports that of the 86,000 veterans of all wars on its payroll, 40,500 are Vietnam-era veterans.

In 1977, Congress got enthusiastic about installing utility meters in military family housing. The idea was to save energy and money, but the Pentagon was leery and talked the lawmakers into testing the idea at ten military sites. The test results, DoD now reports, show that full-scale metering would be extremely expensive, requiring a $415 million outlay just to install the devices. **Forget the meter plan,** DoD officials are urging Congress.

According to high USAF sources, it appears the service cannot avoid denying or delaying some families from going overseas at government expense after October 1. That's when the congressionally imposed **325,000 DoD-wide ceiling on command-sponsored kin abroad** goes into effect. Though Hq. USAF isn't at fault and has worked hard to get the ceiling lifted, it will probably wind up as the target of affected members' ire.

Blue-collar workers throughout the Defense establishment earn about eight percent more than their private sector counterparts—about half a billion dollars more. The Pentagon has tried, many times, to get Congress to **trim the blue-collar wage scales.** The lawmakers have refused, so the Pentagon once again, in the FY '81 budget, is urging reductions.

BUY A PIECE OF HISTORY

"THE LAST COMBAT" by Frank Wootton

On April 26, 1945, General Adolf Galland, the famous German ace credited with 104 victories, led six jet fighters of J.V. 44 against a formation of Marauders. His Me-262 was disabled by 1st Lt. James J. Finnegan of the 10th Fighter Squadron, US Army Air Forces, in a P-47 Thunderbolt. Famed English aviation artist Frank Wootton's painting captures the final moments of Galland's last combat.

Published as a Limited Edition of 850 prints, plate size 21" x 14". Each print individually signed by General Adolf Galland and the artist Frank Wootton.

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Senior Staff Changes

PROMOTIONS: To be **Major General:** John T. **Chain,** Jr.; Russell E. **Mohney.**

RETIREMENTS: M/G Garth B. **Dettinger;** B/G John P. **Rollston.**

CHANGES: Col. (B/G selectee) Donald O. Aldridge, from Special Asst. for Joint Matters, Joint Staff, OJCS, Washington, D. C., to Dep. Dir. of Plans & Requirements, DMA, Washington, D. C. . . . **B/G Harry H. Bendorf,** from Asst. Dep. Dir. for Dev. & Strategic Plans, J-5, OJCS, Washington, D. C., to Dep. Dir. for Force Dev. & Strategic Plans, J-5, OJCS, Washington, D. C. . . . **B/G (M/G selectee) John T. Chain, Jr.,** from Dep. Dir. of Plans, DCS/OP&R, Hq. USAF, Washington, D. C., to Dir. of Ops. & Readiness, DCS/OP&R, Hq. USAF, Washington, D. C., replacing M/G Robert C. Taylor.

M/G Murphy A. Chesney, from Dir. of Med. Plans & Resources, OTSG, Bolling AFB, D. C., to Dep. Surgeon Gen., OTSG, Bolling AFB, D. C., replacing retiring M/G Garth B. Dettinger . . . **B/G James F. Culver,** from Comd. Surgeon, Hq. PACAF, Hickam AFB, Hawaii, to Cmdr., AF Med. Svc. Ctr. and Dep. Surgeon Gen. for Ops., Brooks AFB, Tex., replacing M/G Murphy A. Chesney . . . **B/G Richard T. Drury,** from Cmdr., US Forces Azores, and Cmdr., 1605th ABW, MAC, Lajes Field, Azores, to Vice Cmdr., Military Traffic Management Command, Washington, D. C. . . . **B/G Duane H. Erickson,** from Cmdr., 317th TAW, MAC, Pope AFB, N. C., to Cmdr., US Forces Azores, and Cmdr., 1605th ABW, MAC, Lajes Field, Azores, replacing B/G Richard T. Drury.

B/G Harry A. Goodall, from Dep. Dir. for Intel. Negotiations, J-5, OJCS, Washington, D. C., to Dep. Dir. of Plans, DCS/OP&R, Hq. USAF, Washington, D. C., replacing B/G (M/G selectee) John T. Chain, Jr. . . . **B/G Charles R. Hamm,** from Cmdr., 33d TFW, TAC, Eglin AFB, Fla., to Defense Attaché, Moscow, USSR . . . **B/G Paul H. Hodges,** from Dep. Dir., National Military Command Post, J-3, OJCS, Washington, D. C., to Dep. Dir. for Ops., Recon. & Electronic Warfare, J-3, OJCS, Washington, D. C. . . . **B/G William E. Masterson,** from Dep. Dir. for Plans & Policy, DCS/OP&R, Hq. USAF, Washington, D. C., to Dep. Dir. of Ops. & Readiness, DCS/OP&R, Hq. USAF, Washington, D. C., replacing recently retired B/G George J. Kertesz.

B/G (M/G selectee) Russell E. Mohney, from Vice Cmdr., San Antonio ALC, AFLC, Kelly AFB, Tex., to DCS/Logistics, Hq. PACAF, Hickam AFB, Hawaii, replacing B/G Vernon H. Sandrock . . . **B/G Gerald W. Parker,** from Dep. Dir., Med. Plans & Resources, OTSG, Bolling AFB, D. C., to Dir. of Med. Plans & Resources, OTSG, Bolling AFB, D. C., replacing M/G Murphy A. Chesney . . . **M/G Robert C. Taylor,** from Dir. of Ops. & Readiness, DCS/OP&R, Hq. USAF, Washington, D. C., to Dep. Cmdr., Rapid Deployment Joint Task Force, MacDill AFB, Fla. . . . **Col. (B/G selectee) Larry N. Tibbetts,** from Asst. for Col. Assignments, Hq. AFMPC, Randolph AFB, Tex., to DCS/Manpower & Personnel, Hq. AFLC, Wright-Patterson AFB, Ohio, replacing retiring B/G John P. Rollston. ■

SEE BRITAIN THE EXCITING WAY!

JOIN YOUR FELLOW AIRMEN AND THEIR FAMILIES–if you've ever wanted to see England, now's the time to do it! 1980 is a historic year: the 35th Anniversary of V-E Day and the 40th Anniversary of the Battle of Britain. Combine these important events with the excitement of seeing some of the famous and fascinating places which England offers, and it becomes a trip that will be remembered for a lifetime.

Fun is the keynote of this first European trip sponsored by your Air Force Association. And it will be fun–seeing Buckingham Palace, Big Ben, the Parliament Buildings, Westminster Abbey, St. Paul's Cathedral, the Tower of London–to name only a few in London.

Add the beauty and charm of rural England–Cambridge University, the quaint villages with their delightful Tudor buildings, Guild Houses, and visits to World War II airbases of the US 8th Air Force–then, it becomes a kind of holiday everyone seeks but rarely finds.

There'll be lots of special attractions, too– a visit to the Imperial War Museum in Duxford, where World War II aircraft are kept in flying condition–Mustangs, Spitfires, Lancasters, Messerschmitts, and other planes which formed the backbone of Allied and German air strength.

There'll also be (1) receptions with government officials, (2) special memorial service at the US Military Cemetery in Cambridge, with its magnificent Air Force Chapel, (3) "Hospitality Day" when local citizens provide cars to take individual Yank families for a day's outing, (4) party night with old and new British friends, (5) an evening of World War II music and entertainment styled after the big band era.

This all adds up to "a great time for everyone" –regardless of age. We'll see Mildenhall, Bentwaters, Alconbury, and Lakenheath US Air Bases, still operative, and we plan to dedicate a memorial plaque to commemorate this historic "first" Air Force Association trip.

There's nothing quite like seeing a foreign land through the eyes of a veteran. Remnants of World War II are still much in evidence...even the notorious Brussel Sprout patches and popular old pubs. It's fun at its best!
JOIN US – see for yourself!

Sunday, Oct. 12 - USA/ALOFT. Depart by jet.

Monday, Oct. 13 - LONDON. Arrive London; transfer to nearby hotel. Balance of day to rest and adjust to time change. This allows for everyone to obtain best flights and air fares, joining group after arrival in London. Dinner provided. Briefing of tour members tonight.

Tuesday, Oct. 14 - LONDON/NORWICH. Drive to Imperial War Museum at Duxford, one of the original "Battle of Britain" RAF Bases. Continue to Cambridge, see university and villages, and visit the US Military Cemetery.

Wednesday, Oct. 15 - NORWICH. "Hospitality Day"–local citizens host each family for a day's outing to nearby points of interest–perhaps your old air base. Tonight join your host/driver in a Victory Party celebration with other British/USA friends.

Thursday, Oct. 16 - NORWICH. Visit former US air bases from WW II, the 60's, and present day as requested. Special receptions and lunch scheduled with time to browse...to see things of interest to you.

NERARY

Friday, Oct. 17 - NORWICH/LONDON. Additional time to enjoy East Anglia and former air bases. Motor to London.

Saturday, Oct. 18 - LONDON. Morning memorial service, official luncheon and reception. Balance of day at leisure. Tonight enjoy a program of WW II music and entertainment.

Sunday, Oct. 19 - LONDON. Morning free to attend services at St. Paul's or Westminster Abbey, or simply relax. Afternoon orientation tour of London.

Monday, Oct. 20 - LONDON. Free day for independent activities. Tonight a Farewell Victory Party.

Tuesday, Oct. 21 - LONDON/USA. Return to USA—or remain abroad, joining another group of veterans in visit to France, Luxembourg, Belgium, or Holland—or remain abroad under your own arrangements. If you intend to lengthen your stay in Europe contact our office.

The inclusive price of $1145 per person from New York provides nearly everything:

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Chicago.....	Add $ 32	Miami.....	Add $ 38
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Detroit.....	32	San Francisco.....	136
Los Angeles.....	136	Washington, D.C. ..	21

Important Notice: Tour based on a minimum of 30 participants and tariffs and exchange rates in effect September 1, 1979, and subject to adjustment in the event of change. **Cancellations** for unforeseen and valid reasons in advance of departure, full refund less actual expenses incurred; however if cancellation occurs less than 30 days from departure, the right is reserved to assess cancellation fee of $100 per person plus actual expenses incurred.

JOIN US—whether you served in England [or even in World War II] or not! This is your chance to see where it all happened and to share in the honors bestowed on the US Air Force. It's probably the "only chance" you'll have to see and enjoy major commemorative events which officials of Britain are supporting in such an exciting and fun-oriented way. Be part of them! Join your friends and buddies—bring your family. MAIL YOUR RESERVATIONS TODAY!

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[ ] 2 in a room basis

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Please make checks payable to "Galaxy Tours-AFA."

AFA News

By Vic Powell, AFA AFFAIRS EDITOR

AFA National Director Steve Ritchie, center, was guest speaker at the recent Annual Brunch of the Curtis E. LeMay Chapter, Orange County, Calif. Presenting a plaque of appreciation at left is Chapter President David Graham. At right is Chapter Vice President T. R. "Ted" Gillenwaters.

One of AFA's newest units, the Razorback Chapter of Fayetteville, Ark., recently received its Charter from National President Vic Kregel, center. Chapter President Warren Looper is at left, and Arkansas State President Art Brannen at right.

Rep. Matthew J. Rinaldo (R-N. J.), second from left, was named "Man of the Year" by the Sal Capriglione Chapter of Newark, N. J. Presenting the award is Northeast Region Vice President Amos Chalif. Left and right, respectively, Chapter President Joseph Capriglione and New Jersey State AFA President Leonard R. Wilf. More than 300 guests attended the AFA event.

chapter and state photo gallery

John E. Zipp, left, receives an AFA Citation of Honor from President Vic Kregel in recent ceremonies at National Headquarters. Mr. Zipp retired in February as a high-level civilian of the Air Force Accounting and Finance Center. He was honored for his many years of volunteer service to AFA, and for his several terms as AFA Civilian Personnel Advisor. He is a member of the Silver and Gold Chapter, Aurora, Colo.

National Director L. T. "Zack" Taylor, left, presents AFA Medals of Merit to James H. Estep, center, and S. Samuel Boghosian during the Fresno Chapter's Honors Night Banquet. Both Estep and Boghosian are former Presidents of the Chapter, and are former recipients of California State AFA's "Man of the Year" award.

COMING EVENTS

Alaska State AFA Convention, May 9–11, Anchorage . . . **Florida State AFA Convention,** May 9–11, Tampa . . . **Connecticut State AFA Convention,** May 10, Windsor Locks . . . **Arizona State AFA Convention,** May 10–11, Phoenix . . . **Washington State AFA Convention,** May 16–17, Tacoma . . . **California State AFA Convention,** May 16–18, Merced . . . **New Jersey State AFA Convention,** May 16–18, Atlantic City . . . **AFA Golf and Tennis Tournaments,** May 23, The Broadmoor, Colorado Springs, Colo. . . . **AFA Nominating Committee and Board of Directors Meeting,** May 24, The Broadmoor, Colorado Springs, Colo. . . . **Twenty-first Annual Dinner Honoring the Air Force Academy's Outstanding Squadron,** May 24, The Broadmoor's International Center, Colorado Springs, Colo. . . . **Ohio State AFA Convention,** May 31, Dayton . . . **Alabama State AFA Convention,** June 6–8, Birmingham . . . **Pennsylvania State AFA Convention,** June 6–8, State College . . . **New York State AFA Convention,** June 13–15, Rome . . . **Illinois State AFA Convention,** June 19–21, Urbana . . . **Oklahoma State AFA Convention,** June 20–21, Tinker AFB . . . **Texas State AFA Convention,** June 27–28, Kerrville . . . **Missouri State AFA Convention,** July 12, Whiteman AFB . . . **Massachusetts State AFA Convention,** August 9, Lexington.

Tulsa Chapter President L. S. "Tad" Allen, Jr., kicked off the Chapter's 1980 membership drive with an assist from AFA National Director Steve Ritchie during a recent quarterly meeting. Allen says the Tulsa Chapter's efforts this year will be the best ever.

AFA News

Lt. Gen. Lloyd R. Leavitt, Jr., Vice Commander in Chief, Strategic Air Command, second from right, was the featured speaker at the Mississippi State AFA Convention's recent Dining-Out at Keesler AFB. He was presented a Dinner Bell award by Col. Kenneth M. Holloway, USAF (Ret.), right, President of Mississippi State AFA. Assisting in the presentation is Don Wylie, left, President of the Gulf Coast Chapter, and Maj. Gen. Don H. Payne, Commander, Keesler Technical Training Center.

Central Oklahoma Chapter added ninety-nine new AFROTC cadet members by sponsoring a membership contest between AFROTC detachments of Oklahoma State University and the University of Oklahoma. Angel Flight Cadets Terry Noftsager and Janet Schmidtlein, left, were the leading University of Oklahoma recruiting team with thirty-two members. Arnold Air Society members Steven Herring and William Hamlett, right, won the recruiting competition for Oklahoma State University, bringing in sixty-seven new members. Maj. Norman Ress, Central Oklahoma Chapter AFROTC Activities Monitor, and Ronald Wallis, Chapter Vice President, are at center.

Panama City, Fla., Chapter recently honored the Tyndall AFB "Career NCO of the Year" and "First-Term Airman of the Year." Col. Chester C. Cavoli, left, Vice Commander of the Air Defense Weapons Center, presented an AFA plaque to TSgt. Edgar Belcher, "Career NCO of the Year." Sgt. Mark Tomita, center, receives his AFA plaque as "First-Term Airman of the Year" from William Cowan, Panama City Chapter President. Attending the ceremony was CMSgt. Joe Spence, right, ADWC Senior Enlisted Advisor. The Chapter also honored MSgt. James Russell as "Senior NCO of the Year."

photo gallery

Maj. Gen. William R. Yost, Director of Space Systems and Command Control and Communications, Hq. USAF, was guest speaker at the recent Fourth Anniversary Banquet of the John C. Meyer Chapter, held in Dunedin, Fla. Chapter Vice President Bill Loomis is at left; Jack Rose, President of Florida State AFA, is second from right; and at the right is Jim Sunderman, President of the Meyer Chapter. The Chapter has been instrumental in establishing an AFJROTC unit at a new high school in Clearwater, Fla., that will be open for classes this fall.

George Lambkin, left, of San Antonio, Tex., receives from National President Vic Kregel a Special Citation for establishing and managing an unusually effective AFA awards program in Texas. The program honors active-duty military personnel for their contributions to the Air Force and AFA as well as recognizing the activities of AFA members.

John White, right, President of the Pocono Northeast Chapter, receives the Chapter Charter from Northeast Regional Vice President Amos Chalif in recent ceremonies at the Scranton-Wilkes Barre, Pa., airport. Congratulating White is Cadet Charles E. Hagen, Wilkes College AFROTC. Pennsylvania State AFA President Jack Flaig, left, was the featured speaker.

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The Air Force Association is an independent, nonprofit, aerospace organization serving no personal, political, or commercial interests; established January 26, 1946; incorporated February 4, 1946.

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

OBJECTIVES

adequate to maintain the security and peace of the United States and the free world; to educate themselves and the public at large in the development of adequate aerospace power for the betterment of all mankind; and to help develop friendly relations among free nations, based on respect for the principle of freedom and equal rights for all mankind.

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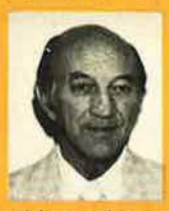

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AFA's 1980 National Convention and Aerospace Development Briefings and Displays

September 14–18 • Washington, D.C.

AFA's 1980 National Convention and Aerospace Development Briefings and Displays will be held at the new Sheraton Washington Hotel, a $100 million facility which has been erected on the site of the old Sheraton-Park Hotel. The new main entrance and the convention entrance are on Woodley Road. The old Motor Inn, now called the Park Tower, and the Wardman Tower are being completely renovated.

We have reserved additional blocks of rooms at the Connecticut Inn and the Normandy Inn at substantially lower rates than the Sheraton Washington. Both properties are on the Connecticut Avenue Metrobus route with frequent Metrobus service.

All reservation requests for rooms and suites at the Sheraton Washington should be sent to: Sheraton Washington Hotel, 2660 Woodley Road, N.W., Washington, D.C. 20008. Reservation requests for the Connecticut Inn and Normandy Inn should be sent to: Connecticut Inn, 4400 Connecticut Avenue, N.W., Washington, D.C. 20008; Normandy Inn, 2118 Wyoming Avenue, N.W., Washington, D.C. 20008. We urge you to make your reservations as soon as possible. To assure acceptance of your reservation requests, please refer to the AFA National Convention.

Arrivals after 6:00 p.m. require a one-night deposit or major credit card number guarantee. Guaranteed reservations must be canceled by 4:00 p.m. on the date of arrival to avoid being charged for that night.

Convention activities will include AFA Opening Ceremonies, Business Sessions, luncheons honoring the Secretary of the Air Force and the Air Force Chief of Staff, Aerospace Education Foundation Awards Luncheon, the annual AFA Salute to Congress, Annual Reception, and the Air Force Anniversary Reception and Banquet. The Annual Reception and the black-tie pre-banquet reception will both be held in the newly expanded Sheraton Washington's 100,000 square foot Exhibit Halls which are already sold out.

Registration information and forms will be presented in forthcoming issues of AIR FORCE Magazine. In the meanwhile, we urge you to make your hotel reservations as soon as possible.

Top: typical briefing; center: Gen. David C. Jones at exhibits; lower: the new Sheraton Washington Hotel.

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Insured's Attained Age	STANDARD PREMIUM: $10 per month Basic Benefit*	HIGH OPTION PREMIUM: $15 per month Basic Benefit*	HIGH OPTION PLUS PREMIUM: $20 per month Basic Benefit*
20-29	$85,000	$127,500	$170,000
30-34	65,000	97,500	130,000
35-39	50,000	75,000	100,000
40-44	35,000	52,500	70,000
45-49	20,000	30,000	40,000
50-54	12,500	18,750	25,000
55-59	10,000	15,000	20,000
60-64	7,500	11,250	15,000
65-69	4,000	6,000	8,000
70-74	2,500	3,750	5,000
Aviation Death Benefit*			
Non-war related	$25,000	$37,500	$50,000
War related	$15,000	$22,500	$30,000
Extra Accidental Death Benefit*	$12,500*	$15,000*	$17,500*

*The Extra Accidental Death Benefit is payable in addition to the basic benefit 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.

OTHER 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 in all but three years (during the Vietnam War) since the program was initiated in 1961, and basic coverage has been increased on six 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 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 members of the Air Force Association are eligible to apply for this coverage provided they are under age 60 at the time application for coverage is made.

*Because of certain restrictions on the issuance of group insurance coverage, applications for coverage under the group program cannot be accepted from non-active duty personnel residing in either New York or Ohio. Non-active duty members residing in Ohio, however, may request special application forms from AFA for individual policies which provide coverage quite similar to the group program.

OPTIONAL FAMILY COVERAGE

(may be added to any of the above Plans)
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.

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.

ALL AFA MEMBERS (under age 60)

APPLICATION FOR
AFA 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

This insurance is available only to AFA members

☐ I enclose $13 for annual AFA membership dues (includes subscription ($9) to AIR FORCE Magazine). Please send membership application.

☐ I am an AFA member.

Name and relationship of primary beneficiary

Name and relationship of contingent beneficiary

Please indicate below the Mode of Payment and the Plan you elect:

Mode of Payment	Standard Plan		High Option Plan		High Option PLUS Plan	
	Member Only	Member And Dependents	Member Only	Member And Dependents	Member Only	Member And Dependents
Monthly government allotment (only for military personnel). I enclose 2 month's premium to cover the necessary period for my allotment (payable to Air Force Association) to be established.	☐ $ 10.00	☐ $ 12.50	☐ $ 15.00	☐ $ 17.50	☐ $ 20.00	☐ $ 22.50
Quarterly. I enclose amount checked.	☐ $ 30.00	☐ $ 37.50	☐ $ 45.00	☐ $ 52.50	☐ $ 60.00	☐ $ 67.50
Semi-Annually. I enclose amount checked.	☐ $ 60.00	☐ $ 75.00	☐ $ 90.00	☐ $105.00	☐ $120.00	☐ $135.00
Annually. I enclose amount checked.	☐ $120.00	☐ $150.00	☐ $180.00	☐ $210.00	☐ $240.00	☐ $270.00

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, sanatorium, 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

Application must be accompanied by a check or money order. Send remittance to:
Insurance Division, AFA, 1750 Pennsylvania Avenue, NW, Washington, D.C. 20006

FORM 3676GL App. REV. 10-79

5/80

Bob Stevens'

"There I was..."

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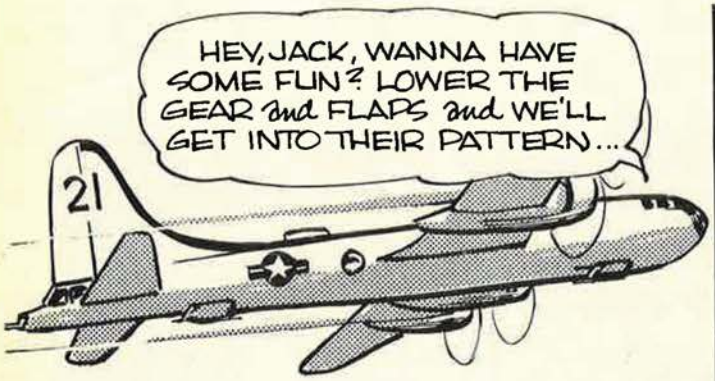
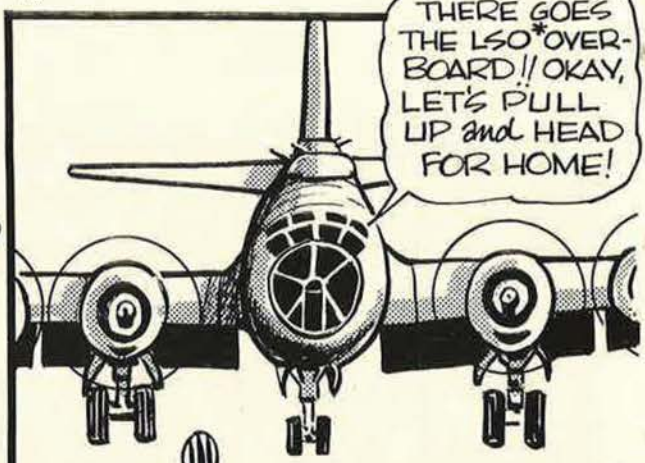
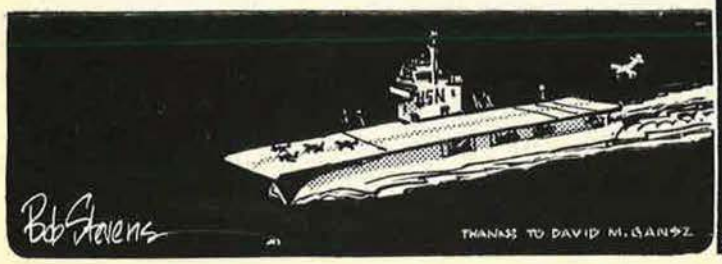
CRUNCH

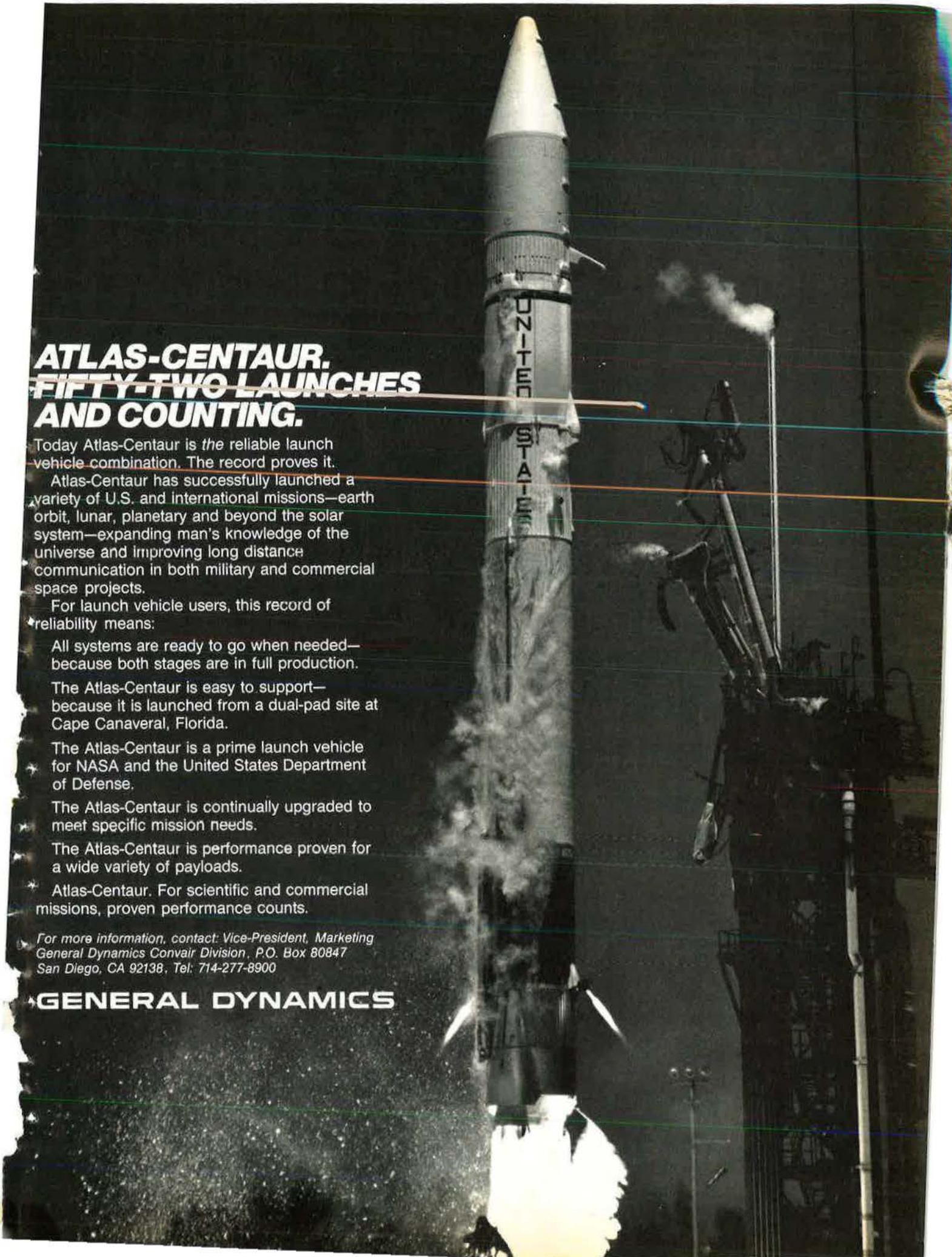
WE UNDERSTAND THE B-29 JOCK WHO PULLED THIS MANEUVER IN '45 WAS PASSED OVER... *and OUT!*







* LANDING SIGNAL OFFICER



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What you'll find is precisely what Israel, Japan, Saudi Arabia and the U.S. Air Force discovered: Nothing outflies, outfights or outperforms the Eagle. Anything else is second best, and that's no alternative at all.

There is none.

The F-15 Eagle
MCDONNELL DOUGLAS